

FINAL

MASTER PLAN for

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# Kailua-Kona

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Prepared for:  
COUNTY OF HAWAII  
Planning Department

Prepared by:  
R.M.Towill Corporation

APRIL 1994

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# MASTER PLAN

## SECTION 1

### INTRODUCTION

#### 1.1 PROJECT AREA DESCRIPTION

The project area boundaries are technically defined by the "Kailua Village Special District" as described in Chapter 25 of the County of Hawaii Zoning Code and Kailua Village Design Commission, Article 24, Section 25-265 (a)(1) to (8).

The planning area is generally bounded by and inclusive of the commercial area on the northern side of Palani Road (north), the area makai of the Queen Kaahumanu Highway (east), Kona Hillcrest (south) and the shoreline including the strip makai of the Old Kona Airport (west) (see Figure 1-1). Kailua Village (also referred to as "Kailua-Kona") is located in the center of the West Hawaii Region in the North Kona district on the Island of Hawaii.

#### 1.2 BACKGROUND

The County of Hawaii adopted the Kailua Village Design Plan in 1976 that established a detailed planning program for implementing the County of Hawaii General Plan, the State Legislative Act 119 (SLH 1973) on urban design plans and Ordinance No. 628 that created the Kailua Village Design Commission.

An update program was conducted in 1988 to re-evaluate the Village design goals, objectives and issues related to land use strategies, design issues, and infrastructural improvement programs identified in 1976 and to formulate new strategies to achieve the goals of the legislative mandates. It also attempted to identify and recognize the consequences and impact of the growth being generated in the West Hawaii region and how this will affect Kailua Village. The draft update plan was never formally adopted.

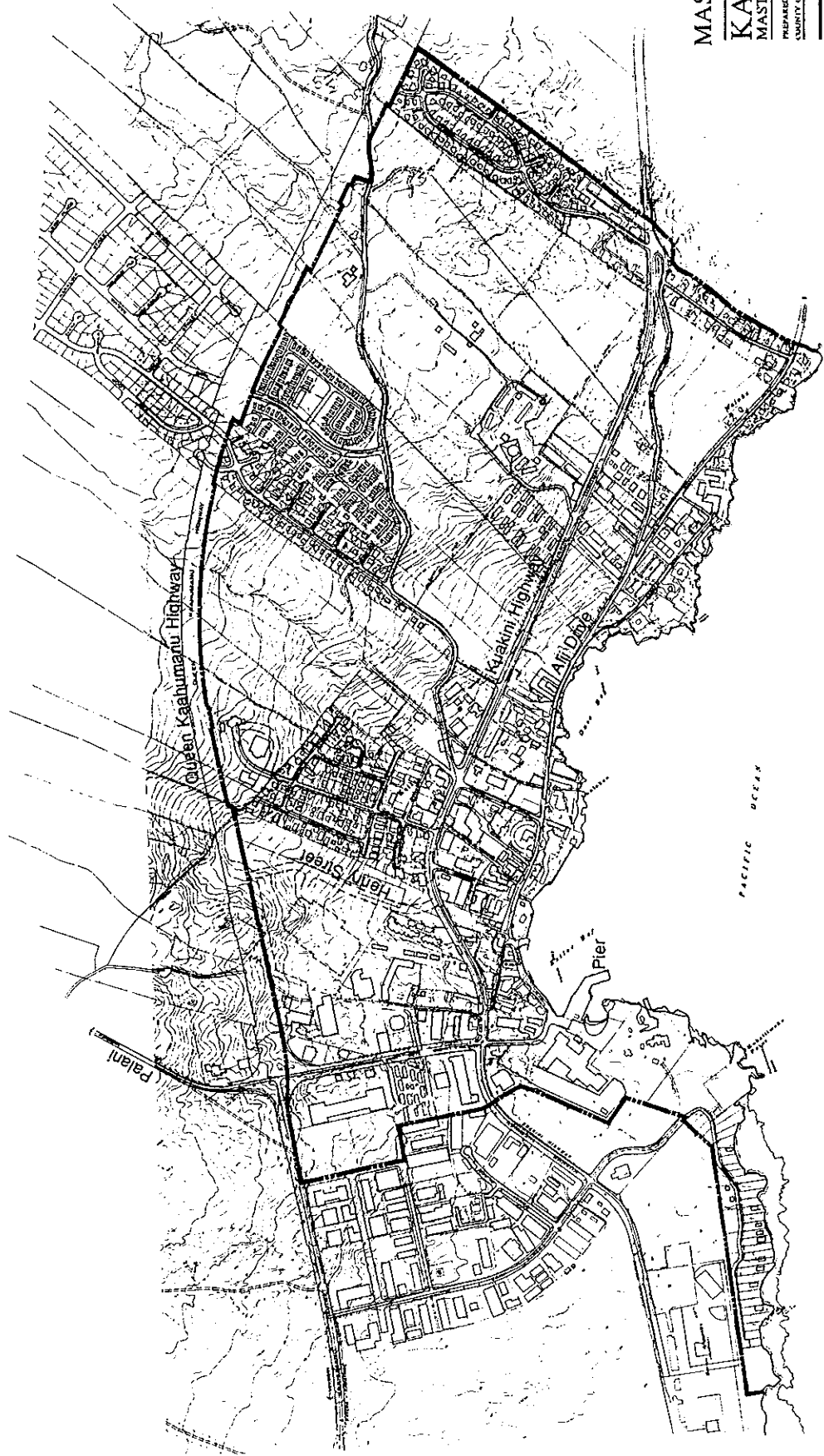
A further discussion on prior plans is in Section 7.

In 1989, the State of Hawaii legislature authorized funding of \$125,000.00 by Section 2, Act 316, SLH 1989, as amended by Section 240D, Act 299, SLH 1990 for the development of a "Kailua Village Master Plan". The legislation mandated the plan to include a study of traffic patterns, planning for future roadways, discussion of the Kailua seawall, and types of development that would be appropriate for the Kailua Village area. The funds were given to the County to administer and R. M. Towill Corporation was selected to prepare a Master Plan for Kailua-Kona.

### 1.3 PURPOSE OF THE UPDATE PROGRAM

The Kailua Village Design Plan was adopted by the Hawaii County Council in 1976. The recent dramatic growth being experienced in the West Hawaii region has placed extreme demands on the area and its resources which has raised concern in the community over the impact on the Kailua Village Special District. Thus, the County of Hawaii is compelled to cope with the potential impacts that this growth may be generating. The "Kailua Village Master Plan" will be used to assist and guide the Kailua Village Design Commission and the County of Hawaii in regulating development in the Kailua Village Special District. The Master Plan will also serve to guide private sector investment and development in the Kailua-Kona area, as well as revitalization efforts in Kailua town.

The Kailua Village Master Plan is a more comprehensive plan than these previously prepared and will express the opportunities and constraints concerning land development controls, land use options, special design treatment areas, physical design treatment and design criteria guidelines, pedestrian and vehicular circulation patterns, other infrastructure assessments, including energy and communication requirements, public and private community facilities, historic and cultural sites, significant natural land form and water features, views and vistas, and basic concepts of environmental character including architectural and design goals. The Master Plan will also provide evaluation mechanisms and an implementation timetable.



MASTER PLAN AREA

KAILUA • KONA

MASTER PLAN

PREPARED FOR  
COUNTY OF HAWAII

PREPARED BY  
K. M. LOWELL CORPORATION

Figure 1-1

#### 1.4 MASTER PLAN PREPARATION PROCESS

During the period January to April 1992, the planning consultants undertook an inventory and analysis of the important characteristics of the project area. The analysis was focused on the identification of important opportunities and constraints for the Kailua Village area.

The Kailua-Kona Master Plan Task Force established by Hawaii County Mayor in May 1991, has been assisting the County in identifying preliminary community issues and concerns. As part of the master plan development process a two-day long community workshop, co-sponsored by the Kailua Village Improvement Association and the County of Hawaii Planning Department, was conducted to generate public interest as well as planning ideas for Kailua-Kona. Residents and business representatives were invited to attend this workshop held March 13 and 14, 1992. Working intensively together over the two-day period, participants contributed more than 650 "person hours" of energy and creativity to their community. A summary of the workshop proceedings may be found in the appendix.

Utilizing the information from the workshop and ongoing comments provided by the Kailua-Kona Master Plan Task Force and the County, the consultant prepared alternative plans and traffic engineering approaches to the plan, looking at land use patterns and specific proposals for the entire planning area and the Village core area. A preliminary concept plan was prepared that consolidated a number of ideas from the alternatives. These plans were used for discussion purposes at a public information meeting (October 1992) to receive community comments and suggestions. Additional technical studies combined with review of comments from the public, the Task Force and the County were used to revise the concept plans and develop a preliminary master plan.

The preliminary master plan was reviewed by the Master Plan Task Force and presented at a public meeting in November 1993.

## SECTION 2

### GOALS AND OBJECTIVES

Based of the goals and objectives established for Kailua-Kona by the County's previous master plan and from public comments through the Master Plan Task Force, Workshop session, and public information meetings the following Goals, Objectives and Urban Design Concepts have been developed for the Kailua-Kona Master Plan.

#### 2.1 GOALS

1. To maintain the continued role of Kailua Village as a tourist destination and retailing focus of Kona.
2. To maintain and enhance the character identified as "The Kona Way of Life".
3. To be a guide for future development and redevelopment, decision making and plan implementation within the Kailua-Kona Master Plan area.

#### 2.2 OBJECTIVES

1. Preserve and enhance the natural environment by preserving natural assets/landscape and integrating them with pedestrian activities and new development.
2. Improve the appearance and function of the pier and seawall areas.
3. Improve beach and ocean access activities.
4. Discourage vehicle oriented development and encourage pedestrian activities, via design guidelines, density, land use and circulation proposals.

5. Enhance the pedestrian environment and bicycle opportunities via:
  - provision for pedestrian pathways, sidewalks and bikeways where appropriate.
  - provision for a continuous shoreline path from one end of the village to the other.
  - optimize pedestrian access to the shoreline and increase mauka-makai connections.
6. Minimize visual impact of the automobile via:
  - providing group parking areas / structures for the Village to permit more pedestrian access.
  - address Kuakini corridor to improve traffic flow and quality of the environment.
  - encourage opportunities for public transit either publicly or privately sponsored.
7. Provide directions for future building and development including:
  - design review guidelines and procedures to assist the Kailua Village Design Commission.
  - identify sub-village areas and develop plans for establishing edges, unifying elements and identity with development guidelines that encourage these elements, as opposed to a suburban homogeneity.
  - identify under utilized use areas/sites/structures, etc. that may have redevelopment potential.
8. Preserve and enhance cultural/historical/natural resources and sites to maintain local values and encourage visitor access.
  - create civic/public spaces and focal points.
  - provide an environment conducive and supportive to visitor access and enjoyment.

9. Upgrade and expand infrastructure to provide full services throughout the planning area.
10. Improve and increase non-ocean oriented public facilities, especially recreation.
11. Establish a community plan of action for implementation of objectives.
  - evaluate existing state of progress towards goals and objectives.
  - establish roles/actions for community groups and government agencies.
  - prioritize activities based on community goals and funding alternatives for private and public sources.
  - phasing plan to establish a time line on activities.
12. Provide the appropriate phased expansion of infrastructure and county services to support gradual growth in the master plan area.

### 2.3 URBAN DESIGN CONCEPTS

(Translation of "The Kona Way of Life" to physical settings)

1. Integration of new development in the natural environment, sustaining and enhancing the latter.
2. A respect for the local history, tradition and culture via the preservation of sites and structures while encouraging public understanding and access.
3. An orientation to the pedestrian scale in buildings and landscape.
4. Casual, rustic, natural, materials and colors designed for comfort and reflection as opposed to the fast paced style of hightech/highrise glass and metal.

5. Preservation and enhancement of tree canopy/plants for shade and natural beauty.
6. Relationships to the mountains and sea (the bay and the shoreline).
7. Opportunities for friendly gatherings in comfortable places.

## SECTION 3

### MASTER PLAN

#### 3.1 ISSUES/RECOMMENDATIONS

As part of the guide for future development and implementation of the master plan objectives, alternatives are discussed and planning concepts have been developed for the various development components of the Master Plan. These include: village image, development patterns (resort, commercial, residential), historic sites, public/community facilities, open space/recreation, circulation and the pier/seawall area.

##### 3.1.1 Village Image

- \* Maintain low scale structures with height limits.
- \* Provide community design guidelines.
- \* Provide for Village entries and other landscape features.

The visual quality is an essential ingredient in the Kona way-of-life. The Alii corridor is representative of this, but later projects are moving away from this theme. We either act now or lose what is the heart of the area. At issue is the scale, architectural character, intensity and the special character of the area.

The Village core as typified by the Alii corridor is the heart of the area. It represents the qualities, scale and essence of the Kona way-of-life. It is the keynote of the area, attracting both locals and tourists alike.

Located along the Alii Drive corridor are the majority of the historic sites, architecture, vegetation and coastal scenery which characterize the popular identity of Kailua Village. These elements include narrow streets and rights-of-way, older low rise structures with minimal street setbacks, distinct architectural character, established trees, and coastal views, with lesser emphasis on the needs of the car. Vehicular speeds are reduced because of the narrow streets and there is limited parking due to the evolution of development in the area. Cruising leisurely along Alii Drive or leaving the car behind to walk or bike seems to be the principal means to experience the Village core. This is also the location of many of the

regional and community activities associated with the Village.

Village Image Concepts: The scale of building must be limited. Two stories, possibly three if stepped back adequately. We need to create a sense of "entry" to the Village. Landscaped medians with theme landscaping can help. Special signage in the Village can be considered.

Views are visual assets to be preserved at appropriate locations. Every effort should be made to preserve views of Mokuaukaia Church spire. It is a landmark to be treasured. The new Henry Street will focus on this. View opportunities from Kuakini Highway to the ocean should be encouraged. In contrast, the view from Queen Kaahumanu Highway into the industrial area is an undesirable announcement of Kailua. Denying or altering this view by screening and landscaping should be encouraged.

### 3.1.2 Development Patterns

The area has seen commercial and resort development predominate with significant areas of residential zoned land being developed more slowly. Several mauka parcels are zoned unplanned and agriculture. The pattern is erratic, and probably influenced by the slow growth of infrastructure, especially, wastewater systems. There is little consistency to the residential pattern.

Development Concepts: Traditional urban feature patterns, such as concentric rings, radial, multiple nuclei, etc., are often not planned, which is the case in Kailua. Now is the time to define the pattern and grain of remaining development. After reviewing several approaches, it is recommended that the "Village core" be reinforced with the most intense uses, with a gradual gradation of lessening densities moving away from the Village. Some of these changes should be abrupt and defined, so that "edge" and "contrast" be noticeable.

A primary land use plan objective would be to maintain the integrity of the differing land use areas within the Village. Future in-fill development would be directed in a manner to amplify these existing land use patterns and strengthen the integrity of the Village core. Controlled development of transitional land uses as a buffer between the Commercial core and Residential areas should be encouraged.

Development Alternatives: Scenarios were prepared to study three land use distribution options:

Scenario A: Emphasizes residential development, with multi-family reinforcing the Village and lower density further out. Commercial and resort uses are limited.

Scenario B: Commercial activities are emphasized, with some additional resort.

Scenario C: Combines the two and demonstrates several roadway options.

These scenarios and projected build out acreages are shown in Section 11.

Recommendations: Focus on and reinforce the Village core as the most intense resort and mixed use area.

- \* Create an "overlay" zone to reinforce the "village" and specific development standards as appropriate.
- \* Orient to the pedestrian scale.
- \* Limit "strip" commercial.
- \* Utilize The Great Wall of Kuakini as a transition element for land use types and intensities.

### 3.1.3 Resorts

The majority of resort zoning is along the Alii Drive corridor, up to Kuakini Highway. The King Kamehameha's Kona Beach Resort and the Kona Hilton stand as anchors at each end. In between is a varied assortment of resort units and commercial. Access to and from the resort areas are generally vehicular, and there is easy pedestrian access to the Village core. Resort hotel development is most appropriate when the scale is low. When prior height limits allowed multi-story the result is oversized, visually intrusive structures.

Resort Concepts: Seek ways to guide resort development to be compatible with Village scale and character. There is currently little zoned acreage left. The task force and consultant concur that resort development should have identifiable limits and not be a continuous strip along the ocean. Transitions from intense resort uses (King Kamehameha) and adjacent lower density zoning should occur. Also, current resort zoning unnecessarily limits commercial development.

#### Recommendations:

- \* Limit resort to areas makai of Kuakini Highway.
- \* Provide for appropriate (pedestrian oriented retail) commercial uses within resort areas. Consider a resort/commercial mixed use zoning district.

### 3.1.4 Commercial

There are essentially two types: (1) tourist commercial as seen along Alii and the hotels, and (2) retail commercial serving the local residents. The more recent trend is toward the suburban, auto oriented model. This is in contrast to the "Village" character.

Commercial uses along Kuakini are scattered, varied and visually confusing. The trend is toward strip commercial along this highly traveled corridor. There is presently only limited regulation of commercial in resort zoning, therefore it is unpredictable if it will occur or not.

Commercial Concepts: A response to current trends is to restrict the "strip" tendency and provide limits and concentrated areas. The consolidation of properties could

help some of the visual confusion.

Improved design guidelines can address design issues. Consolidated parking areas behind commercial fronts can provide visual relief and encourage pedestrian activity.

According to a commercial developer, there is limited need for additional retail in the Village. Most retail will want to be adjacent to Queen Kaahumanu, where greater traffic volumes provide for greater visual exposure.

#### Recommendations

- \* Limit strip commercial.
- \* Provide small lot office and neighborhood convenience commercial.

#### 3.1.5 Residential

Present residential zoning provides for significant amounts of multi-family in mauka (mid-slope) areas. Older residential areas (single-family/duplex) are in fair to poor condition, although these provide moderately priced homes.

It is unknown the extent to which multi-family units are being used as resort units. As a result it is difficult to anticipate and to provide for genuine housing needs.

A newer residential area, the Pines, is monotonous with garage lined streets. However, there are several positive notes, e.g., the commercial center and park as a community focal point and the landscaped setbacks which provide some visual relief.

Residential Concepts: Neo-traditional town planning encourages a pleasant streetscape and a better introduction of open space within a community grid, oriented to pedestrian utilization. The traditional subdivision is not oriented to these concerns, but still has broad market appeal. The quality of living areas could be encouraged via density incentives and ease of County planned unit development (PUD) procedures.

Multi-family should be used to reinforce cores, where greater concentrations can contribute support to other activities and where pedestrian activities can reduce auto usage.

Using more dense residential uses would reinforce the Village core or distributing multi-family to distinct cores throughout the planning area.

Recommendations:

- \* Provide a variety of residential types and densities.
- \* Cluster to increase open space and landscape buffers.
- \* Reinforce village core and resort areas with multi-family uses. Consider a commercial/residential mixed use zoning district.
- \* Reduce densities away from core.
- \* Provide density incentives to encourage cluster and traditional neighborhood design.
- \* Allow small scale convenience commercial.

3.1.6 Historic Sites

Kailua is blessed with a number of historically significant buildings and sites. The Great Wall of Kuakini is one such feature that has been poorly cared for. It could be enhanced (with setbacks and landscape treatments) and utilized as a dividing line as it once was. Historic elements should also be recognized for their tourist appeal, as well as their place in Hawaii's heritage.

Historic Site Concepts: Within the Village make every effort to enhance the value of historic sites. Improve the access to the heiau (at the pier entry) and improve pedestrian access to St. Michael's Church. Establish access to the Great Wall, perhaps with walkways along side. Limit further deterioration. A small brochure for a self guided walking tour of historic features should be prepared and made available for tourist use, in conjunction with community groups such as the Daughters of Hawaii and the Kona Historical Society.

Historic sites within the district should be interpreted per policy of the State Historic Preservation Division of the Department of Land and Natural Resources (DLNR) to preserve the best examples of sites in a region related to different themes.

Recommendations (per the State of Hawaii Historic Preservation Division): Historic preservation planning needs for future development and for general planning related to historic preservation primarily fall in to two areas for Kailua-Kona.

- 1) Because of the importance of the Kailua area, it is vital that future development be preceded by archaeological inventory surveys to determine if important historic sites are present. If such sites are present, then mitigation will be needed before development. This might take the form of archaeological data recovery, more intensive archaeological work to recover the basic information from the sites and better interpret Kailua's history. Such interpretation will help better present the history of the area to Kailua's residents and school children as well as to visitors.

Mitigation might also take the form of physical preservation or interpretive preservation might be needed for any elite housing sites that are found (as part of the royal theme) for sites related to Kuakini's time or for sites related to the time of the late 1800's and early 1900's. It should be realized that the Great Wall of Kuakini as part of the theme of Kuakini's time will have to be preserved with physical and visual setbacks as part of the policy of the County and State Historic Preservation Division.

- 2) For planning purposes it is important to emphasize that the sites which are set aside for interpretive preservation must be aggressively maintained and linked with coordinated interpretation. For example the thatched reconstruction of 'Ahu'ena heiau is now deteriorating and needs restoration. Hawaiian community groups, the Office of Hawaiian Affairs and the hotel owner are working on this project. Sites of similar theme need to be

interpreted such as the Pa o 'Umi as part of the royal center theme. The Kailua Kona community at large must be aware of the needs to keep the interpreted sites maintained. As a tourist center, this is doubly important, because visitors are attracted to the Hawaiian culture as well as the more customary recreational activities.

#### Specific Recommendations

- \* Preserve the remaining portions of the Great Wall of Kuakini and reinforce its importance with setbacks and public access.
- \* Develop a brochure regarding historic sites in the Village for distribution to visitors.
- \* Develop action plans for preservation and maintenance of historic sites.

#### 3.1.7 Public/Community Facilities

Hale Halawai is one of the few public facilities in the Village where community events can occur. Its design and use of the site do not take advantage of the waterfront, as seen from Alii Drive, and the opportunity for continuous pedestrian movement along the ocean is obstructed. Full opportunity is not afforded for public gatherings or events.

Concepts: The Village would benefit from one or more public spaces; not necessarily large but gathering points oriented to the pedestrian. There are several possibilities:

1. Acquire the open lot across from the seawall, where the banyan tree is. It is also proximate to the public parking lot.
2. The junction of Alii Drive and Likana Lane could become a satisfactory area with vehicular traffic removed.
3. Acquire land immediately mauka of Hale Halawai to create a "civic/cultural center." This would require relocation of existing parking.

### Recommendations

- \* Create a civic park(s) (green space) along Alii Drive.

#### 3.1.8 Open Space/Recreation

Kailua is fortunate in its ocean setting which provides wonderful open vistas and recreational (especially commercial) opportunities. The regional park at the old airport is a tremendous asset. As in many areas rich in natural amenity, it is easy to forget what more needs to be done. There is a shortage of neighborhood open/recreational facilities. Also, the pier has become a local playground for youngster and canoe enthusiasts.

Concepts: Provide open and recreational areas as development occurs. Provide play areas within easy walking distance of homes. Encourage open space within and around developments to add contrast with the often unrelenting pattern of land development. Drainage areas present opportunities, as do historic features. There should be cooperative development of a linear park system along the Great Wall of Kuakini including the drainage basin/floodway system. The Wall and park system will serve as an edge between higher density uses of the core and less intense residential development of the outer district. This linear park would also serve as a central spine into which adjoining residential projects would tie with their own internal green belts and recreation facilities, thereby creating an entire system of parkways through the Village and into the Core area. In addition, pedestrian and bicycle routes to such facilities should be developed.

Comment: There is a small site off Kuakini Highway containing a tennis and a basketball court. It is adjacent to resort/commercial uses and is fully paved. Its recreational value to local residents is limited by its location. Options for this site include leaving it as is; using it for public parking; or selling it for higher use and using the money for an alternative site within a residential area. The park area should not be lost. If a change of use occurs, then the facilities should be relocated.

### Recommendations

- \* Increase neighborhood parks and open space.
- \* Utilize area adjacent to Wall of Kuakini as linear park.

#### 3.1.9 Pier/Seawall

Often considered as a coherent entity, the pier/seawall area is a focal point of activity and community image. This is in part due to the activities that occur: the pier as an arrival point for tourists, commercial activities, and use by locals for recreation. The seawall and adjacent Alii Drive provide the vantage point for "what's happening." This area of Alii Drive is also a relative dead spot due to a closed off restaurant structure and residential use, i.e., they do not provide the pedestrian/visual interaction the rest of the area has. The pier is a point of controversy as some blame it for destroying the beach and others hail it as an essential ingredient in the Village. Regardless it is there and under State jurisdiction, which limits local control. All are concerned about the appearance of the pier, and the conflict between vehicles and other activities.

#### Pier Concepts/Alternatives

1. Provide cosmetic improvements to enhance use by pedestrians, e.g., planters, trellis or other shade devices, pedestrian walkway along the edge.
2. Remove all parking and provide for dropoff and boat launching only. Major areas would be open to pedestrian use only. Use items in (a) to improve appearance.
3. Reduce parking and increase pedestrian use and improve appearance. Note that removing any parking from the pier would mean that alternative parking would need to be provided, since present demand exceeds available space. Regardless of the options, the pier is a valuable asset to be enhanced for the benefit of the community and the visitor.

4. Reconstruction of the pier on piles has been suggested as a way to improve water circulation and sand retention.

#### Seawall Options

An Army Corps of Engineer study indicates that the seawall is being undermined and some kind of remedial action is needed, eventually. Their favored option is to insert concrete under and behind the wall (via borings) to stabilize the erosion. This would not change the character and look of the structure. It is a marvelous edge, giving people a vista of Kailua Bay, however, it needs dressing-up, at least. Other options include complete reconstruction of the area. The COE study does not find this cost effective; therefore, Federal matching funds (20%) would not be available.

#### Recommendations

- \* Relocate parking from pier.
- \* Create a pedestrian environment on the pier.
- \* Repair plan for the seawall per Corps of Engineers' recommendations.
- \* Improve appearance of streetscape along the seawall area.

### 3.2 LAND USE MASTER PLAN

As discussed in the previous section, alternative land use patterns and allocations were investigated. The overall conclusion was that the "Village core" was the key area for preservation and enhancement. It is what is unique about Kailua. The next development around it is an undeniable departure from the Village character. Therefore, for the most part, the creation of an overlay zone is recommended. (The overlay zone would be a specific area with the Special District that would have special or unique standards and requirements.)

A part of the character and vitality of the village is derived from the mixture of uses that occur, which result from the Resort-Hotel zone (which permits commercial also). To enhance this activity a new land use category is proposed for areas adjoining the Resort-Hotel. The new "mixed use" category would consist of both commercial and residential.

Higher density residential development is encouraged for several reasons:

- A. It provides for close-in residential that will increase support for existing and future commercial uses.
- B. It encourages less dependence on the automobile, since people can conveniently walk for convenience shopping.

Additionally, in identifying the core area, the intention is to set reasonable limits on the spread of resort and commercial development.

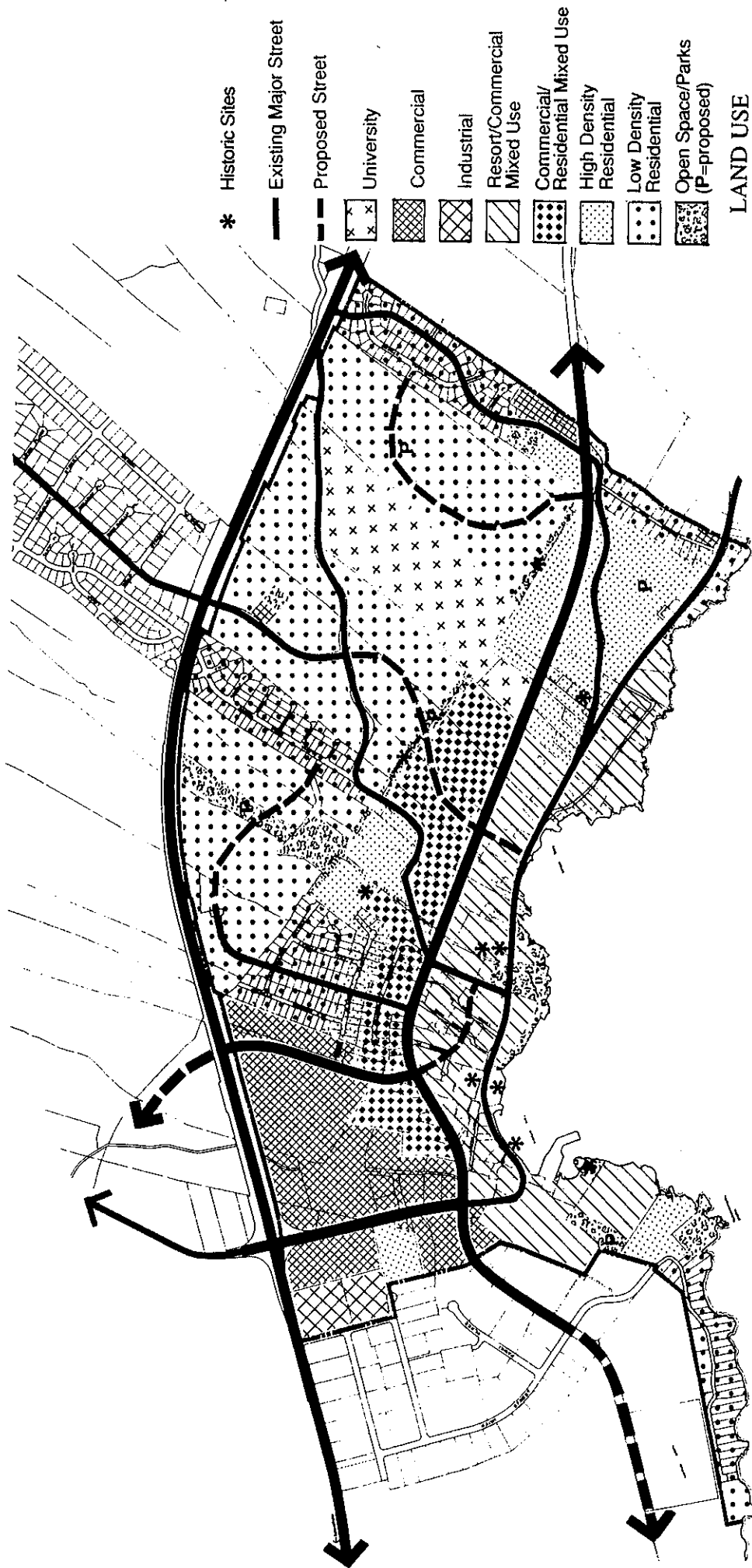
The proposed land use plan for the entire special district is shown in Figure 3-1. Land Use categories include:

A. Commercial/Residential Mixed Use

A combination of retail commercial and multi-family. For underdeveloped properties, or in case of redevelopment, the residential element would be mandatory. Residential would be multi-family and consist of at least 50% of the site utilization. Inappropriate commercial uses include hotels, resorts, and automobile sales and services, and manufacturing. Guidelines for this category include: Uses may be multi-family residential only, but commercial use shall have residential uses on upper floors. No more than 50 percent of building area shall be commercial or office use.

B. Industrial

Presently, there is no industrial use within the existing Kailua Village Special District. The only portion recommended is a parcel behind the Kona Coast Shopping Center on the north side of Palani. This parcel is presently zoned commercial, however, access and orientation relates to the industrial area.



# LAND USE MASTER PLAN

**KAILUA • KONA**  
MASTER PLAN  
PREPARED FOR  
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C. Commercial

Many of the presently zoned commercial areas remain in place since most areas are committed. It is expected that future large scale commercial will occur along the Queen Kaahumanu corridor.

There have been numerous requests to the County Planning Department for smaller lot commercial opportunities. This has resulted in new commercial zoning mauka of Kuakini between Hualalai and Henry Street. On the land use plan this area has been extended beyond the present boundary, but a limit should go no further. Limited convenience commercial within residential areas is appropriate, but not specifically located on the plan, so as to permit flexibility in the planning of these areas.

D. Resort/Commercial

The demand for significant resort development is likely to be limited in the near future. Projects the size of the current major hotels are not appropriate to the character and scale of the Village, and no more should be allowed. Since the ocean is the key resort amenity and excessive resort/hotel development is not desirable, this kind of use should not extend mauka of Kuakini Highway. Additionally, no further north/south extension should be allowed, except for the property immediately adjacent to and north of the King Kamehameha's Kona Beach Resort. This property is appropriate for a low-scale resort use in order to provide a transition between the King Kamehameha Hotel and residential areas to the north. Commercial uses may be independent or combined with resort. Commercial uses shall be pedestrian oriented retail. Automobile related manufacturing and processing are not appropriate uses. Offices are acceptable above the first floor. Residential uses are acceptable.

E. Multi-Family Residential

This encompasses residential uses in the higher density ranges. A top limit of 20 units per acre is proposed.

F. Low Density Residential

This category includes single family detached, duplex, and single family attached (townhomes) housing. This designation is primarily for those areas mauka of the Great Wall. Cluster and neo-traditional planning is encouraged to promote parks, open space and pedestrian orientation. In such instances, specific localized densities may be higher, as long as the overall average is reasonable. An average of 5 dwellings per gross acre is used.

G. Open Space/Parks

Even with the ocean setting and the regional park at the Old Airport, there has been minimal provision for parks and open space.

Parks need to be provided on a pay-as-you-go basis, so that parks are available within walking distance from homes. Several parks are indicated in approximate locations, but small "pocket" parks and tot lots should be frequent.

Perimeter open space should be encouraged around projects, especially adjacent to arterial streets. The concept is to breakup and buffer the senses from the continuous sprawl that is created by lower density residential projects. In contrast, the Village core area should be close to the street, as it is an urban village experience.

H. University

While not a specific land use category, the 44-acre University of the Nations site is a unique element. The University has developed a master plan which integrates instructional facilities with staff and student housing.

I. Build-Out Analysis: This chart identifies, by consolidated zoning categories total acreage, developed land and proposed areas.

## J. Core Area Plan

This plan (Figure 3-2) delineates specific detailed recommendation for the village. Many of these elements are discussed in the Urban Design Recommendations, Section 3.4.

TABLE 3-1

MASTER PLAN - BUILD OUT ANALYSIS

| <u>Zoning</u>                          | <u>Total<br/>Acres</u> | <u>Developed<br/>Zoning<br/>Acres</u> | <u>DU's</u> | <u>Proposed<br/>Development<br/>Acres</u> | <u>DU's</u>  |
|----------------------------------------|------------------------|---------------------------------------|-------------|-------------------------------------------|--------------|
| Agriculture                            | -                      | -                                     | -           | -                                         | -            |
| Unplanned                              | 16.2                   | 16.2                                  | 78          | -                                         | -            |
| Open/Parks                             | 5.1                    | 5.1                                   | -           | 3.7                                       | -            |
| Single Family<br>(5 du's/ac.)          | 174.9                  | 19.9                                  | -           | 142.6                                     | 713          |
| Multi Family<br>(20 du's/ac.)          | 169.1                  | 88.0                                  | -           | 80.5                                      | 1610         |
| Resort                                 | 70.2                   | 67.2                                  | na          | 13.0                                      | na           |
| Commercial                             | 96.8                   | 51.3                                  | na          | 45.5                                      | na           |
| Other                                  |                        |                                       |             |                                           |              |
| University                             | 44.1                   |                                       |             | 44.1                                      | 400          |
| Industrial                             | 9.6                    |                                       |             | 9.6                                       | na           |
| Total<br>(excludes public<br>R.O.W.'s) | 586.0<br>Acres         | 247.0<br>Acres                        |             | 339.0<br>Acres                            | 2723<br>DU's |

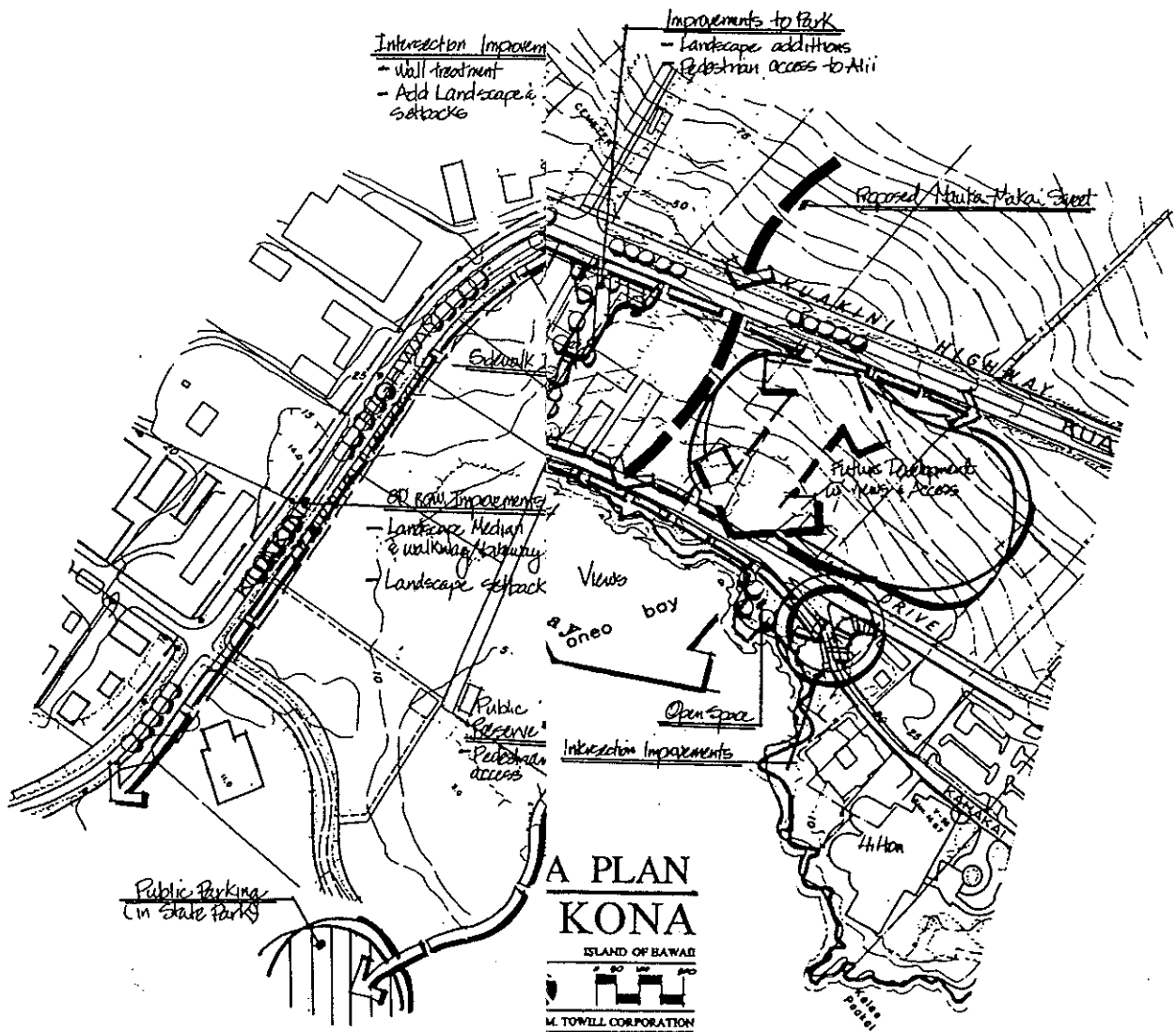
(DU = Dwelling Units)

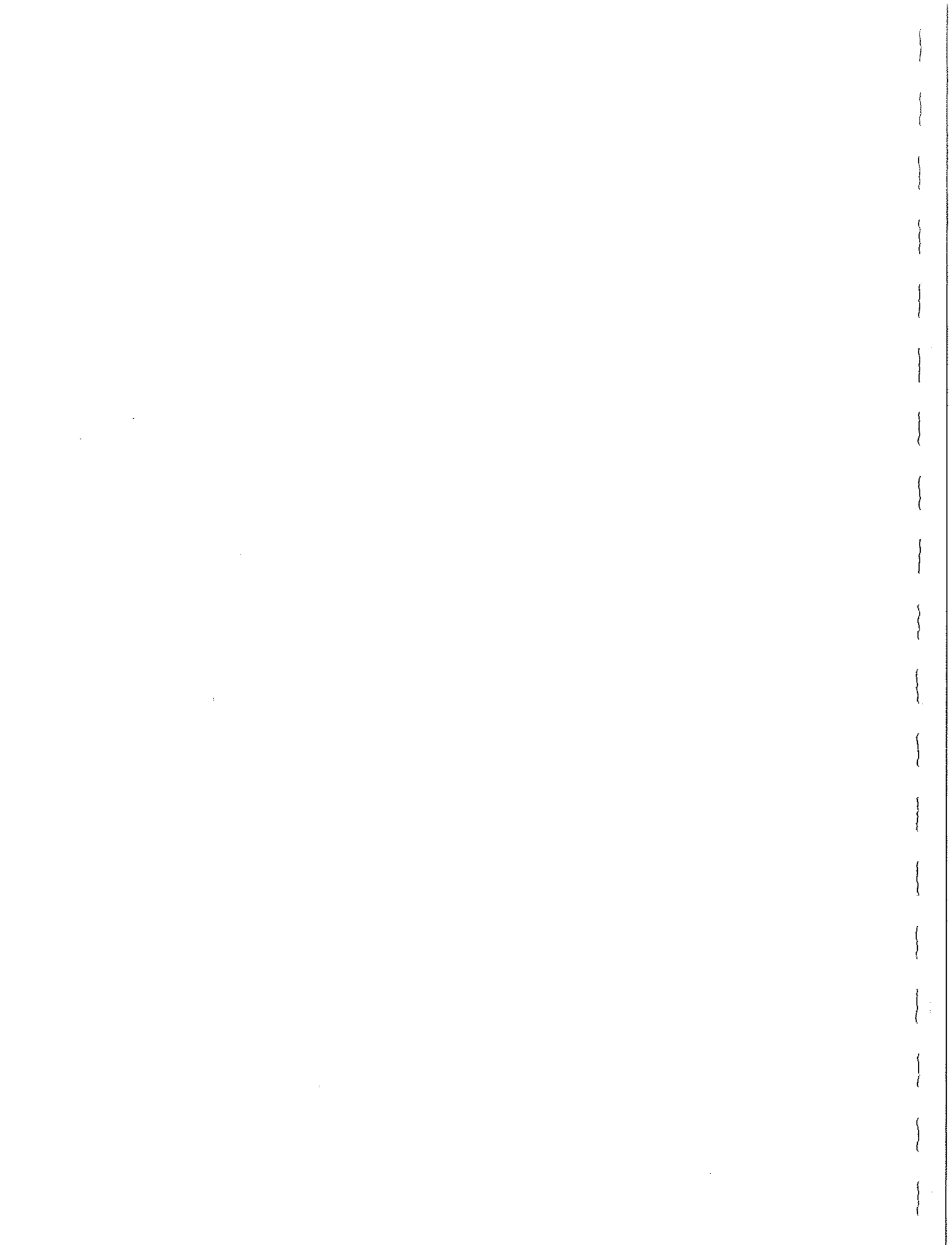
## 3.3 CIRCULATION PLAN

### 3.3.1 Vehicular

Many residential areas are served by mauka-makai roads that connect only to main streets. This means that local traffic must go to a main street to go to the community next door. This needlessly forces local traffic onto major roadways and make traffic worse. This pattern has been encouraged by the historic landownership pattern, the ahupua'a.

Improvements  
to setbacks









### 3.3.2 Pedestrian/Bicycles

Kailua's urban pattern has generally neglected the pedestrian. Sidewalks are missing or inadequate, especially along Kuakini Highway and the southern section of Alii Drive. Little or no provision has been made for bicycles.

### 3.3.3 Parking

The Village core area is the most critical area, where the ability to get people out of a car and onto their feet is essential. Some of the parking lots are obscure somewhat hidden. An informal study done several years ago suggests that the core area is generally lacking in adequate parking. Parking must be provided as development occurs, for after the fact improvements can be costly. There is one public parking lot, which is frequently full. Also, the parking areas provided in the middle area between Alii Drive and Kuakini Highway are unattractive and property boundaries obstruct reasonable traffic movement throughout the area.

### 3.3.4 Vehicular Circulation Concepts

Alii Drive: It is recommended that Alii Drive remain under a two-way operation. Neither one-way operation on Alii Drive, nor the closure will benefit traffic circulation in the area. Any lane reduction here would need to be relocated to Kuakini Highway. Please see the appendix for detailed analysis. Access and exposure to Alii Drive commercial properties is a factor, also.

Henry Street: The construction (in progress) of Henry Street between Queen Kaahumanu Highway and Kuakini Highway will divert some of the traffic load on Palani Road. The extension of Alahou Street to Henry Street would provide a by-pass for residential traffic out of the area. The proposed extension of Henry Street, makai of Kuakini Highway, will improve the access to the "core" area of the Village and relieve some of the traffic demand on Kuakini Highway, between Henry Street and Hualalai Road.

Mid Level Road: The proposed extension of the planned Keahole to Kailua Mid-Level Road from Palani Road to Henry Street will reduce the traffic demand at the intersection

of Queen Kaahumanu Highway and Palani Road. The proposed Mid-Level Road provides another access between the growing Keahole to Kailua region and Kailua Town.

Kuakini Highway: Kuakini between Palani and Hualalai is plagued by an increasing number of signalized "T" intersections, which disrupt traffic flows. Kuakini Highway requires between at least an 80-foot right-of-way to accommodate improvements needed for a four lane divided roadway plus turning lanes (based on the traffic volumes anticipated for this corridor). The traffic signal system on Kuakini Highway should be coordinated to minimize delay through the corridor, combined with elimination of some signals.

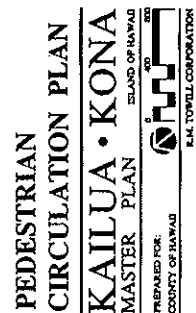
Shore-Line Drive: Shore-line Drive (the extension of Kuakini Highway to the north) is not expected to carry a significant amount of traffic between Kealekehe Parkway and Kailua Town and will function mostly as a scenic route due to the longer coastal alignment and lower operating speed.

Village by Pass: The proposed Village Bypass Road (makai extension of Nani Kailua) will divert some of the traffic demand on Hualalai Road and into the Village Core by routing traffic around the area.

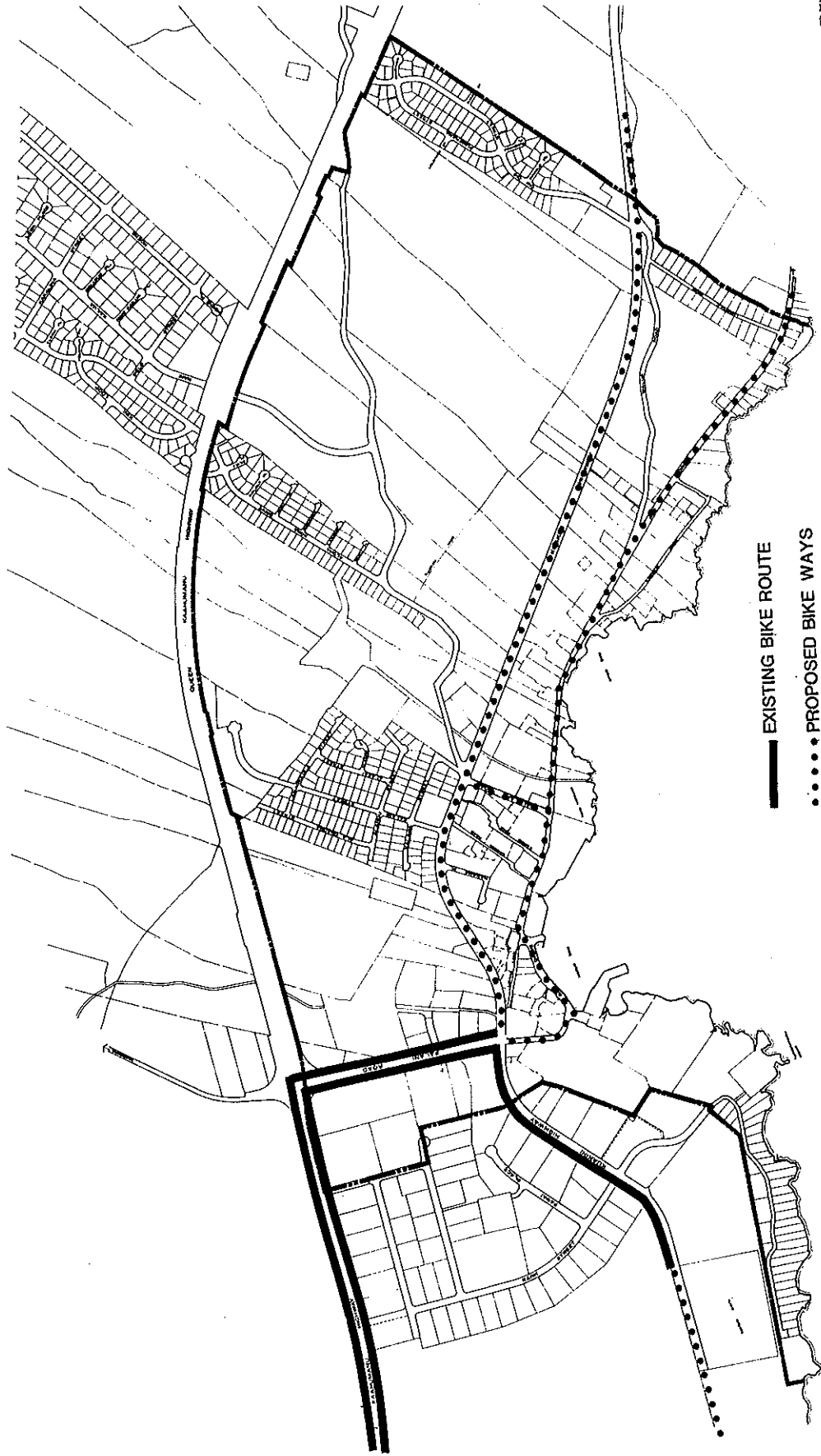
### 3.3.5 Pedestrian/Bikeway (Figures 3-3 and 3-4)

The State Department of Transportation has identified routes and lanes on Queen Kaahumanu Highway - between Queen Kaahumanu and Kuakini Highway, Kuakini Highway and Alii Drive, as part of the State Bike Plan dated 1977. To date, bike routes exist on Queen Kaahumanu north of Palani, Palani, and Kuakini from Palani north to the park.

Pedestrian sidewalks are sporadic and sometimes inadequate, especially along Kuakini Highway and parts of Alii Drive. Private property owners should be required as part of all development approvals to provide adequate walkways along street frontage and internally within the sites. All walkways should accommodate the needs of the handicapped as per Americans with Disabilities Act (ADA) standards. In addition, cooperative efforts between the public and private sectors should be made to provide more pedestrian access to the



**Figure 3-3**



shoreline.

### 3.3.6 Parking Concepts

Generally the quantity, accessibility and visual quality of parking need to be improved. More parking could allow the reduction of pier parking and easier visitor access. Parking structures can be used so long as scale and appearance are satisfactorily handled. Earth berming and landscaping can assist.

### 3.3.7 Options

Development of a remote parking area within the State's Old Airport Park. This would provide an additional parking facility at the South end of the State park with a pedestrian access easement to the Pier area. Encourage employees, other Village businesses and general overflow parking to use this lot, rather than the pier. Encourage cooperation of adjoining property owners for additional shoreline access from parking areas.

### 3.3.8 Recommendations

- Vehicular
  - \* Upgrade Kuakini Highway.
  - \* Increase mauka-makai connections.
  - \* Provide for local connections.
  - \* Extend Henry Street to Hualalai Road.
- Pedestrian/Bicycle
  - \* Improve pedestrian access along Alii Drive (south), Kuakini Highway, mauka/makai.
  - \* Create opportunities for bike access and lanes.
- Parking
  - \* Increase parking in core area via new lots and low scale structures.

### 3.3.9 Interim Traffic Improvements

#### A. General

Interim or "short-term" traffic improvements are developed to mitigate existing

deficiencies in the study area. The improvements discussed herein are based upon existing roadway deficiencies, discussed in the previous section, and do not take into account future development in the region.

B. Queen Kaahumanu Highway at Palani Road

The Queen Kaahumanu Highway at Palani Road intersection is the gateway to Kailua Village from the north. The intersection operates at over capacity conditions during the existing PM peak hour. The critical movements include the left turn and through movements on both approaches on Palani Road and the left turn movement on north bound Queen Kaahumanu Highway and the through movement on south bound Queen Kaahumanu Highway.

Palani Road, makai of Queen Kaahumanu Highway is a four lane, divided roadway. However, mauka of Queen Kaahumanu Highway, Palani Road provides only one south bound through lane. Similarly, Queen Kaahumanu Highway, south of Palani Road, provides two south bound lanes. The south bound approach provides only one through lane. South of Palani Road, the right lane merges into the left through lane.

The following improvements are proposed at this intersection:

1. Widen the makai bound approach of Palani Road to three lanes; one exclusive left turn lane, one optional through/left turn lane, and one optional through/right turn lane.
2. Extend the south bound right turn acceleration lane on Queen Kaahumanu Highway, south of Palani Road, to the exclusive right turn lane at Henry Street.
3. Convert the existing exclusive right turn lane on south bound Queen Kaahumanu Highway to an optional through/right turn lane.

The Palani Road improvements would increase the makai bound through and left turn capacities at Queen Kaahumanu Highway. The widened makai bound approach utilizes the two lanes in the makai bound direction.

The proposed Henry Street is expected to divert south bound Queen Kaahumanu Highway traffic, currently turning right at Palani Road, bound for the shopping center and Kuakini Highway. It is also expected to divert north bound Queen Kaahumanu Highway traffic, currently turning left at Palani Road.

The improvements on Queen Kaahumanu Highway would increase the south bound through capacity to Henry Street. The south bound right turn capacity on Queen Kaahumanu Highway would be diminished, however the some of the right turn demand is expected to divert to Henry Street.

C. Kuakini Highway at Palani Road/Alii Drive

The Kuakini Highway intersection at Palani Road/Alii Drive operates at over capacity conditions during the existing PM peak hour. The critical movements are the left turn movement on makai bound Palani Road and the mauka bound through movement on Alii Drive. Palani Road, mauka of Kuakini Highway, provides two mauka bound lanes. However, Alii Drive only provides one mauka bound through/right turn lane. The north bound right turn demand on Kuakini Highway is also significant however, intersection geometrics and the traffic signal phasing virtually provides a continuous right turn movement.

The following improvements are proposed at this intersection:

1. Convert the exclusive left turn lane on the mauka bound approach of Alii Drive to an optional through/left turn lane, in addition to the existing through/right turn lane. Extend the two mauka bound lanes

within the limits of the existing roadway limits.

2. Extend the exclusive left turn lane on south bound Kuakini Highway, within the existing roadway limits.

The mauka bound approach of Alii Drive is controlled by a separate phase, therefore the left turn movement is protected and would not restrict the through movement. The left turn lane capacity is under utilized during the mauka bound traffic signal phase. The optional left turn/through lane would allow through traffic to utilize two lanes heading in the mauka direction.

D. Hualalai Road at Alii Drive

The intersection of Alii Drive and Hualalai Road operates at LOS "F" during the existing peak hours. The three-way stop facilitates the balanced traffic demands on all approaches and safe pedestrian crossings. On street parking is permitted on the makai side of Alii Drive, both north and south of Hualalai Road. Power poles are also located within the roadway, on the makai side of Alii Drive between the parking lane and the traffic lane. The pedestrian space is limited on the mauka side of Alii Drive, south of Hualalai Road.

The following improvements are proposed at this intersection:

1. Restrict parking on the makai side of Alii Drive and relocate the power poles to the sidewalk area.
2. Provide an exclusive left turn lane and one through lane on south bound Alii Drive.
3. Provide additional pedestrian space on the mauka side of Alii Drive, south of Hualalai Road.

4. Consider installing traffic signals at the intersection.

Providing an exclusive left turn lane on south bound Alii Drive would improve the traffic operations under the three way stop control. The installation of traffic signals would provide a significant improvement to traffic operations. Improving the pedestrian space along the mauka side of Alii Drive would provide for the pedestrian traffic originating from the parking lot located on the mauka side of Alii Drive.

E. Kuakini Highway at Hualalai Road

North bound Kuakini Highway at Hualalai Road is impacted by the traffic signals, located to the north of the intersection. The lack of traffic signal coordination between three closely spaced traffic signals on Kuakini Highway limit the through capacity and results in additional delays. Parking is permitted on the mauka side of Kuakini Highway, which limits the effectiveness of the right turn lane on the north bound approach.

The following improvements are proposed at this intersection:

1. Coordinate the traffic signals along Kuakini Highway.
2. Restrict the parking on the mauka side of Kuakini Highway, south of Hualalai Road. Extend exclusive right turn lane on north bound Kuakini Highway.

F. Findings

1. Alii Drive

It is recommended that Alii Drive remain under a two way operation. Neither one-way operation on Alii Drive, nor the closure will benefit traffic circulation in the study area. One-way traffic circulation usually includes a roadway couplet, i.e., a pair of one-way roadways with traffic

flowing in opposite directions acting as a single facility. A one-way operation on Alii Drive will divert the traffic demand in the opposite direction to Kuakini Highway.

The restriction of traffic flow on Alii Drive would require the replacement of lane capacity on Kuakini Highway. For example, a one-way southbound traffic circulation pattern on Alii Drive would require an additional lane on Kuakini Highway between Hualalai Road and Palani Road, totaling three through lanes in the northbound direction. Similarly, a one-way northbound traffic circulation pattern on Alii Drive would require an additional lane on Kuakini Highway, totaling three through lanes in the southbound direction. The circulating traffic would result in heavy turning movements at the intersections at both ends of the one-way roadway.

The closure of Alii Drive to traffic would require an additional lane on Kuakini Highway in both directions, totaling three through lanes in each direction. Access to businesses along Alii Drive would need to be maintained for delivery vehicles.

## 2. Henry Street

The construction of Henry Street between Queen Kaahumanu Highway and Kuakini Highway diverts some of the traffic load on Palani Road. The extension of the Mid-Level Road to Queen Kaahumanu Highway integrates Henry Street into the regional highway system.

The proposed extension of Henry Street, makai of Kuakini Highway, improves the access to the "core" area of Kailua Town. The proposed extension of Henry Street relieves some of the traffic demand on Kuakini Highway, between Henry Street and Hualalai Road. The extension of Henry Street also could include restricting Hanama Place

to right-turn-in and right-turn-out movements only and the removal of the existing traffic signal. Sarona Road, between the Henry Street extension and Kuakini Highway, could be restricted to property access only.

3. Mid-Level Road

The proposed extension of the Mid-Level Road from Palani Road to Henry Street significantly reduces the traffic demand at the intersection of Queen Kaahumanu Highway and Palani Road. The proposed Mid-Level Road provides another access between the growing Keahole to Kailua region and Kailua Town. As a result of this extension, the four-lane improvement on Queen Kaahumanu Highway should be extended to Henry Street.

4. Shore Drive

The proposed Shore Drive, as shown on the Keahole to Kailua Development Plan, is not expected to carry a significant amount of traffic between Kealekehe Parkway and Kailua Town. The Shore Drive should function as a scenic route because of the longer coastal alignment and lower operating speed. The Mid-Level Road and Queen Kaahumanu Highway provide more direct access to Kailua.

5. Kuakini Highway

Kuakini Highway would require between 80- and 100-foot rights-of-way to accommodate a four lane divided roadway plus turning lanes. Kuakini Highway at Palani Road, Henry Street, Hualalai Road, and at the Village By Pass would require intersection channelization, i.e., exclusive turning lanes, medians, and traffic islands. Traffic signals at Henry Street and at the Village By Pass Road also would be required. The traffic signal system on Kuakini Highway should be coordinated to minimize delay through the corridor.

6. Village By Pass Road

The proposed Village By Pass Road diverts some of the traffic demand on Hualalai Road. It is not as effective as a "by pass" for Kailua Village in diverting through traffic from Henry Street and Palani Road.

An alignment, located further to the north, would provide a shorter route around Kailua Village for through traffic with destinations to the north and south of the study area. The northern alignment may require realignment of Hualalai Road at their intersection. The proposed alignment is subject to road grade considerations.

B. Conclusions

Further detailed analysis should be performed on the preferred alternative circulation plan to develop specific intersection improvements. While current land use patterns and right-of-way restrictions place constraints on alternative traffic improvements, the traffic master plan is viewed as a long range plan. Where the master plan conflicts with existing developments, the traffic master plan is expected to be implemented as redevelopment occurs, or with government intervention as the need arises.

3.4 URBAN DESIGN RECOMMENDATIONS

The following urban design recommendations are intended to provide a guide to physical design solutions and treatment of specific areas within the Village. See Design Guidelines for criteria to be used in the design of projects. These recommendations cover special treatment of the following areas; Alii Drive Corridor (including Pier/seawall), Kuakini Highway Corridor, Queen Kaahumanu Highway Corridor and Palani Road, inner block improvements to the Likani Lane (including the existing public parking lot) and Sarona Road areas, development of the "Village Green" and "Shoreline Promenade", and Streetscape elements (including gateway landscaping, site furniture and pedestrian/bike corridors).

### 3.4.1 Alii Drive Corridor Design Recommendations

When time permits, people like to drive along Alii to see what's going on or to enjoy the ambience. Alii Drive is the great Kona experience due to its relationship with the ocean, the canopy of trees (in some areas) the scale of the street (you can actually recognize people from the car), the intimate relationship between the scale of people and the structures. It is one of the best examples of the Kona way of life.

As has been stated previously the images of the Alii drive corridor are the heart of the Village and represent the qualities, scale and essence of the Kona way of life. In describing the corridor, we will refer to sections of Alii, that differ in character in moving south through the Village to the Special District Boundary.

