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*Community
Development
Plan*

prepared by

Community Management Associates, Inc.

for

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Planning Department

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Introduction

Present and future growth in Puna communities can create opportunity or crisis, depending on our ability to articulate a shared vision. Achieving that vision calls for a variety of planning models and legal and financial tools. The vision that we share and carry out emerges out of appreciation for the unique character and strengths of Puna.

- Puna is the home of a family of Hawaiian deities, the base of an important part of Hawaiian culture. That cultural tradition fell into political disrepute and repression two hundred years ago, at the hands of European colonizers and the descendants of Kamehameha I. That cultural tradition is now in the process of rebirth. The celebration of, and renewed respect for, the family of Pele and her associates in Puna, provides a framework of place names, traditions and sites for further cultural recognition and a heightened "sense of place" for Puna.
- The Hawaiian tradition is matched by strengthened scientific knowledge of and respect for the same forces of nature that made Puna so important to Hawaiian culture: the active volcano, the remarkable forests, and the bountiful pure water, the ultimate combination of earth, fire and water, that the Hawaiians knew and honored. A United Nations-designated International Biosphere Preserve, centered at Kilauea, recognizes Puna's environmental value and significance.
- The newcomers to Puna, together with the "old time" locals and native Hawaiians are a varied mix of people, with a wide range of skills and a commitment to creating opportunities for themselves and their neighbors. Their grassroots community-building history and patterns bodes well for finding solutions to Puna's planning problems. Like the union-organizing struggles of the plantation immigrants, the desire for a quality life for themselves, their children and their elders, has drawn together many diverse personalities and groups.

- Although Puna lost its major agricultural base, sugar, in 1984, and although the income level of its residents is among the lowest in Hawaii, Puna's prospects are good for developing a strong economic tripod.

- ✓ Strong local communities, many skilled workers, a low cost of living, and the beauty of the physical environment are among the chief criteria for locating decentralized, information-intensive businesses. Fortunately, the Keaau area has ample reserves of land suitable for expansion of quality workplaces, conveniently located between Puna's residential communities and Hilo's ports.
- ✓ Puna is already developing in the fastest growing tourism niche in the Pacific basin--ecotourism--and possesses the unspoiled natural and cultural environment, small-business entrepreneurs and commitment to sustainability to lead the state in this area.
- ✓ Development of diversified agriculture is proceeding rapidly in Puna, thanks to abundant rainfall, affordable land, proximity to Hilo's ports and the enterprising spirit of Puna farmers.

The current problems of Puna arise from rapid in-migration into subdivisions which lack adequate infrastructure, community facilities and supporting land uses for current and future residents. These problems are compounded by fact that the location of a large number of those subdivision lots--over 35%--are located in areas of high hazard for flooding, lava flow, coastal subsidence, or tsunami inundation.

The challenge of planning in Puna is to retain Puna's rural character, her natural beauty, affordability and diversity while improving her livability and future prospects.

PUNA COMMUNITY DEVELOPMENT PLAN

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SECTION 1

ORGANIZATION OF PLAN

PLANNING PROCESS

VISION STATEMENT

GOALS AND OBJECTIVES

LANDSCAPE SKETCHES FOR
CURRENT, CONVENTIONAL AND PREFERRED
DEVELOPMENT

POPULATION PROJECTIONS

1.1 ORGANIZATION OF THE PLAN

The Puna Community Development Plan (Puna CDP) is organized to reflect its relationship to the *County of Hawaii General Plan* and to the requirements of the *County of Hawaii General Plan Revisions, 1980*.

The Technical Reference Report of the Puna Community Development Plan (January, 1992), a separate document but an integral part of this community development plan, details the social, economic and environmental data for the Puna district, including significant changes that have occurred in Puna since the drafting of the *General Plan*.

Section 1 is **Introductory**. It starts with a description of the process used to arrive at the Plan recommendations and how the special planning strengths and problems of Puna were approached. Following that is the Vision Statement, Goals and Objectives, and illustrations of the planning landscape envisioned for the future.

Section 1 also includes the population projections and population planning forecast for Puna.

Section 2, Specific Concerns and Courses of Action, is organized to cover the planning elements from the General Plan, and includes Courses of Action from the General Plan as well as new CDP recommendations. Zoning Allocation Needs are enumerated at the end of the Land Use Section.

Section 3 contains chapters on **Implementation and Financing**, and **The Non-Conforming Subdivisions** as well as land use and **Zone Guide** maps and chart, **Transportation Map and Facilities and Utilities Map**.

The chapter on Implementation and Financing makes general recommendations for carrying out the proposals contained in Section 2. It is divided into three parts: Land Use, Capital Projects, and Policies. Each of these sections contains subsections on Equity, Tools, and Timing. The Land Use chapter also contains a conceptual plan and a process diagram for the designation of a Rural Town District that is central to the land use vision of this plan.

The chapter on Non-Conforming Subdivisions includes recommended long-term approaches to bringing all subdivisions into conformance with "kinds of environments," described in the General Plan. Following are a chart and three maps detailing the land use recommendations, and two maps illustrating the recommendations for transportation, public facilities and utilities.

At the end is a Selected Resource List for the both the subject matter and the community-based process described in the plan.

1.2 PLANNING PROCESS

1.2.1 A Unique Planning Environment

The Puna Community Development Plan (Puna CDP) was accomplished in an untraditional manner. There are five process elements which distinguish this plan:

I. The planners live in, and are part of, the Puna community. At County request, community-based planning and community initiatives were the basis for the plan's contents and its recommendations for future action, in recognition of the unique and active community participation level in Puna. This plan's recommendations reflect the dedication, capability and creativity of individuals and groups in Puna, who volunteered to meet head-on and solve the problems of Puna's non-conforming subdivisions.

II. As a part of the Puna Community Development Plan, a comprehensive Technical Reference Report was published (January, 1992) to serve the community, businesses and officials in the public process for the next decade.

III. The planning team carried out extensive research into non-conforming subdivisions in the United States and in other countries, for information on planning strategies and tools to transform lot-sale subdivisions, like those in Puna, into functional communities. A number of those tools are recommended in this plan.

IV. While Puna has large landowners who may be seeking development approvals—the more normal planning situation in Hawaii—most of the property in Puna for which planning is needed is made up of small lots, with development rights that are as yet largely unused. This "throws off" the usual planning process. In Puna, the future growth is already permitted, but the infrastructure, public facilities and supporting land uses are not in place, or even planned.

V. The Puna CDP planning process began concurrent with the destruction of nearly 200 homes by lava flows in Kalapana. The issues of hazard mitigation, for lava flow, earthquake, subsidence and tsunami, directed the focus of research to the policies developed to lower the risk in hazard areas elsewhere. The scientists at the Hawaii Volcano Observatory and their United States Geological Survey colleagues in California generously shared their research and planning documents.

1.2.2 A Community-Centered Process

During Phase I of the planning process, the planning team made dozens of presentations to community groups, to provide information about the County's planning procedures and policies, to identify issues, and to provide information to increase community options and effectiveness.

Community interaction also included interviews with key informants, surveys, "brainstorming" sessions, task groups with a mixture of residents, government representatives and substantive experts, and facilitation of a parallel, independent planning process by a community-based Puna Development Plan Committee.

During the second phase of the planning process, with the help of subconsultant Peter Young, an appraiser, a series of three detailed future scenarios were produced—Suburban, Urban, and Rural—these were presented to the public at four meetings on consecutive days in four different communities: Kea'au, Pahoa, Volcano, and Mountain View.

Participants expressed preference or disapproval on a wide variety of policies, including costs, for each scenario. As the meetings concluded, participants were asked to choose their preferred scenario.

This "straw poll" heavily favored the Rural scenario, based on the replication, in new subdivision centers, of the existing rural towns of Puna, with land use patterns arranged around future transit corridors, and a "downtown" at Waikahekahe, which is the geographical center of the central subdivisions. The most strongly supported planning elements included trail systems, compact small town neighborhoods, preservation of the integrity of agricultural lands, and a variety of community-based planning and infrastructure financing tools to accomplish these ends.

Community responses as well as the infrastructure needs and cost projections generated for the scenarios are the source of many of the Specific Concerns and Courses of Action in Section II.

Subconsultant Alan Okamoto, an attorney specializing in infrastructure financing, assisted in developing suggested courses of action regarding infrastructure financing strategies and tools.

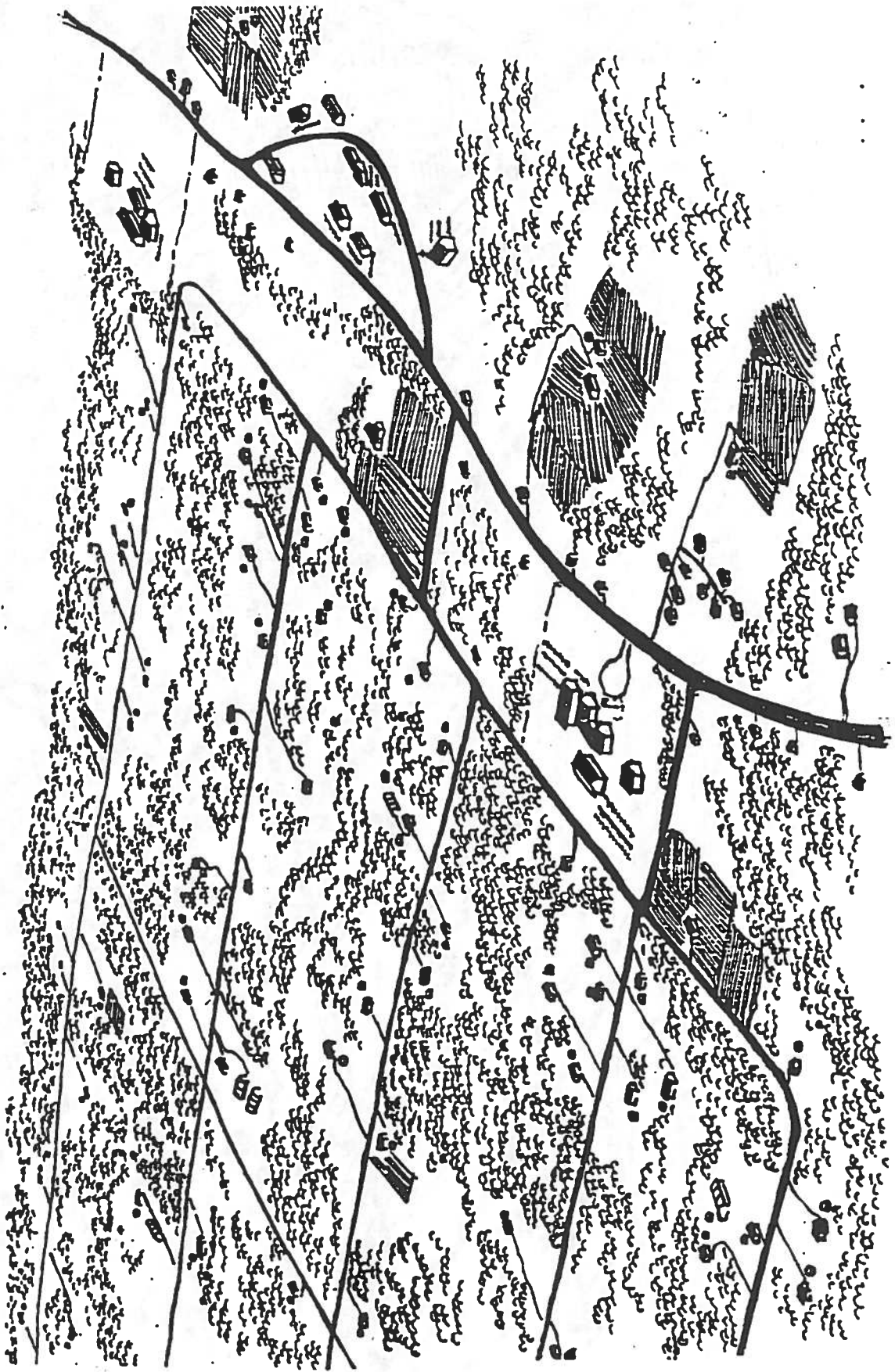
1.3 VISION STATEMENT

Puna will become a thriving rural district, with small, pedestrian, entrepreneurial towns, connected by public transportation, each surrounded by protected farms, rural residential settlements and open spaces, where planning and development is initiated and implemented by community members, property owners and businesses, in cooperation with public and private agencies. Each community will provide a range of housing, employment and service opportunities for residents having diverse incomes, needs and mobility. Development will be appropriate to the natural hazards of the Puna District, with sensitivity and respect for the Hawaiian cultural heritage.

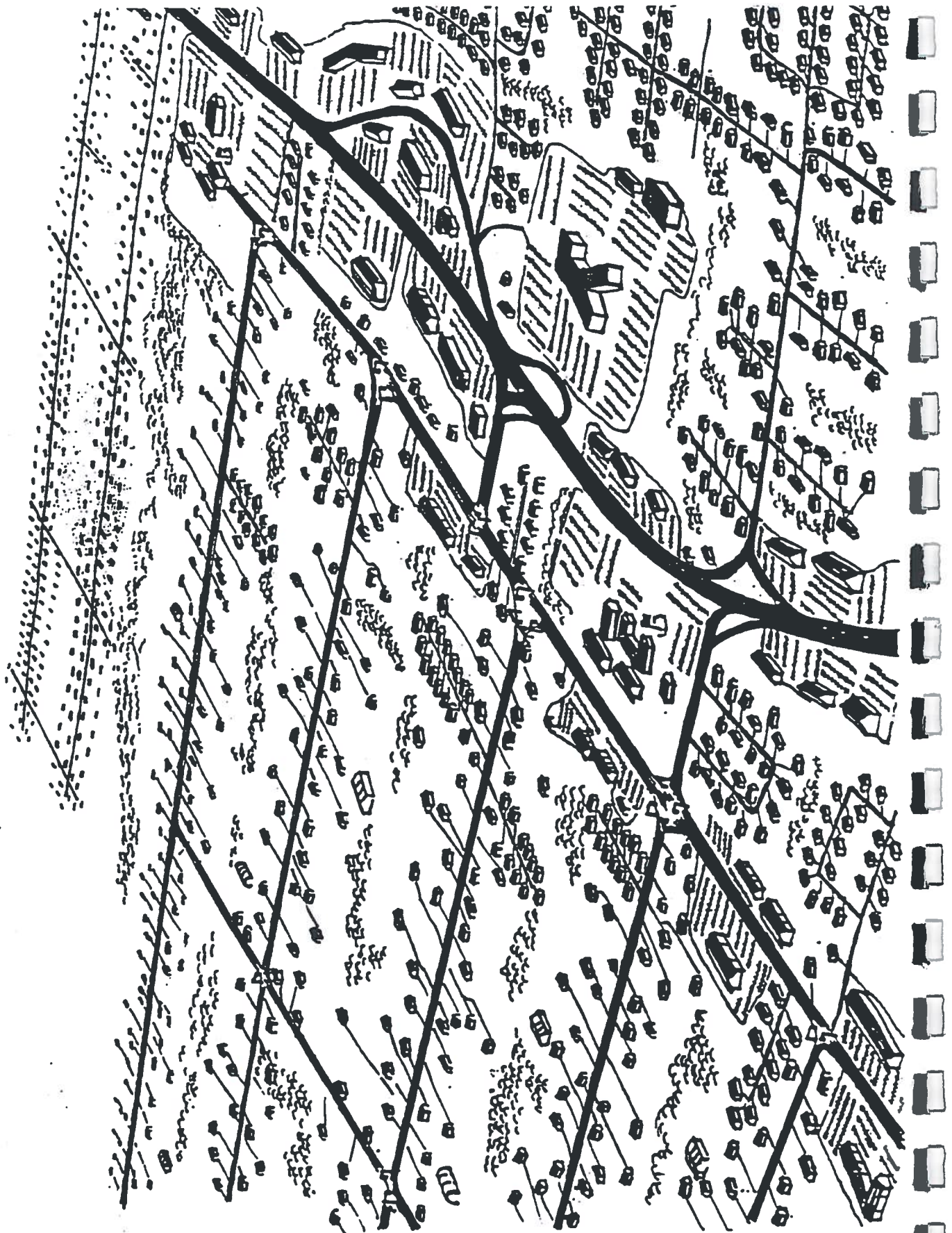
1.4 Goals and Objectives for Puna Community Development

- **Rural character**
 - Small town atmosphere.
 - Agricultural lands and agricultural opportunities for large and small farmers.
 - Areas for people who want to “get away from it all.”
- **Lifestyle**
 - Prevention of “fatal impact” developments that may price low-income lifestyles out of the area.
 - Conveniently located services and workplaces.
 - More pedestrian-friendly neighborhoods.
 - Pluralism: all kinds of people welcome in every neighborhood.
- **Environment**
 - Identified and preserved historic sites, especially Hawaiian cultural sites.
 - Pristine native forests.
 - Native flora and fauna habitats co-existing in and alongside developed areas.
 - Low environmental-impact land use and transportation patterns.
- **Opportunity**
 - Regulatory environment of opportunity for entrepreneurs.
 - Quality neighborhood jobs with family-enhancing features like childcare and eldercare.
 - Alternative tourism development: make assets of environment and owner-operations.
 - Opportunities for large-landowner development, without prohibitive regulatory costs.
- **Security**
 - Land use patterns and building regulations that minimize risk from natural hazards.
 - Escape routes.
 - Better roads.
 - Water supplies.
 - Improved fire and police protection.
 - Flood prevention and improved drainage.
 - Local health-, child- and elder-care.
 - Infrastructure, but without excessive costs that would eliminate affordable housing.
- **Planning**
 - Proactive rather than reactive planning.
 - Vision of build-out.

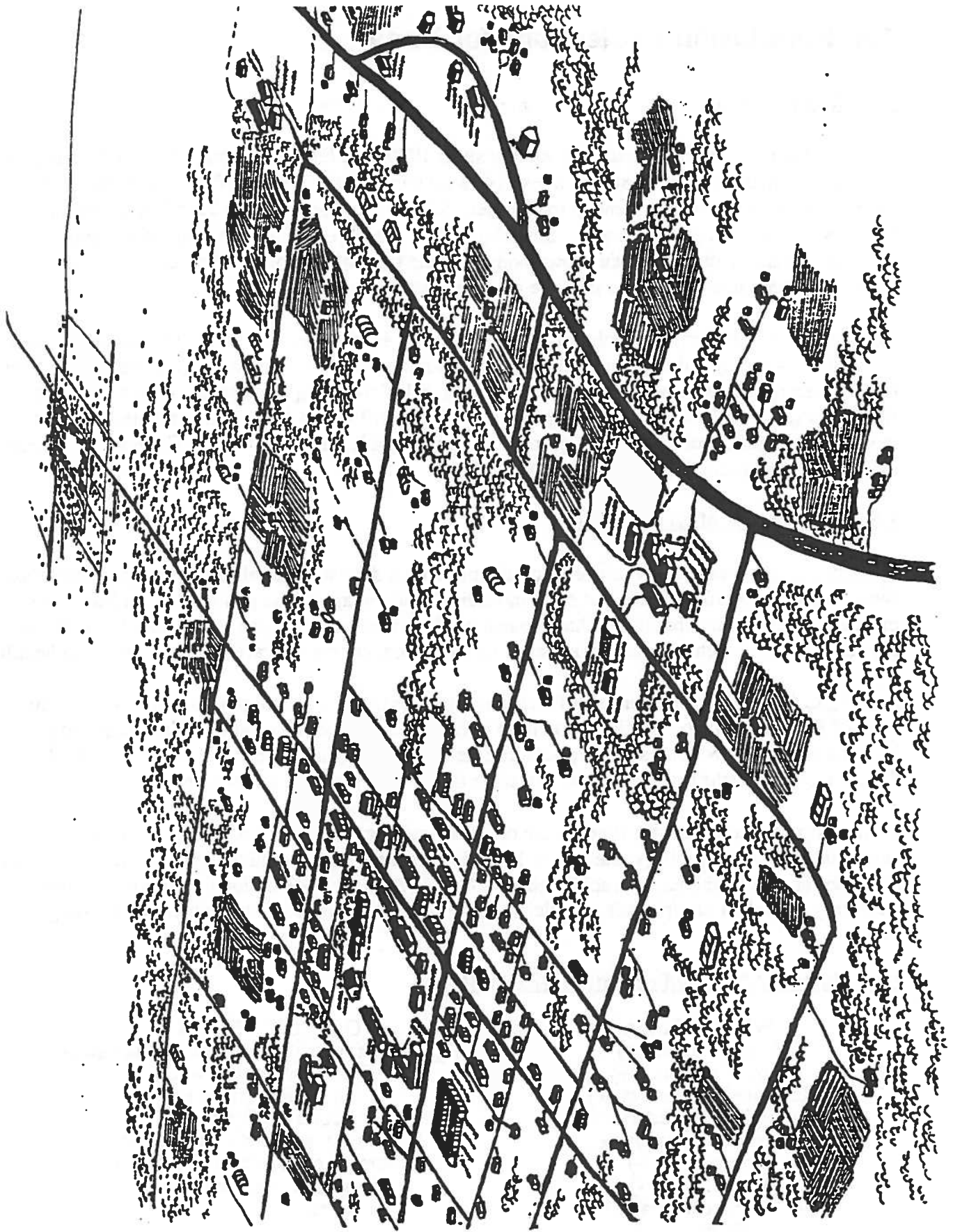
CURRENT DEVELOPMENT



CONVENTIONAL DEVELOPMENT



PREFERRED RURAL DEVELOPMENT



1.6 Population Projections for Puna

1.6.1 Recent Trends

Puna's population has increased very rapidly since 1970, as a result of in-migration to the subdivisions, and, since the early 1980s, as a result of a high birth rate. In the 1970s most of the in-migrants were from the mainland and tended to be older. Since 1985, the trend has been toward younger families from elsewhere in Hawaii. Since Puna does not have a rapidly expanding economic base and since most residents own their own homes (while the majority of incomes are under \$20,000 per year), it appears low-cost home sites are a primary attraction.

