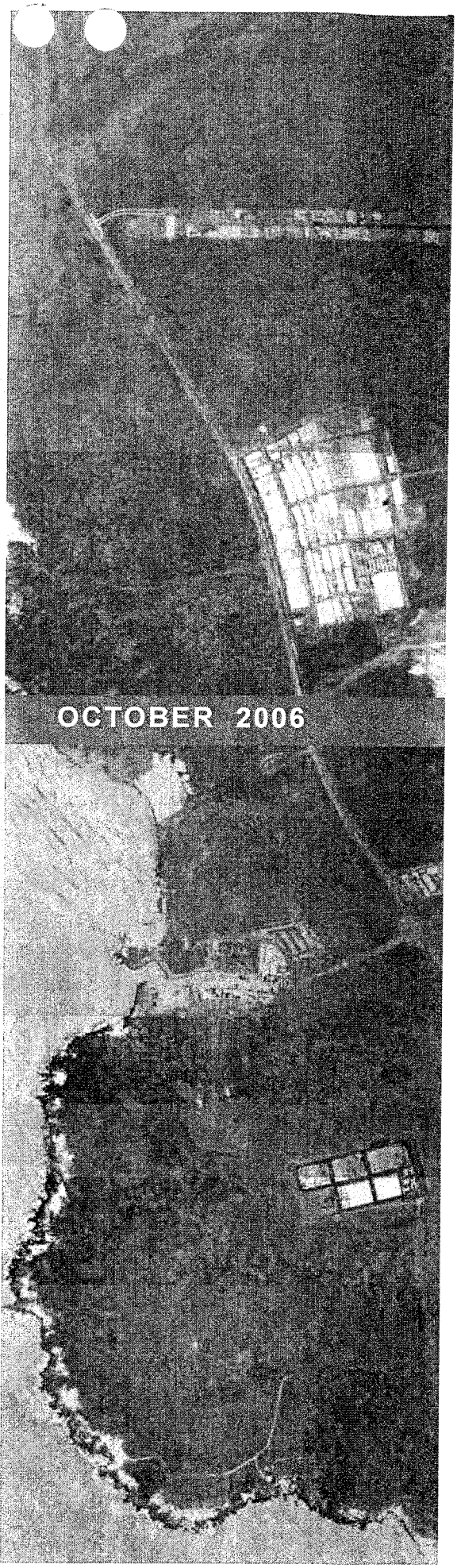
# NORTH KONA IMPROVEMENT DISTRICT PROJECT

## SEWER MASTER PLAN SUMMARY REPORT



OCTOBER 2006

PREPARED FOR
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
COUNTY OF HAWAII

PREPARED BY
SSFM INTERNATIONAL

# SEWER MASTER PLAN SUMMARY REPORT

## FOR

# NORTH KONA IMPROVEMENT DISTRICT PROJECT

KONA, HAWAI'I

## OCTOBER 2006

*PROPOSING AGENCY:*

Department of Environmental Management
County of Hawai'i

*PREPARED BY:*

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# CHAPTER 1
# INTRODUCTION

A *North Kona Sewer Master Plan Summary Report* was developed for the County of Hawai'i (County), Department of Environmental Management (DEM) to address future sewer improvements necessary to serve projected development in the North Kona region of the island of Hawai'i. This sewer master plan summary report would then be used as part of the development of an implementation plan to support the establishment of an "Improvement District" for North Kona by the County Council. This project is thus collectively referred to as the North Kona Improvement District (NKID) Project. This letter report summarizes the results of the efforts undertaken in developing this sewer master plan which is the first phase of this project.

## 1.1 BACKGROUND

A rapid confluence of both private and public developments on several large tracts of land extending from Kealakehe and Honokōhau Harbor northbound to Kohanaiki is occurring or being planned. This coastline north of Kona contains valuable unique marine resources and pristine shoreline park properties that are of concern to the County. As a result, an updated regional sewerage master plan for this North Kona region is warranted because existing sewer studies for this region are over 20 years old and thus outdated not reflecting current development plans.

In light of this pending growth, the County anticipates the need to implement improvements to their municipal sewer system and recycled water system serving this region. Such improvements would include assessing their gravity sewers, force mains, manholes, and pump stations situated north of the Kealakehe Wastewater Treatment Plant. Therefore, the mix of private and public development planned necessitates the preparation of a more comprehensive regional plan of wastewater treatment needs and sewer improvements for this region. In addition, a number of options may be identified for selection in determining the allocation of sewer system improvement costs.

Therefore, the Council of the County of Hawai'i subsequently adopted Resolution No. 129-03 in December 2003 directing the County DEM to develop an implementation plan for an improvement district. This implementation plan would include a sewer master plan for the region north of Kealakehe. It would also address the necessity, feasibility, boundaries, estimated costs, and desirable method of financing to provide sewer system improvements serving this North Kona district. A copy of this Resolution is included in Appendix A.

## 1.2 MASTER PLAN PROJECT AREA

The project area established for this regional sewer master plan consists of a total area that was initially considered for inclusion in an improvement district. This study area boundary generally extends from the County's Kealakehe Wastewater Treatment Plant northbound up to and inclusive of the Kohanaiki ahupua'a[1]. This sewer master plan study area encompasses approximately 5,600 acres, and Figure 1 graphically shows the boundary for this area. It should be noted that the resulting boundary for the improvement district may not reflect the total study area included under this master plan.

As shown on this figure, the boundary along the shoreline starts from Kaiwi Point and extends northbound about 3.75 miles past the Honokohau Small Boat Harbor and Kaloko Point up to Puhili Point. The boundary from this coastline extends mauka (inland) about 3 to 4 miles up to Palani Road and Mamalahoa Highway.

## 1.3 SCOPE OF STUDY

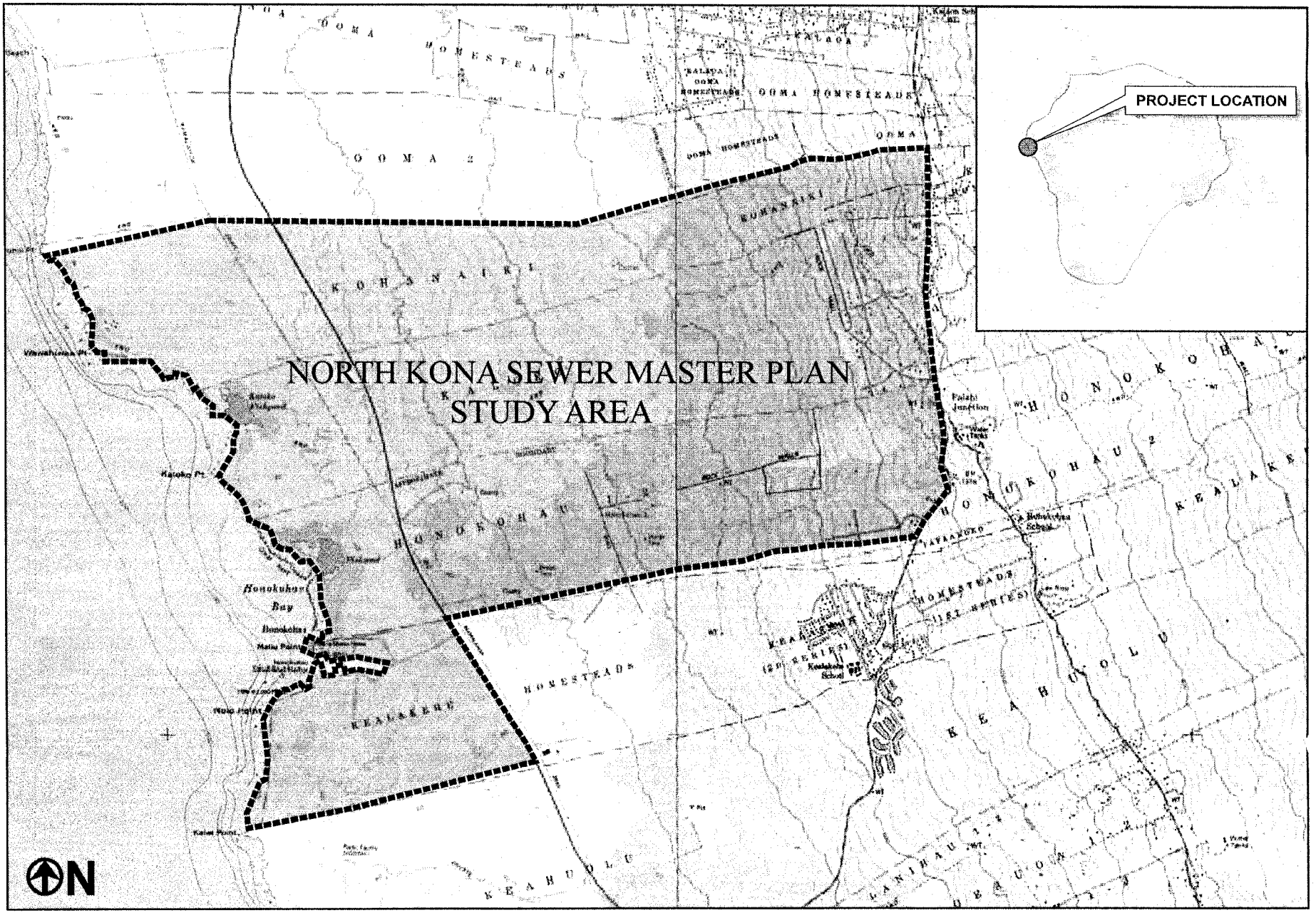
The overall scope of study for this NKID project consists of two primary phases. The first phase is developing a sewer master plan to project future estimated flows and identify system improvements needed. The study year established for this master plan is 2025. The second phase will be developing an implementation study identifying proposed sewer improvements and a desirable method of financing for the improvements. This implementation study will then be transmitted by the County DEM to the County Council for consideration, processing, and action in formally establishing the North Kona Improvement District as mandated in Resolution 129-03.

**Phase 1 - Sewer Master Plan Preparation**

The major tasks conducted in developing the sewer master plan include the following:

1. Researched and reviewed existing sewer plans, as-built drawings, land use entitlements, and other references.
2. Inventoried existing land uses within the study area to establish "baseline" conditions.
3. Identified and consulted with major landowners and developers to obtain information on future development plans within the study area.
4. Established future land uses within the study area for the year 2025 along with increment years (2015 and 2020), and projected flows on a per capita basis.
5. Identified necessary sewer system improvements, developed three (3) alternative plans, and provided an opinion of probable construction costs.

1 Ahupua'a - Land division usually extending from the uplands to the sea.




# PROJECT LOCATION AND STUDY AREA MAP

**Figure 1**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source:*
*Delorme 3-D Topo Quads*

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- Sewer treatment alternatives were not included in this study scope. However, an assessment of when the existing Kealakehe Wastewater Treatment Plant's excess capacity would be totally utilized by future demand was performed.

6. Held a public informational meeting to solicit input on preliminary findings associates with this master plan.
7. Developed the preferred alternative for sewer improvements, and refined cost estimates.
8. Documented the results of this effort in a master plan summary report.

**Phase 2 - Implementation Plan Preparation**

Phase 2 of this NKID Project will consist of conducting a study to develop an implementation plan that can be used in developing an Improvement District for review and action by the County Council. The focus of this phase will be identifying the method of financing for sewer improvements and determining how the distribution of costs will be established among the landowners and developers. The results of that study will be documented in a future Implementation Plan report. The major work tasks associated with that phase will consist of:

1. Assess and evaluate the program components necessary for the implementation plan.
2. Consult with major landowners and developers in the study area regarding program components and requirements.
3. Conduct two public informational meetings to solicit input from the general public on the implementation plan.
4. Evaluate comments received and revise the implementation plan.
5. Identify the preferred implementation plan and prepare an engineering report documenting this.

The final Implementation Plan report would then be submitted by the County DEM to the Council for review, processing, public hearings, and action in adopting a Council-initiated improvement district by Resolution.

# CHAPTER 2
# REGIONAL PROFILE

This chapter provides a profile overview of the region included in the sewer master plan study area. It discusses the existing land use and settlement pattern of the region along with existing infrastructure facilities pertinent to the County's municipal sewer system.

## 2.1 GENERAL CHARACTERISTICS

The study area in this North Kona district encompasses a large area from the shoreline inland up to Mamalahoa Highway and totaling approximately 5,600 acres. This region is for the most part still undeveloped. There are pockets of commercial and industrial developments concentrated along Queen Ka'ahumanu Highway. Areas inland along Mamalahoa Highway generally consist of a few older residential subdivisions. Figure 2 includes an aerial photograph showing existing land uses as of 2004 (Digital Globe 2004).

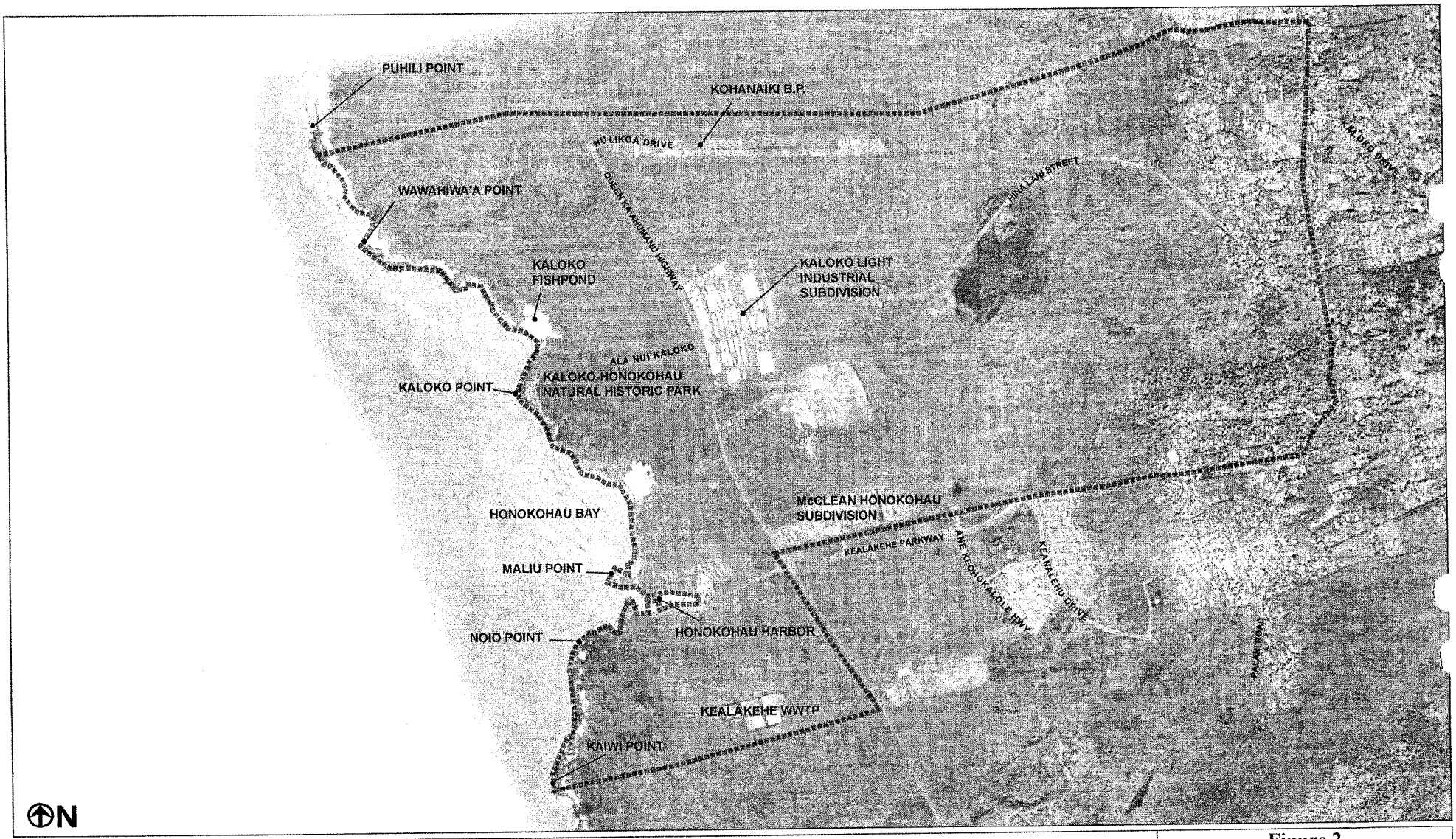
**Highways and Major Roadways**

Major roadway facilities within the study area, as shown on Figure 2, consist of two primary State highway facilities generally running in a north-south direction and two County roadways providing mauka-makai (east-west or inland-shoreline) connection between these highways. A summary of these roadway facilities is provided below.

1. Queen Ka'ahumanu Highway. Queen Ka'ahumanu Highway (Highway 19), also known as "Queen K", is under the jurisdiction of the State of Hawai'i, Department of Transportation. This highway generally runs in a north-to-south direction along the coastline providing access to the shoreline and existing developments along this highway. This highway within the study area has a 300-foot-wide right-of-way, and is a non-divided, two-lane highway with paved shoulders.

2. Mamalahoa Highway/Palani Road. Palani Road and Mamalahoa Highway are two separate highway facilities which are both identified as State Highway 190 under the jurisdiction of the State of Hawai'i, Department of Transportation.

    - Mamalahoa Highway is identified as State Highway 180 through its route northbound from Kailua-Kona town. This highway intersects with Palani Road about 0.25 miles south of its intersection with Hina Lani Street. From this point, it then continues northbound as Mamalahoa Highway (Highway 190) thru the study area. This highway consists of a non-divided, two lane roadway with shoulder.




# EXISTING SITE CONDITIONS

**Figure 2**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source:*
*(Aerial) Digital Globe*

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- Palani Road begins from its intersection with Queen Ka'ahumanu Highway near the entrance to Kailua-Kona town and proceeds northbound as a mauka highway facility up to its intersection with Mamalahoa Highway. This facility consists of a non-divided, two lane roadway with shoulder.

3. Hina Lani Street. Hina Lani Street is under the jurisdiction of the County of Hawai'i. This road generally runs in a mauka-to-makai direction providing the only major link connecting Queen Ka'ahumanu Highway and Mamalahoa Highway. The road is an existing non-divided, two-lane road with wide shoulders.

4. Kealakehe Parkway. Kealakehe Parkway is under the jurisdiction of the State of Hawaii. This roadway generally runs in a makai-to-mauka direction from the Honokohau Small Boat Harbor up to the Villages of Laiopua situated about midway between the two highways. The road is an existing non-divided, two-lane road with paved shoulders. Kealakehe Parkway is planned to be extended mauka (inland) in the future eventually connecting with Mamalahoa Highway.