#### A. GENERAL RECOMMENDATIONS FOR THE ALII DRIVE CORRIDOR

1. Along the entire Alii Drive corridor, heights of buildings should be limited to two stories along the street frontage. From the setback line beginning at a 20-foot height sloped height configuration (based on a one foot horizontal setback for each vertical foot) with a maximum height limit of 45' from the Alii Drive ground floor elevation.
2. On-street parking will not be permitted (except for limited loading zones) along this corridor. Required off-street parking for properties abutting Alii shall be located to the side or rear structures and not in frontyards.
3. Alii Drive front yards shall be used primarily for landscape and related commercial activities such as courtyards, outdoor dining areas or other features oriented towards pedestrians.
4. Building improvements should meet the general Architectural guidelines set by the Design Criteria.

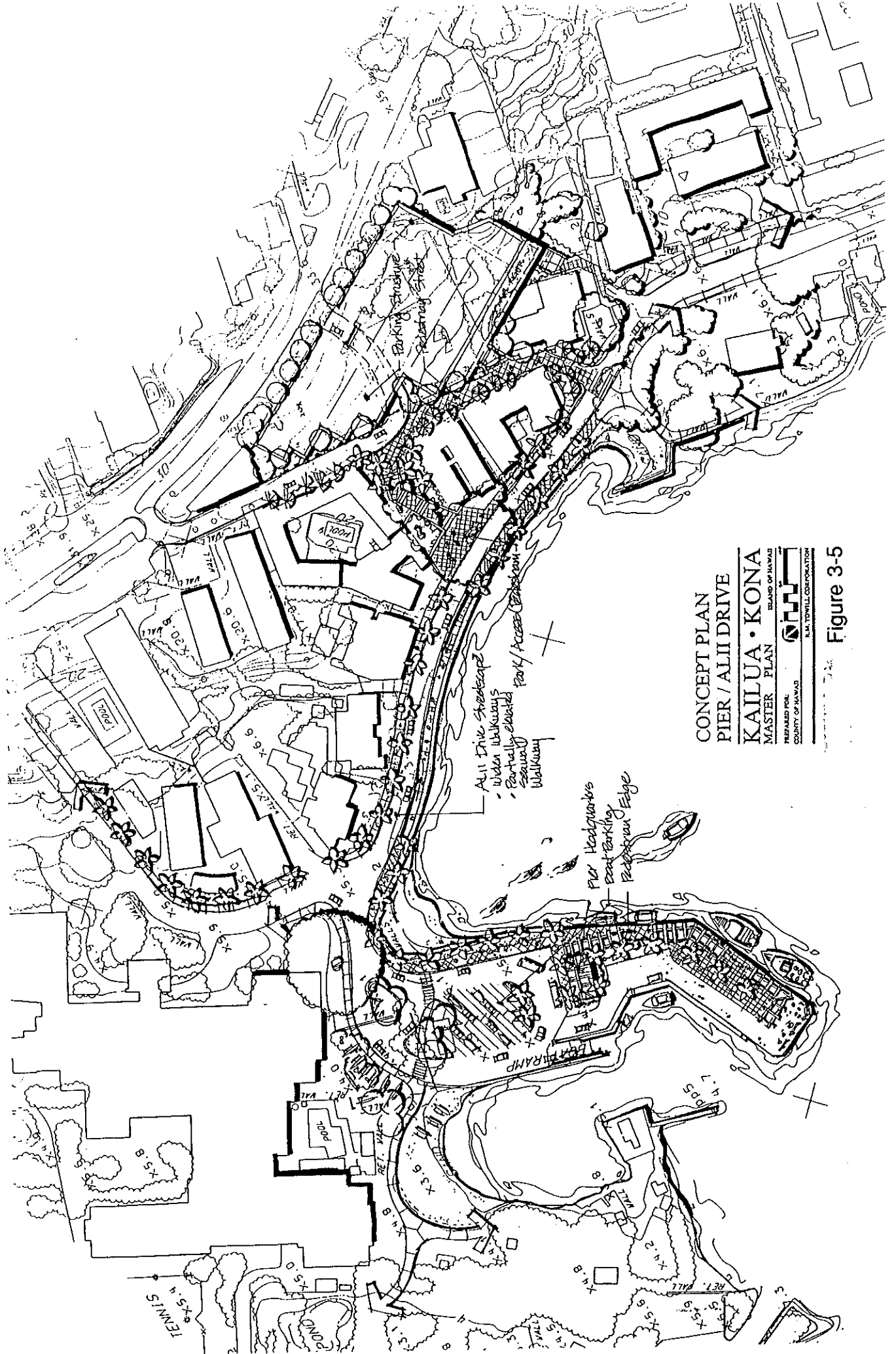
5. Incorporate or improve handicap accessibility to all areas as per Americans with Disabilities Act (ADA) standards by providing additional curb cuts, ramps, and cross walks at key intersections.
6. Provide consistent street lighting and undergrounding of overhead utility lines.
7. Improve pedestrian walkways where possible via width improvements, pavement treatments.
8. Encourage property owners to improve their establishments to provide more alluring pedestrian exterior spaces along the street via courtyards, seating, landscape, etc.
9. Enhance commercial existing street tree canopy with the addition of new trees (where appropriate) and preservation of existing trees. Specific trees along Alii Drive and within adjoining properties could be considered for designation as " Exceptional trees for the County of Hawaii" (Article 14, Chapter 10) to guarantee their continued protection.

#### 3.4.2 Pier/Seawall/Alii Drive Area

(See Concept Plan, Figure 3-5, and Sections, Figures 3-6 and 3-7)

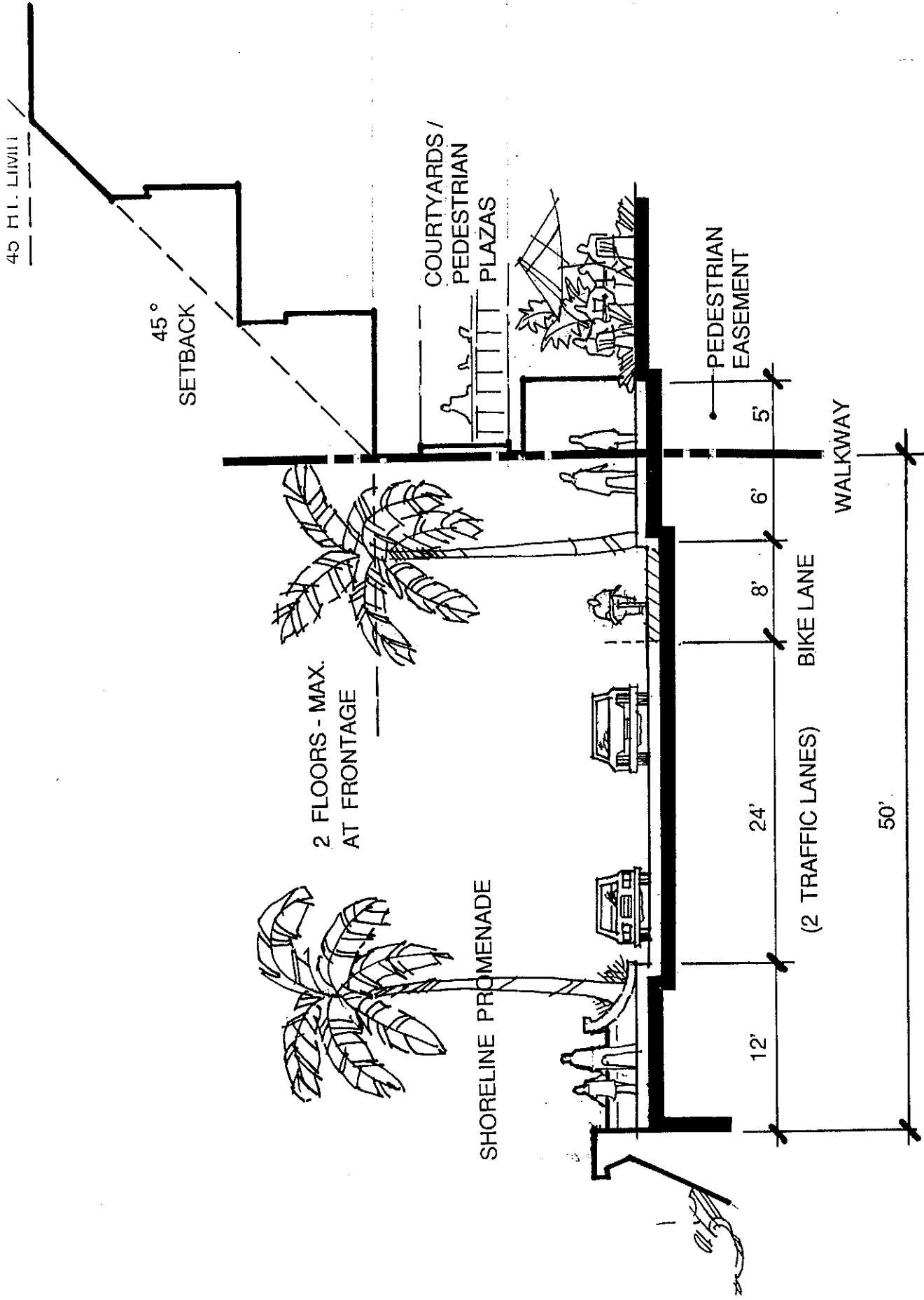
##### A. Pier

1. Create a cul-de-sac that efficiently allows vehicles to drive to the pier area and out again.
2. Provide convenient access and circulation for boat trailer and uses related to the ramp. Parking limited to trailer parking only.
3. Relocate Administration building to center of pier, and provide a landscaped pedestrian treatment for the end of the pier. Add limited



CONCEPT PLAN  
PIER / ALII DRIVE  
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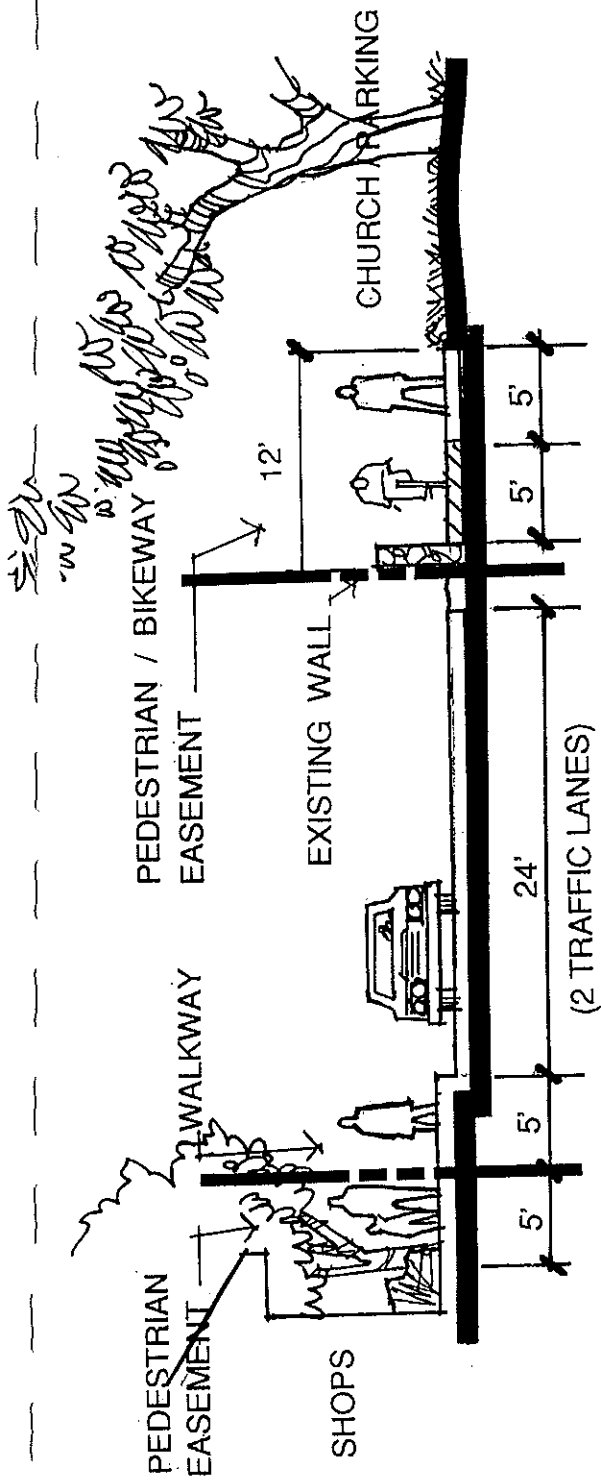
Figure 3-5



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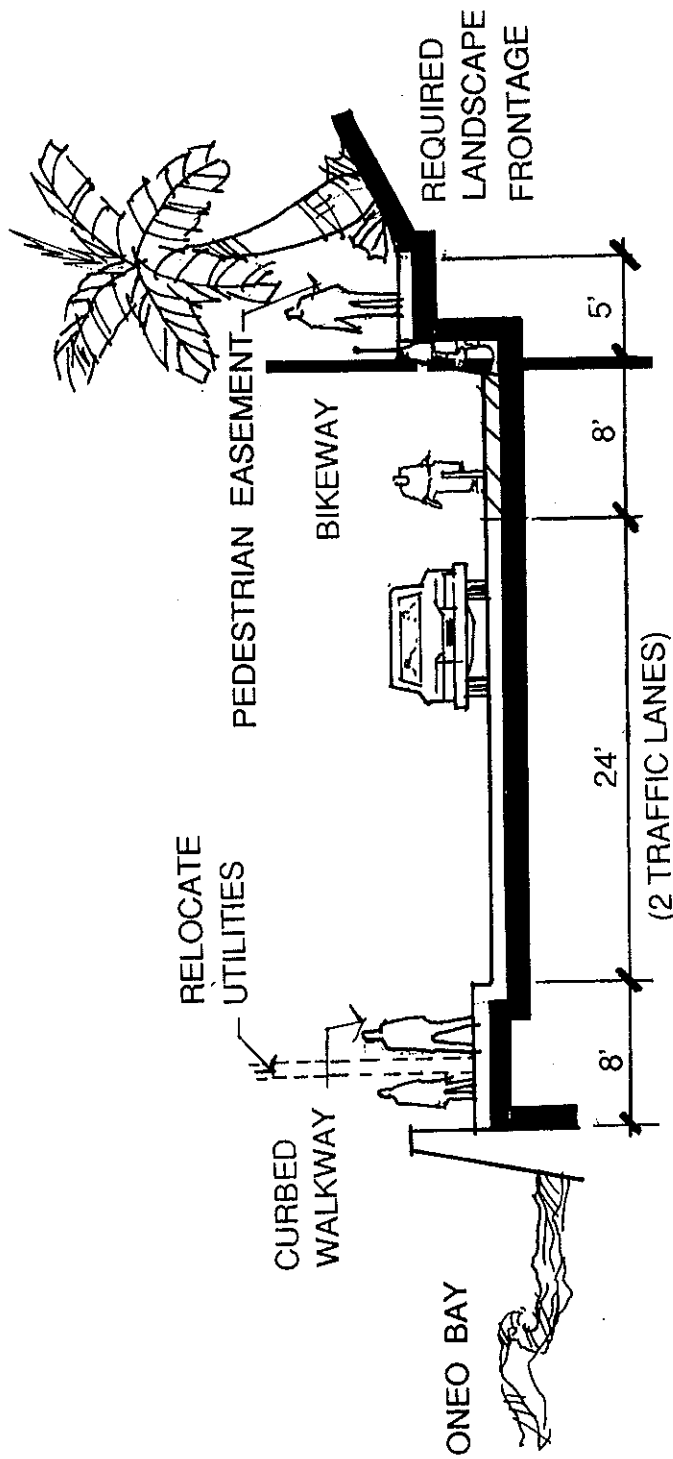
**SECTION - ALII DRIVE / SEAWALL AREA**  
 1" = 10'-0"

**Figure 3-6**



SECTION - CENTRAL ALII DRIVE

1"=10'-0"



SECTION - SOUTH ALII DRIVE

1"=10'-0"

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Figure 3-7

landscape plantings near building and pedestrian areas. Palms which are very hardy accent plants are recommended. Service vehicle can be allowed.

4. Add light structures/trellis etc. for shelter from sun in a manner that will not obstruct views of the Village.
5. Use paving treatments to differentiate between vehicular and pedestrian areas.
6. On the pier edge facing Kailua Village continue the shoreline promenade development around to the end of the Pier. Limit private and commercial boating activities to the area makai of building.

B. Seawall

1. On the makai side of Alii, add a partially elevated walkway/ramp section along the entire length of the existing seawall walkway, combined with seating and recessed lighting.
2. Reduce pavement area to allow for more sidewalk, lights, street trees (Palms) and a bike lane on the mauka side of the street. Street trees would continue up to the Palani intersection and extend out onto the Pier.
3. Implement seawall stabilization in accordance with Corps of Engineers recommendations.
4. See discussion of Likana Lane later, since this ties into Alii Drive.

C. Hulihee Palace to Hualalai Road

1. Re-striping/improvements to existing pavement to accommodate bikeways and pedestrians more comfortably.
2. Work towards implementation of consistent streetscape elements (landscape, furniture, lighting).
3. Encourage public and private cooperation (Kona Inn site and others) on any redevelopment that will enhance direct visual and pedestrian mauka-makai access to the Bay and shoreline. Develop a continuous shoreline promenade.

D. South of Hualalai Road

1. Pedestrian and bike access is very restricted or non existent along various portions of the street. Right-of-way on easement acquisition is needed to provide adequate pedestrian use.
2. Provide consistent street lighting undergrounding of overhead utility lines.
3. Plant shade trees up to the Oneo Bay area. However, use palms adjacent to the Bay on the makai side to maintain views.
4. Redevelopment of Hale Halawai Park frontage is to consist of improvements to the streetscape, providing walkways, elimination of on street parking and removal of the access drive in front of the Hale. Two-way access can be achieved at the drive at the parking lot.
5. For the area south of the Kona Hilton maintain a consistent landscape setback to accommodate landscaping and walkways.

### 3.4.3 Kuakini Highway Corridor Recommendations

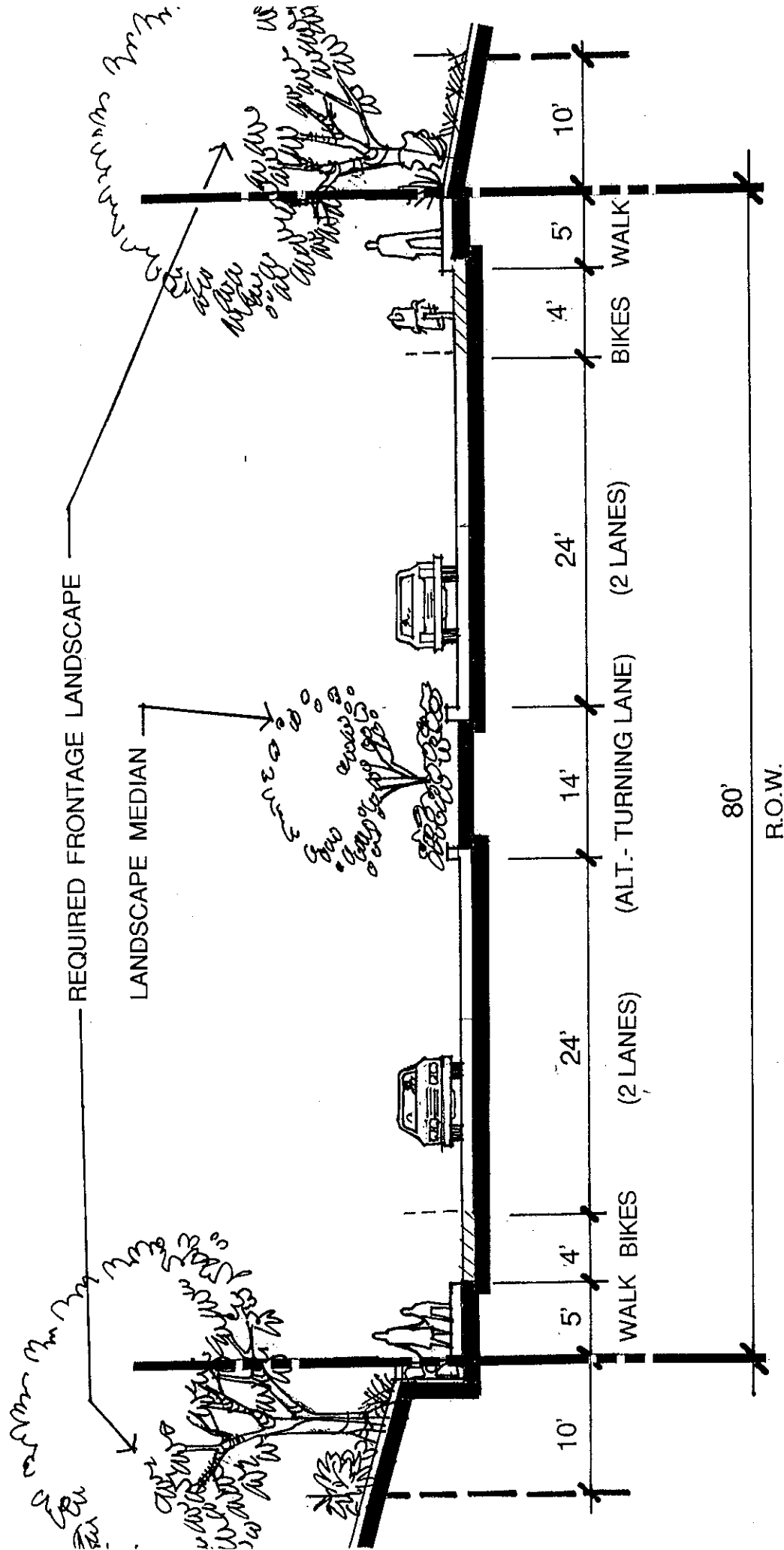
While Alii Drive represents many of the desirable visual qualities of the Kona way of life, Kuakini Highway serves as the major vehicular and local business corridor through the Village. Recent development along this corridor has emphasized the car over the pedestrian and traditional scale and streetscape elements. For many visitors to Kailua this is their only image of the Village. Kuakini Highway should be perceived as a significant part of the Village.

One of the primary issues in this area involves accommodating the growing traffic impacts. The portion of Kuakini Highway adjoining the Village core (based on the traffic volumes within this corridor) requires at least an 80' right-of-way to accommodate improvements needed for a four lane divided roadway plus intersection turning lanes. Increasing the right-of-way width would be undesirable due to the impacts on developed sites (Figure 3-8).

#### A. GENERAL DESIGN RECOMMENDATIONS FOR KUAKINI HWY. CORRIDOR

1. Make the recommended upgrades to the existing traffic lanes along with signal coordination and intersection alterations. Eliminate signalized "T" intersections where possible.
2. Work towards an enhanced and consistent Streetscape (including private property frontage) which accommodates the requirements of the Kailua Kona design criteria for landscaping, lighting and walkways. This would include sidewalks along all frontages, consistent street lighting, and undergrounding of overhead utility lines.
3. Within the required 10' front yard setback along Kuakini Highway the following standards should apply:

Seventy-five percent (75%) of the required setback area shall be landscaped including grass, ground cover or shrubs plus a



SECTION - KUAKINI HIGHWAY  
1" = 10'-0"

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minimum of one tree per 30 linear feet of frontage. Trees installed shall be a minimum of 1-1/2" caliper and 7' in height. Landscaped setback areas shall be irrigated.

4. Upgrade the existing pavement widths for a minimum of 4 lanes, plus turning lanes at intersections with bike lanes. Because the existing 80-foot right-of-way is minimal for this street configuration, a minimum 10 feet of landscaped setback is required adjacent to the street.

#### B. PALANI ROAD TO HUALALAI ROAD

The primary issues in this area are related to accommodating growing traffic impacts which include:

1. Eliminate the traffic signal at Hanama Place and general coordination of signals to minimize delay through the corridor. This would be replaced by the Henry Street signal.
2. Extend Henry Street to make a connection makai through to Hualalai Road. Make accommodations for a temporary by-pass through the County Administration site to accommodate right turns only from Hanama Place and Sarona Road. This will have considerable impact on some properties. Condemnation may be required.
3. Palani Road intersection: At present cars, pavement, signage, and exposed utilities/wiring predominate this intersection. Throughout the Village retaining walls are constructed and faced with native lava rock. At this major intersection, two corners are dominated by unfinished concrete retaining walls. Efforts should be made to complete the rock facing improvements to these walls through County requirements or negotiation between the County and private property owners.

General landscape improvements to all corners of the intersection should be made including screening of the utility station and treatment or possible relocation of junction boxes. The makai corners are paved parking lots for gas stations and the Kona Seaside. Partial removal of pavement area at the corners would make way for additional landscape improvements. Simplified traffic signals/lighting/sign would relieve much of the visual clutter in this area, which is complicated by the grade change.

**C. SOUTH OF HUALALAI ROAD**

1. Inclusion of a medial landscape strip (within the proposed 4 lane road) up to the vicinity of the University. Placement of signage in conjunction with medial accent landscaping would present an informal "arrival" statement for the southern approach to the Village .

**D. NORTH OF PALANI ROAD**

1. Kuakini Highway will eventually be extended to Honokohau Harbor. It will be a scenic drive and an alternative to Queen Kaahumanu Highway.
2. Inclusion of a medial landscape strip north to the Industrial access road. Emphasis should also be placed on use of large shade trees/landscape screening within the proposed 10' landscape setback. This would provide better visual screening of the Industrial Park, more shade and create an entry statement to the Village when Kuakini Highway is extended.

**3.4.4 Queen Kaahumanu Highway Corridor/Palani Road Recommendations**

The primary entry into Kailua is south bound along Queen Kaahumanu Highway and west bound on Palani Road. The first impressions of the Kailua are views of the front edge of the Industrial area. A more positive visual image would occur if the landscaped setback at

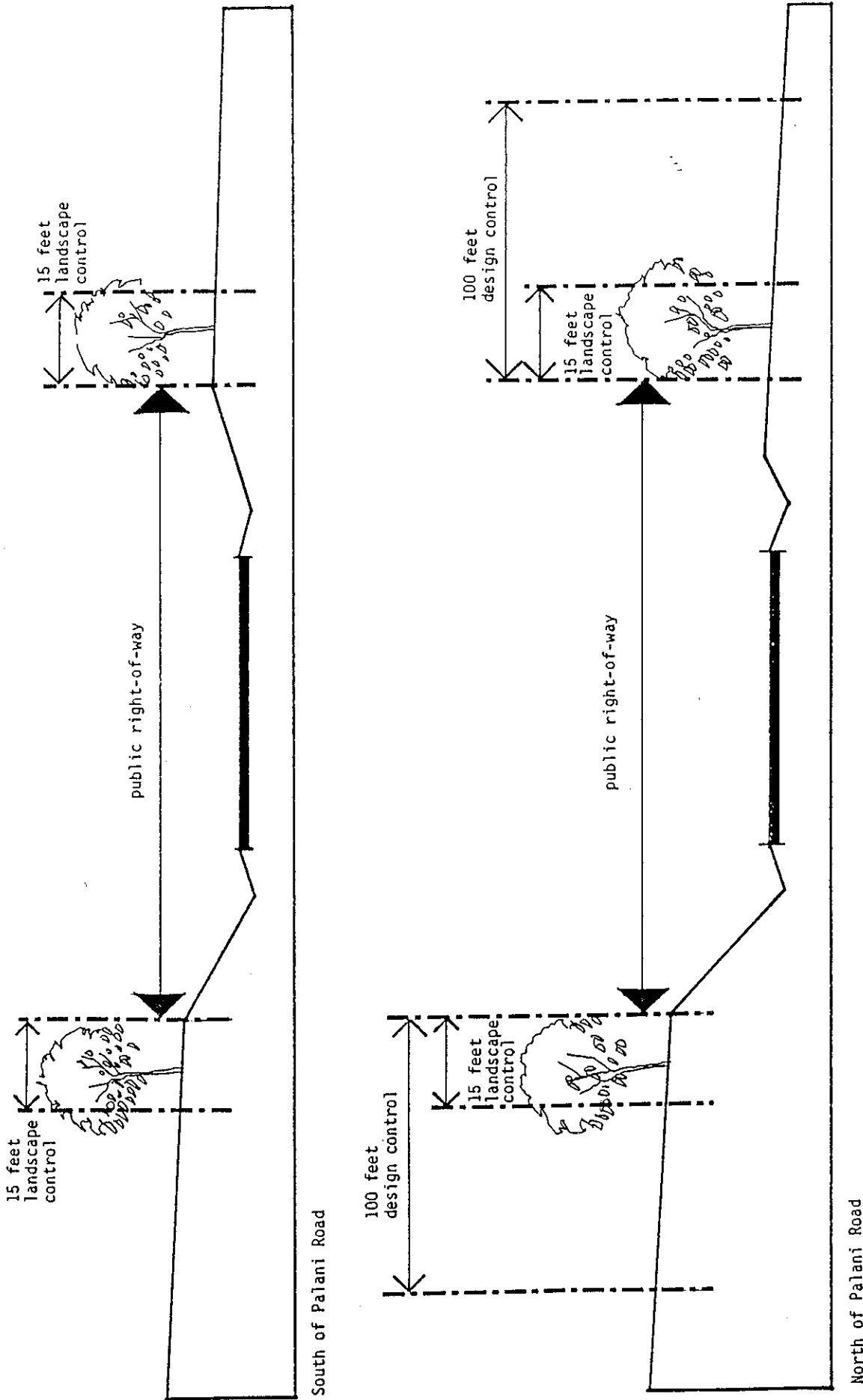
the Kona Coast Shopping Center could be extended to include the industrial area as well as the mauka side of the highway (improvements to be phased in, as these properties develop).

This can be accomplished by creating an additional landscape setback of 20' along all properties fronting Queen Kaahumanu Highway providing both a consistent landscape edge for the highway as well as a visual buffer for the developments along the road. Extending these improvements south to Henry Street would reinforce the visual and physical gateway into the community (see Figure 3-9).

1. The properties adjoining both sides of the highway should incorporate an additional 20' landscape setback which would include: minimum requirement for 1 tree/30 linear feet of frontage (7' high - 1-1/2" cal.) and perimeter accent plantings; 75% of the area should have landscape coverage (all landscape areas to be irrigated).
2. Placement of Village welcome signage should (due to topography ) occur further north along the makai R.O.W. so it is more readily visible prior to the intersection.
3. Henry Street should receive similar emphasis with regard to landscaping and signage. This street into the Village will (unlike Palani Road) allow direct overviews of the Village Bay and church spire. As a result Henry Street may come to be a very significant visual entry into the Village. This view corridor needs to be preserved.

#### 3.4.5 Nani-Kailua Drive

Existing planting at this intersection with Queen Kaahumanu Highway already creates a special accent treatment. The intersection of Nani-Kailua Drive and Hualalai Road could be another key intersection. This is the point on Hualalai Road where an overview of the Village is visible. With the road extension from Hualalai Road to Alii Drive, a series of



**SECTION - QUEEN KAAHUMANU HIGHWAY**  
 (AS PER KAILUA VILLAGE DESIGN PLAN 1988 - NOT TO SCALE)

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southern gateways to the Village can be created which may also permit extended Views all along the road to the Bay.

#### 3.4.6 Parking Garage - Likana Lane Inner Block Recommendations (See Figure 6-5)

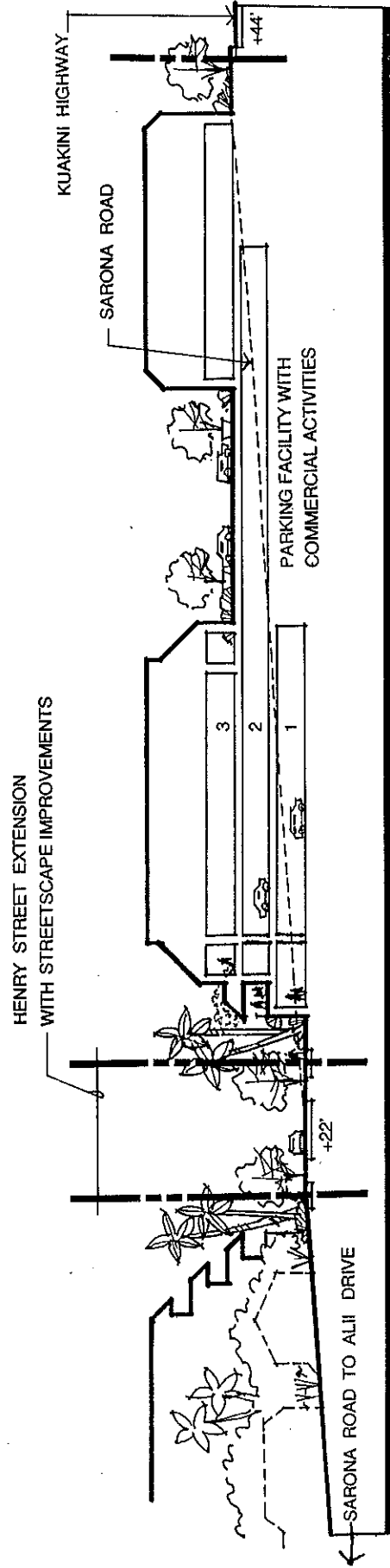
A two-level parking structure is proposed at the existing County lot. When properly built into the slope, the upper level will be even with Kuakini Highway.

Likana Lane connects Kuakini Highway and Alii Drive. The lane could become a landscaped pedestrian street accessing Alii from the parking structure. Vehicular traffic would be limited to service vehicles only with a change in the paving treatments to reflect this. Sidewalk level shop and cafes could occur along Kuakini and Likana, thereby bringing more pedestrian activity to the area. Landscape improvements would be made in conjunction with parking garage development and would tie into the Kuakini Highway and Likana Lane streetscapes.

#### 3.4.7 Henry Street Extension/Inner Block Recommendations (See Figure 3-10)

This area has excellent potential for consolidation of property towards a joint public/private low rise parking garage which would serve the Village core area. This together with the extension of Henry Street through to Sarona Road and Hualalai Road would create "new frontage" along the extension and interface between Kuakini Highway's commercial frontage, local multifamily residential, and the parking garage. The benefit would be more pedestrian activity to and from the parking structure down to Alii Drive and up to Kuakini Highway.

Redevelopment in the area would establish primary pedestrian mauka-makai corridors accompanied by private development of courtyards, arcades, etc. into the garage structure and along the street extension. As part of these developments Sarona Road would be improved for through vehicular traffic and to relieve traffic congestion on Alii Drive. Landscape, grading and other streetscape improvements would be made in conjunction with the parking garage to reduce its visual impact on the area. Sarona should be one way leading from Alii Drive.



## SECTION - HENRY STREET EXTENSION

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Figure 3-10

#### 3.4.8 Village Green Recommendations (See Figure 3-2)

Hale Halawai is one of the few public facilities in the village where community events can occur. Its present configuration does not take full advantage of the waterfront, as seen from Alii, and continuous pedestrian movement along the ocean is obstructed. Opportunities for public gatherings or events are limited in its present condition.

The land immediately mauka of Hale Halawai should be acquired to create a "The Village Green." This would require relocation of the existing private parking lot at the corner of Hualalai and Alii and renovation of existing park space in order to enhance the Village green concept. It would become a central community open space suitable for the periodic civic activities, festivals, block events, and private/public entertainment activities that come to be identified within the "center" of the Village.

The existing Hale Halawai should be reconfigured to permit more direct visual access to the Bay. The present building arrangement disrupts any sense of waterfront orientation. There should be relocation or renovation of the existing structure parking and construction of a facility that would accommodate outdoor performing arts and larger public gatherings and improving shoreline accessibility, while enhancing user and pedestrian safety. There would be a visual design connection between the new green area and the existing park via paving/crosswalks, walkways, consistent landscape and appropriate lighting.

In order to keep needed parking, the "green" would utilize the makai one-half of the existing parking. The mauka parking area would be replaced by a two-level structure built into the slope. With proper design, berming and landscaping the visual impact of a parking structure would be minimized.

#### 3.4.9 Shoreline Promenade Recommendations

Everyone wants (both tourists and locals alike) to enjoy the waterfront experience. Kailua still has the opportunity through public/private cooperation to provide that experience.

With this cooperation it is possible to provide a continuous shoreline walkway system from the Pier and King Kamehameha Hotel south to the Kona Hilton.

This promenade would include enhanced landscape treatment or shelters for shade, plus seating and walls with pedestrian level lighting for an evening stroll. With associated visible street access from the contiguous properties, this corridor would be a delightful way to experience the local shops and sites of Kailua. This area would be a natural place for overflow of festivals, art shows, cultural celebrations or other public events within the Village Core.

For the properties west of the King Kamehameha's Kona Beach Hotel to the Old Airport State park, access easements are needed to provide a continuation of the pedestrian shoreline development in future project approvals.

#### 3.4.10 Streetscape Recommendations

Design of the public streetscape elements should be coordinated to minimize clutter and enhance the Village image. These elements are a means of defining roadway functions and hierarchy in the overall network including the pedestrian walkway and bikeways systems, landscape, lighting (utilities), site furnishings and signage.

##### A. LANDSCAPE (See Figure 3-11)

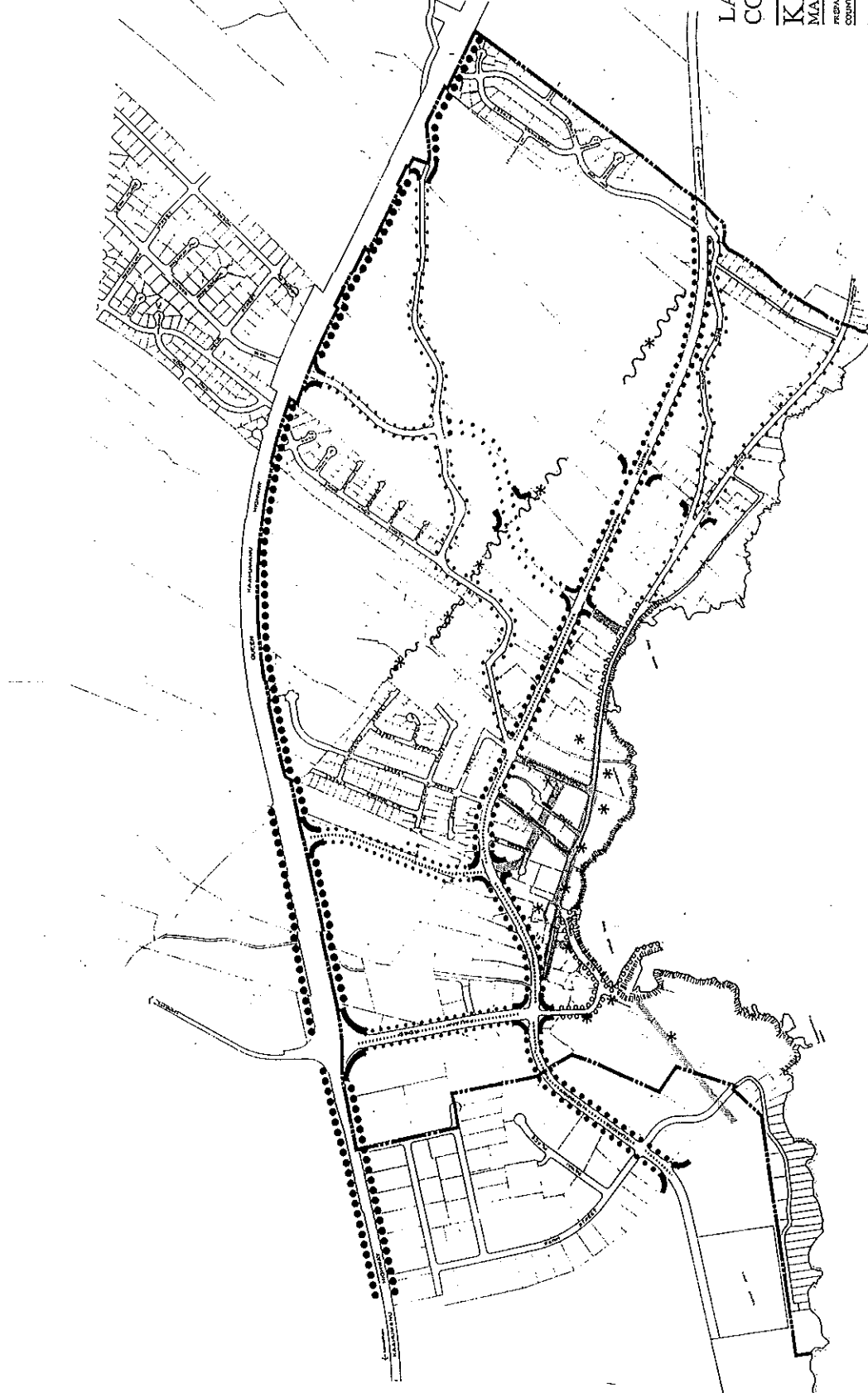
A unified, consistent planting concept is one of the simplest and most effective means of improving the visual quality of the streetscape. Landscaping is a way of defining the road hierarchy; screening headlight glare; reducing visual impacts of adjacent surface parking lots and overhead utilities; providing shade, spatial definition; and improving the visual quality of the area.

All proposed plantings should incorporate basic xeriscape principles combined with native species via appropriate plant material placement and plant selections with drought resistant qualities.

1. The properties adjoining both sides of the Queen Kaahumanu Highway should incorporate an additional 20' landscape setback which would include: minimum requirement for 1 tree/30 linear feet of frontage (7'

# LEGEND

- ..... QUEEN KAHUMANU HIGHWAY  
20' landscape setback - consistent  
landscape/meat buffer.
- GATEWAY IMPROVEMENTS  
Hawaiian theme trees - Gold Tilio Tree,  
Coastal Tree/Waka-Mia, Palms, Accent  
plantings.
- ..... PALANI/POLOHENEY STREET  
..... Makapuu Trees in median/Palms along  
sidewalk.
- ..... KULACINI HIGHWAY CORRIDOR  
Accent trees - Royal palm/diana/showe  
trees.  
Street trees - Autograph tree/Kamaeul,  
.....
- LANDSCAPE MEDIAN  
Small accent trees/shrubs - where space  
permits.
- ..... REQUIRED FRONTAGE  
STREETSCAPE  
1 tree per 30 linear feet plus perimeter  
landscape.
- CORE AREA STREETSCAPE  
Small Street tree - Koa Tree/Jama  
palms.  
Large Feature Plantings - Flax or  
Monkey Pod trees and detail Accent  
plantings.
- ..... BUILDING - DAY FRONTAGE  
Coconut palms, accent plantings.
- SIDEBELINE PROMINENCE  
Enhanced landscape treatment,  
seating/walks, shelters, lighting.
- ..... PRESERVATION/GREAT WALL TRAIL  
Preservation of significant  
trees/vegetation.



## LANDSCAPE CONCEPT PLAN

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Figure 3-11

high - 1-1/2" caliper) and perimeter accent plantings; 75% of the area should have landscape coverage (all landscape areas to be irrigated).

Continuation of landscape theme treatment at Palani/Queen Kaahumanu intersection - with "Kona Gold" African Tulip trees and related accent plantings. Repeat the same treatment at the new Henry Street intersection.

2. Continuation of Palani Road and Henry Street plantings - consisting of Mahogany trees in the median and Alexander palms along the side.
3. Along Alii Drive emphasis is on shade trees except where they may inhibit Bay views. Palms should be used along Bay view areas. As part of roadway general improvements, there should be a reduction of pavement area to allow for palms on the mauka street edge (up to Palani) making room for selected placement of palms along the seawall, pier and bay areas.

Enhance existing street tree canopy with the addition of new trees (where appropriate) and preservation of existing trees. Specific trees along Alii Drive and within adjoining properties should be designated as "Exceptional trees for the County of Hawaii" (Article 14, Chapter 10) to guarantee their continued protection.

- a. Alii/Palani Road to Pier and around to Palace area and Oneo Bay front area of Alii Drive. Coconut palms along the mauka walkways and selected areas on the makai side.
- b. Central Alii Drive - Use of Kou Trees as small street trees in conjunction with Alexander palms (or similar), selective planting of Ficus or Monkeypod trees in feature areas where space

permits.

4. Within the required 10' front yard setback along Kuakini Highway the following standards should apply:

Seventy-five percent (75%) of the required setback area shall be landscaped including grass, ground cover or shrubs plus a minimum of one tree per 30 linear feet of frontage. Trees installed shall be a minimum of 1-1/2 " caliper and 7' in height. Landscaped setback areas shall be irrigated.

There will be landscape medians where Kuakini Highway R.O.W. widths permit, or in other areas with no medians emphasis will be on landscape treatments along adjoining frontages. Special emphasis will be placed on screening industrial frontage.

Required trees in landscape frontage shall be Autograph tree or Kamani. Previous theme trees were Royal Poinciana but because of their intrusive root system and water requirements it would be preferable to use these trees in conjunction with Shower trees.

5. At primary intersections, landscape treatments should include use of Hawaiian theme trees such as Coral Tree/Wili-Wili and Tulip Tree, in conjunction with accent palms, and ground plantings where space permits.
6. Aboveground utilities and junction boxes shall be screened, where possible, with additional landscape area/plantings.
7. Special emphasis will be placed on screening of proposed parking structures and parking lots with landscape and berms.

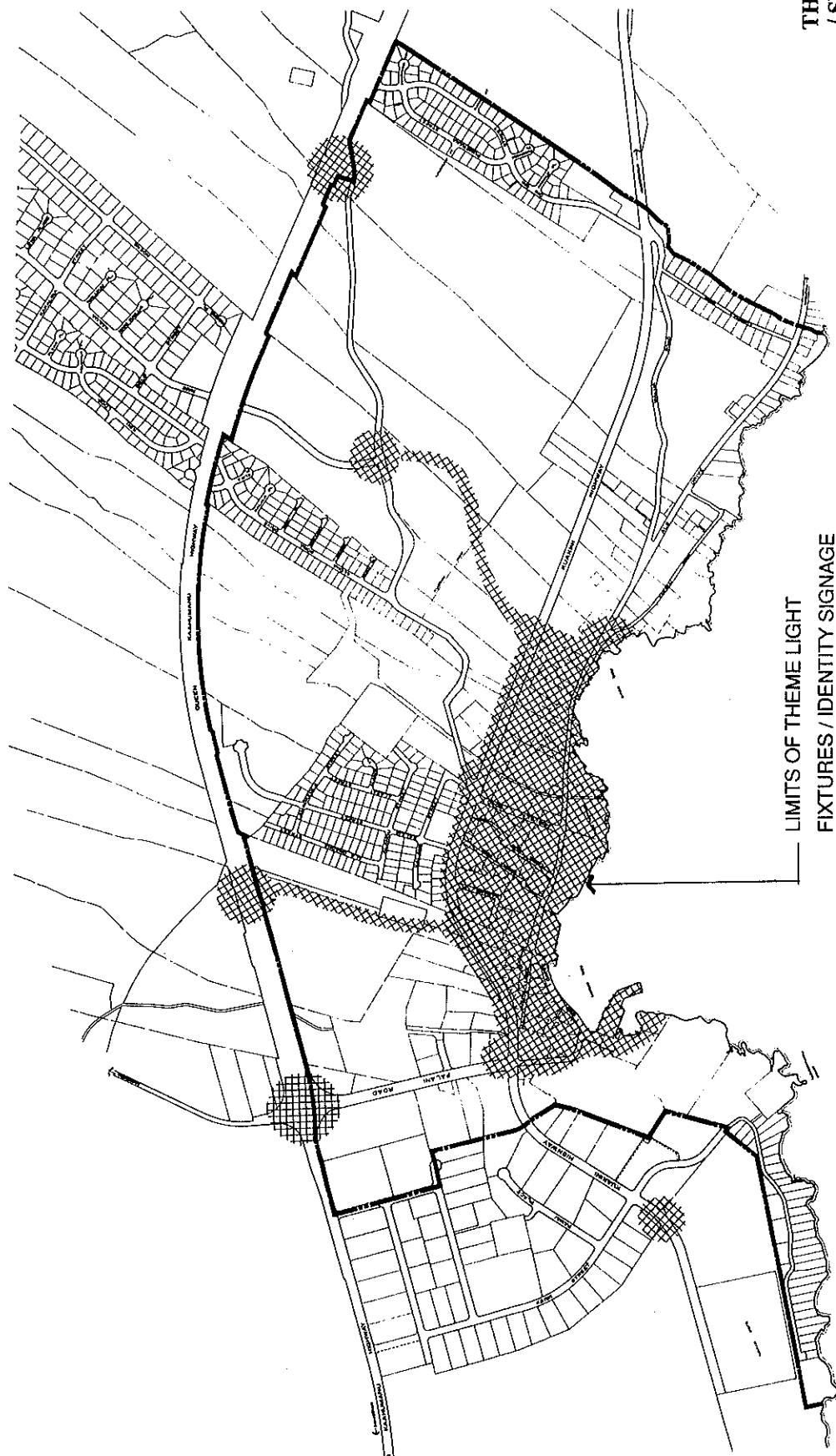
(See the "Recommended Streetscape Plants" in the design criteria.)

## B. LIGHTING/UTILITIES

Street lighting can be effectively used not only for orientation, public safety and security, but also to visually reinforce hierarchies. The importance and function of an area can be conveyed by means of fixture design, placement (height and spacing) and level of illumination (Figure 3-12).

The existing County ordinance regulating outdoor lighting is directed at mitigating negative lighting impacts on the Mauna Kea Observatory. This generally restricts use of certain types of lighting between 11 pm and sunrise. The ordinance requires that lighting visible during this time must be vertically shielded and all light sources with the exception of low pressure sodium shall be filtered to a specified level.

1. The street lighting system within the Village Core area should be consistent in design and placement. Lighting fixture selections should express the unique character of the village. Duplication of the existing post fixture on Alii could be a viable solution if the fixtures can effectively light to County standards.
2. Along the Shoreline Promenade, lighting should be incorporated into seating/walls as recessed lighting or as ballard lighting along walkways.
3. Simplify traffic signals and lighting at intersections to reduce visual clutter. Utilities associated with new construction, renovation or demolition, should be buried to prevent physical and visual cluttering of the streetscape. Existing exposed utilities along roadways should be programmed for underground replacement as soon as practicable. In the meantime, they should be screened by plantings, architecture or berms.



# THEME LIGHTING / SIGNAGE PLAN

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### C. STREET FURNISHINGS/SIGNS

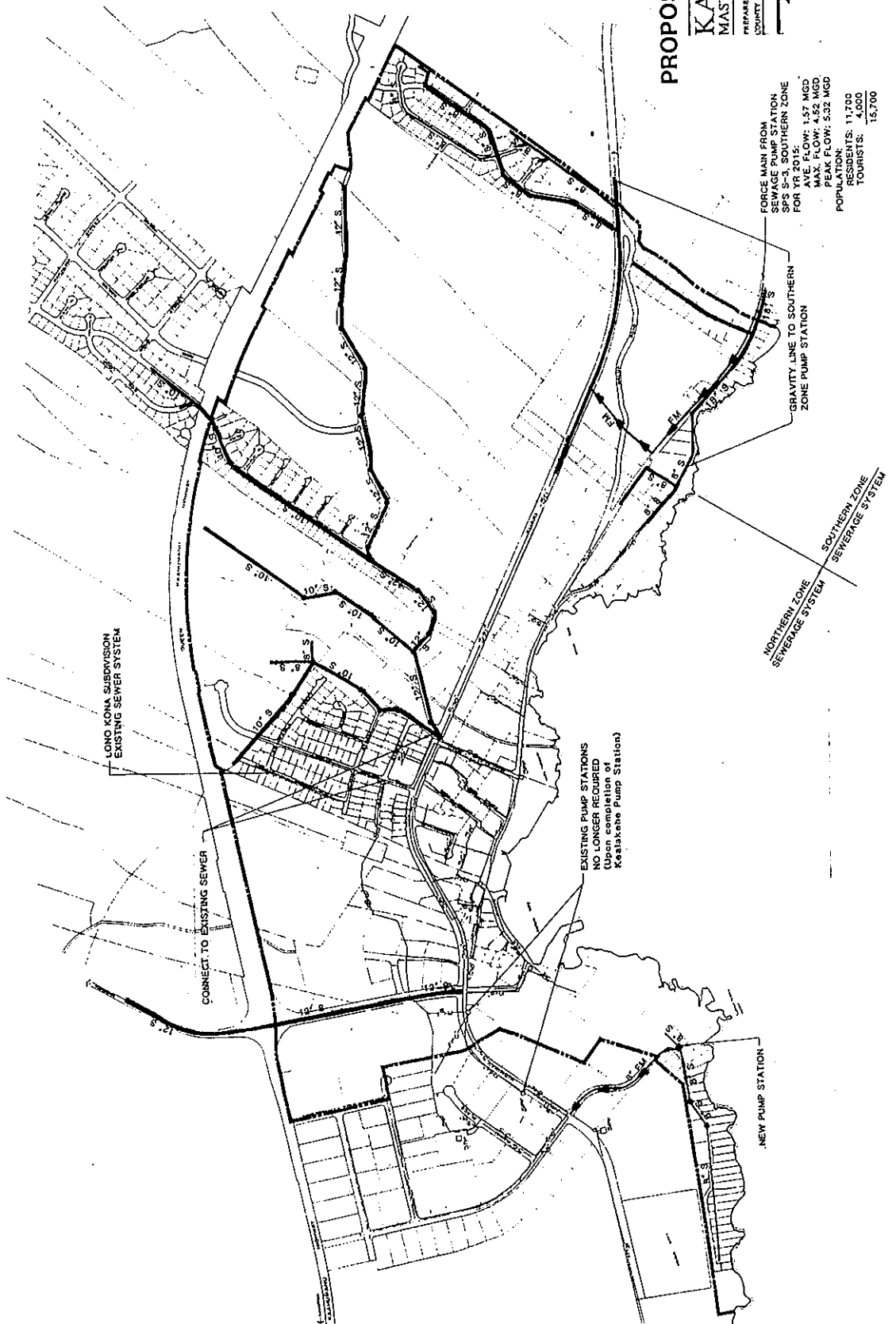
A variety of site furnishings in public places will provide opportunities for a more positive visual identity within the Village. Seating and other furnishings such as trash containers, water fountains and information stands; and encourage social gatherings. The creation of a unified and consistent public signage system will help convey information in an effective and attractive manner.

1. In conjunction with local civic groups, sign development of an overall signage program for "welcome signs", a Historic walking tour, shoreline access, informational and street signs. Private business signs should be consistent with the Design Criteria.
2. Important locations for seating are: major pathways, recreation areas, plazas and miniparks, near stairs and ramps, bus or taxi stops, and along the edges of natural/coastal areas. Incorporate the design of street furniture into or near structures or walls.
3. At present there are receptacles sponsored by the Chamber of Commerce Street Furniture Program, that serve the immediate needs in the area. Future receptacles should be designed as part of stone walls and not as separate features. Newspaper stands should be enclosed in wood cases and placed adjacent to buildings or walls and not in the way of pedestrian movement. All dumpsters should be screened from view.

## 3.5 INFRASTRUCTURE

### 3.5.1 Recommended Sewer System Upgrades

The proposed sewer system upgrades as shown on Figure 3-13 will allow for gravity line sewers to all non-sewered areas within the master plan boundaries except for two areas. On



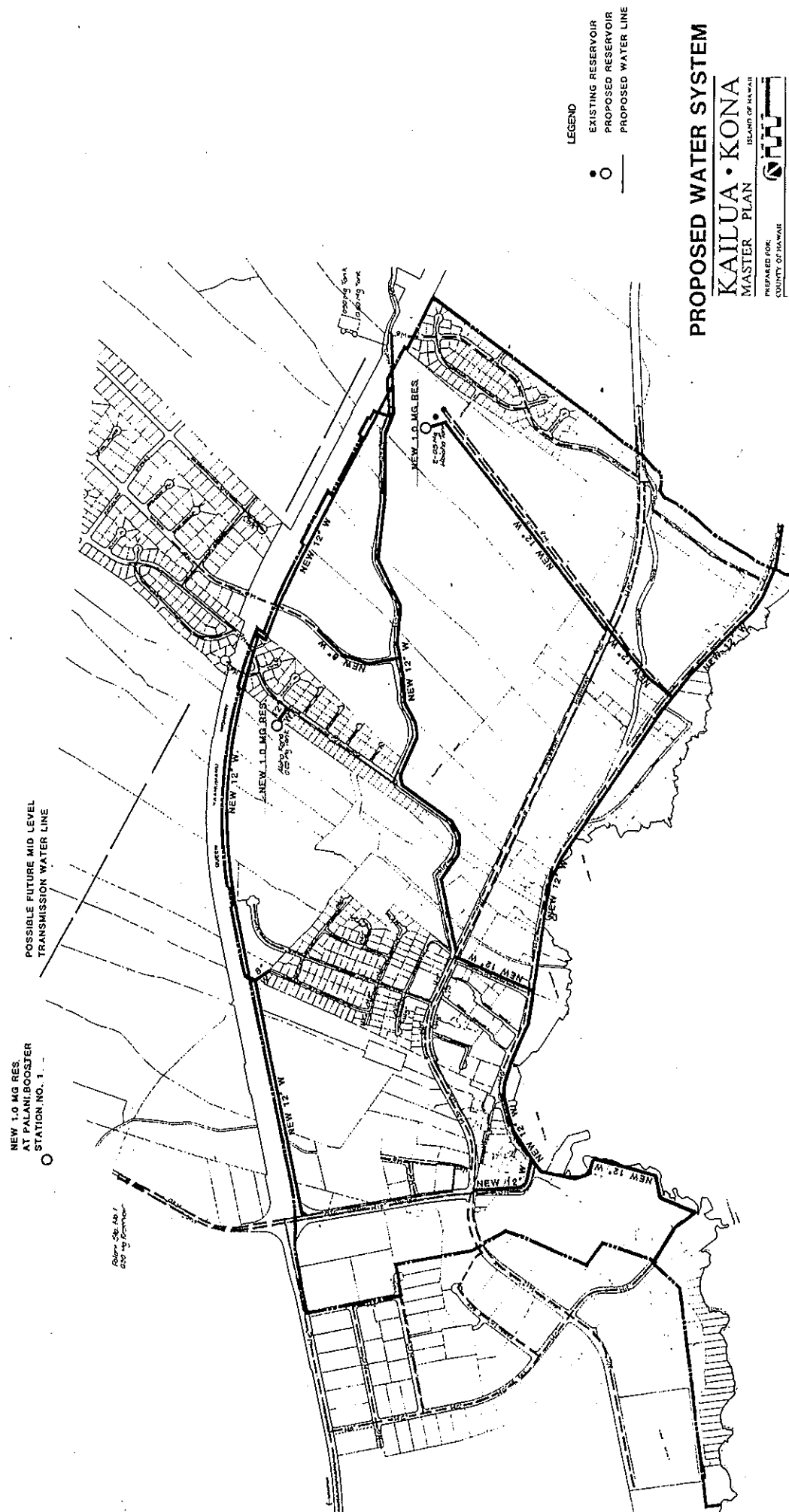
the north makai boundary a new pump station will be required for a peak flow of 0.33 MGD to serve the proposed resort land use in this area. The other area is on the south makai boundary where the sewers are actually part of the Kailua-Kona Southern Zone sewerage system. We have shown the proposed force main from that zone. The upgrades as shown should sufficiently handle any increase inflows resulting from future development as shown in the Master Plan.

### 3.5.2 Recommended Water System Upgrades

The required fire flows and the high demand of water usage from the designated resort areas of the proposed Master Plan will dictate that ultimately new water storage facilities be built. An increase of 3 MG of water storage will be required. The current supply can accommodate 5 MG of storage. The current Palani reservoir will require an additional 1.0 MG reservoir. Two other 1.0 MG reservoirs will be required within the Master Plan boundaries as shown in (Figure 3-14). In the ultimate development phase the water lines that currently serve the resort area will become undersized and new 12-inch lines will be required to maintain demand and fire flows. An additional line will be required to be built parallel to Queen Kaahumanu Highway to complete a looped system for the Master Plan area. Although not a part of this study, we show a possible mid-level transmission line is shown for future areas on the mauka side of Queen Kaahumanu Highway.

### 3.5.3 Recommended Drainage Improvements (Figure 3-15)

The County of Hawaii has no immediate plans to make drainage improvements for Heinaloli Stream. For the Keopu Stream there is no outlet to the ocean. The land downstream of Kuakini Highway is fully developed. Just underway is the extension of Henry Street which is within the flood boundaries of the North Keopu Stream. This street will connect Queen Kaahumanu Highway to Kuakini Highway. A small retention basin is being constructed at the Highway and Henry Street. The construction of the roadway should consider the impact of a 100-year storm and should provide proper drainage protection against such a storm. This street would be an ideal location to install a storm drain system to accommodate the entire North Keopu Stream. An outlet location and route, makai side of Kuakini Highway, however, would have to be identified.



**Figure 3-14**



The Corps of Engineers' (COE) 1988 "Reconnaissance Report ..." studied alternative drainage solutions for a 100-year level of protection using channel improvements and structural diversion works. Most of the alternatives included either an improvement to the Hienaloli Channel or the construction of a new channel to pick up the North Keopu Stream along with variations of structural diversion works. The construction of a storm drain system in Henry Street as previously mentioned and Heinaloli Flood boundaries, the regional flood problems should first be addressed. A proper drainage and financial analysis of the COE's "Reconnaissance Report" should be accomplished with the end result providing a 100-year storm solution thereby minimizing and flood dangers. The financial analysis of the report should allow for future development. Future development in the area was not considered in the COE's Report; furthermore, a new cost benefit analysis may drastically revise the COE's present position regarding their participation in future flood control measures.

For the purpose of this report, the development of flood plain areas should be avoided. The delay in development of these areas will allow time for completion of the drainage and financial analysis as previously mentioned above.

This report provides drainage solutions to those areas immediately adjacent to the flood plain areas. The proposed backbone drainage systems for the project area below Queen Kaahumanu Highway between the Hienaloli and the Waiaha watershed boundaries are shown on the proposed drainage system (Figure 3-15). This portion of the master plan area is broken down into two drainage areas. The area adjacent or south of the Hienaloli watershed will be referred to as Auhaukeae. The area adjacent to and south of Auhaukeae will be referred to as Puaa.