The records of representative subdivisions—Hawaiian Acres, Eden Roc, Ohia Estates and Mauna Loa Estates—indicate that house counts have grown from 50% to 80% in the five years since 1990. County records of permitted dwelling units reveal 5,167 dwelling unit permits issued for Puna in the five years since the 1990 Census, compared to 3,974 from 1980 to 1989. Unfortunately, data is insufficient to make reliable assessments or to reliably project into the future. However, it is clear that Puna's population is growing rapidly.

1.6.2 Components of Growth Rate

Mortality or death rate is a result of a number of factors, such as general health care and sanitation (which especially affect infant and child mortality), and the age of the population. In Puna, the mortality rate is somewhat lower than the rest of Hawaii because the age of the population is lower. However, factors such as a large number of teenage pregnancies may affect infant and child health.

Fertility or birth rate is the number of births as a proportion of the total population. The fertility level of Puna appears to be rising, largely as a result of in-migration of young Hawaiian and part-Hawaiian families, which have a higher birthrate than other groups. In Puna, at the end of 1989, there were 3.44 births for every death, whereas the rate for the state as a whole was 2.89.

In-migration to the area is the chief cause of Puna's rapid growth. The rate of in-migration fluctuated during the 1980s, becoming quite low in 1982-84. As indicated by building permits for new dwellings, the rate began increasing rapidly about 1986. In the early 1990s, dwelling permit numbers were very high then dropped off in anticipation of, then response to, more expensive building regulations.

1.6.3 Factors Affecting Population Growth Rate

WITHIN PUNA
High birth rate(+)
Young families (+)
Improved Highways (+)
Water supplies to subdivisions (+)
Improved highways (+)
Drought/fire (-)
Impact Fees (-)
Social service availability(-)
Lack of Home insurance (-)
Volcanic activity (+/-)
Geothermal electricity (+/-)
Improvement Districts (+/-)
Mortgage availability/land cost (+/-)

OUTSIDE OF PUNA
High cost of housing elsewhere in Hawaii (+)
Development elsewhere
on the Big Island (+)
Economic Boom (+)
Increasing land costs elsewhere (+)
Development elsewhere on Big Island (+)
Infrastructure funds from
Fed, state, or County (+)
Recession (-)
("+" indicates a factor that tends to increase population growth, "-" tends to decrease, and "+/-" indicates an unpredictable relationship)

The growth rate of Puna is remarkably susceptible to factors beyond local control:

- Puna's growth rate appears to reflect the high cost of housing in other places in Hawaii more than it reflects job development in Puna. (Normally, job development is among the leading indicator for population growth.)
- Water development for homes, businesses and/or agriculture could increase Puna's population growth rate, by increasing the availability and affordability of home insurance and mortgages.

1.6.4 Short-term Population Projections: for the year 2005

	<u>Low</u>	<u>Medium</u>	<u>High</u>
<u>Puna CDP</u>	34,326	50,943	65,694
<u>County General Plan</u>	39,790	49,910	59,340

Assumptions for the Puna CDP projections:

Low projection: This projection shows population growing arithmetically, by the same annual numbers as the 1980s average. This figure, which is similar to State Department of Business, Economic Development and Tourism projections, is unlikely unless current trends are reversed. However, a severe drought with associated fires and water shortages, a destructive lava flow through populated areas, or a severe recession are some of the conditions that could markedly slow Puna's in-migration rate.

Medium projection: This projection, considered the "most likely," allows for a growth rate that is comparable to what happened in the 1980s, a 77% increase in a ten year period. This projection assumes that the current rate of in-migration will level off or fluctuate through the Nineties.

High projection: This projection is an extrapolation new dwelling permit figures from 1990 to 1995. This continuing "boom" would severely stress the capacity of existing infrastructure and public facilities.

1.6.5 Planning Forecast: Puna Will Build Out

The chief factor limiting growth elsewhere in Hawaii is the shortage, and therefore high cost, of residential land. This has not been a limiting factor in Puna. The availability of affordable housing is such a powerful draw that it has overcome a number of strong disincentives to in-migration: lack of jobs, lack of infrastructure and community facilities, high rainfall, natural hazards, and limited availability of insurance and mortgages.

Continued shortfall of Puna's infrastructure, community facilities, and supporting land uses could slow growth, while the inventory of undeveloped house lots would remain high. For slowing growth, such a "no development" strategy for the non-conforming subdivisions would undoubtedly work; however this does not equate with good planning. The planning aims of the Puna Community Development Plan are to provide a positive vision of build-out, so that planning can serve its function of providing a sequential scheme, in space and time, for the most efficient relationship possible between cost and quality, to bring non-conforming areas into compliance with the Goals, Policies, and Standards of the County of Hawaii General Plan.

The planning forecast must be that Puna will eventually build out. Puna's population projections, then, are a timing device that affect the pace but not the sequence or ultimate pattern of planned development.

SECTION 2

COMMUNITY CONCERNS

COURSES OF ACTION

2.1 LAND USE

2.1.1.1 Specific Concerns of Puna Community

- Lack of appropriate proportions and mix of convenient land uses for the current and future population.
- Limited availability of community services and employment centers with adequate public utilities and services.
- Community support for home businesses and mixed uses in a rural land use pattern for some areas.
- Concern about incompatible mixing of farming and residential uses in some areas.
- Lack of predictability for investors in all types of land uses because of absence of long-term plan for the maximum permitted population.
- Support for pedestrian core land use patterns which cluster uses without increasing overall population.
- Too high a risk for public and private loss from some already permitted residential uses in areas of flood, lava flow and subsidence hazard.
- Conflicting expectations and financial means of neighboring landowners, especially in the subdivisions.
- Significant discrepancy between actual land uses in Puna and land use designations and zoning, especially in the non-conforming subdivisions.
- Insufficient infrastructure and public services in Puna to support widespread *ohana* dwellings.
- The agricultural tax policy discourages retention of valuable forest, even if desired by owner, and does not recognize the growing time needed for orchards and agroforestry.
- One-acre subdivisions, granted in farming areas, tend to raise agricultural land prices out of reach for farmers and bring in neighbors who complain about farming smells, sounds and chemicals.
- High residential densities and uses on land with agricultural zoning contribute to distrust of planning and zoning.
- Car dependence is caused, in part, by shortage of convenient commercial and light industrial uses, services and compact housing and/or alternative transportation in subdivisions.

Strategic Considerations for Land Use

The retention of affordable housing opportunities, hazard mitigation, the public cost for infrastructure and public facilities in large-lot subdivisions, and the need for an economic base are among the major public interest issues in Puna.

Rural Town District: *This Plan's proposed solution to that problem centers around promulgation of a new Rural Town District designation, to enable and encourage existing and new towns to develop in a more low-cost and compact pattern than allowed by the current zoning code. This can be accomplished by consolidating and mixing uses to provide pedestrian amenities and lifestyle options that serve the needs of the elderly, small shopkeepers, the disabled, young adults and others for whom auto-dependence may be a hardship.*

By this strategy, Puna may develop in such a way as to retain its rural character, provide access to essential safety and health amenities, and provide for more equity in opportunities and services for its diverse population. This proposal is based on a community-based planning strategy for local masterplanning of each rural community. (See CDP Courses of Action for Land Use.)

Existing Land Uses: *There is a need to recognize existing land uses through appropriate zoning and to plan for anticipated future land use needs. Approximately 16,000 lots with agricultural zoning are less than one acre in size. Another 17,000 are one acre in size with a permitted density of two dwellings per acre. Zoning and land use designations different from permitted uses may hamper local efforts to master plan individual communities.*

As more subdivisions fill in, there will be more conflict and public cost and less flexibility in carrying out the land use patterns and facilities prescribed in the General Plan.

In areas of high hazard for lava flow, centralized industrial, commercial, or resort activities, and development that follow topographical flow patterns increase potential losses.

2.1 LAND USE

New Land Uses: In addition to centralization of commercial activity in Pahoa and Kea'au, a new commercial center should be planned at Waikahekahe. This area, located near Orchid Land, Hawaiian Acres and Ainaloa includes the junction of the central subdivision corridor and the proposed "Nine and a Half Road" secondary arterial which would connect to Komohana Street Extension in Hilo. A future commercial center at Waikahekahe would provide the central subdivision community of 30,000 lots with convenient placement of public safety and other civic amenities to create a much needed sense of place— a "there." Waikahekahe has several large lots so that commercial and public amenities could be planned. It would provide many Puna residents with access to their major needs without lengthy travel on a primary arterial, cutting trip distance, and lessening the need to add extra lanes to primary arterials.

An additional future industrial area is proposed for Waipalani, mauka and makai of the current location of the Keaau SolidWaste Transfer Station. This location would not only provide convenience and low cost, but it is also located on a slight ridge between two drainage areas that could become natural buffers, and easily accessible directly from the network of secondary roads.

Eco-tourism and the Environment: There is a growing economic niche, especially in the Pacific Basin, for eco-tourism. Puna's eco-tourism industry is growing rapidly. Hawai'i Volcanoes National Park is the number one natural area destination in the state. It is also at the center of the Puna and Ka'u International Biosphere Preserve and World Heritage Site, designated by the United Nations.

Convenient and small-scale craft shops, commercial amenities, restaurants and accommodations, designed to conform to rural and local character, and located within hiking distance along trails, support eco-tourism. Local market gardens of diverse and exotic crops, flowers, organic farming, agroforestry and sustainable use of native forest are agricultural uses which have a symbiotic relationship with eco-tourism. Low-impact visitor accommodations such as bed and breakfast establishments and lodges can contribute to the district's economy without negative effects upon the environment or lifestyle.

Open space, coastal preservation and hazard mitigation objectives must be weighed against private property rights and investment-backed expectations.

- Commercial development, especially its appearance, should reflect the lifestyle and character of the surrounding community.
- There is an undersupply of commercial land in Puna to meet service, entrepreneurial and employment needs.
- Some residents wish to protect their single family residential/commuter lifestyle while others are more concerned about the congestion and lengthy commutes caused by distant, inconvenient services. In addition, many are concerned about the rising costs of car ownership and home insurance that are caused by their isolation and distance from services.
- Inconvenience of having to go all the way to Kea'au or Hilo for hardware, building supplies, car repairs, etc.
- Lack of industrial lands means repairers, fabricators, tradespeople and crafters have no convenient, affordable place to go if their neighbors complain or they want to hire employees or otherwise expand.
- Resort development, including golf courses, that increases land values beyond the preferred life style of local residents is generally not desired.
- Resort development should support preservation of the coastline and other critical environmental areas.
- Resort development should support the community-centered lifestyle and community-based economic development.
- Subdivisions need public use open space and natural corridors.
- There is strong support for preservation of coastal open space.
- Access to public lands is desired.
- There is concern for preserving the integrity of the native rain forest.

2.1 LAND USE

2.1.1.2 CDP Courses of Action for Land Use in Puna

- New planning and development tools should be considered and enabled in a timely manner to provide the maximum opportunity for public benefit and savings. They should include Transfer of Development Rights (TDR), land readjustment, community land banking, lease partnerships, redevelopment districts and concurrency. These tools could be used in combination with public funding, improvement districts, Tax Increment Financing and Community Facilities Districts to expand the solution choices for Puna's non-conforming subdivisions. These tools are defined in Section 3.1.2.2.
- Promulgate a new Rural Town District (RTD) zoning designation that provides for preservation of the traditional character of existing rural towns and provides for the development of new towns with similar traditional character and pedestrian scale. The Rural Town District is further described in Section 3.1.2.2.
- Provide incentives, in the form of financial and technical assistance, to existing and new subdivisions and towns, to carry out community-based master-planning.
- Encourage the adoption of Rural Town District ordinance for use of the Rural Town District designation, and/or the creation of Village Commercial (CV) and related zoning categories.
- Remove the Urban Expansion Area designation shown on the County of Hawaii General Plan from the area around Pahoa, because of the Lava Flow Hazard Zone 2 designation of that area.
- Encourage creation of a community-based planning process for Pahoa, Kea'au, Mountain View and Volcano, to plan preservation, restoration and redevelopment as an RTD, but in such a way that no new development fronts on Highway 11 or Highway 130.
- Encourage development of village design guidelines for Pahoa, Kea'au, Mountain View and Volcano in cooperation with village residents.
- Encourage W.H. Shipman, Ltd., to participate in an RTD process with Kurtistown, Happy Homes, Iwasaki Camp and Nine and a Half Mile Camp to plan an RTD to include a master planned development that a new town of Olaa is formed, well off Highway 11, which maintains and enhances the traditional character of the area.
- Encourage the development of a comprehensively planned Project District for the King's Landing and Kea'au coastal areas, including the Kings Landing Urban Expansion Area, which brings together Hawaiian cultural preservation, environmental protection including nene habitat, and eco-tourism development.
- Encourage landowners and developers to work with the Puna community to plan a new civic and commercial center for Puna at Waikahekahe, which is the geographical center of the Central Subdivisions. Based on such a plan support State Land Use Boundary amendments, General Plan LUPAG Map changes and rezoning.
- Bring State Land Use designations more into conformity with lot sizes and actual uses in Puna. (See State Land Use and County General Plan Changes maps and chart in Section 3.3.)

2.1.2 LAND USE: Agriculture

2.1.2.1 Courses of Action for Agricultural Land Use

from the GENERAL PLAN:

- Assist in the provision of water in agricultural areas.
- Assist in the further development of diversified agriculture in the district.

CDP Recommendations:

- Collaborate with community groups to develop ways to separate and buffer agricultural and residential uses within existing subdivisions. For example, use transfer of development rights to increase residential density and decrease agricultural density; encourage organic farming to buffer residential and general agriculture, light industry or mixed uses.
- Consider amendment to the County Zoning code to establish a minimum three-acre lot size for agricultural subdivisions, where a change of zone is required, with the exception of subdivisions to five lots or less.
- Encourage collaboration between agricultural and other economic interests to master-plan interrelated land uses, such as the integration of trail corridors, bed and breakfasts, small restaurants, and farmer's markets into agricultural communities, but so that these small-scale, village-type uses are clustered in planned areas rather than allowed as "spot" uses in agriculturally zoned areas.
- Support local food production and competitive marketing for local consumption.

2.1.3 LAND USE: Commercial

2.1.3.1 Courses of Action for Commercial Development

from the GENERAL PLAN:

- Centralization of commercial activities in Pahoa shall be encouraged.
- Expanded commercial services to meet the needs of population growth in the Puna district shall be encouraged in the area of Kea'au.
- Rehabilitation of existing commercial development in appropriate locations shall be encouraged.
- Appropriately zoned lands shall be allocated as the need arises.

CDP Recommendations:

- Collaborate with community and landowners to make a long range master plan for a new commercial and public service center at Waikahekahe, with up to half for civic, recreation, and education, instead of encouraging expansion and centralization of commercial services in Lava Flow Hazard Zone 1 or 2.
- Collaborate with Mainstreet Pahoa to develop old Pahoa as a service area for Pahoa residents and as a historic district, including alternative access via traditional trails and railroad rights-of-way.
- In the Kilauea east rift area, encourage the distribution of community activities in a manner which minimizes risk and discourages commercial development.
- Encourage well-planned residential and proportionate neighborhood commercial development as part of a Rural Town District, with all supporting public facilities and services, in the W.H. Shipman, Ltd., property mauka of Shipman Park.

2.1.4 LAND USE: Industrial

2.1.4.1 Courses of Action for Industrial Development

from the GENERAL PLAN:

- The County shall identify sites suitable for future industrial activities.

CDP Recommendations:

- Consider designation of light industrial areas to meet the needs of the east rift area in the State lands between Pahoa and the central subdivisions, along a connector arterial from Pahoa to "Nine and a Half Road."
- Neighborhood light industrial uses should be distributed to minimize risk in the east rift area.
- The only regional industrial uses that should be allowed in the east rift area are those associated with geothermal development. They should be distributed in very low densities along the rift to minimize investment losses from single lava flow events.
- Collaborate with subdivisions to plan neighborhood light industrial centers which provide convenient and pedestrian uses.
- Consider zoning approximately 1,000 acres for a new light industrial park at Waipalani, in the general area stretching *mauka* and *makai* of the Kea'au Solid Waste Transfer Station. Set-aside should include sufficient buffer area as agriculture and/or open zoning to create a park like industrial environment, and to avoid conflicts between industrial uses and eco-tourism corridors which start at Hilo airport.
- Encourage development of research and educational institutions in conjunction with industrial areas.

2.1.5 LAND USE: Multiple Family Residential

2.1.5.1 Courses of Action for Multiple Family Residential

from the GENERAL PLAN:

- Appropriately zoned lands shall be allocated as the need for multiple family residential development increases.

CDP Recommendations:

- Support the development of alternative housing ownership strategies which provide options for low-cost and more accessible home ownership.
- Collaborate with subdivisions to plan neighborhood centers which incorporate appropriate multi-family residential opportunities.

2.1.6 LAND USE: Single Family Residential

2.1.6.1 Courses of Action for Single-Family Residential

from the GENERAL PLAN:

- The County shall work with community groups to explore possible avenues for financing infrastructural improvements within the nonconforming subdivisions.
- Encourage and aid the agricultural industry in continuing to provide employee housing.

2.1.6 LAND USE: Single Family Residential

- Improve and develop roadways, water and sewerage systems, and other basic facilities necessary to encourage development of lands suitable for residential use.

CDP Recommendations:

- Consider rezoning subdivisions with lots under one acre to Residential and initiating State Land Use District boundary amendments to Rural or Urban unless steps are taken to lower densities.
- Collaborate with subdivision community associations to differentiate land uses according to the principles of the General Plan.

2.1.7 LAND USE: Resort

2.1.7.1 Courses of Action for Resort

from the GENERAL PLAN:

- The development of visitor accommodations and any resort development in the district shall complement the character of the area and be consistent with the General Plan.
- Consider the development of small family or 'bed and breakfast' type visitor accommodations and small-scale retreat resort development.

CDP Recommendations:

- Develop a master plan for a system of trails and associated natural area corridors, starting at Hilo airport, to support eco-tourism development in Puna, while showcasing its natural resources.
- Support the development of low-impact, home-based eco-tourism facilities, e.g., bed and breakfast establishments and lodges, at appropriate locations throughout the district, instead of resort zoning.
- Encourage the development of small-scale, trail accessible, lodges along the Puna coastal trail, but with the shoreline left undisturbed, except by access. Suggested locations are Papa'i, Ha'ena, Kahuwai, Pohoiki, Kehena.

2.1.8 LAND USE: Open Space

2.1.8.1 CDP Courses of Action for Open Space

- Collaborate with subdivision associations and property owners to find means to compensate landowners if open space dedications are desired which "take" the use of whole parcels or significantly lower value and use for which there are investment-backed expectations.

2.1.9 LAND USE: Public Lands

2.1.9.1 CDP Courses of Action for Public Lands

- Collaborate with the National Park Service, the State and private landowners to develop a master plan for preservation and restoration of the forest which integrates the land use patterns and economy of the settled areas with the health of the forest.

2.1.10 LAND USE: Zoning Allocation Needs

2.1.10.1 Zoning Allocation Needs

The Zoning Allocation Needs inventory estimates needed land uses for development which is expected to occur within the planning period (minus the land uses already available to meet those needs). The number of acres within each land use category is like a fund from which rezonings may be drawn to meet the current deficiencies or projected needs.

The model used here to determine zoning needs is drawn from actual zoned acres per thousand population in the County of Hawai'i. It is difficult to gauge the accuracy of this model. It is probable that these figures include lands zoned but not developed. At the same time, many commercial and light industrial uses take place on agricultural or residential lots, especially in Puna. Since they are often without permits, they represent use needs not reflected in zoned acres.

This rural style of mixed uses is valued by many Puna residents. However, some non-residential home businesses which involve noise, smell, inventory in the yard, or traffic, are drawing neighbors' complaints. This conflict will probably increase as subdivisions fill in, and neighbors are brought closer together. The inadequate supply of land properly zoned for these uses may also discourage start-up or expansion of businesses which could supply needed local jobs and services.

Planning to make local supporting land uses compatible with the valued rural style may require new definitions of mixed use and home businesses. It is for this reason that the Rural Town District Code is proposed. Under the model for the Rural Town District, the actual needs for zoned acres for commercial, resort, and light industrial would be much less, for two reasons: 1) new definitions allowing compact mixed uses and a wider range of home occupations would replace these uses in less space, and 2) land requirements for parking would be reduced by as much as 50%, thereby decreasing the acreage required for these uses by as much as 35%.

The Zoning Allocation Needs Table below shows the number of acres in the "fund" for rezoning, based on the actual zoned acres model, projected to the year 2005, based on a projection of approximately 40,000 population, which is a conservative estimate from the County General Plan. See Population Projections chapter in Section 1.