## Major Existing Land Uses within Study Area

Major land uses existing within the study area consists of both residential subdivisions and commercial and industrial subdivisions as previously shown on Figure 2. A summary of these major land uses is provided below:

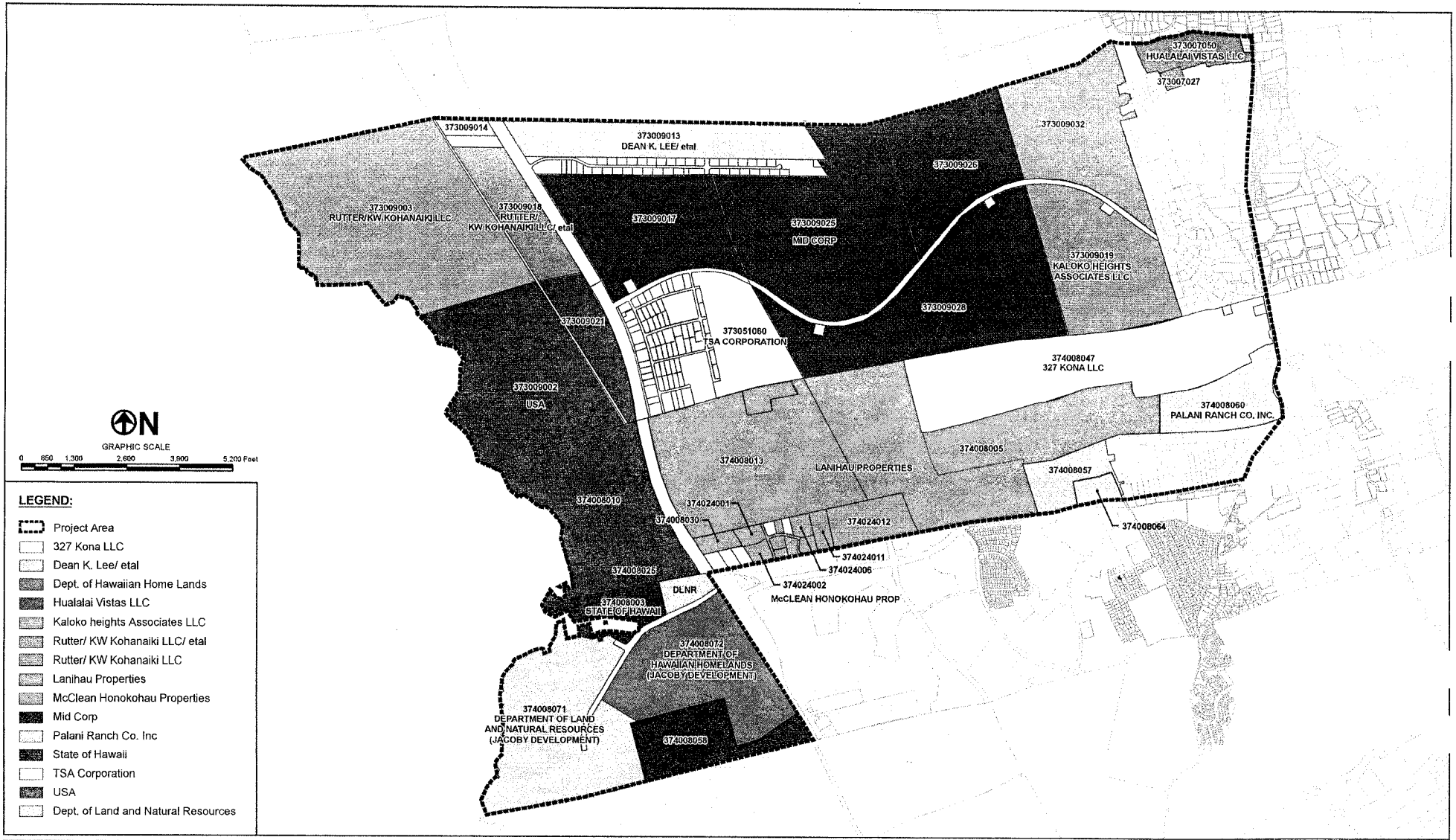
1. Residential Subdivisions. These subdivisions generally consist of older developments established along Mamalahoa Highway under the State Agricultural Land Use District. The majority of the residential lots associated with these subdivisions are already developed.
   - Kohanaiki Homesteads
   - Paniolo Country
   - Kona Hills Estates
   - Kona Heavens
   - Kaloko Orchards
2. Commercial / Industrial Subdivisions. These subdivisions generally consist of mixed uses of commercial and industrial uses concentrated along Queen Ka'ahumanu Highway. Some major tenants in the area include Costco Wholesale and Home Depot. A large number of the lots for these subdivisions are currently undeveloped.
   - Kaloko Light Industrial Subdivision
   - Kohanaiki Business Park Subdivision
   - McClean Light Industrial Subdivision

3. Other Uses and Facilities. Other major land uses and public facilities situated within this study area are identified.
   - *Kaloko Honokohau National Historical Park.* This national park is owned by the Federal government, and encompasses a few large parcels of land totaling about 615 acres. This park is situated north of the boat harbor, and includes the property from the shoreline up to Queen Ka'ahumanu Highway. Existing facilities include a visitor's center and restroom facilities.
   - *Honokohau Small Boat Harbor.* This boat harbor is owned by the State of Hawai'i under the jurisdiction of the Division of Boating and Ocean Recreation of the State Department of Land and Natural Resources. This boat harbor serves as a recreational facility for the public and has 262 moorings, 3 launch ramps, and other accessory facilities.
   - *Kealakehe Wastewater Treatment Plant.* This treatment plant is owned and operated by the County of Hawai'i, and presently serves developments both within and outside of the study area. The property is owned by the State of Hawai'i.

## 2.2 MAJOR STAKEHOLDERS

Major stakeholders within the study area were identified because these entities have significant amounts of property that are affected by the planned North Kona Improvement District. Most of these properties are generally either undeveloped or partially developed, thus, their future development plans were used in developing the sewer master plan.

Major stakeholders are defined under this study as landowners or developers having a combined total of 10-acres or larger. Stakeholders also include both Federal and State governments who own larges properties along the coastline. Figure 3 graphically identifies them within the study area and a listing of these major stakeholders is provided in Table 1.




# EXISTING STAKEHOLDER MAP

**Figure 3**

*Sources: State Land Use Commission*
*County of Hawaii*
*Community Consultation*

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

**Table 1**
**Listing of Major Stakeholders**

| Major Stakeholders | TMK | Acres |
|---|---|---|
| HUALALAI VISTAS LLC | 373007027 | 5.5 |
| | 373007050 | 47.9 |
| THE SHORES AT KOHANAIKI – KOHANAIKI SHORES LLC | 373009003 | 442.3 |
| | 373009016 | 7.8 |
| | 373009018 | 92.9 |
| MC CLEAN HONOKOHAU PROPERTIES | 374024004 | 1.4 |
| | 374024007 | 3.4 |
| | 374024012 | 44.0 |
| KALOKO HEIGHTS - STANFORD CARR DEVELOPMENT | 373009019 | 193.9 |
| | 337300932 | 207.9 |
| LEE, DEAN K /ETAL | 373009013 | 144.5 |
| | 373009014 | 11.7 |
| TSA/MID CORP. | 373009017 | 224.4 |
| | 373009025 | 360.1 |
| | 373009026 | 194.3 |
| | 373009028 | 371.9 |
| | 373051060 | 102.3 |
| LANIHAU PROPERITES/PALANI RANCH CO. | 374008005 | 394.4 |
| | 374008013 | 314.4 |
| | 374008057 | 51.6 |
| | 374008060 | 89.9 |
| 327 KONA LLC | 374008047 | 327.3 |
| STATE OF HAWAI'I (JACOBY DEVELOPMENT) | 374008003 | 442.3 |
| | 374008071 | 218.5 |
| DEPARTMENT OF HAWAIIAN HOME LANDS (JACOBY DEVELOPMENT) | 374008072 | 200.0 |
| FEDERAL GOVERNMENT - KALOKO-HONOKOHAU NATIONAL HISTORIC PARK | 373009002 | 249.5 |
| | 373009021 | 72.1 |
| | 374008010 | 234.7 |
| | 374008025 | 59.2 |

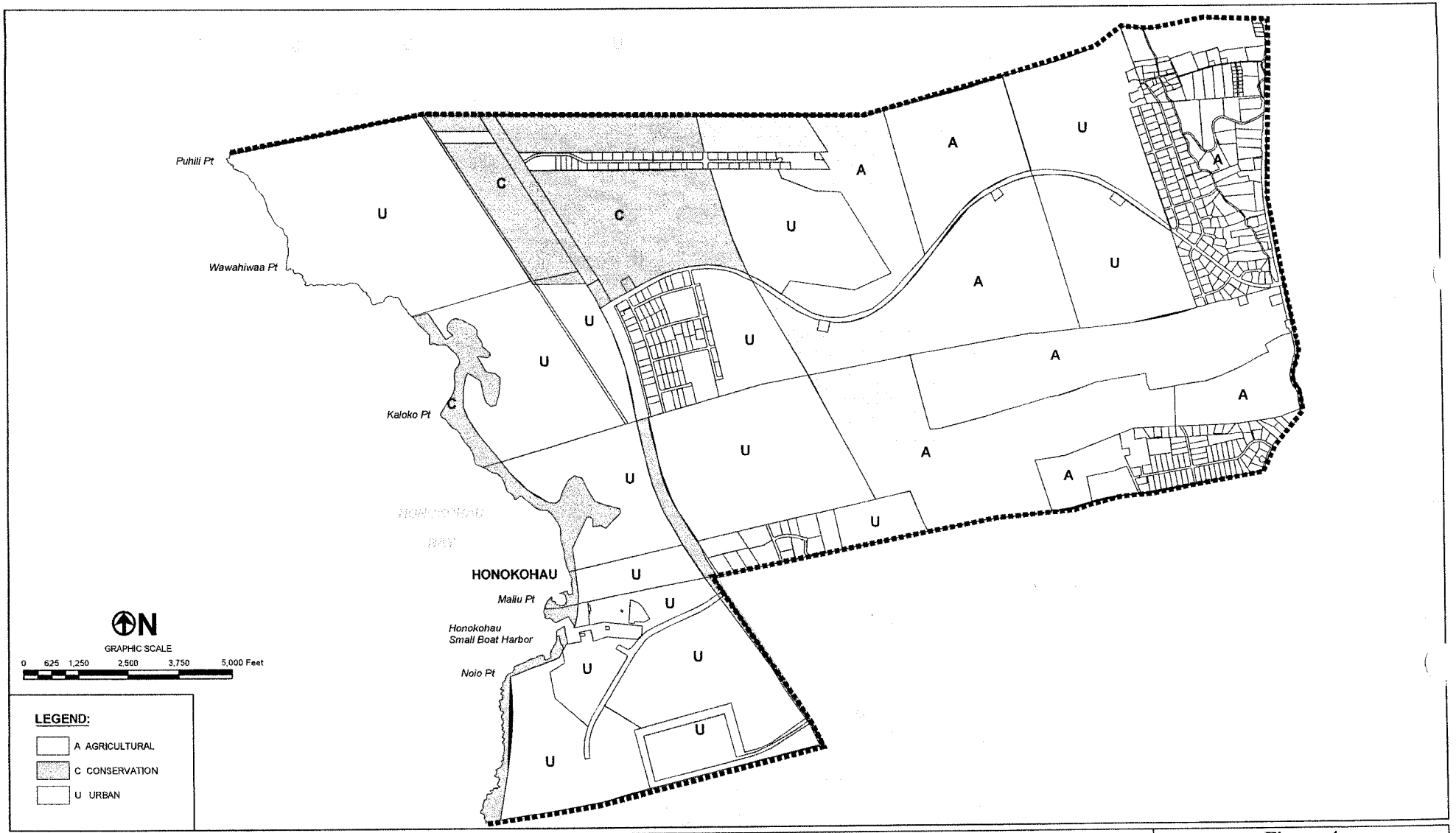
## 2.3 EXISTING LAND USE PLANS AND POLICIES

Information from available land use plans was reviewed to identify existing settlement patterns in the study area, and to assist with evaluating future development and settlement patterns.

**State Land Use District**

Under Chapter 205, HRS, all lands in the State of Hawai'i are classified into four major land use districts (State Land Use Districts): the Urban District, the Rural District, the Agricultural District, and the Conservation District. For each land use district classification, there are defined uses or activities permitted which are described under §205-2, HRS. The boundaries of these districts are shown on maps referred to as State Land Use District Boundary Maps. Figure 4 shows the current land use districts for properties within the study area, and some general comments are provided below:

1. Urban District. Activities or uses permitted within this District are established and regulated by ordinances or regulations of the County of Hawai'i.
   - The majority of parcels along Queen Ka'ahumanu Highway and the coastline are designated Urban District.
   - Most of these parcels are undeveloped, but are available for development under County zoning district.
   - Several large parcels are owned by the Federal government as part of the Kaloko Honokohau National Historical Park, and would thus essentially remain undeveloped.
2. Conservation District. Activities or uses permitted within this District are regulated by Section 13-5, Hawaii Administrative Rules (HAR) falling under the jurisdiction of State Department of Land and Natural Resources.
   - There are a few large parcels along Queen Ka'ahumanu Highway designated Conservation District. Other areas are situated along the coastline.
   - These parcels are undeveloped, and would require reclassification to another land use district along with other entitlements to permit development.
3. Agricultural District. Activities or uses permitted within this District are regulated by Title 15, Subtitle 3, Chapter 15, HAR falling under the jurisdiction of State Land Use Commission. The County of Hawaii can further define accessory agricultural uses and services by zoning ordinance.
   - Most of the mauka parcels within this study area up to Mamalahoa Highway are designated Agricultural District. With the exception of existing residential subdivisions, these parcels are presently undeveloped.
   - Development of these parcels is currently being planned by landowners which will require land use reclassification and other entitlements for permitted uses.




# STATE LAND USE DISTRICT MAP

**Figure 4**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source:*
*County of Hawaii Zoning Map (2005)*

## County of Hawai'i General Plan

The amended *County of Hawai'i General Plan* was recently completed and adopted via Ordinance 05-25 in February, 2005. The *General Plan* is a long-range, comprehensive, general plan prepared to guide the overall future development of the County.

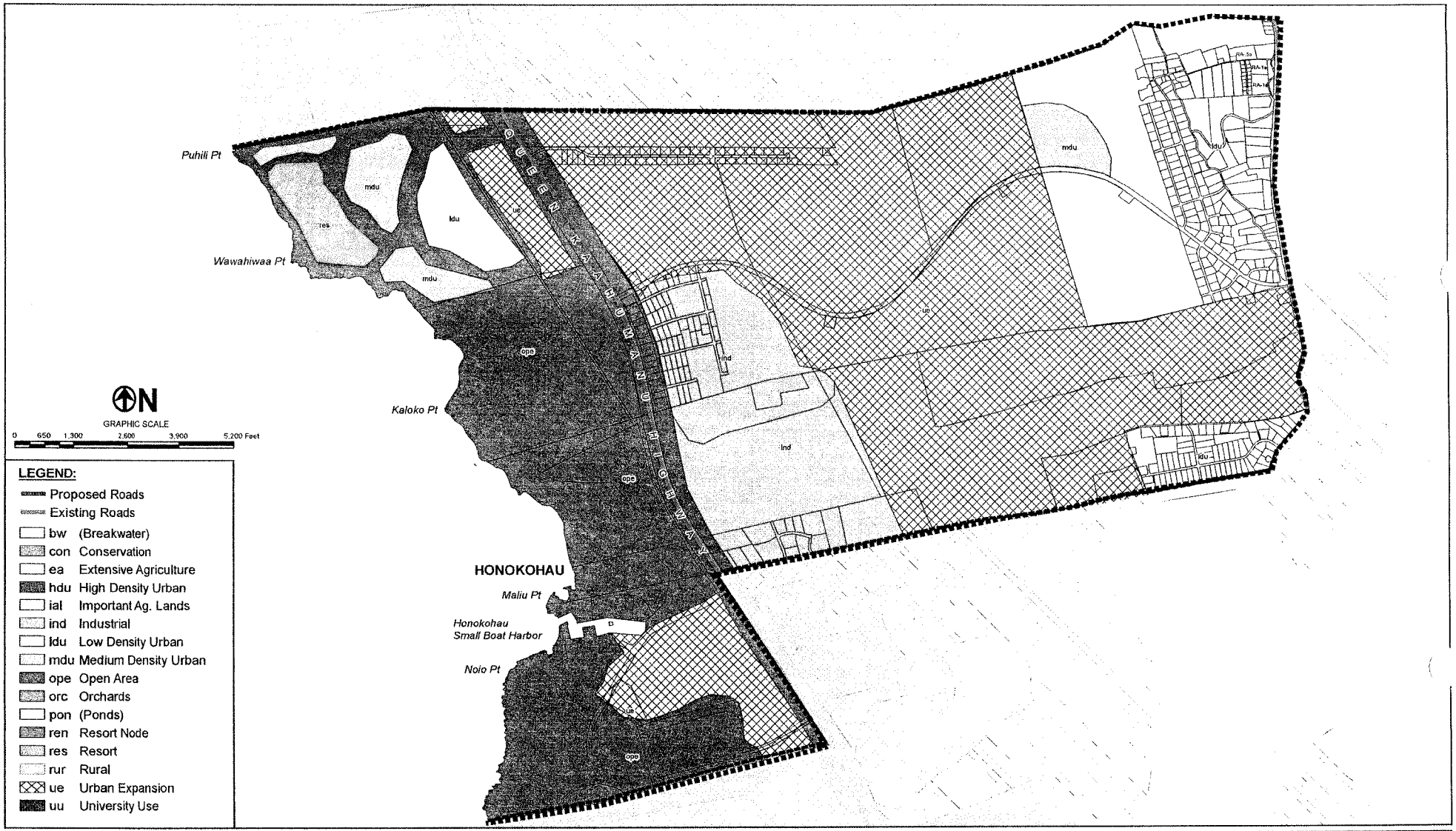
The *General Plan* Land Use Pattern Allocation Guide (LUPAG) Map is the plan that reflects long-range planning through land use designations. These designations are based upon the anticipated direction that each region is headed and are not necessarily consistent with existing county zoning. It is because of this long-range planning document that future land uses can be reasonably forecasted despite having different zone allocations.

Figure 5 shows this LUPAG land use designations within the sewer master plan study area. This map shows that all parcels not already designated for a specific land use has been designated as "Urban Expansion". As a result, the full development, or build out, of the study area has been planned for under the updated *General Plan.* Specific land uses for these urban expansion areas would need to be determined as part of the normal entitlement process.