The Auhaukeae project area receives off-site storm runoff from an existing 65" x 40" box culvert and an existing 30-inch diameter CMP culvert at Queen Kaahumanu Highway. The calculated capacity of each culvert is 488 cfs and 67 cfs, respectively. The Auhaukeae project area is 187.3 acres. The total flow, including off-site runoff, is 861 cfs. The proposed drainage system for this area of the project consists of a concrete channel to collect the off-site runoff, a retention basin covering 3 acres, and trunk lines of 72-inch RCP and 78-inch

site runoff, a retention basin covering 3 acres, and trunk lines of 72-inch RCP and 78-inch RCP and 7' x 3.5' and 10' x 5' box culverts with outlet to the ocean.

It is assumed, based on the "As-Built" construction plans for the Queen Kaahumanu Highway, that the storm flows from the existing subdivision above Queen Kaahumanu Highway (Kini Loop, Nani Kailua Road, Hoene, Aloha Kailua Drive, etc.) drains to the Hienaloli watershed. This appears contrary to the Hienaloli watershed boundaries established by the 1988 FEMA flood report previously mentioned. Introduction of runoff outside of the established watershed may impact the Hienaloli storm flows and should be considered in future studies. Since the Hienaloli flood area has shown to be significant, care should be taken to not allow future diversions into the flood boundary.

The Puaa project area receives off-site runoff through an existing 84-inch diameter pipe under Queen Kaahumanu Highway. The calculated capacity of this pipe is 1,153 cfs. The storm runoff, including the off-site runoff, conveyed through this area is 1,399 cfs. The proposed drainage system consists of a concrete channel to collect off-site runoff, a retention basin covering 2 acres, and box culverts, 8' x 3.5' and 11' x 6' with outlet to the ocean.

Development of properties that are on the mauka side of Queen Kaahumanu Highway should incorporate retention drainage facilities to alleviate the downstream flooding problems. Any new development will increase runoff and thereby create more flooding. All studies to date do not consider any mauka development.



## SECTION 4

### DESIGN GUIDELINES

#### 4.1 THE "KONA WAY OF LIFE" AS A DESIGN CONCEPT

Kailua Village physical environment is reflective of this community's character and the way in which its people experience the Village. Located within the Village core are the majority of the Historic sites, architecture, vegetation and coastal scenery which characterize the popular identity of Kailua Village. These elements include narrow streets and Rights of Way, older low rise structures with minimal street setbacks, distinct architectural character, established trees, and coastal views, with lesser emphasis on the needs of the car. This is also the location of many of the regional and community activities associated with the Village. Vehicular speeds are reduced because of the narrow streets and there is limited parking due to the evolution of development in the area. Cruising leisurely along Alii Drive or leaving the car behind to walk or bike seem to be the principal means to experience the Village core.

The "Kona Way of Life" can be physically translated into design concepts. These include:

1. Integration of new development in the natural environment, while sustaining and enhancing the latter.
2. A respect for the local history, tradition and culture via the preservation of sites and structures while encouraging public understanding and access.
3. An orientation to the pedestrian scale in buildings and landscape.
4. Casual, rustic, natural, materials and colors designed for comfort and reflection as opposed to the fast-paced style of high-tech/highrise glass and metal.

5. Preservation and enhancement of tree canopy/plants for shade and natural beauty.
6. Relationships to the mountains and sea (the bay and the shoreline).
7. Opportunities for friendly gatherings in comfortable places.

The purpose of the design criteria will be to translate the above concepts into definable design elements that can be used to guide future development within the Kailua Village Special District.

#### 4.2 EXISTING ARCHITECTURAL DESIGN CHARACTER

As noted in previous plans for the Village there is no single architectural theme. However, there are some distinct design elements that can be identified as recurring themes. The architecture within the Village is characterized by wide overhanging roofs, vertical accents like mini-towers and pinnacles, generous porches, galleries and arcades, and a "family" of materials and colors including native stone, wood, plaster and stucco, corrugated metal, and special design accents such as graphics, gateways or lattice details. Lush landscaping with large mature trees predominate.

Existing Architectural design elements that characterize Kailua Village:

- 1) ROOF LINES - Indigenous roof lines encompassing broad overhangs and providing protective cover in response to climatic conditions. This includes vents for circulation of air and broad openings/galleries to welcome breezes. The roof line can become a unifying element on the profile of building complexes. Flat roofs are not consistent with Village character.
- 2) VERTICAL ACCENT ELEMENTS - Used in conjunction with smaller scale structures, in the form of (non-habitable) mini-towers, pinnacles and other upward aspiring forms (example - Mokuaukua Church).

- 3) GALLERIES/PORCHES/COVERED ROOF EXTENSIONS - Generous porches, decks, balconies etc., taking advantage of views or creating shelter for social gatherings. Lattice work or railing accents provide privacy while preserving views and air circulation.
- 4) MATERIALS - A family of traditional materials and colors (natural tones) such as local stone, masonry, wood, thatch, metal, plaster and stucco (in light shades-whites/pastels), use of water elements combined with trees/foilage.
- 5) SCALE - Human scale buildings - low rise and simple in form as illustrated by earlier architecture of the area.
- 6) SETBACKS - Building frontage oriented to pedestrians rather than cars. Minimal setbacks in response to earlier (reduced speed) non-vehicular oriented streets. Remote or rear accessed parking areas that encourage users to walk.
- 7) COURTYARDS/ARCADES/PATIOS - Variety of outdoor spaces that invite pedestrians to linger and enjoy the open air spaces.

#### 4.3 STREETSCAPE ELEMENTS

In addition to the guidelines for the architectural character elements, design of streetscape elements should be coordinated to minimize clutter and enhance attractiveness. These elements are a means of defining roadway functions and hierarchy in the overall network, and include signage, plantings, lighting, utilities, site furnishings and paving.

- \* SIGNAGE - A signs function is for identification (not advertising) and must be clearly visible to convey information. The creation of a unified and consistent signage system conveys information in an effective and attractive manner.

- \* **LANDSCAPE** - Plantings are one of the simplest and most effective means of improving the visual quality of the streetscape. They are a way of defining the road hierarchy; screening headlight glare; reducing visual impacts of adjacent surfaces, parking lots and overhead utilities; providing shade; improving the visual quality; and defining buildings and open spaces.
- \* **LIGHTING/UTILITIES** - Street lighting can be effectively used not only for orientation, public safety and security, but also to visually reinforce hierarchies. The importance and function of an area can be conveyed by means of fixture design, placement (height and spacing) and level of illumination. Utilities associated with new construction, renovation or demolition, should be buried to prevent physical and visual cluttering of the streetscape. Existing exposed utilities along roadways should be programmed for underground replacement as soon as practicable.
- \* **WALKWAYS/BIKEWAYS/PAVING** - Different types and configurations of paving and pathways can be used to differentiate between pedestrian and vehicle use areas by creating direction or safety controls in the circulation network. Pavement markings, such as crosswalks, should be consistent in design and application. Striping, curbing or changes in pavement color or texture can be an effective way to define roadways as well as bikeways/walkways private property or public right-of-ways (ROW). Convenient bicycle parking should be provided to encourage less vehicular usage. Handicap access should be provided in accordance with the Americans With Disabilities Act (ADA).
- \* **SITE FURNISHINGS** - A variety of site furnishings can provide opportunities for a more positive visual identity within the Village. Seating and other furnishings such as trash containers, water fountains, information stands, etc., support the pedestrian and encourage social gatherings.

#### 4.4 KAILUA VILLAGE DESIGN COMMISSION (KVDC)

Previously there have been no standards or criteria for use by the KVDC in the review of design proposals.

With the adoption of specific design guideline for the Kailua Kona Special District there will be a structured set of standards to apply to design review for new development in Kailua, which will assist applicants in anticipating design requirements and will provide a consistent baseline for the KVDC to utilize in its review. The Design Commission would continue to review projects submitted to the County Planning Department. The composition of the Commission should be changed to include additional professionals in related design/construction fields (required as new members are appointed). Members should include three design professionals (registered architects and/or landscape architects), two members with backgrounds in building construction and/or engineering and the remaining two members representing interests in Historic Preservation, local business or property owners. This would provide for a higher level of professional expertise in the review of construction documents, interpretation of guidelines and enhance its credibility within the Community.

In addition the KVDC could sponsor an annual recognition of exemplary design within the Community by means of design awards or a gallery of outstanding projects. This would promote further awareness of good local design and the role of the KVDC, in the minds of the public.

The KVDC could also serve as an ad hoc inspection group with the ability to formally notify the Planning and Building Departments of plan violations within the district. Flagged properties maintaining non conforming conditions would not receive sign off on future permits from KVDC until the property was in compliance.

Care must be taken to ensure that KVDC review is strictly oriented to design elements in the guidelines. Planning, zoning and public works issues are not a part of design review. However, the design commission could make suggestions on special standards within the

Special district to appropriate County departments.

The Kailua Village Special District Commission should adopt the enclosed criteria as part of their "Rules and Procedures." As such, the rules would form the basis for the Commission's architectural and design review on applications requiring Plan Approval, referred to them by the Planning Department. The "Plan Approval" section of the Zoning Code should be modified to include wording that would permit the conditioning of applications for Architectural review.

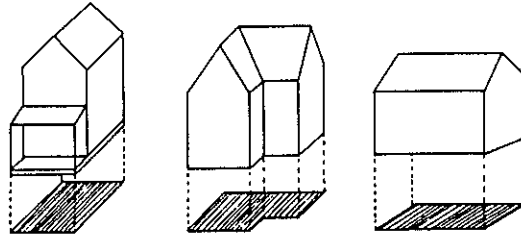
#### 4.5 GUIDELINES

##### 4.5.1 Architectural Design Guidelines

To determine the appropriateness of buildings, design elements of proposed structures shall be evaluated in relation to the context including existing adjacent buildings or other site elements. In most cases, to be considered appropriate, new buildings shall be compatible with respect to the overall village character scale, and vocabulary. However, no single design solution or style should predominate (see Figure 4-1).

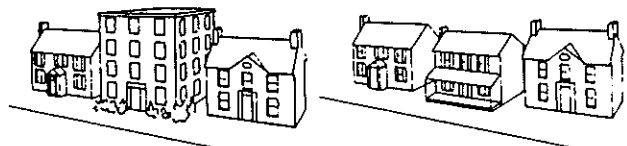
1. Height
2. Bulk and general massing;
3. Major divisions or rhythms of the facade;
4. Proportion of openings (i.e., window to wall relationships);
5. Roof treatments;
6. Materials, colors, and textures of buildings and signage. In general, natural materials such as stone, brick, wood siding, shingles, slate, etc., are preferred to industrial or artificial material such as raw or exposed aggregate concrete, anodized or galvanized metal, tinted glass, plastics, vinyls, etc.
7. General architectural character:
  - a. Horizontal or vertical emphasis;
  - b. Scale;

Directional expression: Is the building footprint narrow, wide, or square?



*footprints of various house shapes*

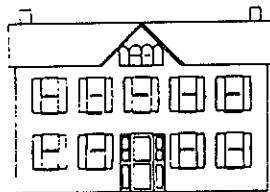
Proportion and scale: How do building heights and widths relate? Are most buildings in scale with each other?



*building out of scale  
with its neighbors*

*building in scale  
with each other*

Rhythm of openings: number and spacing of windows and doors.



*original rhythm of openings  
maintained*



*rhythm of openings  
disrupted*

Platforms: Are buildings elevated above street level by retaining walls or slopes?

Massing: Are buildings simple and boxlike in shape, or articulated by porches, turrets, and bay windows, like most Victorian buildings?



*house with one mass*



*house with  
varied massing*

Figure 4-1

# DESIGN COMPATIBILITY

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- c. Stylistic features and themes (i.e., overhangs, porches, colonnades, detail and ornament);
- 8. Relation to street;
- 9. Except where physical constraints, site configuration or safety considerations preclude strict compliance, all parking must be accessible by driveway to the parking lots of adjacent nonresidential uses and land zoned for nonresidential uses.

A. Site Considerations

1. Village Commercial

Much of the commercial activity within the Village core (Alii Drive) are tourist related retail and restaurants, independent of resort operations. This diversity of activity and intimate streetscape is one of the important attractions of the Village for visitors and should be encouraged.

2. Preserve Views

Do not block or impede important mauka/makai views from streets or other public areas. Views to the Bay and of Mokuaukaia Church steeple are considered important. For new development on vacant sites, appropriate view corridors should be provided.

3. Preserve Site Features

Do not remove or destroy special natural site features. Such features include mature trees and vegetation, natural drainageways and streams, areas of positive environmental and strong visual influences.

4. Relate Buildings to the Site

Buildings should be designed to step with the terrain. The undersides of buildings projecting out over sloping land should, at the very least, be enclosed.

5. Siting

Maximize opportunities for links between commercial and pedestrian activities by using frontyards primarily for landscaping, walkways and related commercial activities with parking located to the side or rear yards. Permitting partial use of front yards for outdoor dining areas would create a variety of activity and facade transitions between the street and buildings. Building frontage should cover at least 70% of the frontyard site area for parcels within the overlay zone.

Special consideration is needed for housing projects. Setbacks and home design that establishes a rigid line of garage doors is unacceptable. A variety of setbacks and the placement of the garage to the side or rear is encouraged. Front entry garages should not be closer to the street than other portions of the house.

6. On-Site Parking

Wherever possible off-street parking for commercial sites should be consolidated into unified parking lots and garages as opposed to individual parking lots for each commercial use. Off-street parking and loading should be placed to the side or rear of buildings where possible. See Figure 4-2.

7. Grading

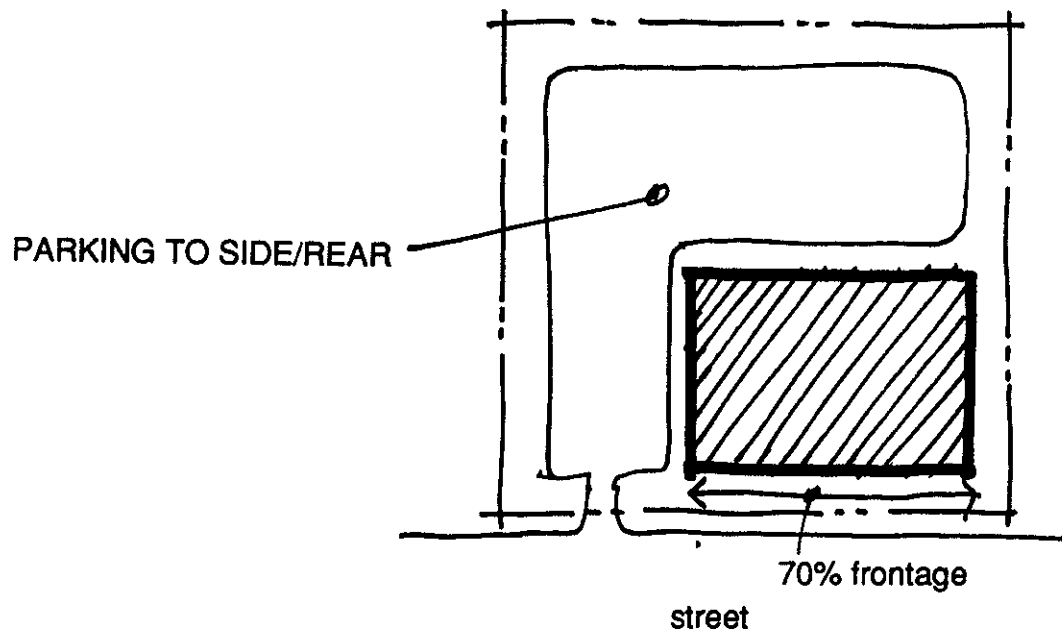
If extensive earth moving is necessary, utilize "re-contouring" rather than "cut and fill." See Figure 4-3.

B. Architectural Character

1. Scale

The design of new buildings should exhibit respect for the architectural context. When siting new buildings directly adjacent or in close proximity to significant existing buildings, utilize similar architectural

COMMERCIAL (Overlay Zone)



RESIDENTIAL GARAGES

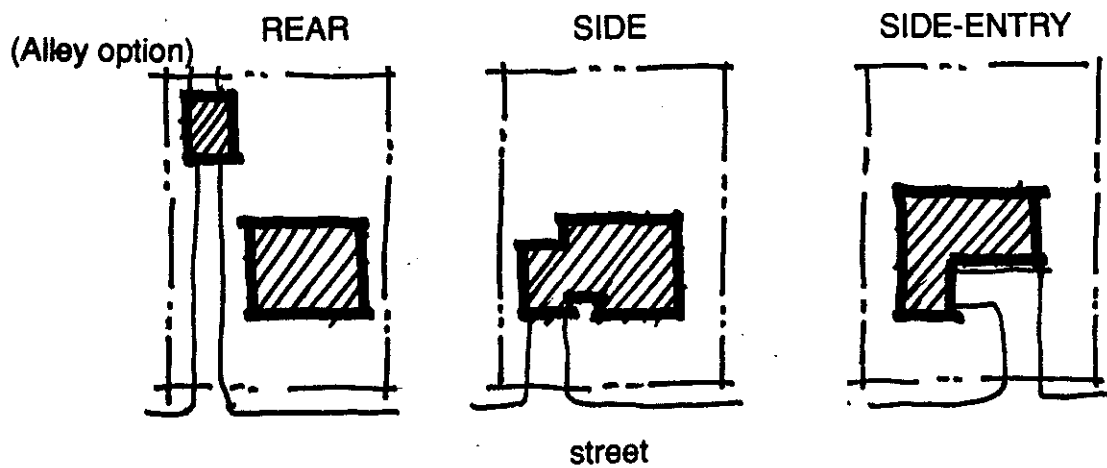
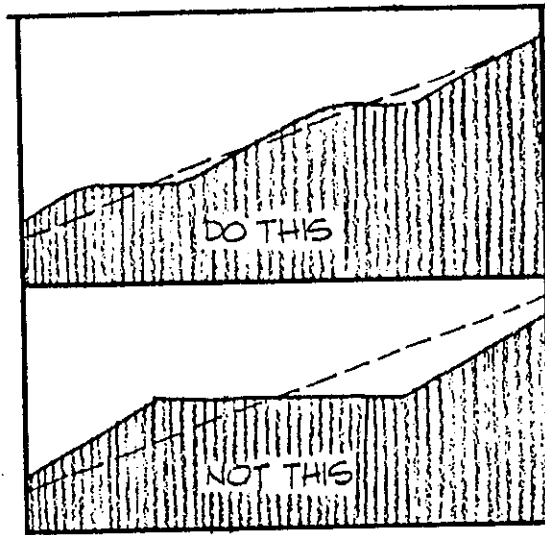
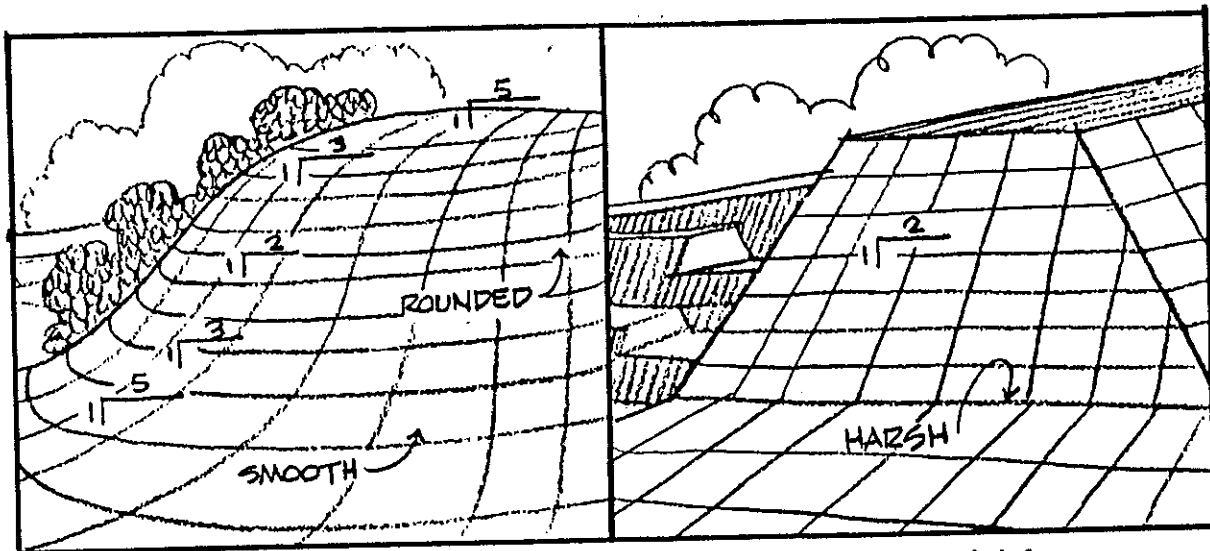


Figure 4-2

PARKING/GARAGES  
KAILUA - KONA  
MASTER PLAN



Make level areas in smaller increments.



Retain smooth flow of ground form; minimize steep slopes.

Avoid harsh, easily eroded forms and high, steep banks.

Figure 4-3

## GRADING

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features, such as scale, proportion and general roof profiles.

All new development should have a scale appropriate to the surrounding buildings or structures with exception to existing multi-story hotels and condominiums (which do not represent the preferred scale and character of the Special District). Where a new building is higher than adjacent ones, and site area will permit, "transitional scaled elements" should be used to enhance the relationships with surrounding structures.

It is important to preserve the intimate scale of the Village which is so important to the atmosphere of the area. An overall height regulation of 45' should be established for the entire district, combined with a one to one vertical horizontal setback starting at the 30' height (for Alii Drive, core area), limiting building facades at the front yard setbacks to 2 stories or 30' in height. These regulations would lessen the impact of larger structures on the Village environment and would be consistent with the overall development objectives.

2. Articulation

Minimum 50 percent of first floor street facade for commercial uses within the Overlay Zone shall be devoted to windows, entries, or other penetrations. To this end, buildings should be "articulated" to avoid overly monotonous facade planes. Structures may be modulated horizontally or vertically to achieve appropriately scaled surfaces.

Reinforcement of the desired image of scale may be accomplished through the use of elements such as banding, jointery, reveals, expression of the heads and sills of openings, balconies, porches, and galleries.

3. Materials/Textures and Colors

Diversity among structures is encouraged in order to express the individual character of the business although simplicity of design and limited color scheme are important.

Use of materials which are compatible to the village atmosphere of Kailua is encouraged. In general, natural materials such as local stone, wood siding and shingles, slate, etc., are preferred to industrial or artificial materials such as raw or exposed aggregate concrete, anodized or galvanized metal, tinted glass, plastics, vinyls, etc.

Color to be used on exterior surfaces of buildings or structures should be limited to natural tones (finishes or stain), which retain the surface quality of the material. The use of natural or earth tones that are not gaudy or clashing shall be encouraged.

4. Roof Lines

All new buildings shall be designed so that a sloped roof line is the predominant appearance (as opposed to flat roofs). Roof top mechanical equipment shall be screened. See Figure 4-4.

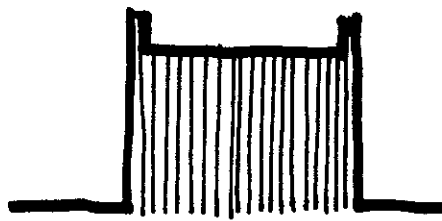
5. Service Elements

Service elements such as trash areas, utility structures shall be screened.

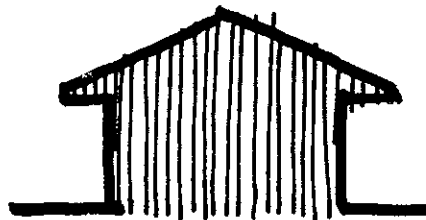
4.5.2 Signage Criteria (See Figure 4-5 and 4-6)

Intent

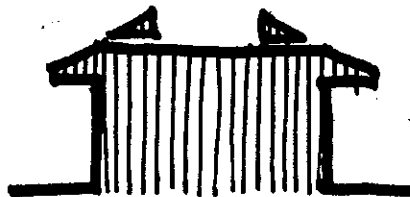
A signs function is for identification (not advertising) and must be clearly visible to convey information. The creation of a unified and consistent signage system conveys information in an effective and attractive manner.



NOT ACCEPTABLE



ACCEPTABLE



ACCEPTABLE OPTION  
(e.g. Jack-in-the-Box)

Figure 4-4

## ROOF LINES

### KAILUA - KONA MASTER PLAN

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Attractive, coordinated, well designed signs have a positive impact on both local businesses and the community. They provide a defined identification of individual businesses; stimulate business performance; create a pleasing environment that will attract people; and enhance the image of the community.

The type, size, and location of a sign can be determined by the zoning ordinance, but the sign material, colors, and design must be determined through guidelines and review by the KVDC.

#### Guidelines for Review

- \* Location and relationships to buildings/site.
  - \* Simplicity, readability of signs.
  - \* Physical composition of signs.
    - a. size and number of signs (12 sq. ft. or 22 sq. ft. based on frontage)
    - b. shape (as related to site and building.)
    - c. lettering - style, size, proportions.
    - d. materials and color
    - e. illumination methods
- A. Location and Relationships to Building, Site, Surroundings
- Signage needs should be determined primarily by criteria established by the building's architecture, the relative size of the sign, and the message. Signs should be an integral design element of a building's architecture and be compatible with the building's style in terms of location, scale, color and lettering.

Storefront commercial building, signs should be confined to a long, continuous "information band" directly above the storefront or applied directly on the display window.

Wall signs are encouraged on older buildings since the lintel that extends above the storefront of these buildings was designed to accommodate such signs, window signs placed on the storefront glass may be appropriate.

Buildings that were originally residential should be identified primarily through a free-standing sign. Projecting signs are especially appropriate when buildings are located very close to the street, with little or no front yard.

Freestanding signs should consist of materials and colors similar to the primary structure.

Consideration for sign placement should take into account whether the sign will be viewed by pedestrians, motorists or both. Signage should be considered within its setting and designed according to the scale, texture, and proportion in which it will ultimately be viewed. Off-premise signage should be in scale, color and proportion to surrounding properties to which the message is being conveyed.

Fitting each sign to its surroundings shall be a prime consideration. A sign shall complement the building it identifies and the theme of Kailua's village way of life as described in the Kailua Village design plan. It shall be a planned feature, reflecting the architectural scale, design, and color of the building or structure.

Landscaping. A free standing sign should offer an opportunity for landscaping treatment at its base.

B. Simplicity and Readability

Simplicity and readability of signs should be stressed. Freestanding signs relating to an assemblage of business, e.g., shopping centers, should be grouped and visually coordinated to reduce confusion. Signs should be legible

and appropriate to the business and its projected image.

C. Physical Composition

1. Size and Number of Signs

Wall signs should not be more than 9 feet above grade level. Monument signs, along major corridors, should be integrated with the landscaping for the site.

The overall size and number of signs shall minimally dominate the property or the building which it identifies.

Particular emphasis should be placed on the size of the sign in relation to the speed limit along the corridor where it is placed. Figure 9-4 indicates driver reaction times for the determination of a maximum effective readable sign size and is applicable to both on and off-premise signs. Narrow streets, small buildings, small frontyard setbacks, and slow moving traffic all demand small signs.

2. Shape

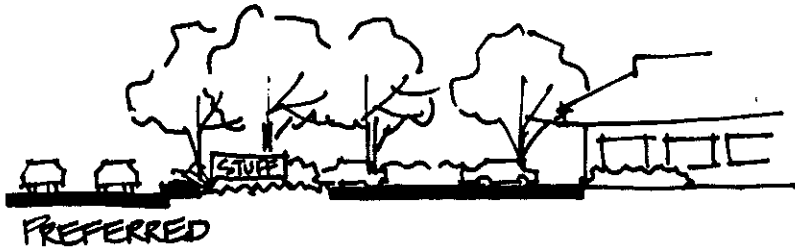
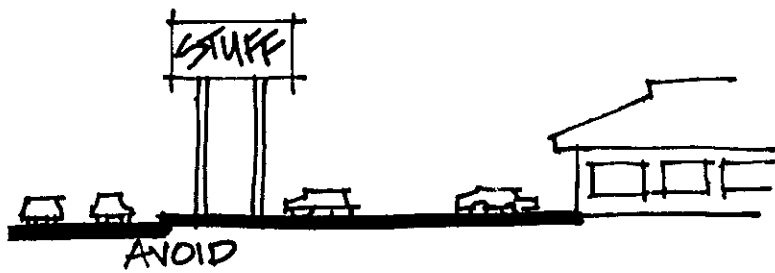
The shape of the sign shall seek to aesthetically and functionally emphasize the message and not compete with the architecture of the building.

3. Lettering

Subtleness, proportion, and design shall be emphasized in sign copy and lettering. No more than two type faces is recommended.

4. Colors and Materials

Use of no more than three colors (for background, lettering, and emphasis). Natural materials like wood and metal are encouraged, although neon may have a place in certain areas. The use of any



Ground signs with appropriate landscape are preferred over pole signs.



Grouping of signs for Commercial Centers.

Figure 4-5

## SIGNS

# KAILUA - KONA MASTER PLAN

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| Design Factors and Resulting Basic Design Elements |             |                         |                                                |                        |                               |
|----------------------------------------------------|-------------|-------------------------|------------------------------------------------|------------------------|-------------------------------|
| Number of Lanes                                    | Speed (MPH) | Reaction Time (Seconds) | Distance Travelled During Reaction Time (Feet) | Letter Height (Inches) | Total Sign Area (Square Feet) |
| Two                                                | 15          | 8                       | 176'                                           | 4"                     | 8                             |
|                                                    | 30          |                         | 352'                                           | 7"                     | 25                            |
|                                                    | 45          |                         | 528'                                           | 10"                    | 50                            |
|                                                    | 60          |                         | 704'                                           | 14"                    | 100                           |
| Four                                               | 15          | 10                      | 220'                                           | 4"                     | 8                             |
|                                                    | 30          |                         | 440'                                           | 9"                     | 40                            |
|                                                    | 45          |                         | 660'                                           | 13"                    | 90                            |
|                                                    | 60          |                         | 880'                                           | 17"                    | 150                           |
| Six                                                | 15          | 11                      | 242'                                           | 5"                     | 13                            |
|                                                    | 30          |                         | 484'                                           | 9"                     | 40                            |
|                                                    | 45          |                         | 726'                                           | 14"                    | 100                           |
|                                                    | 60          |                         | 969'                                           | 19"                    | 190                           |
| Expressway                                         | 60          | 12                      | 1056'                                          | 21"                    | 230                           |

Source: Shreveport Metropolitan Planning Commission, "Sign Sense", 1986.

This chart indicates the appropriate signage letter sizes based on visibility from a moving vehicle.

Figure 4-6

# SIGN CRITERIA KAILUA - KONA MASTER PLAN

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natural or earth tone color that is not gaudy or clashing shall be encouraged.

Diversity among signs is encouraged in order to express the individual character of each business, although simplicity of design and a limited color scheme are still key. The use of any material which is compatible to the Village atmosphere of Kailua shall be encouraged. Material includes, but is not limited to, wood, stone, canvas, rope, brushed or textured metal, or glass.

5. Illumination

When an illuminated sign is used, the light intensity, color illumination, and the careful screening of the light source shall be considered must comply with County light code (re: Observatory).

4.5.3 Landscape

Intent

Plantings are one of the simplest and most effective means of improving the visual quality of the streetscape. They are a way of defining the road hierarchy, can be used to screen headlight glare, reduce visual impacts of adjacent surface parking lots, overhead utilities, service areas or undesirable views, provide shade for a cooler more pleasant environment, improve the visual quality of the area and provide spatial definition.

Where there is a desire to enhance the lush green environment that characterizes Kailua-Kona, there are some major concerns in the Kona area with regard to water consumption. All proposed plantings should incorporate basic xeriscape principles via appropriate plant material placement and selections with drought resistant qualities along with water conserving irrigation technology.

Building groups or open spaces may be unified in function or appearance through the use of similar plant material. This also results in more efficient maintenance. The colors and textures of plants lessen the contrast between incompatible structures and visually unify the total composition of the area. Outdoor spaces should be defined along the streetscape and among building groups, utilizing landscape materials as a primary design element.

### Landscape Guidelines

In addition to Architectural considerations, landscape can amplify the visual quality and spatial definition of the site. Landscape plans will be evaluated based on:

- \* Plant material selection (species selection, size, quality and placement) with consideration of:
  - Scale in relationship to adjoining elements.
  - Color and texture.
  - Growth/maintenance, and watering requirements (use of plants with xeriscape qualities are preferred)
- \* Total site area and front yard landscape requirements.
- \* Off-street parking and screening landscape requirements.
- \* Preservation of existing landscape environments. (Preservation, relocation or replacement of all site trees over 3" in caliper.)
- \* Irrigation.
- \* Maintenance of proposed landscape material.
- \* Compatibility with the overall planting design concepts set forth by the Kailua Village Master Plan.

#### A. Plant Material Selection

Proposed plantings should incorporate basic xeriscape principles via appropriate plant material placement and selections with drought resistant qualities. See Recommended Streetscape Plants.

Building groups or open spaces may be unified in function or appearance through the use of similar plant material. This also results in more efficient maintenance. The colors and textures of plants lessen the contrast between incompatible structures and visually unify the total composition of the area.

B. Total Site Area Requirements

Resort-hotel, commercial and multiple family districts shall maintain a minimum of 25 percent of the total lot area in landscaped green space.

Industrial districts shall maintain a minimum of 10 percent of the total lot area in landscaped green space.

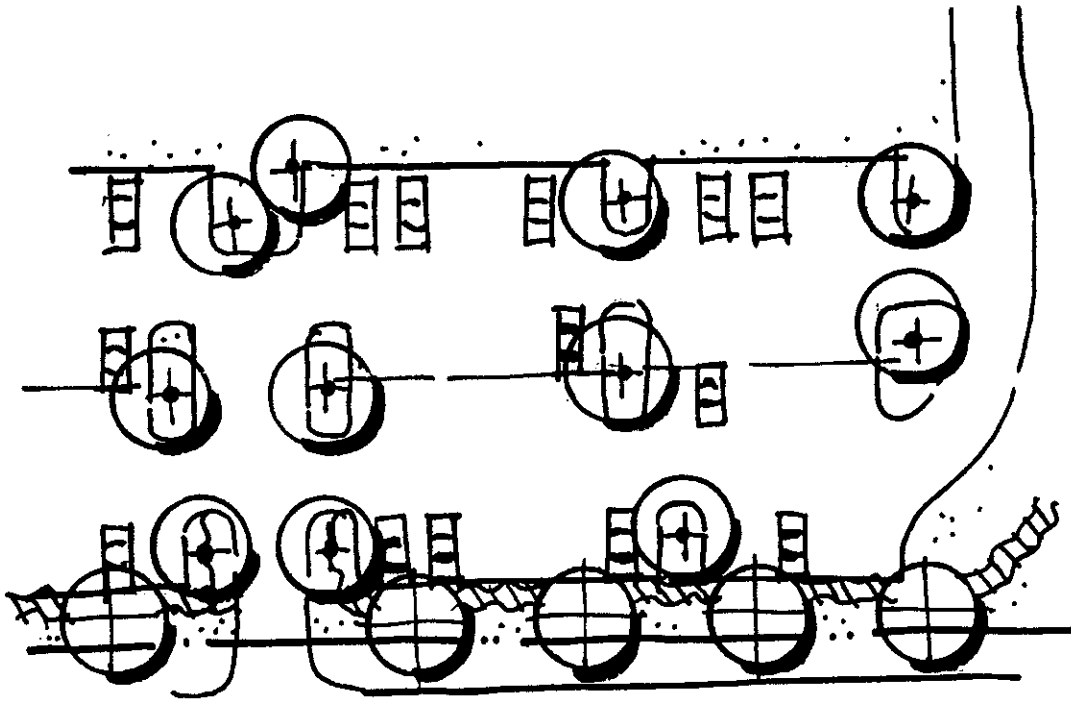
FRONT YARD REQUIREMENTS

- \* Multiple Family, Commercial and Industrial Districts shall maintain a minimum of 60% of the required front yard in landscape material.
- \* Resort/hotel districts shall maintain a minimum of 25% of the required front yard in landscape material.

C. Off-Street Parking Requirements (See Figure 4-7)

The paved areas of large parking lots should be interspersed with landscaped views containing trees and/or other natural growing materials. Unrelieved expanses of asphalt or concrete are monotonous while also detracting from the overall attractiveness of the site.

1. Parking lots (with more than 10 spaces) shall provide a minimum of (10%) ten percent of interior landscaped area. Landscaping shall be evenly dispersed throughout the parking area. ( 5% for industrial sites.)
2. Interior planting islands with a minimum of 50 sq. ft., shall be located between every 10 parking spaces with at least one tree (minimum size of 1-1/2" cal. - 7' ht. - mature clear wood of 5' ht. and a crown spread



Interior planting islands in parking areas  
with required perimeter landscape setbacks.



Visual screening of offstreet parking  
with landscape, berms, walls.

Wheel stops/curbs prevent vehicular  
encroachment into landscape areas.

Figure 4-7

## LANDSCAPE

# KAILUA - KONA MASTER PLAN

of 15') and groundcover or shrubs installed within each island.

3. A 3' width perimeter landscape strip will be provided when a parking lot abuts a public R.O.W. or adjoining property. This landscape strip shall include either a wall, hedge, berm or combination of these elements, that will screen the parking lot from public view to a height of three feet. In addition one tree per each 30' linear feet of perimeter shall be provided.
4. Curbs or wheel stops shall be installed to protect adjoining planting areas within the parking lot, from vehicular encroachment.
5. Exposed utilities (junction boxes, meters etc.), dumpsters, or similar elements, shall be screened from public view with landscape treatment, walls, fences or combination of these elements.
6. Existing landscaping in yards, setback areas and parking lots shall be credited towards the overall lot area requirements for landscaping. Minimum size of new trees shall be 1-1/2" cal. - 7' ht. - mature clear wood of 5' ht. and with mature crown spread of 15'.

D. Preservation/Tree Removal or Relocation

It is recommended that selected trees within the Village be placed on the County's "Landmark Tree List" in order to ensure their continued protection.

Any tree 3 inches or greater in trunk caliper shall not be removed except as follows:

Exceptions

1. Retention of the tree unreasonably restricts development of the site.
2. The tree is a hazard to public safety.

3. The tree is dead, diseased or otherwise irretrievably damaged.
4. The applicant can demonstrate the tree is unnecessary due to overcrowding of vegetation.

#### Replacement

1. Any tree removed shall be replaced by an approved tree with a minimum 2-inch caliper, unless it can be demonstrated that replacement results in overcrowding of vegetation.
2. Trees proposed for removal shall be relocated to another area of the project site, unless age, type or size of the tree restricts relocation.

#### E. Irrigation

All required landscape areas shall be watered by an automated irrigation system.

Proposed plantings should incorporate basic xeriscape principles via appropriate plant material placement and plant selection with drought resistant qualities. Areas that require water enhancement, shall install an automated irrigation system which utilizes water conserving irrigation technology.

In order to reduce water loss due to evapotranspiration, irrigation operation should be limited to the hours of 6 pm through 9 am.

#### F. Maintenance

All required landscape areas shall be maintained in a healthy, attractive and weed free state. Any dead or dying material shall be removed and replaced with healthy new material as per original plan requirements.

Trimming of trees shall be done in a manner that permits healthy uniform growth and should be in accordance to the National Arborist Association Standards. Severe pruning in the form of "Hat racking" is not acceptable.

Location of trees shall not occur beneath powerlines or near structures in a manner that will interfere with the continued growth and maintenance of the tree.

G. Special Treatment Zones

There shall be a minimum 10-foot wide landscaping strip fronting all properties along Kuakini Highway, and a minimum 20-foot wide landscaping strip fronting all properties along Queen Kaahumanu Highway.

Within the 20-foot yard requirement fronting Queen Kaahumanu Highway and the 10-foot yard requirement fronting Kuakini Highway the following standards shall be applied:

1. Seventy-five percent of the setback area shall be landscaped.
2. A minimum of one tree per 30 lineal feet of frontage shall be provided.
3. Trees installed shall be a minimum of 1-1/2-inch caliper and 7 feet in height.
4. Landscaped setback areas shall be irrigated.

H. Recommended Streetscape Plants for Kailua Village

1) LARGE ACCENT TREES

Ficus spp. (benghalensis, nitida), Norfolk Island pine - Araucaria excelsa, Royal Poinciana - Delonix regia, Monkey pod - Samanea saman.

2) MEDIUM ACCENT TREES

Kou - Cordia subcordata, Wiliwili - Erythrina sandwicensis, African Tulip Tree (gold/orange var.) - Spathodea campanulata, Shower trees.

### 3) STREET TREES

Autograph Tree - *Clusia rosea*, Mahogany - *Swietenia mahagoni*,  
Monkeypod - *Samanea saman*, True Kamani - *Calophyllum*  
*inophyllum*.

### 4) PALMS

Alexander/MacArthur Palms, Loulu - *Pritchardia pacifica/beccariana*,  
Niu (Coconut Palm) - *Cocos nucifera*

### 5) LARGE ACCENT SHRUBS/SMALL TREES

Sea Grape - *Coccoloba uvifera*, Heliotrope (Tahinu) *Messerschmidia*  
*argentea*, Milo - *Thespia populnea*, Hau - *Hibiscus tiliaceus*, plumeria,  
banana.

### 6) MEDIUM/SMALL SHRUBS

Natal plum - *Carrissa* spp., *Hibiscus* spp., *Crinum* lilies/Spider lilies -  
*Crinum* spp., *Nerium oleander*, Pikake-Jasmine Sambac, Naupaka -  
*Scaevola taccada*, *Phildendrum*

### 7) FLOWERING SHRUBS/VINES

Nightblooming cactus - *Hylocerus undata*, *Bougainvillea* spp.,  
Honeysuckle - *Lonicera* spp., Alamanda, Kuhio vine, Mexican creeper,  
pikake-Jasmine Sambac

### 8) GROUND COVERS

Creeping 'Ilima - *Sida fallax*, Lakana - *Lantana camara*, Chinese violet  
- *Asystasia gangetica*, St. Augustine grass, Seashore *paspalum*, Bermuda  
grass, wedilia, Laua'e fern, patuos.

#### 4.5.4 Lighting/Utilities

##### Intent

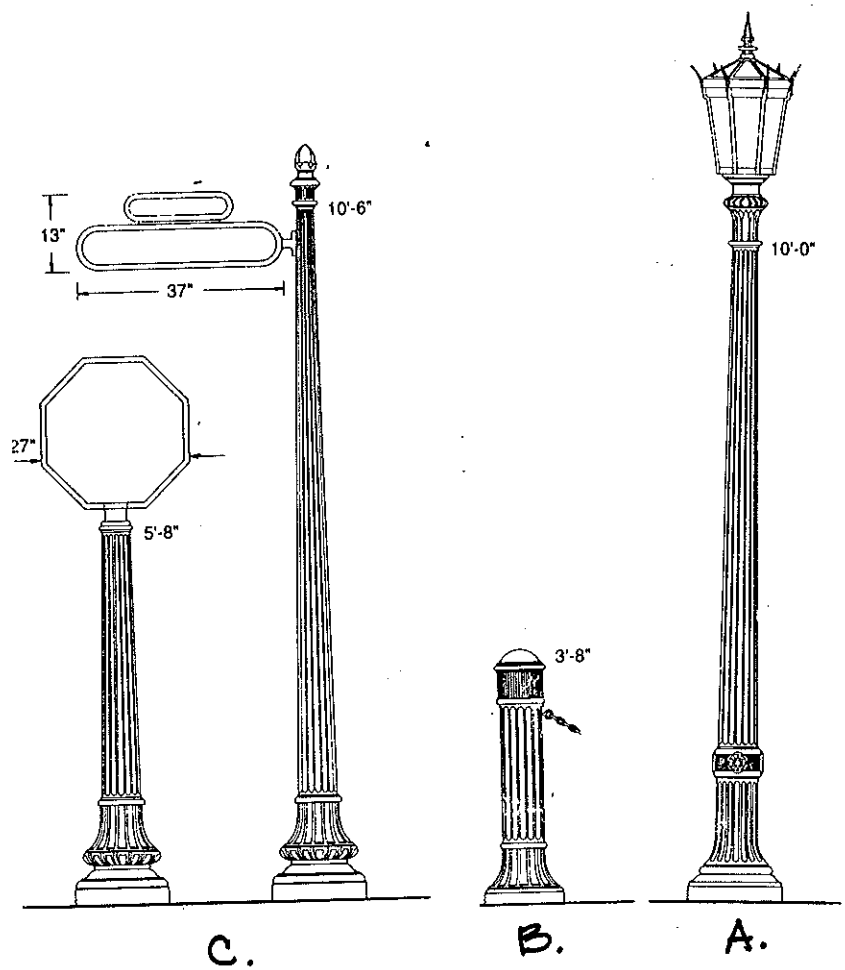
There is an existing County ordinance regulating outdoor lighting which is directed at mitigating negative lighting impacts on the Mauna Kea Observatory. This generally restricts use of certain types of lighting between 11 pm and sunrise. The ordinance requires that lighting visible during this time must be vertically shielded and all light sources with the exception of low pressure sodium shall be filtered to a specified level.

Street lighting can be effectively used not only for orientation, public safety and security, but also to visually reinforce hierarchies. The importance and function of an area can be conveyed by means of fixture design, placement (height and spacing) and level of illumination (see Figure 4-8). Utilities associated with new construction, renovation or demolition, should be buried to prevent physical and visual cluttering of the streetscape. Existing exposed utilities along roadways should be programmed for underground replacement as soon as practicable. In the meantime, they should be screened by plantings, architecture or topography.

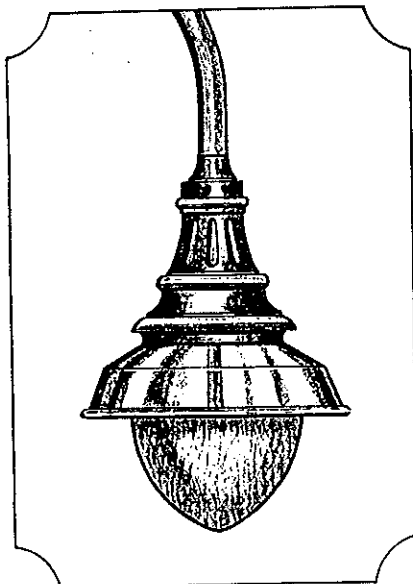
##### General Guidelines for Site Lighting

The guidelines with respect to illumination are as follows:

1. Exterior lighting may be used to illuminate buildings or grounds for night safety purposes in an aesthetic manner (not in the form of advertising or to draw more attention than it would have in the daylight).
2. Fixtures should be selected for aesthetic as well as functional values. They should be considered as visible site furnishings and should be uniform and unobtrusive.
3. The lighting system shall be architecturally compatible with buildings and other features. (They should not compete as sculptural elements.)



D.



- A. Existing Street lights  
(along Alii Drive - mauka of seawall)
- B. Proposed pedestrian level bollards lights
- C. Coordinated Street Signs.
- D. Proposed alternate fixture with fluted reflector.  
(providing vertical light cut-off).

Note: All street light fixtures should be low pressure/high pressure sodium (100-300 watts).

Figure 4-8

## LIGHTING

# KAILUA - KONA MASTER PLAN

4. Exterior light sources should be concealed or indirect in nature so as not to produce glare to surrounding properties or direct public view. A limited number of lights may be used to create shadow, relief or outline effects if concealed. All lighting must also meet the requirements of the lighting code for vertical shielding.
5. Private site lighting and street lighting fixtures should be modestly scaled in height, and used in combination with lower level pedestrian lights or recessed lighting, featuring area walkways, trails, entries or plantings.

#### Other Utilities

All wiring with the exception of the main transmission lines should be underground. Other utility company lines (phone, cable, etc.) - unless directed by any other ordinance or regulation to the contrary, should also place their future lines underground within the Kailua Village Special District.

All exposed transmission boxes, lift stations or other structures shall be screened with fences, walls, or structures (aesthetically compatible with the adjoining uses) or with berms and landscaping.

#### 4.5.5 Walkways/Bikeways/Paving Criteria

##### Intent

It is important, as connections throughout the Village improve, that people with special needs and requirements are not neglected. Barrier-free circulation should be incorporated into residential walkway systems for use by the handicapped. Interior patios and courtyards as part of the pedestrian system emphasize that the Village is a place where people enjoy being out-of-doors, and generous openings relate to these spaces.

Different types and configurations of paving and pathways can be used to differentiate between pedestrian and vehicle use areas by creating direction or safely

controls in the circulation network. Pavement markings, such as crosswalks, should be consistent in design and application. Striping, curbing or changes in pavement color or texture can be an effective way to define roadways as well as bikeways/walkways private property or public ROW's. Convenient bicycle parking should be provided to encourage less vehicular usage and handicap access should be provided in accordance with the Americans With Disabilities Act (ADA).

#### Guidelines

- 1) Incorporation of barrier free conditions for the handicapped in all public and private circulation systems by direct access or ramps.
- 2) All properties should provide safe, convenient walkways along their frontage and from parking lots, sidewalks and primary entries to their facilities. (4 feet width minimum). Where walkways bisect roadways, safe and convenient pedestrian crosswalks should be provided.
- 3) Public and private cooperation on provision for more mauka-makai paths and continuous waterfront access on both public and private properties.
- 4) Paving treatments
  - Private walkways and sidewalk paving material should be visually compatible with the adjoining architecture or native paving materials.
  - Where appropriate, use of surface striping, color or texture to define traffic patterns or functions.
  - Surfaces should be safe for given site conditions and constructed to comply with national handicap design standards.
- 5) Public and private cooperation on provision for more bikeways along all major street corridors with secured/safe parking areas. Where space allows, separation of pedestrian and bike traffic should be effected.

#### 4.5.6 Street Furnishing Criteria

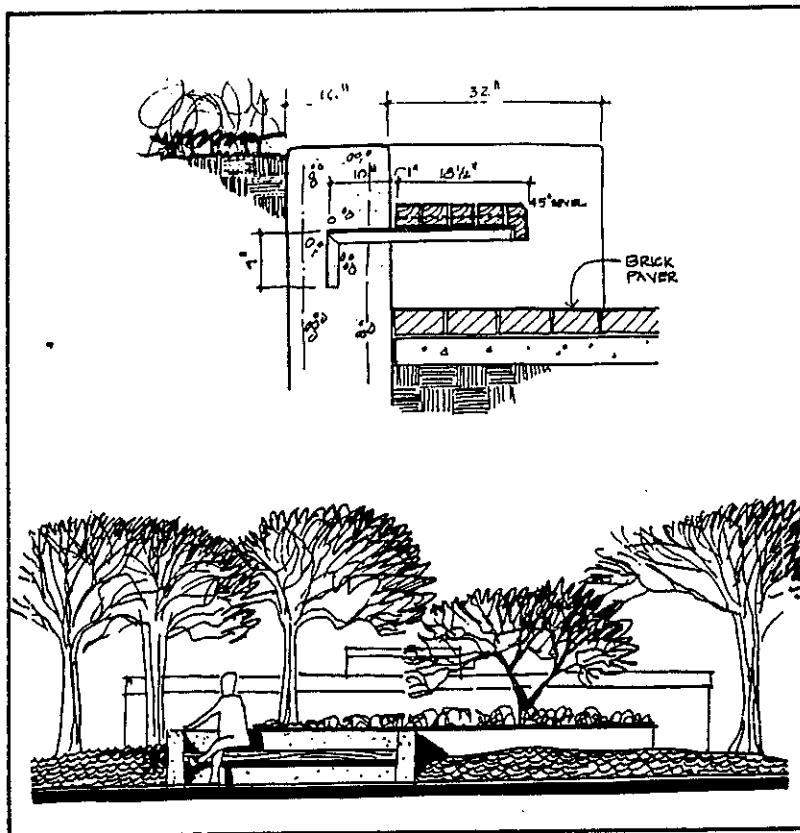
##### Intent

The provision of outside seating can optimize and encourage pedestrian activity. Important locations for seating include: major pathways, recreation areas, plazas and mini parks, near stairs and ramps, bus or taxi stops, along the edges of natural/coastal areas.

The provisions of street furnishings can encourage usage of walkways. A variety of site furnishings will provide opportunities for a more positive visual identity within the Village. A well coordinated streetscape includes provision of seating, and other furnishings such as trash containers, drinking fountains, information stands, etc. These elements will encourage social gatherings and relaxation and can contribute to the Village environment.

##### Guidelines

- \* Furniture should be selected for functional use, comfort and aesthetics.
- \* Should be compatible with local architecture and make use of native materials such as local stone, wood, logs, etc.
- \* Design for long term maintenance (wood should be soaked with preservatives, benches should have slats/pitches to shed water etc.).
- \* Furnishings should be designed into or near a building or other structure (walls, etc.) where possible and not treated as separate element. Enclosure and or screening of newsstands and trash receptacles is needed.
- \* Locate seating near major pathways, recreation areas, plazas and mini parks, near stairs and ramps, bus or taxi stops, edges of natural/coastal areas. Do not place in a manner that obstructs pedestrian traffic or creates a hazard.



Site furnishings should be integrated into surrounding architecture or landscape where possible, creating small "environments" where people can linger and relax.

Figure 4-9

## SITE FURNISHINGS

# KAILUA - KONA MASTER PLAN

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- \* Create as many opportunities as possible for people to relax and socialize. Benches should be dimensioned to enhance functional use as well as comfort. Seating surfaces should have pitched profiles or slats to shed water.

A. Trash Receptacles

At present there are trash receptacles sponsored by the Chamber of Commerce Street Furniture Program, that serve the immediate needs in the area. Future receptacles should be designed as part of stone walls and not as separate features. Newspaper stands should be enclosed and placed adjacent to buildings or walls and not in a pedestrian movement pattern. All garbage containers should be screened from view.

B. Walls

Walls are frequent in the Village, many are stone and this theme should be retained and maintained in new construction. Stone walls can be used to create entrance courtyards and should be developed to reflect the tangents of nearby buildings, define circulation pattern and enhance plaza/courtyard areas.

Also, walls are used to facilitate grade transitions. When visible from public streets, all walls shall be made of or faced with stone.

## SECTION 5

### IMPLEMENTATION

The Kailua-Kona Master Plan envisions a diversity of public and private projects and improvements. The Plan provides recommendations to reinforce and expand bayfront uses to create an environment that is truly reflective of the rich history that is embodied in the village, and at the same time grow as an exciting gathering place for residents and visitors alike. The ultimate success of the Plan will hinge on those agencies that actually carry out the ongoing planning, design, financing, construction, regulation and administration of Kailua-Kona town projects; and the involvement of the private sector. The local residents, working through many interested organizations are an essential force to effect this plan. This chapter contains recommendations on management framework, phasing of priority projects, land use policy and zoning changes, and financing options.

#### 5.1 PUBLIC LAND USE POLICY

Several actions are essential for the implementation of the Kailua-Kona Master Plan. These include:

##### Adoption of the Kailua Master Plan

- \* By County Council.
- \* Commitment of the County Administration to support and implement plan.

##### General Plan/Zoning

- A. Amend the Land Use Pattern Allocation Guide (LUPAG) to achieve conformance with the Master Plan.
- B. Initiate rezoning for those properties not in conformance with the Master Plan. This would apply to commercial, resort and residential districts. Agriculture and Unplanned districts would be considered at such time as applications are made by the property owner.

### Kailua Special District

While a part of the zoning ordinance, the Special District provides the opportunity to implement specific standards that apply to this area only, rather than unnecessarily impact the entire island through other ordinance provisions.

Essentially, the Special District establishes the Kailua Village Design Commission. The district's scope can be enlarged to accommodate additional provisions.

#### A. Amend the Boundaries of the District

Due to the proximity and visual impact to the Village, several areas are recommended for inclusion in the Special District. These are the existing industrial subdivision to the north and areas immediately mauka of the Palani/Queen Kaahumanu intersection. These areas are significant to the Special District due to their high visibility. There are the areas initially perceived as the "entry" and first introduction to Kailua Kona. The proposed boundaries are shown on Figure 5-1. The Special District ordinance permits a boundary review and amendment at five-year intervals.

#### B. Make changes to the Kailua Village Design Commission (KVDC)

The changes recommended in Section 9 include:

1. Revise composition to incorporate design professions.
2. Mandate adoption of guidelines. The adoption but not the content of the guidelines would be mandated. Guidelines for adoption by the KVDC are in Section 9. The design criteria should be summarized in a separate document for giving out at the Planning and Building departments. Design guidelines are most effective when considered prior to design. Additionally, local organizations should be made aware of the guidelines such as A.I.A., APA, ASLA, NAHB, etc.

C. Establish an Overlay Zone for the Village Area

This area, indicated on Figure 5-1, is to receive special consideration as it represents the essential theme area of the Village. Significant elements within this area include:

1. Five-foot frontage setback on Alii Drive with overhang permitted in this setback.
2. A profile to consist of a maximum height of 30' on the front setback, after which a building shall be setback at least 1 foot horizontal for every vertical foot.
3. Creation of a new mixed-use zone that combines commercial and residential uses. This would apply to areas immediately mauka of Kuakini.
4. Creation of a new mixed-use resort/commercial zone for the areas makai of Kuakini Highway.
5. The overlay zone would also be the area for a special management entity oriented to the long term redevelopment of the area and acting as a vehicle to coordinate such items as:
  - Consolidation of parking and construction of joint parking structures.
  - Fund raising.
  - Establishing a special village identity to include entry treatments, special light fixtures and street furniture, identity signage and the priority area for sidewalk improvements and utility undergrounding.

The proposed management entity is discussed in part 5.4 of this section.



#### D. Special District Development Standards

Specific revisions to the Special District include:

- \* Establish a overall height limit of 45 feet.
- \* Changing the following parking ratios to:
  - 5 spaces/1,000 SF for retail commercial
  - 3.5 space/1,000 SF for offices
  - 1.5 spaces/d.u. for multi-family
- \* Provide density bonus for residential projects, i.e., allow up to a 10% increase in dwellings for project designs that embody cluster or neo-traditional techniques that enhance pedestrian oriented neighborhoods and provide increased park and open space. Internal density transfers are permitted. To fully accomplish neo-traditional neighborhoods, changes to codes and policies may be required.

#### 5.2 FINANCING OPTIONS

The critical element in implementing the Kailua-Kona Master Plan is to acquire the means to finance the development or improvements identified in the priority plans. There are a number of different funding avenues that can be explored. Those that can be privately funded would normally be project-related and therefore may be part of a development agreement. In other cases, private funding of improvements may simply involve individual property owners enhancing their own properties and frontages as they upgrade them over time.

Government or public improvement projects, on the other hand, would be subject to statutory authorities. Thus, each option would need to be approached carefully to preliminarily determine its opportunities and limitations. The following is a discussion of public financing options to be considered.

1. **Development/Impact Fees.** The most important point that must be recognized in imposing such fees is that the fee may only be based on a particular development's impact and/or cost for a particular infrastructure

system. This caveat is often referred to as the need to establish a *nexus*. At present, the County only charges development fees for water infrastructure. Development fees for park, recreation, administrative and public safety purposes will produce less in total revenues, however, the amounts are significant enough to justify the fees. ("County of Hawaii Infrastructure Financing Analysis and Plan," Sutro & Co.).

2. **Improvement Districts.** This is considered a classic method that has been used numerous times in Hawaii County. Chapter 12 of the Hawaii County Code sets up the procedure for the creation of an improvement district. The county council may create improvement districts to pay for the cost of certain improvements to land where the council finds that the improvements will "specially benefit" certain land and where the improvements will be in the "public interest."

Types of improvements that can be funded with the mechanism are:

- a. streets, highways, sidewalks
- b. storm drainage facility (incl. sewer facilities);
- c. street lighting system;
- d. water system;
- e. underground or overhead utility facilities;
- f. parking facilities, pedestrian mall, parks, playgrounds, beach areas, or other public recreational facilities;
- g. any other public improvement that will specially benefit the land to be assessed.

Improvement district bonds are sold to pay for the improvements. Owners of the land in the district are assessed their share of the cost of the improvements based on the degree of benefit each parcel of land received. A lien against each parcel in the amount of its assessment is recorded at the

Bureau of Conveyances.

Monthly or annual installments of principal and interest are paid by the land owners in the district. The county uses this money to pay the debt service on the bonds sold to finance the improvements. These bonds are not a general obligation of the County.

Once the bonds are paid off and all assessments are paid, the lien on the property will be released.

Preliminary comments: This mechanism may be difficult to implement particularly with as many parcels and owners involved in the project area. Improvement districts also do not allow much latitude in terms of tailoring cost-sharing formulas to particular situations.

3. **General Obligation Bonds.** G. O. bonds will continue to be the mainstay of the County of Hawaii's infrastructure financing program. However, the County's general obligation capacity is limited. Because of this, the use of G. O. bonds for projects where there is no clear identifiable beneficiary of the infrastructure who should equitably pay or the improvements represent catch-up or in-fill development driven needs.
4. **Revenue Bonds.** Historically, the County has not issued revenue bonds. There are four possible types of revenue bonds that the County should consider in the future.
  - a) **Water.** The Water Department is fully capable of issuing revenue bonds on the strength of its own balance sheet and revenues, as opposed to raising money through general obligation bonds.
  - b) **Sewer.** Both Kona and Hilo require large capital expenditures, and the

rate payers would start bearing the cost of these expenditures through the implementation of a G. O. bond program for this service.

- c) Solid Waste. In certain areas, such as Kona, solid waste capital expenditures are becoming very significant. The County has begun to investigate the possibility of establishing a solid waste revenue program, at least for the larger commercial and industrial users.
- d) Highway Fund. Currently, the Highway Fund is operated on a pay-as-you-go basis. However, although the Highway Fund is legally capable of issuing revenue bond, the current revenues are effectively allocated thereby leaving no surplus revenues to bond against.

#### 5. Community Facilities (Special Tax) Districts

- \* County needs to adopt this mechanism now that there is State enabling law.