Note in the table shown below the acreage shown for SF residential: when non-conforming subdivision lots of less than one acre are included it adds 16,210 lots on 5,396 acres. These figures do not reflect *Ohana* dwelling densities.

TABLE 2.1.10.2 ZONING ALLOCATION ACRES

Zone	Island Actual Use Model Ac./1000	Puna Now: 30,000 people		Zoning Allocation Needs Deficit (Excess)	
		Zoned Acres	Ac./1000	Now 30,000 pop.	Year 2005 40,000 pop.
SF Residential	154	2,684	89	1,936	3,476
<i>Including Non-conforming Subdivisions</i>		8,080	269	(3,460)	(1,920)
MF Residential	22	4	0	656	876
Resort	11	1	0	329	439
Commercial	11	59	2	271	381
Industrial	44	479	16	841	1,281
Resid./Ag	11	625	21	(295)	(185)
Agricultural	8,773	198,796	6,627	64,394	152,124

2.2 TRANSPORTATION

2.2.1 Specific Concerns of Puna Community

- Congestion relief of rush-hour traffic between Pahoa and Hilo, especially focused on the Kea'au bottleneck.
- Support for major design of transportation corridors and surrounding land use patterns for public transit convenience.
- Support for use of old road and rail rights of ways for dedicated bike/pedestrian use.
- The desire to preserve the character of the Coastal Road and the Pohoiki (Mango) Road.
- Liability issues surrounding public use of privately owned subdivision collector roads.
- Width deficiencies for private subdivision roads to meet County standards, and cost of current standards.
- Need for additional boat ramp to relieve congestion and conflict at Pohoiki.

2.2.2 Courses of Action for Transportation

from the GENERAL PLAN:

- Primary arterial rights-of-way providing access to the district should be increased as necessary where they pass through relatively undeveloped lands.
- The present Puna Coast Road, eventually to connect with the Chain of Craters Road, should be developed as a scenic parkway along the coast. Alignment should basically follow the existing road from the Kalapana end of the Chain of Craters Road to the proposed extension of the Saddle Road to the vicinity of the Hilo Airport.
- A new road alignment to connect the junction of the Kapoho-Pohoiki Roads with the Pohoiki area should be constructed. This alignment will eliminate a series of curves in the present road.
- Consider, in conjunction with community associations and the property owners, the use of a variety of mechanisms to provide infrastructure in the non-conforming subdivisions.

Planning for Funding

Transportation planning is being transformed by the requirements of the federal Intermodal Surface Transportation Efficiency Act (ISTEA). The purpose of ISTEA is "to develop a National Intermodal Transportation system that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner." ISTEA aims to provide a more equitably accessible transportation system by designing relationships between land use and transportation so that they are more "mode neutral." This has led to examination of land use and transportation policies which favor automobile-centered development and auto use. ISTEA also has set-asides for "enhancement activities" such as dedicated bike and pedestrian uses, park-and-ride, and rails-to-trails.

States and counties which have aggressively responded, with community-based transportation and land use planning designed for trip elimination and accessibility for non-auto modes, have been able to make the greatest use of ISTEA funding.

In order to take advantage of this federal resource for much-needed transportation funds, the Puna Community Development Plan should plan for development projects which satisfy ISTEA requirements. These and other funds come packaged for particular types of projects and those packages cannot be completely anticipated, so it is important to be prepared with a variety of projects and to maintain flexible priorities, so that opportunities will not be missed for lack of planning. (See Section 3.1)

Land Use Solutions to Congestion

Puna has near-critical congestion problems on Highway 130 between Pahoa and Keaau as a result of "bedroom community" development in the non-conforming subdivisions with residents who must commute long distances to work, school, services and recreation. It is perhaps a truism of modern planning that more pavement cannot solve congestion. Traffic congestion is solved in the end by reducing trips and trip distance, and by changes in land use so that there is a balance of jobs, housing and services at the Census-tract level. This means "balanced land uses" within population areas of 5,000 to 10,000 people.

2.2 TRANSPORTATION

Lateral Transportation Capacity Needs

New lateral transportation corridors will be needed as subdivisions further develop toward build-out. The subdivisions are now approximately 20% occupied so, without changes of land use pattern, tremendous roadway capacity increases would need to be anticipated. However, studies show that land use improvements can cut trip generation and distance by 50% or more. A regional Puna roadway master plan together with community-based master plans for subdivisions would help to identify future transportation corridors and improvements needed to accommodate the anticipated population.

Central Subdivision Corridor

There is a tendency for strip development along Highway 11 to provide services to the developing central subdivisions. Alternatively, to preserve Highway 11 as a primary arterial and to decrease trips and trip distance, the secondary rural arterial planned for the center of the central subdivisions should be developed as a spine along which to locate rural town cores to provide locations for employment, services and education for subdivision residents without having to commute on a primary arterial.

Eco-tourism Facilitated

Research into light rail systems indicates that they are most economically successful when integrated with visitor uses. Comparison with other Pacific tourist destinations shows that convenient public transit with intermodal connections to trails, and conveniently located small-scale accommodations and amenities, would improve Puna's attractions for eco-tourists.

Coastal hazards and historic, recreation, and aesthetic value make the Puna coast road inappropriate for development as a primary or secondary throughway, but make it well suited to preservation as a multi-modal and scenic by-way.

- Major collector roads should run from:

Opihikao to the Puna Road.

Volcano Road to the coast parkway along the Puna-South Hilo boundary.

Volcano Road to the Saddle Road above Hilo along the existing Kulani Road.

Upper portion of the National Park to a point approximately 2 miles west of Kalapana.

- Provide for general aviation and small boat harbor facilities as the need arises.

CDP Recommendations:

- Encourage County funding of a Puna Roadway Master Plan that establishes a regional roadway network, identifies roadway improvements and new roadway corridors, and recommends roads for County dedication.

- Study the feasibility of widening Highway 130 to a four-lane arterial between the Pahoa Bypass and the planned Keaau Bypass, and of eliminating frontage access.

- Upgrade of subdivisions' entrance roads—Kuauli, South Kulani, South Kopua, South Glenwood, and 22.5 Mile Road — on an incremental basis, in conjunction with upgrading of subdivision collector roads.

- Encourage the State to plan and implement development of a rural arterial corridor extending from the upper end of Kahakai Boulevard to the bottom of Hawaiian Acres, or another limited access route in the same general area, and then through Hawaiian Acres at "Nine and a Half Road" (between Nine and Ten Roads) to Kuauli, then through the upper part of Kurtistown and below Happy Homes, to connect with Komohana Street Extension in Hilo.

- Plan for and seek design funding for implementation of the Central Subdivision Corridor as shown in the General Plan, seeking State and federal assistance, as a limited access route, based on appropriate engineering studies and seeking to protect the underground lava tubes in the vicinity.

- Plan for and seek design funding for a mid-level parkway below Highway 130 from Hawaiian Beaches to Hilo, at the level of 14th or 15th Street through Hawaiian Paradise Park, instead of along the coast.

2.2 TRANSPORTATION

CDP Recommendations (continued):

- Design upper ("Nine and a Half Road") and lower (14th or 15th Streets) laterals and Central Subdivision Corridor to preserve options for later conversion to street car or light rail, and to otherwise comply with ISTEA requirements for rural arterials.
- Study the feasibility of extending Pikake Road in Orchid Land east to cross Highway 130 and to intersect with the lower parkway, as the transportation spine of a future light industrial/technical park at Waipalani.
- Work with the County Department of Public Works, the State Department of Land and Natural Resources Na Ala Hele Program, and community interest groups to dedicate Railroad Avenue, Volcano Trail, Puna Trail and other suitable routes for bicycle and/or pedestrian routes, with emphasis on community-managed operation and maintenance.
- Promulgate new standards for rural roads comparable to the standards in effect before the 1967 County Zoning and Subdivision Codes. Begin a cooperative program to bring candidate Puna subdivision roadways up to standard for dedication to the County.
- Collaborate with the subdivisions for gradual County acceptance of appropriate subdivision collector streets.
- Collaborate with community groups to designate the coastal road and Pohoiki (Mango) Road as historic and scenic roads, as defined by the federal guidelines, to "protect and enhance the scenic, historic, cultural, natural and archeological integrity and visitor appreciation of an existing highway and adjacent area." Consider making the Mango Road one-way, and developing an additional corridor on the Kapoho side, to preserve its character.
- Design transportation routes to integrate with regional and local bicycle/pedestrian networks.
- Support community initiatives to plan for Rural Town Districts, and/or other community-based master planning.
- Consider other land use patterns, with land uses which provide for less auto-dependence and more transportation choices for residents.
- Maintain but do not widen road between Kapoho and Honolulu Landing, except as needed for emergency access.
- Urge the State Department of Transportation to develop a new boat ramp facility at Kapoho Bay on lava accretion land, and to consider a small boat harbor at Makuu.
- Expedite Keaau bypass road.

2.3 ECONOMIC

County General Plan: Economic GOALS

- Provide residents with opportunities to improve their quality of life.
- Economic development and improvement shall be in balance with the physical and social environments of the island of Hawai'i.
- The County of Hawai'i shall strive for diversity and stability in its economic system.
- The County shall provide an economic environment which allows new, expanded, or improved economic opportunities that are compatible with the County's natural and social environment.

Puna's Population and Economy:

Puna's present population of approximately 30,000 provides 12,000 workers, increasing by up to 800 per year. Puna's build-out population (without ohana, approximately 167,000; at 40% in the labor force) would have the potential to provide approximately 67,000 people in the labor force.

Since the vast majority of those residents will be in the non-conforming subdivisions, the development of the economy of Puna hinges in part upon correcting the deficiencies in infrastructure in those subdivisions which prevent the development of convenient employment and services prescribed by the County General Plan.

Puna is well placed to develop three economic bases to support her potential population: diversified agriculture, eco-tourism and specialty industries. Careful placement in the physical landscape, based on a long-term vision, will allow these bases to develop in support of each other and in keeping with the rural pattern valued by Puna residents.

2.3.1 Community Concerns for Economic Development of Puna

- Development of economic opportunities in Puna should be appropriate to the current and future population of Puna, so that Puna may become economically self-sufficient rural communities, rather than merely a commuter suburb of Hilo.
- The economic environment should be one which encourages entrepreneurs, self-employment and small business, so that it is possible to start a business with a minimum of capital.
- Home businesses and diversified agriculture are highly desirable to Puna residents as a way to maintain the rural character of their communities and a rural lifestyle.
- The development of the economy should respect traditional Hawaiian culture and the native environment of Puna, including the forests, the coastline, cultural and burial sites, and the religious and cultural significance of Puna as the home of the goddess Pele and other Hawaiian deities.
- Development of industries in technical and information fields, and small-scale, specialized manufacturing, should give Puna residents and their children a wide range of economic choices and opportunities.

2.3.2 ECONOMIC: Agriculture

2.3.2 Courses of Action for Agriculture

from the GENERAL PLAN:

- The County shall assist the further development of the agricultural industry by providing support services, such as cooperation with other agencies in developing manpower training programs, protecting important agricultural lands, and requesting and providing necessary capital improvements.
- The overseas capacity at Hilo's General Lyman Field is extremely important to the development of Puna's export crops. The County shall continue to encourage the further development of this facility.

CDP Recommendations:

- The County Department of Research and Development should encourage collaborative efforts by commodity and other agricultural groups, and state and federal agricultural agencies, to form a regional agricultural task force to coordinate agricultural resource management, infrastructure, research and other institutional support in a manner that maintains confidentiality for farmers and commodity groups.
- Encourage the designation of agricultural buffers, based on State ALISH designations, to serve as green belt areas, within which subdivisions of agricultural lands for residential purposes is prohibited.
- Support the expansion of the freight facility/marshaling yard/storage facility in Hilo to serve expanding industry.
- Support state funding for development of agricultural water systems designed to meet the needs of Puna farmers.
- Encourage the amendment of the County tax code relating to forestry, pasture, and agro-forestry, to provide greater incentives for sustainability, flood control, protection of native species in keeping with the goals of the General Plan.
- Encourage the prohibition of subdivision of agriculturally zoned land in Puna into lots smaller than three acres, except for subdivision into five lots or less.
- Support efforts to legislate regulations for the certification and labeling of organic produce in Hawai'i.

Agriculture in Puna

The number of farm operators and products is increasing rapidly in Puna. The Federal Soil Conservation Service has over 400 cooperators in Puna and conservatively estimates over 900 operators. Diversified agriculture is rapidly changing and growing. Development is so fast in some commodities that individuals, associations and corporations are hesitant to expose the investments and details of their operations. Yet change is fast in residential and commercial uses also. Agriculture needs a strong representation in land use and infrastructure planning to assure its continued development.

Puna has many small-scale, developing, entrepreneurial, experimental and independent growers and gardeners. These innovators can provide leadership toward locally and internationally competitive new crops, products, and markets. In addition, they are not generally dependent upon subsidies and protection whose loss may threaten some segments of Hawaii agriculture. This is a long-term strength of Puna agriculture. At the same time this diversification of agriculture among many new crops and operators complicates regional resource management, record-keeping and planning for institutional support.

Puna has enough developable water to supply all her foreseeable agricultural, domestic, and industrial needs. Current trends, both in Hawai'i and globally, point to higher costs and competition for agricultural water. Puna's agricultural competitiveness and sustainability can be enhanced by careful husbanding of this precious resource.

The major infrastructure barrier to development of agriculture in Puna is the cost of water development and transmission lines. Because of Puna's high rainfall, supply needs can generally be met by economical catchment reserves, except during drought. This problem applies equally to agricultural areas served by County systems developed to provide domestic needs, which do not have the capacity to provide farmers during dry periods.

Puna has a large and growing market for its products in its own rural communities. Marketing assistance could help Puna farmers to expand their markets to other parts of the state and beyond.

The existing and emerging specialties of Puna's small farmers—flowers, native plants and flowers, exotic tropical fruits, organic produce, and gourmet and ethnic products—are especially compatible with eco-tourism.

2.3.3 ECONOMIC: Tourism

The Potential for Ecotourism in Puna

The rebirth of native Hawaiian culture and a new reverence for nature's unique creations have created great potential for the development of ecotourism. Eco-tourism is described as:

- *travel to visit and appreciate the traditional cultural sites and natural environment of the destination area.*
- *protection of the native ecosystems of an area and of the traditional culture of the people within those ecosystems.*
- *activities to generate income by providing community-based services to visitors of natural and cultural sites in a way that protects and nurtures the natural and cultural systems, and in a manner that is economically sustainable.*

Puna has already established herself as Hawai'i's premier natural/cultural attraction. Bed and breakfast and retreat accommodation units have grown to over 200 establishments since 1985, and occupancy rates have steadily increased.

Puna is in a unique position to market its eco-tourism destinations because of its pristine areas. Puna is part of the United Nations-designated International Biosphere Preserve, of which Hawai'i Volcanoes National Park is the core. Puna's coastal areas are among the most unspoiled in Hawai'i and have one of the highest continuous concentrations of significant Hawaiian cultural sites.

Traditional trail systems are largely unspoiled, are still identifiable, and are largely publicly owned. The Puna trail starts at the Hilo airport.

The only land zoned for resort development, in Kalapana, was covered by lava in 1990. Small-scale, decentralized, low-investment tourism is appropriate: lodges, bed and breakfast establishments, and small-scale visitor attractions.

2.3.3 Courses of Action for Tourism

from the GENERAL PLAN:

- There is potential for limited visitor facilities in the form of small accommodations and support facilities, such as natural areas, botanical gardens, and limited commercial facilities. Resort growth should enhance and be in keeping with this area's rural character.

CDP Recommendations:

- Collaborate with the Department of Land and Natural Resources and community support groups to implement a district-wide system of trails, historic roads and railroad rights-of-way, starting at Hilo airport, integrated with other transportation corridors and local community trail systems. (Also see Environment and Recreation sections, Zone Guide Map, and trail system map in map section.)
- In overall land use planning, insure the integrity of continuous corridors compatible with eco-tourism, such as the combination of trail corridors within open space reserves, naturalized drainways, and connection with services and accommodations in town centers and more remote areas, as well as the National Park.
- Support community initiatives to plan for and implement special regulations and designations to accommodate and integrate eco-tourism development into local community land use planning.

2.3.4 ECONOMIC: Fishing

2.3.4 Courses of Action for Fishing

from the GENERAL PLAN:

- The fishing industry in Puna should be assisted by the County through a cooperative effort with State and Federal agencies.

CDP Recommendations:

- Encourage the State to construct an access road and boat ramp on the lava accretion land next to Kapoho Bay.
- Ask the State Department of Transportation to consider the possibility of constructing a ramp or a small boat harbor at Maku'u.

2.3.5 ECONOMIC: Industry

2.3.5 CDP Courses of Action for Industry

- Designate for gradual rezoning suitable industrial lands around Kea'au, including ample area for buffers and retention of natural areas to maintain a park-like environment.
- Consider promulgating new zoning classifications for industrial uses which create the specialized environments attractive to desirable industries, such as communication and "back office" industries, which would provide quality employment for Puna residents.
- Consider development of free trade zones in future Puna industrial areas.
- Include an option for small parks for specialized industry in a new Rural Town District zone designation.

Puna's Fishing Industry: Offshore Puna is one of Hawaii's most productive fishing grounds, but launching from Puna's coast has always been one of the most difficult and dangerous in Hawaii.

Fishing boats in Puna are inadequately served by a single boat ramp at Pohoiki. Launching at Pohoiki is incompatible with the intensive recreational uses of the area, which does not have adequate sanitary facilities for either the fishing boats or the park users.

Because there are so few places to get in the water on Puna's coast, for boats or people, intense competition needs to be anticipated and mediated in advance to insure the separation needed for safety.

Puna's Industrial Uses: Puna has an ample reserve area for industrial expansion well placed between the subdivisions and the ports of Hilo. Shipman Industrial Park, 488 acres, started in the mid-1980s, is now 25% used.

Puna has a number of the characteristics attractive to "back office" or other specialty industries:

- labor force with a low cost of living,
- a beautiful and clean environment, and
- local communities with a high level of initiative and local control.

A number of characteristics needs improvement if Puna is to attract industry:

- quality neighborhood schools.
- health and safety infrastructure, community facilities and services, and
- supporting land uses at the neighborhood level.

County zoning does not now differentiate between types of general industrial uses. Many of the most desirable industries may be reluctant to locate where they might have a polluting or otherwise offensive neighbor.

2.3.6 ECONOMIC: Geothermal Energy

2.3.6.1 Community Concerns for Geothermal Energy

Puna's Geothermal Development

Geothermal development began in lower Puna in the 1960s with the drilling of several shallow exploratory geothermal wells without much success. The first producing geothermal well, called Hawaii Geothermal Project-Abbot well (or HGP-A) was drilled in 1976 just east of the intersection of Leilani Avenue and Pohoiki Road. This well, one of the hottest in the world, not only became the true start of Hawai'i's geothermal industry but also initiated the anti-geothermal movement, largely as a result of its poor management and operation. The well and attendant power plant (which started producing power in 1982) were intended to be a demonstration of electrical generation using geothermal energy for a two-year period, but instead operated for seven years, amply demonstrating the lack of foresight in land use planning.

The anti-geothermal movement continues to strongly oppose the industry to this day. Geothermal and residential development have been shown to be incompatible in this region.

Transfer of residential development rights (TDRs) to potential direct-use industries could ameliorate the polarization caused by the existing conflicting land uses.

Studies and data support the renewability of the resource on the east rift zone of Kilaue'a. However, Hawaii Electric Light Company (HELCO) is not interested in negotiating any more "firm power" contracts, since Puna Geothermal Venture already produces nearly 50% of the island's baseload. This could change dramatically with the development of some form of energy storage or significant usage of electrical vehicles.

Because of the hazards associated with the east rift of Kilaue'a, there is a high risk of loss of a significant portion of the island's electrical supply.

- Geothermal development has resulted, for some residents, in a lack of confidence in government to protect or respond to the community.
- Some nearby residents believe their health has been, and continues to be, negatively affected by geothermal well-drilling and the operation of the power plants.
- After incidents of uncontrolled venting, community members are anxious for testing and refinement of emergency response.
- After many years of delay, Geothermal Asset Fund money, set aside by the developer and government to compensate for losses suffered by nearby residents, is now being made available. However, the amount of compensation and the administration of the fund are in dispute by area residents.
- Use of geothermal power will not reduce the amount of fossil fuel imported into the state, although it will reduce the amount of heavier grades of refined products that must be transported from Oahu to the Big Island.

2.3.6.2 Courses of Action for Geothermal

From the General Plan:

- The County shall support the development and utilization of geothermal resources and by-products consistent with environmental, social, economic and other goals expressed elsewhere in the General Plan.
- Assist the Research Corporation of the University of Hawaii in acquiring land adjacent to geothermal exploration sites to expand research programs or uses of geothermal by-products.

CDP Recommendations:

- Conduct and implement pro-active land use planning for geothermal designation for the rift zone areas of Puna.
- Study the use of Transfers of Development Rights (TDRs) to reduce density in the rift zone and to transform some residential rights to direct-use, e.g., waste heat industries, if appropriate.
- Support the development of an incentive program, within an operative overall energy management program for the County, that would increase the use of electric vehicles, thereby storing energy and allowing increased use of geothermal energy in off-peak hours.

2.3.6 ECONOMIC: Geothermal Energy

CDP Recommendations (continued):

- Geothermal development and transmission corridors should be dispersed along the east rift and the Geothermal Subzones so that sources are limited to 20% or less of the island base load in any one-mile section.