## County of Hawai'i Zoning District

The County's zoning district maps identifies the current zoning districts for properties within the study area. Permitted uses and activities are set forth through provisions from Chapter 25, Zoning Code, Hawai'i County Code. Figure 6 shows the present zoning districts established for properties in the study area. Some general comments are provided below.

- Most of the properties makai (seaward) of Queen Ka'ahumanu Highway is zoned Open restricting more urban type developments.
  - The parcel owned by the State Department of Hawaiian Home Lands is not subject to County zoning district regulations, and is planned for development.
  - The Kohanaiki parcel planned for development under their approved Special Management Area Use Permit will not match the zoning districts identified.
- Many parcels situated mauka (inland) of Queen Ka'ahumanu Highway is zoned for industrial or mixed uses.
- The majority of property situated inland up to Mamalahoa Highway is still zoned for agricultural uses. Change of zoning will be required for these properties to allow for more intensive urban uses and activities.

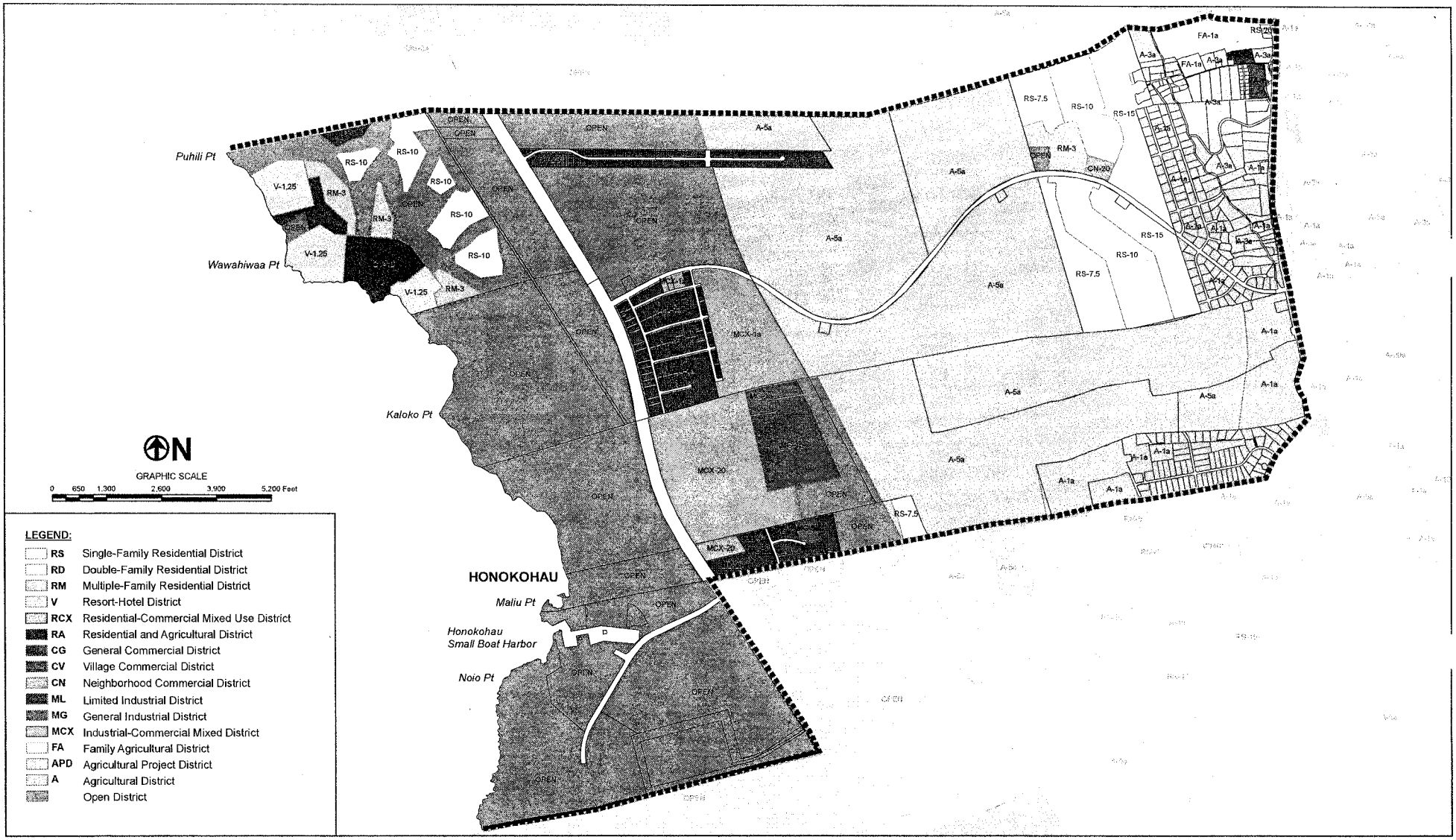



# COUNTY GENERAL PLAN LAND USE PATTERN ALLOCATION GUIDE MAP

**Figure 5**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source:*
*County of Hawaii Zoning Map (2005)*




# COUNTY OF HAWAII ZONING MAP

**Figure 6**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source:*
*County of Hawaii Zoning Map (2005)*

## 2.4 EXISTING WASTEWATER FACILITIES

Research was conducted to identify existing wastewater facilities in the study area. Such systems consist of private wastewater systems and the County's public sewer system which includes the wastewater treatment plant.

### Private Wastewater Systems

There are numerous individual wastewater systems (IWS) for the many developments (residential and commercial) present within the study area. These IWS consist primarily of septic tanks and leach fields, which are serving developments on privately-owned properties. The design and construction of these IWS are regulated by the Hawai'i Administrative Rules 11-62 which are enforced by the Department of Health – Wastewater Branch. For the purposes of this Sewer Master plan, the location/amount of these existing IWS were not factors considered.

### County Sewer Collection Systems

Most of the study area does not have an existing public sewer collection system. During the utility research process, it was discovered that "dry sewers" were installed in the Honokohau Business Park subdivision and the Kaloko Light Industrial Subdivision. These "dry sewers" were basically sewer mains installed per the County design standards with the intent of connecting them to a future sewer collection system. These "dry sewers" are capped and marked at each end of the sewer pipes.

There are existing sewer mains, which range from 10-inch diameter to 30-inch diameter, located to the south of the study area. These existing sewer mains are concentrated within the Villages of Laiopua, and gravity flow to the Kealakehe Wastewater Treatment Plant.

### County Wastewater Treatment Facility

At the southwestern corner of the study area and to the south of Honokohau Harbor is the existing Kealakehe Wastewater Treatment Plant (KWWTP). The following are excerpts of the "Keahole to Kailua Development Plan", prepared by the County of Hawai'i Planning Department in April 1991. The following excerpt describes the basis of the KWWTP construction and preface for the design of future improvements.

> *"The Kealakehe Sewage Treatment Plant serves both the northern zone and the southern zone of Kailua-Kona. The Keahole to Kailua Development Plan area was included in the tributary area of the northern zone with the exception of the extreme north end of the study area, an area of approximately 2,400 acres. This area will be tributary to sewage treatment plant No. 2 and does not affect the capacity of the Kealakehe Sewage Treatment Plant. The Kalaoa subarea is also tributary to STP No. 2. The upper Keopu subarea is not expected to be sewer in the first 20 years.*

*Flow projections for the Kealakehe STP for both the northern and southern zones are given in Table 4.7 (source: Kailua-Kona Facility Plan Southern Zone, June 1981). Required capacity of the plant as submitted to EPA is 2.80 mgd average flow for the 20-year design period and 5.82 mgd for the 40-year design period. The treatment plan is designed for a capacity 2.80 mgd average flow for the 20-year design and 7.82 mgd average flow for the 40-year design. The Keahole-Kailua Development Plan when fully implemented by the year 2010 (20 years) will contribute 4.92 mgd average flow. The projected flow from the southern zone in the year 2010 is 1.29 mgd. The total required capacity of STP No. 1 is 6.21 mgd average flow which is within the 7.82 mgd planned capacity of the plant."*

## Previous Sewer Studies

Previous sewer studies completed for this area were reviewed. This section provides a brief description of these previous study which were used in developing the master plan.

In July of 1990, R.M. Towill Corporation completed the *Amendment to the Revised Environmental Impact Statement for the Kailua-Kona Sewerage System Phase IV (Northern Zone)* for the County Department of Public Works. The purpose of this amendment was to address the impacts of effluent disposal by land irrigation compared with disposal by ocean outfall. Due to the environmental significance of Class AA offshore waters and the anticipated increase of reclaimed water demand, the ocean outfall concept for disposal was abandoned.

In August of 1994, Belt Collins Hawai'i completed the *Villages of La`iopua Planned Community, Sewer System Master Plan* for the Housing Finance and Development Corporation, State of Hawai'i. The purpose of this master plan was to update the plan completed in 1981 by R.M. Towill Corporation for sizing of the County of Hawai'i's Kealakehe Wastewater Treatment Plant. This report, in accordance with the Keahole to Kailua Development (K to K) Plan, incorporated flows from adjacent private parcels.

In February of 1999, Brown and Caldwell completed the *Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan* for the County Department of Public Works. The purpose of this report was to expand upon the earlier ideas for reuse. The master plan's objectives were to: estimate reuse demand, demand timing, and water quality requirements of potential users; evaluate the existing WWTP effluent quality to determine acceptability for reuse; develop design criteria for filtration and ultraviolet disinfection treatment facilities to meet Department of Health R-1 reclaimed water standards; develop design data for transmission system and storage facilities to serve potential users; and develop recommended phasing of treatment, transmission system and storage facilities.

# CHAPTER 3
# FUTURE LAND USE AND PROJECTED WASTEWATER

This chapter discusses the future land use assumptions for the year 2025 that were used in developing projected wastewater flows and loads.

## 3.1 FUTURE LAND USE ESTIMATES

Future land uses within the study area were estimated based upon: 1) research of existing available references, entitlements, and studies, and 2) consultation with major stakeholders identified. The availability of wastewater data was limited due to the vast amount of undeveloped lands in the study area. Therefore, extensive research of available files and documents to identify future land uses and development plans was conducted through various State and County agencies along with private resources. Based upon the available information obtained, estimates were developed for future land uses for properties within the study area along with timeframes for their completion.

**Major Stakeholder Consultation Efforts**

Consultation efforts with stakeholders were a significant element in determining the future wastewater needs associated with the undeveloped parcels in the study area. The initial phase of consultation efforts identified major stakeholders to be included in the consultation process. Only the major land owners with parcels over 10 acres have been solicited for land use information. Consultation efforts included the following:

- An information package was created and mailed out to consult stakeholders regarding their future development plans and wastewater needs.
  - Survey packages were sent to the major stakeholders on December 19, 2005.
  - Packages included a cover letter with a description of the improvement district, survey form, location map, and copy of County of Hawai'i Resolution 129 03.
  - Only one (1) completed survey was returned by the requested deadline. Six (6) more surveys were received after the initial deadline.
- Phone calls were made to major stakeholders who did not return completed surveys to remind them and ask for their cooperation.
- A follow up survey package was sent to all major stakeholders not yet responding.
  - These were sent out on February 15, 2006 to six (6) major stakeholders.
  - Since then three (3) additional survey responses have been received.
  - No responses have yet been received from three (3) stakeholders.

## Future Land Uses

Based upon the information received and researched, future land uses were estimated. It should be noted that several of the stakeholders did not have any information or future development plans available. Other stakeholders had general development plans for their properties, but were still early in their processes.

Timeframes for future development phasing were estimated using information provided by major stakeholders or available land use references. Consequently, several of the developments would occur over several phases and many still needed to obtain discretionary entitlements for their properties before proceeding. Appendix B includes a table listing the major stakeholders correlating future and existing land use information gathered. Figure 7 graphically shows the estimated land use patterns for this study area.

## Descriptions of Future Land Use Designations

The following descriptions correlate to the land use designations shown on Figure 7. Each designation has been generalized to include either specific land uses or groupings encumbering numerous uses. Each description below also includes future likely County of Hawai'i zoning district designations associated with the land use designations. Therefore, the land uses represented on Figure 7 are not official zoning district map designations, but are intended to only serve as a guide to establish land use information used to predict future wastewater projections.

***Low Density Residential:*** These areas have been identified for future single family residences involving the subdivision of land or similar land development. Anticipated County Zoning includes RS, FA or A.

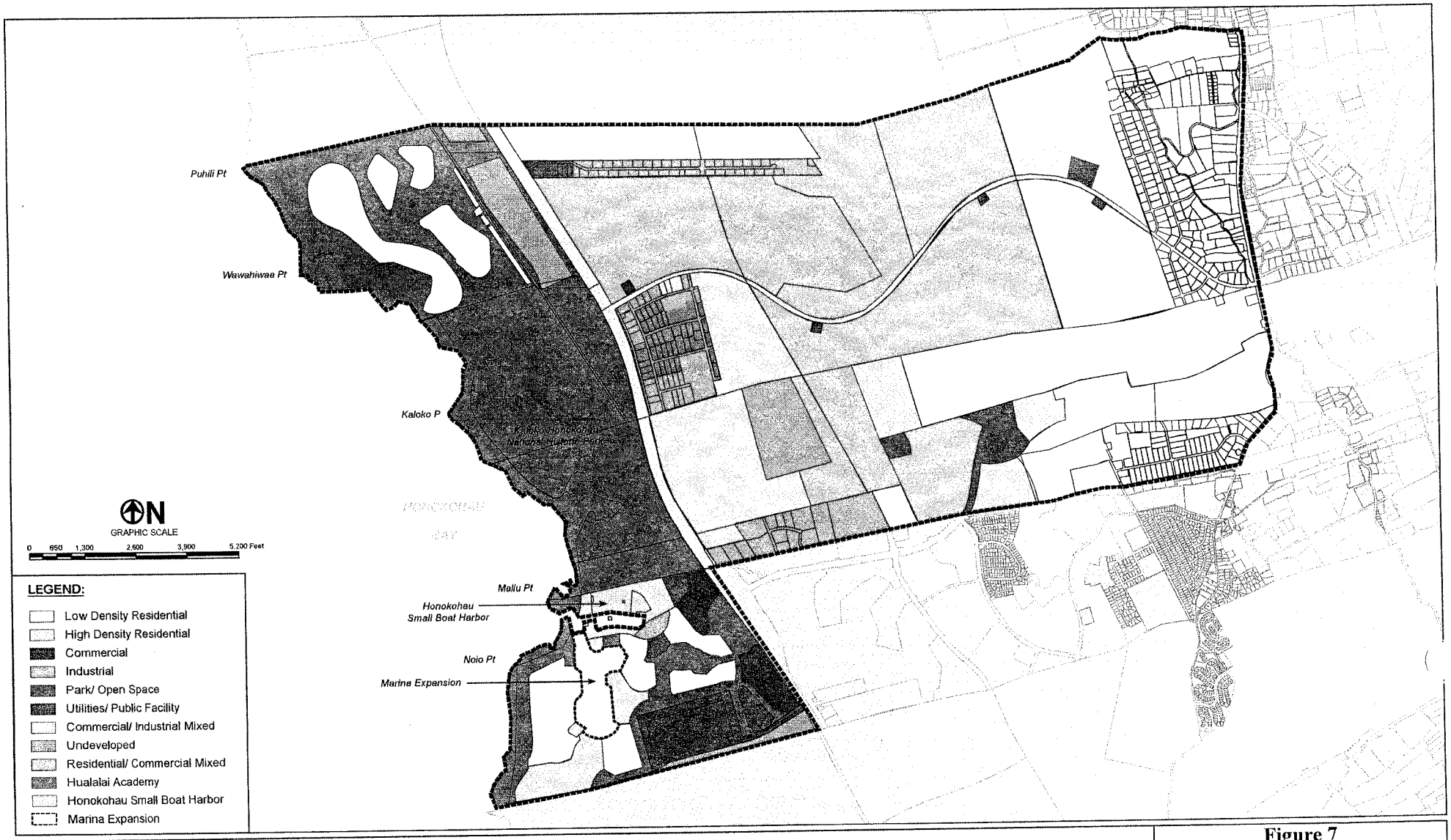
***High Density Residential:*** Includes areas designated for higher residential densities. Anticipated County Zoning include RM.

***Commercial:*** Reserved for commercial uses, anticipated County Zoning includes CN, CG, and CV.

***Industrial:*** Intended for industrial uses, anticipated County Zoning includes ML and MG.

***Park/ Open Space:*** These areas will be reserved for uses such as park and open space, areas. These sites will remain undeveloped and will not generate wastewater. Anticipated County Zoning includes O.

***Utilities/ Public Facility:*** These areas include the Kealakehe Wastewater Treatment Plant and other public facilities or utilities. Also included in this designation are future public parking areas in the Honokohau Harbor expansion areas. Anticipated County Zoning includes possible O, A, R, C and M designations.




## 2025 FUTURE LAND USE MAP

**Figure 7**

*Sources: State Land Use Commission*
*County of Hawaii*
*Community Consultation*

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

| | |
|---|---|
| ***Commercial/ Industrial Mixed:*** | Intended for future areas incorporating mixes of commercial and industrial uses. Anticipated County Zoning includes MCX. |
| ***Undeveloped:*** | These lands are anticipated to remain undeveloped thru our study year and beyond. Anticipated County Zoning includes O. |
| ***Residential/ Commercial Mixed:*** | These areas intended for mixed residential and commercial uses. Anticipated County Zoning includes RCX. |
| ***Hualalai Academy:*** | Private School as depicted on Figure 7. |
| ***Honokohau Small Boat Harbor:*** | The existing Honokohau Small Boat Harbor as shown on Figure 7. |
| ***Marina Expansion:*** | Future expansion of the small boat harbor. |

## 3.2 FUTURE PROJECTED WASTEWATER FLOWS AND LOADS

This section discusses how the future wastewater flows generated from the proposed study area were estimated. County of Hawai'i DEM currently references the City and County of Honolulu (C&C) Wastewater Design Standards (1993) (henceforth referred to as C&C Standards). Therefore, the projected wastewater flows were based upon the C&C Standards. These standards recommend that the new sewer systems should be designed for the ultimate tributary equivalent population, except for systems that can be readily increased in capacity.

**Wastewater Flow Generation Methodology**

The amount of wastewater generated from each parcel depends on many factors including; usage of sewer connections (i.e., domestic, industrial, etc), entitled/proposed developments, existing domestic water consumption, groundwater conditions, and lifestyle. Each parcel within the study area was researched and categorized into one of the following land uses and its associated capita per acre (cpa) values. These CPA values were obtained from the C&C Wastewater Design Standards, and are based on the average per capita flow of wastewater of 80 gallons per day (gpd).