Also referred to as the Mello-Roos method, the purpose of this method is to provide a means of financing needed facilities and improvements that will benefit a specific area through the creation of a Special Tax District. The cost of the facilities or improvements will be paid by the users who benefit from them through a special tax.

A Community Facilities District can be initiated by petition of the property owners of the proposed district, or by the County Council. Such a district can be created to finance the construction or maintenance of improvements and facilities, and also services.

The construction of improvements and facilities can be financed buy the sale of special district bonds by the County. The bonds will then be retired by the

special tax payments made by the property owners in the district. Services can be financed directly by the special tax, but not by the sale of bonds.

A special tax will be assessed against the benefitted property. A lien is recorded against the property to guarantee the payment of the tax. If the tax is being used to retire bonds, the length of time it runs would be dependent on the terms of the bonds, which is usually 20 years. A tax to finance services may well be for an indefinite time, perhaps permanently.

Advantages: The advantages to this method over traditional improvement districts include:

- \* Services as well as facilities and maintenance can be financed; bonds cannot be used to finance services, but services can be paid for by special taxes;
- \* Payments made by lot owners in these types of districts are a special tax, which is expense deductible for federal income tax purposes; assessments paid by lot owners in an improvement district are not; and
- \* There is no requirement that the allocation of the special tax be made on the basis of the degree of benefit received by the parcels of land as is required in an improvement district. The tax may be levied on any reasonable basis agreed upon by the County and the property owners.

Preliminary comments: This would be the most flexible and appropriate funding method. Various factors can be considered in allocation of costs. The State enabling law was approved by the 1992 State legislature; the County ordinance to implement the concept has been drafted and is now under review by the County administration. It was also noted that while there is no clear law on the subject, it is standard practice on the mainland for property owners

who are paying Mello-Roos tax payments to treat them as deductible expenses for tax purposes.

A working example of the application of the Mello-Roos assessment district would be the Kuakini Highway widening project. Included in the preliminary examination will be crucial questions such as, what increments at what costs?

6. **Tax Increment Financing.** This is a method of financing public improvements within a specific contiguous or non-contiguous area, designated a tax increment district, by dedicating increases in property tax revenues within the district to the funding of specific projects. Upon the creation of a district the County Council, the "assessment base" (total assessed value of all taxable real property within the district) is frozen. As the property increases in value, the real property taxes on the assessment base continue to go to the county, while the taxes on the increased value, the "increment," go to the tax increment district.. The improvements would be completed, and, due to the new public improvements, the value of the property in the district would increase. Taxes paid on the increased value would go to the tax increment fund and be used to retire the bonds.

At the time a district is created, an "adjustment rate" can be set by the Finance Director to protect the county from revenue loss. This rate is based on the "historical and projected" increases in assessed value of taxable real property within the district and the projected cost increases to the county for servicing new development within the tax increment district.

It should be noted that under this method, the county loses control over increased tax revenues generated within an area because they go to pay for improvements benefitting a certain area. Traditionally, this is a method used in urban areas to spur redevelopment of blighted neighborhoods. Whether it is appropriate for use in Hawaii County remains to be seen.

### 5.3 INFRASTRUCTURE AND ROADWAY IMPLEMENTATION

Sections 7 and 8 discuss the major proposals for infrastructure and roadway improvements. These proposals are for "backbone" facilities and are not intended to provide individual on-site services (this is the responsibility of the developer).

To summarize the proposed improvements.

- \* Water system improvements include additions to the water distribution system and additional reservoirs. See Figure 8-4.
- \* Sewer system improvements include extension of sewer mains and construction of a pump station and force main.
- \* Drainage improvements are more complex. Cost estimates are available for improvements to the Puaa and Auhaueae systems. These could be installed at such time as development occurs. Other significant improvements to the Keopu and Hienaloi Streams, which involve areas and improvements mauka of the master plan area. For these latter streams it is essential that the County, possibly in conjunction with the Corps of Engineers, take the initiative to determine appropriate solutions. Steps to take could include:
  - a. Asking the Corps of Engineers to evaluate their earlier drainage study to consider existing development. As a result, Federal funding may be possible.
  - b. The County should study and select an option for long term flood protection and develop an implementation plan that considers Federal, County and/or private developer funding. An improvement district could be formed.
  - c. Allow no further downstream development until adequate flood protection is in place.

- \* Roadway Improvements include: upgrading of Kuakini Highway to a 4-lane divided roadway, extending Nani-Kailua makai to Alii (private developer responsibility), extending Henry Street from Kuakini to Hualalai, and right-of-way improvements on Alii Drive.
- \* Electrical and communications system improvements include expanding facilities to serve the entire area.
- \* Other improvements include the undergrounding of utility lines within the Village overlay zone and on Kuakini Highway and Alii Drive. This could be done as street improvements occur. Another needed improvement is a parking structure at the County parking lot.

Following are cost estimates for facilities indicated above.

#### 5.3.1 Water System Cost

| <u>Size</u> | <u>Unit Cost</u> |   | <u>Length</u> | <u>Cost</u>      |
|-------------|------------------|---|---------------|------------------|
| 8"          | \$ 82            | x | 730'          | \$ 59,860        |
| 10"         | 100              | x | 2,520'        | 252,000          |
| 12"         | 125              | x | 23,770'       | <u>2,971,250</u> |
|             |                  |   |               | \$3,283,110      |

#### RESERVOIRS:

3 - 1.0 mg reinforced concrete     3 x \$1.5M = \$ 4.5M

12" pressure reducing valves 3 ea @ \$24,000 = 0.072M

#### SUMMARY:

|                           |              |
|---------------------------|--------------|
| Water Distribution System | \$3.36M      |
| Storage Reservoir         | <u>4.50M</u> |
|                           | \$7.86M      |

### 5.3.2 Sewer System Cost

| <u>Size</u> | <u>Unit Cost</u> |   | <u>Length</u> | <u>Cost</u>    |
|-------------|------------------|---|---------------|----------------|
| 6"          | \$ 92            | x | 450'          | \$ 41,400      |
| 8"          | 115              | x | 17,610'       | 2,025,150      |
| 10"         | 135              | x | 8,290'        | 1,119,150      |
| 12"         | 160              | x | 7,120'        | 1,139,200      |
| 18"         | 220              | x | 1,410'        | 310,200        |
| 21"         | 250              | x | 2,280'        | <u>520,000</u> |
|             |                  |   |               | \$5,205,100    |

|       |                |  |                   |
|-------|----------------|--|-------------------|
| PS    | Q = 0.326 MGD  |  | \$ 225,000        |
| 8" FM | \$125 X 920' = |  | <u>121,250</u>    |
|       |                |  | <u>\$ 346,250</u> |

#### SUMMARY:

|                      |              |
|----------------------|--------------|
| Sewer Lines          | \$5.21 M     |
| Pump Station & 8" FM | <u>.35 M</u> |
|                      | \$5.56 M     |

### 5.3.3 Drainage Improvements

cut and paste 2 pages

#### Kailua-Kona Master Plan Drainage Improvements: System Breakdown

##### PUAA System:

|                                |    |        |                 |              |
|--------------------------------|----|--------|-----------------|--------------|
| Retention Basin (350x350)      | CY | 13,620 | \$20            | \$272,400    |
| Debris Barrier/Energy Dissip.  | EA | 1      | \$20,000        | \$20,000     |
| 11'x 8' Concrete Channel       | LF | 400    | \$2,300         | \$920,000    |
| 8'x 3.5' Box Culvert           | LF | 1,850  | \$4,500         | \$8,325,000  |
| 11'x 6' Box Culvert            | LF | 1,100  | \$5,500         | \$6,050,000  |
| Ocean Outlet Headwalls         | EA | 1      | \$300,000       | \$300,000    |
| Headwalls - Inlet              | EA | 1      | \$90,000        | \$90,000     |
| Drainage Structure Transitions | EA | 1      | \$100,000       | \$100,000    |
|                                |    |        |                 | <hr/>        |
|                                |    |        |                 | \$16,077,400 |
|                                |    |        | Erosion Control | \$803,870    |
|                                |    |        | PUAA total      | <hr/>        |
|                                |    |        |                 | \$16,881,270 |

##### AUHAUKEAE System:

|                                |    |        |                 |             |
|--------------------------------|----|--------|-----------------|-------------|
| Retention Basin (400x300)      | CY | 13,340 | \$20            | \$266,800   |
| Debris Barrier/Energy Dissip.  | EA | 1      | \$20,000        | \$20,000    |
| 6'x 6' Concrete Channel        | LF | 450    | \$2,000         | \$900,000   |
| 78" Dia. RCP CI.III            | LF | 550    | \$600           | \$330,000   |
| 72" Dia. RCP CI.III            | LF | 1,300  | \$575           | \$747,500   |
| 10'x 5' Box Culvert            | LF | 500    | \$6,000         | \$3,000,000 |
| 7'x 3.5' Box Culvert           | LF | 700    | \$4,500         | \$3,150,000 |
| Ocean Outlet Headwalls         | EA | 1      | \$300,000       | \$300,000   |
| Headwalls - Inlet              | EA | 1      | \$90,000        | \$90,000    |
| Drainage Structure Transitions | EA | 2      | \$100,000       | \$200,000   |
|                                |    |        |                 | <hr/>       |
|                                |    |        |                 | \$9,004,300 |
|                                |    |        | Erosion Control | \$450,215   |
|                                |    |        | AUHAUKEAE total | <hr/>       |
|                                |    |        |                 | \$9,454,515 |

\$26,335,785

## Kailua-Kona Master Plan Drainage Cost Estimate

February 23, 1993

| Description                          | Unit | Quantity | Unit Cost | Total Cost   |
|--------------------------------------|------|----------|-----------|--------------|
| Retention Basin (350x350)            | CY   | 13,620   | \$20      | \$272,400    |
| Retention Basin (400x300)            | CY   | 13,340   | \$20      | \$266,800    |
| Debris Barrier/Energy Dissip.        | EA   | 2        | \$20,000  | \$40,000     |
| 11'x 8' Concrete Channel             | LF   | 400      | \$2,300   | \$920,000    |
| 6'x 6' Concrete Channel              | LF   | 450      | \$2,000   | \$900,000    |
| 11'x 6' Box Culvert                  | LF   | 1,100    | \$5,500   | \$6,050,000  |
| 10'x 5' Box Culvert                  | LF   | 500      | \$6,000   | \$3,000,000  |
| 8'x 3.5' Box Culvert                 | LF   | 1,850    | \$4,500   | \$8,325,000  |
| 7'x 3.5' Box Culvert                 | LF   | 700      | \$4,500   | \$3,150,000  |
| 78" Dia. RCP Cl.III                  | LF   | 550      | \$600     | \$330,000    |
| 72" Dia. RCP Cl.III                  | LF   | 1,300    | \$575     | \$747,500    |
| Ocean Outlet Headwalls               | EA   | 2        | \$300,000 | \$600,000    |
| Headwalls - Inlet                    | EA   | 2        | \$90,000  | \$180,000    |
| Drainage Structure Transitions       | EA   | 3        | \$100,000 | \$300,000    |
| Cost Drainage Structures             |      |          |           | \$25,081,700 |
| Erosion Control (5% of Construction) |      |          |           | \$1,254,085  |
| Total Cost of Drainage Improvements  |      |          |           | \$26,335,785 |

## NOTES:

A. Does not include cost for purchase of land right of ways.

B. Does not include cost for permitting (i.e. NPDES, Corps, SMA etc.)

#### 5.4 MANAGEMENT FRAMEWORK

For the Village overlay zone a special approach is needed to coordinate and initiate needed activities and projects. To take the master plan to the first critical step of implementation, however, the establishment of a strong community based planning core consisting of an individual or group of individuals that are truly dedicated to shepharding the program into actual fruition is needed.

Projects identified would require cooperation and coordination between governmental agencies at the Federal, State and County levels and private enterprise. No one entity can be entrusted with this enormous responsibility due to their individual areas of expertise. An entity with a broad-based level of project coordination and implementation experience would have to oversee such an undertaking.

Many of the projects involved in the master plan would require public works support because of the wide community public benefit implications. Yet other projects may be of a private benefit on private property with very little impact on the Kailua-Kona community. In the overview, however, realistic implementation of the Kailua-Kona master plan will require some vital form of public/private codevelopment wherein the complexities of jurisdiction, funding/financing, timing, and coordination will be crafted by a single independent office that can work effectively with both sectors in the community by facilitating and expediting projects.

##### 5.4.1 Public/Private Partnership

Regardless of the Program used there needs to be a public/private partnership formed to carry forth the implementation of the master plan. Elements of the organization should include:

1. Involvement of local landowners to assist/encourage core area redevelopment.
2. Coordination of the work of existing community organizations in a "clearinghouse" function. Ideally community organizations could "adopt a

project."

3. Development of a "promotion" strategy for the public and local business understanding of the master plan and projects and local business.
4. Establishment of a Core group to pursue private/public finance option and development incentives with government and local businesses.

It is recommended that the "main street" program be investigated as the management structure for the core area. The advantages of this program is that its structure is set; it has as its foundation historic preservation; and some State funding may be available. This program is presently in place in downtown Hilo.

## 5.5 POLICIES AND PROJECT ACTION PLANS

Identify interim vs. long range improvements and a priority wish list based on relative cost of specific facility, timing, availability of funding, and strategic alternatives that best effectuate the plans.

### 5.5.1 Drainage

In light of the drainage problems in the Kailua-Kona project area, development of flood plain areas should be avoided. The delay in development of these areas will allow time for the County of Hawaii and the U. S. Army Corps of Engineers (COE) to complete its drainage and financial analysis for the project area (as previously mentioned).

The COE's 1988 Reconnaissance Report provides drainage solutions to those areas immediately adjacent to the flood plain. These measures can be translated into phased infrastructure improvement projects.

A. Policies

1. Drainage improvements should be built with each affected project. These necessary improvements cannot be deferred any longer.
2. No further development should occur in the areas that are subject to flooding until adequate improvements can be made.

Development of properties that are on the mauka side of Queen Kaahumanu Highway should incorporate retention drainage facilities to alleviate the downstream flooding problems. Any new development will increase runoff and thereby create more flooding. All studies to date do not consider any mauka development.

B. Implementation Steps

1. Petition the COE to consider cost-benefit with existing development in place.
2. County to initiate study to determine an area-wide solution, considering COE studies.
3. Select a long-range plan and study financing options for the necessary drainage improvements. Financing scenarios to be included:
  - a) Federal matching funds
  - b) County CIP funds
  - c) Involved private land owners

C. Costs

To be determined.

D. Responsible Agency

County of Hawaii, Department of Public Works

E. Potential funding Sources

County CIP

Federal Government

Impact Fees

Special Improvement District

5.5.2 Seawall

A. Policy

Coordinate a long-term solution to preserve the 700-foot long seawall and waterfront pedestrian path.

The soil behind the wall which forms the foundation for both the sidewalk and the roadway adjacent to the wall, has eroded during the past two years due to the corrosion of the steel sheetpile over time. This erosion has caused cracking and large potholes in the roadway pavement and has caused the sidewalk to crack and fail in several locations. One section of the wall has begun to shift, apparently due to a related shift in the foundation boulders.

The Hawaii County Department of Public Works has patched the cracks that periodically have grown as the seawall shifted and has repaired the holes that continually form in the sidewalk and roadway. The accelerating rate of erosion has caused a need for more frequent repairs and threatens the integrity of both the sidewalk and roadway. As the erosion process continues to accelerate, the County will need to expend an estimated \$20,000 annually to repair the erosion damages to the sidewalk and roadway. Furthermore, without immediate action, portions of the roadway are in imminent danger of failure during the next severe storm.

B. Implementing Steps

1. Proceed with improvement project that will consist of filling the voids between the large foundation boulders with a cement-sand grout (the

voids between the boulders comprise an assumed volume of 40% of the total foundation volume). The method of placement of the grout will consist of drilling holes and injecting the grout mix to fill the voids within the wall's foundation. The section of the wall (32 feet) that has begun to shift must be repaired by water jetting to remove sand under the foundation stone to assure an adequate and stable foundation prior to grouting of this section. This design is not intended to prevent overtopping of the seawall by ocean waves.

C. Costs

Estimated total cost of improvements in 1992 = \$301,500 (cost sharing would be between the Federal and County governments as follows: 75% Federal, 25% County).

At the same time work out a long-term reinforcement design with the COE and examine financing options for improvements, and examine design options that incorporate upgraded "edge" treatments of seawall for better aesthetics and pedestrian functions.

D. Responsible Agency

County of Hawaii, Department of Public Works

E. Potential Funding Sources

County CIP

Federal Government

5.5.3 Pier

Improvements and alterations to the pier are complicated since this is a State owned and operated facility.

A. Policy

The pier is an important asset to Kailua and is used by local residents and visitors for recreational and commercial purposes. The County should develop a cooperative working relationship with the State in order that local benefits of this facility are properly realized.

B. Implementing Steps

1. Improve a working relationship between the County and State to inform the State as to County concepts.
2. Review, critique and contribute to State design activities.
3. County initiate alternative parking solutions of (a) new lot near regional park, or (b) parking structure at existing County lot.
4. Install reserved stalls for pier personnel as an interim step in removing part of pier parking.

C. Costs\*

\$350,000 (includes partial concrete paving, trellis, benches, and trees in planters).

\* Note: Costs include 20 percent for contingency and 12% for design fees. Land acquisition, if required, is not included.

D. Responsible Agency

County of Hawaii, Department of Public Works (Planning Department support)

E. Potential Funding Sources

County CIP, State of Hawaii

#### 5.5.4 Public Parking

##### A. Policy

1. The County needs to maximize parking opportunities for use of public facilities, especially parking for the pier and Alii Drive corridor.
2. Each developer must provide required parking to support each project. Such parking may be off-site.
3. The consolidation of private and public parking in the Village is encouraged to provide efficient solutions and optimize pedestrian opportunities.

##### B. Implementing Steps

1. Install parking meters at existing County lot to encourage visitor and transient usage, rather than long term parking.
2. County to prepare a feasibility study to assess public parking projects to include: land availability, design and access, preliminary costs and funding methods.
3. Establish project priorities and schedule.
4. Initiate design and construction.

##### C. Costs

1. Parking Structure: 2-story - 55,800 SF each level = \$6,250,000.
2. Parking Lot (at Kaiwe and Kuakini): 67,500 SF = \$1,350,000

##### D. Responsible Agency

County of Hawaii, Department of Public Works (Planning Department support).

E. Potential Funding Sources

County CIP

Revenue Bonds (metered parking)

5.5.5 Private Parking

A. Policy

Encourage consolidation of private parking in middle area between Alii Drive, Kuakini Highway and Hualalai through development of a parking structure and roadway improvements.

B. Implementing Steps

1. County initiate and guide through formation of a public/private development organization.
2. Feasibility study to elicit property owners cooperation and identify design and funding concepts for a parking structure.
3. Initiate design and construction.

C. Costs

To be determined when area involved is identified.

D. Responsible Agency

County of Hawaii, Planning Department (public/private organization)

E. Funding Sources

Special Improvement District

5.5.6 Kuakini Highway Improvements

A. Policy

Improve Kuakini Highway to a four-lane, divided road with bike lanes, including undergrounding of utility lines. Phase 1 to consist of portion between Palani and Hualalai.

B. Implementing Steps

1. Prepare concepts for right-of-way, section and intersection requirements.
2. Identify funding sources.
3. Design and construction.

C. Costs

1. Kaiwe to Palani (2,700 LF): \$11,897,000
2. Palani to Hualalai (1,600 LF): \$7,340,000
3. Hualalai to Oni Oni (5,200 LF): \$23,463

*Note: Portions will be provided by adjacent development.  
No ROW acquisition included.*

D. Responsible Agency

County of Hawaii, Department of Public Works

E. Potential Funding Sources

County CIP

Special Improvement District

Impact Fees

5.5.7 Alii Drive Improvements

A. Policy

Improve Alii Drive within the Village overlay zone to include ROW or easement acquisition, underground utilities, sidewalk and bikeway improvements.

B. Implementing Steps

1. Prepare detailed master plan to finalize design solutions.
2. Prioritize and define funding.
3. Design and construction.

C. Costs

\$2,800,000 (includes sidewalks, partial walls, and underground utilities).

D. Responsible Agency

County of Hawaii, Department of Public Works (support by Planning Department and public/private organizations).

E. Potential Funding Sources

County CIP

Special Improvement District

5.5.8 Henry Street Extension

A. Policy

Extend Henry Street from Kuakini Highway to Hualalai. This could be coordinated, in part with redevelopment activities and/or consolidated parking structure.

B. Implementing Steps

1. The public/private organization should take the lead in preparing a detailed design plan for this area in cooperation with affected property owners. The approach should be to improve (or at least break even) current property potentials. Parking is to be a joint (not an individual) solution.
2. Establish a cooperative agreement (Special Improvement District) among property owners.
3. Establish phasing and funding.
4. Acquire ROW or easement design and construction.

C. Costs

\$930,000 (56' ROW - construction only - no land acquisition included).

D. Responsible Agency

Public/private organization (support by County Planning Department)

E. Potential Funding Source

Special Improvement District

5.5.9 Hale Halawai/Village Green

A. Policy

1. Reconfigure Hale Halawai to remove road in front of building and, eventually, relocate structure to open area up.
2. Create a village green, across from Hale Halawai by consolidating existing parking into a structure to fill up landscaped open area at the corner of Alii and Hualalai.

B. Implementing Steps

1. Prepare a detailed master plan for roadways and parking improvements.
2. Obtain community input for green design concept (perhaps a local design competition or getting school children involved).
3. Phasing/priority plan design and construction.

C. Costs (Village Green)

\$2,950,000 (2-story structure and park)

D. Responsible Agency

Public/private organization (support by County of Hawaii, Parks Department)

E. Potential Funding Source

County CIP

Revenue Bonds

5.5.10 Waterfront Walkway

A. Policy

Establish a continuous walkway from the Kona Hilton to the Old Airport Park.

B. Implementing Steps

1. Very complex due to variety of conditions. Coordinate with Alii Drive improvements. Obtain private property cooperation. Please note this could be phased with interim solutions that await development, redevelopment or funding.

2. Prepare a detailed design and implementation plan.

3. Design and construct as possible.

C. Costs

\$130,000 (1,500 LF with metal rail, land acquisition not included).

D. Responsible Agency

Public/private organization or private party (community organizations).

E. Potential Funding Source

Private funds (donations and fund raising).

Development exactions or impact fee.

#### 5.5.11 Great Wall of Kuakini Park

##### A. Policy

Develop a linear park along the Great Wall of Kuakini.

##### B. Implementing Steps

1. Competition and community involvement similar to Village green.
2. Establish designs standards and developer requirements.
3. Design and construction.

##### C. Costs

To be provided by adjacent developers.

##### D. Responsible Agency

County of Hawaii, Department of Parks and Recreation

##### E. Potential Funding Source

County CIP, portions to be constructed and dedicated by developers of adjoining properties.

#### 5.5.12 Miscellaneous Streetscape Elements

##### A. Policy

Provide entry treatments consisting of landscaping, signage, etc., to announce and highlight the "village."

##### B. Implementing Steps

1. Define design criteria and develop standard elements and treatments.
2. Portions within streets to be improved (Kuakini Highway and Alii Drive) or to be constructed (Nani-Kailua extension) shall be done as

a part of roadway improvements.

3. Design and construction.

C. Costs

To be determined, as specific designs occur.

D. Responsible Agency

Public/private organization (in coordination with County Planning and Public Works).

E. Potential Funding Source

- Same as roadway improvements.
- Community organizations could take on providing of Village entry signs, benches, or other elements as a community project.

TABLE 5-1

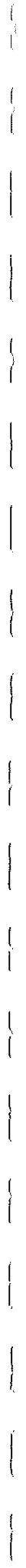
SUMMARY OF LAND USE POLICY RECOMMENDATIONS

| ITEM                               | EXISTING                    | RECOMMENDED CHANGE                                                        |
|------------------------------------|-----------------------------|---------------------------------------------------------------------------|
| Kailua Master Plan                 | 1976, 1988 Plan             | Adopt this Master Plan                                                    |
| General Plan                       | Per GP                      | Amend LUPAG                                                               |
| Rezone                             | Per Zoning Map              | Change commercial, resort and residential per Master Plan.                |
| Amend Boundary of Special District | Per Ordinance               | Include existing industrial area/Palani/Queen Kaahumanu interchange area. |
| Design Commission                  | Per Ordinance               | Amend (see below)                                                         |
| Design Guidelines                  | None Exist                  | Adopt                                                                     |
| Composition of Board               |                             |                                                                           |
| * Qualifications of Members        | Non-Existent                | Include design professionals.                                             |
| Village Core Overlay               | Non-Existent                | Create overlay with Special Standards and mixed use zone.                 |
| Development Standards              |                             |                                                                           |
| * Height Limit                     | Per Ordinance, 90 Ft for GC | 45 feet throughout                                                        |
| * Parking Ratios                   | Per Ordinance               | 5/1,000 SF commercial, 3.5/1,000 SF office, 1.5/acre multi-family         |
| * Density Bonus                    | Non-Existent                | 10% for special design                                                    |

TABLE 5-2

## PROJECT PRIORITY CHART

| Tasks                                                                         | Responsibility             | Funding                                         | Priority | Comments                                                                     |
|-------------------------------------------------------------------------------|----------------------------|-------------------------------------------------|----------|------------------------------------------------------------------------------|
| Drainage Improvements                                                         | County (DPW)               | County<br>Federal<br>Private                    | 1        | Keopu-County Priority<br>(Auhaukeae/Puaa-<br>concurrent with<br>development) |
| Seawall Improvements                                                          | County (DPW)               | County<br>Federal                               | 1        | \$301,500                                                                    |
| Pier                                                                          | County (PD)<br>(State)     | CIP, State                                      | 1,2      | New building under design.<br>Parking alternate needed.                      |
| Public Parking Structures<br>* County Structure<br>* New Lot (park)           | County (DPW)               | CIP, Rev.<br>Bonds                              | 1        | Interim needed for pier                                                      |
| Private Parking                                                               | Public/Private             | Imprv't District                                | 2        |                                                                              |
| Kuakini Highway<br>Improvements<br>* Widening<br>* Underground Utilities      | County (DPW)               | CIP, Imprv't.<br>District, Impact<br>Fees       |          |                                                                              |
| Alii Drive Improvements<br>* Street<br>* Underground Utilities<br>* Sidewalks | County<br>(DPW/PD)         | CIP,<br>Imprv't. Dist.                          | 1        |                                                                              |
| Henry Street Extension                                                        | Public/Private             | Imprv't. Dist.                                  | 3        |                                                                              |
| Hale Halawai/Village<br>Green                                                 | Public/Private             | CIP, Rev.<br>Bonds                              | 2,3      | 2: Reconfig. access to<br>Hale Halawai<br>3: Remainder                       |
| Waterfront Walkway                                                            | Public/Private             | Private, Impact<br>Fees                         | 2        |                                                                              |
| Great Wall Park                                                               | County (DPR)<br>developers | CIP,<br>Dedication                              | 3        |                                                                              |
| Streetscape                                                                   | Public/Private             | CIP, Improv't<br>Dist., Impact<br>Fees, Private | 2        |                                                                              |



## BACKGROUND INFORMATION



## BACKGROUND INFORMATION

### SECTION 6

#### INVENTORY AND RESEARCH

##### 6.1 PROJECT AREA DESCRIPTION

Kailua Village (also referred to as "Kailua-Kona") is located in the center of the West Hawaii Region in the North Kona district on the Island of Hawaii. An area known historically for its excellent fishing and coffee orchards, Kailua Village was included in the characterization of Kona in a 1960 "Plan for Kona" as "...small unpretentious Villages which have developed slowly and naturally as independent units on the vast, massive lava coast ("A Plan for Kona", Harland Bartholomew and Associates, 1960)."

Since the completion of the 1960 plan and the subsequent Kailua Village Design Plan in 1976 (D. Wolbrink & Associates, Inc.), the population of Hawaii County has grown steadily, particularly since 1970 with the dramatic growth in the visitor industry. "The growth of district populations in the last twenty years is closely associated with the existence of visitor industry facilities in areas in that North Kona (and Puna) experienced the largest increases ("The General Plan," County of Hawaii, 1989)."

"Tourism has expanded tremendously in North Kona, primarily in Kailua Village. In 1988 there were about 4,748 visitor units in the area (ibid)." Further, according to the General Plan the visitor industry is expected to continue to expand at a rapid rate in North Kona.

##### 6.1.1 Regional Considerations

While this master plan for Kailua-Kona is limited to the boundary of the Kailua Special District, there are important regional issues and development activities that could impact Kailua Town.

##### 1. Tourism

The Kona Coast is a world famous resort location. Within this regional location, Kailua represents a departure from the large scale planned resort

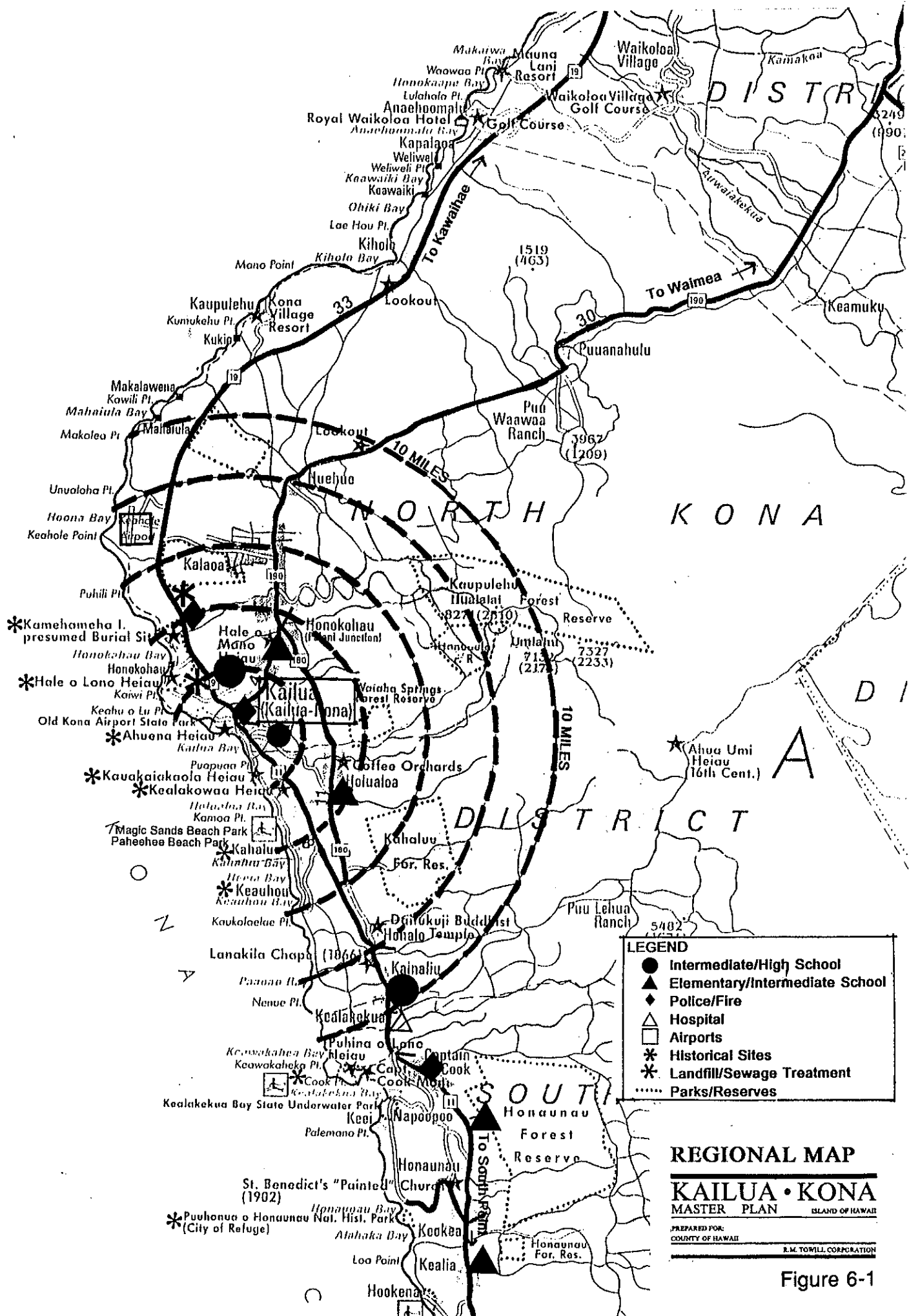


Figure 6-1

development, such as Keauhou to the South and the Kohala coast resorts to the north.

Tourists arrive both by car from the resorts and Keahole Airport and by tour ships that anchor in Kailua Bay. The town offers a lovely seaside setting and a somewhat picturesque pedestrian experience.

Tourist business is an important element in the Village and the tourist involvement needs to be nurtured and encouraged.

## 2. Transportation

Regional transportation is dependent on the automobile. Kailua is primarily served by Queen Kaahumanu Highway and by Palani Road, which connects into Mamalahoa Highway.

The State Department of Transportation - Highway Division is preparing a master plan for Queen Kaahumanu Highway. Initial emphasis is being placed on the portion between Palani and Keahole Airport. The ultimate master plan calls for a 6-lane freeway, possibly starting north of Palani at the proposed Liliuokalani Parkway and then going south to Keahole Airport. The initial phase of upgrading is expected to improve the Highway to a 4-lane divided road. The highway master plan should be completed in 1994.

The improvements to Queen Kaahumanu Highway are sorely needed to help with peak hour traffic volumes. Regrettably, with anticipated land use changes, the visual experience along the Highway is likely to deteriorate.

Expansion of the runway at Keahole Airport is under construction. This will provide greater opportunity for larger aircraft to land. This potential will require a strong tourist industry to be fully realized.

3. Commercial Development

Commercial development is expected, especially along the Queen Kaahumanu corridor. Projects anticipated include a shopping center at Lako Street; the "Crossroads" project between Palani and Henry Street, mauka side; Lanihau Phase II on the makai side at Henry Street; Queen Liliuokalani Trust (QLT) commercial proposal for the mauka side and expanded business and industrial on the makai side, both north of Palani; and additional expansions to the existing Kaloko project.

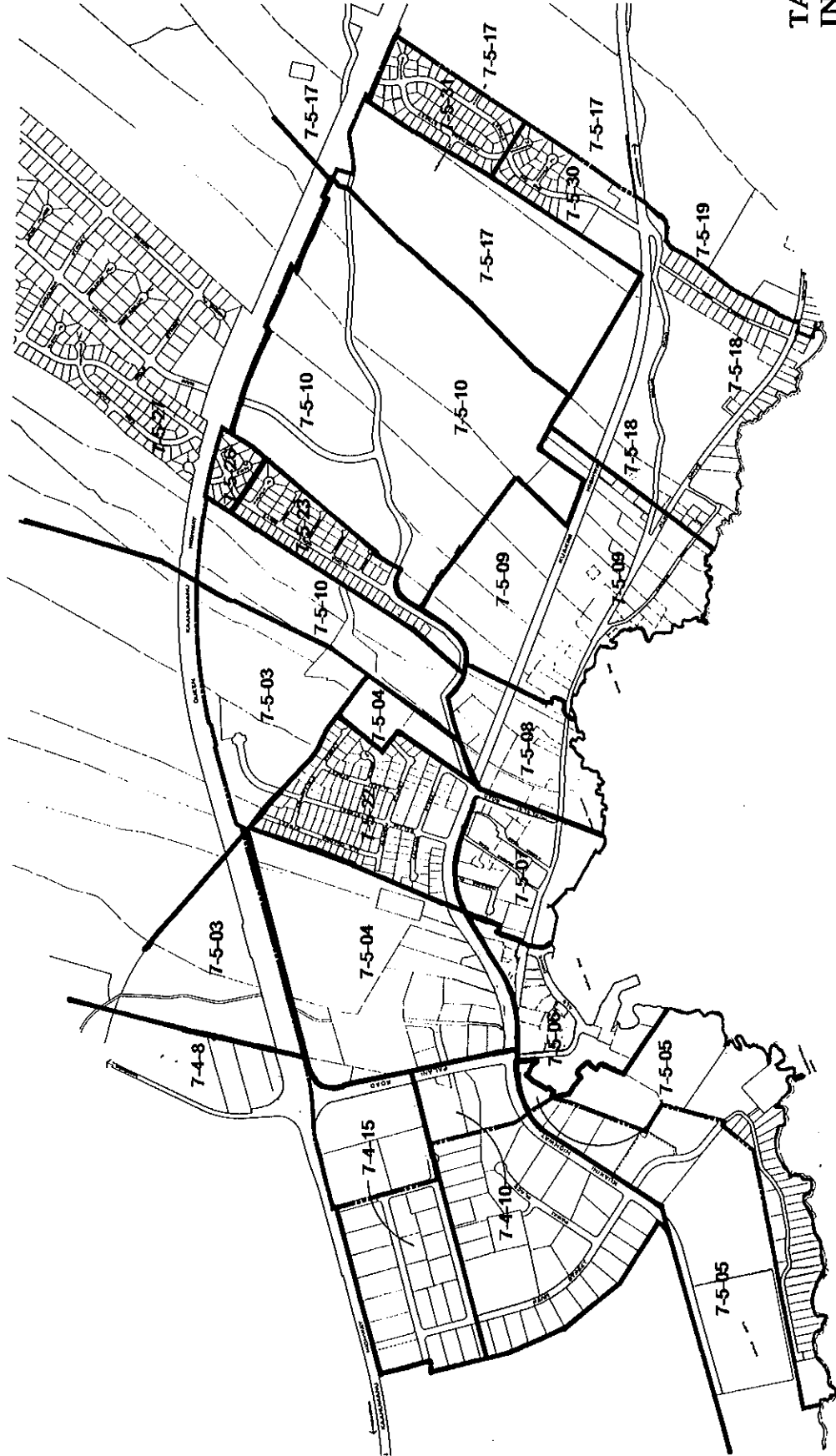
While it is likely to take some time for build-out of all these projects to occur, it is clear that the Queen Kaahumanu Highway corridor is the emerging commercial focus. This is likely to draw larger commercial development out of Kailua, which is possibly for the better. Large scale commercial is a high impact use. This could permit the retention of the "village" character of Kailua, which could then emphasize tourist and specialty commercial opportunities.

4. Other Development

The State residential project at Kealakehe is moving ahead. This project has also provided the nearly complete Kealakehe Wastewater Treatment Plant, which will allow the expansion of sewage treatment throughout Kailua and nearby areas.

Many other projects of various sizes are expected. The County of Hawaii anticipated the growth in this area and prepared an overall master plan called the Keahole to Kailua Development Plan in 1990.

Kailua, at the edge of this growing region, will need to deal with a variety of issues including pressure for additional development. It is important for Kailua to define its role in the future of the area.

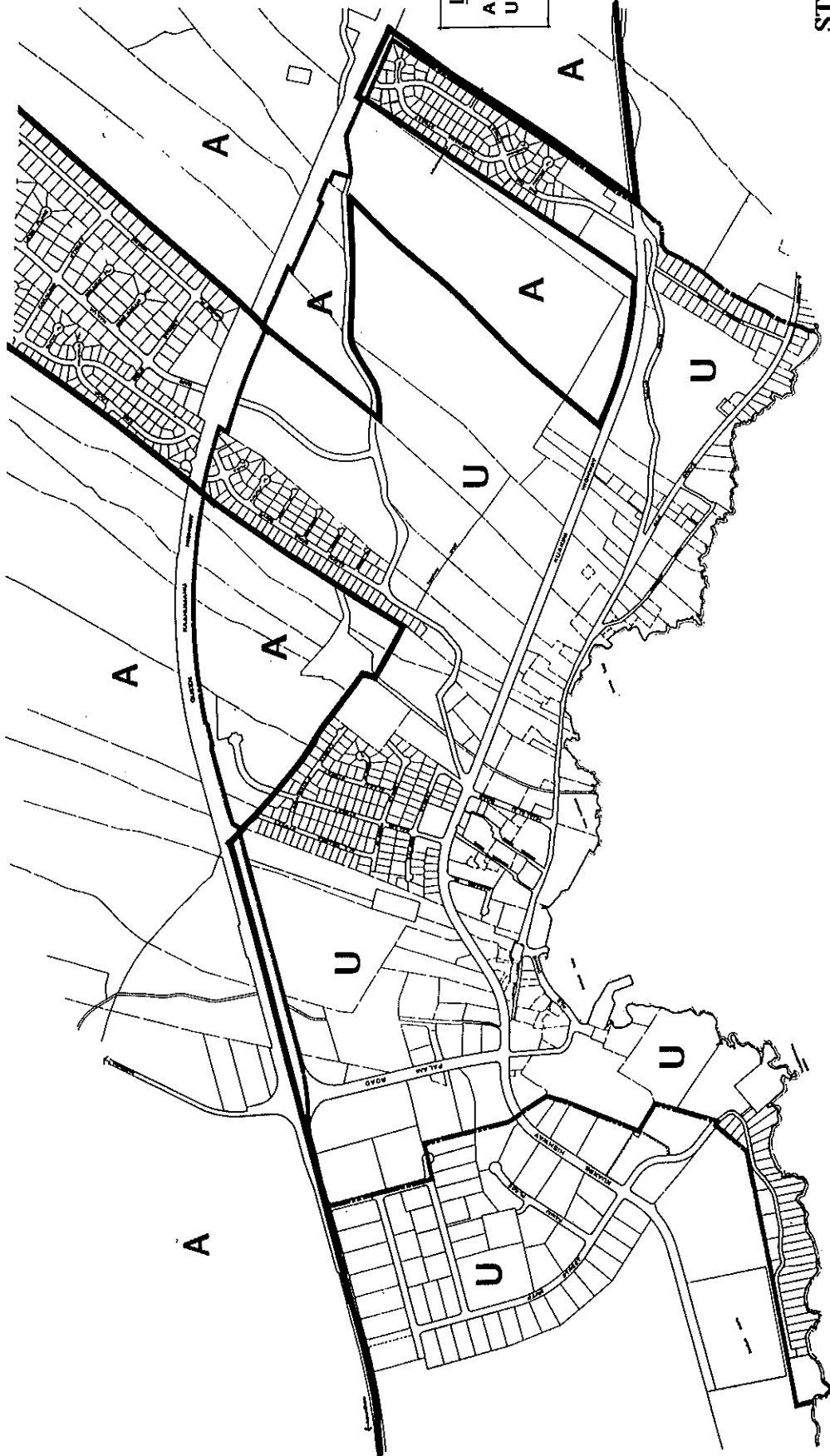


# TAX MAP KEY INDEX

**KAILUA • KONA**  
**MASTER PLAN**  
 ISLAND OF MAUI  
 PREPARED FOR:  
 COUNTY OF MAUI  
 PREPARED BY:  
 S.M. TOWELL CORPORATION

### 6.1.2 Summary of Important Characteristics

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Project Area Location</u>            | North Kona Judicial District, Island of Hawaii                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>Project Area Boundaries and Size</u> | North: North side of Palani Road<br>East: Area makai of Queen Kaahumanu Highway<br>South: Kona Hillcrest<br>West: Shoreline incl. Strip makai of the Old Kona Airport<br>Total Project Area: 730 acres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>Ahupua'as in Project Area</u>        | Ahupua'as - Keahoulu, Lani, Moea, Keopu, Honuaula, Hienaloli, Auhaukeae, Puaa, Aiaha.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <u>Land Use Regulations</u>             | <p>* State Land Use: 75% percent Urban, 25% percent Agriculture (See Figure 6-3).</p> <p>* County General Plan: The project area includes the following designations: H (High Density Urban - 65 acres), M (Medium Density - 490 acres), Resort (102 - acres), O (Open - 35 acres), Flood Plain - 38 acres (see Figure 6-4). Urban designated lands are found adjacent to the project area (mauka of Queen Kaahumanu Highway). Also, north of project area are lands designated I (Industrial) and Open (see Figure 3-4).</p> <p>* County Zoning: The project area includes lands that are zoned as follows: Single Family (RS-7.5, RS-10, and RS-15), Double Family (RD-3.75), Multi-Family (RM-1, RM-1.25, RM-2, RM-1.5, RM-4), Commercial (CV-7.5, CV-10, CG-20, CG-7.5, CN-20), Resort Hotel (V-7.5, V-1.25, and V-2), Open (O), Unplanned (U), Agriculture (A-1a), and Industrial (ML-20 and MG-1a) (see Figure 6-5).</p> <p>* Special Management Area (SMA) - From Queen Kaahumanu Highway to the Bay - the entire project area.</p> |
| <u>Climate</u>                          | Semi-tropical with average annual rainfall of 25 inches, average annual temperature of 75 degrees F. The project area is within the Coastal Area which is characterized as the shore zone and related lands extending up to about one mile inland. Generally hot and humid.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>Topography</u>                       | Generally slopes between Queen Kaahumanu Highway and Kuakini Highway are in the range of 7%-8%. Between Kuakini and Alii Drive slopes range from 4% (Village core Area) to 8.5% (at south boundary). The areas from Alii Drive to the shoreline are generally very level with slopes less than 4% (see Figure 6-6).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



**LEGEND**  
 A Agriculture  
 U Urban

STATE LAND USE  
**KAILUA • KONA**  
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 COUNTY OF HAWAII  
 PREPARED BY: H.M. LOWELL CORPORATION

FIGURE 3-3 Figure 6-3

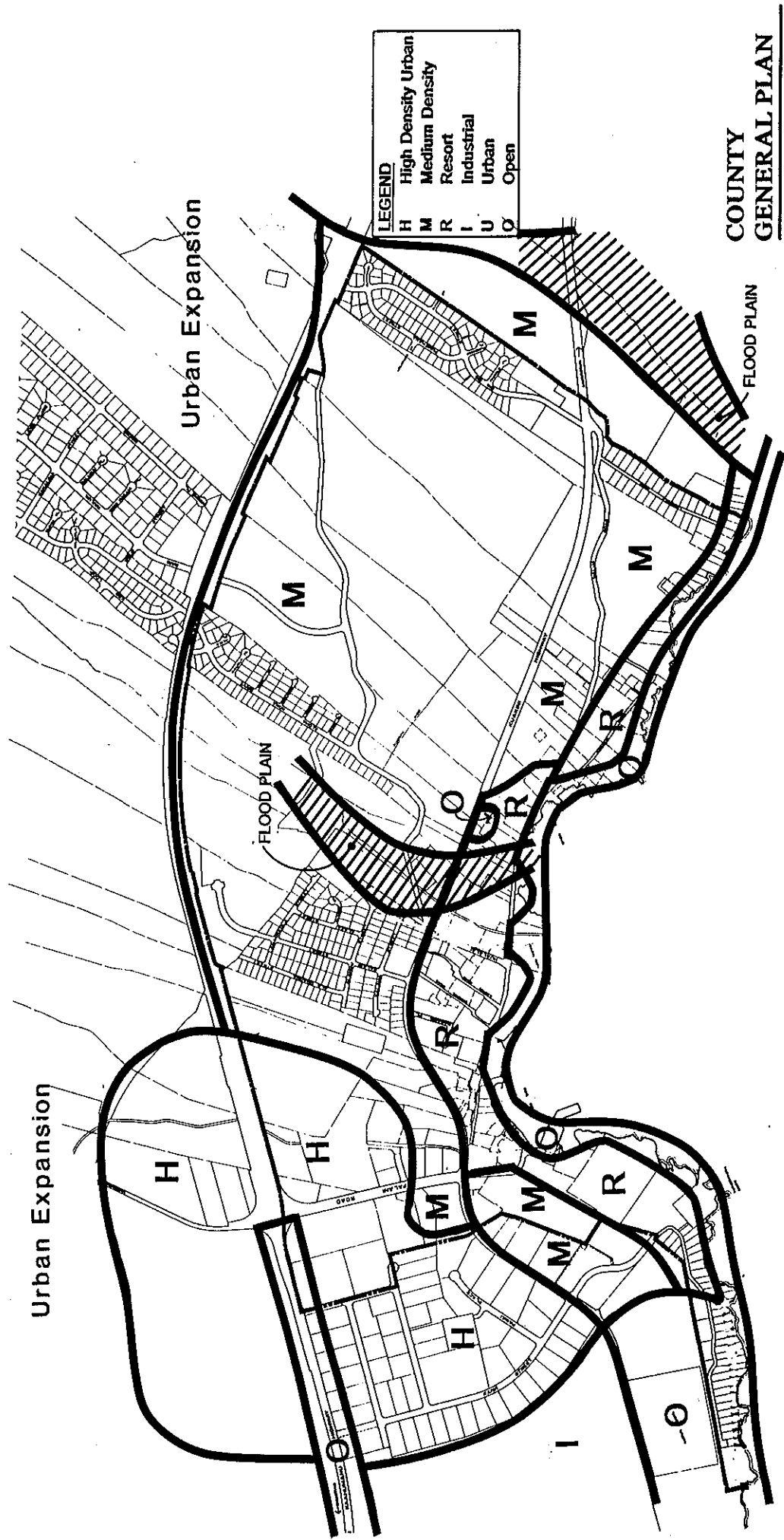
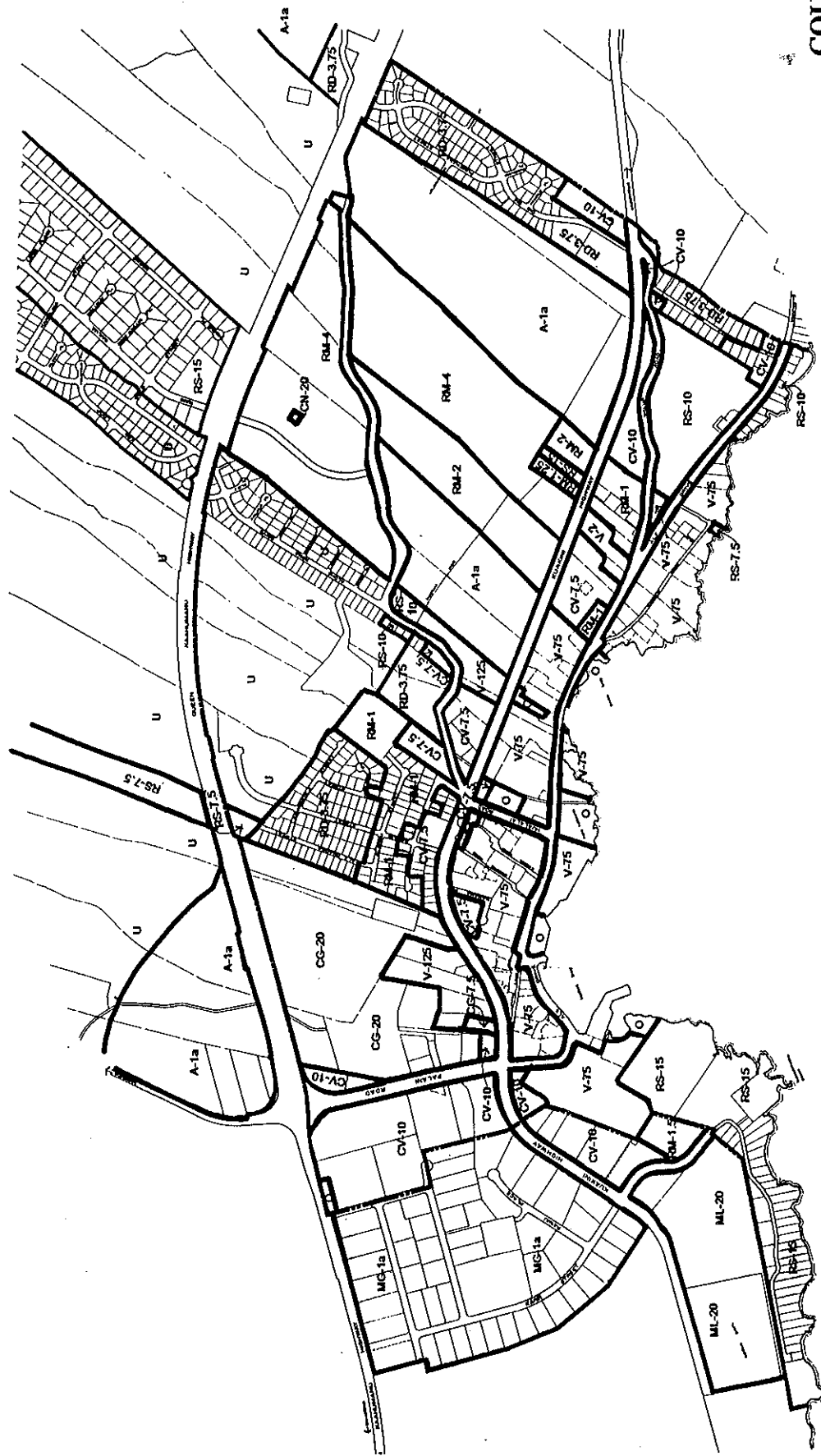


Figure 6-4

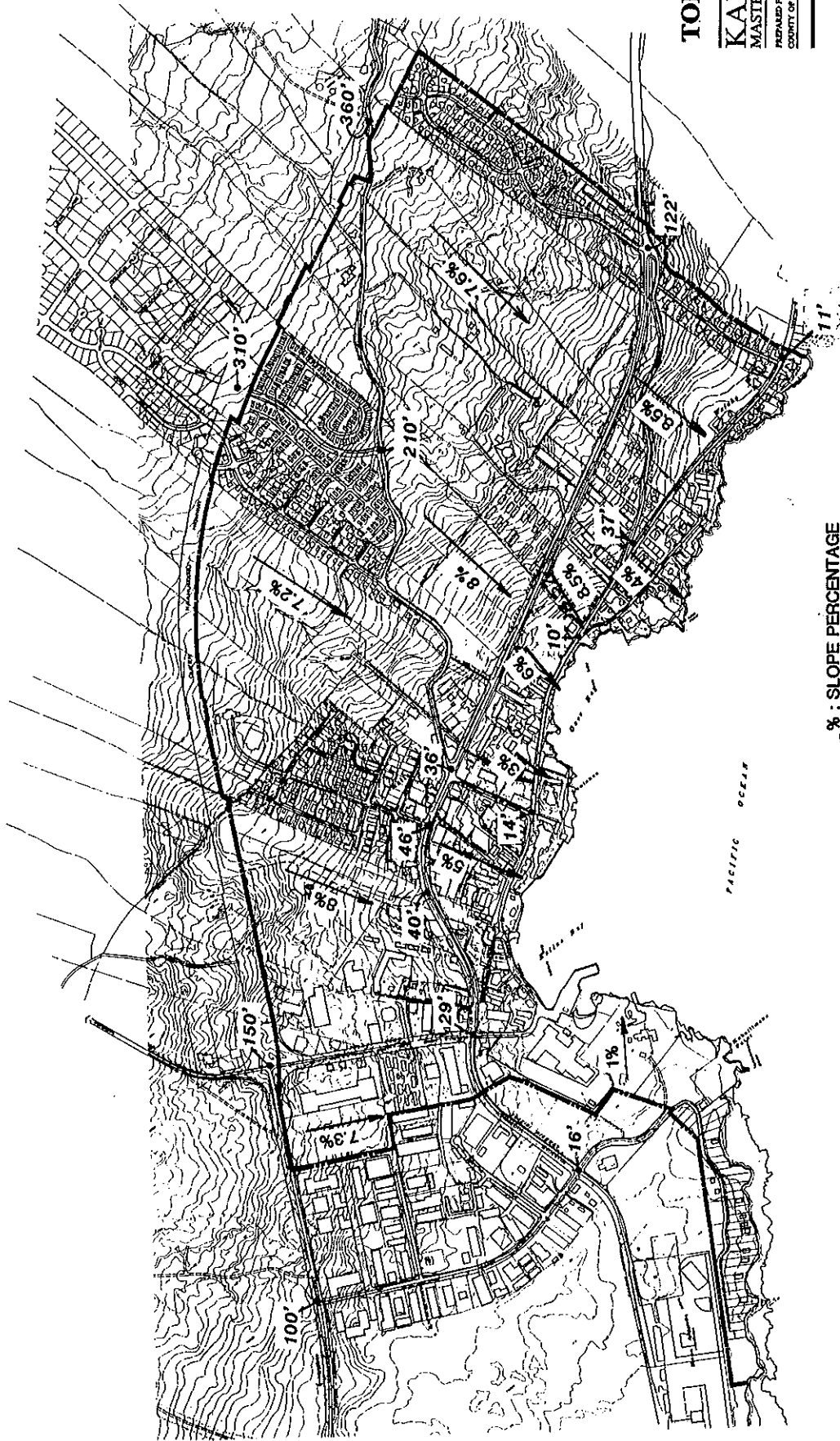


**LEGEND**

|               |         |
|---------------|---------|
| Single Family | RS-7.5  |
|               | RS-10   |
|               | RS-15   |
| Double Family | RD-3.75 |
| Multi-Family  | RM-1    |
|               | RM-1.25 |
|               | RM-2    |
|               | RM-1.5  |
|               | RM-4    |
| Commercial    | CV-7.5  |
|               | CV-10   |
|               | CG-20   |
|               | CG-7.5  |
|               | CN-20   |
| Resort Hotel  | V-7.5   |
|               | V-1.25  |
|               | V-2     |
| Open          | O       |
| Unplanned     | U       |
| Agriculture   | A-1a    |
| Industrial    | ML-20   |
|               | MG-1a   |

**COUNTY ZONING**  
**KAILUA • KONA**  
**MASTER PLAN**  
 PREPARED FOR: HAWAII DEPARTMENT OF PLANNING  
 COUNTY OF HAWAII  
 PLANNING DIVISION

Figure 6-5



# TOPOGRAPHY

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MASTER PLAN

PREPARED FOR:  
COUNTY OF HAWAII

PREPARED BY:  
S.A. TOWELL CONSULTANTS

Figure 6-6

## Geology & Soils

The project area is located on the lower slopes of Hualalai Volcano, which is in Lava Flow Risk Zone 4. Lava Flow Risk Zones 1 to 9 - 1 being of the highest risk - are based upon the probability of coverage by lava flows. A Zone 4 project site would mean that the frequency of an eruption is probably foreseen as occurring in 100 to 300 years (telecon with Harry Kim, County of Hawaii Civil Defense Administrator, 5/28/92) as opposed to 2 to 4 years as at Mauna Loa.

Hualalai Volcano last erupted in 1801 (Stearns & MacDonald, 1946). All the volcanic rocks of Hualalai Volcano are grouped together in the Hualalai volcanic series. These rocks comprise the entire mountain and all are basalts except the Waawaa volcanic, which consist of a trachyte cone and flow. It is assumed that the whole mountain was built by continuous activity, but erosional unconformities may exist within the mountain. The freshness of the flows in the exposed part of the Hualalai volcanic series indicates that the rocks are mostly Recent, although a few flows may be late Pleistocene in age. The bulk of the lavas is not exposed. The core of the mountain may be as old as Pliocene.

Studies prepared by U. S. Soil Conservation Service and the U.S. Army Corps of Engineers in defining/identifying two major floodways through the project area: Keopu-Hienaloli Watersheds; however, no action has yet been taken on these.

## Flora & Fauna

Honokohau (north of Kailua) is a water bird sanctuary including endangered Hawaiian stilt, State Marine Life Conservation district 500 feet from shore beginning at the northern coastal boundary of the State park to the Kailua Lighthouse (purpose is to protect limu, opihi, crustaceans, other marine life in waters off the old Kona Airport). Nature Conservancy Report indicates that the endangered species, Hawaiian Hoary Bat and Hawaiian Hawk have been sighted in the area. Anchialine pools (2) exist on the Thurston Estate and at the north end of (2) old airport.

Local landscape materials include:

Large Canopy Trees - Banyan (retusa/benjamina), False Kamani, Milo, Monkeypod, Formosan Koa.

Medium Canopy Trees - Albezia, Kiawe, Royal Poinciana, Schefflera, Buttonwood, Wiliwili, Olive, Mahogany, Tamarind, Tipa.

Small Trees - Autograph, Beach Heliotrope, Ficus lyrata, Seagrape, silver trumpet.

Flowering Trees - Albezia, Bauhinia, Be-still, Shower trees, Plumeria, Gold tree, Royal Poinciana.

Large Shrubs - Sea Grape, Hoa, Scavolea.

Flowering Shrubs - Bird of Paradise, Ginger, heleconia, hibiscus, honeysuckle, night blooming cereus, plumbago, spider/crinum lilies.

Ground cover - Hemigraphis, honeysuckle, naupaka, pathos, sword fern, synogonium.

Vines - Creeping lantana, Indian rubber vine, mexican creeper, philodendron, thunbergia.

Palms - Areca, coconut, MacArthur, Queen, Pritchardia (Fiji Fan), Royal, Sabal.

Accent Plants - Banana, crotons, cyperus, eranthemum, heleconia, jacobs robe (comb), papaya, snow bush, ti.

Shoreline and  
Nearshore  
Environment

Kailua Bay fronts Kailua Village and the waters of this Bay are classified "AA." Anchialine ponds can be found on the Thurston Estate and in the project vicinity to the north near the old airport.