2.4.1 NATURAL HAZARDS: Subsidence

***Puna's Coastal Subsidence:** There is general island-wide subsidence of approximately 1/4" per year. In addition, the south flank of Kilauea is subject to catastrophic subsidence of five or more feet in a single event. This catastrophic subsidence has occurred three times in the last 130 years, resulting in loss of life and property, and coastlines moving inland as much as several hundred feet at a time, with a concurrent tsunami.*

Coastal property ownership changes status when inundated. What was previously private property may be reclassified as navigable waters, under the jurisdiction of the U.S. Army Corps of Engineers, or public shoreline, under State jurisdiction.

When shoreline moves inland, coastal protection policies may become ineffective. For instance, the width of the coastal Conservation District and the Special Management Area may become narrower.

2.4.1.1 Specific Concerns of Puna Community

- Risk for loss of life and property from subsidence along the coastal areas of the south flank of Kilauea.

2.4.1.2 CDP Courses of Action for Subsidence

- Study the use of Transfer of Development Rights (TDRs) to reduce residential densities in the area of subsidence and environmental pollution in Kapoho.
- Consider increasing the State Conservation District and County Special Management Area boundaries in areas subject to subsidence.

2.4.2 NATURAL HAZARDS: Lava Flow

2.4.2.1 Specific Concerns of Puna Community

- Leilani Estates and Lanipuna Gardens (2,400 lots) are concentrated in Lava Flow Hazard Zone (LFHZ) 1, where lava intrusion may make roads impassible within forty-eight hours of an eruption.
- In LFHZ 2, which may have a somewhat longer warning period, there are 13,450 houselots; approximately 2,500 have been covered or made inaccessible by lava flow since 1983.
- 10,000 lots in LFHZ 2 are under one acre and are candidates for future requirements for central sewage treatment.

2.4.2.2 CDP Courses of Action for Lava Flow

- Encourage the funding of a risk analysis study of LFHZs 1 and 2, as a basis for land use, building code and infrastructure policies and remedies appropriate to the risk. Consider the option of low-cost, low-risk housing, such as traditional Hawaiian "thatched roof" housing.
- Study the use of Transfer of Development Rights (TDRs) to reduce residential densities in LFHZ 1 and 2.
- Seek means to direct Pahoa development laterally rather than downslope, to lower potential property damage from lava flows.
- Encourage provision of two or more escape routes from every residential area and regular emergency response tests.
- Support National Park acquisition of recent flow areas adjacent to park boundaries.
- Work with the USGS in any reevaluation and/or refinement of Lava Flow Hazard Zone 2 designation for Hawaiian Beaches, Parks, and Shores.

***Puna's Lava Flow Hazard Areas:** The east rift area of Kilaue'a is designated by the USGS as Lava Flow Hazard Zone 1, and the rest of the south flank and the area north including Pahoa and Hawaiian Beaches as Lava Flow Hazard Zone 2.*

Federal Housing and Urban Development policies have prohibited use of HUD funds in those areas since 1990.

The State of Hawai'i Administrative Plan for Hazard Mitigation states: "Federal, State and County agencies will not promote or encourage higher densities than presently exists in the Lava Flow Hazard Zones 1 and 2 of the east rift zone of Kilauea..."

In addition, recent USGS studies have designated some areas of the south flank, such as the Pohoiki/Leilani Estates area as having a 65% chance of lava coverage in the next 50 years. Thirty-five percent of the area of east rift LFHZs 1 and 2 has been covered by lava since 1953.

Among hazards, lava flows are unique. Lava flows resemble landslides, since infrastructure is destroyed and land may be covered or unusable for many years.

County government has no existing land use goals, policies, or standards for lava flow hazards. Lava flow hazard is not mentioned in the County General Plan.

Lava flows downhill to the coast, unless affected by obstructions, pooling, etc. Development that follows a similar pattern is at greater risk than development spread laterally across the slope.

2.4.3 NATURAL HAZARDS: Flooding

***Puna's Drainage Issues:** Development anticipated under existing rights in Puna can be expected to significantly increase surface water flow. The amount of rainfall in Puna is very high. The porosity of the lava surface in most places allows this water to be absorbed. Development may lower absorption by as much as 20 to 60 percent.*

In addition, the location of drainage channels in Puna cannot be reliably predicted because of the geologically young topography. Lot clearing, a driveway or even a hapu'u falling in the forest, may divert runoff water significantly.

Because of the lack of clearly defined drainageways, the identification and creation of dedicated drainage channels may be required and may require costly acquisitions or condemnations in areas where subdivision has already occurred and residential development is proceeding.

Studies by the Soil Conservation Service and by the U.S. Army Corps of Engineers in the last decade have indicated a too-low cost:benefit ratio to qualify for federal programs, but as development progresses, increasing flooding and increasing the development in the way of the floods, the benefit, ironically, will increase.

In addition, stringent control of non-point source pollution of surface water may significantly increase the cost of channeling surface waters to the coast at the same time that public funds to pay for mitigation are rapidly shrinking while the responsibility is being transferred to the private sector.

Recent state law has assigned responsibility for existing drainage improvements to the landowner.

2.4.3.1 Specific Concerns of Puna Community

- The subdivisions in Glenwood on the Mauna Loa side of Hwy. 11 (Orchid Isle, Aloha, Glenwood, and Pacific Paradise Mountain View Manor) are particularly subject to flooding because of high rainfall and ash clay soil. Roads have washed out repeatedly. The cost for drainage improvements to mitigate flooding for permitted development is expected to be prohibitive.

- Runoff quality will continue to degrade with development. Non-point source pollution of surface waters can be expected to increase from agricultural chemicals, suburban wastes and landscape chemicals, automobile and roadway toxins, and runoff from industrial development.

2.4.3.2 Courses of Action for Flooding

from the GENERAL PLAN

- As urbanization increases within the district, the drainage systems designed for the existing village areas shall be implemented. These systems are designed to collect and transport surface runoff through the communities.

- Provide improvements as shown by the County of Hawai'i "Drainage Master Plan" and the "Mountain View Drainage Study."

- Support development of the Glenwood/Mtn. View Watershed project.

- Encourage diversified agricultural farmers to participate in Soil and Water Conservation District Programs.

CDP Recommendations:

- Study the use of Transfer of Development Rights (TDRs) to reduce residential densities in areas subject to severe flooding in upper Puna.

- The Department of Public Works should collaborate with subdivisions, the Federal Emergency Management Agency, and the Natural Resources Conservation Service to inform lot owners and developers of drainage problems, the effect of development on drainage, and recommended practices to minimize and prevent increase in run-off in all developing areas.

2.4. 3 NATURAL HAZARDS: Flooding

- Seek State and federal funding for a comprehensive flood control and drainage study of the upper Puna drainage area including Hawaiian Acres and Orchid Land.
- The County should consider initiating a task group, including all stakeholders in the two associated drainage patterns of Kurtistown/Kea'au and Hawaiian Acres/Orchid Land flooding, the U.S. Army Corps of Engineers and the Natural Resources Conservation Service. The task group should, if possible, choose one drainage channel of the two to accept the flood waters and to focus on education, better flood plain management and land use planning to most effectively prevent future flood damage.

2.4.4. NATURAL HAZARDS: Fire

2.4.4.1 Specific Concerns of the Puna Community

- Wildland fires occur in and near subdivision areas regularly during droughts.

2.4.4.2 Courses of Action for Fires

- Encourage clearing of land and construction standards which conform to fire codes.
- Consider dedicating water tanks to fire protection in susceptible areas far from public water systems.

The South Kulani Diversion Wall: A series of water diversion walls, totaling over one-half mile in length and varying from six to twelve feet in height, channels water into Hawaiian Acres, starting at the South Kulani Bridge. This channel also receives overflow waters from the Mountain View Drainage Improvements developed by the County in the early 1980s. Water along and below the wall, in Hawaiian Acres and Orchid Land, can reach five feet or more in heavy rains.

According to the recollections of residents, the walls were built by Olaa Sugar Company (Amfac) starting in 1938, to divert floodwaters away from cane fields along the Mauna Loa/Kilauea boundary into what was then called "wasteland," owned by W. H. Shipman.

According to records of the Hawaiian Acres Community Association (HACA), the original subdivision developer was involved in litigation with Amfac over the walls at or shortly after the time of subdivision. Amfac purchased the lots under and around the walls in the early 1960s, but has sold all but one to different individuals in the last few years.

In 1979, debris blocked the flow under South Kulani Bridge, diverting floodwaters away from the wall to what may have been the original drainage channel. The two patterns are approximately two miles apart where they cross Highway 130. The unpredictability surrounding the two drainways, arising from policy failures as well as geographic features, increase the risk of planning and development for everyone involved.

The cemented stone wall, which crosses five lots in Hawaiian Acres, is overgrown with strawberry guava and other plants. HACA is concerned that the wall may begin to break apart because of the tree roots and lack of maintenance. Should this occur, it is feared that the course of already serious flooding will become even more unpredictable.

2.5 HOUSING

2.5.1 Specific Concerns of Puna Community

- Lack of infrastructure and public services in existing areas with already permitted residential development; lack of fully served buildable homesites but a great surplus of buildable homesites, with no orderly infrastructure planned.
- More residential development rights than are appropriate in some areas, especially hazard zones.
- Lack of housing opportunities for elderly and others who cannot drive, or do not drive.
- Low-income owner-builders, often with non-permitted dwellings, for whom the one-time costs of electrical and plumbing, or the complexities of building permits, are a barrier.

2.5.2 Courses of Action for Housing

from the GENERAL PLAN:

- Aid and encourage the development of a wide variety housing choices for this area.
- Since the sugar company has lands zoned for residential use within existing urban areas, they should be encouraged to make these lands available on the private market.
- Consider and encourage the use of a variety of mechanisms to provide the necessary infrastructure in the nonconforming subdivisions.
- Encourage the maintenance and rehabilitation of the existing housing stock to maintain the viability of existing communities.

CDP Recommendations:

- Plan, design and build a corridor of secondary public roadways and water mains into the central corridor of the central subdivisions, as shown in the General Plan, as a starting point for clustering of service and pedestrian areas.
- Encourage planning for future multi-family residential areas near future commercial centers in the existing subdivisions, in collaboration with these communities, in collaboration with these communities, to provide transportation and housing options for residents who cannot or do not wish to be auto-dependent.

County General Plan: Housing

GOALS

- Attain safe, sanitary, and livable housing for the residents of the County of Hawai'i.
- Attain a diversity of socio-economic housing mix throughout the different parts of the County.
- Maintain a housing supply which allows a variety of choice.
- Develop better places to live in Hawaii County by creating viable communities with decent housing and suitable living environments for our people.
- Improve and maintain the quality and affordability of the existing housing stock.
- Seek sufficient production of new affordable rental and fee simple housing in the County in a variety of sizes to satisfactorily accommodate the needs and desires of families and individuals.
- Ensure that housing is available to all persons regardless of age, sex, marital status, ethnic background, and income.
- The cornerstone of the County's housing programs and activities shall continue to be the encouragement and expansion of appropriate home ownership opportunities for our residents.

***Puna's Housing Dilemma:** The non-conforming subdivisions of Puna have a long way to go toward meeting the Housing Goals of the General Plan. The comprehensive installation of infrastructure is financially infeasible. Even if it were feasible, many of Puna's homeowners would be priced out of their homes, by increases in taxes or other fees, such as improvement district payments. However, some of the most critical infrastructure, such as water fill stations and water supplies for fire protection within a mile of dwellings, could be provided with little cost to homeowners. See Section 3.1.2.*

The pressure to comply with building regulations is increasing as subdivisions fill in. This may create conflict among neighbors and a threat to low-income owner-builders who fear losing their homes.

2.6 PUBLIC FACILITIES

County General Plan: Public Facilities

POLICIES

- The County shall continue to seek ways of improving public service through the coordination of service and by maximizing the use of personnel and facilities.
- The County shall coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.
- The County shall develop short and long-range capital improvement programs and operating budgets for public facilities and services.
- The County's Capital Improvement and Operating budgets shall reflect the goals and policies of the County General Plan.
- The County shall require a six-year, long-term capital improvements budget by County Departments and agencies which shall be reviewed for consistency with the County's General Plan.

Sites for Future Public Facilities: Sites have not yet been reserved for public facilities in most subdivisions. Finding sites is becoming difficult as more lots are developed. Land acquisition and consolidation/resubdivision would be required for most of Puna's non-conforming subdivisions to create lots large enough for public and community facilities and for commercial centers.

Quality neighborhood schools are one of the chief characteristics sought by new residents as well as businesses when choosing locations for new branches or decentralization. Neighborhood schools are also one of the chief determinants of parental involvement and ultimately of student success. The lack of schools in the non-conforming subdivisions may therefore limit opportunities for residents in several ways.

2.6.1.1 Specific Concerns of Puna Community

- There is a need for more equitable proportional appropriation of the County capital improvement budget over time to create the public facilities needed in Puna to service the residential development already permitted by the County of Hawai'i.
- Neighborhood locations of public facilities and multi-use of such facilities, such as schools, parks and community centers, are needed to preserve the sense of community that is highly valued by Puna communities.

2.6.1.2 CDP Courses of Action for Public Facilities

See proposals for New Towns in Subdivision section in Appendix.

2.6.2 PUBLIC FACILITIES: Education

2.6.2.1 Specific Concerns of Puna Community

- There are insufficient neighborhood school locations and facilities in subdivisions and some towns.
- Many desire availability of school facilities for community use.
- Many desire community involvement in schools.
- There is a need for educational choices, including sites for small alternative schools.

2.6.2.2 Courses of Action for Education

from the GENERAL PLAN:

- Improve existing school complexes to meet the standards established by the Department of Education.
- School facilities shall be made available to the community for recreation and other compatible uses during and after school hours.

2.6.2 PUBLIC FACILITIES: Education

General Plan Recommendations continued:

- Encourage the implementation for relocation and development of a new elementary complex in Pahoa.
- Encourage improvements to pedestrian access between the village of Pahoa and the school and library facilities.
- Encourage expansion or development of community-school library complexes at Pahoa and Mtn. View.

CDP Recommendations:

- In the east rift area: Instead of increasing the school facilities in Pahoa, consider developing smaller community elementary schools near centers of population in the subdivisions. The United States Geological Survey should be consulted so that schools can be placed with minimum of risk, i.e., schools may be located laterally rather than directly *mauka* or *makai* of population centers, and in smaller than normal modules.
- Encourage the State to cooperate with subdivisions in early selection of sufficient neighborhood school sites to accommodate the future build-out of the subdivisions, in order to avoid later condemnations.
- Schools sites should be reserved at the following general locations over the next fifteen years, in collaboration with the Department of Education, with development to proceed as needed:

Elementary/Library:

Royal Hawaiian /Ohia Estates	22.5 mile
Eden Roc/Fern Acres	Waikahekahe
Ola'a	Hawaiian Paradise Park
Nanawale	

Intermediate Schools & High School:

22.5 mile	Waikahekahe
Hawaiian Paradise Park	

Acreage needed (DOE standards):

Elementary with playground: 12 acres
Intermediate School: 18 acres
High School complex: 50 acres

- Subdivisions should be encouraged to collaborate with the DOE to do long-term planning for additional school facility locations that may ultimately be needed for permitted development.

County General Plan: Education

POLICIES

- The County shall encourage continuous joint pre-planning of schools with the Department of Education and the University of Hawai'i to ensure coordination with roads, water, and other support facilities and considerations such as traffic and safety, and access for vehicles, bicycles, and pedestrians. Encourage master planning of present and proposed public and private institutions.
- The County shall encourage the joining of school yards with county parks and the availability of school facilities for after school use by the community for recreational, cultural, and other compatible uses.
- The County shall encourage joint community-school library facilities, where a separate community library may not be feasible, in proximity to other community facilities, affording both pedestrian and vehicular access.

STANDARDS

- In proposed communities, sufficient acreage shall be reserved for school facilities. Sites shall be free from flooding and drainage problems, and excessive slope and shall incorporate appropriate street and driveway design and location to minimize traffic interference, pedestrian hazard, and to enable safe and easy access for vehicles, bicycles and pedestrians.

2.6.3 PUBLIC FACILITIES: Protective Services

County General Plan: PROTECTIVE SERVICES

STANDARDS

- Development of police and fire facilities should entail joint use structures whenever feasible.
- The establishment of a fire/police facility shall consider site size and locations which permit quick and efficient vehicular access.
- Police headquarters shall be near the geographic center of the service area and near concentrations of commercial and industrial use.
- Stations in outlying districts shall be based on the population to be served and response time rather than on geographic district.
- Additional rehabilitation and counseling centers shall be established as needed.

2.6.3.1 Specific Concerns of Puna Community

- There is a shortage of conveniently located water supplies for fire-fighting, especially during drought.
- There are insufficient sites and facilities for fire/police stations needed to serve permitted development.
- There are lengthy response times for some emergency calls.

2.6.3.2 Courses of Action for Protective Services

from the GENERAL PLAN:

- A review of the possibility of 24-hour fire service for the entire district should be conducted and expansion of public office facilities should be considered in accord with district needs.
- Police services and facilities should be expanded to meet the needs of the district.

CDP Recommendations:

- Cooperate with master planning in subdivisions to reserve sites for fire/police centers in planned rural town centers.
- Collaborate with subdivisions to locate and reserve future fire facility sites to meet safety standards for response times for future build-out of permitted development. At those sites, build dedicated water tanks for fire protection.
- Support new volunteer fire stations in Nanawale, Hawaiian Beaches, and Orchid Land, located at the sites of future county fire/police stations.
- Plan for new fire/police stations at Waikahekahe, or other central location to serve the new population centers in the subdivisions.
- Carefully limit future County expenditures in new police/fire station facilities in Pahoa and elsewhere in Lava Flow Hazard Zones 1 and 2, except for necessary repairs and maintenance. (See Natural Hazards section.)

2.6.4 PUBLIC FACILITIES: Government Operations

2.6.4.1 Specific Concerns of Puna Community

- Government services are not commensurate with current population, and services for permitted population are not yet planned.
- There is insufficient opportunity for government employment located in Puna.

2.6.4.2 Courses of Action for Government Operations

from the GENERAL PLAN:

- Expand and improve facilities as necessary.

CDP Recommendations:

- A new, full-service civic center should be planned for the future at Waikahekahe, to be developed first as a center for social service outreach and processing.
- Collaborate with subdivision associations to locate future government service center sites in conjunction with community master planning. These may be developed gradually in conjunction with fire, police and community services.
- Encourage the State and County to consider locating "back office" services in Puna, and to support neighborhood technology work centers for public and private use.

2.6.5 PUBLIC FACILITIES: Health and Sanitation

***Puna's Health Services:** Distance to Hilo Hospital makes physicians reluctant to locate in Puna. In addition, because of the low income of Puna residents and lack of medical coverage of Puna residents, providers may be reluctant to locate in Puna. The new State Health Program, Quest, may help ease that situation.*

***Puna's Solid Waste Disposal:** Increasingly strict requirements for solid waste disposal are rapidly increasing the costs of new landfill sites for permanent placement. The result is that recycling and resource recovery are becoming relatively more economical. Rapidly advancing technology in composting, alcohol production and biomass indicate that future waste disposal sites should be sufficient in size and location to accommodate a symbiotic combination of waste disposal, resource recovery, and energy generation in changing configurations.*

2.6.5.1 Specific Concerns of Puna Community

- Puna has a high proportion of children in low-income households and a high rate of teenage pregnancy; the groups most likely to lack adequate medical care.
- There are elderly and disabled persons in Puna who need frequent medical services and often have no transportation.
- There are insufficient health services for the current population and there is no integrated planning of services for the permitted population.
- There is insufficient provision of solid waste handling and convenient recycling sites for current or permitted population.
- There are hundreds of abandoned vehicles at Railroad Avenue, Sand Hill, and on sites in and near towns and subdivisions.

2.6.5.2 Courses of Action for Health and Sanitation

from the General Plan:

- Maintenance of cemetery sites shall be improved.

CDP Recommendations:

- A future hospital should be sought for Waikahekahe, to be developed first as an out-patient clinic, medical offices, and social service provider center.
- The State should cooperate with the subdivisions to reserve future health service center sites.
- The County and State should collaborate with subdivisions to locate and reserve future sites for recycling, waste disposal, resource recovery and energy production options.
- The County and State should collaborate to develop legislation which provides disposal fees for vehicles at the time of purchase and business opportunity for removal and recycling of abandoned vehicles.

2.7 PUBLIC UTILITIES

2.7.1 CDP Courses of Action for Public Utilities

- A main utility corridor should be located along the Central Subdivision Corridor, as shown on the County General Plan Facilities Map.
- The County should collaborate with subdivisions to locate Rural Town Districts to reduce the cost of providing utilities.

2.7.2 PUBLIC UTILITIES: Water

2.7.2.1. Specific Concerns of Puna Community

- In many areas there are no provisions for water for use in drought or fire.
- Water from catchment tanks can be unsafe for drinking.
- There is a need for additional agricultural water systems and adequate agricultural capacity in existing systems.

2.7.2.2 Courses of Action for Water

from the GENERAL PLAN:

- Improve inadequate water systems.
- Water source investigation and exploration should be continued in order to provide service for anticipated needs.