Standard CPA Values

Residential (4 persons/home, 2.8 persons per apartment unit)

Central business (300 cpa)

Community Business (140 cpa)

Neighborhood Business (40 cpa)

Resort (400 cpa)

Apartment (high density 390 cpa, medium density 250 cpa and low density 85 cpa)

General Industry (100 cpa)

Waterfront Industry (40 cpa)

School (25 gpcd)

Institution (200 gpcd)

Industrial CPA Values

The assignment of CPA values for parcels with the County zonings of MCX (Industrial-Commercial), ML (Limited Industrial) and MG (General Industrial) were more challenging. As listed above, there were no obvious categories for these industrial zoned parcels. Therefore, as stated in the C&C Wastewater Design Standards, the average daily flows from these industrial parcels were analyzed and based on land use or best available data, whichever is higher.

To determine appropriate CPA values for the MCX, ML, and MG zoned parcels, domestic water consumption records were acquired from the County Department of Water Supply for the existing industrial-zoned parcels within the study area. From there, the current CPA values were estimated by dividing the average monthly water consumption (gpd) by usable acreage of each parcel and then divided by the average daily water use of 80 gallons per day per capita. This analysis estimated the following CPA values for the MCX, ML, and MG zoned parcels.

| | |
|---|---|
| MCX zoning | ~ 100 cpa (similar to General Industry) |
| ML zoning | ~ 40 cpa (similar to Waterfront Industry) |
| MG zoning | ~ 100 cpa (similar to General Industry) |

Other CPA Values

As previously mentioned, there were several TMK parcels, identified as 3-7-009:013, 014, 017, and 018 which were zoned "OPEN" but did not have any existing or planned entitlements within the 20-year study period. Questionnaires and interviews with the current landowners did not produce any useful development plans. However, these parcels could theoretically sustain various types of developments in the future.

As a result, some flow volumes were needed in developing a Total Build-Out scenario for this sewer master plan. Therefore, some assumptions were needed on the wastewater projections from these four parcels for the "Total Build-Out" year in order to account for possible development near the tail end of the 20-year study period and to aid in the sizing of the lift station and force main currently under design by Kohanaiki/Rutter Development.

Thus, it was assumed that these four parcels could be developed in a similar manner to the proposed development of Kaloko Heights owned by Stanford Carr Development, LLC. The Kaloko Heights development will have mixed commercial and/or industrial uses. Thus, extrapolated land use information obtained for the Kaloko Heights development was used to

calculate an approximate CPA value of 20. Therefore, the 20 CPA assumption was used for these four undeveloped parcels for the wastewater projections.

## Summary of CPA Values

Therefore, the following capita per acre values were used for the wastewater flow generation calculations (unless capita per acre values from more detailed plans were obtained from landowners).

**Table 2**
**Summary of CPA Values**

| County of Hawai'i Zoning | County of Hawaii Zoning Definition | Applied capita per acre (cpa) |
|---|---|---|
| RS | Single-Family residential | 4 person/home or parcel |
| RM | Multiple-Family residential | 4 person/home or parcel |
| RCX | Residential-commercial mixed use | 4 person/home or parcel |
| RA | Residential and agricultural | 4 person/home or parcel |
| FA | Family agricultural | 4 person/home or parcel |
| A | Agricultural | 4 person/home or parcel |
| V | Resort-hotel | 400 |
| CN | Neighborhood commercial | 40 |
| CG | General commercial | 100 |
| CV | Village commercial | 40 |
| MCX | Industrial-commercial mixed use | 100 |
| ML | Limited industrial | 40 |
| MG | General industrial | 100 |
| O | Open | 20-400 |

## Future Wastewater Flows

The following future wastewater flows were projected: 1) design average flow; 2) design maximum flow; and 3) design peak flow.

### Design Average Flow

The Design Average Flow is the flow expected on an average day if it were evenly spread over a 24-hour period. This flow includes the Average Wastewater Flow and the applicable dry weather infiltration and inflow. It is assumed that the entire study area collection system will be above the normal groundwater table. Therefore, the applicable dry weather infiltration/inflow (I/I) rate for sewers above the normal ground water table should be 5 gallons per capita per day (gpcd).

The Average Wastewater Flow was calculated based upon the C&C Wastewater Design Standards. The majority of the area is undeveloped and it is anticipated that future developments will require considerable road infrastructure improvements. Therefore the CPA values were applied to an adjusted acreage. The adjusted acreage provided a 20 percent allowance for uninhabited/unoccupied uses such as roads, easements, etc.

Design Maximum Flow

The Design Maximum Flow is the highest flow anticipated at any time during an average day. Daily peaks occur because the timing of wastewater generation depends on the timing and type of water uses that take place. Domestic users tend to have high morning peak with a lower evening peak corresponding to bathing, food preparation, dishwashing, and clothes washing trends. Industrial users, on the other hand, tend to use water on a more consistent basis with much more subdued daily peaks.

The Design Maximum Flow is the sum of the maximum wastewater flow and the applicable dry weather infiltration and inflow. Per the City & County of Honolulu Wastewater Standards, the maximum wastewater flow is obtained by multiplying the average flow by a flow factor. Figure 22.2.4 from the C&C Wastewater Standards was used to obtain the flow factors, which is referred to as the Babbit Curve. The Babbit Curve essentially provides a peaking factor based upon the average rate of dry weather flow (i.e., the smaller the flow, the higher the peaking factor). The peaking factor used was 5.0.

Infiltration/Inflow

The dry and wet weather infiltration/inflow rates were calculated for the study area and included in the Design Peak Flow. Infiltration/Inflow is the surface (inflow) and ground water (infiltration) which leaks into a sewer through joints, manhole covers, or breaks. This calculation assumed that the entire study area was sewered with the new sewer mains above the normal ground water table. It was also assumed that there would be minimal wet weather infiltration/inflow from the National Parks properties since there will be very limited future development on these parcels.

The applicable dry weather infiltration/inflow (I/I) rate for sewers above the normal ground water table is 5 gallons per capita per day (gpcd) and the wet weather infiltration/inflow rate for sewers laid below the normal ground water table is 35 gpcd. The wet weather infiltration/inflow rate for sewers laid above the normal ground water table is 1250 gallons per acre per day (gad) and the Infiltration/Inflow rate for sewers laid below the normal ground water table is 2750 gad.

Design Peak Flow

The Design Peak Flow, also known as the peak wet weather flow, is the highest flow anticipated any time during a major rainfall event. Wet weather peaks occur in any collection system, although proper design, construction, and maintenance can help minimize the peaks.

Per the City & County of Honolulu Wastewater Standards, the Design Peak Flow is the sum of the Design Maximum flow and the Wet Weather Infiltration/Inflow rates.

Future Wastewater Flow Summary

The following Table 3 summarizes the estimated future Design Average Flow, Design Maximum Flow, and Design Peak Flow for the study area for the years 2015, 2020, 2025, and Total Build-Out. These future flows are based on the current land uses, current entitlements, future entitlements for each parcel, assumptions previously mentioned, and the various developer and government planning policies for the region. The following flow projections would be subject to change based on these factors and many other macroeconomic factors.

**Table 3**
**Estimated Wastewater Flow Summary**

| Build-Out Year | Average Daily Flow (mgd) | Maximum Daily Flow (mgd) | Design Maximum Flow (mgd) | Peak Wet Weather Flow (mgd) |
|---|---|---|---|---|
| 2015 | 9.02 | 25.41 | 25.97 | 42.04 |
| 2020 | 10.57 | 31.41 | 32.07 | 48.13 |
| 2025 | 12.05 | 36.57 | 37.32 | 53.38 |
| Total Build-Out | 13.85 | 44.01 | 44.88 | 60.95 |

[1]Current flows represents a hypothetical scenario if the entire study area was to be sewered and connected to the Kealakehe WWTP in the year 2005.

Appendix C includes a figure showing the estimated average daily flows and peak wet weather flows for the entire study area which are based upon the Build-Out Year phasing estimates. These flows were also calculated for the Total Build-Out Year in addition to the other increment years.

On this figure, there are certain parcels which show no (0) wastewater flows. The reason these parcels show no wastewater flows is because these parcels did not indicate any future development within the corresponding study timeframe.

# CHAPTER 4
# COLLECTION SEWER ALTERNATIVES

This chapter discusses establishment of the preferred sewer master plan and previous sewer alternatives based upon the projected wastewater flows and loads.

## 4.1 ALTERNATIVES DEVELOPMENT

In order to facilitate the analysis of the collection system alternatives, the study area was geographically divided into four reasonable zones which are graphically shown on Figure 8.

The first zone, Zone 1, generally encompasses the parcels situated between the ocean and Kamanu Street. Zone 1 also includes the TMK parcels 7-4-008: 003, 7-4-008: 071, 7-4-008: 072 (DHHL/DLNR), 7-4-008: 058 (Kealakehe WWTP), etc.

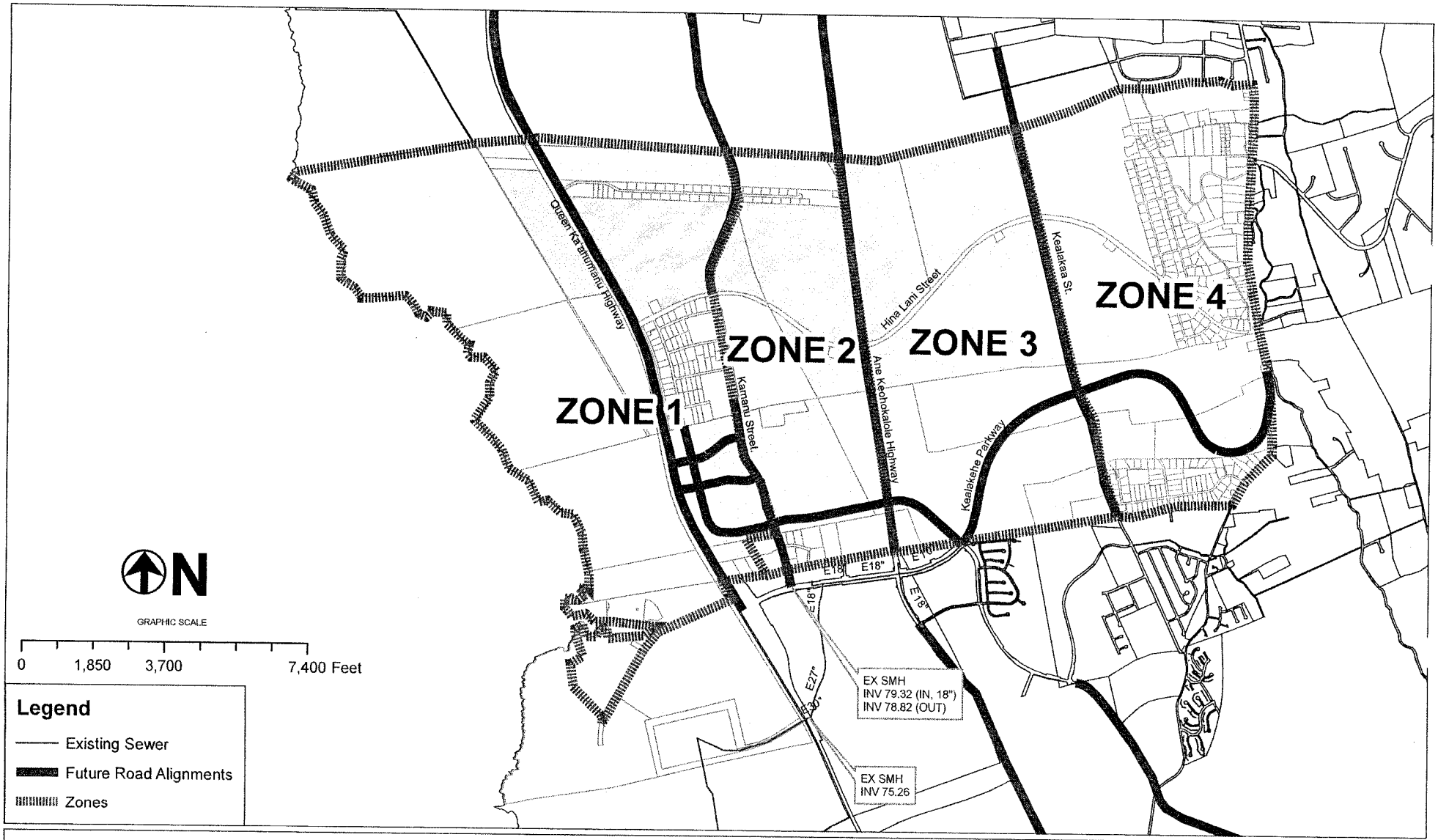
The second zone, Zone 2, generally includes the parcels between Kamanu Street and the future Ane Keohokalole Highway (also known as the Middle Road). The third zone, Zone 3, is generally comprised of the parcels between the future Ane Keohokalole Highway and the future Kealakaa Street. The fourth zone, Zone 4, consists of the parcels between the future Kealakaa Street and the existing Mamalahoa Highway (upper highway). Appendix D includes a summary of future sewer loads for estimated each zone within the project area.

**Criteria for Selection of Preferred Collection Sewer System**

The type of collection system that is most appropriate for the study area depends on many different factors ranging from geographic characteristics of the study area, economic considerations, and community views. The following criteria are the most important factors considered when evaluating the collection system alternatives:

1. Existing topography. Generally, the study area slopes down from east (mauka) to west (makai). The preferred sewer alternatives will be gravity sewer lines.

2. Alternate Sewer Collection Technologies. Research was completed on other sewer collection technologies such as low-pressure collection systems. The low-pressure system would require additional grinder pumps on each private parcel which would grind and pump wastewater to a County-owned low-pressure collection line. This alternate technology was not foreseen as a favorable option for the existing community because of additional private costs and maintenance. In addition, the general topography of the study area favors a gravity sewer from the mauka to the makai regions and then typical sewer lift stations on the makai portion to force the wastewater to KWWTP.




**GEOGRAPHIC WASTEWATER SYSTEM COLLECTION ZONES**

**Figure 8**

*North Kona Improvement District Project*
*County of Hawaii, Department of Environmental Management*

*Source: SSFM International Inc.*

3. Expected growth patterns of the study area. See Appendix B for detailed information on the expected build-out patterns for the study area. The preferred sewer alternatives will attempt to collect wastewater from the all the parcels within the study area.

4. Future roads. Per the County of Hawai'i, Planning Department, there are several future roads or road extensions planned in the study area. Thus, preferred sewer routes are within the proposed future roads and County-owned rights-of-way. See the Alternative alignment figures for the locations of the future roads. Since these are future planned roads and are subject to change, the proposed sewer routes are tentative and also subject to change. The unforeseen discoveries of subsurface lava tubes or archaeological sites could also significantly impact the alignments of these future roads and the future sewer alignments.

5. Land acquisition. The County may need to acquire private land or obtain new utility easements in order to collect the wastewater. The preferred sewer alignments will minimize the need for land acquisition or new utility easements.

6. Sewer infrastructure by others (i.e. Kohanaiki Development, etc.). The preferred sewer alternative will aim to take advantage of the sewer infrastructure being proposed by other developers. Rutter/Kohanaiki Development, which is proposing to construct at their cost, a private lift station on its property, a gravity sewer and sewer force main along Queen Kaahumanu Highway, another County-owned lift station near the Honokohau Boat Harbor entrance, and another sewer force main to connect to KWWTP. Rutter/Kohanaiki Development is also planning to construct a recycled water transmission line from the KWWTP back to the Kohanaiki development for the irrigation of the resort's golf courses (Kohanaiki/Rutter Off-Site sewer infrastructure plans dated January 6, 2006).

7. Initial construction costs. Initial construction cost is a major factor in identifying the preferred sewer alignment. The initial construction costs are to be determined.

8. Future costs of operating and maintenance (O&M). The approximate future costs for operations and maintenance are also included in the evaluation process for the preferred alignment. The County DEM's goal is to limit the amount of future O&M costs because these costs will be affected by future O&M budgets and manpower allocations. The future operating and maintenance costs are to be determined.

9. Other items. It is assumed that the Kealakehe Wastewater Treatment Plant can accept and treat all of the projected wastewater generated from the study area. It is assumed that the projected wastewater will not have to be conveyed to another future wastewater treatment plant.

## 4.2 PRESENTATION OF COLLECTION SYSTEM ALTERNATIVES

The following sections present the preferred method of sewer collection and each proposed sewer alternatives developed for this study area. Table 4 compares each of these alternatives based upon the factors discussed.

### 4.2.1 Preliminary Collection System Alternatives

Three (3) preliminary sewer collection systems were initially developed and presented to the public through a public informational meeting held in the Kona area on June 6, 2006. Several assumptions had to be made in the development of the collection system alternatives. These assumptions are listed below.