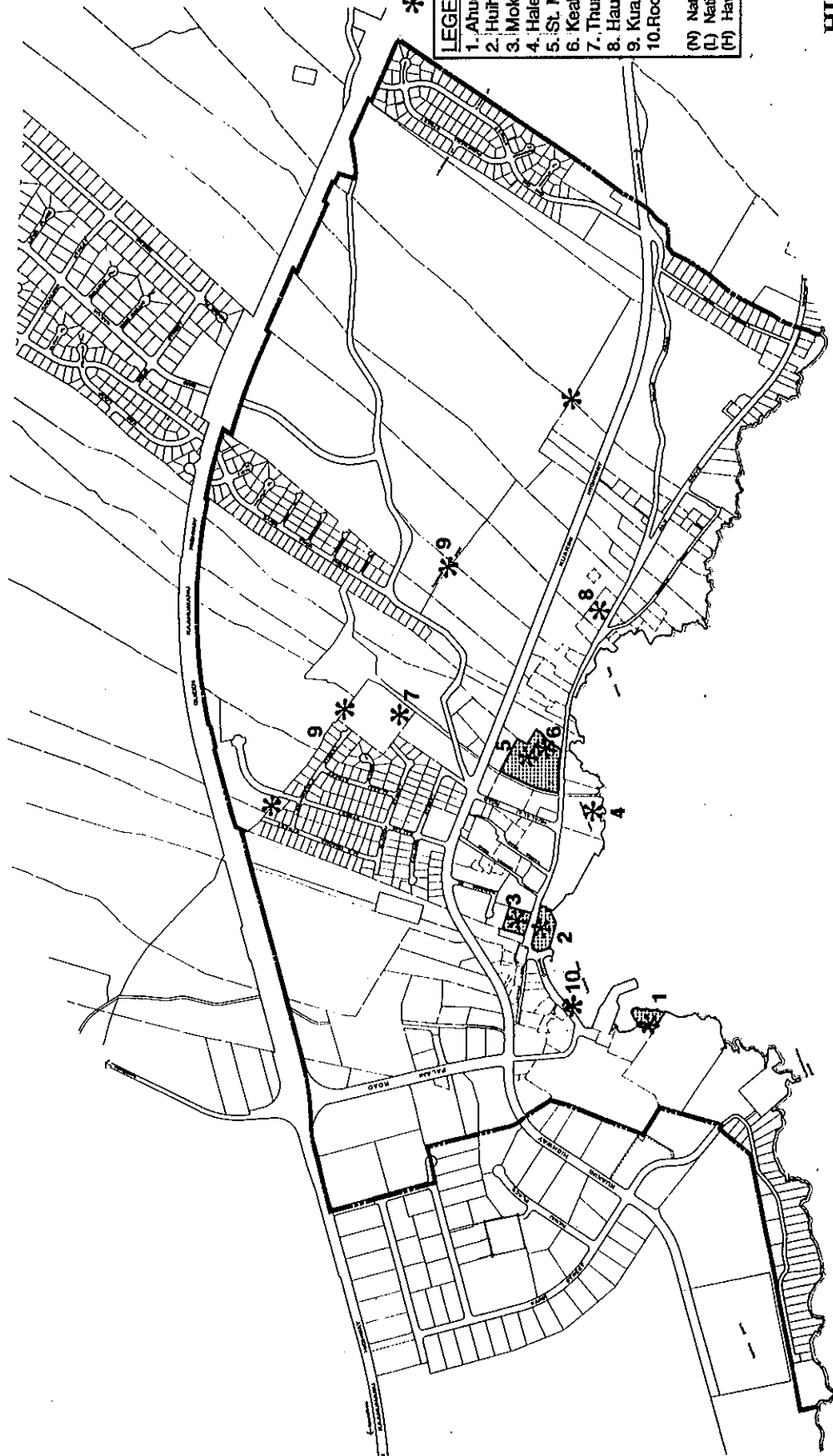
Regulatory Conditions: the Coastal Zone Management (CZM) area as administered by the Special Management Area (SMA) program by the County of Hawaii defines the setback line as 100 feet from the shore in Kailua Village. Any plans to reconstruct within this setback area will be subject to determination of consistency with the County's SMA standards and requirements, State CZM consistency review, as well as the County's shoreline setback variance rules and regulations. Previous plans for Kailua Village refer to the need to be cognizant of future air and water quality impacts from sewer and irrigation water runoff on waters of Kailua Bay.

Archaeological/  
Historical  
Resources

(Sources: Kona Historical Society, "Plan for Kona," Bartholomew & Associates, 1960, and DLNR Historic Preservation Development letter dated 1/93.) (See Figure 6-7 and 6-8.)

Settlement Period - A.D. 900 Through 1700's: In the North Kona Region - Kaloko-Honokohau National Historic Park.

Royal Centers: The royal center theme is reflected at Kailua-Kona with parts of Kamehameha's residence (Kamakahonu) which was restored in the 1970's (National Historic Landmark) on the grounds of what used to be the King Kamehameha Hotel. The structures remaining include 'Ahu'ena heiau, which has reconstructed thatch



\* Historical Sites

# LEGEND

1. Ahuena Heiau (H)(N)(L)
2. Huihee Palace (H)(N)
3. Mokuaikeia Church (H)(N)
4. Hale Halawai
5. St. Michael's Church
6. Kealaokamalamalama Church
7. Thurston Ruins
8. Haukeae Platform (H)
9. Kuakini Wall
10. Rocks (Pa-o-Umi)

(N) National Register of Historic Places  
(L) National Historic Landmark  
(H) Hawaiian Register of Historic Places

## HISTORIC

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PLANNING DEPARTMENT  
HAWAIIAN TERRITORY CORPORATION



buildings on it and the mortuary platform of Kamehameha. Pa o 'Umi as a place is also a remnant of the royal center theme, but it is not suitably interpreted (it is located within the foundation of the seawall). Other archaeological remains of elite house sites may be found during survey of remaining undeveloped lands in Kailua and such sites may merit preservation as part of this theme.

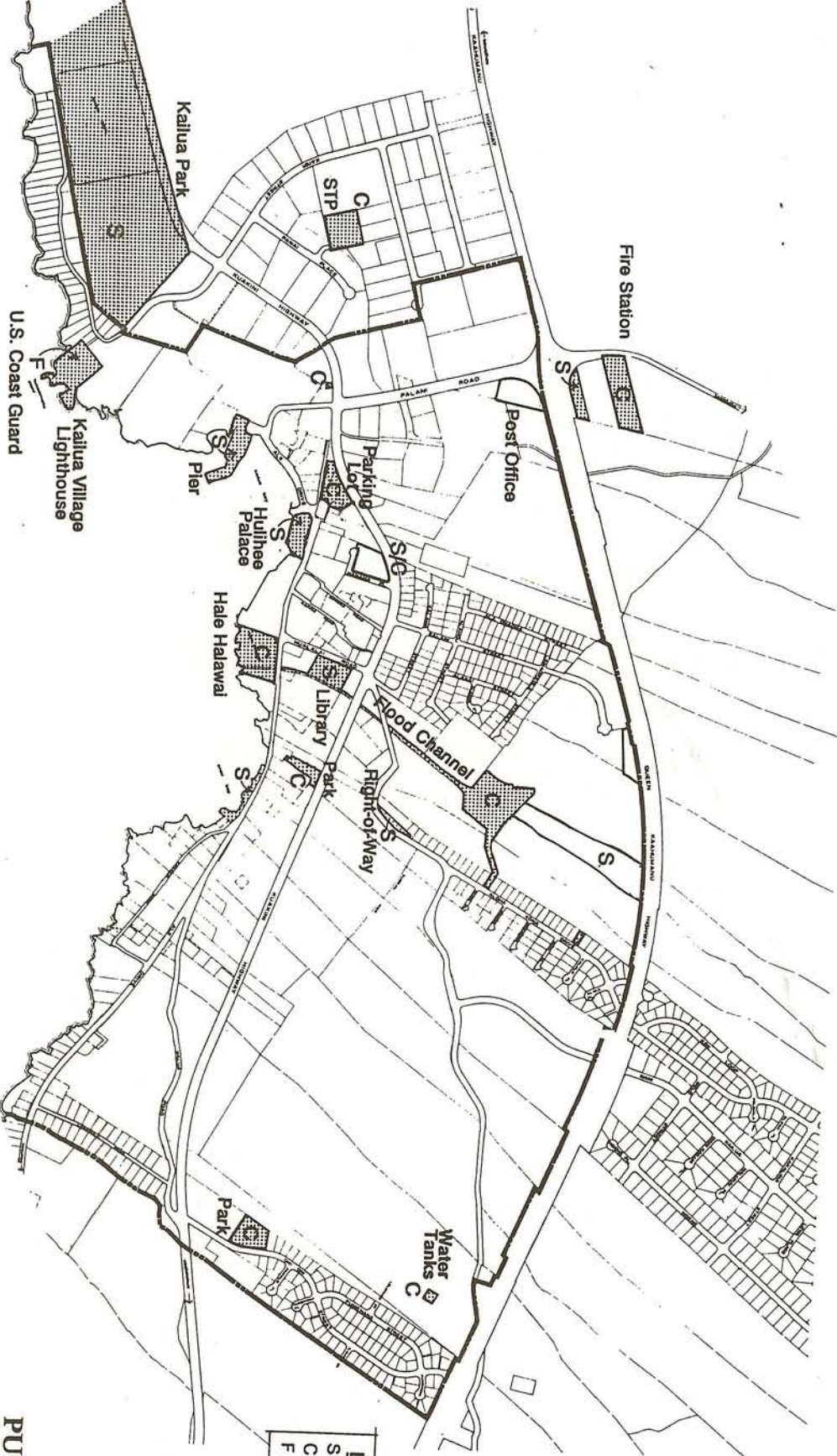
A.D. 0 - 900: Current archaeological research indicates that permanent settlement was in the windward areas of Hawaii Island, where rainfall was sufficient for successful growing of crops near the shore. Population gradually spread throughout these windward areas during these centuries. At this time leeward areas, such as Kailua-Kona were visited to gather natural resources -- quite notably fish. Some campsites in caves have been found dating to this period.

A.D. 900 - 1200: It appears that permanent settlement began to spread into leeward lands - initially focusing around embayments. Kailua-Kona with its Bay is likely to have been an early settlement. At this time it is believed that people had their dwellings near the shore and cleared forest inland where rainfall was sufficient for the cultivation of taro. Trails would lead up to these inland farms. Population gradually spread in the area in ensuing centuries.

A.D. 1200 - 1300: It seems likely that Kona or parts of Kona had formed into a small polity (polities) with a ruler, local chiefs and commoners. Oral histories indicate that other polities existed on the island, with Hilo and Hamakua (the later controlled by Waipio) and several in Kohala of note. Small national heiaus were present at this time.

A.D. 1400 - 1500: The island became unified under the Pili line of rulers based in Waipio. In the time of the ruler 'Umi-a-Liloa, ca. A.D. 1600-1620 by one means of estimation, the royal center was moved from Waipio and royal centers in Kona became of importance. 'Umi, himself, was said to have had a primary center in Kailua-Kona with his residence near the place called Pa-o-Umi. Succeeding Pili line rulers cycled their centers among a number of Kona residences and residences elsewhere on the island, with Kailua-Kona being one of these royal centers. The ruler Alapainui was in residence in Kailua when the Maui king began raiding Hawaii Island in the mid 1700's. Typically such centers contained the ruler's residence, residences of high chiefs, a major national heiau, other heiaus and often a refuge area (puuhonua). These became increasingly larger in size.

A.D. 1600 - 1700: By the 1700's, the fields of Kona's communities had also intensified with greater populations and greater demands of the chiefs. In the higher rainfall zones inland, stones had been cleared out



| LEGEND |         |
|--------|---------|
| S      | State   |
| C      | County  |
| F      | Federal |

# PUBLIC FACILITIES

KAILUA • KONA

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 COUNTY OF HAWAII



Figure 6-9

and stacked as walls, creating a formal, walled field area planted in taro and sweet potatoes and in breadfruit at lower elevations. In lower elevations all the way to the shore, informal clearings, mounds, and terraces were used to plant sweet potatoes; and on the forest fringe above the walled fields there were clearings, mounds and terraces which were primarily planted in bananas. A coastal trail connected the communities of northern Kona, approximating today's Alii Drive in the Kailua area.

The Kuakini Period (late 1700's to early 1800's): Hulihe'e Palace was built for Kuakini in 1837. Under Kuakini's sponsorship the missionaries' first stone church, Mokuaikaua, was constructed in 1836. The "Great Wall" or Kuakini wall, 6-8' in height surrounds Kailua-Kona and communities to the south. It may well have been built under Kuakini's instructions. This wall is being set aside for preservation in developments as per the requirements of the County of Hawaii and State's Historic Preservation Division.

Late 1700's - Post European Contact: In 1782, shortly after European contact, the kingdom of Hawaii fell into three competing kingdoms with the death of the ruler Kiwalao. The third kingdom (Kona, Kohala and parts of Hamakua) was under Kiwalao's cousin, Kamehameha. Eventually, Kamehameha prevailed and reunified the Hawaii kingdom and expanded its borders to include the entire island chain. The Kona Coast was the site of Captain Cook's arrival and death in 1779. In the years from 1782 until 1792, when Kamehameha unified Hawaii Island, he often was in residence in Kailua-Kona which had become a port for foreign traders along with Kawaihae and Kealahou. In the final years of his life, 1813-1819, Kamehameha returned to establish his residence in Kailua-Kona.

Period - 1800's to early 1900's: The Hulihe'e Palace structure is interpreted and furnished relevant to the late 1800's. The ranching period of history for Kona is emphasized at the Kona Historical society's museum in Kealahou. Original portions of the Kona Inn built in 1928, are an excellent example of the early resort architecture on the island of Hawaii. The Henderson House (south of the District boundary) should be included and several beach houses on the mauka side of Alii Drive may have historic significance.

Upon Kamehameha's death in 1819, his son Liholiho and wife Kaahumanu assumed control of the kingdom. The kapu system was abolished shortly thereafter in Kailua-Kona and the capital of the kingdom was moved from Hawaii Island, never to return. In the absence of the king, high chief Kuakini (brother of Kaahumanu) was eventually appointed governor over Hawaii Island and became an extremely powerful figure on the island. Kuakini resided primarily in

Kailua-Kona. Here the missionaries arrived, establishing a station in 1823 where Kuakini and his many subjects lived. The Thurston ruins are representative of one of the original missionary settlements. The Laniakea cave is on the same site. In the past this cave system permitted access down to the ocean as well as to upland areas. The "Great Wall of Kuakini" (origin unknown) surrounding Kailua-Kona area to the South was believed to have been built to confine livestock (introduced by Captain Vancouver in 1792).

Governor Kuakini (John Adams) completed the governor's mansion "Hulihee" in 1834. In 1874 it was designated as the summer palace for the King. The structure was restored in 1885 and set aside by the State to the Daughters of Hawaii in 1927.

The Mokuaikaua Church was completed in 1827 (with corner stones from the Great Heiau). The structure burned in 1835 and was rebuilt by 1836. In 1831 the Bishop family constructed a home in Kailua as well.

In 1840 Kamehameha III granted freedom of religious worship within the new Hawaiian constitution. Within the year the First Catholic Church and School of St. Michael was established in Kailua (later relocated to its present site). Some of the few other remaining sites (south of the district) are St. Peter's Catholic Church built in 1880, presently located in Kahaluu; and Stone Church ruins across Kahaluu Beach Park.

After Kuakini's death in 1844, (his son's widow) princess Ruth Keelikolani became Governor of Hawaii (1855-1874). She moved the island's capital to Hilo, where it remains to this day. Thus, for the latter part of the 1800's, Kailua-Kona no longer was a political center -- although occasionally it was visited by the governors or the king's family and retainers. Kailua-Kona did remain an economic center for northern Kona, with goods transported in from outlying areas (dried fish, salt) and shipped out to those areas. By the end of the century, large ranches had begun to form and ranching, along with coffee, came to dominate much of the economics of the area for the next 50 years. Original portions of Kona Inn built in 1928, are an excellent example of the early resort architecture on the Island of Hawaii. The Henderson House (South of the District) and several beach houses on the mauka side of Alii Drive may have historic significance. In 1908 the Courthouse was completed in Kailua (Hale Halawai). This structure is no longer present.

Photographs from the 1890's (Historical Society) indicate a continuous beach from the Hulihee Palace to the Kamakahonu site and Heiau. Eventually there was a single-lane road along the beach where Alii

Drive now exists. During the late 1950's, the Mayor (County of Hawaii) responded to abutting property owner's desires for provision of a two-lane road through the beach. The existing 700-foot seawall was constructed along Alii Drive during this time. The beach seaward of the wall has since eroded due to wave action. The original pier was an open wood pile structure built in its present location for the transport of cattle. This practice was eventually discontinued.

- \* National Historic Landmark - Kamakahonu/Kamehameha site (1962);
- \* National Register of Historic Places and Hawaiian Register of Historic Places - Kamakahonu/Kamehameha site (1962); Hulihee Palace (1973/1981); Mokuaikaia Church (1978). (Figures 6-7 and 6-8)

Historic sites once covered much of Kailua-Kona. With the urbanization of the area this pattern has changed. Historic preservation laws did not come into place until the early 1970's. Development prior to that time was focused in the core of Kailua-Kona from what used to be the King Kamehameha Hotel to beyond the Kona Hilton, and mostly seaward of Alii Drive. This development proceeded without archaeological survey. Many historic sites were destroyed in these years, with our records being only brief survey work (Stokes' turn of the century study of heiau, Reinecke's 1930 coastal survey, Kekahuna's 1952 study of some heiaus). Since the early 1970's, most developments have been preceded by archaeological surveys, and in the late 1980's these increased in number and quality with a resurgence of development. Only a few areas in Kailua-Kona lack survey at this point.

Because many of the shoreline areas have long been developed, most, if not all, of the early sites of Kailua-Kona are probably gone -- those temporary camps dating before the A.D. 900's and the early permanent settlements of the A.D. 900's-1100's. Archaeological surveys are finding some house sites, temporary camps (in caves and in small surface shelters), burials and informal fields inland of Alii Drive which date to the A.D. 1200's-1700's.

#### Visual Resources

Kailua's visual resources include all of the natural scenic beauty of the sea, shoreline, mountains, and landscape as well as many historic manmade environments and structures. Mauka-makai views, and views of the beach areas include significant rocks and natural shoreline features, the pier, seawall, views of Mokuaikaia Church, the existing ficus trees and other tree canopy, the Kona Inn, Heiau and Palace, and the general character of the Kailua Village architecture.

Tsunami Hazard Coastal areas up to 50 feet are susceptible to tsunami inundation.

## 6.2 PUBLIC SERVICES AND FACILITIES

Existing sewer, water and drainage conditions are discussed within Section 9 (Infrastructure) in conjunction with infrastructure recommendations.

### 6.2.1 Roads

Queen Kaahumanu Highway is owned by the State of Hawaii and provides access into Kailua-Kona. Palani Road, Kaiwi Street, and Hualalai Road are the County maintained arterials that lead into the Village from Queen Kaahumanu Highway. Palani Road has four lanes and provides access to the major shopping centers in Kailua-Kona. The other roads have two lanes. Kaiwi Street leads into the existing industrial area and the popular Old Airport Park. Kuakini Highway is owned by the State of Hawaii and provides two lanes from Kaiwi Street south through Kailua-Kona. Alii Drive is a scenic route along the coast from Kailua-Kona to Keauhou. This two-lane road passes through the heart of the Village.

The State of Hawaii is planning to widen Queen Kaahumanu Highway. A 35-mile portion from the future Henry Street intersection to Kawaihae is presently in the design phase. At this time the State Department of Transportation has not yet decided on the number of lanes that will be required. The construction time frame is also yet to be determined.

Capital Improvement Program (CIP) funds that have been identified for public facility improvements include: \$6.5 million for the extension of the shoreline drive (Kuakini Highway) to the boat harbor, and \$85.5 million for the proposed Queen Kaahumanu Highway expansion in accordance with the County's "Keahole to Kailua" plan whereby widening up to Palani Road from the airport is underway, with a possible freeway interchange over Palani.

### 6.2.2 Solid Waste

The existing landfill at Kealakehe is quickly nearing its capacity. The new West Hawaii

Sanitary Landfill is scheduled to begin construction in 1993. The Kealakehe landfill will be closed thereafter with conversion to a solid waste transfer station.

#### 6.2.3 Parking/Transportation

Privately-operated existing parking lots include: Central block between Kuakini/Alii/Hualalai, a lot located at the corner of Hualalai and Alii Drive, and a lot at the King Kamehameha Hotel. Free parking is available at the County lot on Kuakini Highway (between Palani and Henry Streets).

An unofficial parking study was prepared in 1986 ("Kailua Village Park Study" by Leo Fleming). The results indicated that properties that have not complied with parking requirements have resulted in a shortage of 162 spaces overall from noncompliance with the conditional requirements of development approvals. Estimated shortages include: Kona Seaside (deficit of 11 spaces), Akona Kai Mall (deficit of 15 spaces), International Inn (no parking available), Kim Chong Building (short by 8 spaces), Kona Plaza (24 spaces short), World Square (24 spaces short), Kailua-Kona Medical Hospital (unknown deficit), Kona Inn Shopping Center (unknown deficit), Kona Islander Inn (unknown deficit), and the Sprindrifter (short by 37 spaces).

#### 6.2.4 Water-Related Facilities

The existing pier in Kailua Bay is owned and maintained by the State of Hawaii. There is an informal agreement between the State Department of Transportation-Harbors (DOT-H) Division and the State Department of Land and Natural Resources (DLNR) regarding public parking and access, pick up and delivery of commercial fishing tours, small commercial fishing boats, boat ramp, canoe club launch nearby, jet ski concession, and the marked swimming area. The existing building is being utilized by the marine patrol office, and DOT operates a Visitors Bureau booth.

The design of a new building by the DOT-H is underway. The County of Hawaii Parks Department is working with DOT in planning of the facilities. At present, the pier entry is paved with parking on the pier, and poor access to the beach. The rest of the area is paved with a few palm trees.

The 3-acre lighthouse facility at Kukailimoku Point is owned and operated by the Coast Guard. To the north of the project area, DOT-H plans to expand its Honokohau Harbor by adding 200+ slips to the boat harbor. This expansion is planned for 1994.

#### 6.2.5 Seawall

The Army Corps of Engineers in 1992 analyzed alternatives for repair of the seawall. The Army Corps of Engineers has indicated that funding is available from Emergency Status Section 14 (re: public safety and welfare) for study of the condition on Alii Drive shoreline protection (\$40,000) with a \$500,000 construction limit. Plans and specifications costs can be up to 15% of the construction budget. Cost sharing would be 25% for State/local funds and 75% for federal.

According to the TEchnical Synopsis of the COE report: "During the early 1950's the owners of the properties fronting the beach along Kailua Bay built a recurved wall approximately 700 feet long. The wall rests on a foundation of large boulders having an average diameter of about five feet. There are no as-built drawings on record. However local residents recall that the seawall has a steel sheetpile behind the boulders and beneath the sidewalk. The beach which was seaward of the wall has since eroded exposing the boulders foundation to constant wave action. The wave energy has been free to progress through the large cavities between the large foundation boulders. The soil behind the wall, which forms the foundation for both the sidewalk and the roadway adjacent to the wall, has eroded during the past two years due to the corrosion of the steel sheetpile over time. This erosion has caused cracking and large potholes in the roadway pavement and has caused the sidewalk to crack and fail in several locations. One section of the wall has begun to shift, apparently due to a related shift in the foundation boulders.

The Hawaii County, Department of Public Works, has patched the cracks which periodically have grown as the seawall shifted and has repaired the holes which continually form in the sidewalk and roadway. The accelerating rate of erosion, has caused a need for more frequent repairs and threatens the integrity of both the sidewalk and the roadway. As the erosion process continues to accelerate, the County will have to expend an estimate \$20,000

annually to repair the erosion damages to the sidewalk and roadway. Furthermore, without immediate action, portions of the roadway are in imminent danger of failure during the next severe storm."

The COE Reconnaissance Report dated June 1992 indicated the following (see complete Corps of Engineers' report in the Appendices):

COE Proposed Plan of Improvement: The plan of improvement consists of filling the voids between the large foundation boulders with a cement-sand grout (the voids between the boulders compromise an assumed volume of 40% of the total foundation volume). The method of placement of the grout will consist of drilling holes and injecting the grout mix to fill the voids within the wall's foundation. The section of the wall (32') which has begun to shift must be repaired by water jetting to remove sand under the foundation stone to assure an adequate and stable foundation prior to grouting of this section. This design is not intended to prevent overtopping of the seawall.

The estimated total cost of improvements is approximately \$301,500.00 (75% Federal, 25% County).

#### 6.2.6 Existing and Future Parks and Parks Facilities

The County of Hawaii parks in the project area and vicinity are: Hale Halawai (3.2 acres), Hillcrest neighborhood park (1.63 acres), the Kailua Community Park (airport 34.85 acres) within the State Recreation area, Onea Bay (0.53 acre Right-of-Way), Kailua parking lot (0.3 acre landscaping), Kailua pier (0.1 acre restrooms), Palani Road (0.1 acre medial landscape), and other regional beach parks.

The State of Hawaii owns the following facilities: Hulihee Palace operated by the Daughters of Hawaii; the Old Airport Park area (117 acres) with a beach park; pavilion baseball/football/soccer; tennis court; a gym (under construction) and a canoe storage project

which was partially funded by the County. Other facilities include those located at school sites.

#### 6.2.7 Schools and Library

Educational facilities existing in the project area and vicinity are: Kahakai (grades K to 5), Kealakehe (grades K to 5 and grades 6 to 8), Konawaena High at Kealakekua (grades 7 to 12), new high school at Kealakehe opening in Fall 1994. Private schools in the area include: University of Nations (with preschool), Creative Day Preschool - Kona Baptist Church, Mokuaikaua Church/Nursery, and other private elementary and intermediate schools located in Kamuela, Kapaau, Houaloe, and Honaunau.

The State of Hawaii's West Hawaii University is proposed to be located in the north "Keahole to Kailua" area, with Kona Community College in Kealakekua, and the University of Nations also has expansion plans.

The existing Kailua-Kona Library is owned and operated by the State of Hawaii.

#### 6.2.8 Hospitals

The State's Kona Hospital located in Kealakekua, provides medical and health care services to the project area. The hospital's service area covers from Kohala to Hawaiian Ocean View Estates in Ka'u. It is a 75-bed acute care facility that provides a range of services including long-term care, skilled and interim nursing care, obstetrical, pediatrics, laboratory, cat scan, physio- and occupational therapy, chemotherapy, and a 24-hour emergency room. Plans for physical facility expansion were underway in Spring 1991 to include a surgical suite and new recovery room (source: Waikoloa Affordable Housing Project Final EIS, R. M. Towill Corp., March 1991).

#### 6.2.9 Police and Fire Protection Services

The County Satellite Police Station is located in Kealakehe at the Old Kona Airport site. Services available here include drivers licensing, permits, and safety check applications.

The County Fire Station is located at the Palani Road intersection, while an inspector is stationed in the County offices on Kuakini Highway.

#### 6.2.10 Postal Service and other Government Offices

The U.S. Post Office is located at the corner of Palani and Queen Kaahumanu Highway. State of Hawaii and County of Hawaii's West Hawaii government offices are located on Kuakini Highway. These offices include the State Office of Information and the Governor's liaison.

Additional expanded government services are planned in a civic/government/business center and municipal golf course on a 100-acre site as part of the County's "Keahole to Kailua" plan. A 540-acre site was recently acquired by the State for the development of a national cultural center.

### 6.3 SOCIO-ECONOMIC CONDITIONS

#### 6.3.1 Population

The island's population has grown rapidly since 1970. In the ten-year period between 1970 and 1980, the resident populations increased by 45 percent from 63,470 to 92,050. This growth has continued into the 1980's with further growth of 30.7 percent from 1980 to 1990. In 1990 the resident population for the County was 120,317 (U. S. Bureau of the Census, 1991).

Population growth in the West Hawaii Region is largely responsible for this increase. The population of the region increased by 156 percent from 1970 to 1986. The North Kona District, the most populous place on the island after the South Hilo District, experienced a 308 percent increase between 1970 and 1986. Population there was estimated at 19,700 in 1986 ("West Hawaii Regional Plan," Office of State Planning, 1989). Between 1986 and 1990, North Kona's resident population increased another 13 percent, with the population in 1990 estimated at 22,284 (U.S. Bureau of the Census, 1991). Kailua Village's population in 1990 was 9,126 (ibid). The County of Hawaii projects that this population trend in West Hawaii will continue. According to the County Planning Department's projections by the

year 2010, the North Kona district population is expected to exceed 52,600. This represents a projected 136 percent increase, and comprising approximately 25.5 percent of the entire island's resident population. Kailua Village is projected to have a population of 20,637, which represents a predicted 126 percent increase over the next 18 to 20 years.

### 6.3.2 Age and Race

As indicated in Table 6-1, according to the U.S. Bureau of the Census (preliminary information dated Feb., 1991), nearly 74 percent of the population in the North Kona district in 1990 was over the age of 18 years. Kailua Village's age composition in 1990 was a reflection of the district's in that of the 9,126 persons (U.S. Census 1991), approximately 72 percent or 6,551 people were over 18 years of age. Similarly, the ethnic composition of Kailua Village was a reflection of the makeup of the North Kona district in 1990 whereby 55 percent of Kailua Village was caucasian, 42 percent was Asian and Pacific Islander, and the remainder was all other groups (the proportions in the North Kona district were 59 percent, 38 percent and nearly 3 percent respectively).

TABLE 6-1  
Population By Age and Race

| <u>Place</u> | <u>Total</u> | <u>White</u> | <u>%</u> | <u>Asian &amp;<br/>Pacific<br/>Islander</u> | <u>%</u> | <u>Other</u> | <u>%</u> |
|--------------|--------------|--------------|----------|---------------------------------------------|----------|--------------|----------|
| N. Kona Div. | 22,284       | 13,124       | 58.9     | 8,521                                       | 38.2     | 639          | 2.8      |
| 18 yrs +     | 16,393       | 10,222       | 62.3     | 5,725                                       | 34.9     | 446          | 2.7      |
| Kailua CDP   | 9,126        | 4,977        | 54.5     | 3,848                                       | 42.1     | 301          | 3.3      |
| 18 yrs +     | 6,551        | 3,855        | 58.8     | 2,480                                       | 37.8     | 216          | 3.3      |

### 6.3.3 Housing Resources

According to the U.S. Census Bureau, there were 9,990 housing units in the North Kona district in 1990 (see Table 6-2). Assuming a population of 9,126 in Kailua Village alone, and 2.8 persons per unit average, there were 3,259 housing units in the project area. The County of Hawaii Planning Department has estimated that by the year 2010, Kailua Village will have a housing inventory of 8,286 units -- this is expected to account for about 41 percent of the North Kona district housing inventory of 20,344 units (Draft projections, County Planning Dept., 7/17/89).

TABLE 6-2  
Housing Unit Projections: 1990-2010

| <u>Place</u>     | <u>No. of Units Estimated By Year</u> |             |             |             |
|------------------|---------------------------------------|-------------|-------------|-------------|
|                  | <u>1990</u>                           | <u>1995</u> | <u>2000</u> | <u>2010</u> |
| N. Kona District | 9,990                                 | 11,266      | 13,957      | 20,344      |
| Kailua Village   | 3,259                                 | 4,281       | 5,420       | 8,286       |

(Sources: U.S. Bureau of the Census, Feb 1991; County of Hawaii Planning Department, July 1989).

In 1990, the median house value in North Kona was \$113,000, and the median rental unit price was \$428.00 (County of Hawaii Housing & Community Development).

#### 6.3.4 Employment, Income

Employment trends in the County generally parallel population growth. The county-wide annual job count increased by 62 percent between 1970 and 1987. Between 1980 and 1987, the job count increased by 21 percent from 38,200 to 46,050. Jobs in the service and retail sectors have contributed substantially to the increased overall job count. The service sector jobs increased by 35 percent and retail sector jobs increased by 49 percent between 1980 and 1987 ("West Hawaii Regional Plan," Office of State Planning, 1989).

The 1989 job count totalled 56,900 with an average unemployment rate of 3.9 percent. The sources of income were as follows: finance, insurance, real estate, hotels, other services (14,550), wholesale retail trade (11,400), government (8,000), agriculture (5,850), manufacturing (2,350), and construction (2,400) (County Planning Department).

The service and retail sectors are dominated by lower wage jobs. Per capita personal income for the County increased 19 percent between 1980 and 1986, from \$9,682 to \$11,553. During the same period, the per capita personal income for the State increased 38 percent. The slower rate of increase in the County is due primarily to rapid population growth and relatively fewer numbers of higher paying jobs (ibid). The median family income in the County of Hawaii in 1990 was \$32,000 (for family of four) (County of Hawaii Housing and Community Development).

Patterns of population settlement and growth are defined primarily by an area's economic opportunities. In this respect, the West Hawaii region already has the foundations for providing an economic base as diverse as the island's environmental and climatic conditions. The region has many opportunities to sustain a stable and diversified economy supported by energy resources, high technology research and development, aquaculture, diversified agriculture, commercial and sport fishing, seafood marketing and ocean research. Expansion in these areas will increase job choice and the availability of higher paying jobs.

In North Kona, the visitor industry provides the major source of economic activity and is expected to expand at a rapid rate. According to the County of Hawaii General Plan (1989), the expansion of the visitor industry in this district has been occurring primarily in Kailua Village. There are now more than 4,500 hotel and condominium visitor units in the district. In fact, as of 1989, there were 4,748 visitor units.

Diversified agriculture continues to develop steadily. In North (as well as South Kona), agribusiness and small farmers have promoted the growing industries of papaya, bananas, avocados, and ginger root. Floraculture and nurseries specializing in orchids, anthuriums, and protea are also growing industries in this region.

With the exception of a grower on Molokai, the Big Island is the sole producer of coffee in the United States, and the North (and South) Kona districts have experienced increases in the number of coffee farms. The unit cost of production for Kona coffee growers is higher when compared to other coffee-producing areas of the world, so growers are depending upon the gourmet status of Kona coffee in order to realize a reasonable profit.

6.4 COMMUNITY GOALS (Results of Community Workshop Held March 13-14, 1992)  
As part of the inventory, research and issues identification phase of the master plan development, the two-day long workshop conducted in Kailua-Kona yielded valuable concepts and priorities for further study and consideration. See Section 12 for the Summary of Proceedings.)

#### 6.4.1 Concepts

##### A. Natural Environment

There is an increasing need to respect the natural environment. A strong desire for more immediate contact with nature was expressed, for instance, walkways along the shoreline, the entire length of the Village; mauka-makai pedestrian ways connecting the Village and ocean with interior locations; conservation and intensification of the great green tree canopy over the Village. Also better opportunities for fishing, swimming, diving, and boating, and opening up of views to the mountains and to the sea.

##### B. History

All significant historic sites should be carefully tended and protected according to the attendees. The Great Wall of Kuakini should be made accessible via hiking trail. They added that walking tours should be made available so that residents and visitors can take self-guided tours to points of historic and natural interest.

##### C. Culture

A Cultural Center is proposed, perhaps on the Thurston site if it can be acquired. Many experiences and events could take place, including those that inform people of Kona's history as well as the culture, religion and crafts of the ancient and pre-modern Hawaiian society.

##### D. Circulation

Most agreed on the importance of improving pedestrian circulation and access. A network of walkways threading through the Village was called for. Cars should be parked in appropriately sited, low scale parking structures (perhaps with shops and cafes at street level). Small scale transit similar to the Kona Inn tram could carry people through and around the Village and to recreational uses at the Old Airport and to the new shopping centers. Some groups proposed pedestrianizing part of Alii Drive for portions of time (resident and emergency delivery access guaranteed). A shoreline walkway

and mauka-makai walkways were proposed (the latter perhaps utilizing the flood plains). It was recommended that the open space on Alii Drive with its two magnificent trees ("banyan park") be acquired as a focus of the open space network.

Some suggested Alii Drive could become one way south, with north bound cars using Kuakini Highway (widened to four lanes). This would provide space for pedestrian uses along Alii Drive, with more parking and service embayments. Improved mauka-makai street connections are needed; also to neighborhoods like the Pines. More direct connections between the Village and the newer shopping centers would benefit both areas. Streets around the Village periphery should give easy access to parking structures so that people can leave their cars and experience the Village on foot. Access for the disabled is important, as well.

E. The Pier

Some people proposed removing the pier and building another further north and around the Bay. Others suggested keeping the pier in its present location, but improving it in various ways; by permitting water flow beneath it; by banning parked cars and use by large scale vehicles (buses, RV's, etc.); by requiring large scale water traffic to relocate elsewhere; by enhancing possibilities for pedestrian uses of the pier as well as fishing, swimming, small boating, etc.

F. Landscaping

It was agreed that the island's potential for lush vegetation should be encouraged in the Village. More trees and a wide variety of plantings should occur. Many colors should abound. Plantings with alluring scents should perfume the air. Plants that attract interesting bird life should be featured. Canopy trees should be mixed with the vertical accents of palms for variety and also to provide shade throughout the Village. Landscaping can enhance important intersections while providing gateways into the Village.

G. Hotels and Motels

Major visitor accommodations are recommended to be north and south of the Village core itself, perhaps with smaller inns, bed-and-breakfasts, etc., in the core.

H. Facilities for Residents and Visitors

Places and facilities that serve both residents and visitors were favored over those aimed solely at tourists. Cafes, restaurants, areas for the performing arts, outdoor gathering places, a cultural center, a proposed museum, places to picnic, would serve both residents and visitors alike. Such facilities should be inter-mixed as much as possible. The zone along Hualalai Road from the library to the coastline might become a focus of more civic buildings, so that the whole Village gains a "civic center" or municipal focus.

6.4.2 Priorities

The following "wish list" summarizes the projects viewed as necessary/desired by the community workshop to implement the concepts listed above.

1. General facelift of the pier; removal of parking on the pier, better visitor arrival experience, new building and landscape.
2. Consolidated parking structures near King Kamehameha Hotel, the County parking lot, and interior within the block between Hanama Place to Hualalai Road and Alii Drive to Kuakini Highway.
3. Continuous waterfront pedestrian path from the heiau to the Kona Hilton.
4. Improvements to Kuakini Highway; widening to four lanes with more bike/pedestrian paths, landscaping, change of traffic signals, extension to Honokohau Boat Harbor and extension of Henry Street makai of Kuakini.

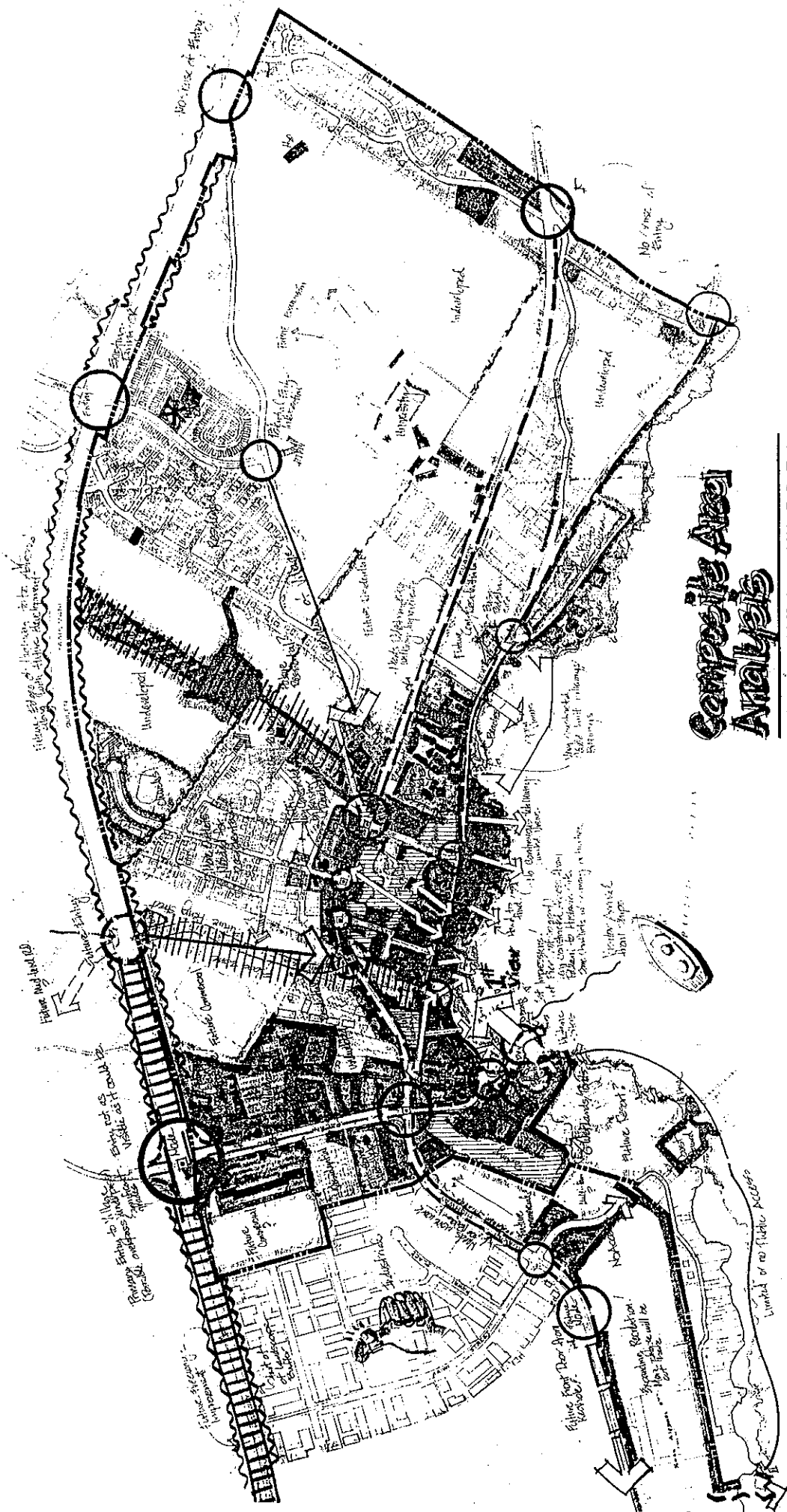
5. Mauka-makai pedestrian connection from public parking lot through vacant lot to Alii Drive.
6. Cul-de-sac Palani at the pier and alterations to Alii; more pedestrian/landscape/one-way traffic, etc., from seawall to Hualalai Road.
7. Reconfiguration of Hale Halawai; open views to the water, more civic activities in the area.
8. Acquisition of the Thurston Estate as a Cultural Center/Park.
9. Put utilities underground.
10. Improved entry features on Queen Kaahumanu Highway at Palani, Hualalai and other entry areas.
11. New mauka-makai roadways between Queen Kaahumanu Highway, Kuakini and Alii to the south of the Village core (for residential bypass) and to the north of the industrial area.
12. More mauka-makai pedestrian access and views.
13. Better bike/pedestrian access and views.
14. Inclusion of Old Airport site, industrial area, and Queen Kaahumanu Highway - right-of-way within the planning boundaries.
15. Preservation or community use of the undeveloped areas near the flood basin, Old Kona Plantation, and "Great Wall" (for a trail).

The overall retention of the quality of life that reflects the special nature of Kailua Village, its past and history, its close relationship with the natural environment, relaxed and hospitable lifestyles, were stressed. In Kailua Village, people live together with respect in a casual but vibrant manner that becomes apparent to even the most casual visitor. To conserve and preserve that unique quality is as important as making plans for the physical characteristics of the community.

#### 6.5 COMPOSITE AREA ANALYSIS (Figure 6-10)

An analysis of available developed versus undeveloped zoned land within the project area was prepared during the inventory and research phase. The purpose of this exercise is to help the planners determine the availability of lands for future development of necessary land uses. Table 6-1, Build-Out Analysis, indicates that the planning area contains approximately 586 acres (excluding ROWS), of which 42 percent or 247 acres is developed. Of the lands zoned Commercial, 51 percent (or 51.3 acres) is developed. When Phase II of the Lanikai Shopping Complex is built, Commercially zoned lands will be 73 percent developed. Usually commercial development lags behind residential, thereby making the Kailua-Kona land use profile different in that residential appears to be lagging. This suggests that Kailua Commercial serves an area outside of the master plan area. This is certainly true for transit related commercial.

Residential zoned land comprises resort units and are somewhat difficult to determine since some lie in Multiple Residential zones, in addition to Commercial and Resort zones. Based on 35 dwelling units per acre, if the County General Plan guideline is applied literally, up to 10,000 residential units could be built on remaining undeveloped portions. Under current zoning, there is a potential for 1,468 single-family and multi-family dwelling units and 1,092 resort units. Based on the General Plan, 8,600 additional units are possible, although this may be on the high side.



# Composite Area Analysis

# KAILUA • KONA

## MASTER PLAN

ISLAND OF HAWAII

PREPARED FOR:  
COUNTY OF HAWAII

 8 100 200 300 400 500

R.M. TOWILL CORPORATION

R.M. TOWILL CORPORATION

Figure 6-10

## SECTION 7

### PREVIOUS PLANS AND PROGRAMS

#### 7.1 OVERVIEW

In 1960, Harland Bartholomew and Associates was commissioned by the Hawaii State Planning Office to prepare A Plan for Kona. The Master Plan document produced was a set of comprehensive planning evaluative studies including:

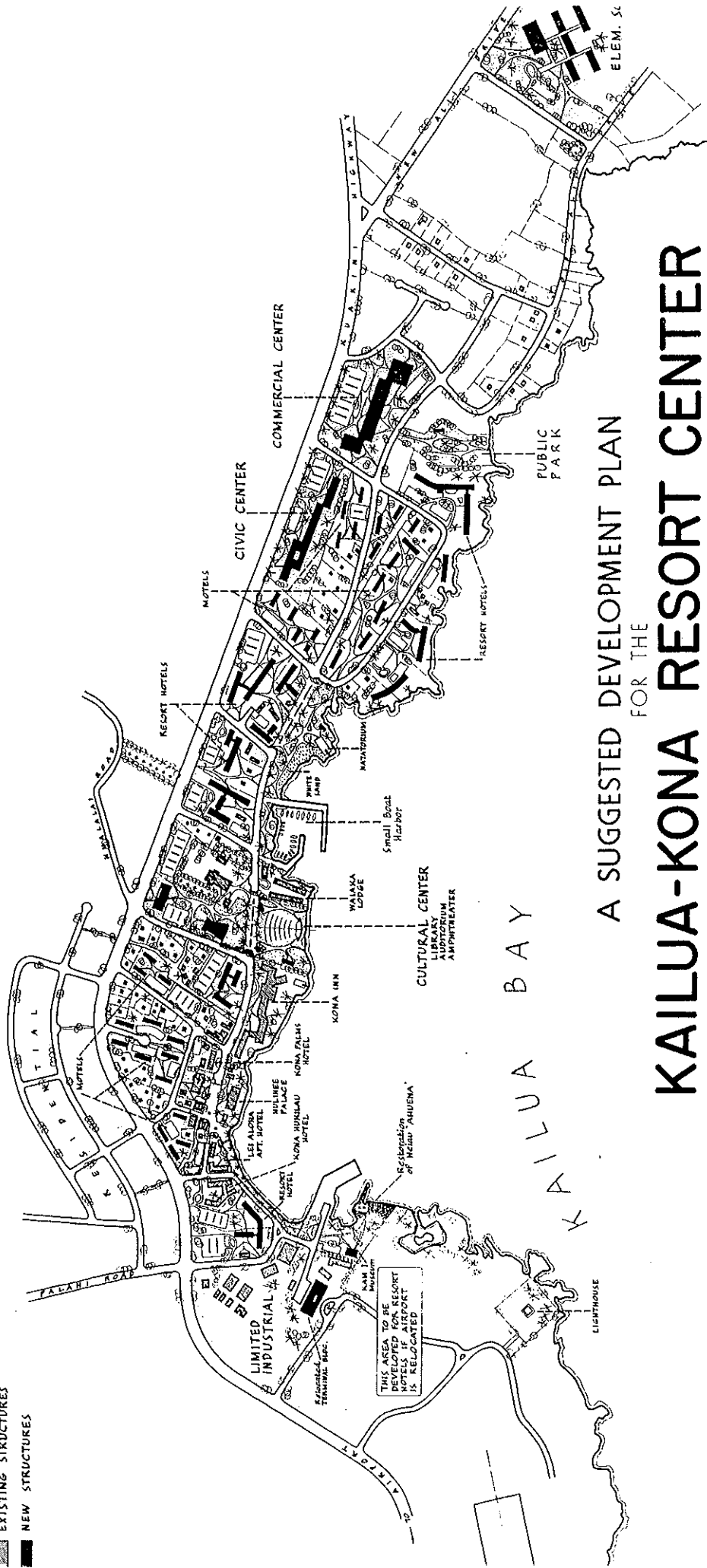
1. A series of group interviews by a survey-research firm that permitted evaluation of the assets and liabilities of Kona and indicated what residents want Kona to become in the future.
2. Kona history, historical sites, and the Kona way of life.
3. Analyses of existing physical characteristics including mapping of existing land uses, transportation facilities, utilities, and disaster characteristics.
4. Population and economic characteristics and a summary of community social problems.
5. Development potentials in Kona. (Figure 7-1)

The "Kailua Village Design Plan," July 1976, by Donald Wolbrink & Associates, Inc., adopted as County of Hawaii Ordinance No. 217 and the "Kailua Village Design Plan" update prepared by Wil Chee in 1988, were prepared as urban physical design guidelines specific to the Kailua Village area. The design theme of "the Kona Way of Life" was utilized to implement the 1976 and 1988 design guidelines. This theme essentially was defined by the following elements:

1. Very favorable climate.

LEGEND:

- EXISTING STRUCTURES
- NEW STRUCTURES



A SUGGESTED DEVELOPMENT PLAN  
FOR THE

# KAILUA-KONA RESORT CENTER

ISLAND OF HAWAII

prepared for  
THE TERRITORIAL PLANNING OFFICE  
TERRITORY OF HAWAII

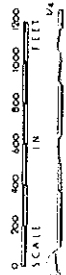


Figure 7-1

2. Urban development characterized by small unpretentious villages which have developed slowly and naturally as independent units on the vast, massive lava coast.
3. A pattern of quiet, relaxed, uncrowded living.
4. Friendly sincere residents with strong reputation for freedom and independence.

Both of these plans addressed plan boundaries, design themes, land use development controls, special design treatments, circulation and landscape, signage, architectural standards, parking, historic features, public facilities and plan implementation.

## 7.2 SUMMARY OF RECOMMENDATIONS FROM PRIOR PLANS

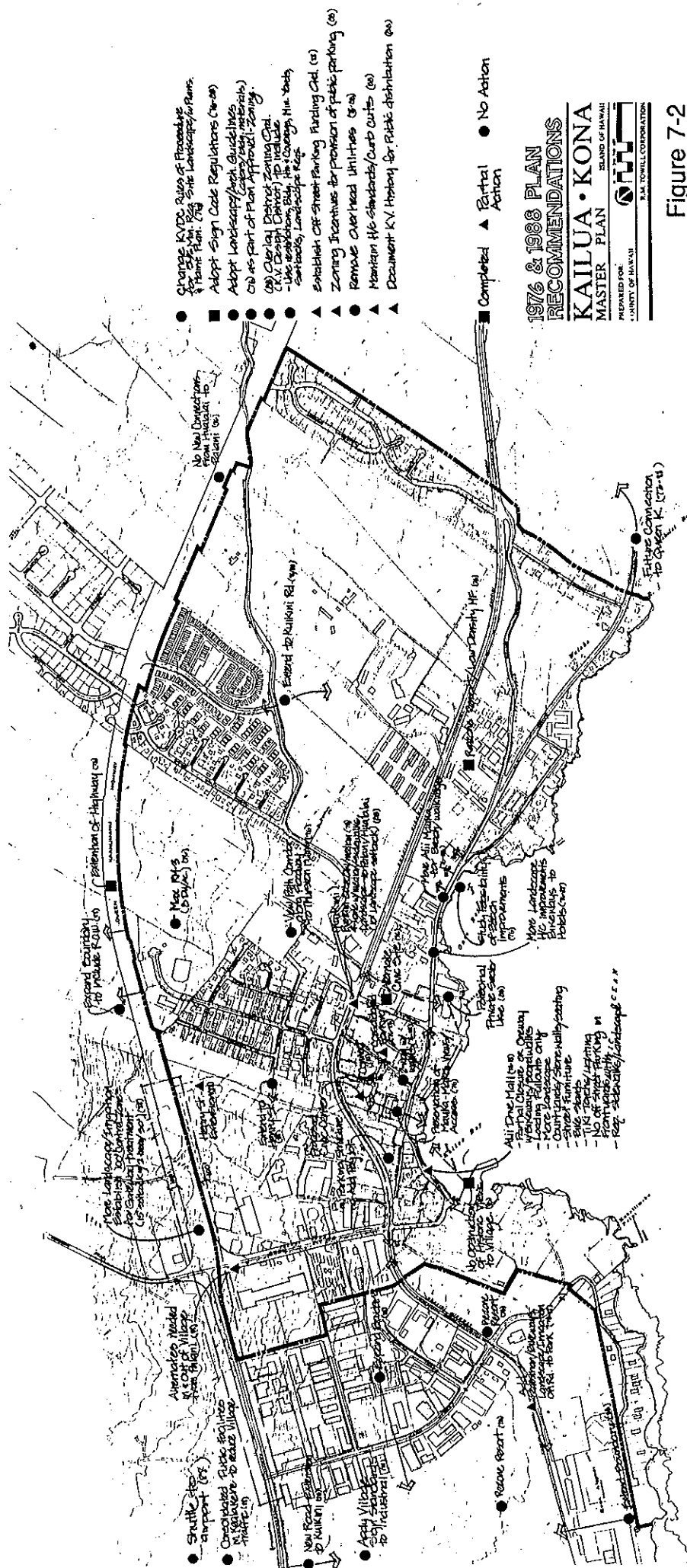
The following is a summary of recommendations from prior plans, with a code indicating which recommendations have been acted upon. (See Figure 7-2 for locations of recommendations.)

LIST OF PREVIOUS RECOMMENDATIONS

| NA (No Action)                                                                                        | PA (Partial Action)                                                                                                                             | C (Completed)                                                        |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Expand boundaries to include old airport and industrial area (88), and all of Queen R.O.W. (76-88)    | Add pedestrian walks and bikeways, landscape and irrigation to Kuakini from Palani to old airport. (88-76)                                      | Alternate Civic site at old school property. (76)                    |
| Rezone Lanihau Trust areas near old airport and behind King Kamehameha to Resort (76)                 | Make sure there will be no further development that would obstruct views of historic church steeple or other major views from the pier. (88-76) | Support of Queen K. extension. (76)                                  |
| Add new entry road off of Queen K. to by pass Industrial down to old airport for Village access. (88) | Expand existing public parking lot via; adding to land area, building parking garage, making it a pay lot. (76-88)                              | Establish new sign code standards and regulations (adopted). (76-88) |
| Consolidate Public facilities out of Village in Kealakehe (reduce traffic impacts). (88)              | Vehicular/pedestrian connection between Hanama Place and Sarona Rd. (88)                                                                        |                                                                      |

| NA (No Action)                                                                                                                                                                                                                              | PA (Partial Action)                                                                                                                                                                                                                                                                                                                                                                                    | C (Completed) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Alternative traffic diversions needed in and out of Village away from Palani. (88)                                                                                                                                                          | Alii Mall concept - raised board walks, landscaping along seawall, close all or portions of road to Hualalai or make it one way after improvements elsewhere. Loading pullouts only on street. Improved bikeways, walks, landscape, lighting (300 watt 10'-12'), stone walled courtyards, street furniture, trash receptacles/seating/news stands as part of walls, tiki torches, bike stands. (76-88) |               |
| Apply Village Sign Standards to Industrial area. (88)                                                                                                                                                                                       | Extend Henry Street to Queen . K. Highway. (88)                                                                                                                                                                                                                                                                                                                                                        |               |
| Proposed a civic center area (on existing office development behind M. church) and maintaining mauka makai views and access from civic area, church and palace. (76)                                                                        | Kuakini - maintain 80' R.O.W. and medial landscape strip. (76) Four lane with medial trees, sidewalks both sides from Palani to Hualalai,(with 10' landscape setback) 25 mph speed limit. Improve sidewalks along entire length of Village. (88)                                                                                                                                                       |               |
| No more auto services in Village core. (76)                                                                                                                                                                                                 | Rezone south area between Alii and Kuakini to Resort or low density Multifamily. (76)                                                                                                                                                                                                                                                                                                                  |               |
| Make Sarona Rd. two way to Kuakini with sidewalks. (76-88)                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| Extend Alahou to Henry Street. (88)                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| Encourage more landscape and irrigation all along Queen K. Highway. Establish a 100' Design Control Zone (100' to each side of R.O.W. from Industrial to Henry St.) for gateway treatments. (15' landscaped setback with 2 trees/30'). (88) |                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| Area near floodway - Max. zoning RM-3 (8 du/ac.). (76)                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| Open up views and establish pedestrian corridor from Civic areas along floodway to Thurston ruins. (76)                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| Add bikeways on Alii south to Hotels. (76) Provide more H/C cuts and access. (76-88)                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                        |               |

| NA (No Action)                                                                                                                                                                                                                                          | PA (Partial Action) | C (Completed) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------|
| Partial use of Hale Halawai by private sector to generate income. (88)                                                                                                                                                                                  |                     |               |
| Move Alii mauka along Oneo Bay to make room for beach area and sidewalks/bikeways. (76-88)                                                                                                                                                              |                     |               |
| Study feasibility of establishing a beach at Oneo Bay. (76)                                                                                                                                                                                             |                     |               |
| No new outlets to Queen K. Highway between Palani and Hualalai. (76)                                                                                                                                                                                    |                     |               |
| Continue Alii south with eventual connection to Queen K. Highway. (88)                                                                                                                                                                                  |                     |               |
| Establish Off street Parking Fund Ordinance (to penalize nonconforming sites and finance new parking). (88)                                                                                                                                             |                     |               |
| Shuttle service from Village out to Airport. (88)                                                                                                                                                                                                       |                     |               |
| Adopt landscape and architectural guidelines (colors, building materials) as part of Zoning Plan Approval process. (88)                                                                                                                                 |                     |               |
| Changes to KVDRC Rules of Procedure to include landscape and maintenance plan approval with min. 5% front yard landscape. (76)                                                                                                                          |                     |               |
| Remove all over head utilities. (76-88)                                                                                                                                                                                                                 |                     |               |
| Adopt Overlay District zoning (KV Design District) with use restrictions (allowing Retail in Resort zoning, building hts. (max. 75' - 45' on Alii), setbacks (45% step) and lot coverage (max. 75%), landscaped - parking and yard minimums (25%). (88) |                     |               |



- Change KVDL Rules of Procedure for Site Plan, Reg. Site Landscaping/Plants, & Home Plan. Reg.
- Adopt Sign Code Regulations (New)
- Adopt Landscaping/Arch Guidelines
- Adopt as part of Plan Approval Zoning
- (a) Overlay District Zoning Ord.
- (b) Overlay District Zoning Ord. to include - Use restrictions, Sign, etc. (Overlay, N/A, Yards, setbacks, Landscaping Regs)
- ▲ Establish off-street parking parking Ord. (a)
- ▲ Zoning Incentives to provision of public parking (a)
- Remove Overhead Utilities (a)
- ▲ Maintain Hic standards/Curt cuts (a)
- ▲ Document K.V. History or Public distribution (a)

Completed ▲ Partial Action ● No Action

**1976 & 1988 PLAN  
RECOMMENDATIONS**

**KAILUA • KONA**

MASTER PLAN

PREPARED FOR: COUNTY OF HAWAII

BY: K.M. TOWELL CORPORATION

Figure 7-2

## SECTION 8

### TRAFFIC ANALYSIS

#### 8.1 INTRODUCTION

##### 8.1.1 Purpose

The purpose of this section is to assess the future roadway needs for the full build-out of the Kailua-Kona Master Plan.

##### 8.1.2 Scope

1. Description of access and existing roadways within the study area.
2. Establish the existing traffic conditions using recent studies in the vicinity.
3. Update the existing traffic data and assess the existing traffic conditions.
4. The identification and analysis of existing roadway deficiencies in the study area.
5. Develop interim traffic improvements to mitigate existing roadway deficiencies.
6. Analyze the parking needs within the "core" area of Kailua Village.
7. Develop a sub-area traffic simulation model to analyze alternative traffic circulation plans.
8. Project future traffic demands based upon the land use forecast for the Kailua-Kona Master Plan.
9. Develop alternative traffic circulation plans for the study area.
10. Analyze the future roadway needs for study area.