CDP Recommendations:

- Develop new sources and a new major water main delivery system along Central Subdivision Corridor. Along it, place fill stations and dedicated tanks for fire fighting.
- Consider instituting graduated water rates which reflect the cost of energy for pumping uphill.
- Collaborate with the State Department of Agriculture to develop agricultural water systems suitable to meet the needs of Puna's diversified agriculture industry. Encourage the State to explore the possibility of assisting agricultural water cooperatives using aboveground delivery

Puna's Public Utility Services: Because of the lack of planned centers for the orderly and gradual expansion of utilities, development in the non-conforming subdivisions has been widely dispersed, making delivery of phone and electricity very expensive per service. The high cost of providing service in this pattern raises the cost of services for all users. This has been a recurrent complaint of public utility companies. This hidden subsidy of dispersed development needs to be addressed.

Clustering of public utilities nodes near centers of permitted development will minimize public and private costs and allow developers, investors and homeowners to locate according to their need and ability to pay for amenities.

Puna's Water Services: Lack of agricultural water may be holding back development of diversified agriculture in Puna. Even farmers tied to County water cannot use the water during droughts when they most need it.

In addition, the lack of water prevents planned and orderly development of businesses and commercial areas sorely needed in Puna subdivisions to provide an economic base and convenient services and public facilities for subdivision residents.

Placement of catchment tanks on individual lots is critical to fire fighting. However, during drought, when fire risk is greatest, water tanks are likely to be empty. The distance, especially uphill, for water delivery from fill stations is the major time and expense factor for delivery of water to catchment tanks.

Although the legislation creating the Department of Water Supply directs water rates tied to the delivery costs, DWS policy is to charge a uniform rate. This policy discourages the development of water systems in mauka areas because the extra energy costs must be spread to all customers.

2.7.3 PUBLIC UTILITIES: Water (continued)

systems in agricultural areas.

- Standards for water tanks should be adopted by the State Department of Health as well as the County.
- Collaborate with local community associations in Rural Town District planning to designate "dispersed infrastructure areas" and other alternative utility districts to preserve lifestyle choices.

2.7.3 PUBLIC UTILITIES: Electricity

Puna's Transmission Systems

Independent sources for generation and conservation technology are advancing rapidly. However, for safety and security, whatever the power source, a network of transmission corridors is more secure than one or two corridors that may be subject to disaster.

2.7.3.1. Specific Concerns of Puna Community

- Lack of electricity in some areas where residents want service and pressure to connect for others who don't.
- Unsightly and/or unsafe transmission lines.
- Power interruptions and black-outs.
- The desire of some communities to be designated as "dispersed infrastructure communities," or "off-the-grid" communities.

2.7.3.2 CDP Courses of Action for Electricity

- Collaborate with subdivisions to set aside "dispersed infrastructure" or "off-the-grid" areas for alternative and experimental energy systems.
- Consider a study of the relative costs and risks of one or two transmission corridors and centralized sources versus multiple small ones for long-term reliability of energy grid in Puna's natural hazard areas.

2.7.4 PUBLIC UTILITIES: Telephone

2.7.4.1 Specific Concerns of Puna Community

- Lack of telephones for emergencies in some areas.
- Poor telephone service hampering business development.

2.7.4.2 CDP Courses of Action for Telephone

- Collaborate with local communities in designating certain areas as "dispersed infrastructure communities," based on agreement among landowners.
- Encourage development of reliable and economical cellular telephone service.

2.7.5 PUBLIC UTILITIES: Sewer

2.7.5.1 Specific Concerns of Puna Community

- Coastal pollution, especially that caused by inadequate sanitation at coastal parks and residences.
- Cesspool may desecrate burial and historic sites and disturb unique ecosystems in lava tubes.

2.7.5.2 Courses of Action for Sewer

from the GENERAL PLAN:

- The use of cesspools shall be discontinued in coastal areas where cesspools do not function satisfactorily to meet water quality standards. Individual household aerobic treatment units approved by the State Health Department and the County of Hawai'i could be utilized in these areas. Future sewerage systems for the Puna area would then naturally commence with service to the lower coastal areas.

CDP Recommendations:

- Encourage the State Department of Health to inform builders at the time of building permit of the long-term prospects for central sewers for the dwelling being constructed so that the dwelling may be placed on the lot to facilitate connection if and when it is required.
- Collaborate with the subdivisions and the Big Island Resource Conservation and Development Council to evaluate potential for alternative low-flow treatment systems for small communities as opposed to large central systems.
- Encourage the State Department of Health to anticipate and mitigate the long-term problems of transition from present septic requirements to compliance with the federal Clean Water Act.
- Locate and reserve sites for future sewage treatment plants where they will be needed.
- As much as possible, install adequate toilets and treatment systems at coastal recreation areas.

County General Plan: SEWER

POLICIES

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

Federal Clean Water Act: In order to comply with the federal Clean Water Act, the future need for central sewers must be anticipated for all subdivisions with lots smaller than one acre and for one-acre lots if second dwelling approvals continue.

Where anticipated densities are over one acre per dwelling septic systems must be anticipated.

State Department of Health requirements for individual wastewater systems may complicate the transition to future compliance. Homeowners in subdivisions which will eventually need sewers are now required to install expensive septic systems, while areas where cesspools are now allowed are anticipated to need septic tanks in the future.

If Puna homebuilders are informed of the prospect of being required to connect to central sewer in the future, they may reduce connection costs by siting their structures to anticipate connection.

2.8 PUBLIC FACILITIES: Recreation

County General Plan: Recreation

POLICIES

- The County shall coordinate recreation programs and facilities with governmental and private agencies and organizations. Innovative ideas for improving recreational facilities and opportunities shall be considered.
- The County shall develop local citizen leadership and participation in recreation planning, maintenance, and programming.
- The County of Hawai'i shall adopt an ongoing program of identification, designation, and acquisition of areas with recreational resources, such as land with sandy beaches and other prime areas for shoreline recreation.
- Public access to the shoreline shall be provided in accordance with an adopted program of the County of Hawai'i.
- The County shall establish a system of pedestrian access trails to places of scenic historic, natural, or recreational values.
- The County, in coordination with appropriate State agencies shall establish a program to inventory ancient trails, cart roads and old government roads on the island.
- The County shall develop facilities and safe pathway systems for walking, jogging and biking activities.

Puna's Parks: Puna has a high proportion of Hawaiians; the Hawaiian culture is ocean-oriented, using the coastal waters and shoreline for fishing, swimming, surfing and the gathering of marine resources. There are few [beaches] places in Puna where children can safely play in the ocean and the few there are may not be accessible. Many of the Hawaiians in Puna have relocated from Oahu. Some are frustrated by the lack of beaches, and the lack of easy access to the one beach in Puna at Kea'au (Ha'ena), and the coastline in general. However, the opening up of coastal accesses for contemporary users who are not from traditional Puna families may adversely impact the traditional uses and malama (care for) traditional cultural sites and coastal resources by the Puna families who have maintained their stewardship of those areas. Traditionally, the authority over use of these areas by outsiders has been the kuleana of these families.

Many of the traditional trails in Puna are well-recorded. There are also a number of unused public roadways.

Puna has several communities which operate county parks at considerable public savings, in joint public/private partnerships.

2.8.1 Specific Concerns of Puna Community

- Lack of future park space for potential population in subdivisions.
- Lack of sufficient coastal park space for current and future needs.
- The community has expressed strong support for trail systems and bikeways. (See proposals for trail development under Transportation Section.)
- Kalapana and Kaimu recreation sites lost to lava should be replaced.
- There is strong community need and support for coastal access and support facilities.
- Conflict between desires of in-migrants for shoreline access and traditional stewardship and protection of those areas by Puna families.

2.8.2 Courses of Action for Regional and District Parks

from the GENERAL PLAN:

- A swimming pool should be provided in Pahoia in cooperation with the Department of Education.

CDP Recommendations:

- Plan a future regional park at Upper Maku'u.
- Set aside areas for district parks adjacent to future high school sites.

2.8.3 Courses of Action for Community and Neighborhood Parks

from the GENERAL PLAN:

- As population increases and need arises, neighborhood parks in large subdivisions between Kea'au and Pahoia should be provided and improved.

CDP Recommendations:

- Collaborate with subdivisions to set aside community park sites to serve areas with 5,000 to 10,000 permitted population as part of master planning, in conjunction with planning for elementary schools.
- Collaborate with community groups to set aside and develop neighborhood parks, pocket parks and neighborhood trail and nature corridors.

2.8 PUBLIC FACILITIES: Recreation

2.8.4 Courses of Action for General Use Parks

from the GENERAL PLAN:

- Implement the County of Hawai'i Park Development Plan for the Kalapana-Kaimu area.
- Recommend that the State develop the ancient canoe landing site area as a recreation site.
- Recommend establishing a wilderness camp and park reserve on State-owned land east of Kaimu.
- Recommend the establishment of beach reserves at Kehena Beach and Opihikao (west of Opihikao junction).
- Recommend that the State expand the MacKenzie State Recreation Area.
- Develop and expand the Isaac Hale Beach Park recreation area. Provide trail access to Keahialaka Springs and Pond and Mahinaakaka Heiau.
- Develop the Kapoho Tidepools as a marine park.
- Establish a small scenic park overlooking Kapoho and provide minimum facilities.
- Develop recreational areas along the coast between Hilo and Kapoho, including areas at Papai, Ha'ena (Kea'au), Kaloli Point, Keonepoko Nui, Honolulu Landing, and Nanawale.
- Establish small scenic viewpoints along the Puna Road to overlook the rift zone and Kauileau, Ke'eke'e and the 1955 lava flows.

CDP Recommendations:

- Collaborate with community groups, and especially with traditional Puna Hawaiian communities, to produce a long term master plan for coastal park facilities and access to accommodate the build-out population in a manner which, as much as possible, protects sensitive areas from public access, and provides for traditional Puna Hawaiian community stewardship of limited access areas.
- Complete development of the County's Puala'a recreation area in lower Puna.
- Collaborate with community groups and the State on the restoration or provision of basic recreational support amenities wherever there is heavy recreational use of the coastline. If the area is unsafe, provide facilities at the nearest practical safe shoreline access point.
- In collaboration with the State's Na Ala Hele program and community groups, develop inventory and master plan for a Puna trail and bikeway system. (See list under Names, Sites and Corridors.) (See also Transportation Section.)

2.9 ENERGY

2.9.1 Specific Concerns of Puna Community

- Many Puna residents live independently of the energy grid and are actively involved in promotion and development of alternative energy for domestic and transportation use. At the same time many residents who are currently "off the grid" would probably desire to tap into the grid if it is made available at reasonable hook-up cost. Sometimes residents with similar sentiments are grouped together, sometimes not.

CDP Courses of Action for Energy

- Collaborate with subdivisions to create viable town centers aligned along future public transit routes central to potential population. Implement land use patterns which cluster uses in pedestrian-scale town centers.
- Support efforts of subdivisions to establish and recognize "off-the-grid" or "dispersed infrastructure" areas.
- Collaborate with community initiatives to develop model "non-emission" or other experimental and alternative transportation routes.
- Locate future sewage treatment, green waste/biomass and energy production sites for cooperative processes and convenience, e.g., at Glenwood, Kea'au, Waipahoehoe, and Maku'u.

County General Plan: Energy

GOALS

- Strive towards energy self-sufficiency for Hawaii County.
- Establish the Big Island as a demonstration community for the development and use of natural energy resources.

Puna's Energy Issues: Energy demand in Puna is rising rapidly with new residential development. Puna's non-conforming subdivisions are auto-centered, with great distances to services, schools, services, employment centers, supplies and recreation. Their residential development is therefore significantly more energy intensive than development in better-planned areas, and therefore a disproportionate burden on the many low-income residents.

The cost of installing and maintaining the electrical grid is very high in Puna because of weather, vegetation, and the relatively great distances from house to house.

One of the major impending energy uses for Puna is for pumping water. While it may be some time before a large number of homes connect to a water supply, eventual connection should be strategically considered.

2.10 ENVIRONMENTAL QUALITY

Puna's Natural Environment: The lower Puna forest and the Ola'a forest are among the finest and most well preserved of their types in the state. In addition, the Office of State Planning and the National Biological Survey, in a joint project with The Nature Conservancy, have identified areas of Puna, now zoned for agriculture, which have significant remnants of the Ola'a forest.

Coastal areas, especially on the south flank of Kilauea, have subdivisions where there is a history of subsidence. As a result, some house sites and their wastewater systems are under water at high tide.

2.10.1 Specific Concerns of Puna Community

- Cave environments beneath a number of subdivision lots are critical environments for unique cave ecosystems. These may be threatened by the seepage of raw sewage from residential cesspools and by increased human disturbance.
- Fear that information on the location and distribution of lava tubes will become too available, and subsequently, sites and burials will be vandalized or intentionally destroyed.
- Fear that lack of information about the location of lava tubes will threaten the safety of bulldozer operators, property owners and the integrity of the caves themselves.
- The Puna shoreline, though relatively unspoiled, has areas of sewage pollution associated with residential and recreational uses.
- Several forested subdivisions serve as critical environments for a number of native species including birds, plants and insects.
- Continuous forest environment in small-lot subdivisions is particularly threatened by individual water and wastewater systems (water catchment tanks and septic systems) which require clearing lots beyond housepads, so that there may be no room to retain forest fragments. In addition, the clearing tends to expand the introduction of noxious weeds.

2.10.2 CDP Courses of Action for the Environment

- Coastal environmental quality should be protected by encouraging placement of new development inland.
- Consider the use of Transfer of Development Rights (TDRs) to reduce residential densities in areas of subsidence and coastal pollution.
- Consider the use of TDRs to protect important forest lands in upper Puna.
- Participate with the National Park Service, State and private landowners in regional forest protection and restoration.
- Collaborate with subdivisions containing lots smaller than one acre to educate owners about and plan for the future requirement of central sewers.
- Support local communities in the preparation of community master plans which provide for retention of continuous natural corridors and reserve areas large enough to maintain ecosystem integrity.
- Availability of information on lava tube locations should be restricted or controlled to minimize potential vandalism and intrusion into burial sites.

2.10.3 ENVIRONMENTAL QUALITY: Lava Tube Caves

2.10.3.1 Specific Concerns of Puna Community

- Danger of loss of human life due to potential cave-in from bulldozing over caves.
- Pollution of caves and water resources, and desecration of sacred sites by location of cesspools in or near caves and diversion of polluted surface floodwaters into caves.
- Unavailability of information for bulldozer operators and surface property owners.
- Lack of guidance and/or support for appropriate treatment of caves by surface property owners.

2.10.3.2 CDP Courses of Action for Lava Caves

- Support creation of an interagency committee including the following:
 - State of Hawai'i:
 - Office of Hawaiian Affairs
 - Department of Health (DOH)
 - Department of Land and Natural Resources (DLNR) and subagencies, including Historic Preservation Division
 - Burial Council
 - County of Hawaii:
 - Department of Public Works
 - Planning
 - Civil Defense
 - Federal:
 - Natural Resources Conservation Service
 - National Park Service
 - Community:
 - Hawaii Speleological Survey
 - National Speleological Society
 - Subdivision Associations
 - Puna's Hawaiian Kupuna

to propose short-term policy, education and permitting procedures for cave conservation and public safety.
- Consider requirement of cave safety approval as part of County Department of Public Works grading permits and DOH individual wastewater system approvals.
- Support development of a cave management plan.

Puna's Lava Caves

"The Keaau and adjoining *ahupua'a* of Puna District are the world's leading area for the scientific study of lava tubes, their features and environments. Some of these caves also have considerable utilitarian and cultural importance.

"In recent years, the Hawaii Speleological Survey has given priority to systematic inventory, mapping, and study of the caves of north Puna, in cooperation with the lava hazard studies of the U.S. Geological Survey. In the course of these studies, numerous short caves have been connected into lava tube systems of various lengths, with mapping of more than 40 miles of lava tube caves...Others have paced or mapped more than ten miles in another cave or caves...No other volcanic area of the world comes even close to such a concentration of lava tube caves."

-William R. Halliday, February 1995.

Resources, Values and Management of Puna Caves, Hawaii Speleological Survey of the National Speleological Society

The lava tube caves of Puna are an emerging critical issue, because of their common presence beneath the lots and roadways of non-conforming subdivisions. This makes for inevitable increasing human interactions with those caves, intended and unintended. The result is a greater potential for negative consequences for the humans, for the caves' special environments, and for water resources.

The locations of the caves are not all known. There may be some liability issues for the County in not reviewing building and grading permits for known cave locations if injury or loss of life or property results.

At the same time, the caves of Puna are a valuable resource for biological, archeological and geological studies. Like it or not, they are also a tourist attraction.

2.11 HISTORIC SITES & NATURAL BEAUTY

Puna's Historic Heritage

Puna's coastal areas has relatively dense concentrations of historical (sites originating before and after contact-1780) cultural and burial sites. There are also a number of sites located at former inland settlements and agricultural areas. While few resident descendants remain of the the people who lived and are buried in these sites, those descendants still malama (care for) those sites. The rapid influx of newcomers, including Hawaiians who do not have these ties or traditions, threaten to overwhelm this heritage.

Historical sites are not uncommon on subdivision lots, especially in coastal areas. Under subdivision lots are lava tubes, many of which also have significant sites and burials.

The presence of protected historic sites in communities and the cultural integrity of the community increases its potential for ecotourism that can help support cultural appreciation and understanding, if managed carefully by the cultural practitioners themselves.

Sites of natural beauty, and other sites which may not be considered "beautiful" or historic may be culturally significant sites for Hawaiian Religious tradition. It is impossible to separate the dieties who make their home in Puna from the natural beauty itself. Ola'a, for instance, is both the forest of Laka and a manifestation of Laka.

Many of the ancient and traditional trails of Puna connected areas whose natural beauty has cultural significance. Many of these are still protected as public land or with traditional access rights.

The presence of unspoiled vistas and traditional sites of natural beauty, accessible by trail, is an important asset for the development of eco-tourism.

2.11.1 Specific Concerns of Puna Community

- Owners of small lots with significant sites need support and assistance if saving significant sites renders their lots unusable.
- The cost of archeological data recovery from privately owned sites that need to be studied before they are destroyed.
- Dense vegetation often disguises historic sites until they have already been destroyed by bulldozing. Sites in lava tubes are threatened by the raw sewage of cesspools.
- Many historic/burial sites have already been destroyed.
- Place names with traditional or cultural importance have been replaced, especially in Kea'au and Ola'a.
- The traditional town centers of Volcano, Mountain View, Kea'au and Pahoa have distinct architectural styles that should be retained.
- Long views across expansive view planes are found from many locations in Puna. Location of electrical transmission corridors may degrade these views.
- The almost totally unspoiled natural vistas along the whole Puna coast are highly valued.

2.11.2 CDP Courses of Action for Historic and Cultural Sites & Natural Beauty

- Support efforts by the Historic Preservation Division to preserve and interpret several large landscapes with ruins of houses, fields, paths, and religious structure, at Kahuwai Village and a land section in Keauohana, and other sites, working with landowners, the National Park Service, and with the Puna Hawaiian community, to result in a number of linked interpreted historic sites for limited access.
- Support efforts by the Historic Preservation Division to identify, with the Puna Hawaiian community, sites that are of traditional cultural significance -- burials, gathering places, and extremely sacred areas -- to protect from public access and interpretation.
- Support and collaborate with the State Department of Land and Naural Resources, Historic Preservation Division to conduct comprehensive field surveys and continue to improve the inventory of historic sites in Puna that identify the distribution of known historic sites and help predict the relative likelihood of historic sites in the different parts of Puna.
- Collaborate with subdivision associations to institute volunteer community historical survey boards to facilitate identification and protection of sites within subdivisions and to devise acceptable means to assist owners in protection of sites.
- Restore traditional and historical place names. Kurtistown's historic name is Ola'a. Ihope road was Ola'a Back Road. Other

2.11.3 NAMES, SITES AND CORRIDORS

instances of replacement of Hawaiian place names should be corrected.

- New town centers created in the subdivisions should be given Hawaiian names associated with that particular part of Puna.
- Support public education, protection and access to traditional trails and unused public rights of way, based on a management plan to avoid impacts to traditional Hawaiian places and environmentally sensitive areas along the trail or right of way.
- In Keaau, encourage research and documentation, and, if appropriate, application for historic district designation.
- In Keaau, Pahoa, and Volcano, encourage traditional design district guidelines for rehabilitation of existing structures and "infill" that matches the existing historic patterns, with special attention to parking and setback requirements.
- Where designated, historic districts should be recognized with signs at entrances to the area.
- Encourage research and documentation, and where appropriate, historic designation of additional sites, including those along trails and old rights of way.

2.11.3.1 HAWAIIAN CULTURAL SITES

This list represents only a small percentage of known sites in Puna. There are additional sites that have not yet been identified.