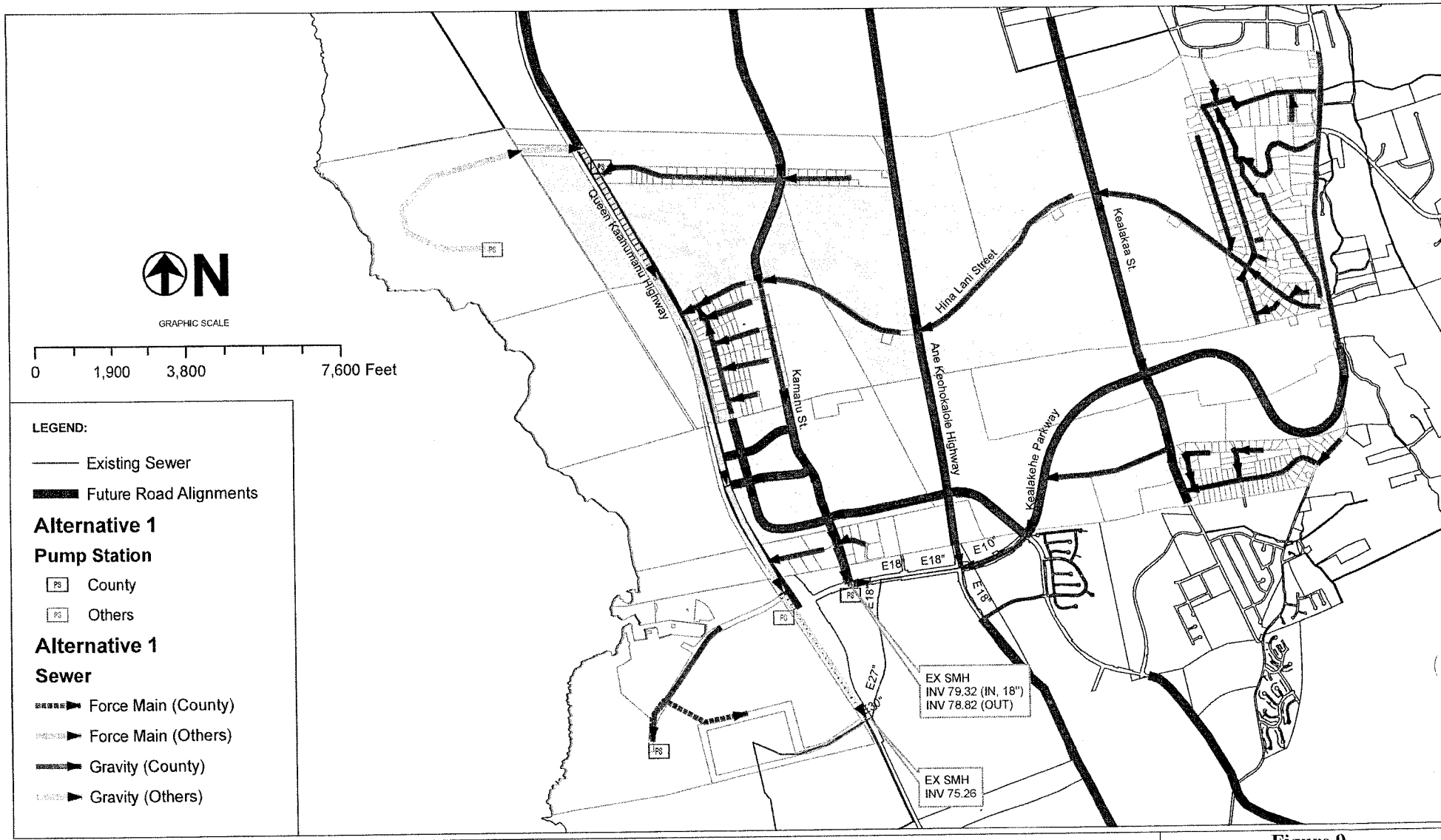
1. Proposed sewer lines from the smaller parcels on the mauka (inland) side of the study area were removed from the master plan. These smaller parcels are residentially zoned and many already have existing individual cesspools or septic tanks.
2. A sewer line along the future Kealaka'a Street, north of Hina Lani, was removed because this portion of sewer line would not collect any wastewater flow from the study area.
3. A sewer line at the mauka end of the Kealakehe Parkway Extension was removed because this portion of sewer line would not collect any wastewater flow from the study area.

**Alternative 1 – Kamanu Lift**

Alternative 1 is shown on Figure 9 and uses Kamanu, Ane Keohokalole Highway, and Kealaka'a Streets as collection sewer mains which would gravity flow in a southerly direction. At the south end of the study area the collection mains from Ane Keohokalole Highway and Kealaka'a would connect into the existing sewer main along Kealakehe Parkway. The collection sewer main along Kamanu Street would gravity flow to the south and at the south end of the study area the wastewater would be pumped mauka into the existing sewer system in Kealakehe Parkway.

The wastewater from the areas between the ocean and Kamanu Street would primarily be carried by gravity flow into the sewer system along Queen Kaahumanu Highway. This is the system being developed by the Kohanaiki/Rutter Development. The gravity sewer in Queen Kaahumanu Highway would continue to approximately the Queen K and Honokohau Boat Harbor intersection. From there the wastewater would be pumped to the KWWTP.

This alternative also includes a gravity main along the Honokohau Boat Harbor Road. At the makai end of that road a pump station will be needed to force the wastewater collected from the surrounding parcels into the KWWTP.




**ALTERNATIVE 1**

**Figure 9**

*North Kona Improvement District Project*
*County of Hawaii, Environmental Management*

*Source:*
*SSFM International, Inc.*

## Alternative 2 – Kamanu Gravity

Alternative 2 is shown on Figure 10 and is similar to Alternative 1. However, the main difference is at the south end of Kamanu Street where the sewer main would gravity flow across TMK parcel 7-4-020: 007 which is currently owned by the State of Hawai'i. Therefore, a new utility easement across this parcel would need to be obtained. Initial discussions with the State of Hawai'i, Department of Land and Natural Resources and the County of Hawai'i indicated that a new easement would be possible given the benefit to the public is substantial.

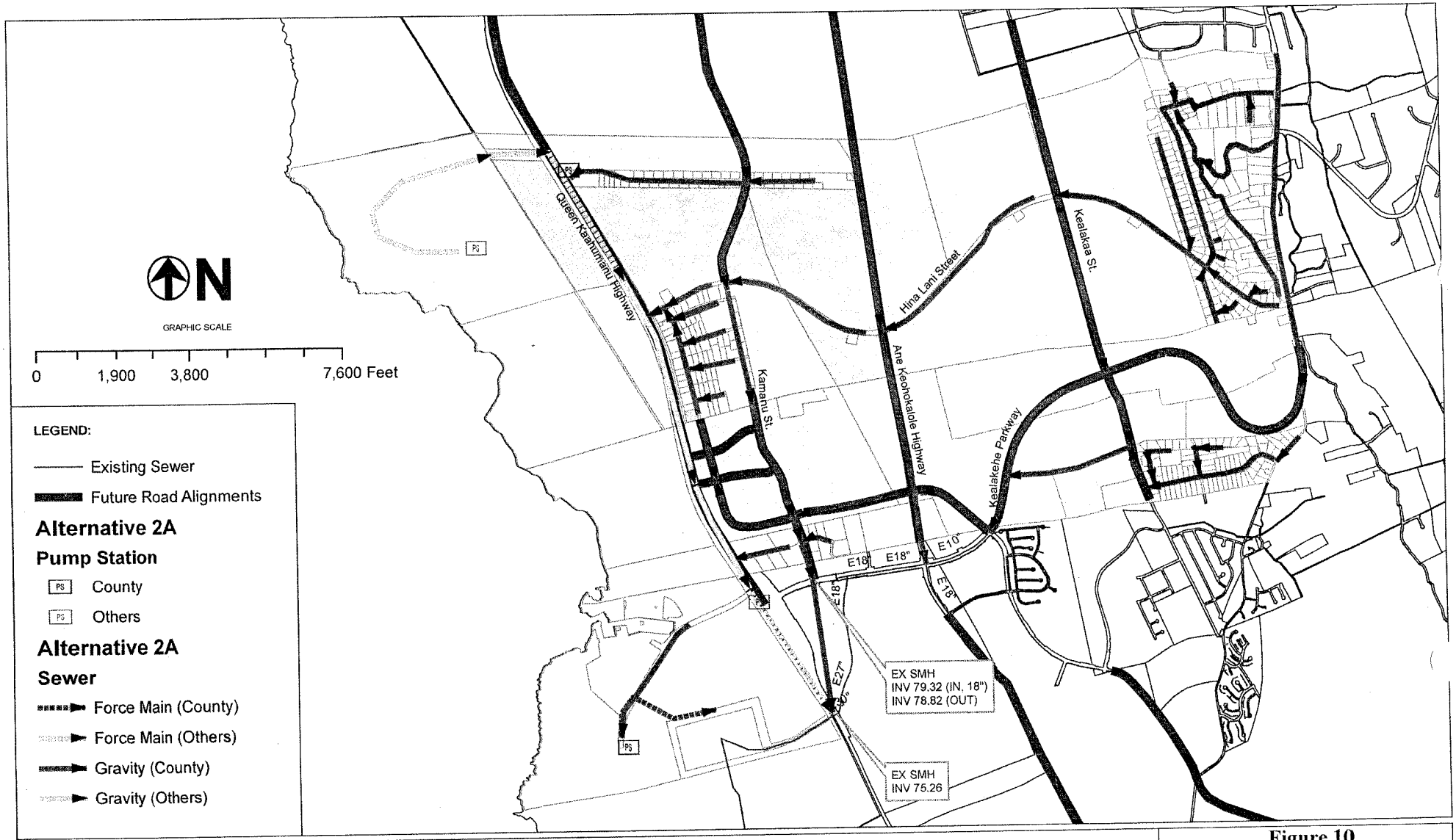
## Alternative 3 – National Parks

Alternative 3 is shown on Figure 11 and is similar to Alternative 1. The main difference is from the Hina Lani Street and Queen Kaahumanu Highway intersection where the sewer alignment would run through the National Parks property in a southern direction to the KWWTP.

This alignment is similar to that proposed in the Keahole to Kailua Development Plan (1991). A new utility easement across the National Parks property would need to be obtained. No initial discussions have been initiated with the National Parks for a new easement. In addition, at the south end of Kamanu Street, the sewer would flow makai and into the gravity main along Queen Kaahumanu. The wastewater would then be pumped to the KWWTP.

**Table 4**
**Comparison of Sewer Alternatives**

| | Alternative 1 – Kamanu Lift | Alternative 2 – Kamanu Gravity | Alternative 3 – National Parks |
|---|---|---|---|
| Approximate Length (lineal feet) of New Gravity Sewers | 120,280 | 123,690 | 129,980 |
| Approximate Length (lineal feet) of New Sewer Force mains | 11,210 | 10,560 | 10,560 |
| Number of Proposed County-Owned Lift Stations | 3 (sizes TBD) | 2 (sizes TBD) | 2 (sizes TBD) |
| Approximate area (acres) of New Utility Easements | None | 1.16 (assume 15' wide easement) | 2.83 (assume 15' wide easement) |
| Approximate area (acres) Land Acquisition (for pump stations) | TBD | TBD | TBD |
| Approximate Initial Construction Cost | $46,300,000 | $47,200,000 | $49,400,000 |
| Approximate Future Operations and Maintenance Costs (over 20-year lifecycle) | TBD | TBD | TBD |
| Does Alternative Service all of the NKID study area? | Yes | Yes | Yes |
| Is there a strong community opposition to this alternative? | No | No | No |

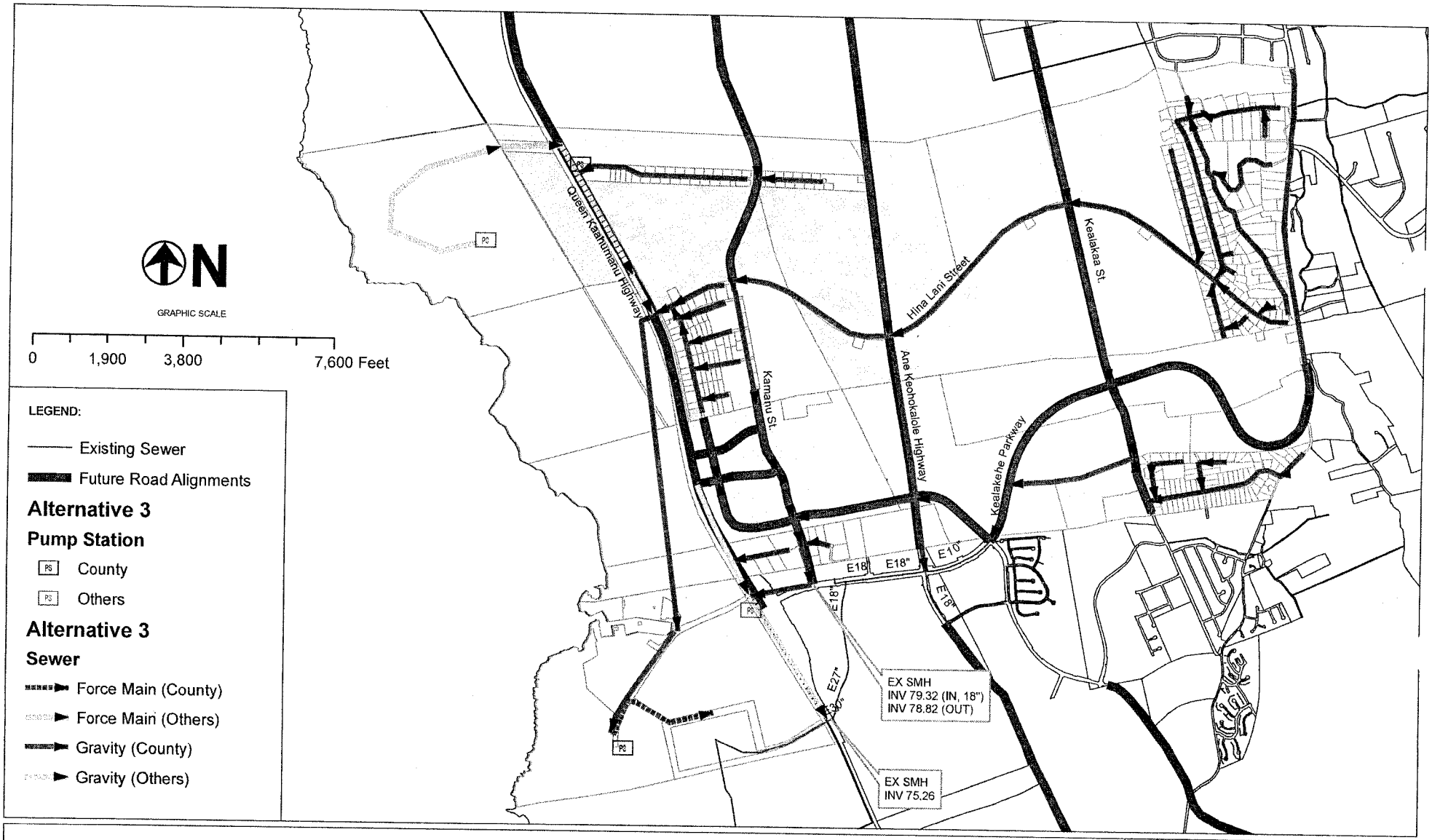



**ALTERNATIVE 2**

**Figure 10**

*Source: SSFM International, Inc.*

*North Kona Improvement District Project*
*County of Hawaii, Environmental Management*




**ALTERNATIVE 3**

**Figure 11**

*North Kona Improvement District Project*
*County of Hawaii, Environmental Management*

*Source:*
*SSFM International, Inc.*

## Analysis of Collection System Alternatives

A summary of the pros and cons of each preliminary sewer collection system alternative is provided below.

Alternative 1 – Kamanu Lift:

- Pros
  - Primarily uses gravity flow sewers
  - Sewer mains are aligned along existing or proposed County road rights-of-way.
  - No new utility easements anticipated.
  - Less future Operations/Maintenance Costs
- Cons
  - Approximately three new County-owned and operated lift stations, which will likely require some land acquisition
  - Additional future Operations/Maintenance Costs

Alternative 2 – Kamanu Gravity:

- Pros
  - Primarily uses gravity flow sewers
  - Sewer mains are generally aligned along existing or proposed road rights-of-way.
  - Less number of County-owned and operated lift stations (2)
  - Less future Operations/Maintenance Costs
- Cons
  - Additional future Operations/Maintenance Costs
  - New utility easements anticipated
  - Some land acquisition will likely be required for the lift stations.

Alternative 3 – National Parks

- Pros
  - Primarily uses gravity flow sewers
  - Sewer mains are generally aligned along existing or proposed road rights-of-way.
  - Less number of County-owned and operated lift stations (2)
- Cons
  - Additional future Operations/Maintenance Costs
  - Some land acquisition will likely be required for the lift stations.
  - New utility easements across U.S.A. Government lands anticipated

Alternative 1 was not preferred because that option had the most proposed County-owned lift stations. Alternative 3 was not preferred because of the proposed easement crossing the U.S. Government lands. Alternative 2 was the original recommended alternative; however this alternative has since been refined into Alternative 2A.

### 4.2.2 Alternative 2A – Kamanu Gravity

The comments received by the stakeholders and the public were used to develop Alternative 2 into a refined collection system alternative, which is referred to as Alternative 2A – Kamanu Gravity. A summary of comments received at this public informational meeting is included in Section 4.4 of this report. Alternative 2A has been proposed because it maximizes the use of gravity sewers, has the least amount of County-owned lift stations, and requires an easement through State-owned lands (instead of an easement from the Federal Government). The estimated construction costs for this alternative is $91.6 million.

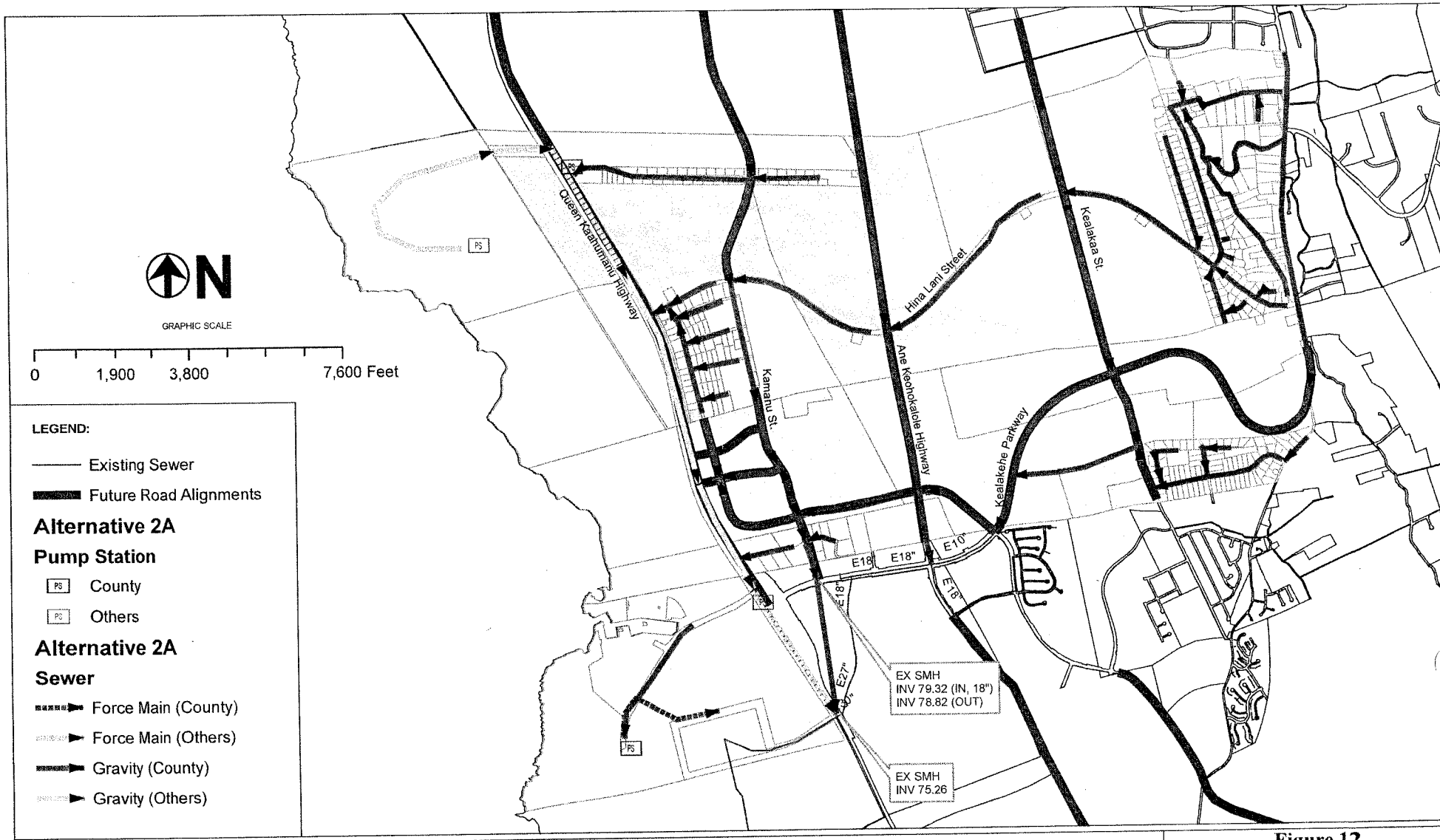
Alternative 2A was further developed based on additional information received from the public meeting identifying the location of an existing lava tube along the Kamanu Street extension. Akinaka and Associates is the consultant for the County Department of Public Works' Kamanu Street Extension Project providing information. Due to the sensitivity associated with the lava tube, no deep utilities will be permitted along the Kamanu Street extension. Therefore, the proposed sewer mains in this vicinity were re-routed accordingly. Alternative 2A is shown on Figure 12 and is similar to Alternative 2 except for the following major difference:

1. There is a break in the proposed sewer line on the Kamanu Street extension through the proposed West Hawai'i Business Park to the north of the Honokohau Business Park.