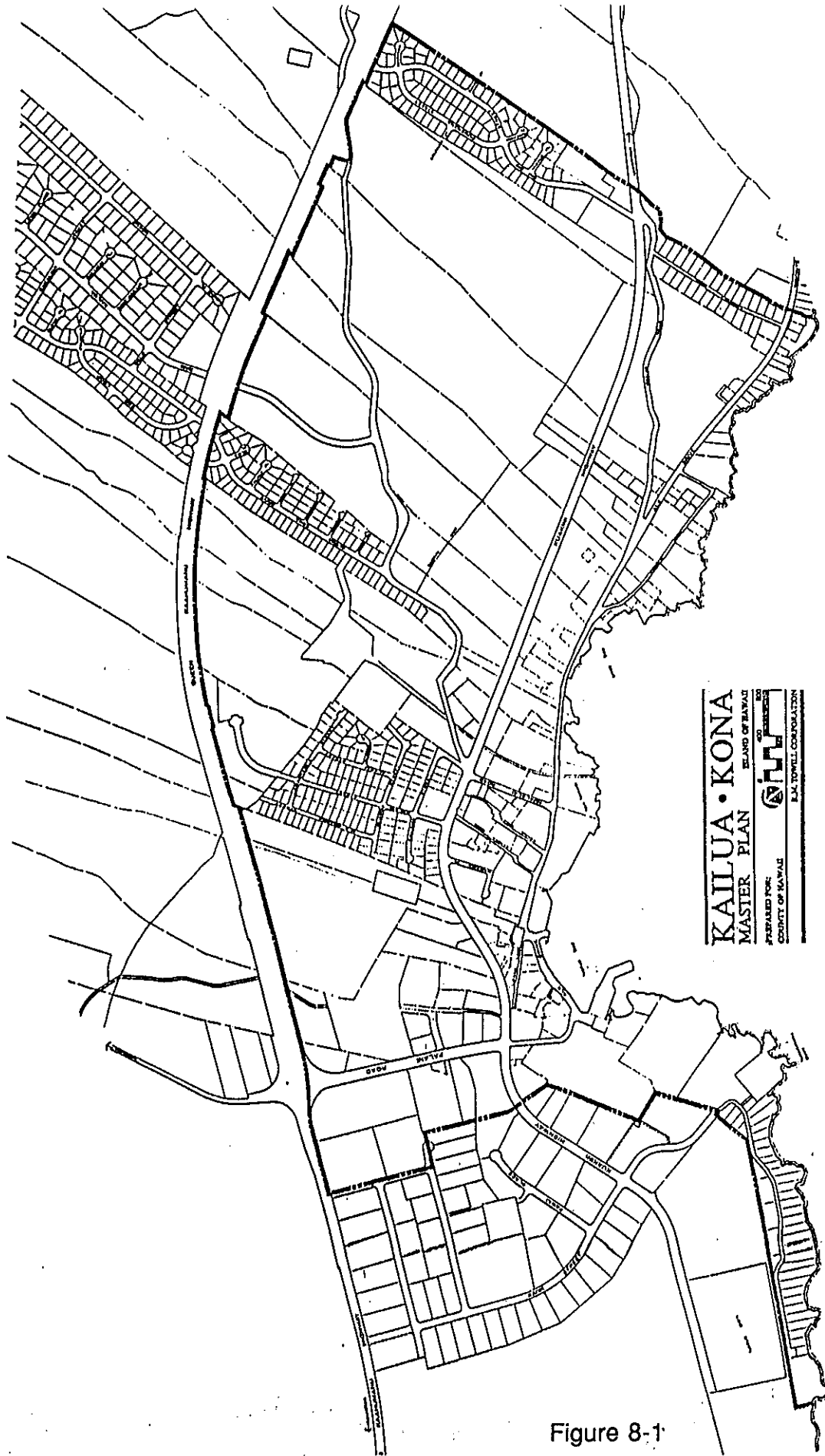


Figure 8-1  
STUDY AREA

11. Recommend traffic circulation improvements for the study area.

### 8.1.3 Limitations

The planning of roadways and traffic circulation system within the Master Plan area is based upon the most recent available information from other planning efforts in the region. These include: the update of the Island of Hawaii Long Range Highway Plan (HLRHP); the Queen Kaahumanu Highway Master Plan (QKMP); and the Keahole to Kailua Implementation Plan (K-K Plan). The HLRHP formulates the basis for the land use and traffic forecasts and the long range highway plan for the Island of Hawaii. The QKMP is part of the implementation of the long range highway improvement of Queen Kaahumanu Highway. The K-K Plan is the County's master plan for the region targeted for growth in West Hawaii. The K-K Plan details the roadway network interconnecting with the roadway system in Kailua-Kona. Each plan is part of an integrated, on-going planning effort, involving the State, County, and private developers. While this study is part of that integrated effort, it is subject to change as these regional studies continue to evolve.

## 8.2 EXISTING ROAD AND TRAFFIC CONDITIONS

### 8.2.1 General

The purpose of this section is to report on the existing roadway and traffic conditions within the study area defined by the Master Plan for Kailua-Kona. This section also presents the findings of the road and traffic inventory assessment phase of the study, which includes a field investigation, traffic count data collection, and the assessment of existing deficiencies identified based upon the data collected in the inventory assessment.

### 8.2.2 Regional Access

Access to Kailua Village from the north is provided by Queen Kaahumanu Highway and Palani Road/Mamalahoa Highway. Queen Kaahumanu Highway is a high quality, two lane, two way State highway between Kailua and Kawaihae. Queen Kaahumanu Highway is the primary arterial highway in North Kona and South Kohala, connecting primary destinations such as the Keahole Airport and Waikoloa Resort.

Mamalahoa Highway is a two lane, two-way roadway. Mamalahoa Highway provides the primary route from Kailua to Waimea and continues eastward to Hilo. Mamalahoa Highway passes the study area, mauka of Kailua Village and circles the south point of the island to Hilo. Palani Road is a four-lane roadway, which leads from Kailua Village up to Mamalahoa Highway.

Access to Kailua Village from the south is provided by Kuakini Highway and Alii Drive. Kuakini Highway is a two to three lane, two way State Highway between Kailua and the Kealahakua area, where it intersects Mamalahoa Highway. Kuakini Highway is the primary arterial highway south of Kailua Village. Alii Drive is a two lane, two way roadway along the coastline between Kailua Village and Keauhou.

### 8.2.3 Kailua Village Roadways

Queen Kaahumanu Highway is the primary arterial highway, which runs along the east (mauka) boundary of Kailua Village and terminates at its intersection with Kuakini Highway, south of the Village. Queen Kaahumanu Highway is signalized at its intersections with Palani Road and Nani-Kailua Drive. The posted speed on Queen Kaahumanu Highway varies between 35 and 45 miles per hour (mph).

Kuakini Highway is a secondary arterial highway through Kailua Village. Kuakini Highway is primarily a two lane roadway with auxiliary left turn and right turn lanes at major intersections. North of its intersection with Palani Road, Kuakini Highway provides access to the Kona Industrial Park and the Old Airport Park. Within the study area, Kuakini Highway is signalized at Palani Road, Kalani Street, Hanama Place and Hualalai Road. The posted speed on Kuakini Highway varies from 25 mph to 45 mph.

Alii Drive follows the coastline through the heart of Kailua Village and terminates at its intersection with Palani Road. Alii Drive would functionally be classified as a major collector road. The intersections along Alii Drive are unsignalized through the study area. Alii Drive at Hualalai Road is a three-way stop intersection, i.e., all approached are required to stop before proceeding through the intersection. The posted speed on Alii Drive

varies from 15 mph to 30 mph.

Makai of Queen Kaahumanu Highway, Palani Road is a four lane, divided roadway to its intersection with Kuakini Highway. Palani Road passes through the commercial core of Kailua Village. Palani Road is signalized at Queen Kaahumanu Highway, the entrance to Lanihau Center, and at Kuakini Highway. The posted speed on Palani Road within the study area is 25 mph.

Hualalai Road extends from Alii Drive to Mamalahoa Highway, intersecting Kuakini Highway, Nani-Kailua Drive and Queen Kaahumanu Highway. Hualalai Road is signalized at Kuakini Highway. The posted speed on Hualalai Road is 25 mph.

Palani Road and Hualalai Road are the only continuous roadways between Queen Kaahumanu Highway and Alii Drive. Henry Street, which is under construction at this writing, would connect Queen Kaahumanu Highway and Kuakini Highway. There are other narrow roadways between Alii Drive and Kuakini Highway within the study area. These include Likana Lane, Sarona Road, Lunapule Road, and Walua Road.

The road network in Kailua Village in the north-south directions consists of Queen Kaahumanu Highway, Kuakini Highway, and Alii Drive, in descending hierarchical order. The mauka-makai directions lack connecting roadways between these north-south corridors both in number and carrying capacity. As a result, Palani Road and Hualalai Road are heavily utilized and result in recurring traffic congestion at their intersections with the north-south roadways. Exhibit 1 shows the roadways within the study area.

#### 8.2.4 Existing Traffic Volumes and Operating Conditions

##### 8.2.4.1 Traffic Count Data

The following intersections are included in the traffic analysis:

- \* Queen Kaahumanu Highway and Palani Road
- \* Queen Kaahumanu Highway and Nani-Kailua Drive

- \* Queen Kaahumanu Highway and Hualalai Road
- \* Kuakini Highway and Palani Road
- \* Kuakini Highway and Hualalai Road
- \* Alii Drive and Hualalai Road
- \* Alii Drive and Lunapule Road
- \* Nani-Kailua Drive and Hualalai Road
- \* Palani Road and Lanihau Center Driveway

Recent traffic studies, containing relevant traffic data, were obtained from the County of Hawaii. The projects for which these studies were conducted include:

- \* Lilioukalani Trust/Keahuolu Lands
- \* Governor Kuakini Shopping Center
- \* Alii Regency Condominiums
- \* Lanihau Center/Henry Street
- \* Iolani Terrace
- \* Hiéanaloli
- \* Kamehameha Gardens
- \* Pa'a Place
- \* Keahole to Kailua Traffic Circulation Plan

The data, obtained from these studies, were collected between 1989 and 1992. The pre-1992 data were updated to 1992 traffic conditions to establish a uniform base line.

#### 8.2.4.2 Traffic Data Update Methodology

The travel data collected are dated from 1989 through 1992. Linear regression techniques were performed on the historical data to obtain the growth rates of traffic in the vicinity. The traffic data were obtained from the State Department of Transportation (DOT). The historical growth rates are used to develop growth factors in order to update pre-1992 traffic data to establish 1992 base line traffic conditions.

#### 8.2.4.3 Capacity Analysis Methodology

The highway capacity analysis performed for this study is based upon procedures presented in the "Highway Capacity Manual", Special Report 209, Transportation Research Board, 1985 (HCM) and the "Highway Capacity Software", Federal Highways Administration. Level of Service (LOS) is a quantitative and qualitative assessment of traffic operation, "A" being the highest or best condition and "F" being the lowest or worst condition.

"Volume-to-capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road's traffic carrying ability. A v/c ratio of 1.00 indicates that the roadway is operating at its capacity.

Another measure of relating traffic volumes to intersection capacity presented in the HCM as the "planning analysis" method. Three categories are used: "under capacity", "near capacity", and "over capacity". Under capacity conditions indicate that the traffic demands would virtually always be below the intersection's capacity. Over capacity conditions indicate that the intersection capacity will be exceeded in most cases. Near capacity conditions requires engineering judgement, especially when critical traffic volumes approach over capacity conditions. The details of the traffic signal operation and intersection design become more critical factors in determining the adequacy of the intersection capacity. The purpose of this analysis is to determine the adequacy of intersection geometrics, i.e., number of through and turning lanes required, under given traffic demands. This method is a broad measure for intersection operation, where the details of the traffic signal design and operation and vehicle type distribution of traffic are not available.

#### 8.2.4.4 AM Peak Hour Traffic Analysis

The intersection of Queen Kaahumanu Highway and Palani Road operates at near capacity conditions during the AM peak hour of traffic. The left turn movement from north bound Queen Kaahumanu Highway to makai bound Hualalai Road operates at LOS "D". The mauka leg of Hualalai Road and Queen Kaahumanu Highway operates at LOS "F" conditions. Hualalai Road at Alii Drive operates at LOS "D" conditions during the AM

peak hour of traffic. The remaining intersections analyzed operate satisfactorily. Exhibits 2 through 4 show the existing AM peak hour traffic and the results of the capacity analysis.

#### 8.2.4.5 PM Peak Hour Traffic Analysis

During the PM peak hour of traffic, the intersection of Queen Kaahumanu Highway and Palani Road operates at capacity conditions. The intersection of Palani Road and the Lanihau Center operates at near capacity conditions. The intersection of Kuakini Highway and Palani Road operates at capacity conditions during the PM peak hour of traffic.

The intersection of Queen Kaahumanu Highway and Nani Kailua Drive operates at near capacity conditions. The intersection of Kuakini Highway and Hualalai Road also operates at near capacity conditions. Kuakini Highway, between Hualalai Road and Kalani Road, experiences congestion resulting from the lack of coordination between the traffic <->signals. The left turn movement from north bound Queen Kaahumanu Highway to makai bound Hualalai Road continues to operate at LOS "D" during the PM peak hour of traffic. The mauka leg of Hualalai Road at Queen Kaahumanu Highway operates at LOS "D".

Hualalai Road at Alii Drive operates at LOS "F". Lunapule Road at Alii Drive operates at LOS "D" during PM peak hour of traffic. Exhibits 5 through 7 show the existing PM peak hour traffic and the results of the capacity analysis.

### 8.3 PARKING

#### 8.3.1 General

The parking analysis discussed herein pertains to the "core" area of Kailua Village, i.e., the area bounded by Palani Drive, Alii Drive, Hualalai Road, and Kuakini Highway. The makai side of Alii Drive is also included in the core area.

It is generally recognized that parking capacity in Kailua Village is deficient as a result of development which occurred prior to the modern day County parking code(s). Older buildings/businesses were allowed to operate under pre-existing parking conditions.

### 8.3.2 Kailua Village Parking Study

A draft of the "Kailua Village Parking Study", dated December 8, 1986, is prepared by Leo Fleming, Civil Engineer. The study has not been accepted by the County of Hawaii and remains in its "unofficial", draft form. However, it presents a detailed account of the parking conditions as of 1986. The total number of stalls within the core area, according to the Fleming study, 1,116 stalls.

### 8.3.3 Public Parking

The County of Hawaii operates one public parking lot, totaling 120 stalls, located between Likana Lane and Kuakini Highway.

### 8.3.4 Parking Demand

#### 8.3.4.1 General

Parking demand is defined by the number of occupied parking spaces during the time of peak usage of a land use activity. The statistical correlation between parking demand and various land use characteristics lead to the development of parking generation rates, i.e., parking stalls per 1,000 square feet of gross floor area. These rates are used as guidelines and combined with local experience to establish parking codes.

#### 8.3.4.2 County of Hawaii Parking Code

The County of Hawaii specifies the number of parking stalls required for a variety of land use activities. Commercial office space requires one stall per 200 square feet (SF) of gross floor area (GFA). Retail space requires one stall per 200 to 300 SF GFA. Hotel rooms without kitchens require one stall per three units.

#### 8.3.4.3 Institute of Transportation Engineers

The Institute of Transportation Engineers (ITE) has developed parking generation rates and published them in "Parking Generation", 2nd Edition, 1987. The ITE parking rates for a specified land use are developed by correlating the peak parking occupancy data with various land use characteristics, such as parking stalls per 1,000 square feet of gross floor area. The County parking code implies a linear relationship between parking demand and

gross floor area. However, the ITE rates for retail and office space vary with the mass of the land use activity. For example a regional shopping center would experience a higher peak parking rate per 1,000 SF GFA than a neighborhood store.

#### 8.3.4.4 Shared Parking

Shared parking is defined as the utilization of parking capacity by two or more land use activities without conflict or encroachment. This phenomenon is observed in mixed-used developments, central business districts, and other areas where different land uses are combined.

The Urban Land Institute (ULI) has developed the concept of shared parking and published the results of their research in "Shared Parking", 1983. The hourly variation in parking demands for individual land use activities are combined to obtain the cumulative parking demand for a mixed-use development or area. For example, commercial office activities, which tend to utilize parking during the day, would complement entertainment activities, where peak parking demands occur in the evening.

Shared parking often occurs, not by design, but by necessity, as is the case in core area of Kailua-Kona. When the overall parking demand is less than parking capacity and where free and open parking exists, shared parking can operate quite efficiently. However, as parking demand increases and parking availability becomes more scarce, individual parking lot owners begin to restrict outside parking or charge high parking fees for non-customer parking. This effectively reduces the "sharing" of parking capacity between different land use activities.

#### 8.3.4.5 Parking Generation Comparison

Table 8-1 shows the peak parking generation comparison for the core area of Kailua Village, using the County of Hawaii parking code, ITE parking generation rates, and the ULI shared parking concept. The parking demands are based upon existing land use inventory: 82,000 SF GFA of office space; 237,000 SF GFA of retail space; and 180 hotel rooms.

TABLE 8-1. Weekday Parking Generation Comparisons

| <u>Land Use</u> | <u>County of Hawaii</u> | <u>ITE</u> | <u>ULI</u>                       |
|-----------------|-------------------------|------------|----------------------------------|
| Office          | 410 stalls              | 411 stalls | 246 stalls                       |
| Retail          | 1,185 stalls            | 651 stalls | 901 stalls                       |
| Hotel           | 60 stalls               | 94 stalls  | 225 stalls                       |
| TOTAL           | 1,655 stalls            | 956 stalls | 1,192 stalls<br>(shared parking) |

The parking inventory within the core area is approximately 1,236 stalls. The available parking is deficient according to County standards. The ITE and ULI parking demand calculations indicate that the gross number of stalls are adequate, assuming the available parking is shared among the land uses. The County parking code appears high for retail and office uses and low for hotel use, as compared with the ITE and ULI rates.

#### 8.4 MODEL DEVELOPMENT

##### 8.4.1 General

This section discusses the development of a sub-area traffic simulation model, based upon an island-wide model developed by the State Department of Transportation (DOT) and the County of Hawaii Departments of Planning and Public Works. The State/County study documentation is presented in the "Island of Hawaii Long Range Highway Plan" (HLRHP), May 1991. The purpose of the HLRHP is to identify future highway deficiencies and recommend highway improvements. The HLRHP is an island-wide plan assessing the regional highway needs for the Island of Hawaii.

A sub-area model is developed herein to analyze the Year 2010 traffic forecast for Kailua-Kona. The methodology for the traffic model is documented in the HLRHP. Sub-area analysis is a refinement process using the same methodology as the HLRHP. The purpose of sub-area analysis is to develop a model that is more sensitive to densely developed regions and their road networks, while maintaining the integrity of the island-wide model.

#### 8.4.2 Traffic Analysis Zones

The HLRHP divides the island of Hawaii into 127 traffic analysis zones (TAZs). Six of these zones comprise the study area. Three zones are contained entirely within the study area and portions of three zones are included in the study area. These six TAZs were subdivided into 59 subzones, 56 of which are contained in the study area.

#### 8.4.3 Highway Network

The sub-area highway network is extracted from HLRHP island-wide network by establishing a "cordon" line, circumscribing the sub-area. The cordon line cuts all highway segments (identified as "links") entering and exiting the sub-area. The cut links are defined as "external" stations, representing the TAZs outside the sub-area, i.e., "external" zones. The TAZs and subzones within the sub-area are defined as "internal" zones.

#### 8.4.4 Model Calibration

The HLRHP island-wide model is calibrated to 1987 base year conditions, using the land use inventory developed from the County of Hawaii and traffic data obtained from the State DOT. The sub-area model is also calibrated to 1987 conditions. Model calibration is an iterative process of adjusting road capacities and speeds, reconfiguring subzonal access, adjusting trip generation characteristics of the subzones, and comparing the model's output to observed traffic data. The remaining deviations between the traffic simulations of the calibrated model and the observed conditions are used to adjust the model's traffic forecasts.

### 8.5 TRAFFIC FORECAST AND ALTERNATIVES ANALYSIS

#### 8.5.1 Land Use Forecast

The land use forecast used in this study represents full build-out of the Kailua-Kona Master Plan. The Year 2010 regional land use forecast, developed for the HLRHP, is adopted for use in this analysis. However within the study area, the land forecast, developed for the Kailua-Kona Master Plan, is used to adjust the HLRHP forecast. In order to remain consistent with the HLRHP island-wide model, it is assumed that the Kailua-Kona Master Plan will be fully developed by the Year 2010. The land use forecast for the Kailua-Kona Master Plan exceeds the HLRHP land use forecast by about 900+ dwelling units in the

study area.

### 8.5.2 Future Highway Improvements

The following improvements are assumed to be constructed by the Year 2010. These proposals are at various stages of development. The geometric alignment and cross sections are assumed, based upon the recent available information at this writing.

#### 8.5.2.1 Roadway Improvements Located Within the Study Area

1. Construction of the proposed Henry Street between Queen Kaahumanu Highway and Kuakini Highway.
2. The extension of Henry Street makai of Kuakini Highway to Hualalai Road.
3. Extension of Nani-Kailua Drive (proposed Village By Pass Road) from Hualalai Road across Kuakini Highway to Alii Drive.
4. Widening of Kuakini Highway to four lanes (two lanes in each direction) plus exclusive turning lanes at key intersections from the north limit of the study area to the proposed Village By Pass Road.

#### 8.5.2.2 Roadway Improvements Located Outside the Study Area

1. Widening of Queen Kaahumanu Highway from two to four lanes between Keahole Airport and the proposed Henry Street.
2. Construction of the proposed Mid-Level Road between Kaiminani Drive and Palani Road, per the Keahole to Kailua Development Plan.
3. Extension of the proposed Mid-Level Road from Palani Drive to Queen Kaahumanu Highway at Henry Street.

4. Construction of the proposed Shore Drive from Kealekehe Parkway at Queen Kaahumanu Highway to the north terminus of Kuakini Highway.

### 8.5.3 Alternative Traffic Circulation Plans

#### 8.5.3.1 General

Two proposals are analyzed in this paper. A third proposal is proposed for consideration. Henry Street should relieve some of the mauka-makai traffic demands on Palani Road. Similarly, the proposed Village By Pass Road is expected to relieve some of the demand on Hualalai Road. Kuakini Highway is expected to be the critical roadway, even with the proposed four-lane widening. The four lane Kuakini Highway should be able to handle approximately 20,000 vehicles per day (vpd) in each direction. Alii Drive is expected to accommodate about 8,000 vpd in each direction. These "capacity" estimates will be analyzed in more detail, using projected peak hour volumes, after the preferred alternatives are selected.

#### 8.5.3.2 Alii Drive

The first proposal involves modifying the traffic flow on Alii Drive between the Kona Pier and Hualalai Road. Four traffic circulation patterns are compared using 24 hour traffic forecasts developed by the traffic model. These include:

1. Maintaining the existing two-way traffic pattern.
2. Restricting traffic flow on Alii Drive to the southbound direction only, from the Kona Pier to Hualalai Road.
3. Restricting traffic flow on Alii Drive to the northbound direction only, from Hualalai Road to the Kona Pier.
4. Closing Alii Drive to all traffic between Hualalai Road and the Kona Pier.

Table 8-2 shows the Year 2010 24-hour traffic projections on Kuakini Highway and Alii Drive, comparing the alternative traffic circulation patterns on Alii Drive.

| TABLE 8-2. Alii Drive Alternatives Analysis                  |           |                                     |               |               |        |
|--------------------------------------------------------------|-----------|-------------------------------------|---------------|---------------|--------|
| Roadway Segment                                              | Direction | Alii Drive Operation                |               |               |        |
|                                                              |           | Two-Way                             | One-Way<br>SB | One-Way<br>NB | Closed |
|                                                              |           | Year 2010 24-Hour Traffic Forecasts |               |               |        |
| Kuakini Highway<br>between Palani Road<br>and Henry Street   | NB        | 20,100                              | 25,500        | 20,200        | 24,100 |
|                                                              | SB        | 18,700                              | 18,900        | 23,500        | 23,200 |
| Kuakini Highway<br>between Henry Street<br>and Hualalai Road | NB        | 21,500                              | 26,200        | 21,700        | 25,700 |
|                                                              | SB        | 20,300                              | 21,700        | 23,400        | 22,600 |
| Alii Drive Makai<br>of Kuakini Highway                       | EB        | 6,800                               | 3,500         | 8,000         | 4,400  |
|                                                              | WB        | 8,700                               | 10,200        | 3,800         | 4,800  |
| Alii Drive North<br>of Hualalai Road                         | NB        | 6,300                               | 0             | 7,200         | 0      |
|                                                              | SB        | 6,500                               | 4,400         | 0             | 0      |

#### 8.5.3.3 Henry Street

The second proposal involves the extension of Henry Street, makai of Kuakini Highway to Hualalai Road. The Henry Street extension is expected to provide additional access to Village core. Table 7-3 shows the Year 2010 average daily traffic projections on Kuakini Highway and Alii Drive resulting from the extension of Henry Street.

| TABLE 8-3. Henry Street Extension Alternative Analysis |           |                                     |                                |
|--------------------------------------------------------|-----------|-------------------------------------|--------------------------------|
| Roadway Segment                                        | Direction | With Henry Street Extension         | Without Henry Street Extension |
|                                                        |           | Year 2010 24-Hour Traffic Forecasts |                                |
| Kuakini Highway between Palani Road and Henry Street   | NB        | 20,100                              | 20,200                         |
|                                                        | SB        | 18,700                              | 18,600                         |
| Kuakini Highway between Henry Street and Hualalai Road | NB        | 21,500                              | 28,400                         |
|                                                        | SB        | 20,300                              | 25,800                         |
| Alii Drive Makai of Kuakini Highway                    | EB        | 6,800                               | 7,100                          |
|                                                        | WB        | 8,700                               | 9,300                          |
| Alii Drive North of Hualalai Road                      | NB        | 6,300                               | 6,800                          |
|                                                        | SB        | 6,500                               | 7,000                          |

#### 8.5.3.4 Village By Pass Road

The proposed Village By Pass Road is described in the HLRHP as the Nani-Kailua Drive extension. The Village By Pass Road is expected to provide an alternate route between Queen Kaahumanu Highway and Alii Drive, avoiding Kailua Village core. The By Pass Road is expected to carry trips with origins and destinations north and south of Kailua Village. The Nani-Kailua Drive alignment involves some "back tracking," as it proceeds in the makai direction, making it a longer and less desirable route than Henry Street or Palani Road. Consideration should be given to realigning the mauka section of the Village By Pass Road through the residential expansion, located between Kalani Street and Aloha Kona Drive.

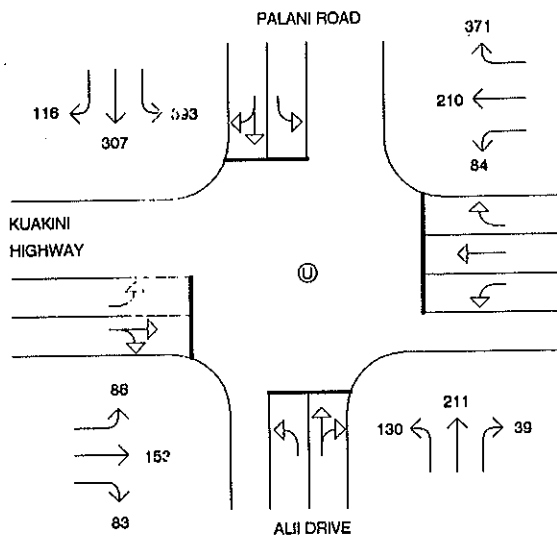
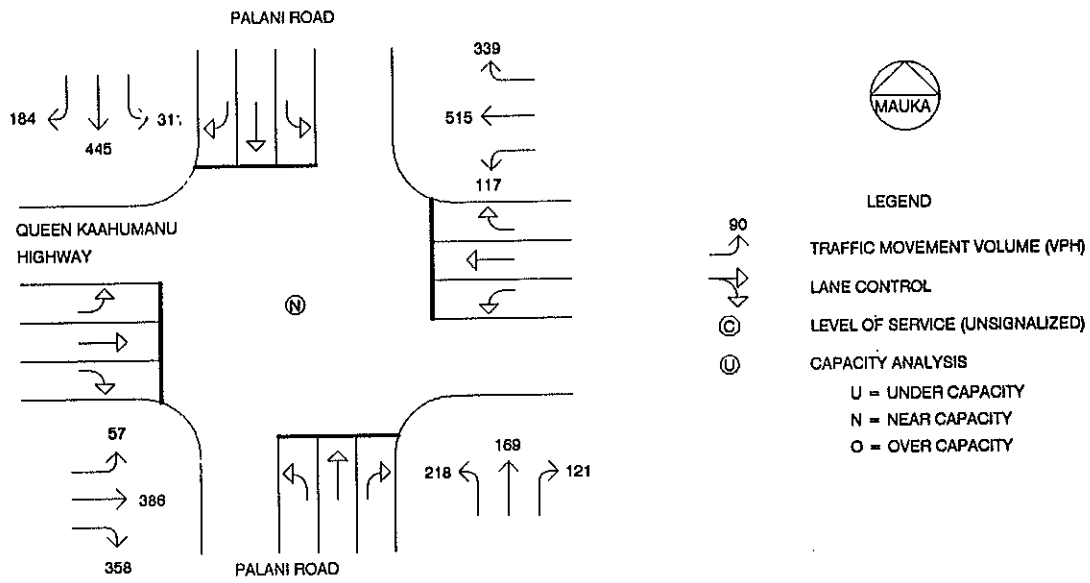
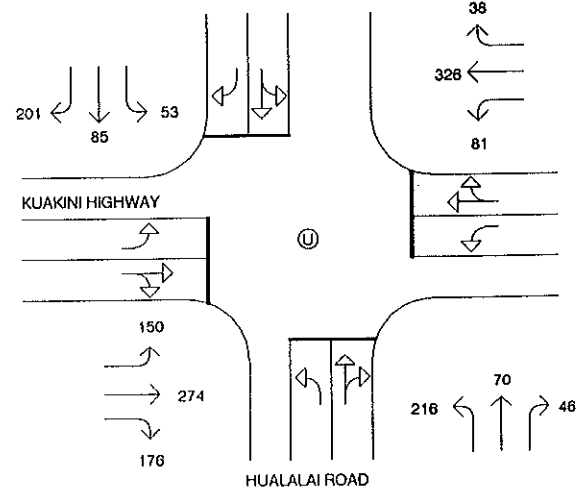
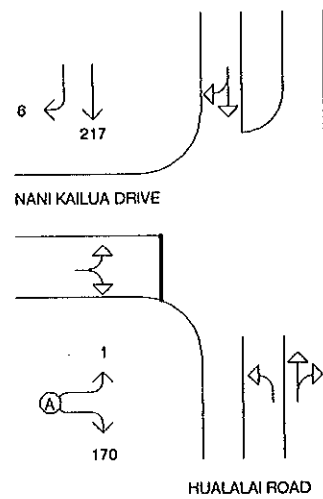
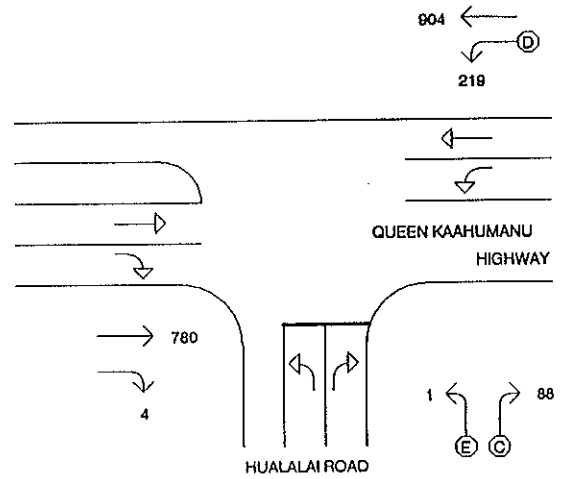
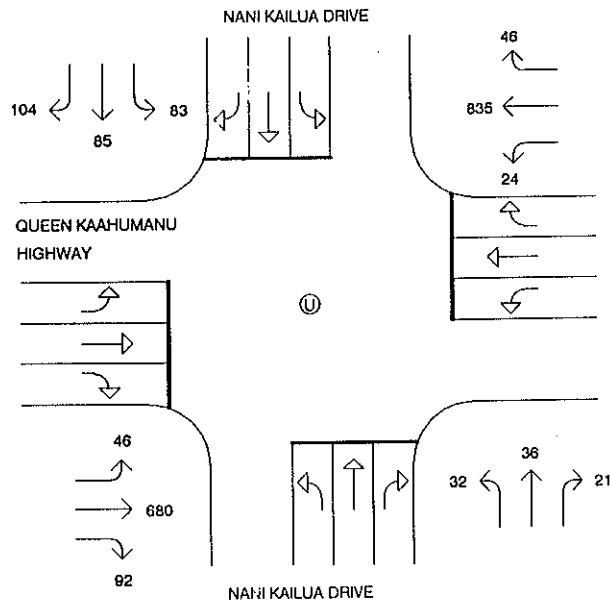


Figure 8-2

EXISTING AM PEAK HOUR TRAFFIC - NORTH



#### LEGEND

- 90 TRAFFIC MOVEMENT VOLUME (VPH)
- LANE CONTROL
- LEVEL OF SERVICE (UNSIGNALIZED)
- CAPACITY ANALYSIS
- U = UNDER CAPACITY
- N = NEAR CAPACITY
- O = OVER CAPACITY

Figure 8-3

EXISTING AM PEAK HR TRAFFIC - CENTRAL

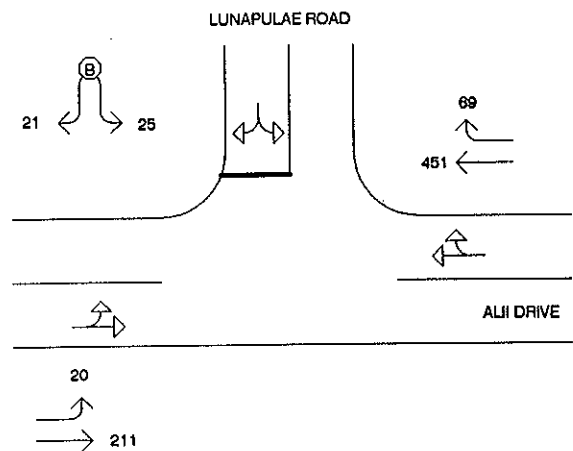
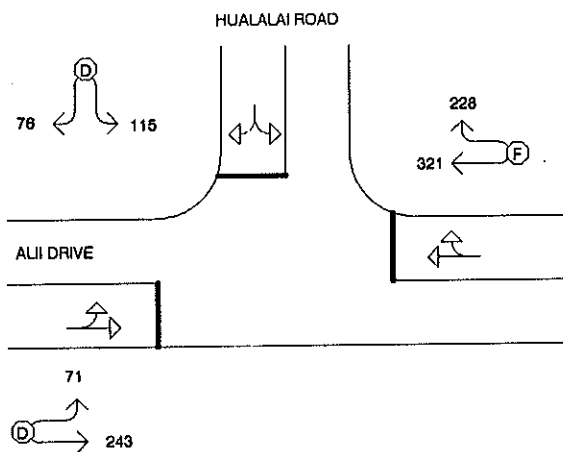
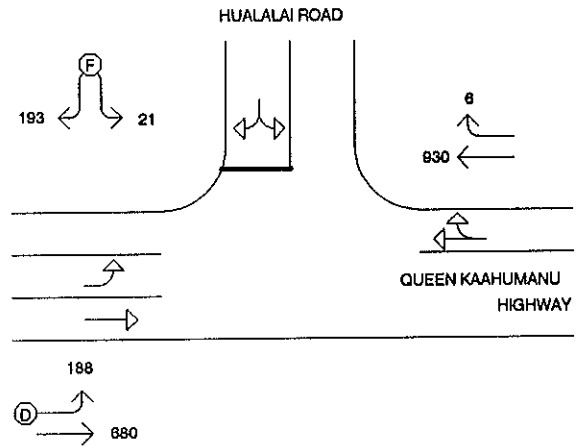
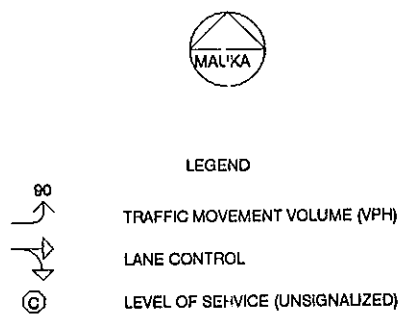


Figure 8-4  
EXISTING AM PEAK HOUR TRAFFIC - SOUTH

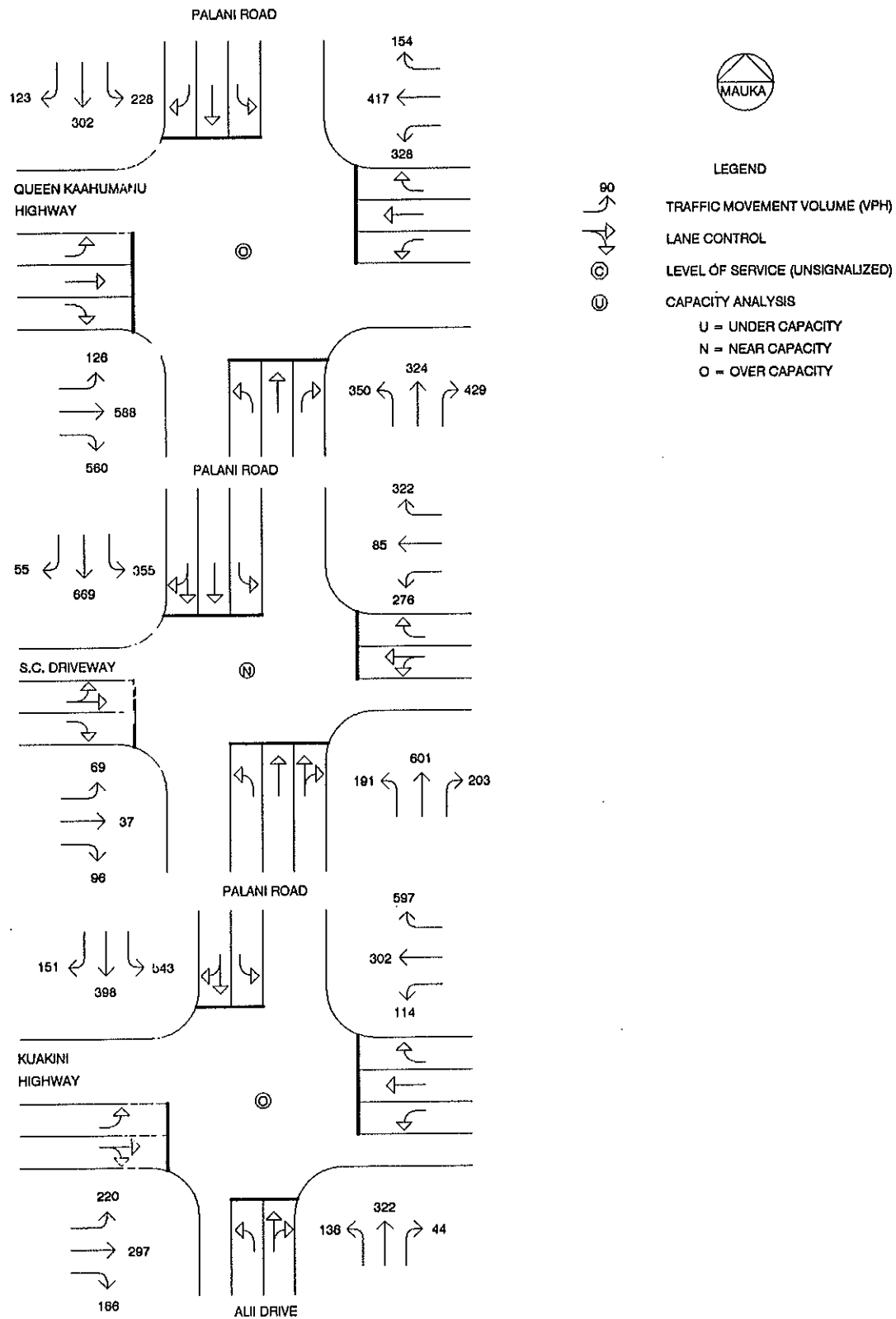


Figure 8-5.

**EXISTING PM PEAK HOUR TRAFFIC - NORTH**

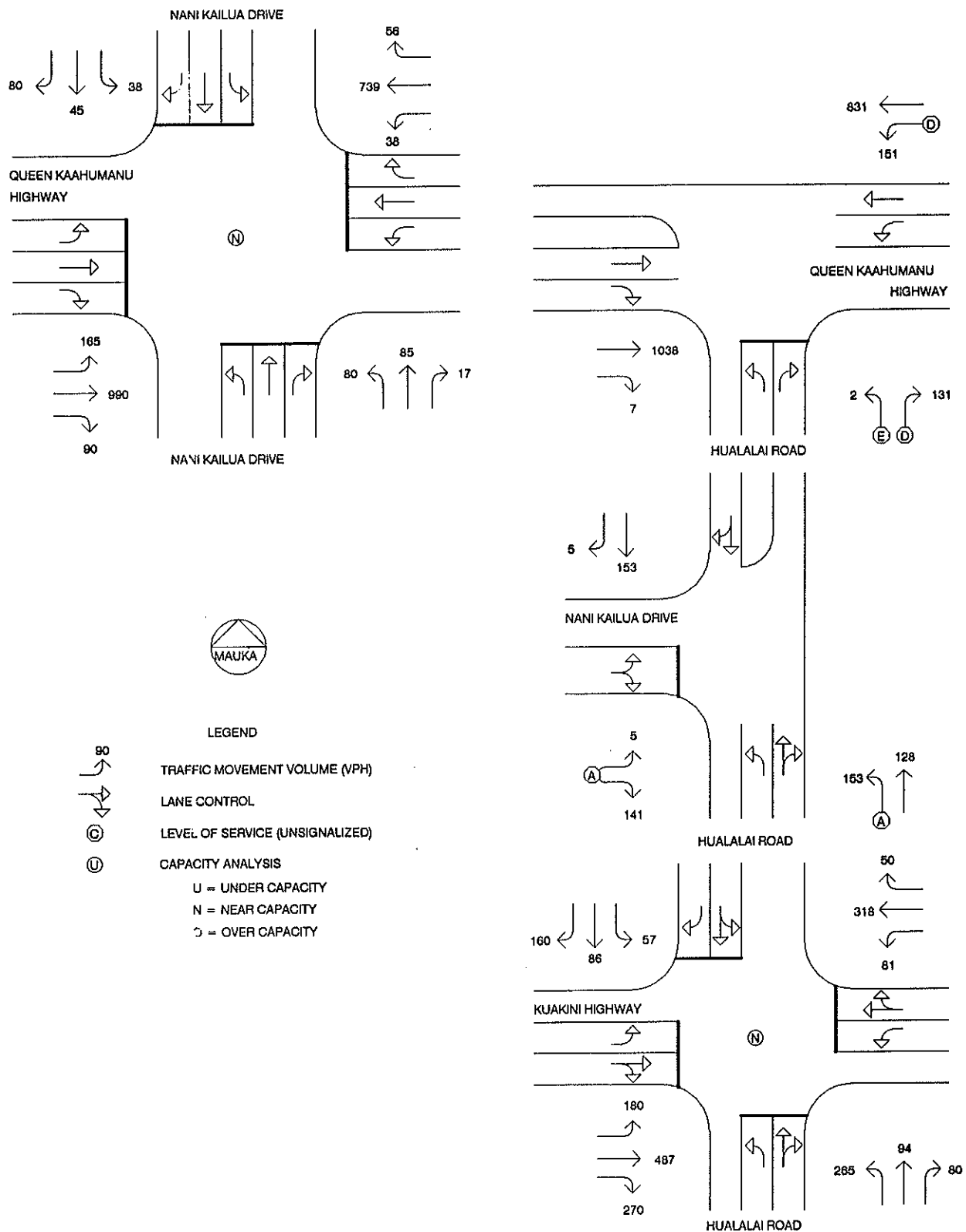


Figure 8-6  
EXISTING PM PEAK HOUR TRAFFIC - CENTRAL

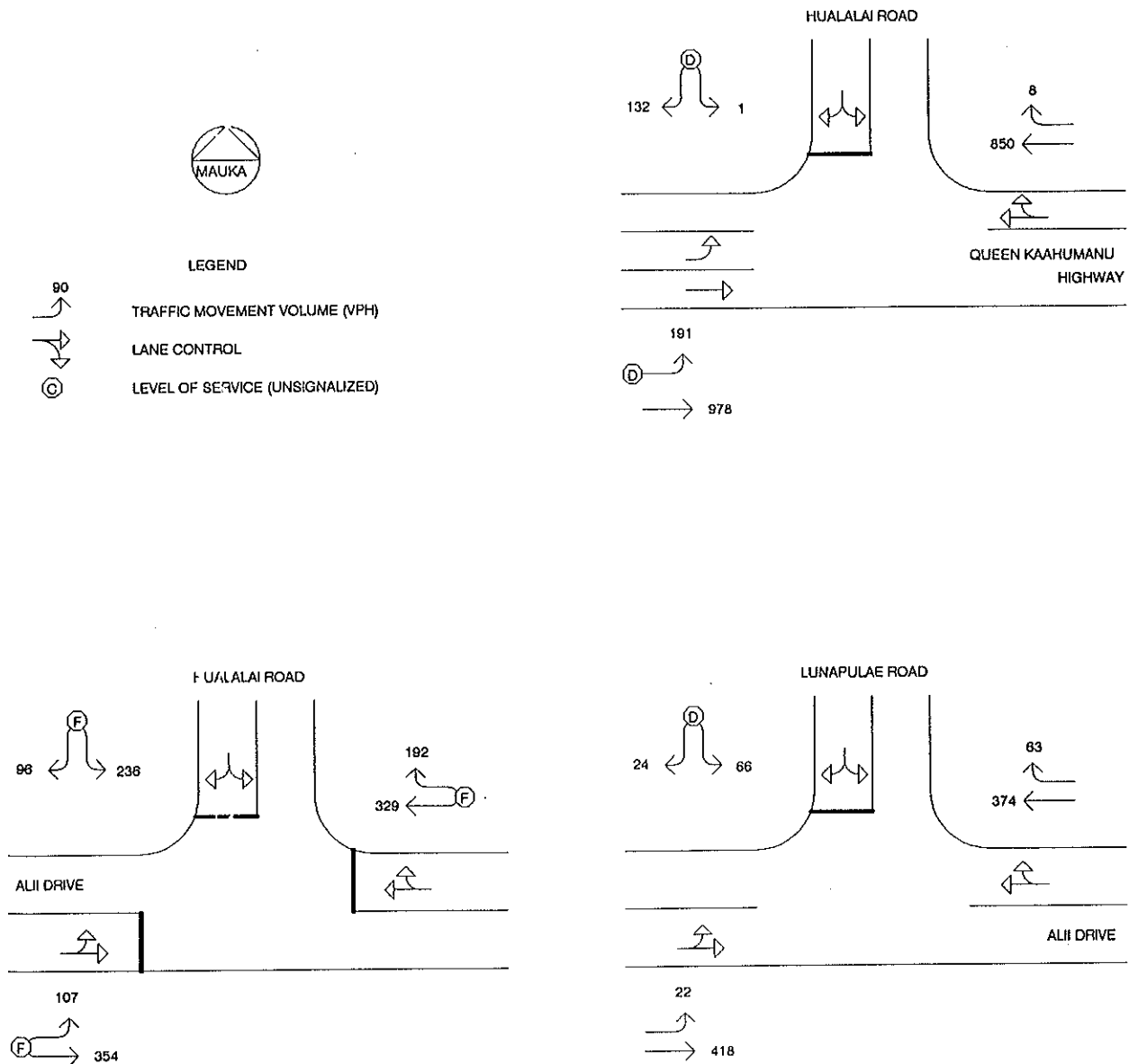


Figure 8-7  
EXISTING PM PEAK HOUR TRAFFIC - SOUTH

## SECTION 9

### INFRASTRUCTURE

#### 9.1 SEWER

##### 9.1.1 Existing Conditions

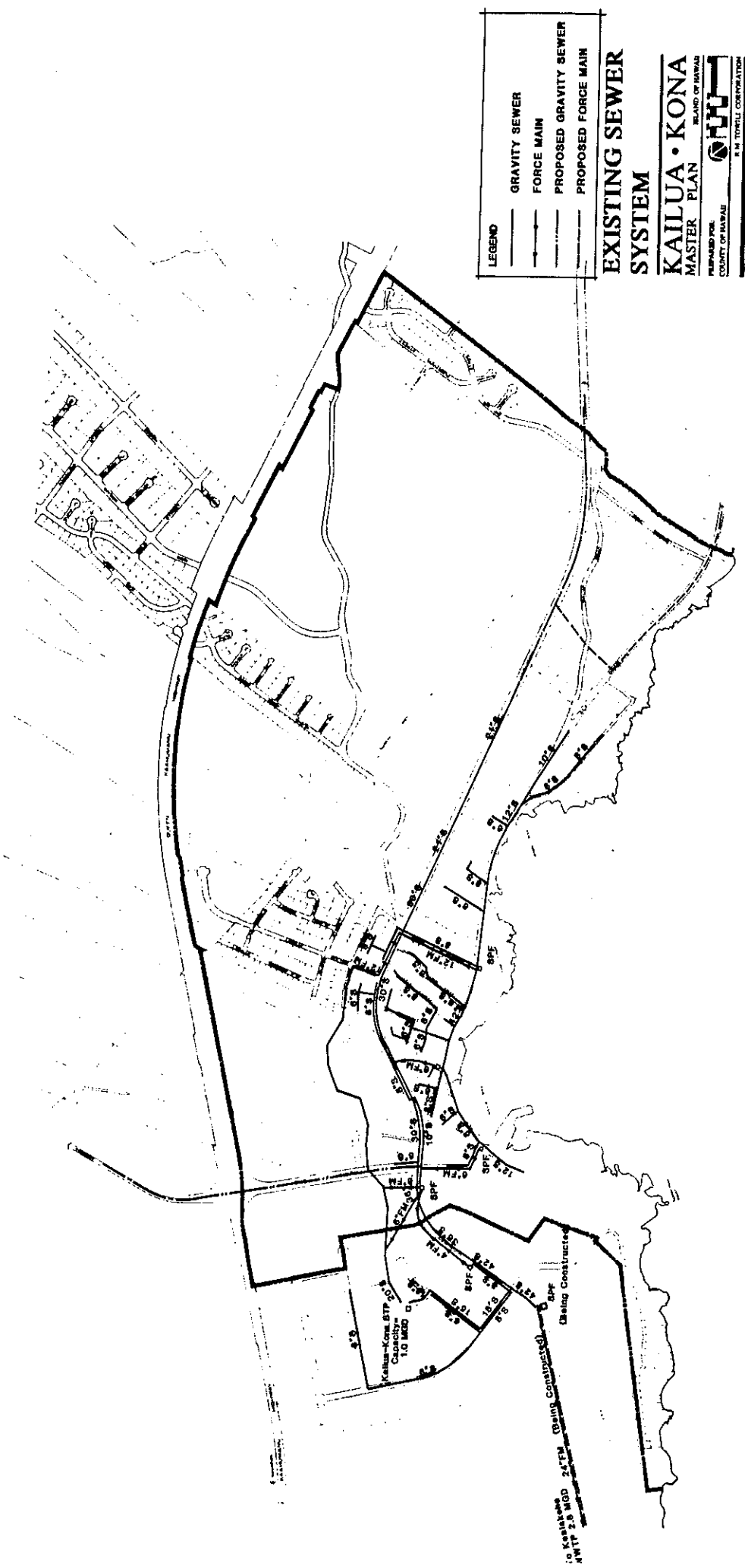
The existing wastewater collection system (see Figure 9-1) serves the hotels, apartments, townhouses, commercial, light industrial, and the more densely populated residential areas in Kailua-Kona which is most of the area makai of Kuakini Highway. The unsewered areas as shown in Figure 8-1 are utilizing cesspools as a primary means to dispose of household waste. Six existing pump stations are located within the project site. The existing 1.5 million gallons per day (MDG) Kailua-Kona Sewage Treatment Plant (STP) is located in the industrial area and services the majority of the master plan area. The other portion of the site is serviced by a treatment plant in the Kailua-Kona Southern Zone sewerage system.

Within the coming year cesspools will no longer be allowed and the County of Hawaii will be requiring everyone with cesspools to connect to the county sewer system. The costs involved will be assessed to the individual property owners. This will bring the existing Kailua-Kona STP up to its capacity, thus negating further development in Kailua-Kona. However, by September 1993 the Kealakehe Wastewater Treatment Plant located near Honokohau Harbor will be completed. A pump station and 24-inch force main in Kuakini Highway is currently under construction and scheduled for completion in October 1993. The force main will connect the pump station to the Kealakehe Treatment Plant. The plant will have a year 2005 design capacity of 2.8 mgd. The flow to the existing Kailua-Kona STP will be redirected to the Kealakehe Treatment Plant when it is ready for operation and the existing STP will then be abandoned. The treated effluent will be recycled and used to irrigate the municipal golf course at Kealakehe.

#### 9.2 WATER

##### 9.2.1 Existing Conditions (Figure 9-2)

The Kailua-Kona master plan area is serviced by a 20-inch transmission main from the Palani Station No. 1 which is a 0.30 million gallon (MG) reservoir. Palani Station No. 1 is



LEGEND

|  |                        |
|--|------------------------|
|  | GRAVITY SEWER          |
|  | FORCE MAIN             |
|  | PROPOSED GRAVITY SEWER |
|  | PROPOSED FORCE MAIN    |

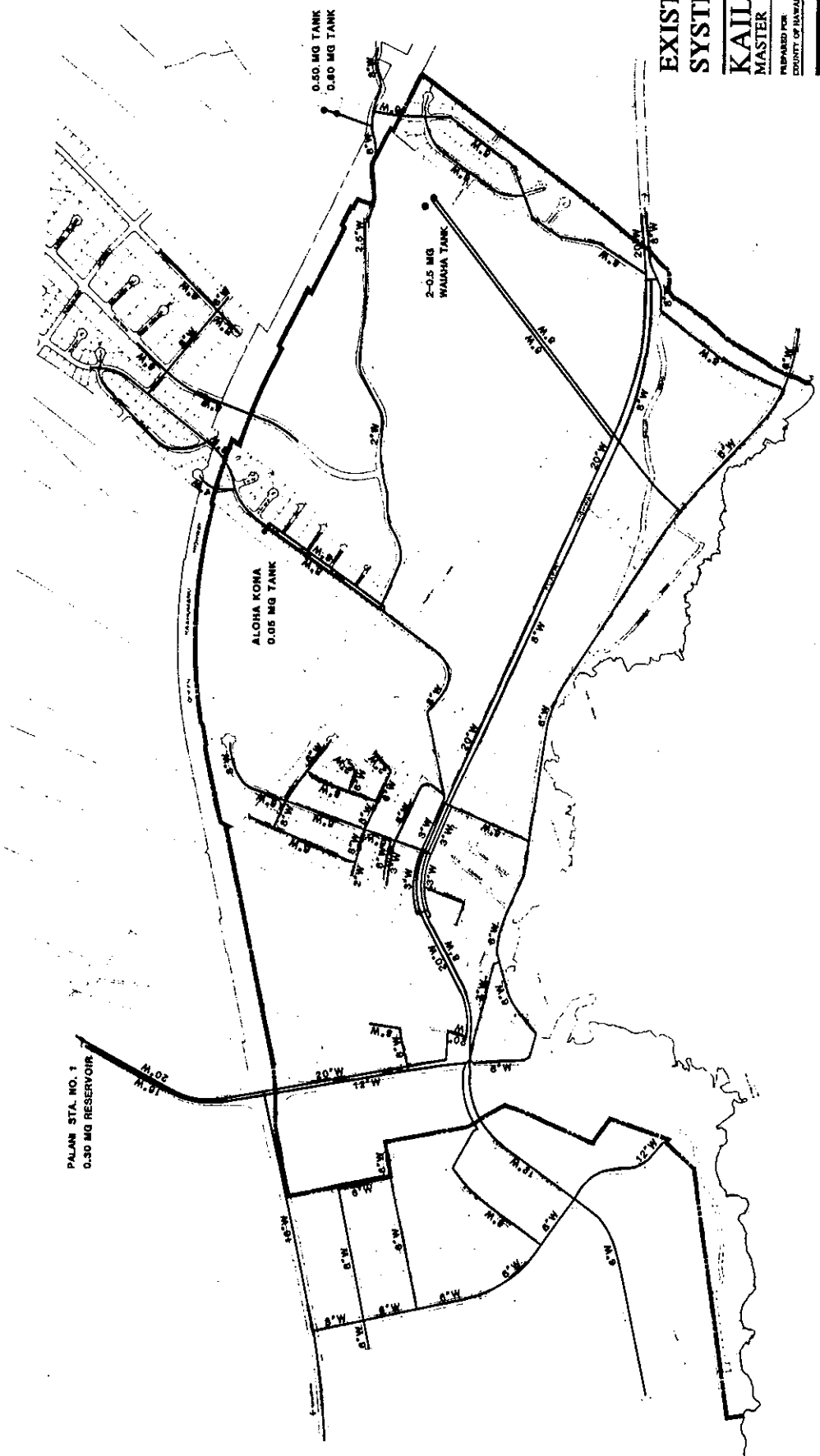
**EXISTING SEWER  
SYSTEM**

**KAILUA • KONA  
MASTER PLAN**

PREPARED FOR:  
COUNTY OF KAUAI

BY:  
H. M. TOWELL CORPORATION

Figure 9-1



# EXISTING WATER SYSTEM

**KAILUA • KONA**  
MASTER PLAN  
ISLAND OF HAWAII  
PREPARED FOR  
COUNTY OF HAWAII  
H. M. TOWELL CORPORATION

Figure 9-2

located on Palani Road approximately 1/2 mile mauka of Queen Kaahumanu Highway. The 20-inch transmission line follows Palani Road to Kuakini Highway. Then it follows Kuakini Highway south through the project area. The Aloha Kona Subdivision near the center of the project area is served by the Aloha Kona 0.05 MG tank. An 8-inch distribution line runs through the subdivision with smaller lines branching off for the cul-de-sacs. Two water tanks, one 0.50 MG and one 0.60 MG, serve the Kona Hillcrest Subdivision on the south and are located mauka of Queen Kaahumanu Highway. Two 8-inch distribution lines from these tanks feed the subdivision down to Kuakini Highway. Two 0.50 MG tanks serve the Waiaha area via an 8-inch transmission line and a 6-inch distribution line along Alii Drive.

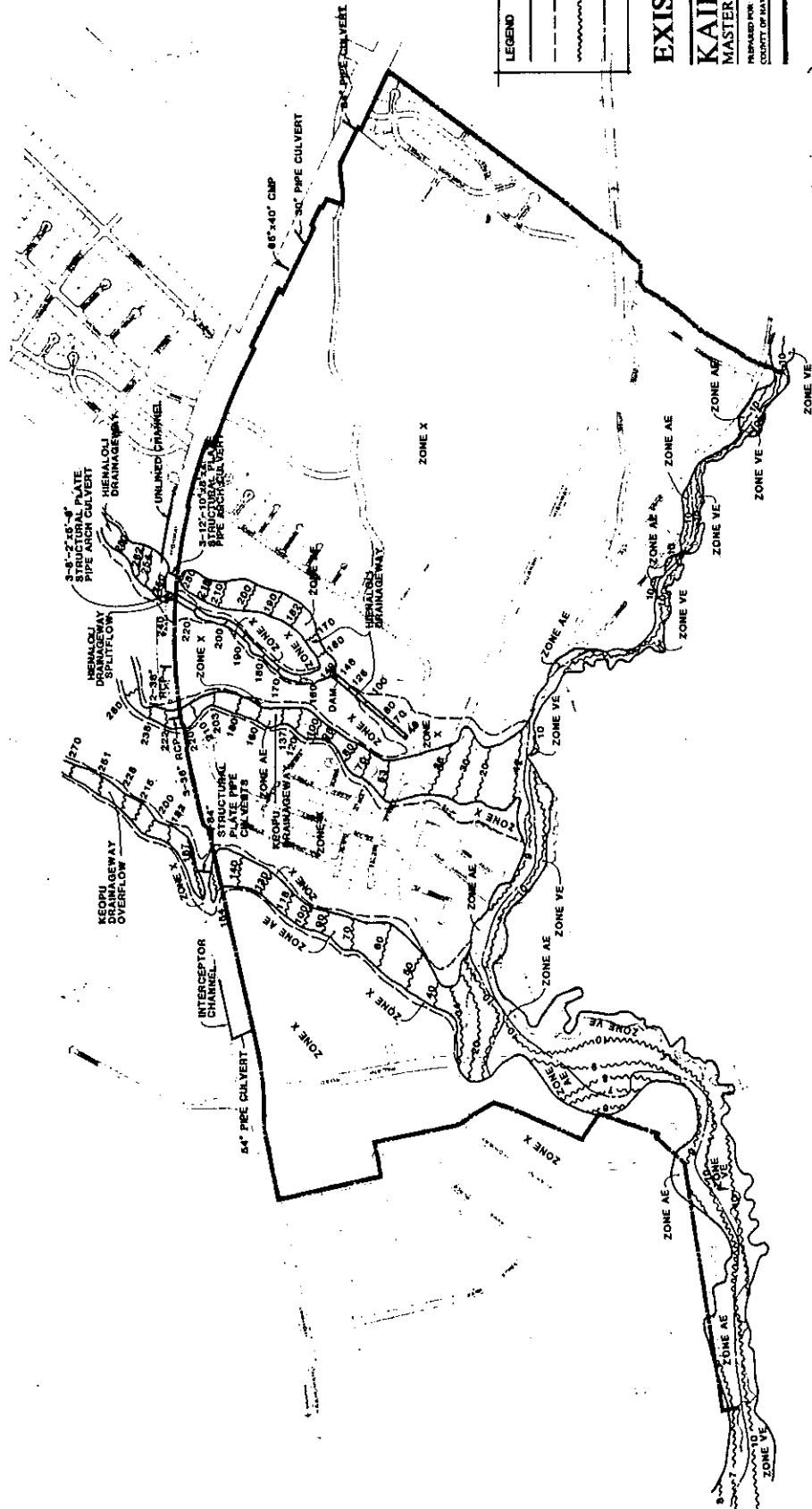
### 9.3 DRAINAGE

#### 9.3.1 Existing Conditions

A flood study was prepared for the Kailua-Kona project area by the Federal Emergency Management Agency (FEMA) in 1988. The flood boundaries as determined by the study are shown in Figure 9-3. This information was derived from the Flood Insurance Rate Map (FIRM) Hawaii County, Hawaii, FEMA, Community-Panel No. 155166 0694C and 155166 0713C. There are two drainageways that pass through the master plan area, the Hienaloli and Keopu Streams. The current flow for a 100-year storm is 3,000 cubic feet per second (CFS) at the Hienaloli Stream outflow and 4,600 cfs at the Keopu Stream overflow. The Soil Conservation Service established alignments for the streams from ground markings left by a major storm in February of 1982. Both Keopu and Hienaloli Streams originate high up on Hualalai Mountain.

Hienaloli Stream follows a single path until just upstream of the Queen Kaahumanu Highway, where it splits into north and south branches. These two branches meet at a sedimentation and debris basin about 1,300 feet above Kuakini Highway. An open concrete channel carries the flow to an underground box culvert beneath Hualalai Road for conveyance to the ocean.