Place Name	Feature	Tax Map Key
Pu'u Laimana Kapoho	1960 lava flow	1-4-02:1
Kuki'i, Pu'au Kukae, Kapoho	Cinder cones	1-4-02:2
Kapoho Cone	Cinder cone	1-4-02:16,31
Halekamahina, Kapoho	Cinder cone	1-4-02:32
Honua'ula Cone, Kapoho	Cinder cone	1-4-01:19
Pu'ulena, Kahuwai	Craters	1-3-45:36,37
'I'ilewa Cone, Kamaili	1955 lava flow	1-2-10:1
Holei Pali Fault, Kalapana	Fault	1-1-01

Coastal areas of striking contrasts:

Kahau Le'a (above cliffs)	Tidal ponds, fishing area	1-1-01:17
Ka Lae Ahole, Kalapana	Viewpoint	1-2-03:12
Kehena Beach	Black sand beach	1-2-09:21
Ke'eke'e viewpoint	Viewpoint	1-2-09:22
Opihikao shoreline	Scenic shoreline	1-3-04:71
Pohoiki warm springs	Warm springs	1-3-08:5
Pohoiki shoreline	Scenic shoreline	1-2-08:5
Keahia Laka Spring	Spring and ponds	1-3-08:15
Keahia Laka shoreline	Scenic shoreline	1-3-08:15
Kapela Bay, Kahuwai	Black sand Beach	1-4-03:13
Kahuwai shoreline (Hilo)	Scenic shoreline	1-4-03:13
Kahuwai shoreline (Puna)	Scenic shoreline	1-4-03:13
Kahuwai Viewpoint	Makaukiu Point	1-4-03:13
Honolulu Landing	Waiakahuila shoreline	1-4-03:19
Waiakahuila shoreline	Scenic shoreline	1-5-63:1-4
Kea'au Cove	Cove with stone beach	1-6-140:4,5
Kaua'ea	Kauaea	1-3-03:5
Malama Ki	MacKenzie Park	1-3-07:26
Ahalanui Pond, Kapoho	Mauna Kea Pond	1-4-02:5

2.11.3 NAMES, SITES AND CORRIDORS

2.11.3.2 HAWAIIAN HISTORIC SITES

This list represents only a small percentage of known sites in Puna. There are additional sites that have not yet been identified.

Name	Location/Destination	Site #	Tax Map Key
Enclosure	Kea'au Ranch	1845	1-6-118:37
Lava Bubble Enclosure	Kea'au Ranch	1846	1-6-118:37
Honolulu Landing			
Habitation Complex	Honolulu Landing	4221	1-4-03:19
Maku'u Petroglyphs	Maku'u	4222	1-5-10:11,15,16
Kuki'i Heiau	Kapoho	2500	1-4-02:2
Ahalanui	Kapoho	2503	1-4-01:49,73
Ahalanui Complex 2	Kapoho	2505	1-4-02:7
Laepao'o Enclosure	Kapoho	2506	1-4-02:7
Pohoiki North Complex	Pohoiki	2507	1-3-8:16
Pohoiki Enclosure	Pohoiki	2512	1-3-08:4
Hale Park Complex	Pohoiki	2515	1-3-08:4
Complex	Malama	2524	1-3-08:1
MacKenzie Petroglyphs	Malama	2529	1-3-07 and 08
King's Pillars	Kapoho	4250	1-4-02:1
Kumukahi Grave Site	Kapoho	4251	1-4-02:1
House Sites	Kapoho	4254	1-4-27:24
House Sites/Complex	Kapoho	4255	1-4-27:14
Pu'ala'a Village, <i>Makai</i>	Kapoho	4294	1-4-02:4,15,16
Pu'ala'a Village, <i>Mauka</i>	Kapoho	4295	1-4-02:37
Keokea Petroglyphs	Kehena	2544	1-2-07:1

2.11.3.3 ANCIENT TRAILS

This list represents only a small percentage of known sites in Puna. There are additional sites that have not yet been identified.

Name	Location/Destination	Site #	Tax Map Key
Kehena Beach Trail	Kehena	2540	1-2-19:22
Hawaiian Coastal Trail	Kehena to Hilo	7386	
Makuu Trail	Railroad Ave to Maku'u		
Volcano Trail	Kea'au Beach to Volcano		
Trails of Kea'au, various*	<i>Mauka/Makai</i> , Maku'u to Hilo		
Glenwood/Makaopuhi	Glenwood to Makaopuhi		
Ka'ohe/ Puna Forest Trail	Pahoa to Mountain View		

* Located on maps in Department of Public Works archives, surveyed by Chief Engineer E.L. Wung in 1932.

2.11.3 NAMES, SITES AND CORRIDORS

2.11.3.4 HISTORIC/CULTURAL SITES

This list represents only a small percentage of known sites in Puna. There are additional sites that have not yet been identified.

Name	Location/ Destination	State Site #	Tax Map Key
Opihikao Congregational Church	Opihikao	7383	1-3-04:4
Kahaloa House	Opihikao	7384	1-3-04:18
Old Kudo Camp	Kaueleau	7385	1-3-05:12,13,19
Coffee Mill	Pohoiki	7386	1-3-08:4
Hale House	Pohoiki		1-3-08:4
Lyman Marker	Kapoho	7492	1-4-02:16
Pu'ula Congregational Church	Nanawale	7387	1-4-51:115
PAHOA TOWN	Pahoa	7388	1-5-7,11,13,14
Sacred Heart Catholic Church	Pahoa	in 7388	1-5-06:1
Pahoa YBA Hall	Pahoa	in 7388	1-5-02:9
Tao House	Pahoa	in 7388	1-5-114:24
Kamahele House	Maku'u	7476	1-5-10:9
Holy Rosary Catholic Church	Kea'au	in 7389	1-6-06:1
KEA'AU TOWN	Kea'au	7389	1-6-2,3,143
Puna Hongwanji Temple	Kea'au	in 7389	1-6-02:28
Manager's House	Kea'au	in 7389	1-6-03:10
Kamaulua Oka Malamamalama			
Hoomana Naauao O Hawaii	Kurtistown	7375	1-7-06:12
First Hawaiian Church	Kurtistown	7376	1-7-07:24
Kurtistown Jodo Mission	Kurtistown	7378	1-7-17:60
Iwasaki Camp	Kutistown	7379	1-7-17:15
Yamashita House	Kurtistown	7377	1-7-16:33
MOUNTAIN VIEW VILLAGE	Mtn. View	7374	1-8-01:01
Nichiren Shoshu Church	Mtn. View		1-8-02:10
Kunio Takaku House	Glenwood	7373	1-8-08:1
GLENWOOD	Glenwood	7453	1-8-09,10
VOLCANO VILLAGE	Volcano		1-9-03:4,5
Hale Ohia Log Cabin	Volcano		1-1-05:29
Dillingham Retreat	Volcano		1-1-05:14
Morse House	Volcano		1-9-03:10
Old YMCA (Kilauea Lodge)	Volcano		1-9-04:55

2.11.3.5 RAILROAD RIGHTS-OF-WAY

Railroad Avenue	Hilo Bay to Kapoho
Pahoa/Kaohe Branch	Keonepoko to Pahoa/Kaohe
Opihikao Branch	Kapoho to Opihikao
Waipahoeohoe Branch	Waipahoeohoe to Orchid Land
Glenwood Line	Keaau to Glenwood

2.1.3.6 HISTORIC/SCENIC ROADS

Pohoiki (Mango) Road	Leilani to Pohoiki
Coast (Red) Road	Kehena to Hawaiian Beaches
Opihikao Road	Kamaili to Opihikao

SECTION 3

IMPLEMENTATION & FINANCING

THE NON-CONFORMING SUBDIVISIONS

CHART OF LAND USE CHANGES

MAPS

RESOURCE LIST

SECTION 3.1 IMPLEMENTATION AND FINANCING

This section recommends ways to carry out the proposals contained in Section 2. It is divided into three parts:

- Land Use
- Capital Projects
- Policies

Each of these sections contains subsections on Equity, Tools, and Timing, as well as other topics that are specific to that element.

3.1.1 LAND USE

A number of land use changes are proposed in Section 2. Most of them are intended to move the planning and zoning of the State and the County into conformance with the actual permitted uses. Some of the land use changes address Puna's natural hazards that impose health, safety, and other costs on the County and its taxpayers. In addition, there is a proposal for a major new section in the County's Zoning Code to enable both old and new towns to develop as compact, pedestrian-oriented Rural Town Districts.

3.1.1.1 Equity.

The primary equity issues for land use are consistency and conformity of planning and zoning designations for the non-conforming subdivisions.

3.1.1.1.1 Consistency and Conformity. In order for zoning and land use designations to provide the protection of health and safety that justifies land use regulation, land designations and zoning should be in conformance with permitted use. Since there are different standards for health and safety and for services for different zoning designations, equity requires this consistency if all residents are to have their health and safety needs equitably met. It is recommended that the County initiate State Land Use boundary amendments from Agricultural to Rural or Urban where the lots are one acre or smaller. This involves a number of subdivisions in Puna which are now non-conforming and where the residents now find themselves in violation of State requirements for farm-related dwellings in Agricultural Districts.

3.1.1.2 New Tools.

New planning and zoning tools are proposed: H zoning suffix for volcanic hazard areas, a Rural Town District code, as well as consideration of Transfer of Development Rights (TDRs) to solve some of the land use problems of Puna, as well as elsewhere on the island.

3.1.1.2.1 Hazard Designation. Where there is a high risk of loss of public investment and private investment which, if lost, would require public aid and mitigation, and/or potential for injury or loss of life, the County, as the regulator of land use, has a duty to all taxpayers to try to prevent such losses by wise planning. Therefore, disclosure of the risks of development in the areas of high lava flow hazard is recommended. Disclosure would take the form of a new zoning suffix: H for volcanic hazard areas. The Hazard zone suffix should be defined in the Zoning Code and then attached to all zoning designations for the defined areas. For instance, RS-H-15 would mean Single Family Residential, Hazard Zone, 15,000 square feet minimum lot size, similar to how the Safety Zone designation is currently used for tsunami inundation areas.

The H suffix, in Puna and elsewhere on the island, should be attached to the zoning designations of

SECTION 3.1: IMPLEMENTATION AND FINANCING

all lots in Lava Flow Hazard Zones 1 and 2 as designated by the United States Geological Survey. The County Planning Department would need to work closely with the USGS and other agencies such as the Office of State Planning to translate and superimpose the broad-scale lava flow hazard maps onto the County tax maps. In addition, the County should consider requiring full disclosure of the presence of a Hazard Zone, by way of a signed disclosure statement, at the time of plan approval, building permit and/or subdivision application. The County should also consider prohibiting further subdivision of any parcel with the Hazard Zone designation unless it results in no net increase in buildable homesites in the designated Hazard zone.

3.1.1.2.2 Rural Town District. The community-based planning process for the Puna Community Development Plan was designed to elicit values, fears, and needs from residents. The results showed the most support for preservation of the existing character of the rural towns of Puna and for re-planning the existing subdivisions so that they develop to be more like those traditional rural towns. The most often expressed fear of development was of the traffic-congested lifestyle associated with the current suburban-sprawl pattern.

The current Zoning Code lacks a mechanism that would encourage the preservation of traditional-style rural towns, or the development of new towns in the traditional style, except as individually formed special districts, e.g., the Downtown Hilo District. Traditional towns are characterized by compactness, convenient pedestrian-accessible services, diversity of income and employment, a balance of jobs and housing, mixed uses, and clear boundaries between town and surrounding open space or agricultural land. It is recommended that a Rural Town District (RTD) code be added to the zoning and subdivision codes by the County. The RTD should be available for communities to use, subject to community initiation and a master plan adopted by the area to be served. It would be applicable to Puna and elsewhere on the island.

The RTD code should be considered for incorporation in the County Zoning Code, similar to (or as a subsection of) the Project District section of the current draft Zoning Code Update. However, the Rural Town District would have an essential difference: its function would be to guide and facilitate a community-based planning process in which the applicant would not be a "developer" in the traditional sense, but rather, the owners and residents of an existing community. To fulfill this function, both the planning process and development requirements need to involve County and State regulatory agencies and the applicants in a partnership, rather than strictly a permitter/permittee relationship. Such a divergence from the usual zoning and subdivision approval process needs to be simple and user-friendly as well as comprehensive. The RTD code should be a ready-made blueprint of the characteristics of successful traditional town features to guide the community planners, developers and organizers. Development of the code itself should be the result of a community-based process, with the assistance of County planners and perhaps planning consultants and would require several communities island-wide to act as test cases to work on the details of an RTD zoning ordinance. The following, therefore, are intended more as guidelines than as a formula for the actual code.

- The RTD, including its service area of farms, if any, should serve, at community maturity, a population of 4,000 to 7,000 people. Research indicates that this is an ideal size for civic and economic self-sufficiency, and provides approximately 400-500 children for a community elementary school—which would generally be the central focus of the community.

SECTION 3.1: IMPLEMENTATION AND FINANCING

- The RTD code should provide a mix of very small but varied zoning districts, mixed uses, small and medium-sized lots and a range of densities for a balance of jobs, housing, and services for a wide diversity of incomes and age levels.
- The RTD code should provide for a compact commercial/civic core including a "town square" with narrow "mixed mode" streets, with reduced parking requirements, parking in the rear or side of lots, medium-density apartments and offices over stores, passive open spaces interspersed between buildings, pedestrian-oriented blocks, and civic services such as post office, fire and police, and social services.
- The commercial uses should be defined as discrete mini-zones with user-friendly names. For example, a "shopping district" (even if only one block long) could be described in words and illustrations as follows:

A shopping street is a 70-foot wide right-of-way with parking and twelve-foot covered sidewalks on both sides. Retail sales (including restaurants) are the sole use. Restaurants may have some chairs and tables on the sidewalk. All frontages will line up with the sidewalk. There must be a new display window and entrance in storefronts at least every 25 feet. Upstairs will be professional services, real estate offices, travel agencies, and location-neutral businesses such as catalog sales.

A "repair district," a "financial district" and an "entertainment district" would receive similar treatment. These distinctions are patterns that are found in successful downtowns, no matter how small, and are easier for community planners to envision.

- Mixed uses for non-nuisance businesses, residences, preschool and elementary schools, elderly housing, lodges and boarding houses, and "less than twenty unit" garden apartment developments, should be within a five-minute walking distance of the central square.
- Growth boundaries are needed to clearly define the "edge of town" to separate it from agricultural and/or open spaces and provide protection for agricultural uses, especially where these may be the major land uses within the RTD planning district.
- An optional provision could be made for up to 200 acres on the edge of town for non-nuisance industries, technical centers, educational institutions and/or office buildings.
- The RTD code could be designed to be published on poster paper combining text and illustrations for ease of use by community planners in a workshop or charrette process.
- A workbook could be developed, including a checklist of activities, for creating individualized design guidelines to meet the unique characteristics or requirements of each town.
- Narrow streets, short blocks, lower parking requirements and shared parking, and other cost savings for developers should be encouraged to provide cost-incentives for pedestrian and bicycle amenities, open spaces and community facility sites.
- The RTD should provide the opportunity for delineating special districts, such as "off-the-grid" communities and for establishing TDR sending and receiving areas to help cluster density.
- The Community-Based Master Planning Process need not require the use of the RTD code. A conventional subdivision plan, using current zoning and subdivision codes may also be the product.

3.1.1.2.2.A

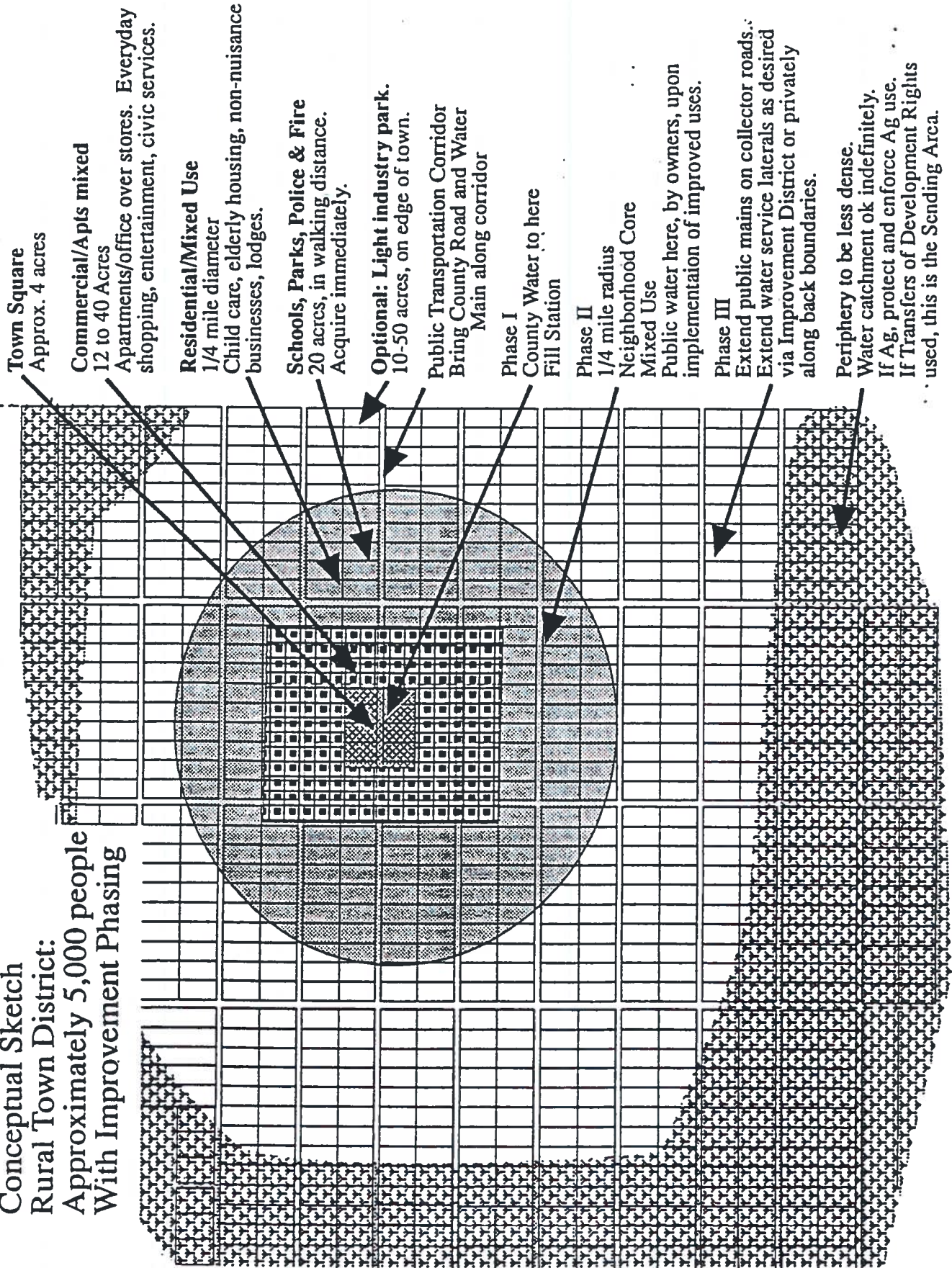
Puna Community Development Plan

Conceptual Sketch

Rural Town District:

Approximately 5,000 people

With Improvement Phasing



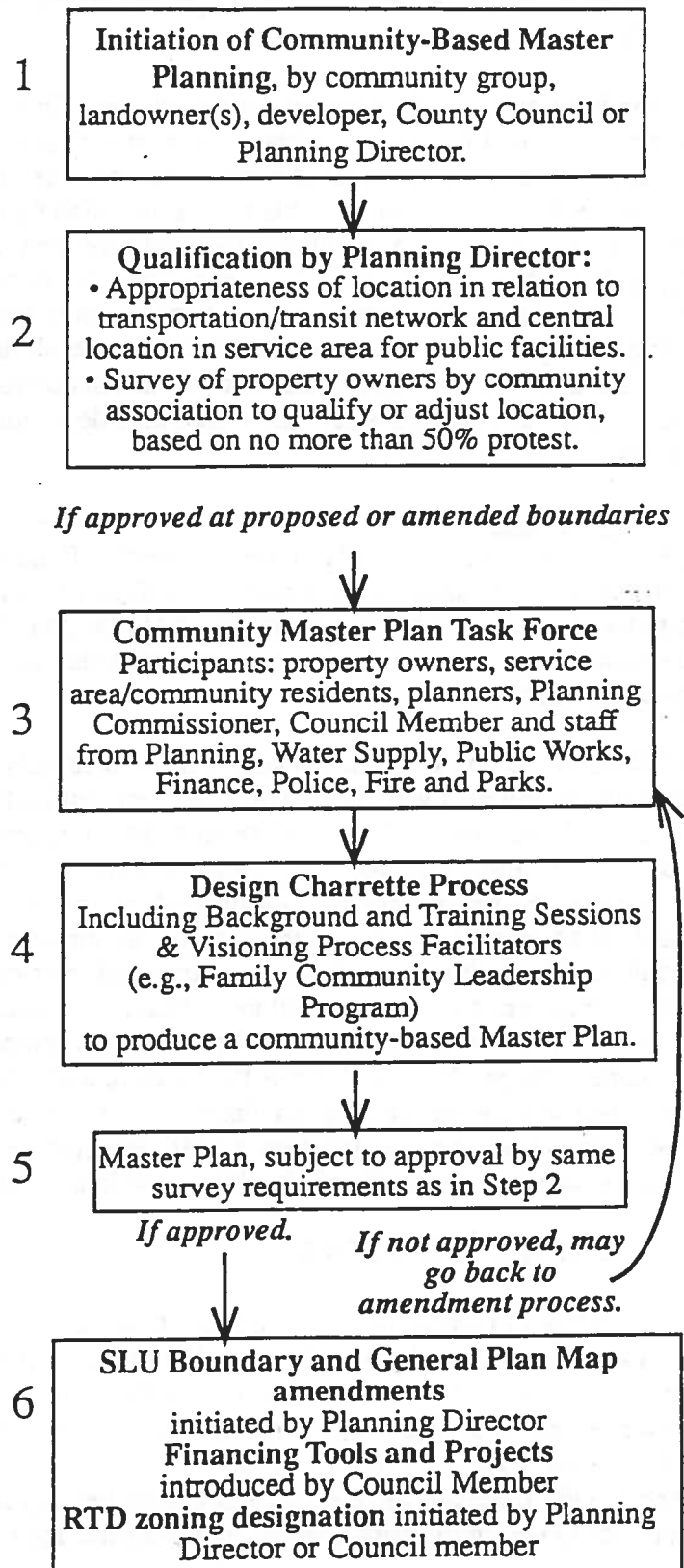
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3.1.1.2.2 B

COMMUNITY-BASED MASTER PLAN PROCESS EXAMPLE

• The Community-Based Master Planning process should be simple and cooperative. It should include the following elements:

- A clear beginning and ending to a process that can be completed in less than a year.
- One staff member each from Departments of Water Supply, Public Works, Finance, Parks and Recreation, and Planning, as well as at least one volunteer Planning Commissioner and volunteer Council Member, as participants with the community in the planning process.
- A wide variety of ways for residents and owners in the planning area to participate or provide input to the process.
- A requirement that, at least twice in the process, all property owners in the planning district are invited to participate and given the opportunity to protest, so that if more than 50% protest, or if more than half the votes received are negative, the community-based master plan cannot be adopted.
- A preliminary Planning Commission recommendation of approval would be required to delineate the boundaries of the planning district at the beginning of the process. The community master plan would be reviewed by the Planning Commission and adopted (or rejected) by the county Council by ordinance.
- Upon approval, the County Planning Director may apply for a State Land Use (SLU) boundary amendment to Urban for the Rural Town center of 12-40 acres, or conventional subdivision master plan, and may initiate appropriate amendments to the County General Plan LUPAG Map and Land Use District boundaries



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3.1.1.2.3 Transfer of Development Rights, or TDRs, as they are commonly known; are a tool for moving development rights from one area to another. It is accomplished through enabling legislation by the County, and the subsequent designation of Sending Areas from which building rights may be sold, and Receiving Areas where property owners may increase density by buying development rights from the Sending Area. Specific sending and receiving areas would have to be adopted by County ordinance.