This proposed break in the sewer line was necessary because of the existence of an archaeological site (State Site No. 18117) along the Kamanu Street Extension. The developers of the Kamanu Extension exhausted various road alignments to avoid the archaeological site. However, the County Department of Public Works did not approve any alignment because of non-compliance with National and County design safety standards. In 2006, the State Department of Land and Natural Resources, Historic Preservation Division approved the surface crossing of the eastern portion of this site as proposed by the WHBP developers[2]. The proposed crossing includes a roadbed with a reinforced concrete section and to minimize the width of travel lanes in the area of the archaeological site. Alternative 2A also includes the following assumptions:

1. Development of a sewer line along Kealakehe Parkway which parallels the existing sewer lines in that road. This parallel sewer would connect into the sewer line coming from the south end of Kamanu Street.

2 DLNR letter dated January 20, 2006




**ALTERNATIVE 2A**

**Figure 12**

Source:
SSFM International, Inc.

*North Kona Improvement District Project*
*County of Hawaii, Environmental Management*

2. Development of a sewer line from the south end of Kamanu Street across the lower DHHL property. This sewer line would follow the approximate boundary between Residential and Commercial uses as detailed in the 2005 Laiopua Water Master Plan. This sewer line would then turn 90-degrees to the west and cross Queen K highway and continue to the KWWTP.
3. The reroute of wastewater from Honokohau Business Park and parcel directly to the south to the Queen Kaahumanu Highway sewer trunk line.

### 4.2.3 Preferred Sewer Collection System

This Preferred Sewer Collection System is similar to Alternative 2A but is more defined and is now recommended as the Preferred Collection System Alternative. The details of this sewer collection system are shown on a figure located in Appendix C of this report.

The Preferred Sewer Collection System Alternative was developed based on the information received about the existing lava tube and development information received from the Villages of Laiopua project consultant. The Villages of Laiopua is not within the NKID study area, however the proposed NKID sewer mains that are routed through the Villages of Laiopua and are aligned based on future land development layouts shown in the Villages of Laiopua Water Master Plan (2005). The Preferred Sewer Collection System Alternative also considers the latest proposed road alignments received from the Jacoby development and the proposed West Hawai'i Business Park subdivision.

## 4.3 RECYCLED/REUSE WATER DISTRIBUTION

The usage of Recycled/Reuse water is meant to decrease the demand on the domestic water resources and provide an alternate source of irrigation water for many developers. It also provides an alternate wastewater effluent disposal. Within the study area, the demand for recycled water was primarily expressed by several large landowners for irrigation purposes. The following landowners expressed a desire to benefit from recycled water from the KWWTP.

- TMK 7-3-009:003 (Kohanaiki Shores)
- TMK 7-3-009:025 (MID Corporation)
- TMK 7-4-008:071 (Kona Kai)
- TMK 7-4-008:072 (Kona Kai)

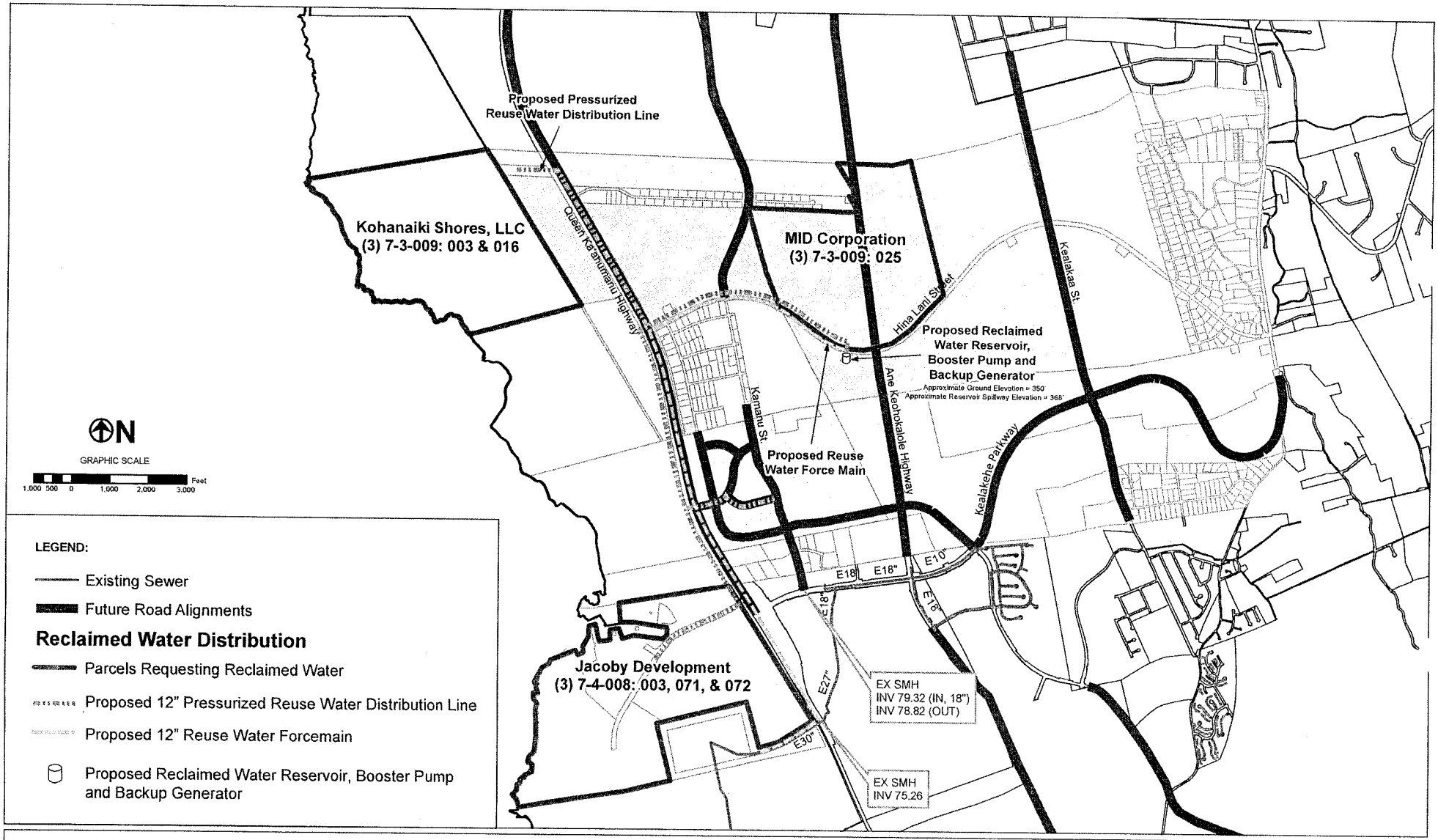
KWWTP currently has the ability to treat wastewater to the R2 level. Currently the Swing Zone is receiving R-2 water from the plant. However, because there is limited demand for the recycled water, the plant has been treating the wastewater to the R3 level and disposing the effluent in a seepage pit.

The total future demand for R1 recycled water has yet to be determined. However, the Kohanaiki Development has agreed to receive 1.30 mgd of R-1 water. More demand information from the prospective R1 users is necessary to further the sizing of the R1 recycled main.

One reclaimed water reservoir is included in this Report. This reservoir will be located on 1.22 acres of vacant land along Hina Lani Street within TMK 7-3-009:025. This site is currently undeveloped and formerly belonging to the County Department of Water Supply (DWS). This site was turned over to the County from the DWS for use as a reclaimed water reservoir. There is no existing reservoir on this parcel.

This reclaimed water reservoir will function to provide flow equalization, water storage, and pressurization for the re-use system. The reservoir site is located at approximately 350-feet above sea level. It is assumed that the reservoir's spillway elevation will be approximately 368-feet above sea level. Therefore, due to the location and elevation of the proposed reservoir, it is assumed that adequate pressure can be supplied to parcels at the 268-feet elevation or lower. For parcels at elevations at 268-feet and higher, the recycled water will need to be boosted to serve these parcels. Thus, a booster pump and backup generator for this pump will be necessary at the reservoir site.

Figure 13 indicates a possible alignment for the Recycled/Reuse water from the KWWTP. The route of the Recycled/Reuse water line by the County is subject to change as more R1 demand information is acquired.




# RECLAIMED WATER

**Figure 13**

*North Kona Improvement District Project*
*County of Hawaii, Environmental Management*

*Source:*
*SSFM International, Inc.*

## 4.4 Public Involvement Program

As previously mentioned, an initial public informational meeting was held by the County DEM to notify the public of the project, solicit input on community needs, concerns, and other information that could be used in developing project concepts and alternatives. This informational meeting was held on the night of June 6, 2006 at the Kelalakehe High School Cafeteria. Public notification of this meeting was published in the May 17th issue of the Hawai'i Tribune Herald. Flyers providing notice of this meeting was also distributed to major stakeholders within the project area.

Prior to the date of the meeting, a draft of this Sewer Master Plan Report was made available to the public for view at the Kailua-Kona Public Library as well as on the County of Hawai'i website (www.co.hawaii.hi.us) under the Department of Environmental Management, Technical Services Section. A copy of the meeting sign-in sheet is located in Appendix E of this document along with a summary of comments received at this meeting. General comments received at this informational meeting could be grouped into a few categories which are summarized below along with discussions as to how they are being addressed.

**Comments Received at Public Meeting**

1. Comments on participating in the Sewer Improvement District included:
   - Residential properties greater than 10,000 square feet would not require sewer connection and that many of the sewer connections shown on the graphics within the existing subdivisions were not required to connect.
   - Asked what if septic is already done for a certain property.

   *The project study area boundary is not to be confused with the Improvement District Boundary, which is to be determined at in Phase 2 of the NKID Project. However it was mentioned that depending on which alternate, some property owners may be forced to participate, even if they have existing septic systems currently in place.*

2. Comments about planned land uses included the following:
   - Stated that in 1992, the State's Housing Finance Development Corporation (HFDC) paid $5.35 million to finance the expansion and upgrade of the KWWTP, thereby entitling HFDC to 1.6 MGD of reserve sewage treatment capacity. When State Department of Hawaiian Home Lands (DHHL) purchased this land from HFDC in 2004 it was assumed that the 1.6 MGD capacity at the plant and sewer collection system was also purchased.

   *DHHL will continue to have rights to KWWTP encumbrances as per their agreement resulting from their purchase of previously owned HFDC lands.*

   - Described a portion of land which will remain under the jurisdiction of Department of Land and Natural Resources (DLNR) and suggested further refinement of the boundaries between the KWWTP, DHHL, and DLNR parcels.

- Provided with a copy of the Jacoby Development project update of Kona Kai Ola mixed-use development.
- Comments that the land uses need to be readjusted and the maps need to be updated with projects already planned.

*The future land uses identified in the Kona Kai Ola (Jacoby Development) development plans have been incorporated into the future land use map presented as Figure 7 in this report. This figure has also incorporated available land use information regarding projects with current or anticipated development plans.*

3. Comments about the sewer improvements and planned facilities included the following:
   - Concerns made about the 30-inch sewer line and its adequacy to handle wastewater connections.
   - Suggested for alternative 2 that the sewer line along Kealakehe Parkway be extended to connect with the lift station on Queen Kaahumahu Highway.
   - Questioned the necessity for the Hina Lani Street sewer line between Ane Keohokalole Street and Kealakaa Street. Also suggested removing this line due to the intent of property owners in this zone to connect directly to Ane Keohokalole Street.
   - Concerns about the Rutter sewer line and whether or not the State would allow Rutter to use the public Right-of-way for a private sewer line.
   - Question regarding the location of the lift station on Queen Kaahumanu Highway near Kealakehe Parkway.

   *Comments regarding the preliminary sewer collection system alternatives have been incorporated into the development of Alternative 2A which has been further refined into the Preferred Sewer Collection System alternative. This preferred system incorporates received public comments and presents the recommended alternative which best accommodates the needs of this project.*

4. Comments concerning the Kealakehe Waste Water Treatment Plant included the following:
   - Questioned if Kealakehe Waste Treatment Plant could handle the additional flows created by new development.
   - Asked if the WWTP maximum capacity limit had the authority to set limits for land uses.
   - Recommended that a study be conducted to analyze the WWTP and incorporated into the Master Plan and Implementation Plan.

   *Additional analysis of KWWTP should identify in what year the treatment plant will reach 75% of its current design capacity. Further analysis of the KWWTP capacity and its expandability is recommended. It was noted that there is ample room at the KWWTP for updating technology and expansion The current disposal method for KWWTP is by seepage pit, which is temporary in nature.. Thus, this report further recommends that these KWWTP issues be addressed as soon as possible.*

5. Comments on significant archaeological sites and resources included the following:
   - Commented that a lava tube which is a sensitive archaeological site is located within Lanihau Properties mauka of Queen Kaahumanu Highway.
   - Indicated that because of the archeology site along Kamanu Street there would probably be a break in the sewer line and the sewer would flow down a new East-West road towards Queen K. also indicated was that there was a "high point" in the Kamanu Street extension near Lanihau's south border.

   *These issues have been addressed in the discussion of Alternative 2A and are also incorporated into the preferred sewer collection alternative located in Appendix C.*

   - Commented there were other significant archeology and dry land forest sites.
   - Commented that alternative 3 would be difficult to implement due to the National Park crossing, there are too many sensitive resources that would require costly mitigation in the millions of dollars.

   *Additional archaeological sites and sensitive forest lands will be mitigated and addressed when found. In the event of any such discovery, the appropriate authorities would be contacted.*

6. Comments on problems that could occur included the following:
   - Asked what would happen if Rutter/ Kohanaiki sewer line failed to be constructed.

   *It was explained that the line would likely be built, and if not by Rutter, then this line and costs would need to be included into the Improvement District.*

   - Asked if Rutter's line would be constructed to handle additional flows or just their own. Concerned about the "under usage" of a sewer line and lift station and what would happen if the sewer line was in place but not receiving an adequate amount of flows.

   *Rutter/Kohanaiki is working with the County to determine the size and anticipated flows of the new sewer line which will be located along Queen Kaahumanu Highway and privately developed. Due to the issues associated with inadequate flows and usage, these coordination efforts continue to occur between Rutter/Kohanaiki and the County.*

7. Comments about the cost of the sewer improvements included the following:
   - Asked who would pay for the reclaimed water system.
   - Suggested a formula needs to be established on payment allocation.

   *The County pointed out that the summary report costs estimates were "ballpark" estimates but still missing a considerable amount of hidden costs. Cost allocation will be established in Phase 2 of this project and will be determined once the sewer improvements and Improvement District boundary has been established.*

8. Comments about the Master Plan Included:
   - Suggested keeping the future zoning colors consistent on the alternative figures.
   - Questioned 2025 Future Land Use Map (Figure 7) being outdated and on zoning descriptions.

*Per the comment received, future zoning colors were adjusted to be consistent throughout the report. The 2025 Future Land Use Map (Figure 7) is a conceptual map showing future land uses based upon information gathered from the State Land Use Commission for land use districts, County zoning and land use patterns, and from survey responses received from major stakeholders regarding future land use plans.*

- Concerns made about the huge amount of "residential/commercial mixed" land use in the 2025 Future Land Use Map.

*Due to the potential for residential and commercial mixed development and lack of available future land use information, the "residential/commercial mixed" land use designation was used to depict areas most likely to be developed as residential subdivisions. As mentioned earlier, this is a conceptual land use map and is subject to changes as new information becomes available.*

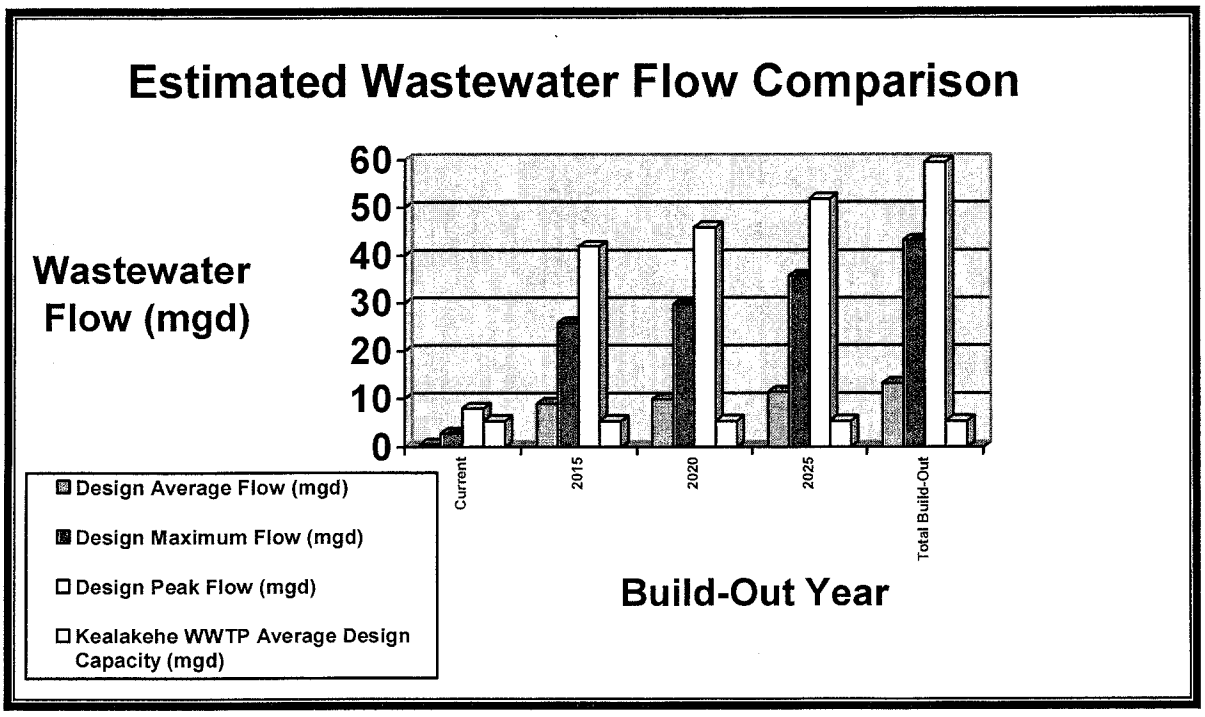
- Asked when draft of Phase 2 the Implementation Plan will be done.