Keopu Stream remains in a single course until Mamalahoa Highway. During events larger than an estimated 100-year magnitude, the stream splits at the bridge with one branch



| LEGEND                                       |       |
|----------------------------------------------|-------|
| FLOOD BOUNDARY                               | ---   |
| FLOODWAY BOUNDARY                            | ---   |
| BASE FLOOD ELEVATION LINE                    | ~~~~~ |
| BOUNDARY DIVIDING SPECIAL FLOOD HAZARD ZONES | ---   |

# EXISTING DRAINAGE

KAILUA • KONA

MASTER PLAN

PREPARED FOR

COUNTY OF HAWAII

DEPARTMENT OF PUBLIC WORKS

PLANNING DIVISION

REFERENCE:  
 FEMA HAWAII COUNTY, HAWAII, FEMA  
 COMMUNITY PANEL NO. 155166 0884C SEPTEMBER 16, 1983  
 COMMUNITY PANEL NO. 155166 0718C SEPTEMBER 16, 1988

Figure 9-3

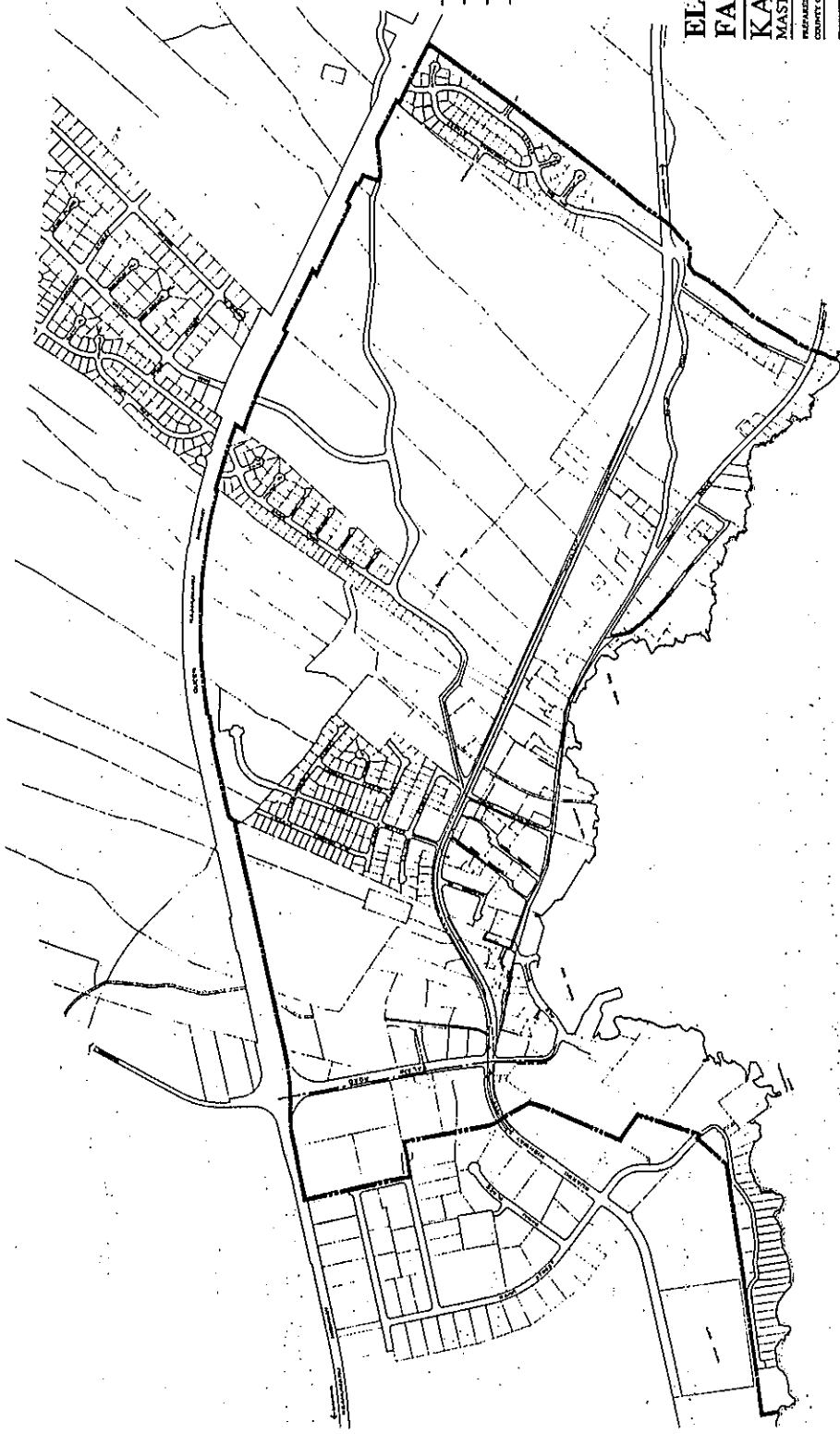
flowing down the Keopu Subdivision Road. The other branch is routed down an unlined County of Hawaii drainage channel. Both flows are recombined at the end of the Keopu Subdivision Road in an overgrown earthen debris basin. This basin is small, captures only a portion of the runoff and readily overflows during moderate flooding conditions. Flows downstream of the basin travel in a single course before splitting at a point approximately 18 miles above Queen Kaahumanu Highway. The north branch eventually empties into Kailua Bay. The other branch travels south and converges with Hienaloli Stream near Kuakini Highway before draining into the ocean.

An analysis from the "Reconnaissance Report" for Damage Reduction - Keopu-Heinaloli Streams prepared by the Corps of Engineers in February 1988 presented the following flood problems in the above-mentioned flood boundaries:

"Flooding problems within the Keopu and Hienaloli basins are attributed to inadequately defined channels, accumulation of debris and vegetation, steep slopes, and inadequate channel and culvert capacities. Rapid flood flows are caused by high intensity rainfalls of short duration and steep terrain. Flood damages to agriculture land, residential and commercial properties and public roads and utilities are aggravated by deposits of sediment and other debris. These deposits cause changes in the flow directions making other areas prone to flooding. Local flooding caused by inadequate facilities to handle street and lot drainage have caused repeated problems in the Kailua area."

#### 9.4 UTILITIES

The Kailua-Kona area is presently served by the utility companies primarily via overhead pole lines (Figures 9-4 and 9-5). Electric and communication improvements necessary to support the requirements of the Kailua-Kona master planned facilities are not yet available from the respective utility companies. The cost estimate provided (Table 9-1) is a very preliminary budget estimate based on available data for electric and communication overhead utility pole line upgrades anticipated for the master planned facilities.

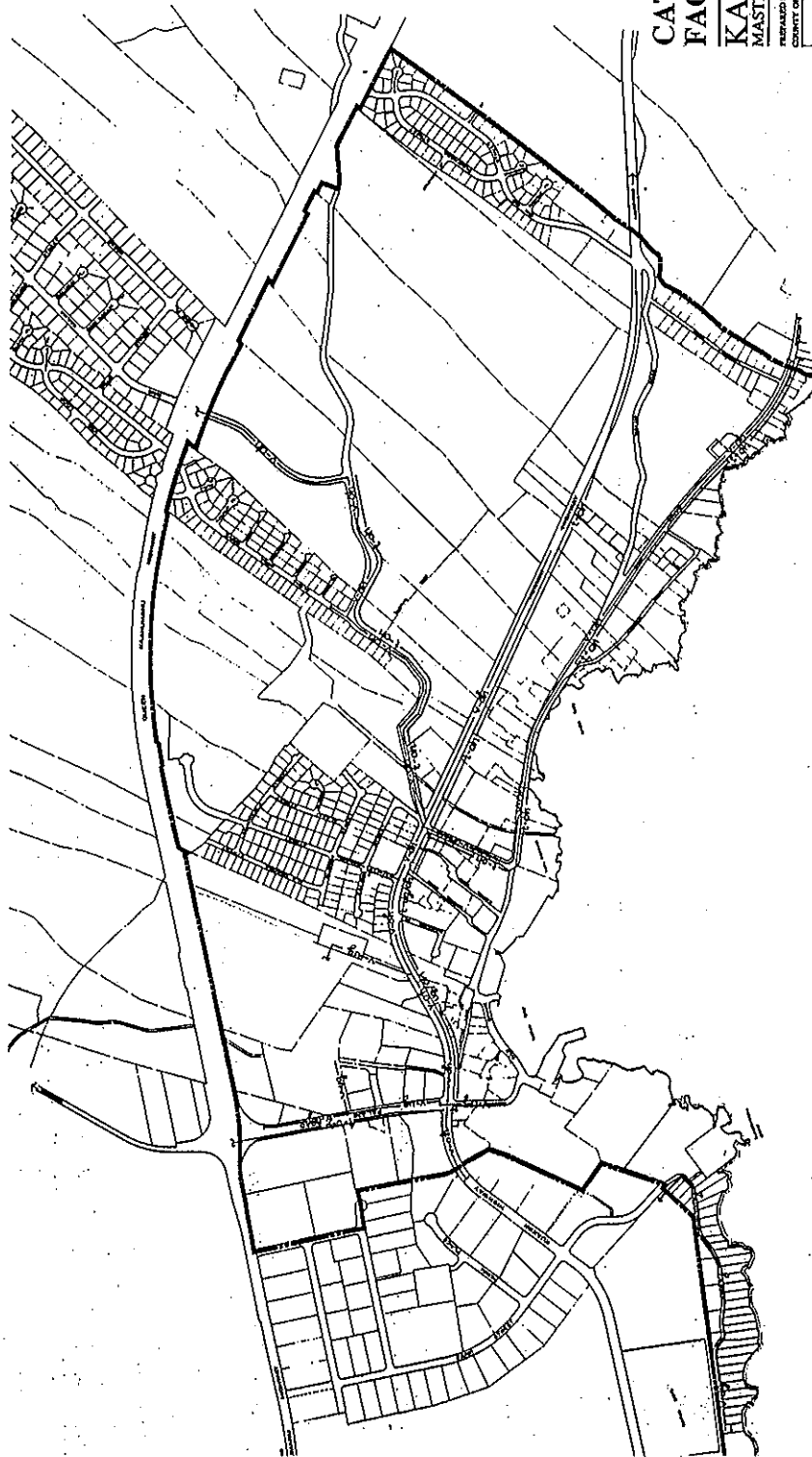


LEGEND

- EXISTING 12.47KV, 3 $\phi$  HELCO OVERHEAD LINE
- - - EXISTING 12.47KV, 3 $\phi$  HELCO UNDERGROUND LINE
- ... EXISTING 22KV, 1 $\phi$  HELCO OVERHEAD LINE
- . - . EXISTING 69KV HELCO OVERHEAD LINE

**ELECTRIC  
FACILITIES PLAN**  
**KAILUA • KONA**  
**MASTER PLAN**  
HAWAIIAN POWER  
COUNTY OF HAWAII  
ISLAND OF HAWAII  
S.A. TOWELL CORPORATION

Figure 9-4



LEGEND

- t-ug — EXISTING UNDERGROUND TELEPHONE LINE
- t-oh — EXISTING OVERHEAD TELEPHONE LINE
- y-ug — EXISTING UNDERGROUND CATV LINE
- y-oh — EXISTING OVERHEAD CATV LINE

CATV & TELEPHONE  
FACILITIES PLAN

KAILUA • KONA  
MASTER PLAN

PREPARED FOR:  
COUNTY OF HAWAII

BY:  
K.M. YOWELL CONSULTANTS

Figure 9-5

TABLE 9-1. Cost Estimate

| Item Description                     | Number | Unit | Unit Cost   | Total              |
|--------------------------------------|--------|------|-------------|--------------------|
| Substation                           | 1      | EA   | \$1,000,000 | \$1,000,000        |
| 69 kV HELCO Rel. OH Line (ckts)      | 7,800  | LF   | 120         | 936,000            |
| 12.47 kV HELCO Rel. OH Line (4 ckts) | 18,750 | LF   | 80          | 1,500,000          |
| 7.2 kV HELCO Rel. OH Line            | 450    | LF   | 25          | 11,250             |
| Tel Rel. OH Line                     | 20,250 | LF   | 25          | 506,250            |
| CATV Rel. OH Line                    | 20,400 | LF   | 25          | 510,000            |
| TOTAL                                |        |      |             | <u>\$4,463,500</u> |

A preliminary electric load study was done based on the load density and usage. The forecasted additional load is estimated at 16,703 KW (Table 9-2). The Kailua-Kona area is presently served by the Kailua substation, Kuakini substation, and Keauhou substation. A modification upgrade to these substations or development of a new station will be required to service the proposed planned development.

TABLE 9-2. Forecasted Electric Loads (Peak)

| Description                 | Quantity | Unit | KW/Unit | Forecasted Load (KW) |
|-----------------------------|----------|------|---------|----------------------|
| CONCEPTUAL DEVELOPMENT PLAN |          |      |         |                      |
| Open/Parks                  | 1        | EA   | 300.0   | 300                  |
| Single Family Res.          | 713      | EA   | 4.0     | 2,852                |
| Multi Family Res.           | 1,610    | EA   | 3.5     | 5,635                |
| Resort (Retail)             | 13       | AC   | 55.0    | 715                  |
| Commercial                  | 46       | AC   | 155.0   | 2,503                |
| University                  | 44       | AC   | 100.0   | 4,410                |
| Industrial                  | 10       | AC   | 30.0    | 288                  |
| Roadway Ltg.                |          | LF   | 0.001   | 0                    |
| Water Pump Station          |          | EA   | 300.0   | 0                    |
| Irrig. Pump Station         |          | EA   | 400.0   | 0                    |
| Sewer Pump Station          |          |      |         |                      |

Forecasted Electric Loads (Peak) 16,703

## NOTES:

1. Load forecasts are based on the Concept Development Plan and Build Out Analysis prepared by R. M. Towill Corporation, dated 19 October 1992.
2. Electrical requirements for various improvements to the water and sewer systems, if required, are not available and therefore they are not included.
3. Electrical requirements for various roadway improvements, if required, were not available and therefore, they are not included.

No information is presently available regarding possible undergrounding of the present and proposed electric and communication facilities, therefore, no cost estimate for overhead to underground conversions or undergrounding of the proposed utility systems have been provided.

## SECTION 10

### IMPLEMENTATION PROGRAMS

An entity that will bridge the gap between government and private enterprise would be required to oversee the actual implementation of simultaneously occurring projects.

- A. Two programs were explored during the planning process to determine whether one or both of these concepts can be adopted as an implementation mechanism of the master plan for the commercial and design revitalization objectives. They are the Main Street Program and the Neighborhood Reinvestment Corporation (NRC) program. Both are spinoffs of federal mandates; Main Street from the National Trust for Historic Preservation, and the NRC from a Congressional charter.
- B. The *Neighborhood Reinvestment Corporation (NRC)* Honolulu office and the field offices called Neighborhood Housing Services (NHS) offices. The NHS program in Hawaii has been predominantly focused on the rehabilitation of older, deteriorating residential neighborhoods. While the NRC has commercial revitalization projects in other geographic settings in the United States, the local examples are focused on residential developments.
- C. The *Main Street Program* was examined for its adaptability to the Kailua-Kona master plan requirements. Initially transplanted in Hawaii by Historic Hawaii Foundation, this program has separate offices throughout the State including Haleiwa on Oahu, in Wailuku on Maui, and in Hilo on the island of Hawaii.

#### 10.1 MAIN STREET PROGRAM

##### A. Background/History of Main Street

With its initiation in 1977 by the National Trust for Historic Preservation, the intention of the program was to develop a comprehensive revitalization strategy that would encourage economic development within the context of

historic preservation. During a three-year pilot program period in three selected towns throughout the United States, the groundwork for the Main Street approach to business district revitalization was laid. Over the three years, the interrelationship of a public-private partnership, committed organization, full-time project manager, commitment to good design, quality promotions and a coordinated incremental approach to economic restructuring became clear.

By almost any standard of measurement, business improved in the downtowns of all three demonstration communities during the course of the Main Street project: seven new businesses opened in Hot Springs, six in Madison and 30 in Galesburg. Sales tax revenues increased by 25 percent in Hot Springs while the downtown occupancy rate in Galesburg rose to 95 percent. Moreover, for every dollar spent for the management of the local project, \$11 was invested by private business in rehabilitation and adaptive-use projects.

B. Basic Elements

The foundation of the Main Street approach is preservation of the built environment and of the human resources of the downtown or neighborhood business district. It emphasizes the use of the best of the district's surviving assets to build a lasting, positive physical and emotional image for everyone associated with the area. The approach relies on unified management of the district where public and private partnerships are built cooperatively to affect revitalization. Four basic elements must be carefully orchestrated to create a marketable identity for the business district:

1. Organization

Establishing a consensus and cooperation by building partnerships that will allow the development of a consistent revitalization program and permit the emergence of effective management and advocacy of the district. Diverse groups -- bankers, city officials, merchants, chamber

members, civic leaders, individual citizens and others -- must work together to improve the business district.

2. Promotion

Creating a positive image of the business district to attract customers and investors and rekindle community pride. Promotion includes the development of sophisticated joint retail sales events, festivals and the creation of a consistent image through graphic and media presentations. Promotion also includes target selling of the district to investors, developers and new businesses.

3. Design

Enhancing the visual quality of the business district means attention to all physical elements: buildings, storefronts, signs, public improvements, landscaping, merchandising displays and promotional materials. The quality of the designed environment more than any other aspect demonstrates to the public the other qualities of the district.

4. Economic Restructuring

Strengthening the existing economic assets of the business district while diversifying its economic base. Activities include retaining and expanding existing business, recruiting new businesses to provide a balanced mix, converting disused space into productive property and sharpening the competitiveness of Main Street's traditional merchants.

The key to the success of the Main Street approach is its comprehensiveness. By carefully integrating all four areas into a practical management strategy, the approach produces fundamental changes in the district's economic base. These changes are critical to long-term success.

The designated "clearinghouse" for preliminary and final approval to establish a Main Street program for Kailua-Kona is the Hilo Main Street program office. The Hilo office is the resource for all future Main Street seedling programs on the island of Hawaii. Key criteria is determining the future of any proposal to establish such a program will be based on the continuity and integrity of the proposed implementation strategy.

## APPENDIX A

### Build Out Analysis - Plans A-B-C

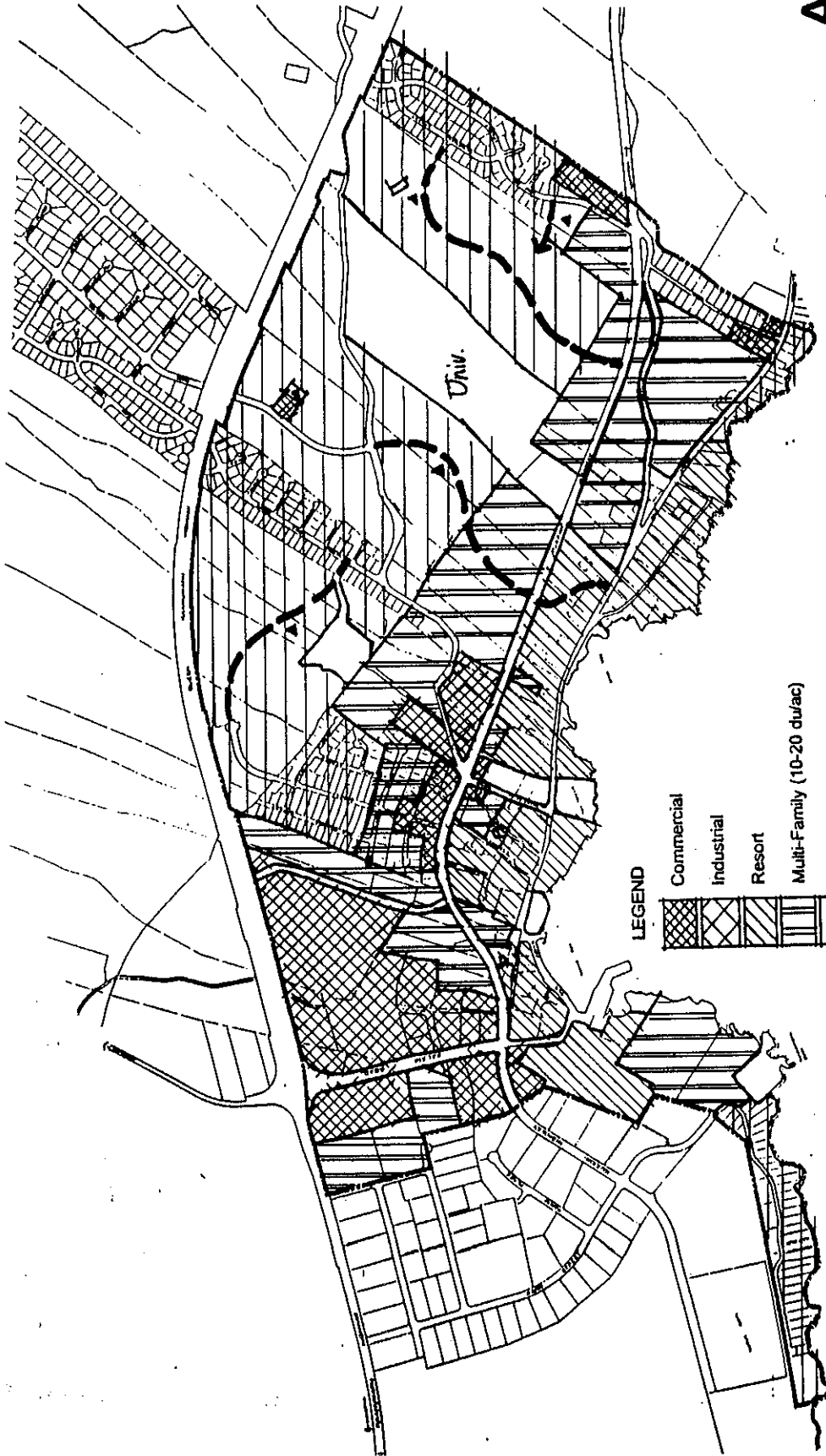


# BUILD OUT COMPARISON KAILUA-KONA MASTER PLAN

| USE                | TOTAL DEVELOPED |       | PROPOSED |     | Per GP |       | A     |      | B     |      | C     |      |
|--------------------|-----------------|-------|----------|-----|--------|-------|-------|------|-------|------|-------|------|
|                    |                 |       |          |     |        |       |       |      |       |      |       |      |
|                    | Acres           | Acres | Acres    | Du  | Per Du | Du    | Acres | Du   | Acres | Du   | Acres | Du   |
| AGRICULTURE        | 92.7            | -     | 92.7     | 92  | 3220   | -     | -     | -    | -     | -    | -     | -    |
| UNPLANNED          | 52.8            | 16.2  | 36.6     | 78  | 1281   | -     | -     | -    | -     | -    | -     | -    |
| OPEN/PARKS         | 5.1             | 4.4   | 0.7      | -   | N/A    | 0.8   | 3.0   | 16.6 | 3.0   | 16.6 | 16.6  | 16.6 |
| SINGLE FAMILY      | 59.0            | 19.9  | 39.1     | N/A | 1536   | 151   | 755   | 405  | 135   | 405  | 161.4 | 484  |
| MULTI FAMILY       | 189.7           | 88.0  | 101.7    | N/A | 3558   | 105.8 | 2100  | 1746 | 87.3  | 1746 | 67.6  | 1014 |
| RESORT             | 85.8            | 67.2  | 18.6     | -   | -      | 3.0   | 0     | 15.4 | 0     | 15.4 | 15.4  | 15.4 |
| COMMERCIAL         | 100.9           | 51.3  | 49.6     | -   | 0      | 34.3  | 69.6  | 24.3 | 69.6  | 24.3 | 24.3  | 24.3 |
| INDUSTRIAL         | -               | -     | -        | -   | -      | -     | -     | -    | -     | -    | 9.6   | 9.6  |
| OTHER (UNIVERSITY) | -               | -     | -        | -   | -      | 44.1  | 400   | 400  | 44.1  | 400  | 44.1  | 400  |
| TOTAL              | 586             | 247   | 339      | N/A | 9595   | 339   | 3255  | 2551 | 339   | 2551 | 339   | 1898 |
|                    | Acres           | Acres | Acres    |     | Du     | Acres | Du    | Du   | Acres | Du   | Acres | Du   |

**BUILD OUT ANALYSIS  
KAILUA-KONA MASTER PLAN  
PLAN A**

| <b>Zoning</b>                                   | <b>Total<br/>Acres</b> | <b>Developed<br/>Zoning<br/>Acres</b> | <b>DU's</b> | <b>Proposed<br/>Development<br/>Acres</b> | <b>DU's</b>          |
|-------------------------------------------------|------------------------|---------------------------------------|-------------|-------------------------------------------|----------------------|
| Ag                                              | -                      | -                                     | -           | -                                         | -                    |
| Unplanned                                       | 16.2                   | 16.2                                  | 78          | -                                         | -                    |
| Open/Parks                                      | 5.1                    | 5.1                                   | -           | .8                                        | -                    |
| Single Family<br>(5 du's/ac.)                   | 170.9                  | 19.9                                  | -           | 151.0                                     | 755                  |
| Multi-Family<br>(20 du's/ac.)                   | 193.8                  | 88.0                                  | -           | 105.8                                     | 2100                 |
| Resort                                          | 70.2                   | 67.2                                  | na          | 3.0                                       | na                   |
| Commercial                                      | 85.6                   | 51.3                                  | na          | 34.3                                      | na                   |
| Other<br>(University)                           | 44.1                   |                                       |             | 44.1                                      | 400                  |
| <b>Total<br/>(excludes public<br/>R.O.W.'s)</b> | <b>586.0<br/>Acres</b> | <b>247.0<br/>Acres</b>                |             | <b>339.0<br/>Acres</b>                    | <b>3255<br/>Du's</b> |



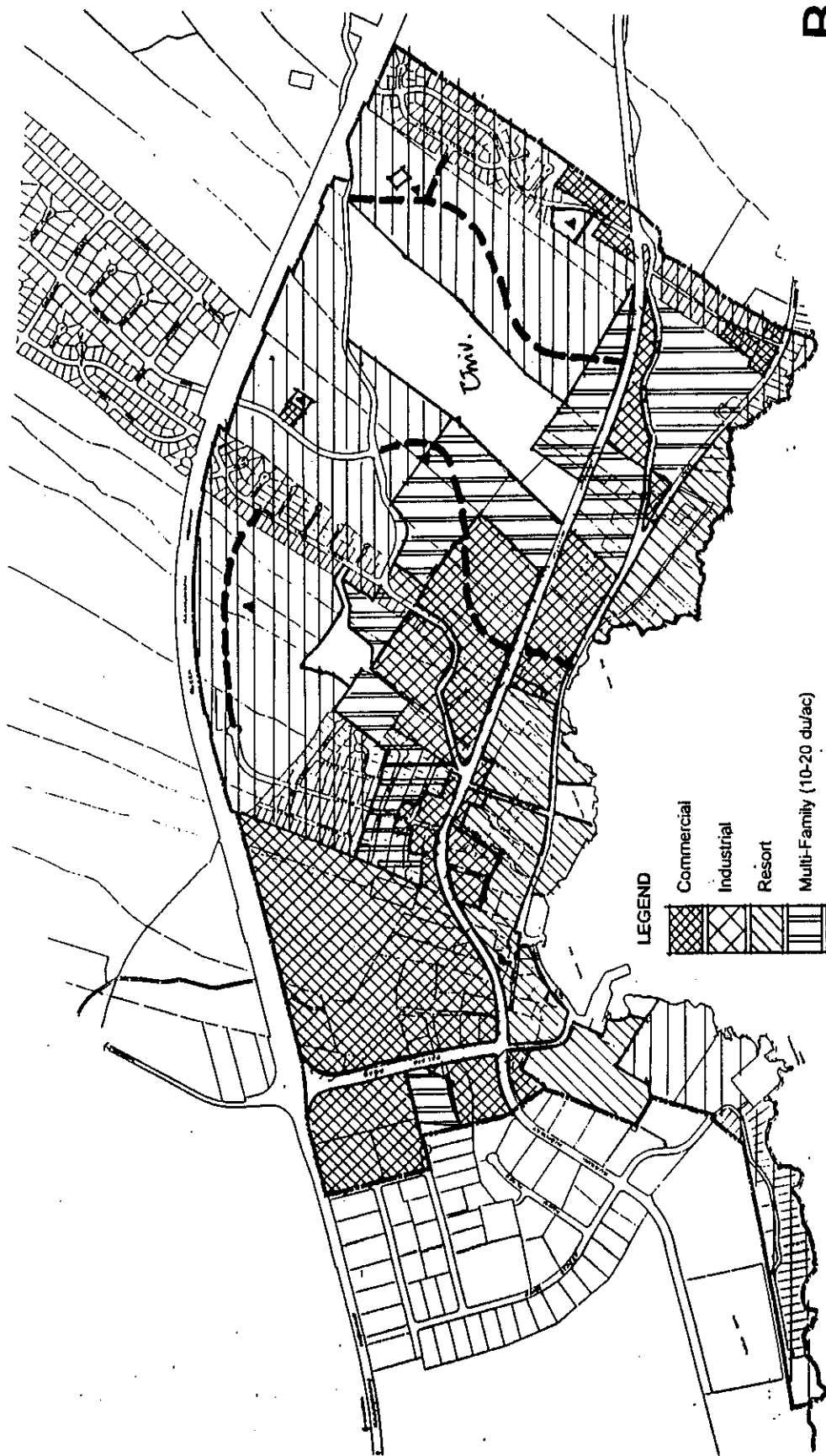
LEGEND

-  Commercial
-  Industrial
-  Resort
-  Multi-Family (10-20 du/ac)
-  Low Density Residential (2-6 du/ac)
-  Open / Other
-  Park
-  Parking

A

**BUILD OUT ANALYSIS  
KAILUA-KONA MASTER PLAN  
PLAN B**

| <b>Zoning</b>                          | <b>Total<br/>Acres</b> | <b>Developed<br/>Zoning</b> |             | <b>Proposed<br/>Development</b> |             |
|----------------------------------------|------------------------|-----------------------------|-------------|---------------------------------|-------------|
|                                        |                        | <b>Acres</b>                | <b>DU's</b> | <b>Acres</b>                    | <b>DU's</b> |
| <b>Ag</b>                              | -                      | -                           | -           | -                               | -           |
| <b>Unplanned</b>                       | <b>16.2</b>            | <b>16.2</b>                 | <b>78</b>   | -                               | -           |
| <b>Open/Parks</b>                      | <b>8.1</b>             | <b>5.1</b>                  | -           | <b>3.0</b>                      | -           |
| <b>Single Family<br/>(3 du's/ac.)</b>  | <b>154</b>             | <b>19.9</b>                 | -           | <b>135.0</b>                    | <b>405</b>  |
| <b>Multi-Family<br/>(20 du's/ac.)</b>  | <b>175.3</b>           | <b>88.0</b>                 | -           | <b>87.3</b>                     | <b>1746</b> |
| <b>Resort<br/>(churches)</b>           | <b>67.2<br/>(4.8)</b>  | <b>67.2</b>                 | <b>na</b>   | -                               | <b>na</b>   |
| <b>Commercial</b>                      | <b>120.9</b>           | <b>51.3</b>                 | <b>na</b>   | <b>69.6</b>                     | <b>na</b>   |
| <b>Other<br/>University</b>            | <b>44.1</b>            |                             |             | <b>44.1</b>                     | <b>400</b>  |
| <b>Total</b>                           | <b>586.0</b>           | <b>247.0</b>                | <b>112</b>  | <b>339.0</b>                    | <b>2551</b> |
| <b>(excludes public<br/>R.O.W.'s.)</b> | <b>Acres</b>           | <b>Acres</b>                | <b>Du's</b> | <b>Acres</b>                    | <b>Du's</b> |



LEGEND

-  Commercial
-  Industrial
-  Resort
-  Multi-Family (10-20 du/ac)
-  Low Density Residential (2-6 du/ac)
-  Open / Other
-  Park
-  Parking

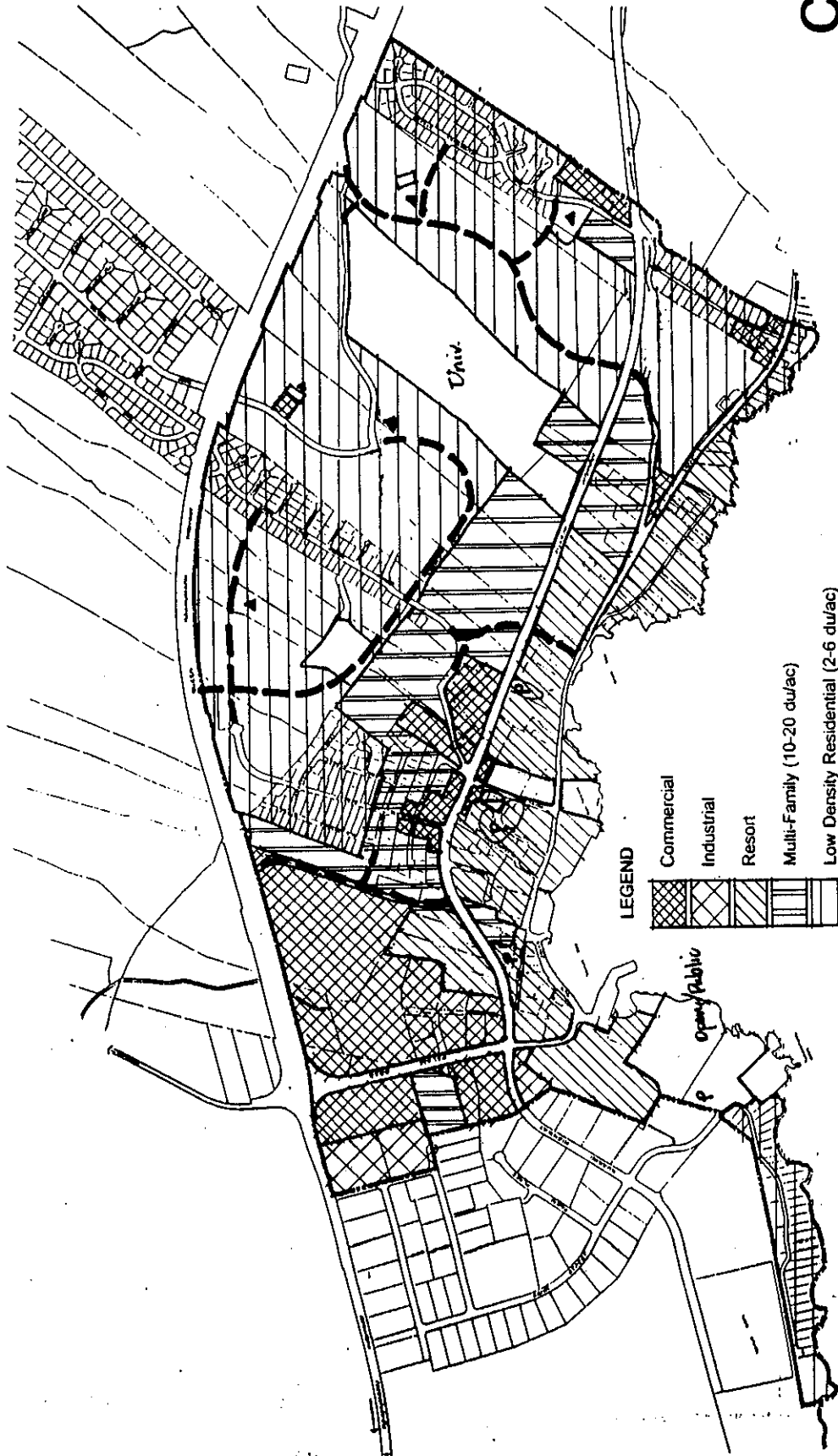
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KAILUA • KONA  
MASTER PLAN

PREPARED FOR: HAWAIIAN LAND DEVELOPMENT  
COUNTY OF HAWAII  
DATE: 10/1/77

**BUILD OUT ANALYSIS  
KAILUA-KONA MASTER PLAN  
PLAN C**

| <b>Zoning</b>                         | <b>Total<br/>Acres</b> | <b>Developed<br/>zoning<br/>Acres</b> | <b>DU's</b>         | <b>Proposed<br/>Development<br/>Acres</b> | <b>DU's</b>          |
|---------------------------------------|------------------------|---------------------------------------|---------------------|-------------------------------------------|----------------------|
| <b>Ag</b>                             | -                      | -                                     | -                   | -                                         | -                    |
| <b>Unplanned</b>                      | <b>16.2</b>            | <b>16.2</b>                           | <b>78</b>           | -                                         | -                    |
| <b>Open/Parks</b>                     | <b>21.7</b>            | <b>5.1</b>                            | -                   | <b>16.6</b>                               | -                    |
| <b>Single Family<br/>(3 du's/ac.)</b> | <b>181.3</b>           | <b>19.9</b>                           | -                   | <b>161.4</b>                              | <b>484</b>           |
| <b>Multi-Family<br/>(15 du's/ac.)</b> | <b>155.6</b>           | <b>88.0</b>                           | -                   | <b>67.6</b>                               | <b>1014</b>          |
| <b>Resort</b>                         | <b>82.6</b>            | <b>67.2</b>                           | <b>na</b>           | <b>15.4</b>                               | <b>na</b>            |
| <b>Commercial</b>                     | <b>75.6</b>            | <b>51.3</b>                           | <b>na</b>           | <b>24.3</b>                               | <b>na</b>            |
| <b>Other</b>                          |                        |                                       |                     |                                           |                      |
| <b>University</b>                     | <b>44.1</b>            |                                       |                     | <b>44.1</b>                               | <b>400</b>           |
| <b>Industrial</b>                     | <b>9.6</b>             |                                       |                     | <b>9.6</b>                                | <b>na</b>            |
| <b>Total</b>                          | <b>586.0<br/>Acres</b> | <b>247.0<br/>Acres</b>                | <b>112<br/>Du's</b> | <b>339.0<br/>Acres</b>                    | <b>1898<br/>Du's</b> |
| <b>(excludes public R.O.W.'s).</b>    |                        |                                       |                     |                                           |                      |



LEGEND

- Commercial
- Industrial
- Resort
- Multi-Family (10-20 du/ac)
- Low Density Residential (2-6 du/ac)
- Open / Other
- ▲ Park
- P Parking

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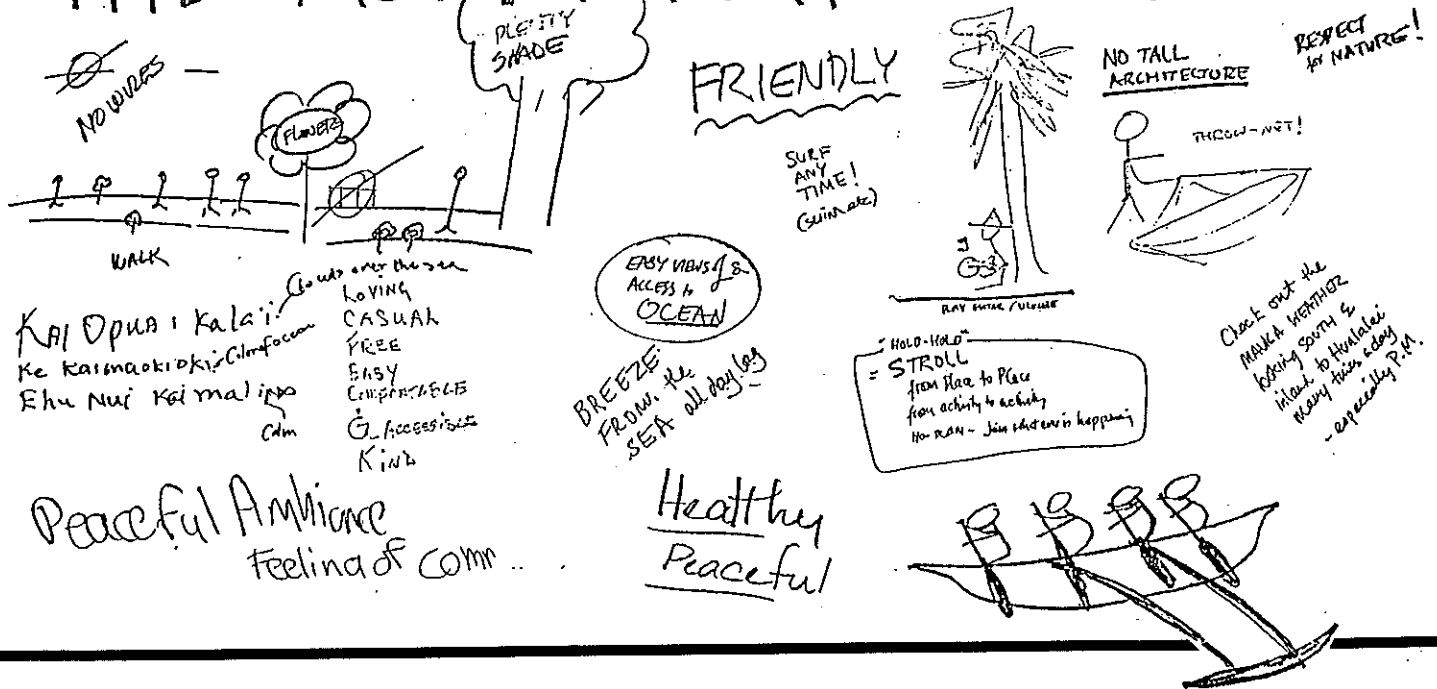
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## APPENDIX B

### Summary of Proceedings - Community Workshop for the Future of Kailua Village



# "THE KONA WAY OF LIFE"



## SUMMARY OF PROCEEDINGS COMMUNITY WORKSHOP FOR THE FUTURE OF KAILUA VILLAGE

Prepared by R.M. Towil Corporation and Jim Burns "Take-Part".  
For the Hawaii County Planning Department - March 1992

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# PEOPLE PLAN FOR THE FUTURE OF KAILUA VILLAGE

## SUMMARY OF PROCEEDINGS

Prepared by R. M. Towill Corporation and Jim Burns "Take Part"  
For Hawaii County Planning Department, March 1992

The County of Hawaii Planning Department has recently contracted with R. M. Towill Corporation to produce the Kailua-Kona Master Plan, utilizing State funds. The Kailua-Kona Master Plan Task Force established by Mayor Lorraine Inouye in May of last year and chaired by Greg Ogin has been assisting the County in identifying preliminary community issues.

It was felt that a community workshop would be an ideal way to generate public interest as well as planning ideas for Kailua-Kona. And so at the invitation of the Task Force approximately 50 residents and business representatives gathered on Friday and Saturday, March 13-14, 1992 to discuss objectives, ideas, and other concepts to fuel the process of creating the future of Kailua Village.

Working intensively together over the two days, participants contributed more than 650 "person hours" of energy and creativity to their community. Jim Burns, co-founder of "Take Part," a San Francisco based facilitator and programmer conducted the workshops with Steve Kellogg, Manager of Planning and Land Development, and Deborah Stone, Senior Planner of R. M. Towill Corporation. The 2-day event was co-sponsored by the Kailua Village Improvement Association and the County Planning Department.

### DAY ONE

#### Walking Tour

The morning of March 13, people set forth from the meeting room in the King Kamehameha Kona Beach Hotel on a "walkabout" of the Kailua Village core, armed with a map, walking tour description, notebooks, and pens. The dozen locations they visited, and many other points of interest in between, helped them discover and rediscover many of the potentials and problems of the Village.

### The Kona Way of Life

Returning to the workshop, participants were asked to sketch or verbally define the famous local saying, "The Kona Way of Life," on a long scroll stretched the length of the workshop space. Then, they were asked to explain their definitions to the other participants. Examples of the "Kona Way of Life" ranged from "cruising Alii Drive" to "relaxing under the banyan tree" to "an unhurried way of life that makes time for people" to the concept of "O'hana" or our extended family. Respect for nature, peace of mind in a placid setting, ties to the mountains and back to the sea, a wide mixture of cultures living well together, and the pride in Kona which merges into the present and future were all important to participants.

### Preliminary Planning Exercise

After lunch, participants worked in groups of eight or nine to plan the Kailua Village they would have if they were to come upon the area in its original state today. To do this, they worked on base maps of the area showing only the natural topographical contours and the coastline. Many ideas came out of this exercise, and a lot of these were put to the test during the Saturday workshop. It was impressive that even though they had been given a "blank slate" to work with, most groups chose to retain historic buildings and sites such as the Ahuena Heiau, Hulihe'e Palace and Mokuaikaua Church. Access to the shoreline was mentioned again and again, and walkways were provided for that purpose. Amphitheaters near the shore, a waterpark, consideration for pedestrians over cars, satellite parking areas and trams, an upgraded and/or differently sited pier, arts and crafts center and cultural facilities, a marina, improved beaches, a sports park, and better mauka-makai connections for both pedestrians and vehicles, were all recommendations. As Steve Kellogg pointed out the next morning, "If we could move the Village mauka 500 feet, or push the shoreline out that far, you'd almost have the plans you made, so close are they to the qualities of your existing Village."

This was an important discovery, indicating that people do not wish to "fix something that is not broken" in planning for the future, but rather to intensify and enhance the Village's many good qualities, and adjust or repair the elements that need more attention.

## DAY TWO

### Planning Priorities

The aspects of Kailua in reality came to the fore in Saturday's workshop at the Kona Hilton, when, after a review of the planning team's plan map which consolidated all the recommendations of Friday's session, participants reassembled to jointly create Kailua's future from detailed present-day maps of the Village core and the overall project planning area. Everyone worked energetically to come up with two plans: one for the core of the Village and then one for the larger area, placing the core plan in the larger context. Finally, participants were asked to identify priority projects and issues by marking them with red (#1), blue (#2), and yellow (#3) markers. This information will help the planning team and the County to develop appropriate planning priorities when the time comes for implementation of the Kailua Plan.

Implementation was an important topic to Rep. Virginia Isbelle, who congratulated participants for their civic-mindedness and creativity, and encouraged them to strive for what they thought was right for Kailua Village, and then work with County, State and Federal agencies as well as private interests to make it all happen. "Depend on us; we can help you to make it a success!" she said.

At the end of the second day, community participants were given a resounding "Mahalo!" by the planners for valuable contributions of personal time and ideas in getting the planning of Kailua Village off to such an auspicious start.

### COMMUNITY WORKSHOP CONCEPTS FOR KAILUA VILLAGE

The two illustrated and labeled plans accompanying this report consolidate the information emerging from the "Take Part" workshops. It is notable that people were "conservative" in the creative sense, in determining what they wish Kailua Village to become. That is, they made few if any extravagant recommendations, preferring instead to adopt an approach of conserving what is special about the Village, and adding other positive elements, and eliminating or fixing negative aspects. This approach is quite different from

total preservation, which might result in saving the physical form of places but squeeze the day-to-day life out of them. It is also different from full-scale reorganization and reuse, which might provide a new Village, but one very different from the one people love.

### Natural Environment

Workshop participants emphasized the need to respect the natural environment which may become even more important in their daily lives. A strong desire for more immediate contact with nature was expressed, for instance, walkways along the shoreline, the entire length of the Village; mauka-makai pedestrian ways connecting the Village and ocean with interior locations; conservation and intensification of the great green tree canopy over the Village. Also better opportunities for fishing, swimming, diving, and boating, and opening up of views to the mountains and to the sea.

### History

All significant historical sites should be carefully tended and protected according to the attendees. The Great Wall of Kuakini should be made accessible via a hiking trail. They added that walking tours should be made available so that residents and visitors can take self-guided tours to points of historic and natural interest.

### Culture

A Kailua Village (or Kailua-Kona) Cultural Center was proposed, perhaps on the Thurston site if it can be acquired. Many experiences and events could take place, including those that inform people of Kona's history as well as the culture, religion and crafts of the ancient and premodern Hawaiian society.

### Circulation

Most agreed on the importance of improving pedestrian circulation and access. A network of walkways threading through the Village was called for. Cars should be parked in appropriately sited, low-scale parking structures (perhaps with shops and cafes at street level). Small-scale transit similar to the Kona Inn tram could carry people through and around the Village and to recreational uses at the Old Airport and to the new shopping

centers. Some groups proposed pedestrianizing part of Alii Drive for portions of time (resident and emergency-delivery access guaranteed). A shoreline walkway and mauka-makai walkways were proposed (the latter perhaps utilizing the flood plains). It was recommended that the open space on Alii Drive with its two magnificent trees ("banyan park") be acquired as a focus of the open space network.

Some suggested Alii Drive could become one-way south, with north-bound cars using Kuakini Highway (widened to four lanes). This would provide space for pedestrian uses along Alii Drive, with more parking and service embayments. Improved mauka-makai street connections are needed; also to neighborhoods like The Pines. More direct connections between the Village and the newer shopping centers would benefit both areas. Streets around the Village periphery should give easy access to parking structures so that people can leave their cars and experience the Village on foot. Access for the disabled is important, as well.

### The Pier

Some people proposed removing the Pier and building another further north and around the bay. Others suggested keeping the Pier in its present location, but improving it in various ways; by permitting water flow beneath it; by banning parked cars and use by large-scale vehicles (buses, R.V.s, etc); by requiring large-scale water traffic to relocate elsewhere; by enhancing possibilities for pedestrian uses of the Pier as well as fishing, swimming, small boating, etc.

### Landscaping

It was agreed that the island's potential for lush vegetation should be encouraged in the Village. More trees and a wide variety of plantings should occur. Many colors should abound. Plantings with alluring scents should perfume the air. Plants that attract interesting bird life should be featured. Canopy trees should be mixed with the vertical accents of palms for variety and also to provide shade throughout the Village. Landscaping can enhance important intersections while providing gateways into the Village.

## Hotels and Motels

Major visitor accommodations are recommended to be north and south of the Village core itself, perhaps with smaller inns, bed-and-breakfasts, etc., in the core.

## Facilities for Residents and Visitors

Places and facilities that serve both residents and visitors were favored over those aimed solely at tourists. Cafes, restaurants, areas for the performing arts, outdoor gathering places, a cultural center, a proposed museum, places to picnic, would serve both residents and visitors alike. Such facilities should be inter-mixed as much as possible. The zone along Hualalai Road from the library to the coastline might become a focus of more civic buildings, so that the whole Village gains a "civic center" or municipal focus.

## Priorities

Plans for Kailua Village core area and the Kailua-Kona Master Plan area were produced by each of the six work groups. Priority projects were identified by participants and ranked from high to low with red, blue or yellow dots (red being highest, blue-second, yellow-third) on each plan. Although there were variations on the degree of priority from group to group, the following wish list of projects was consistently noted as important.

### "RED" PRIORITY

- 1) General face lift of the pier; removal of parking on the pier, better visitor arrival experience, new building and landscape.
- 2) Consolidated parking structures near King Kamehameha Hotel, the County parking lot, and interior within the block between Hanama Place to Hualalai Road and Alii to Kuakini.
- 3) Continuous waterfront pedestrian path from the heiau to the Kona Hilton.
- 4) Improvements to Kuakini Highway; widening to four lanes with more bike/pedestrian paths, landscaping, change of traffic signals, extension to Honokohau Boat Harbor and extension of Henry Street makai of Kuakini.
- 5) Mauka-makai pedestrian connection from public parking lot through vacant lot to Alii Drive.
- 6) Cul-de-sac Palani at the pier and alterations to Alii; more pedestrian/landscape/one-way traffic, etc. from seawall to Hualalai Road.

### "BLUE" PRIORITY

- 7) Reconfiguration of Hale Halawai; open views to the water, more civic activities in the area.
- 8) Acquisition of the Thurston Estate as a Cultural Center/Park.
- 9) Put utilities underground.

- 10) Improved entry features on Queen Kaahumanu Highway at Palani, Hualalai and other entry areas.

#### "YELLOW" PRIORITY

- 11) New mauka-makai roadways between Queen Kaahumanu Highway, Kuakini and Alii to the south of the Village core (for Residential bypass) and to the north of the Industrial area.
- 12) More mauka-makai pedestrian access and views.
- 13) Better bike/pedestrian access on Kuakini and Alii.
- 14) Inclusion of Old Airport site, industrial area, and Queen Kaahumanu Highway - R.O.W. within the planning boundaries.
- 15) Preservation or Community use of the undeveloped areas near the flood basin, Old Kona Plantation, and "Great Wall" (for a trail).

#### Quality of Environment/Quality of Life

In order for Kailua Village to retain and enhance the wonderful qualities it offers to people, steps should be taken to insure that what new things are proposed there, and what older things experience change, will all reflect the special nature of the Village, its past and history, its close relationships with the natural environment, people's relaxed and hospitable lifestyles. In design and planning terms, this means establishment of appropriate design guidelines for people to consult when they propose change. These must be backed up by government authority as well as community support.

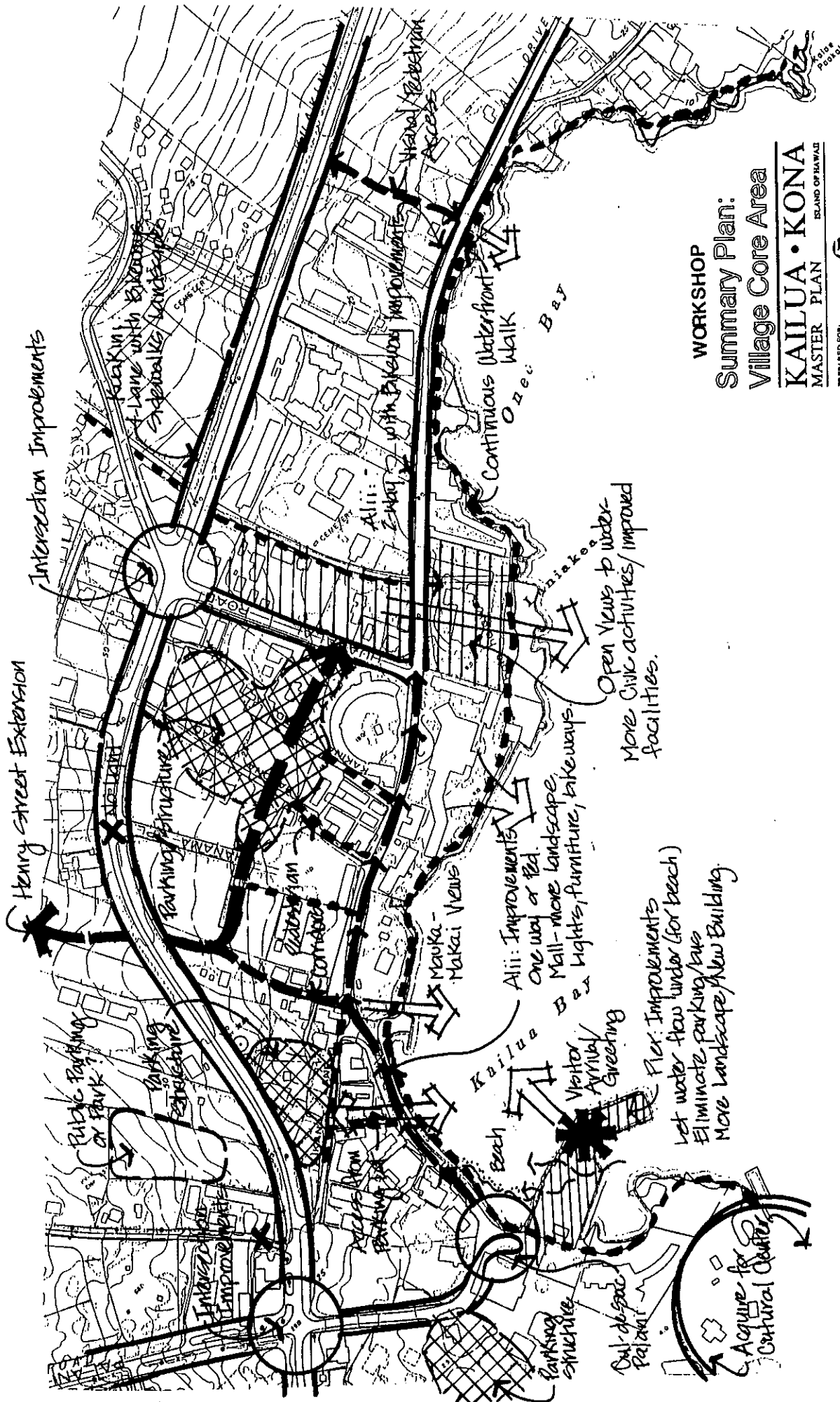
For instance, people can foresee that even beloved places do not always remain the same, the Kona Inn complex for example. For this central place and others to retain their charm and at the same time respond to new needs and opportunities, a well-done yet flexible system of design guidelines will be most helpful.

As far as the quality of life is concerned, the lives of the residents themselves best reflect this elusive sense. In Kailua Village, people live together with love and respect in a casual but vibrant manner that becomes apparent to even the most casual visitor. To conserve and preserve that unique quality is as important as making plans for the physical characteristics of the community. In the workshops, people definitely demonstrated that they are the staunch guardians of "The Kona Way of Life." They will be careful to not allow this ideal to be diluted or compromised as planning advances and the future comes to meet them.

### The Next Phase

Community ideas and priorities developed through the workshop activities will be synthesized with the inventory work being conducted by R.M. Towill Corp. as part of the planning process. This information will form the basis for development of a workable set of goals and objectives for the Master Plan. Additional public informational meetings will be scheduled later in the year.