In the Puna area, TDRs have two potential uses. One would be to move existing development rights from subdivided lots in high hazard areas into areas more appropriate for increased density. Another would be to provide for more differentiation of uses and orderly development of infrastructure within existing subdivisions. This is accomplished by allowing the transfer of building rights into rural town centers from peripheral areas that are then designated for less density and/or protection of agricultural or open spaces. The intent of this use is to allow clustering of density in a core service area, to lower infrastructure needs and costs, and to protect agricultural uses and affordability in the surrounding area, with little or no increase in overall density. This Community Development Plan recommends the funding and initiation of an island-wide study of TDRs, its applicability to solve certain land use problems such as hazard area development, and the designation of sending and receiving areas, if any.

3.1.1.3 Timing.

The implementation of the land use changes for Puna must begin as soon as possible. The current deficiencies in health, safety, equity and efficiency in the development of Puna have costs which will rapidly escalate as development continues to progress in disorder. In addition, failure to provide for disclosure of the presence of land use hazards may increase liability for the County in the event of natural disaster.

Infilling of the non-conforming subdivisions is rapidly increasing traffic congestion as well as the number of residents who lack basic amenities, public facilities and services. Many subdivision residents have indicated that their highest priorities are rural character, affordability and economic opportunity, along with reducing traffic congestion. The Rural Town District is a planning tool which can be used to help meet all of these priorities. Several of the subdivisions have already initiated community-based planning processes aimed at development of rural town centers. The residents of existing towns have also expressed their concern about their ability to develop in a way which preserves their rural, small town character. Mainstreet Pahoia has adopted a strategic plan while the Volcano community is debating design issues for maintaining the traditional character of Volcano Village. Kea'au Town is the focus of a legal dispute in part over the retention of older buildings and the rural plantation character of the area. A Rural Town District Code containing design standards and development guidelines could be used by existing and new communities to address these concerns if it can be developed in a timely manner.

3.1.2 CAPITAL PROJECTS

The funding of capital projects is a crucial and controversial issue for Puna. Disagreement about who should pay for a large and increasing shortfall in basic services has raised issues of fiscal equity due to the history of neglect of the non-conforming subdivisions. Nevertheless, further delay of a concerted effort to begin major improvements of public facilities and services to meet the needs of the growing Puna population will only increase the ultimate cost and increase the shortfall. This section will articulate some principles of fiscal equity in apportioning these costs as well as suggestions for lowering the costs overall, and priorities for scheduling selected major projects.

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3.1.2.1 Fiscal Equity.

The following are proposed principles for equitable implementation of capital improvement projects in the Puna district.

3.1.2.1.1. Parks, Police and Fire. The basic services of the County—parks, police and fire stations—should be provided to the non-conforming subdivisions and to all existing villages in Puna from the County General Fund. Fiscal history indicates that these subdivisions made substantial, partially-retuned contributions to the General Fund which provided such services to existing communities elsewhere. There are also indications that the non-conforming subdivisions of Puna were created, in part, for this purpose.

The fiscal equity principle, however, does not preclude the development of these services by innovative public/private partnerships and volunteer organizations working with the County. Puna communities have shown great initiative and innovation in developing such programs, from park facilities to volunteer fire stations, with substantial government savings. However, these programs cannot flourish if there is a perceived double standard. To succeed, fiscal equity programs should be instituted island-wide, for operations as well as for capital improvements.

3.1.2.1.2 Secondary Arterial Corridors and Water Mains. The basic public linear infrastructure of secondary arterial roads and of the water mains that run beneath them, along with the water capacity infrastructure to fill those mains should be developed under the same principle that has applied in the past to existing communities, but utilizing combinations of new and old financing tools. These new proposed corridors, as shown on the Transportation and Utility Maps as the Central Subdivision Corridor and the two roadway corridors at about 15th Street in Hawaiian Paradise Park and "Nine and a Half Road" in Hawaiian Acres, are comparable to Komohana Street or Waianuenue Avenue in Hilo.

These projects will require complex packages of funding sources that cannot easily be prescribed in advance. However, the following is an example of how the Central Subdivision corridor could be implemented:

The corridor is approximately twenty miles long, from Hawaiian Paradise Park to Volcano Highway at the 25-mile marker. The cost of the roadway itself, apart from land acquisition where needed, can be expected to be about \$2 million per mile, or \$40 million dollars total. As a rural arterial connecting rural town centers, it could qualify for 80% federal funding under the Intermodal Surface Transportation Efficiency Act (ISTEA). The County or State share would be \$8 million. The water main underneath the road and the wells, pumps and water tanks located along the road can be expected to cost approximately \$1 million per mile, or \$20 million. It is probable that part or all of the water project would qualify for grants and/or loans under the federal Rural Economic and Community Development section of the United States Department of Agriculture (the same program that funded 50% of the sewer improvements in Papaikou).

This project would provide substantial opportunity for higher uses and community facilities in rural town centers located near it. In addition, because of the availability of those facilities and emergency services, insurance and mortgage benefits and agricultural security for lots would accrue within a wide zone all along the corridor. Because this improvement can be expected to provide a substantial tax increment, this project may lend itself well to Tax Incre-

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ment Financing. The Central Subdivisions' present tax contribution, or base, is more than \$5 million. Over a 30-year payment period, an annual payment for two-thirds the cost, or \$14 million, would require a tax increment of under \$1 million per year.

In addition, property owners in the area might agree to a modest Community Facilities payment. If the Community Facilities payment were one-third of the cost of the water project, or \$7 million, spread over 30,000 parcels that would benefit, it would amount to only \$250 per lot in current dollars. This sort of financing is complex, and would require a lot of "packaging" to bring it about. But this one project would make everything else possible, and would lay the foundation for health, safety, services and economic opportunity in the Puna District.

3.1.2.1.3 Collector and Frontage Roads. For collector roads and access or frontage roads, the principles of "who pays" apply differently. For collector roads, which provide public access to public destinations and emergency services, County funding is appropriate. Moreover, the distances of these collector roads, in general, are comparable to per capita distances of existing County roadways. However, private road fees, Improvement Districts, Tax Increment Financing or Community Facilities Districts should be the financing choice for frontage roads and water distribution lines.

3.1.2.2 Tools.

A substantial number of new tools have become available for financing in Hawaii County in the last few years, including Tax Increment Financing and Community Facilities Districts, demonstrating County interest in tackling deficits in infrastructure and facilities island-wide. Additional planning and financing tools that would also be helpful for the County to consider are described below.

3.1.2.2.1 Land Banking. Most of the existing subdivisions in Puna do not have land set aside for parks, schools, fire stations, police stations, secondary roadway corridors, or water capacity facilities. If these lands are not set aside in the near future, the cost and barriers to later lot acquisition and assembly will become much higher, because more vacant lots will have been built on. In order to keep costs as low as possible, a public fund should be set aside to acquire lands for these purposes on the open market as soon as possible. In this way, lands in the right location or comparable lots for trading can be "banked" at the lowest possible public cost for new roads and other major public facilities. Also, if unexpected sources of infrastructure improvement funds such as federal grants become available, they need not be missed by not having the land ready and available.

3.1.2.2.2 Public/Private Partnerships. Public/private partnerships cover a wide range of arrangements. One example is lease partnerships, where local government, under a redevelopment program, buys and provides infrastructure to land, then leases it for development on a percentage basis, thereby being reimbursed for the public investment. A version already in use in Puna, at Cooper Center in Volcano and at Puala'a Park is a partnership arrangement between the County Department of Parks and Recreation and community management organizations. The County's volunteer fire stations are operated under similar programs. These types of programs show great potential for substantially lowering the costs of basic facilities and services and should continue to be expanded, in Puna and throughout the island.

3.1.2.2.3 Concurrency. Concurrency is a basic requirement of planning and zoning that is being adopted in an increasing number of jurisdictions, starting in Florida in 1985. It requires that the principle in the Land Zoning Bank section of the County General Plan be adhered to, by limiting upzoning and subdivision to concurrent needs. It also limits approvals of developments to those for

SECTION 3.1: IMPLEMENTATION AND FINANCING

which the public facilities and infrastructure, or the means to provide them, are in place. As a corollary, a Level of Service standard for facilities and infrastructure must be in place, with deficiencies made up in an orderly and equitable manner.

3.1.2.2.4 Project District Incentives within a Rural Town District. An RTD can provide substantial savings for developers, by allowing narrower streets, lowered parking requirements, smaller lot sizes, etc. As part of the package, therefore, dedications may also be required, such as for open space set-asides, within or near the RTD itself, or provision of space for child-care or elder-care. Incentives could also be provided for rehabilitation of existing structure, and for "infill" in existing towns to match existing historic areas. A flexible point system is one way to allow communities to put together a package of incentives and exactions in master planning their communities to suit their specific needs.

3.1.2.2.5 Redevelopment Districts. Creating a redevelopment district provides a broadened range of powers in solving the problems of lack of planning that blights the non-conforming subdivisions of Puna. Another defining feature of "blight" is, however, not found in the non-conforming subdivisions: lack of sufficient tax base to pay for needed improvements. Since the subdivisions, with their many vacant lots, produce more taxes than are currently used in those subdivisions, it may be hard to justify redevelopment districts. However, it is suggested that this option be explored, since it may provide access to additional funding sources. A county ordinance to establish the district would be required.

3.1.2.2.6 Land Readjustment. Land readjustment, a form of lot consolidation and resubdivision among a group of individual owners, provides an effective means to privately assemble and redevelop lots. It may be useful for implementing the plans of Rural Town Districts, and may provide a format for providing public spaces and a source of infrastructure funding. Incentives, such as providing a revolving loan fund for the readjustment process and some matching funds for infrastructure have been very successfully used by government to support land readjustment in other locales. State and County enabling legislation would be required.

3.1.2.3. Capital Improvements Timing

Timing of capital improvements is affected by a great many eventualities that can speed them up, slow them down, or re-order priorities: politics, community activism, unexpected funding sources or shortages, and changing rules for outside funding. Therefore, this Plan does not present a list or specific timing of capital improvements or overall priorities for government action. Instead, this section discusses important capital improvements on a general level, along with suggestions on how to begin building up Puna's level of public services.

3.1.2.3.1 Land Acquisition. The timing of land acquisition is perhaps the chief determinant of the public cost toward solving the lack of planning and the infrastructure and public service deficiencies in Puna. This plan as well as subsequent community-based master plans that identify infrastructure improvements and community needs will of themselves begin attracting residential development and indirectly raising prices in the very areas that will be needed for public lands. A million dollars spent on selected land acquisition in Puna in the next five years could translate into savings of up to hundreds of millions of dollars to future taxpayers.

3.1.2.3.2 Parks. Park development should be based on level of service standards set by the County, but initiated by the communities, starting with land banking upon request from the communities. In order to keep costs down, all new park development in Puna should be considered for the partnership program, in addition to island-wide expansion of the program.

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3.1.2.3.3 Police and Fire. A new centralized police/fire station should be built at Waikahekahe as one of the first priorities. Within the ten-year planning period of this plan, a new police and fire station should be planned for the the Volcano area, to lower the response time for upper Puna.

3.1.2.3.4 Transportation. Timing and planning together are critical issues for transportation because the federal Intermodal Surface Transportation Efficiency Act, ISTEA, requires that all projects appear in adopted community-based plans in order to qualify for ISTEA funds. ISTEA funds and other transportation funds may become available unexpectedly for those with projects "on the shelf" ready for development. For this reason, it is strongly recommended that all proposed secondary roads and trails, the projects most likely to qualify for ISTEA funds, be planned for completely. In this way, the maximum use can be made of non-local funding opportunities.

Of the major projects proposed, the priority should be for the Komohana Street Extension to Pahoia via "Nine and a Half Road" first, with the Central Subdivision Corridor as second priority. However, this order of priority should be flexible, depending on timing and fund sources. At the same time, funding should be sought immediately for land acquisition for a 15th Street corridor through Hawaiian Paradise Park, since so many lots must be acquired to eventually convert this corridor into a thoroughfare with the "frontage" eliminated.

The trail projects—Railroad Avenue, Puna Coast Trail, and Volcano Trail— should all be planned and engineered, then pursued according to funding opportunities and community initiative.

3.1.2.3.5 Water. The critical water infrastructure for Puna is the development of the base of a major new system centered along the Central Subdivision Corridor. Here, timing will be critical, because the cost of the main extensions will be much lower if installed at the time of the roadway improvements. At the same time, it can be expected that use of the water capacity that should be provided to such a system will only be gradually subscribed, as homeowners hook up one by one. In other words, the system will be "oversized" for awhile. Pricing policy changes for that interim period are suggested in Section 3.3. Land acquisition for pump and water tank locations should be made as soon as possible.

3.1.2.3.6 Schools. Decentralization of school development responsibilities should be encouraged. More direct participation and "voice" by Puna communities in planning and developing future school facilities in and for the non-conforming subdivisions and existing villages is needed. Community initiative for park development can also be extended to school development if there is local control of development and use of school facilities, providing better and cheaper neighborhood services and more community use of school facilities.

3.1.3 POLICIES

3.1.3.1 Equity Issues.

There are a number of policy changes which could lower barriers and costs for basic infrastructure and services in Puna. A number of these changes would also improve equity. Among these are more realistic roadway standards for Puna's rural roads, as well as rural roads islandwide, to meet the needs of all non-conforming areas, from the homestead areas to the more recent non-conforming subdivisions. County and State level of service standards for facilities and operating funds and more equitable water pricing are also needed.

SECTION 3.1: IMPLEMENTATION AND FINANCING

3.1.3.2. Tools.

3.1.3.2.1 Roadway Standards. Puna's non-conforming subdivisions which maintain their own roads are caught in a double-bind of maintaining huge local networks of private roadways that funnel individually onto public highways, while being unable to dedicate any of the roadways to the County due to their substandard condition. This problem could be solved by the implementation of equity-based policies. The first of these would be County acceptance of the collector roads, along which are or will be located public services and facilities. Second is the adoption of a rural road standard, comparable to the standard that was in place when the subdivisions were approved, so that access roads may be dedicated, if subdivisions desire it, at a more realistic cost.

3.1.3.2.2 Level of Service (LOS) Standards. Up-front, quantified standards should be articulated for County services and infrastructure, so that capital improvement funding and the tradeoffs and difficult decisions can be more clearly understood and debated. Puna residents as well as the rest of the island would benefit. LOS standards and inventories of deficiencies would inspire greater public trust in the budgeting and planning process. These standards should be clearly tied to population levels to facilitate planning for orderly and efficient development. The draft Impact Fee Study carried out by the Planning Department in 1990 would be one place to start.

3.1.3.2.3 Water Pricing. The current pricing system for water creates a strong disincentive for the Department of Water Supply to extend the mains and capacity needed in Puna. Because of the need to oversize the system for an unknown interim period of slow expansion of service connections, and the current DWS policy for a single rate, the inequity would lie in other ratepayers subsidizing such a system. It is therefore suggested that the water supply pricing system be individualized for a local system to be self-supporting, as was the case in the past. This is a complicated issue and process, but since water is the most basic infrastructure of economic life and since its absence is the chief barrier to the economic development and provision of public services in the non-conforming subdivisions, resolution must be found.

3.1.3.2.4 Partnership Programs. The rural areas of Puna have pioneered partnership programs with the County to develop and operate local facilities for parks and fire stations. These programs should be expanded island-wide, in concert with Level of Service Standards for facilities.

3.1.3.2.5 Hawaiian Acres/Orchid Land Flooding Plan. At issue is a solution to the disposition of the water flow below the elevation of the South Kulani Bridge where water was evidently diverted, by way of a substantial wall, into what is now Hawaiian Acres and Orchid Land. Because of the geography of Puna, both the natural drainway (down the Kea'au/Olaa boundary through the outskirts of Kea'au town) and the wall-diverted drainway through Hawaiian Acres and Orchid Land, are subject to change from grading, grubbing, construction, and other landscape activities that have not been sufficiently monitored by the existing system of permitting. It is recommended that lot owners and other stakeholders in both forks of the drainway be brought together with advisors from the Department of Public Works, the Natural Resources Conservation Service and the U. S. Army Corps of Engineers to weigh the alternatives and plan for long term channeling of waters to a predictable course.

SECTION 3.1: IMPLEMENTATION AND FINANCING

3.1.3.3 Timing.

All of the tools proposed above would provide economic benefits, and would contribute to the perception of a level playing field for Puna and for other rural districts of the Big Island. However, the policies for Puna's community development are political issues and will require public examination and discussion. A number of draft ordinances containing portions of the proposals presented here have already been submitted. These examinations should continue.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

Housing, Public Facilities & Utilities, Recreation, Transportation, Land Use

A primary function of *this* Community Development Plan is to begin the process of fully integrating the non-conforming subdivisions of Puna into the fabric of the County of Hawaii. The problems of these subdivisions, and their solutions, do not divide neatly into separable planning elements, nor do they lend themselves to a ten-year planning horizon. This section provides an analysis and proposal for a comprehensive approach to the integration process, based on the need to consider build-out in order to achieve efficiency and order in providing for equity of health, safety and opportunity for all.

3.2.1 INTRODUCTION TO THIS SECTION

Non-conforming subdivisions in Puna, of which many were created shortly before and after statehood, have almost every problem that could have been prevented by land use planning: private substandard roads laid out without consideration for a district-wide roadway network or emergency access needs; absence of public water supply systems in many areas; absence of central sewer systems; absence of electricity and telephone service in the more remote areas of some subdivisions; lack of sufficient parks, including land set aside for parks, particularly neighborhood parks; and distant community and public services, including police, fire protection, emergency medical, schools and libraries. The above notwithstanding and in part *because of* the lack of facilities and services, Puna offers an extremely large stock of affordable, fee simple homesites, in relatively close proximity to the City of Hilo—a unique and valuable resource for many of Hawai'i's young families, as well as newcomers.

3.2.1.1 Need for a Positive Vision: The land use and development history in Puna in the last 40 years indicate the serious consequences that face the district and County government if Puna's vacant lots continue to fill out in an unchecked manner. The planning challenge is to produce a workable community plan that maintains Puna's homeownership while expanding agricultural, and other economic opportunities, in a rural environment, while directing development away from less appropriate areas, and encouraging community involvement in planning and in the provision of public improvements and community facilities.

3.2.1.2 "Window of Opportunity:" Puna's subdivisions are filling rapidly. By the year 2000, several more subdivisions may approach or exceed 25% of build-out. Because the vast majority of lots are currently vacant, it is still possible to plan for and locate sites for infrastructure, community facilities and supporting land uses. Key parcels for important facilities and community services need to be identified and purchased in the next five to ten years before the opportunity is lost. Community groups should begin organizing their efforts now in cooperation with government agencies. Education and dialogue will help existing and future residents to anticipate these improvements and changes as sources of opportunity instead of conflict and dislocation. Aware and pro-active subdivision communities, and geographic advantages, give the County and Puna residents a chance to "retrofit" their communities.

3.2.1.3 Being Prepared to Take Advantage of Unforeseen Opportunities: There are two major advantages of planning over crisis management. The first and most obvious is that planned solutions, by being considered in a comprehensive context, can lower overall costs while providing better solutions. Solutions can be made to serve many issues, i.e., water extensions can serve multiple planned uses, from education and recreation to economic opportunity, at a compact location, rather than multiple extensions with a low return. Order can also save money: for instance, a the road and water line extension implemented together rather than digging up the road twice.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

Second, funding cannot always be anticipated but unanticipated funding can always be missed, or—as is commonly the case with federal funds and private grants—can go to another county or state if we are not ready with planned projects. For example, Federal funds under the Intermodal Surface Transportation Efficiency Act (ISTEA) are available for planning, engineering, construction and land acquisition, with 20% matching state or county funds.