*A draft of the Implementation Plan (Phase 2) should be completed by the end of 2006.*

# CHAPTER 5
# KEALAKEHE WASTEWATER TREATMENT PLANT

Per the "Keahole-Kailua Development Plan (1991)," the Kealakehe Wastewater Treatment Plant is designed for a capacity 2.80 mgd average flow for the 20-year design and 7.82 mgd average flow for the 40-year design. However, based on further discussions with the County DEM, the "as-built" average design flow for the KWWTP is 5.31 mgd.

Per the Wastewater Projections, by the year 2015, the Design Average Flow from the study area will exceed the current capacity of the KWWTP. It should also be noted that if the study area were to be hypothetically sewered, in the current (2005) year the Design Peak Flow (7.91 mgd) would exceed the existing design capacity of the treatment plant. For the purposes of creating this report, it is assumed that the KWWTP will have adequate capacity to treat all the future wastewater from the NKID study area.




Based on the above, it appears that further analysis of the KWWTP capacity and its expandability is critical and urgent. The additional analysis should identify in what year the KWWTP will reach 75% of its current design capacity. In addition, the analysis should address the disposal mechanism of the KWWTP.

Additional development projects outside the NKID study area will develop additional tributary areas that will create effluent to be treated at the Kealakehe Wastewater Treatment Plant. These areas are currently under study with a sewer master plan expected in mid-2007.

It is understood that the current disposal method for the treatment plant is a seepage pit, which is understood to be temporary in nature. However, any increase of wastewater effluent to this seepage pit will possibly come under scrutiny from the public and other governmental agencies. Thus, it is highly recommended that these KWWTP issues be addressed as soon as possible by the County.

**Encumbered Flows**

In 1992, the State of Hawai'i, Department of Housing Finance and Development Corporation (HFDC) and the County of Hawai'i entered into a participation agreement for the expansion of the County's Kealakehe Wastewater Treatment Plant to meet the future sewage treatment needs of the HFDC planned project, the Villages of La'iopua. The Villages of La'iopua, while outside of the study area, is important because sewage effluent from this area will be conveyed to and treated at the Kealakehe Wastewater Treatment Plant.

The following quotes are taken from the agreement between the Department of Public Works, Wastewater Division, County of Hawaii and the Housing Finance and Development Corporation (HFDC) dated March 19, 1992:

1. "HFDC estimates its planned project (Villages of La'iopua Master Planned Community Project) will require on an average about 1.6 mgd of sewage to be treated on a daily basis after the planned project is fully completed over a period of 15 - 20 years;"
2. "HFDC's financial participation in the County's expansion and upgrade of the Kealakehe Treatment Plant will entitle the HFDC to reserve up to 1.6 mgd of sewage treatment capacity for its planned project."

The HFDC transferred its rights to the 1.6 mgd of treatment and disposal for the Villages of La'iopua to the Department of Hawaiian Home Lands (DHHL) via a Transfer Agreement dated December, 30, 2004 and a First Amendment of Transfer Agreement dated May 2, 2006.

It is expected that portion of the Villages of La'iopua will be developed before the NKID area will have sewer collection infrastructure built. Sewer collection infrastructure in the Villages of La'iopua has been master planned with excess capacity constructed. This excess capacity will be able to serve the Villages well into the study period.

| | |
|---|---|
| Capacity of Kealakehe Wastewater Treatment Plant | 5.31 mgd |
| Existing flows to Kealakehe Wastewater Treatment Plant | 1.50 mgd (approximate) |
| Encumbered flows to KWTP | 1.60 mgd |
| Remaining unencumbered capacity | 2.21 mgd (approximate) |

# APPENDIX A

## *COUNCIL RESOLUTION 129-03*

# COUNTY OF HAWAI'I STATE OF HAWAI'I

RESOLUTION NO. 129 03
Draft 2

**A RESOLUTION RELATING TO THE PREPARATION OF (1) A NORTH KONA REGIONAL SEWERAGE MASTER PLAN; AND (2) A COUNCIL INITIATED IMPROVEMENT DISTRICT IMPLEMENTATION STUDY FOR THE CONSTRUCTION OF CERTAIN WASTEWATER AND RECYCLED WATER SYSTEM IMPROVEMENTS FOR KEALAKEHE, HONOKOHAU, KALOKO AND KOHANAIKI, DISTRICT OF NORTH KONA, HAWAI'I**

**WHEREAS**, the Council of the County of Hawai'i wishes to initiate proposed improvements on certain real property located at Kealakehe, Honokohau, Kaloko and Kohanaiki, District of North Kona, County and State of Hawai'i for improvements consisting of extension to the municipal sewer system and recycled water system, pursuant to the provisions of Section 12-10, Hawai'i County Code, as amended; and

**WHEREAS**, the Council of the County of Hawai'i acknowledges that the Kona Coast north of Kailua contains valuable, unique marine resources and pristine shoreline park properties including Honokohau Harbor, Kaloko Honokahau National Historic Park, a new Kohanaiki shoreline park, and the Natural Energy Laboratory of Hawai'i Authority at Keahole Point; and

**WHEREAS**, the Council finds that the rapid confluence of private and public developments within the North Kona region extending from Kealakehe and Kaloko to Honokokau Harbor and north to the Lands of Kau calls for an updated regional sewerage master plan for this area; and

**WHEREAS**, the operative "sewer policies" referenced in Ordinance 89-142, An Ordinance Adopting the County of Hawai'i General Plan and Repealing Ordinance No. 439, As Amended ("the General Plan") for the general planning of sewerage disposal systems are decades old, to wit: the "Sewerage Study for All Urban and Urbanizing Areas of the County of Hawai'i, State of Hawai'i," December 1970, the "Water Quality Management Plan for the County of Hawai'i," December 1980, and the "Facility Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)," April, 1981; and

**WHEREAS**, in its assessment of the projected sewage flow capacity of the Kealakehe Sewage Treatment Plant, the "Keahole to Kailua Development Plan" adopted by the County Council in Resolution 296-91 on April 3, 1991 called for "further planning and design"; and

**WHEREAS**, the General Plan states that industrial development in North Kona's "redeveloping or newly developing areas shall be developed in concert with programmed public and privately funded infrastructure to meet the expected needs"; and

**WHEREAS**, expanded visitor use of the Kaloko Honokahau National Historic Park administered by the National Park Service, coupled with shoreline park development of Kohanaiki and its planned, low density intentional community, merit thoughtful wastewater treatment and sewerage planning to assure environmental protection of these pristine shoreline areas; and

**WHEREAS**, the "Sewer Policies" outlined in the General Plan states, in part:

- "Private systems shall be installed by land developers for major resort and other developments along shorelines and sensitive higher inland areas, except where connection to nearby treatment facilities is feasible and compatible with the County's long-range plans, and in conformance with state and county requirements.

- The County shall take immediate steps to designate treatment plant sites, sewerage pump station sites, and sewer easements according to the facility plans to facilitate their acquisition.

- The County shall seek State and Federal funds to assist in financing the construction of proposed sewer systems"; and

**WHEREAS**, the Council of the County of Hawai'i acknowledges the need to implement improvements consisting of extension to the municipal sewer system and recycled water system on certain real property located at Kealakehe, Honokohau, Kaloko and Kohanaiki, District of North Kona, County and State of Hawai'i; and

**WHEREAS**, extension of said improvements from the existing Kealakehe Wastewater Treatment Plant north along the alignment of the Queen Kaahumanu Highway to Kohanaiki will include, but not be limited to, necessary recycled water mains, gravity sewers, manholes, pump station(s) and force mains, and sewer laterals with cleanouts to be installed to each property serviced by the proposed improvements; and

**WHEREAS**, the Council acknowledges that there are a number of public and private developments planned or completed in this region including, but not limited to, Lanihau Properties, McClean Honokohau Properties, Gentry Properties, Taylor Family Ltd. Partnership, Mid Corporation, Rutter/KW Kohanaiki LLC, TSA Corporation, Y-O Properties, and various public landowners including the State of Hawai'i, the State of Hawai'i Department of Hawaiian Homelands, the United States of America (General Services Administration and National Park Service), as well as a newly proposed West Hawai'i campus of the University of Hawai'i; and

**WHEREAS**, the Council acknowledges that the mix of private and public development of properties within the region requires the preparation of a more comprehensive regional plan of wastewater treatment needs and sewer improvements than that contemplated in Resolution No. 70-01 (deferred), which proposed a Council-initiated improvement district from the Kealakehe Wastewater Treatment Plant to the Kaloko Industrial Area; and

**WHEREAS**, the Council finds that a number of options may be chosen for the allocation of costs of sewer system improvements, including, but not limited to: distribution of sewer improvement district costs by parcel, allocation by zoning or permissible number of units assigned to each parcel, potential usage, required sewer capacity, square footage of buildings, benefits conferred upon the land, or a combination thereof; and

**WHEREAS**, the allocation of costs associated with said improvements and the preferred financing thereof may best be determined after the scope and timetable(s) of intended development, including incremental development, of all affected landowners are surveyed, and all landowners are consulted within a regional planning process.

**NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE COUNTY OF HAWAI'I** that:

(1) in consultation with the landowners referenced above, the Director of the Environmental Management is directed to prepare for submission to the Council (a) a broad regional sewerage master plan for the region north of Kealakehe, and (b) a specific and detailed implementation plan for an improvement district to include the necessity, feasibility, proposed boundaries, proposed real properties subject to assessment, estimated total cost, and method of financing desirable for the aforementioned sewer system improvements at Kealakehe, Honokohau, Kaloko and Kohanaiki, District of North Kona, County and State of Hawai'i; and

(2) include in the specific and detailed implementation plan all such data, survey, maps, plans, drawings, details and specifications for the improvements and any other matters or details intended to apply thereto in accordance with the provisions of Section 12-10, Hawai'i County Code, as amended; and

(3) advise the Council as to the preferred method of financing said improvements, whether by Council-initiated improvement district, owner-initiated improvement district, tax increment district, community facilities district, or private financing.

**BE IT FURTHER RESOLVED** that the Clerk of the County of Hawai'i transmit copies of this resolution to the directors of the Departments of Finance and Environmental Management, and the Environmental Management Commission.

Dated at Hilo, Hawai'i, this 17th day of December, 2003.

Introduced By:

FCA for

Council Member, County of Hawai'i

COUNTY COUNCIL
County of Hawai'i
Hilo, Hawai'i

I hereby certify that the foregoing RESOLUTION was by The vote indicated to the right hereof adopted by the COUNCIL of the County of Hawai'i on December 17, 2003.

ATTEST:

COUNTY CLERK CHAIRMAN & PRESIDING OFFICER

ROLL CALL VOTE

| | AYES | NOES | ABS | EX |
|---|---|---|---|---|
| ARAKAKI | X | | | |
| CHUNG | X | | | |
| ELARIONOFF | X | | | |
| HOLSCHUH | X | | | |
| JACOBSON | X | | | |
| REYNOLDS | X | | | |
| SAFARIK | X | | | |
| TULANG | X | | | |
| TYLER | X | | | |
| | 9 | 0 | 0 | 0 |
| | | | | |

Reference: C-417.4

RESOLUTION NO. 129 03 (Draft 2)

# APPENDIX B

## *MAJOR STAKEHOLDER'S EXISTING AND FUTURE LAND USES*

# Appendix B
Existing and Future Land Uses

| Property Information | | | Existing Land Uses | | | Future Land Uses | |
|---|---|---|---|---|---|---|---|
| Major Stakeholder | TMK | Acres | SLUD | CHZ | LUPAG | Proposed Development | B-O Year |
| HUALALAI VISTAS LLC - CHRIS CLEVER | SEE BELOW | | | | | | |
| HUALALAI VISTAS LLC | 373007027 | 5.5 | A | FA-1a | ldu | Low Density Residential (5 RS Units) | 2015 |
| HUALALAI VISTAS LLC | 373007050 | 47.9 | A | FA-1a | ldu | Low Density Residental (41 RS Units) | 2015 |
| THE SHORES AT KOHANAIKI-RUTTER/KW | SEE BELOW | | | | | | |
| KOHANAIKI SHORES LLC | 373009003 | 442.3 | U | RS-10, ML-10, RM-3, CV-10, V-125 | ope, res, mdu, ldu | Golf Course, Low Density Residential (500 RS Units) | 2020 |
| KOHANAIKI SHORES LLC | 373009016 | 7.8 | U | Open | ope, ue | Access Road | 2015 |
| KALOKO LAND CO /etal | 373009018 | 92.9 | C | Open | ue, ope | Undeveloped | >2025 |
| MC CLEAN HONOKOHAU PROPERTIES | SEE BELOW | | | | | | |
| MC CLEAN HONOKOHAU PROPERTIES | 374024004 | 1.4 | U | ML-1a | ind | 1 Existing Unit | n/a |
| MC CLEAN HONOKOHAU PROPERTIES | 374024007 | 3.4 | U | ML-1a | ind | 1 Existing Unit | n/a |
| MC CLEAN HONOKOHAU PROPERTIES | 374024011 | 10.3 | U | ML-1a | ind | 6 Existing, 6 Future Units | 2015 |
| MC CLEAN HONOKOHAU PROPERTIES | 374024012 | 44.0 | U | Open, RS-7.5, A-5a | ind, ue | Low Density Residential (70 RS Units) | 2015 |

| Property Information | | | Existing Land Uses | | | Future Land Uses | |
|---|---|---|---|---|---|---|---|
| Major Stakeholder | TMK | Acres | SLUD | CHZ | LUPAG | Proposed Development | B-O Year |
| KALOKO HEIGHTS - SCD | SEE BELOW | | | | | | |
| STANFORD CARR DEVELOPMENT | 373009019 | 193.9 | A | RS-7.5, RS-10, RS-15 | ldu | Low Density Residential (710 RS Units) | 2025 |
| STANFORD CARR DEVELOPMENT | 337300932 | 207.9 | U | RS-7.5, RS-10, RS-15, CN-20, RM-3, CV-7.5 | mdu, ldu | Low Dentisty Residential (790 RS Units), High Density Residential, Commercial (15 CN Units), Park/ Open Space | 2025 |
| LEE, DEAN K /etal | SEE BELOW | | | | | | |
| LEE, DEAN K /etal | 373009013 | 144.5 | C, A | Open | ue, ope | Low Density Residential | >2025 |
| LEE, DEAN K /etal | 373009014 | 11.7 | C | Open | ue, ope | Low Density Residential | >2025 |
| LANIHAU PROPERITES/PALANI RANCH CO. | SEE BELOW | | | | | | |
| LANIHAU PROPERTIES | 374008005 | 394.4 | A | A-5a | ue | Residential/ Commercial Mixed, Low Density Residential, High Density Residential, Park/ Open Space | 2025 |
| LANIHAU PROPERTIES | 374008013 | 314.4 | U | MCX-20, MG-1a, Open | ind | Industrial/ Commercial Mixed (99 Total Units), Industrial, Residential/ Commercail Mixed | 2015 |
| PALANI RANCH CO. INC. | 374008057 | 51.6 | A | A-1a | ue | Low Density Residential | 2025 |
| PALANI RANCH CO. INC. | 374008060 | 89.9 | A | A-1a, A-5a | ue | Low Density Residential | 2025 |