WORKSHOP  
Summary Plan:  
Village Core Area

KAILUA • KONA  
MASTER PLAN  
ISLAND OF HAWAII

PREPARED FOR:  
COUNTY OF HAWAII



H. M. TOWILL CORPORATION

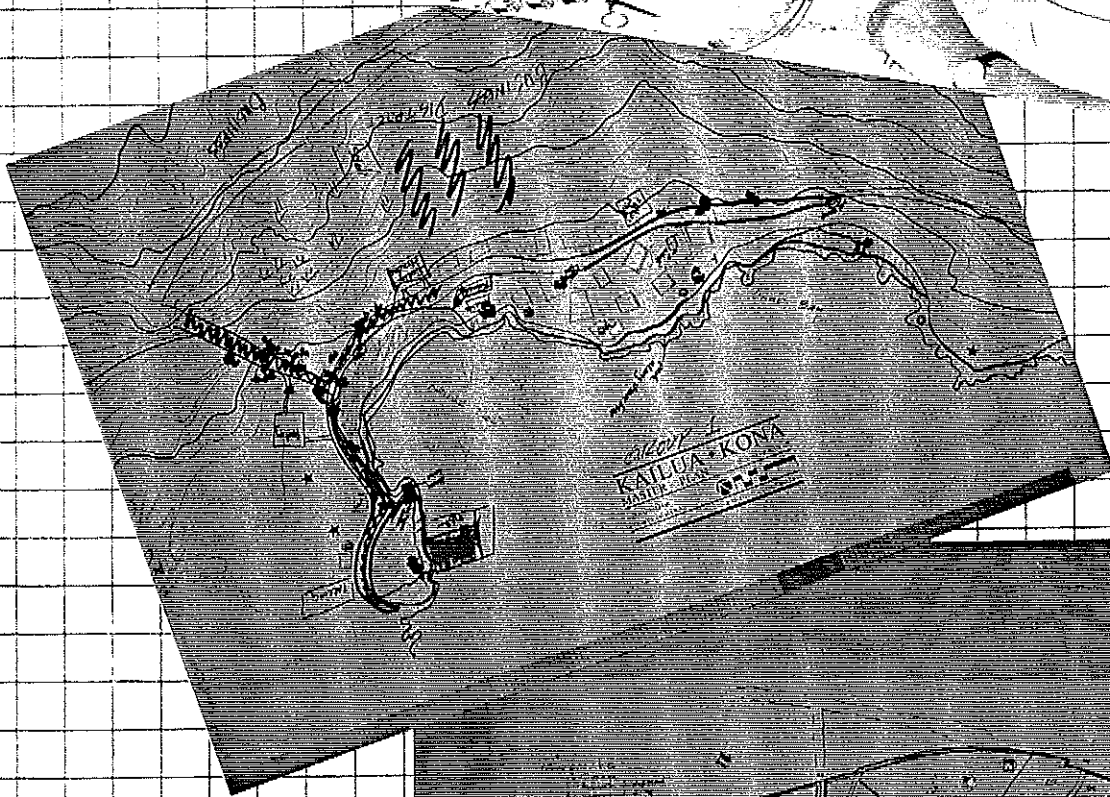




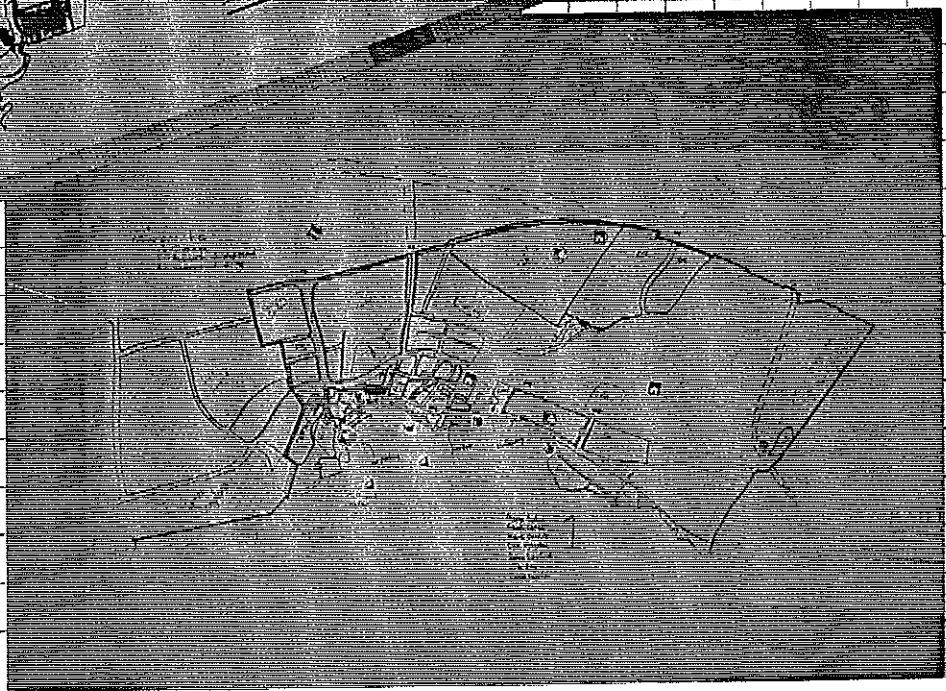
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DAY ①



DAY ②



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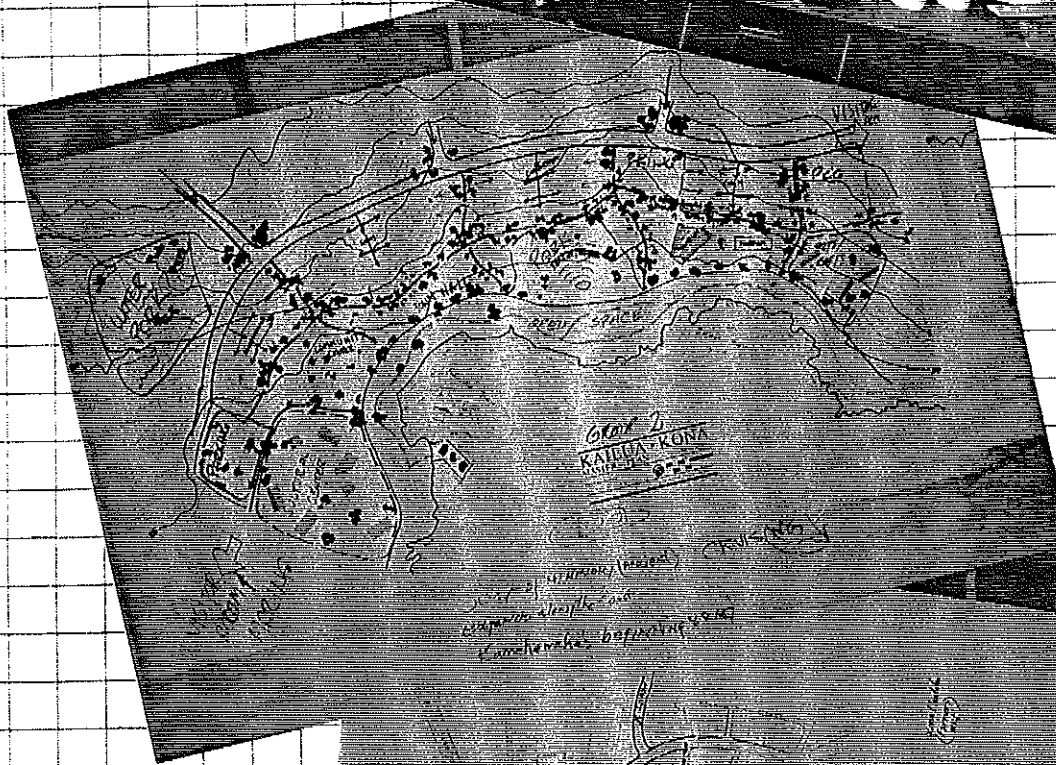
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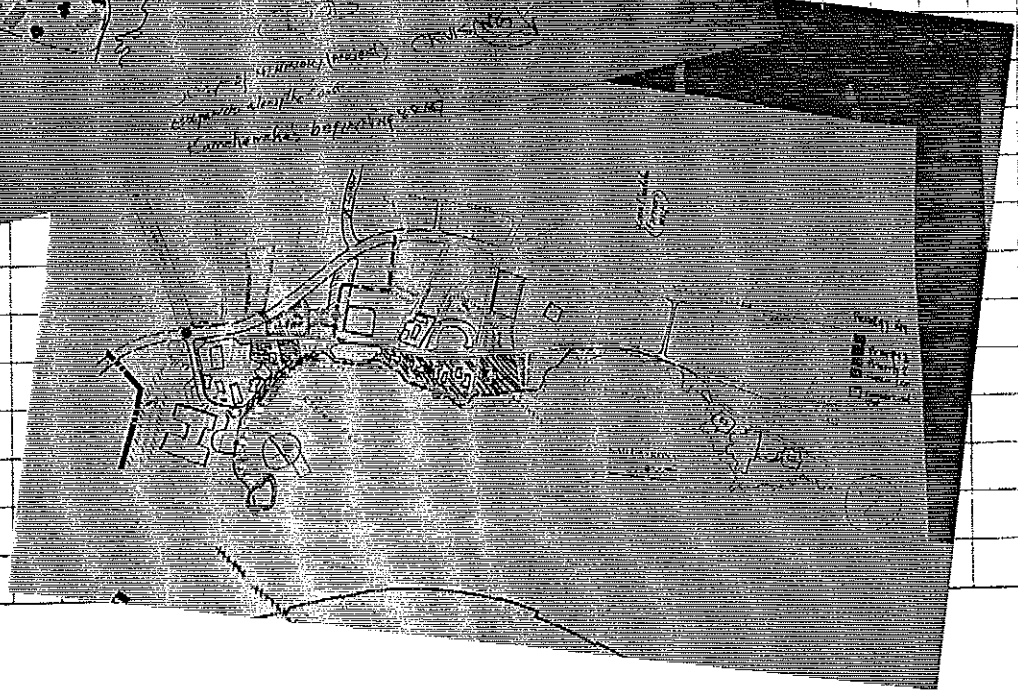
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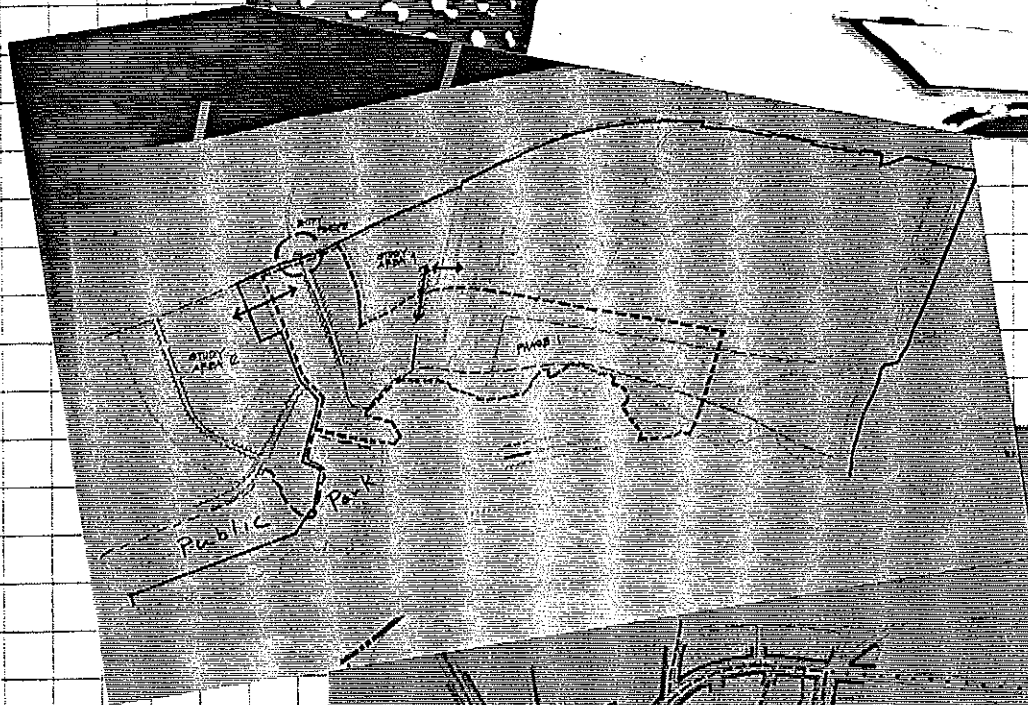


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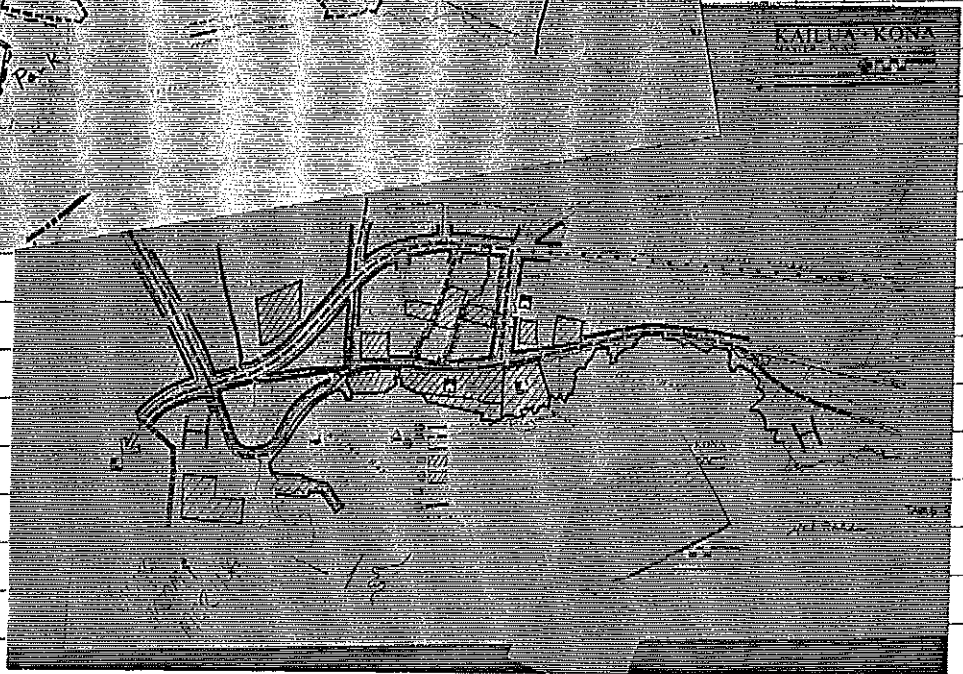


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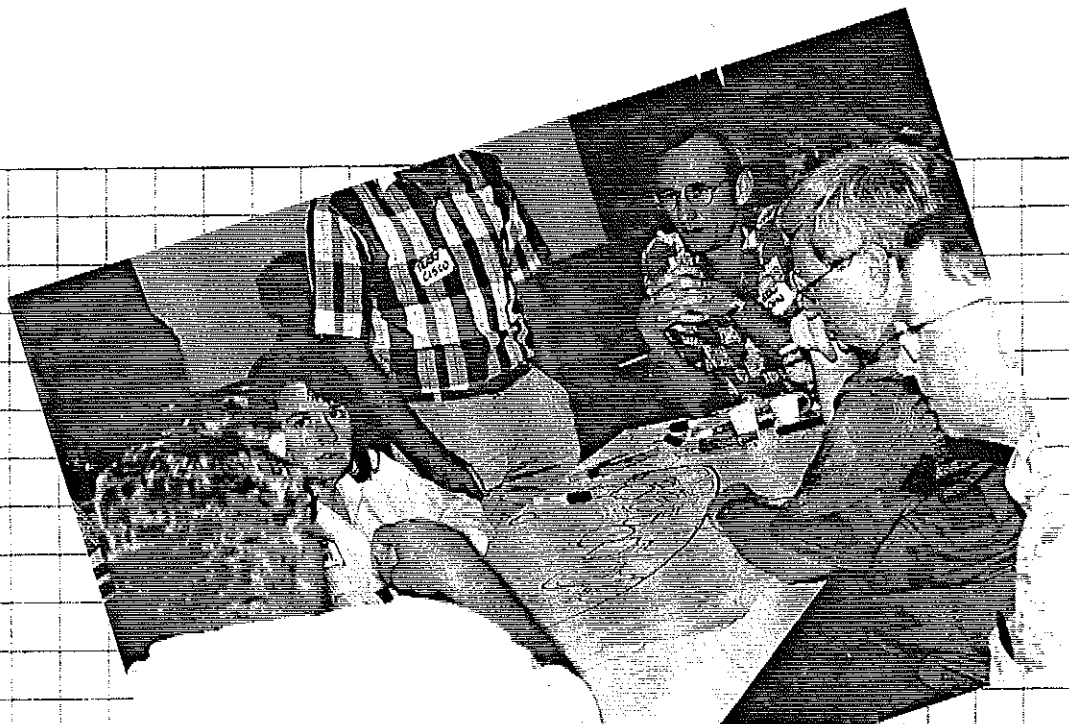
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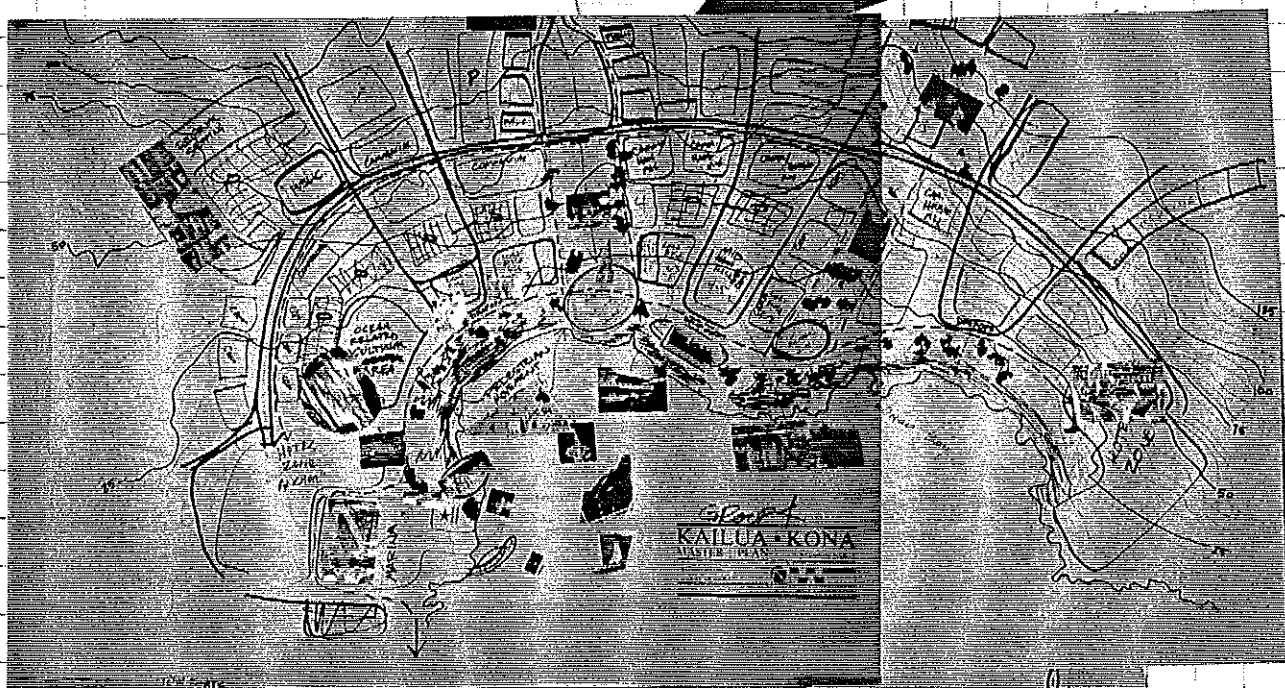
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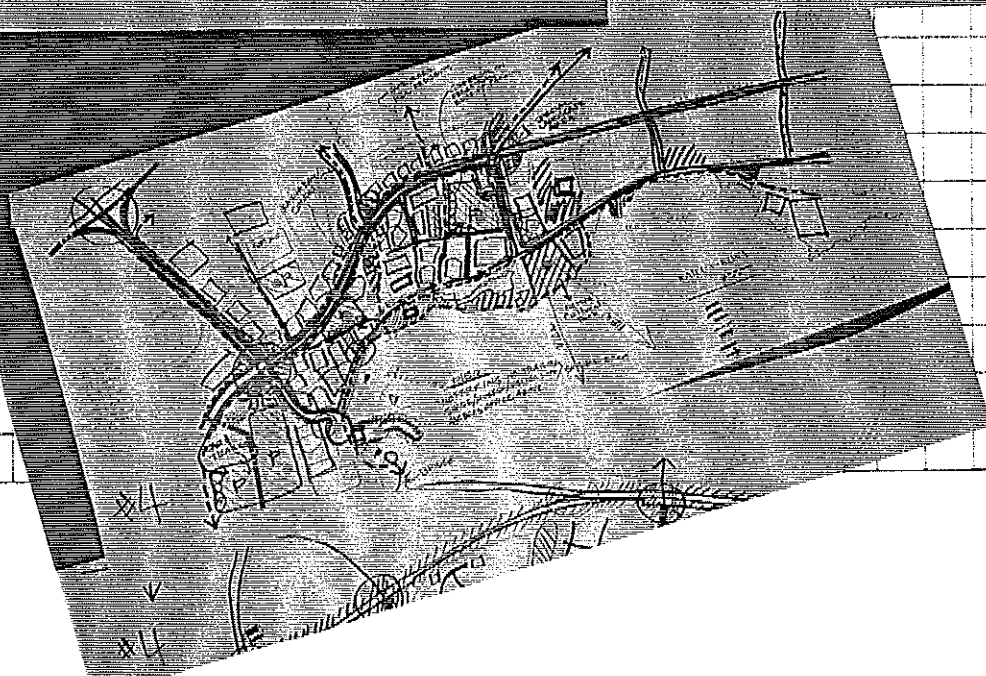


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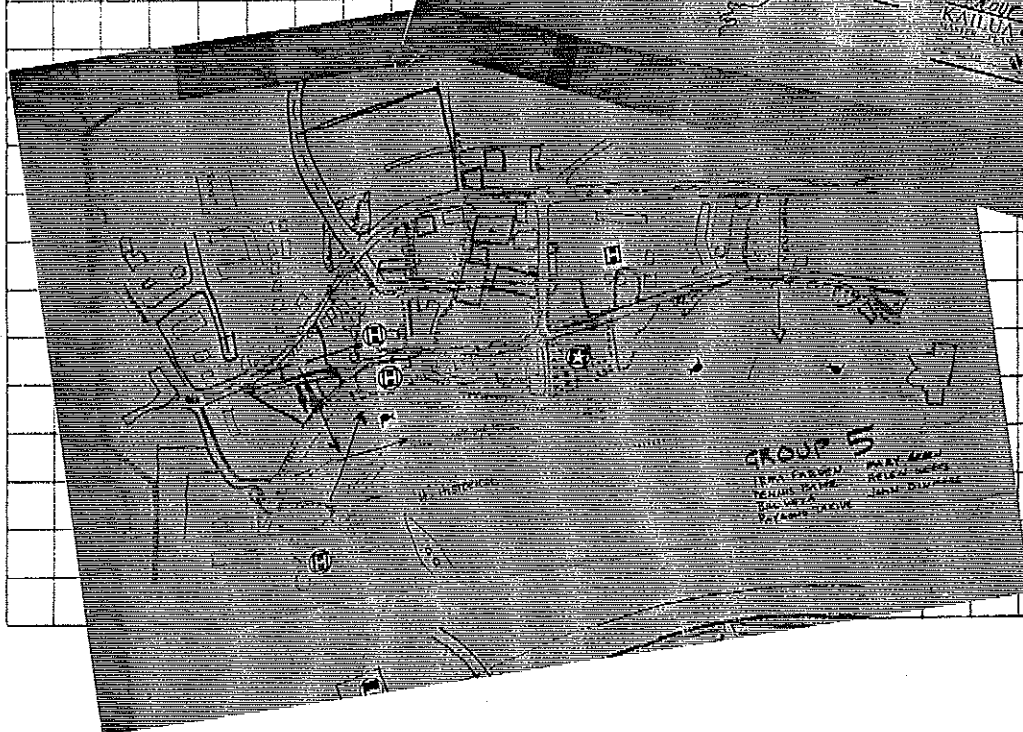
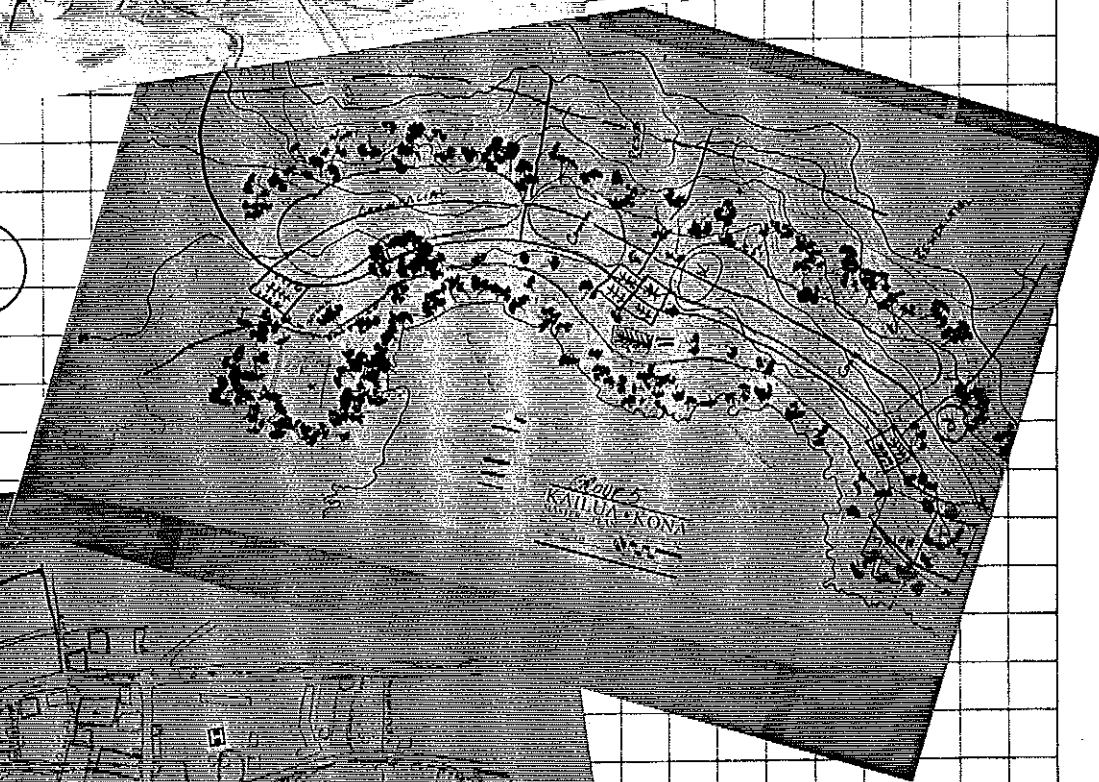
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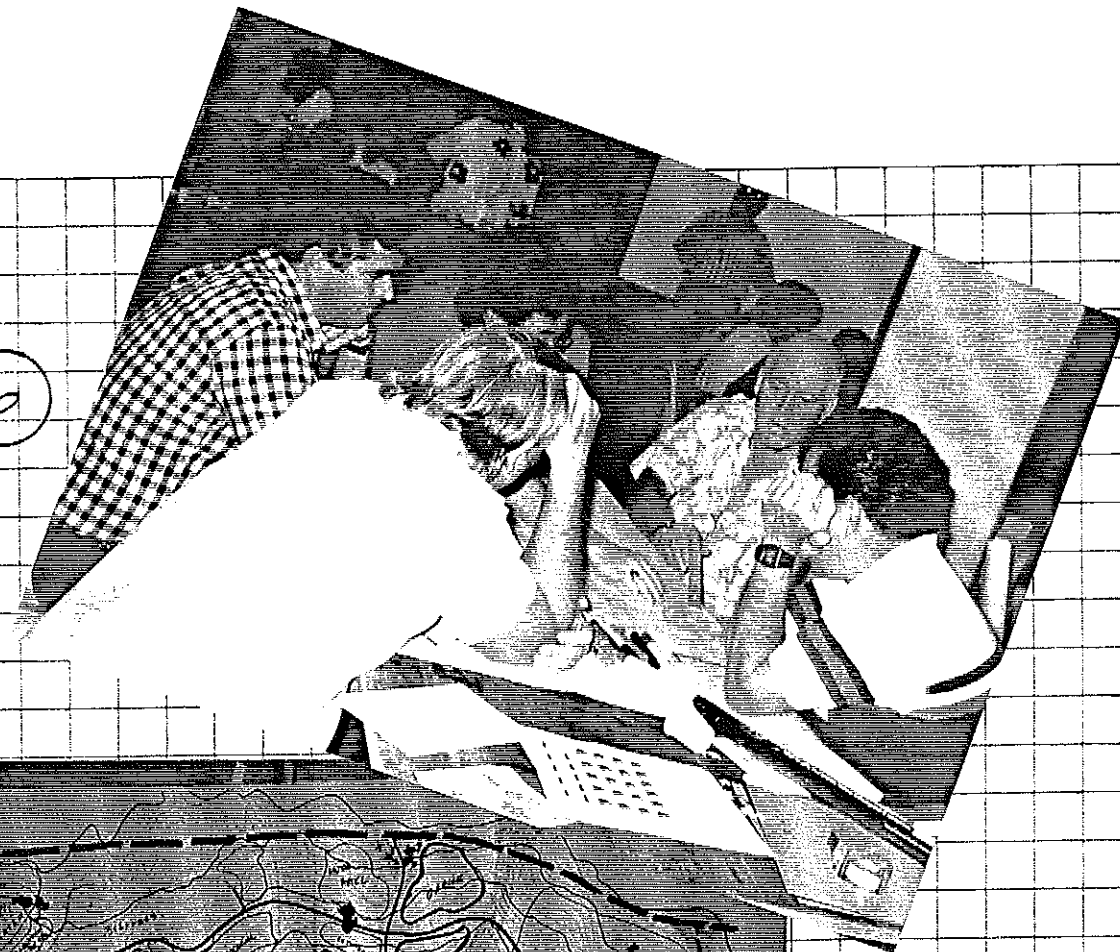
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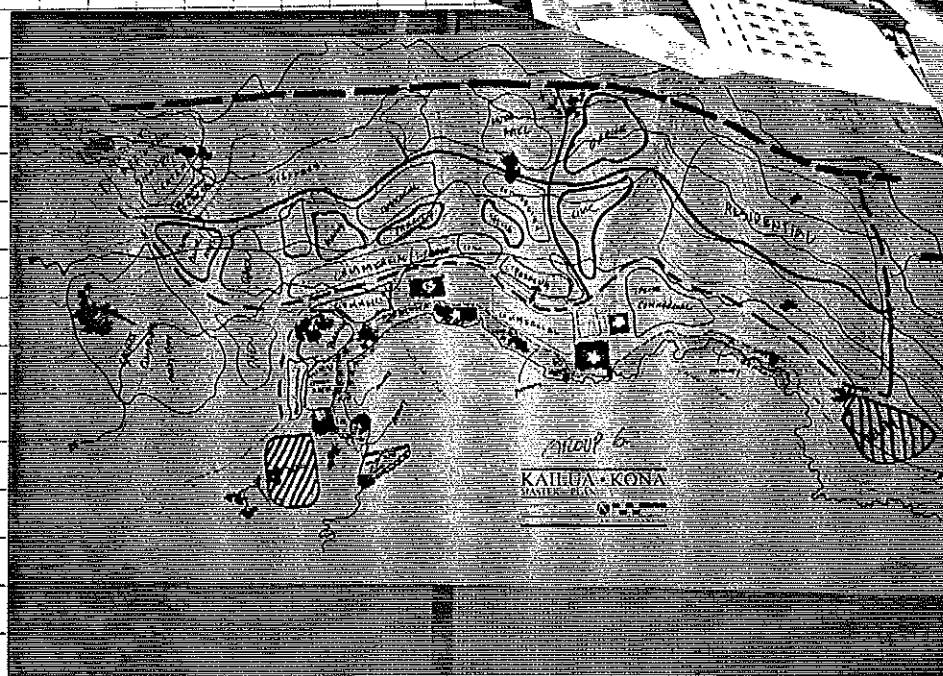
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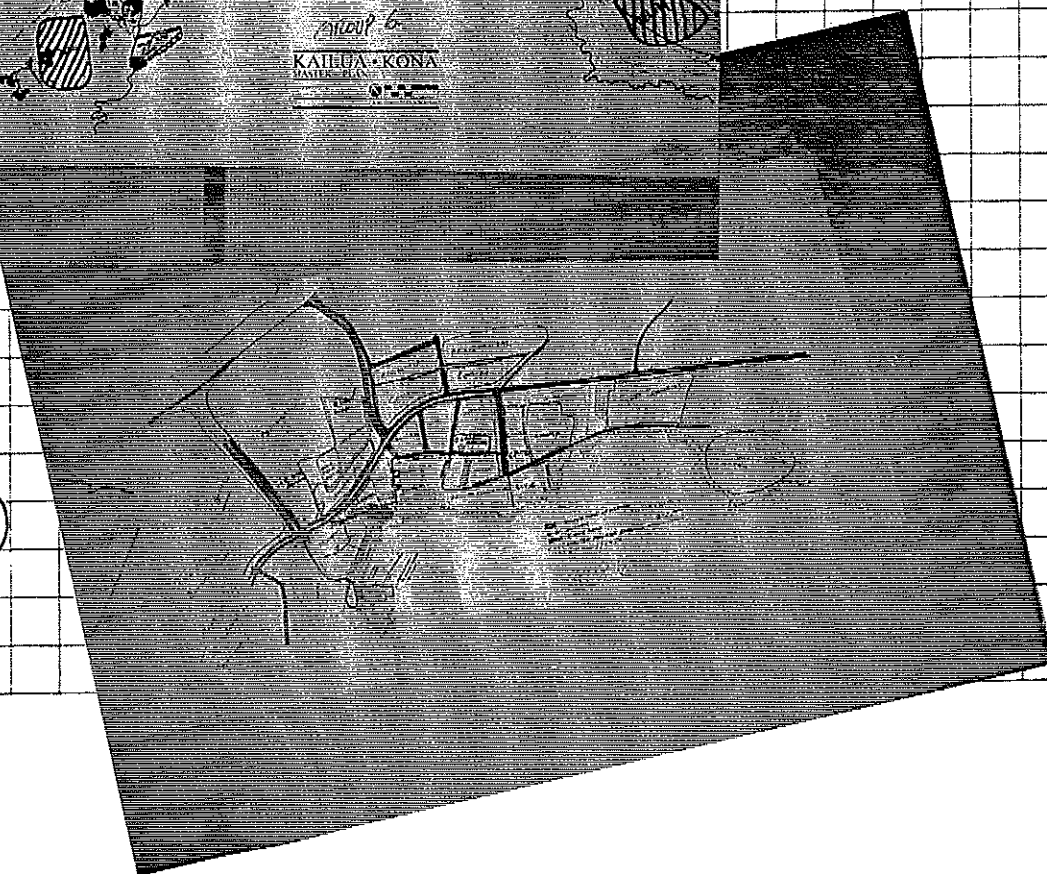
GROUP 6



DAY 1



DAY 2





## THANKS AGAIN TO ALL PARTICIPANTS!

### GROUP ONE

Helen Lanford, Frank Goodale, Marni Herkes, Dan Bjugstad, Frank Zuzak, Jim Ong, David Fuertes

### GROUP TWO

Annie Ferren, Sue Aronson, Jack Hartman, Kelly Greenwell, Dennis Haserot, Lionel Kutner, Kiyono Kunitake, Ellen Takazawa

### GROUP THREE

Jana Mugford, Kathryn Martin, Bruce Owensby, Dave Eldridge, Helen Ross

### GROUP FOUR

Gerry Rott, Terry Cisco, Tina Clothier, Francis McMahon, Tom Krenich, Councilman Harry Ruddell, Alan Kimi, Billy Kimi, Greg Ogin

### GROUP FIVE

John Dinmore, Helen Weeks, Mary Green, Raymond Takiue, Bill Weza, Dennis Bader, Irma Farden

### GROUP SIX

Jim Greenwell, Frank Jahrling, Brenda Lam, Bill Crockett, Tom Pack, Raymond Takiue Jr.

### OTHER PARTICIPANTS

State Rep. Virginia Isbell, Damien Wong, Don Heydenberk, David K. Roy, Mark Richards, Ruby MacDonald, Bonnie Rice-Ogden, Terry Dunlap.

### PLANNING DEPARTMENT STAFF

Royden Yamasato, Ann Usagawa

### CONSULTANT TEAM

Steve Kellogg, Deborah Stone (R. M. Towill Corporation)  
Jim Burns - "Take Part"

### ORGANIZATIONS

Hawaii County (Council, Planning, Public Works, Fire)  
Kailua Village Improvement Assoc.\*  
Kailua Village Design Commission\*  
Hawaii Leeward Planning Conference\*  
Greater Kona Community Council\*  
Kona-Kohala Chamber of Commerce\*  
Kona Board of Realtors\*  
West Hawaii Committee\*  
Daughters of Hawaii\*  
Mokuaikaua Church\*  
Kona Outdoor Circle\*  
Kai'opua Canoe Club\*  
Hawaii Restaurant Association\*  
Moku Hawaii Canoe Association\*  
ALL Inc.\*  
Hawaii Hotel Association\*  
Kona Traffic Safety Committee  
Nautilus II  
Kona Village Resort  
Royal Waikoloan  
Kona Coast Resort  
Dinmore and Cisco Architects  
Queen Liliuokalani Trust  
Pacific Kona Landscaping  
Orchard-Marine  
West Hawaii Today  
McMahon Realty  
Holualoa Management Corporation  
Lanihau Center  
Kona Coast Shopping Center  
Maryl Development  
Destination Kona  
Seaside Hotels  
Konawaena High School

\* Indicates members of the Kailua-Kona Master Plan Task Force

**NOTE:** For more information or if you would like to participate in planning for Kailua Village, please contact the County Planning Department in Hilo at 961-8288 or in Kona 329-4878.

## KAILUA-KONA MASTER PLAN - RESPONSE FORM

As the consultant to the County of Hawaii on the Kailua-Kona Master Plan, R.M. Towill Corp. is interested in gathering as much information on specific issues of concern or community activities that may be ongoing (or proposed) by the business/community organizations within the Village. Your response comments regarding the following items would be appreciated. Please return this form to the County of Hawaii Planning Department (25 Aupuni St., Hilo 96720 or Hanama Place, Rm.108, 75-5706 Kuakini Hwy., Kailua-Kona 96740). Thank you!

- 1) Please give your reaction to the "The Workshop" proceedings/Summary.

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- 2) Do you have specific concerns, or know of ongoing/proposed development projects or other activities in Kailua-Kona that should be taken into consideration as part of the Master Planning effort?

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- 3) Are you aware of any community action projects or funding sponsored by your organization or others (education, tours, publications, service activities, physical improvements, etc.)?

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- 4) Any other comments or information you want the planning group to be aware of?

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## APPENDIX C

### Technical Synopsis Report of Draft Reconnaissance Report Alii Drive Shoreline Protection



8 June '92

**TECHNICAL SYNOPSIS OF  
DRAFT RECONNAISSANCE REPORT  
ALI'I DRIVE SHORELINE PROTECTION**

**1. AUTHORITY.**

a. This report is submitted under the authority of Section 14 of the Flood Control Act of 1946, as amended, and per the policies and procedures prescribed by the Chief of Engineers in ER 1105-2-100.

b. This report is submitted in response to a letter, dated August 8, 1991, in which the Mayor of the County of Hawaii requests assistance for the protection of Ali'i Drive along the shoreline of Kailua Bay in Kailua-Kona.

**2. STUDY PURPOSE.**

The purpose of this study is to determine the feasibility of federal interest in providing highway protection for Ali'i Drive under Section 14 and to assess the environmental impacts of the proposed project as required by the National Environmental Policy Act (NEPA).

**3. PROBLEM DESCRIPTION.**

During the early 1950's, the owners of the properties fronting the beach along Kailua Bay built a recurved wall, approximately 700 feet long (Photo 1 and Photo 2). The wall rests on a foundation of large boulders having an average diameter of about 5 feet. There are no as-built drawings for the wall on record; however, local residents recall that the seawall has a steel sheetpile behind the boulders and beneath the sidewalk. The beach which was seaward of the wall has since eroded, exposing the boulder foundation to constant wave action. The wave energy has been free to progress through the large cavities between the large foundational boulders. The soil material behind the wall, which forms the foundation for both the sidewalk and the roadway adjacent to the wall, has eroded during the past two years, presumably due to the corrosion of the steel sheetpile over time. This erosion of the foundational materials has caused "alligator" cracking and large potholes in the roadway pavement and has caused the sidewalk to crack and fail in several locations. Furthermore, one section of the wall has begun to shift, apparently due to a related shift in the foundational boulders.

The Hawaii County Department of Public Works has patched the cracks which periodically have grown as the seawall shifted and has repaired the holes which continually form in the sidewalk and roadway. The accelerating rate of erosion, however, has caused a need for more frequent repairs and threatens the integrity of both the sidewalk

and the roadway. The County Department of Public Works records give evidence of the accelerating rate of erosion. During 1986, the County spent \$139 to repair the wall, \$552 during 1988, \$1,774 during 1990, and \$8,792 during 1991. As the erosion process continues to accelerate, the County will have to expend an estimated \$20,000 annually to repair the erosion damages to the sidewalk and roadway. Furthermore, without immediate action, portions of the roadway are in imminent danger of failure during the next severe storm. Ali'i Drive is a key roadway within Kailua-Kona, paralleling the coastline and linking the major business and cultural activities in Kailua-Kona.

#### **4. DESIRED IMPROVEMENTS.**

The Mayor of the County of Hawaii desires Corps of Engineers' assistance in providing emergency shoreline protection along Ali'i Drive. The Mayor's letter, dated August 8, 1991, is in Appendix A.

#### **5. ALTERNATIVES CONSIDERED.**

Alternatives considered include the following measures for protecting Ali'i Drive from the effects of erosion:

##### **a. No Action (Alternative A).**

The "no action" alternative is not considered an acceptable or viable solution to the problems and needs of the study area, since the "no action" alternative neither solves the identified problems nor fulfills the identified needs of the study area. Under this alternative, the shoreline along Ali'i Drive would continue to erode, resulting in further damages to the road, its adjacent seawall, and the sidewalk, disrupting the traffic and businesses along the road.

##### **b. Toe Protection Structure (Alternative B).**

A sloping rock toe protection structure is a viable alternative for Kailua Bay, as this alternative would arrest the erosion process from behind the wall and would stabilize the seawall relative to its potential to overturn. This type of structure, shown in Figure 5, would also dissipate a portion of the wave energy and would consequently give the added benefit of decreasing the frequency and degree of overtopping. The toe protection structure also has virtually no impact upon environmental and cultural resources. A sheetpile structure would also provide a degree of toe protection. A sloping rock structure, however, appears to be the more practical structure, based on constructibility, durability, and maintenance requirements; less potential for adverse effect upon environmental and cultural resources; and the added benefit of decreased overtopping.

c. Revetment Designed to Prevent Overtopping (Alternative C).

Since waves which overtop the seawall may also damage other structures along the road, changing the toe protection structure to a sloping rock revetment which provides an increased level of protection to prevent overtopping was also considered. The construction of a revetment designed to prevent overtopping, however, would be both economically and socially prohibitive. In addition to its higher cost, a structure designed to prevent overtopping would have a crest elevation which is 2 feet above the present seawall. This elevational difference would disrupt the present viewplane and is not acceptable for the majority of the local population. For these reasons, this alternative was dropped from consideration early in the formulation process.

d. Geotextile (Alternative D).

Excavating behind the seawall, progressively filling the large voids with cobbles and gravel (1"-8" in diameter), and installing a geotextile sheet is also a viable alternative, as shown in Figure 6. Under this alternative, the one 32-foot-long section of the seawall which has begun to shift must be repaired. This solution, however, does not provide any added protection for the seawall against overturning. Other disadvantages of this alternative are the shorter project life, higher repair/replacement costs relative to the other alternatives, and the potential that excavation will adversely impact any historic properties which may exist behind the wall.

e. Concrete Grout (Alternative E).

Filling the voids between the large foundational boulders with a concrete grout, as shown in Figure 7, is another viable alternative. This solution offers a simple means by which to seal the wall to prevent the erosion of the material behind the wall. Under this alternative, the one section of the seawall which has begun to shift must be repaired. This alternative also offers a degree of additional protection for the seawall against overturning by greatly reducing the ability of the foundational boulders to shift. Another advantage of this alternative is the comparatively lesser degree to which construction adversely impacts business and traffic, due to the relatively smaller amount of construction equipment this alternative requires.

f. Beach Replenishment (Alternative F).

Replenishing the beach as a means to protect the wall foundation was considered, as shown in Figure 8; however, this alternative is not economically viable due to its relatively high construction and maintenance costs and the uncertainty of the beach's stability without the construction of an off-shore structure which could protect the beach from excessive wave action.

g. Comparative Summary of Alternatives.

Each of the above alternatives was considered primarily on the basis of its ability to technically solve the problem, its construction and maintenance costs, and its effects on environmental and cultural resources. Secondary considerations were each alternative's ability to provide both further stability to the wall and overtopping protection.

Alternative C (Revetment) was removed from consideration due both to its high cost and to the social unacceptability of disrupting the area's viewplane. Alternative D (Geotextile) would solve the problem due to erosion; however, its short life expectancy and the potential impact to cultural resources during excavation make this alternative less desirable. Alternative F (Beach) would arrest the erosion process, would protect the seawall's foundation, would provide protection against overtopping, and would provide recreational benefits; however, its high construction cost, its high maintenance cost, and the high degree of uncertainty regarding the beach's stability make this alternative both technically and economically infeasible. Similarly, Alternative B (Toe Protection) would arrest the erosion process, would protect the seawall's foundation, and would lessen the degree to which overtopping occurs; however, this alternative is not as desirable economically and environmentally as Alternative E (Grout). Alternative E would arrest the erosion process and would stabilize the seawall's foundation, although it provides no reduction in overtopping. Alternative E, however, would have no significant impact to environmental and cultural resources and is the most economically feasible alternative. Alternative E (Grout) was therefore selected for implementation.

6. **PROPOSED PLAN OF IMPROVEMENT.**

The proposed plan of improvement consists of filling the voids between the large foundational boulders with a cement-sand grout. Due to the large diameter of the boulders which form the foundation of the seawall, the voids between the boulders comprise an assumed volume of 40 percent of the total foundational volume. The method of placement of the grout will consist of drilling holes 1-1/2" to 3" in diameter at horizontal intervals of 5 to 10 feet and injecting the grout mix to fill the voids within the wall's foundation. The exact hole diameter and interval will depend upon the stiffness of the grout mix and an on-site determination of the degree to which the grout fills the voids. The method will vary somewhat for the 32-foot section of seawall which has begun to shift. Prior to placing the grout beneath this section, water jetting will remove any sand under the foundational stones to ensure that the section has an adequate and stable foundation. There is a gas line located at a distance varying from 3-1/2' to 10' from the wall; therefore, prior to any drilling, the gas company must verify the location of this line to ensure that the drilling operations will not inadvertently damage the line. The proposed plan provides protection along the entire 700-foot length of the concrete seawall. While the

design is not intended to prevent overtopping, the existing drainage system is considered adequate for run-off. The proposed plan will have no affect on the drainage system.

## 7. SYNOPSIS OF ECONOMIC BENEFIT.

Table 2  
Summary of Average Annual Benefits

| <u>Benefit Category</u>           | <u>Toe Protection</u> | <u>ALTERNATIVES</u>      |                            |                 |
|-----------------------------------|-----------------------|--------------------------|----------------------------|-----------------|
|                                   |                       | <u>Geotextile Fabric</u> | <u>Beach Replenishment</u> | <u>Grout</u>    |
| Roadway Repair                    | \$11,600              | \$11,600                 | \$11,600                   | \$11,600        |
| Sidewalk Repair                   | \$ 9,100              | \$ 9,100                 | \$ 9,100                   | \$ 9,100        |
| Delays from Road Repair           | \$ 9,000              | \$ 9,000                 | \$ 9,000                   | \$ 9,000        |
| Overtopping Expense               | \$ 2,500              | ---                      | \$12,300                   | ---             |
| Delays from Overtopping           | \$ 4,800              | ---                      | \$24,100                   | ---             |
| <b>TOTAL AVE. ANNUAL BENEFITS</b> | <b>\$37,000</b>       | <b>\$29,700</b>          | <b>\$66,100</b>            | <b>\$29,700</b> |

## 8. ESTIMATE OF AVERAGE ANNUAL COSTS.

Annual costs consist of interest and amortization of the recommended plan's project first cost and its annualized cost of periodic maintenance. Interest and amortization are computed at the rate of 8-1/2 percent and are based on an economic project life of 50 years. Annual charges for periodic maintenance are estimated to be zero. The estimated average annual cost for the proposed project cost of \$301,500 is \$26,400.

## 9. APPORTIONMENT OF COSTS.

Federal participation for the Ali'i Drive Shore Protection project under authority of Section 14 of the the Flood Control Act of 1946, as amended, is 75% of the estimated project cost, subject to an overall statutory limitation of \$500,000. Apportionment of costs for the proposed project is as follows:

|                           |                  |
|---------------------------|------------------|
| Federal Share @ 75%       | \$226,125        |
| Non-Federal Share @ 25%   | \$ 75,375        |
| <b>Total Project Cost</b> | <b>\$301,500</b> |

## 10. BENEFIT-TO-COST RATIO.

The benefits and costs calculated for the various alternatives, along with the respective benefit-cost ratios, are summarized as follows:

|                                      | <u>Toe<br/>Protection</u> | <u>Geotextile<br/>Fabric</u> |
|--------------------------------------|---------------------------|------------------------------|
| <u>BENEFITS:</u>                     |                           |                              |
| Road Repair Cost Reduction           | \$11,600                  | \$11,600                     |
| Sidewalk Repair Cost Reduction       | \$ 9,100                  | \$ 9,100                     |
| Travel Delay Reduction (Road Repair) | \$ 9,000                  | \$ 9,000                     |
| Overtopping Cost Reduction           | \$ 2,500                  | ---                          |
| Travel Delay Reduction (Overtopping) | \$ 4,800                  | ---                          |
|                                      | <hr/>                     | <hr/>                        |
| TOTAL AVERAGE ANNUAL BENEFITS        | \$37,000                  | \$29,700                     |

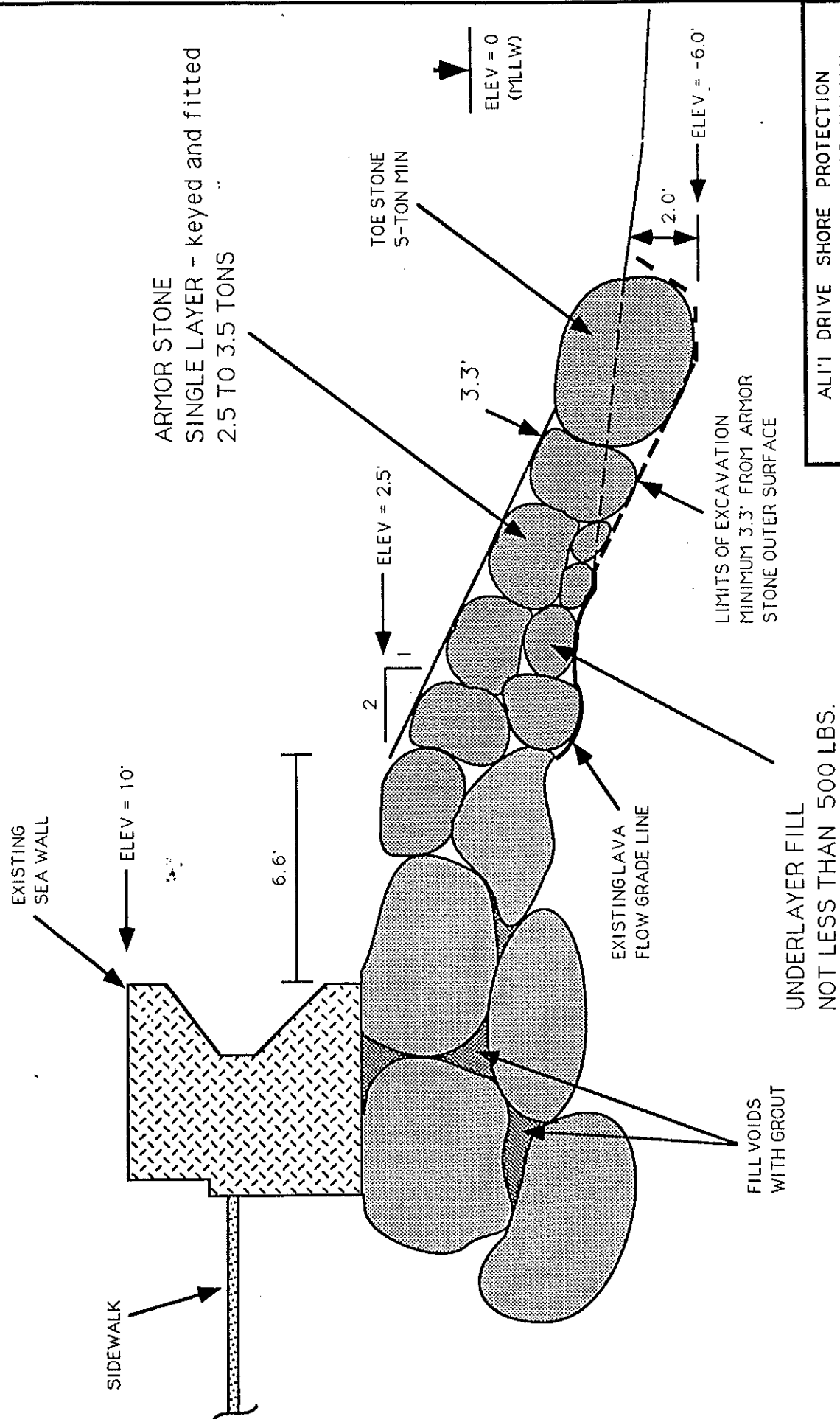
|                                 |           |           |
|---------------------------------|-----------|-----------|
| <u>COSTS:</u>                   |           |           |
| Total First Project Cost        | \$438,500 | \$414,200 |
| Interest During Construction    | \$ 6,000  | \$ 5,700  |
| Total Investment Cost           | \$444,500 | \$419,900 |
| Average Annual Cost             | \$ 38,400 | \$ 36,300 |
| Average Annual Maintenance Cost | \$ 1,150  | \$ 3,000  |
| TOTAL AVERAGE ANNUAL COST       | \$ 39,600 | \$ 39,300 |

|                            |     |     |
|----------------------------|-----|-----|
| <u>BENEFIT-COST RATIO:</u> | .93 | .76 |
|----------------------------|-----|-----|

|                                      | <u>Beach<br/>Replenmt</u> | <u>Grout</u> |
|--------------------------------------|---------------------------|--------------|
| <u>BENEFITS:</u>                     |                           |              |
| Road Repair Cost Reduction           | \$11,600                  | \$11,600     |
| Sidewalk Repair Cost Reduction       | \$ 9,100                  | \$ 9,100     |
| Travel Delay Reduction (Road Repair) | \$ 9,000                  | \$ 9,000     |
| Overtopping Cost Reduction           | \$12,300                  | ---          |
| Travel Delay Reduction (Overtopping) | \$24,100                  | ---          |
|                                      | <hr/>                     | <hr/>        |
| TOTAL AVERAGE ANNUAL BENEFITS        | \$66,100                  | \$29,700     |

|                                 |             |           |
|---------------------------------|-------------|-----------|
| <u>COSTS:</u>                   |             |           |
| Total First Project Cost        | \$1,345,900 | \$301,500 |
| Interest During Construction    | \$ 18,100   | \$ 4,000  |
| Total Investment Cost           | \$1,364,000 | \$305,500 |
| Average Annual Cost             | \$ 118,000  | \$ 26,400 |
| Average Annual Maintenance Cost | \$ 23,000   | \$ 0      |
| TOTAL AVERAGE ANNUAL COST       | \$ 141,000  | \$ 26,400 |

|                            |     |      |
|----------------------------|-----|------|
| <u>BENEFIT-COST RATIO:</u> | .47 | 1.13 |
|----------------------------|-----|------|

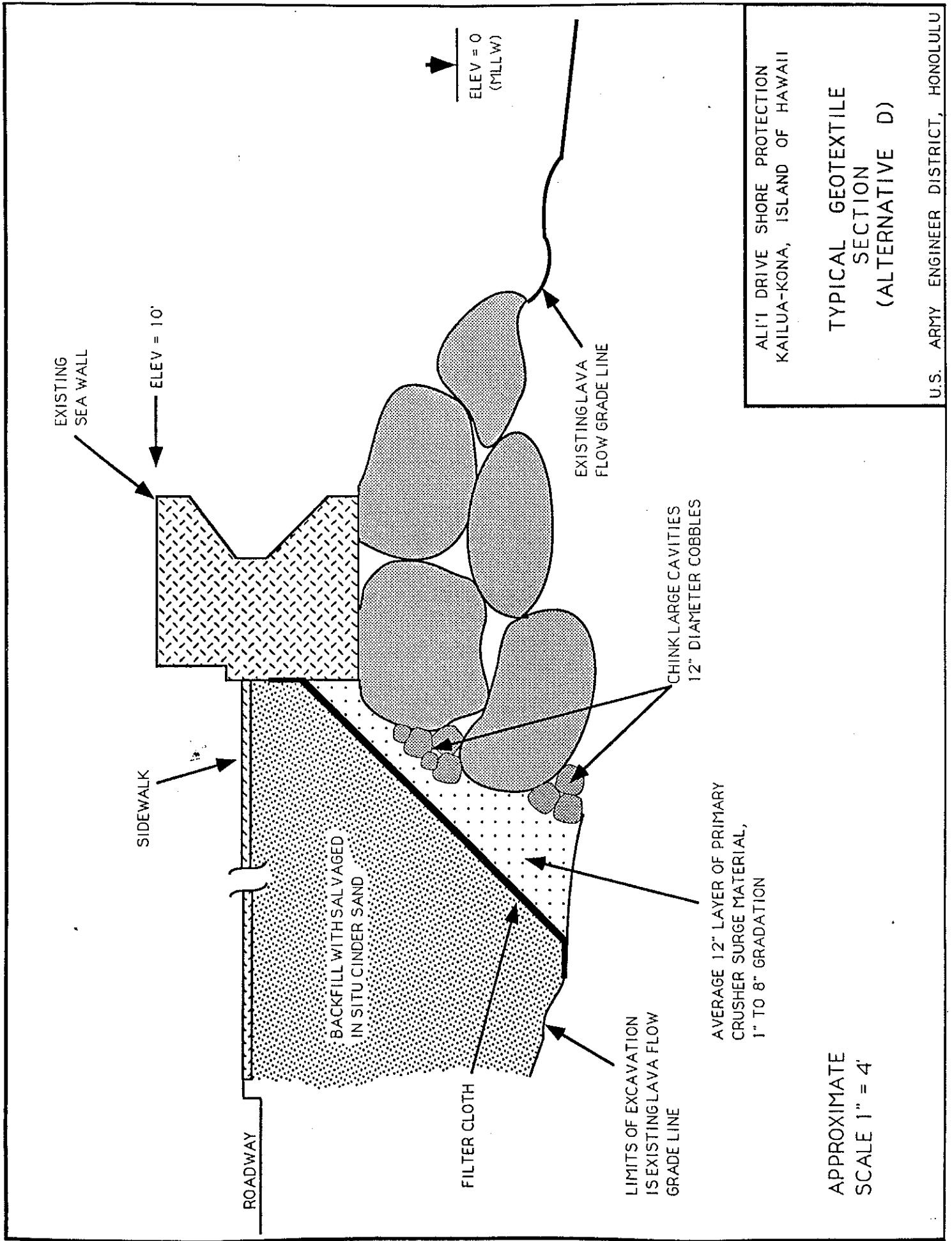


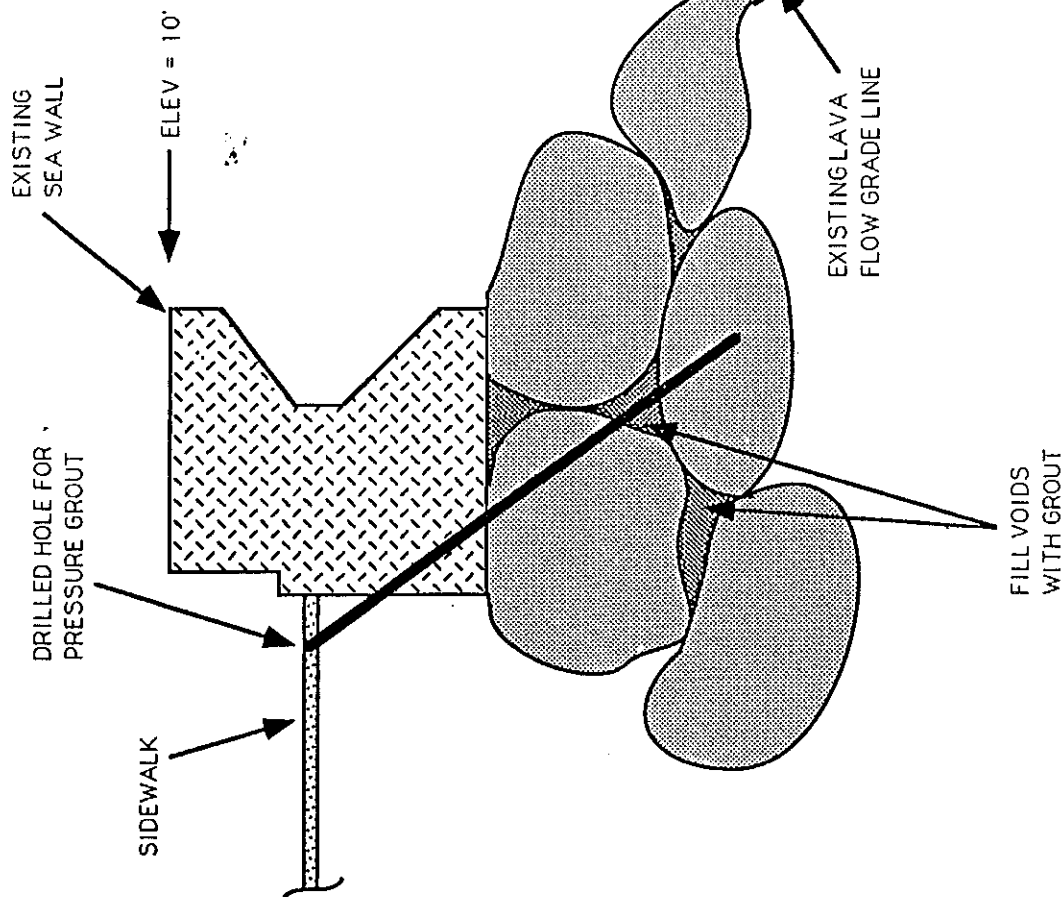
ALI'I DRIVE SHORE PROTECTION  
KAILUA-KONA, ISLAND OF HAWAII

TYPICAL TOE PROTECTION  
SECTION  
(ALTERNATIVE B)

U.S. ARMY ENGINEER DISTRICT, HONOLULU

APPROXIMATE  
SCALE 1" = 4'





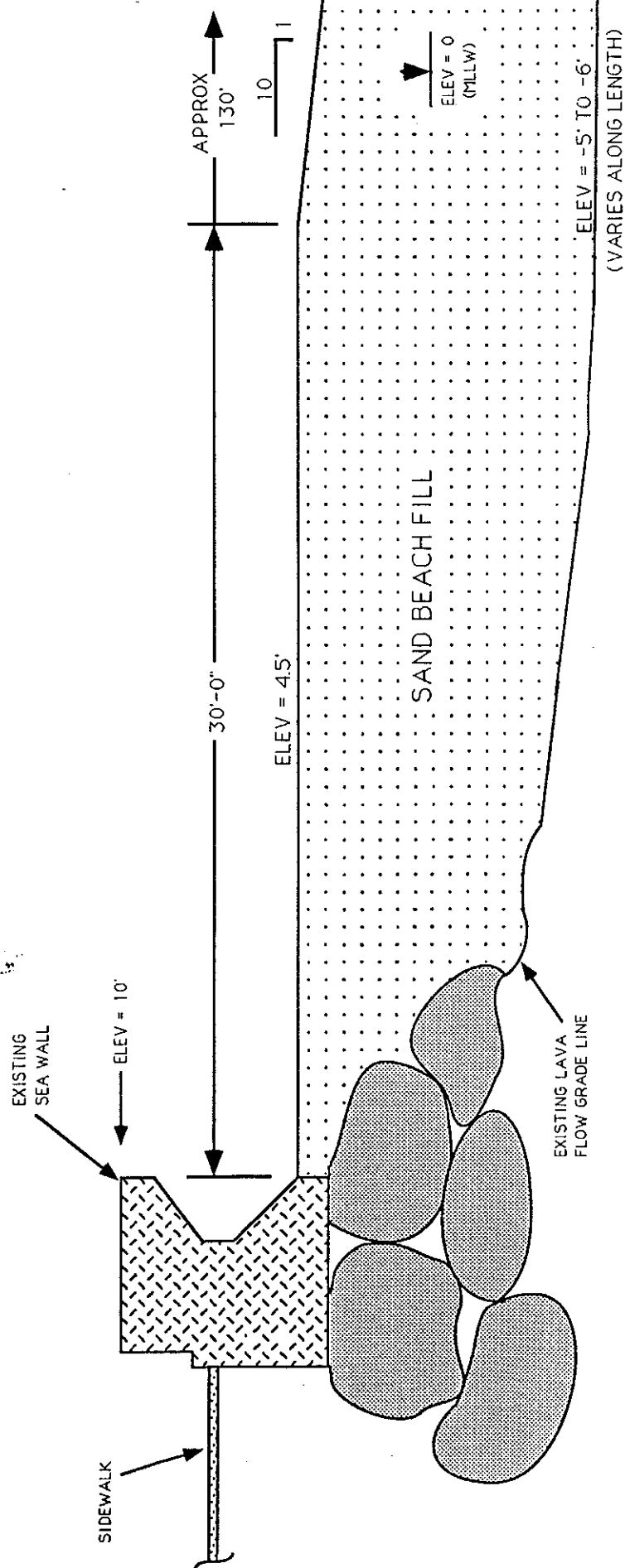
ALI'I DRIVE SHORE PROTECTION  
KAILUA-KONA, ISLAND OF HAWAII

TYPICAL GROUT FILL  
SECTION  
(ALTERNATIVE E)

U.S. ARMY ENGINEER DISTRICT, HONOLULU

APPROXIMATE  
SCALE 1" = 4'

FIGURE 7



ALI'I DRIVE SHORE PROTECTION  
KAILUA-KONA, ISLAND OF HAWAII

# TYPICAL BEACH REPLENISHMENT SECTION (ALTERNATIVE F)

U.S. ARMY ENGINEER DISTRICT, HONOLULU

APPROXIMATE  
SCALE 1" = 5'

FIGURE 8