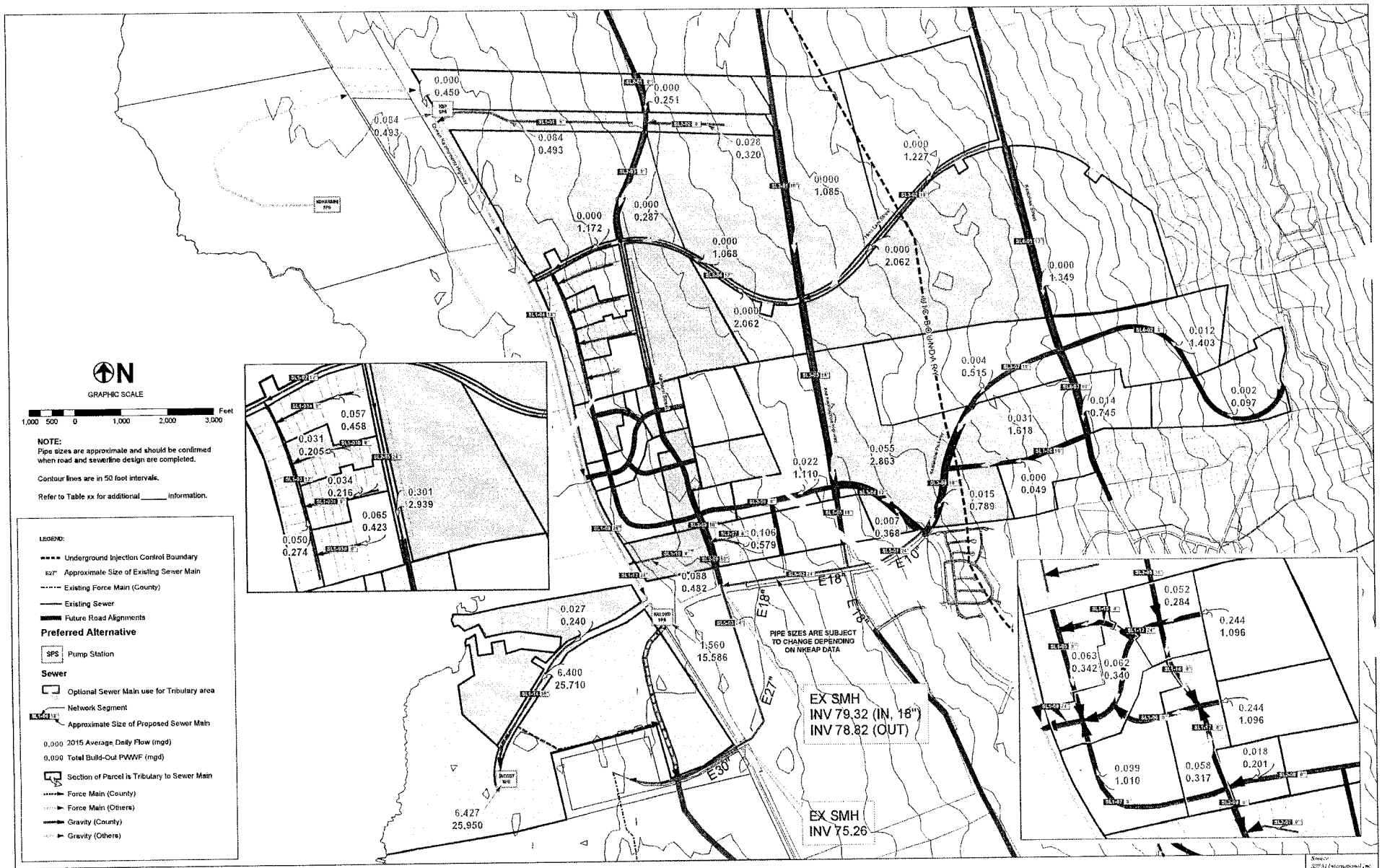
**Appendix B**
**Existing and Future Land Uses**

| Property Information | | | Existing Land Uses | | | Future Land Uses | |
|---|---|---|---|---|---|---|---|
| Major Stakeholder | TMK | Acres | SLUD | CHZ | LUPAG | Proposed Development | B-O Year |
| TSA/MID CORP. | SEE BELOW | | | | | | |
| MID CORP. | 373009017 | 224.4 | C | Open | ue | Residential/ Commercial Mixed | >2025 |
| MID CORP. | 373009025 | 360.1 | U, A | A-5a | ue | Residential/ Commercial Mixed | >2025 |
| MID CORP. | 373009026 | 194.3 | A | A-5a | ue | Residential/ Commercial Mixed | >2025 |
| MID CORP. | 373009028 | 371.9 | A | A-5a | ue | Residential/ Commercial Mixed | >2025 |
| TSA CORPORATION - KALOKO IND PARK | 373051060 | 102.3 | U | MCX-1a | ind, ue | 73 MCX Units | 2025 |
| 327 KONA LLC - TOM SMITH | 374008047 | 327.3 | A | A-1a, A-5a | ue | Low Density Residential (1050 RS Units) | 2025 |
| JACOBY DEVELOPMENT | SEE BELOW | | | | | | |
| STATE OF HAWAII | 374008003 | 442.3 | U | Open | ope, ue | Commercial/ Industrial Mixed, Low Density Residential, Park/ Open Space, Marina Expansion, Honokohau Small Boat Harbor | 2025 |
| STATE OF HAWAII | 374008071 | 218.5 | U, C | Open | ope | Commercial/ Industrial Mixed, Low Density Residential, High Density Residential, Park/ Open Space, Marina Expansion | 2015 |
| STATE DEPT. OF HAWAIIAN HOME LANDS | 374008072 | 200.0 | U | Open | ope, ue | Commercial/ Industrial Mixed, Commercial, Low Density Residential, Utilites/ Public Facilities, Park/ Open Space, Marina Expansion | 2025 |

| Property Information | | | Existing Land Uses | | | Future Land Uses | |
|---|---|---|---|---|---|---|---|
| Major Stakeholder | TMK | Acres | SLUD | CHZ | LUPAG | Proposed Development | B-O Year |
| KALOKO-HONOKOHAU NHP (KAHO) | SEE BELOW | | | | | | |
| U.S.A. | 373009002 | 249.5 | U, C | Open | ope | National Park | n/a |
| U.S.A. | 373009021 | 72.1 | U, C | Open | ope | National Park | n/a |
| U.S.A. | 374008010 | 234.7 | U, C | Open | ope | National Park | n/a |
| U.S.A. | 374008025 | 59.2 | U, C | Open | ope | National Park | n/a |

# APPENDIX C

## *PREFERRED SEWER COLLECTION SYSTEM*




PREFERRED SEWER COLLECTION SYSTEM

North Kona Improvement District Project
County of Hawaii, Environmental Management

Source: SSFM International, Inc.

# APPENDIX D

## *PUBLIC INFORMATIONAL MEETING SIGN-IN SHEET AND GENERAL COMMENTS SUMMARY*

**NORTH KONA IMPROVEMENT DISTRICT PROJECT**
**Department of Environmental Management**
**County of Hawaii**

PUBLIC INFORMATIONAL MEETING NO. 1
SIGN-IN SHEET
Kealakehe High School Cafeteria, 6:00 p.m.
June 6, 2006

| | | | |
|---|---|---|---|
| 1. Name | Genevieve Runningwind | Phone: | 933-2727 |
| Organization or Address | SSFM International ~~50~~ 101 Aupuni St. Ste 315 Hilo, HI 96720 | Email | grunningwind@ssfm.com |
| 2. Name | Bobby Jean Leithead-Todd | Phone: | |
| Organization or Address | Corporation Counsel | Email | |
| 3. Name | Ronald Sato | Phone: | 531-1308 |
| Organization or Address | SSFM 501 Sumner St. Ste 620 | Email | |
| 4. Name | KAREN EOFF | Phone: | 3273642 |
| Organization or Address | for COUNCILMAN ANGEL PILAGO COUNTY COUNCIL 75-5706 Hanama Pl. #109 Kailua-Kona 96740 | Email | kapilago@co.hawaii.hi.us |
| 5. Name | ~~David~~ David Tarnas | Phone: | 9875810 |
| Organization or Address | MCS International PO Box 6882 Kamuela, HI 96743 | Email | davidtarnas@hawaii.rr.com |
| 6. Name | Jim McClean | Phone: | 329-4213 |
| Organization or Address | Honokohau Properties P.O. Box 3000 KK. | Email | |
| 7. Name | Steve Yee | Phone: | 933-2727 |
| Organization or Address | SSFM | Email | |

**NORTH KONA IMPROVEMENT DISTRICT PROJECT**
**Department of Environmental Management**
**County of Hawaii**

PUBLIC INFORMATIONAL MEETING NO. 1
SIGN-IN SHEET
Kealakehe High School Cafeteria, 6:00 p.m.
June 6, 2006

| | | | |
|---|---|---|---|
| 8. Name | Larry Sumida | Phone: | 630-7141 |
| Organization or Address | DHHL | Email | Larry.M.Sumida@hawaii.gov |
| 9. Name | Sheldon Yamasato | Phone: | 836-1900 |
| Organization or Address | Akinaka & Assoc., Ltd. 3049 Ualena St. 500 Honolulu, HI 96819 | Email | sty@akinaka.com |
| 10. Name | Dora Beck | Phone: | |
| Organization or Address | COH, DEM | Email | |
| 11. Name | Roy Takemoto | Phone: | |
| Organization or Address | COH | Email | |
| 12. Name | Bill DeMent | Phone: | 933.2727 |
| Organization or Address | GSFM 101 Aupuni St. Ste 315 Hilo, HI 96720 | Email | bdement@gsfm.com |
| 13. Name | MARK VAN PERNIS | Phone: | 324-1166 |
| Organization or Address | P.O. Box #837 Kailua Kona HI. 96745 | Email | |
| 14. Name | Richard Boston | Phone: | 329-6881 ex 203 |
| Organization or Address | 74-8657 #14 Kaulani #14 Kailua-Kona | Email | richard_boston@nps.gov |
| NPS | | | |

**NORTH KONA IMPROVEMENT DISTRICT PROJECT**
**Department of Environmental Management**
**County of Hawaii**

PUBLIC INFORMATIONAL MEETING NO. 1
SIGN-IN SHEET
Kealakehe High School Cafeteria, 6:00 p.m.
June 6, 2006

| | | | |
|---|---|---|---|
| 15. Name | Jarred Chang | Phone: | 531.1308 |
| Organization or Address | SSFM<br>501 Sumner St. Ste 620<br>Honolulu, HI 96817 | Email | jchang@ssfm.com |
| 16. Name | Rebecca Ferguson | Phone: | 933.2727 |
| Organization or Address | SSFM<br>101 Aupuni St. Ste 315<br>Hilo, HI 96720 | Email | rferguson@ssfm.com |
| 17. Name | PAUL KAY | Phone: | 325-2255 |
| Organization or Address | STANFORD CORE DEV. | Email | PJKAY@STANFORDCORE.COM |
| 18. Name | RODNEY FUNAKOSHI | Phone: | 946-2277 |
| Organization or Address | WILSON OKAMOTO | Email | rfunakoshi@wilsonokamoto.com |
| 19. Name | Jim Medlin | Phone: | 325.2255 |
| Organization or Address | STANFORD LARR Development | Email | JMedlin@STANFORDLARR.com |
| 20. Name | BRIAN McCOURT | Phone: | 989-5990 |
| Organization or Address | | Email | BRIAN@MCCOVERREALTY.COM |
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# NORTH KONA IMPROVEMENT DISTRICT PROJECT

**Department of Environmental Management**

**County of Hawaii**

PUBLIC INFORMATIONAL MEETING NO. 1

SIGN-IN SHEET

Kealakehe High School Cafeteria, 6:00 p.m.

June 6, 2006

| | | | |
|---|---|---|---|
| 22. Name | Kawika Uyehara | Phone: | 933 2727 |
| Organization or Address | SSFM International<br>101 Aupuni St #315<br>Hilo HI 96720 | Email | kuyehara@ssfm.com |
| 23. Name | JIM + EMMY GREENWELL | Phone: | 732-2622 |
| Organization or Address | LAN. HAU PROPERTIES<br>34465 WAIALAE AVE #260<br>Honolulu 96816 | Email | jgreenwell@lan.hawaii.net |
| 24. Name | Gary Takahashi | Phone: | 329-4499 |
| Organization or Address | R.M. TOWILL CORP.<br>73-5574 Maiau<br>Kailua-Kona, HI 96740 | Email | garyt@rmtowill.com |
| 25. Name | Tom Smith | Phone: | 217-520-0600 |
| Organization or Address | 4054 McKinney Av. Suite 210<br>Dallas, TX. 75220 | Email | Tom@ATTY.HI.US |
| 26. Name | BURKE MATSUYAMA | Phone: | 325-5411 |
| Organization or Address | Kohanaiki Assn<br>73-4335 Hanku Pl<br>KK 96740 | Email | BURKEKM@LAVA.NET |
| 27. Name | | Phone: | |
| Organization or Address | | Email | |
| 28. Name | | Phone: | |
| Organization or Address | | Email | |

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Project Managers, Planners, & Engineers
American Council of Engineering Companies, Member

June 7, 2006

SSFM 2004_115.000

NKID
1st Public Informational Meeting Notes

Opening: Dora Beck
Introduction: Steve Yee
PowerPoint Presentation: Steve Yee

Comments by the audience during the presentation:

1. Tom Smith (327 Kona) asked if Kealakehe WTP could handle the additional flows created by new development and why hasn't this project analyzed the plant as well.
2. Jim Greenwell (Lanihau) asked who would pay for the reclaimed water system. Then commented that only three users will benefit from the reclaimed water use, yet everyone within the ID will pay for it. It was also clarified that the Rutter/Kohanaiki line will be constructed at partial developer expense and the county will likely pay a share for the excess capacity in the collection system
3. Sheldon Yamasato (Akinaka & Assoc) described a lava tube with a sensitive archaeological site located within Lanihau Properties' TMK parcel 3-7-4-008: 030, mauka of Queen Kaahumanu Highway. The approximate location of this site was recorded.

Comments received during General Discussion:

1. Tom Smith commented that many of the one-acre lots (Kohanaiki Homestead & Kona Heavens Subdivision) located in the north-east portion of the ID boundary will option-out of participating in the ID.
2. Tom Smith also indicated that residential properties greater than 10,000 sf would not require sewer connection and that many of the sewer connections shown on the graphics within the existing subdivisions were not required.
3. Tom Smith had concerns dealing with the zoning showed in the 2025 Future Land Use Map and indicated our information appeared incorrect and out of date. He asked how low-density residential zoning was defined in this map. And high-density? It was explained that low-density residential would consist of single-family residential units, and high-density would include multi-family residential units.
4. Larry Sumida (DHHL) expressed concern about the Queen Kaahumanu Highway 30-inch sewer line's adequacy to handle all of the wastewater connections. SY advised that these alignments are conceptual and that design and pipe sizing has not been incorporated.
5. Larry Sumida stated that in 1992, the State's HFDC paid $5.35 million to finance the expansion and upgrade of the KWTP entitling the HFDC to reserve 1.6 MGD of sewage treatment capacity. When DHHL purchased this land from HCFCD in 2004 it was assumed that the 1.6 MGD capacity at the plant and sewer collection system was also purchased.
6. Paul Kay (Stanford Carr) suggested for alternative 2 that the sewer line along Kealakehe Parkway be extended to connect with the lift station on Queen Kaahumahu Highway. It was explained that the size and capacity of the lift station would need to be increased if

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that connection were to take place, but that his suggested alignment was indeed being considered.

7. Paul Kay questioned the necessity for the Hina Lani Street sewer line between Ane Keohokalole Street and Kealakaa Street. Mr. Kay suggested removing this line due to the intent of property owners in this zone to connect directly to Ane Keohokalole Street. It was explained that this section of line would be necessary to further separate and define the flows from zones 3 and 4.
8. Paul Kay asked what would happen if Rutter/ Kohanaiki sewer line failed to be constructed? It was explained that the line would likely be built, and if not by Rutter, then this line and costs would need to be included into the ID.
9. Richard Boston (National Park Service) commented that alternative 3 would be difficult to implement due to the National Park crossing, there are too many sensitive resources that would require costly mitigation in the millions of dollars.
10. Jim Greenwell expressed concern about the huge amount of "residential/commercial mixed" land use in the 2025 Future Land Use Map. It was explained that this land use assumption was allocated to these areas due to a number of reasons: 1) lack of future land use information; 2) lack of required entitlements for these parcels to build anything; and 3) could not assume "zero" any parcel.
11. Tom Smith made a comment to adjust and refine the "residential/commercial mixed" areas on the 2025 Future Land Use Map.
12. Burke Matsuyama had concerns about the Rutter sewer line and whether or not the State would allow Rutter to use the public ROW for a private sewer line. DB and BJLT indicated that their latest understanding is that they have SDOT's buy off since the sewer line could benefit the State.
13. Sallie Beavers asked if Rutter's line would be constructed to handle additional flows or just their own. It was explained that the line was not for Kohanaiki's exclusive use and would be able to handle additional flows based upon the anticipated flows from Zone 1 and deliver to Kealakehe WWTP.
14. Burke Matsuyama was concerned about the "under usage" of a sewer line and lift station. He asked what would happen if the sewer line was in place but not receiving an adequate amount of flows. It was acknowledged that problems occur with low flows in large capacity collection systems and this will be evaluated by future designers before sizing is determined.
15. Sheldon Yamasato asked if the WWTP maximum capacity limit had the authority to set limits for land uses. It was noted that there is ample room at the KWTP for updating technology and expansion.
16. Tom Smith recommended that a study be conducted to analyze the WWTP and incorporated into the MP and IP.
17. Mark Van Pernis pointed out that the MP costs estimates were "ballpark" estimates but still missing a considerable amount of hidden costs.
18. Jim Greenwell asked when he can expect to see a draft of Phase 2 the IP. It was explained to him that each stakeholder will be kept up to date on the status of this project, that there will be more public meetings and to expect the completion of the IP sometime in early 2007. Greenwell expressed the sense of urgency on timing and cost for the ID process.

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19. Tom Smith suggested keeping the future zoning colors consistent on the alternative figures.

Comments were collected during the "Break-out" discussion session:

1. David Tarnas (Jacoby) described a portion of land which will remain under the jurisdiction of DLNR. He further refined the boundaries between the WWTP, DHHL, and DLNR parcels and provided us with a copy of the Jacoby Development project update of Kona Kai Ola.
2. Mr. Tarnas explained that the EISPN for the Jacoby project will be published in the June 23, 2006 issue of the OEQC Environmental Notice. We will be able to contact Scott Abrigo (PBR) for a copy of their EISPN.
3. Mr. Tarnas had a question regarding the location of the lift station on Queen Kaahumanu Highway near Kealakehe Parkway. His concern was whether the lift station would be mauka or makai of the Queen K Highway, he was directed to speak with the County on this matter.
4. Paul Kay reiterated his concern over the Zone 1 alignment saying he has indications that Rutter's intentions may not be the same as everyone's expectations.
5. Tom Smith and Paul Kay spoke at some length describing their plans to develop much of their properties in a manner that would preclude the need for sewer connection for large portions of their project; that Kealakaa road alignment has been changed in consultation with the COH Planning Dept and affected landowners and is near finalization; that he is striking deals with COH Planning Director, Chris Yuen to grant zoning considerations in exchange for construction of the road; and that if we want gravity lines in the area we should speak with them right now. Tom Smith opined out that lots 10k square feet and larger (mauka section of his project) are not required to have sewer connection to county systems but noted his development will have some 6000-7500 square feet lots (makai section) that will.

Comments were collected during the "Civil Break-out" discussion session:

1. Sheldon Yamasato indicated that because of the archeology site along Kamanu Street there would probably be a break in the sewer line and the sewer would flow down a new East-West road towards Queen K. (See marked up Alternative Maps). Mr. Yamasato also indicated that there was a "high point" in the Kamanu Street extension near Lanihau's south border. (See marked up Alternative Map).
2. Jim Greenwell approximated other significant archeology and dry land forest sites on the Alternative map.

Comments collected during the "County Break-out" discussion session:

1. Bobby Jean Leithead-Todd informed Burke Matsuyama that a formula needs to be established on payment allocation. It all depends on feedback from landowners on usage. Possible formula of square footage and potential density.
2. Burke Matsuyama asked what if septic is already done and Bobby Jean Leithead-Todd replied that most likely that property will not be included.

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3. Bobby Jean Leithead-Todd indicated that depending on which alternate, some can be forced to participate.
4. Bobby Jean Leithead-Todd noted that Stanford Carr does not want to wait and Kohanaiki does not want Sewage Treatment next to their homes yet they both need the water.
5. Bobby Jean Leithead-Todd commented that County is not moving ahead with planned county golf course. The State land in the lower portion of Laiopua is E&O'd specifically for golf course and effluent reuse from the State and if not used for the specific purpose, it can be taken back by the State. Dora Beck asks if it can be included in the Improvement District and Bobby Jean Leithead-Todd says County will need permission from the State.
6. Sheldon Yamasato says land use needs to be readjusted and the maps need to be updated with projects already planned i.e. the tributary.
7. Gary Takehashi asked how the Kamanu Street extension will come into play in the plans.