3.2.2 ISSUES of INTERRELATED PLANNING ELEMENTS

3.2.2.1 Affordable Housing

Many have moved to Puna because of the availability of inexpensive buildable lots and Puna's proximity to the City of Hilo. The low prices reflect the absence of supporting infrastructure, facilities and land uses normally associated with residential areas. Many residents with limited financial means have purchased lots and have built or intend to build homes on them.

A market also exists in the Puna district for buildable lots which have infrastructure at urban standards. Kea'au Agricultural Lots, with infrastructure comparable to Hilo, have market values comparable to Hilo lots. For instance, lots in Hawaiian Paradise Park which have good road maintenance, water, and are connected to the electrical grid, have significantly higher market value than lots in nearby subdivisions which lack such features. Where infrastructure is upgraded in the pre-1967 subdivisions, lot prices can be expected to rise, raising cost barriers. However, at the same time, this would have the effect of increasing competition with existing and new fully served subdivisions, contributing to lower overall market prices for comparably served lots.

Since it is likely that the bulk of the frontage infrastructure costs must be financed through methods which will ultimately require repayment by the owners of the affected lots, the cost of owning lots in existing pre-1967 subdivisions will also increase significantly once improvements are made. Even financing vehicles such as tax increment financing will have that effect, since financing is predicated on lot owners paying more taxes each year as lot values increase. For some low-income Puna residents, this situation might ultimately force relocation. While these owners may benefit from the equity represented by the increase in the value of their lots, planning should help to insure sufficient reserve areas of greater density, less infrastructure or other features that preserve a variety of low-income housing and farming options.

3.2.2.2 Variety of Housing and Lifestyle Options

Lots in Puna's unimproved subdivisions have been sold, over the years, to owners with diverse expectations. Those who wanted to invest in vacant land may not welcome the expenses of improvements to facilities and infrastructure. Those who come to the subdivisions to live in voluntary simplicity and low cost find themselves in conflict with neighbors who want services, security, convenience and business opportunity, and are willing to pay the price, in anticipation of reaping benefits of increased property value and income. There is a range in between, of people who want some but not all amenities, or whose needs and expectations are changing, as they have children or become disabled or frail. They are all stakeholders, with an equal right to their expectations. Many have said that they value Puna's diversity of community lifestyles, but are anxious about, or are already experiencing, the conflicts of mutually exclusive expectations.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

3.2.2.3 Timing and Predictability

To become fully functional, the unimproved subdivisions will ultimately require infrastructure, public facilities, and supporting land uses. Advance planning to locate and cluster these amenities in core locations along a central corridor contributes to community stability and a "sense of place" and avoids uncertainty, waste, and lost opportunity.

- The more the subdivisions fill in without a planning and implementation program for infrastructure, community facilities and supporting land uses, the greater the short- and long-term cost to subdivision residents and to the County.
- Some homesteaders in Puna have invested labor and life savings in independent water, sewer, and communications systems. They need to know if their investment will decline in value or whether they will need to expend more money upgrading their systems. By the same token, some residents anticipate convenient amenities and are ready to invest in them. Investors need to know where future town centers can be located.
- Infrastructure financing vehicles require comprehensive planning. The County's Improvement District and Community Facilities District ordinances both require that the infrastructure to be financed must be sized to expected uses. Community facilities and supporting land uses for Puna's future population must be located. In addition, any financing package would be enhanced by the increased value of a functional and predictable community layout.
- As more homes are built before supporting infrastructure, land uses, and community facilities are planned, there will be less flexibility and greater potential for hardship and duplication in the planning and implementation process. The longer the wait, the more likely the consequences of widespread real property condemnation, dislocation, and personal hardship for those affected.
- There is potential for public and private waste from failure to anticipate impending infrastructure requirements. A current example is the State Department of Health requirement for septic tanks in areas that may eventually need to upgrade to central sewage treatment, and the allowing of cess-pools in areas that will ultimately need septic systems. The County Department of Water Supply is similarly concerned about private investment in inefficient and redundant "spaghetti" water lines in areas that will eventually need water distribution systems.

3.2.3 Deficiencies in Infrastructure, Public Facilities, and Supporting Land Uses

The intent of this inventory is to look at underlying health and safety, equity, and efficiency issues.

3.2.3.1 Catchment water, the only water source in most Puna subdivisions, has several problems:

- Potential for dangerous impurities, such as lead and microbial parasites;
- Shortage of water for sanitation during drought;
- Lack of water for fire protection, especially during drought, when fire danger is greatest; and
- A barrier to community facilities and supporting land uses.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

3.2.3.2 Sewage treatment, while meeting current Department of Health Standards for Individual Wastewater Systems, may soon be out of compliance with the federal Clean Water Act, as homes are built. To meet the Clean Water Act, national engineering standards indicate central sewers where density is greater than one house per acre. If density is lower than one house per acre (where cesspools are now allowed), septic tanks will be required. Further complicating this problem are several unique characteristics of Puna's geographic and regulatory environments:

- Numerous lava tubes, many of them large and many miles long, were used by the Hawaiians for shelter, worship, and burial sites. In addition, a number of unique plant and animal species have been identified by scientists. These caves and species may be threatened by raw sewage from cesspools.
- The porosity of layers of lava underlying Puna and its high rainfall allow rapid water movement downward and to the coast. This may dilute pollution, and, because of the elevation of most Puna homes above the sea-level water table, may provide complete natural treatment, even with cesspools. However, wastewater near the coast or near lava tubes may cause rapid flow and concentration of untreated sewage or treated effluent at unexpected locations either on land or along the coast.
- *Ohana* dwelling approvals may eventually promote densities requiring central sewers in some subdivisions where single family densities on one-acre lots would require only septic tanks. These subdivisions are Leilani Estates, Hawaiian Paradise Park, and Eden Roc.

3.2.3.3 Utility grids are being extended into the subdivisions, but they are expensive to maintain because of Puna's distances, weather, and rapid tree growth. There is a need for reliable power sources for residential uses, economic enterprises and public safety.

There are a number of Puna residents who have expressed a desire for "off-the-grid" or "dispersed infrastructure" neighborhoods within which they may pursue alternative and independent lifestyles. A procedure for residents to petition for recognition of such a designation in appropriate low-density areas, would help to preserve lifestyles while encouraging the County of Hawaii and Hawaii Electric Light Company to plan around such areas. Time is of the essence if this lifestyle choice is to be accommodated.

3.2.3.4 Neighborhood school sites are provided in only a few subdivisions, yet schools require ten acres per elementary site and 40 acres for an intermediate/high school complex. As subdivisions fill, it becomes increasingly difficult to find sites without displacing residents. For the currently permitted population, excluding *ohana* dwellings, up to 40 additional sites will be needed in the future for elementary, intermediate, and high schools.

3.2.3.5 Elder- and child-care are essentials of secure community life for which no space has been set aside in Puna, but for which a number of non-regulated services are currently being provided. The acreage needed in the future may be several hundred acres, depending on the styles of these uses permitted by regulation.

3.2.3.6 Hospitals and community health care sites are not provided for at all in Puna's subdivisions, although there is a need for one or more future hospital sites as well as neighborhood services.

3.2.3.7 Cemetery sites are not provided at all in the subdivisions, and sites outside are inadequate or inconveniently located.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

3.2.3.8 Police and fire stations. Upwards of ten new fire station sites in Puna will be needed to provide adequate protection and insurability for future permitted population. Some of these are already volunteer fire stations, but the issue of insurance qualification for these areas remains unresolved.

3.2.3.9 Solid Waste Recycling and Disposal is an issue of increasing concern over the entire Big Island. It is especially acute on the east side because the high rainfall makes it very difficult to meet federal Environmental Protection Agency standards for landfills. The increase in volume that can be predicted from Puna's increasing population will probably need a variety of solid waste handling facilities—beyond landfill sites—that are difficult to place, but for which convenience is essential for success. These include:

- composting sites for green and yard-waste;
- toxic waste collection centers;
- recycling collection and processing centers;
- storage and exchange centers for reusable items; and
- collection stations for limited landfill waste.

3.2.3.10 Regional, district, community, and neighborhood parks and community centers are not provided for in most Puna subdivisions. Based on the County standards of five acres of park per thousand population (eliminating some uses, such as beach parks, and discounting the potential for *ohana* permits which could increase population), over 800 acres of park sites would still be needed within Puna subdivisions to meet the future needs of the currently permitted population.

3.2.3.11 Roadways within most subdivisions fail to meet County standards for width, sight distance and surface. The lack of sight distance is becoming increasingly hazardous as traffic increases on collector roads. Issues of width and surface are less clearly related to health and safety issues. While resurrection of agricultural road standards, met by public/private cooperation, may provide appropriate and affordable solutions in many cases, collector roads should nevertheless be eventually adopted as County roads.

3.2.3.12 Public Arterial Transportation Corridors are virtually non-existent in the subdivisions. The private collector roads create a liability barrier to placement of facilities and supporting land uses within subdivisions, and are incompatibly located and aligned to provide efficient and orderly extension of water services and facilities to connected cores. The result, pressure for strip development along public roads, threatens the safety and efficiency of existing major arterials. The absence of public roads in subdivisions also preclude opportunities for developer participation in the provision of infrastructure and facilities needed within subdivisions. If not corrected in a timely manner, the lack of public arterials may raise the share of costs that must be borne by residents and/or taxpayers, both from inefficiency and from lost opportunities to participate in federal transportation funding.

3.2.3.13 Variety in housing is a requirement of the General Plan as well as a specific mandate for Puna. While the current low cost of housing in Puna has made multi-family housing needs less pressing, the automobile-dependent layout of the subdivisions creates disadvantage and isolation for children, the frail elderly, people with disabilities, and anyone who cannot operate or afford a car.

3.2.3.14 General industrial land uses are not appropriate directly adjacent to residential areas, but must be located for easy access from the homes of workers and the sources of supply—sea- and airports—in order to provide for development of the economic base that will be required for a potential population as large

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

as Puna's. Approximately 20 acres per thousand population is the island-wide proportion for planning this land use category, but this may include some regional, large-scale uses, such as ports. At the same time, many existing industrial uses, such as quarries and agricultural processing factories, are on sites not zoned for industrial use, e.g., obtained special permits but retained Agricultural land designation.

- Shipman Industrial Park provides 488 acres of industrial land. Ultimately, given the limiting factors for appropriately locating this land use, the long-range planning for approximately 3,000 acres for future industrial use would be needed, ideally located between Puna's subdivisions and Hilo's ports, near Kea'au. The need for adequate buffers, transportation corridors, and related facilities (i.e. university, technical and research) and the rapidity of innovation, indicate the future need for a large total area.
- Stewardship of Puna's greatest resources—her abundant, pure groundwater and clean, productive shoreline and fisheries—require protection from industrial waste and toxins. Policies should address industries which require the use of toxic materials, enforce stringent regulations, and place industries below critical recharge areas, but away from the shore.
- Office and technical parks are a category for which zoning is not currently provided. The General Plan directs that such a category be considered. In other locations, this category provides opportunities for "back office," technical service and assembly industries. These are less likely to locate where they will be mixed with general industry, are more compatible with residential use, and are likely employers of Puna workers, who are skilled but need not demand the higher wages of workers in areas with prohibitive housing costs.

3.2.3.15 Light industry is needed in close proximity to residential areas to provide services to residents, and space for crafts and tradespeople. Some of these services are already supplied in Puna subdivisions, largely without permits and regulations. As density increases, some of these mixed uses will remain appropriate, but some which generate noise or other nuisance, will become inappropriate. The requirements for this category of land use are particularly hard to estimate since so much light industry on the Big Island, and especially in Puna, occurs on agricultural or residentially-zoned land. The proposed proportion for light industrial use is twenty-four acres per thousand population, but some of these uses may continue to be best served by mixed use zoning or special permit.

3.2.3.16 Commercial land, with 59 acres now zoned in Puna, is proposed at a proportion of eleven acres per thousand population. At this standard, Puna currently has a shortage of over 250 acres. Highway congestion between Puna and Hilo is testimony to this shortage. Commercial needs may be divided between neighborhood and regional uses. Some neighborhood commercial uses are appropriate for mixed-use and should include residences, home businesses, and light industry in the proposed Rural Town Districts to provide pedestrian convenience and minimize vehicle use.

Regional uses for commercial land include shopping centers and may require coordinated planning with other elements of community centers and towns. Comprehensive considerations for placement of regional commercial facilities in Puna include:

- integration with, and financial support for, basic health and safety infrastructure in subdivisions, to ameliorate current deficiencies; and
- proximity to population centers in the subdivisions, and alignment with efficient public transportation corridors to reduce public and private transportation costs.

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

3.2.3.17 Resort land in Puna is entirely lacking except where it is located under lava in Kalapana. The County currently has approximately eleven acres per thousand population, but the direction of the County General Plan for alternative and retreat resort development in Puna can perhaps best be met by low-impact, home-based eco-tourism facilities, integrated throughout the district, instead of resort zoning.

3.2.3.18 Open space requirements are particularly important to Puna subdivisions, which have significant concentrations of important and sensitive habitats for native species and significant cultural sites. There is a high level of community concern and value for preservation of these sites. The requirement for connected networks of natural areas of sustainable size can best be met by early community agreements on set-asides and on incentive strategies for preservation set-asides as part of the proposed Rural Town Zoning Districts.

3.2.4 New Towns

Using as a model the traditional small towns of Puna—Volcano, Mountain View, Kurtistown, Kea'au, Pahoa and Kalapana— and the proposed Rural Town District, a necklace of new towns should be located in existing subdivisions. These new towns should fulfill the following criteria:

3.2.4.1 Location

- Towns should be located along potential future public transportation corridors which, in the most cost-effective alignment, link new and existing towns with Hilo.
- Town centers should be placed to provide the greatest possible service at the least cost. They should be physically located as centrally as possible in relation to the potential population they are intended to serve.

For the central subdivisions, the alignment that best fulfills the above two criteria is the Central Subdivision Corridor, the secondary road alignment shown on the County General Plan Facilities Map.

- Location of towns within subdivisions: Approximate locations in the Zone Guide Map and the proposed Rural Town District concept can direct developers and local planners to appropriate areas that would interconnect with regional systems. Within each planning area it will be important to place infrastructure so that the areas where infrastructure improvements are not planned will still be within a reasonable radius containing basic safety amenities, such as water fill stations and/or dedicated fire tanks, and fire and police stations.

3.2.4.2 Planning horizon: This Community Development Plan discusses short-term solutions that are needed in the ten-year planning period of the Plan. It also addresses long-term solutions and planning strategies. Although build-out will take many decades to materialize, long-range planning principles dictate the designation of tentative future sites for major public facilities and major roadway alignments in Puna to prepare for their eventual demand and development.

3.2.4.3 Sizing of new towns: The suggested land use model provided as part of this proposal uses as a unit a town or neighborhood of 5,000 people. This size was chosen because it represents the population to support one elementary school of 400-500 pupils, and it is the approximate build-out population (without *ohana* dwellings) of a number of subdivisions with 1,500 to 2,000 lots. A range of town sizes is desirable. Community confidence, lowest infrastructure cost, and planning goals are best served by clear

SECTION 3.2: THE NON-CONFORMING SUBDIVISIONS

articulation of the boundaries of the town center service area and the anticipated population within these boundaries.

3.2.3.4 Clustering versus increasing overall density: A number of communities and individual lot owners have expressed concern about the loss of Puna's rural atmosphere due to the increasing density and population they fear will result from the development of new towns within their subdivisions. In addition, a number of owners of multiple lots have expressed anxiety about their ability to support the increased taxes on a lot or lots which they want to maintain in a natural state or without a house.

Several land use tools are designed to solve these problems, including transfers of development rights from lots in outlying service areas to town centers, dedications, land readjustment, minimum lot size, land banking, and the purchase or dedication of greenbelt easements. (See Section 3.1.2.2.) There is a trade-off that must be weighed in using these tools. Developers, whether of homes or commercial sites, have a certain amount to invest. If they are asked to purchase increased density, they may have less remaining for other needed exactions, such as dedication of public facilities sites or contribution to regional infrastructure. However, the proposed Rural Town Zoning Districts provide balancing incentives, such as lowered parking requirements, narrower street widths, mixed uses and higher densities in a traditional town package. These features have been shown to be desirable and to provide a good return to investors in other jurisdictions. This is the reason for the package nature of the proposed Rural Town Districts, with the suggested use of Community Facilities Districts as the vehicle for obtaining cooperation from a variety of landowners working together to meet the requirements of the District and thus reap the benefits.

3.2.3.5 Growth management for towns should include clear and not-easily-moved boundaries between the rural town center and surrounding rural service areas, as well as between residential and agricultural uses and further lifestyle uses, as needed, such as off-the-grid areas and organic farming districts. A plan for such boundaries must be developed with community initiation and direct participation. Such areas should match the lifestyles and financial abilities of current and anticipated residents in the whole service area of the town center.

3.2.3.6 Green Belt designations can be used to:

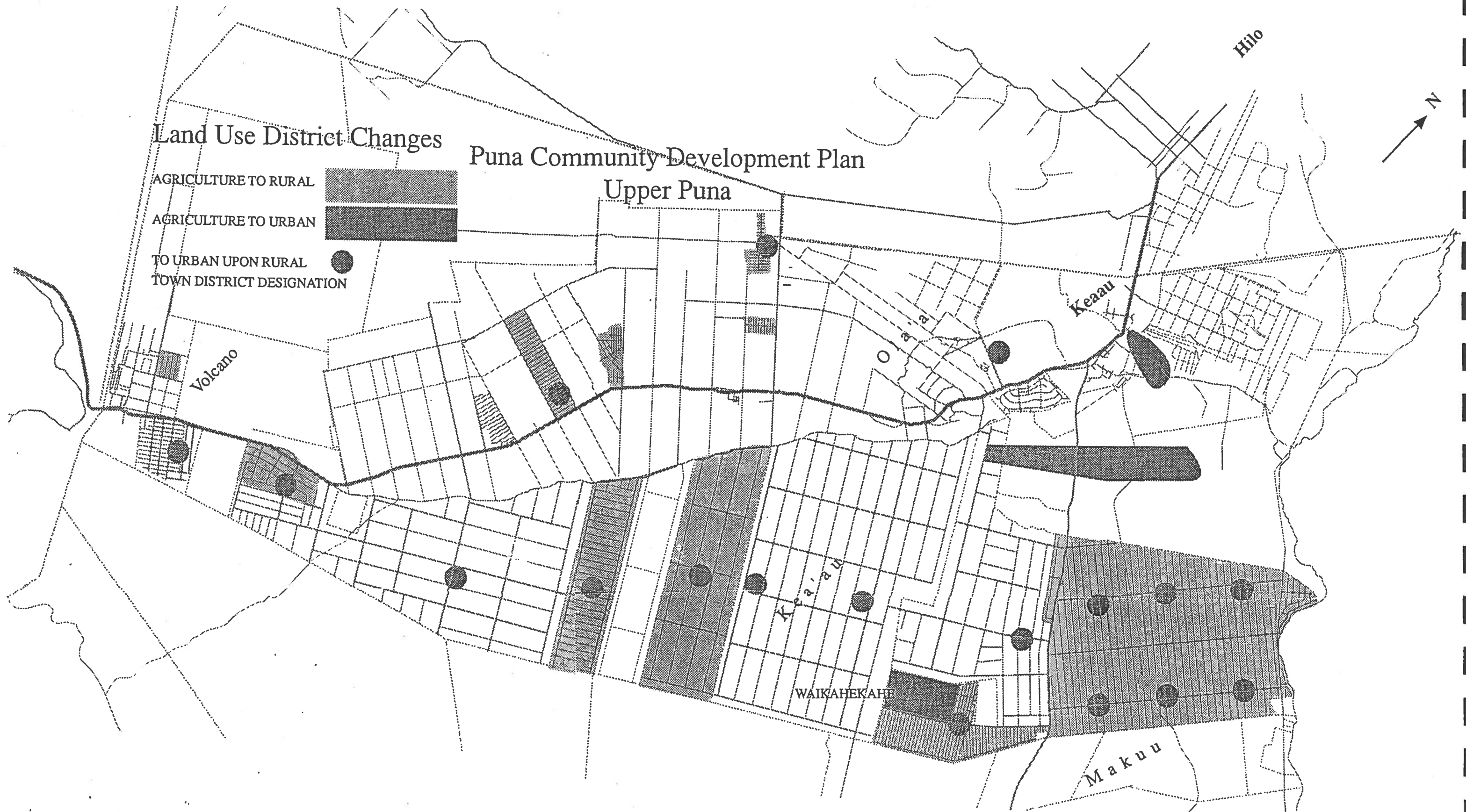
- designate and preserve agricultural areas by clarifying intent and limiting infrastructure development to agricultural rather than to residential standards;
- define and reserve drainage areas;
- reserve and surround trailways;
- provide recreation areas; and
- separate uses, where appropriate.

Puna Community Development Plan Draft 2												
3.3.1 Proposed Puna Land Use Changes												
				Approx.								
				Total	LUPAG		LU District		Zoning			
Subdivision or Place Name	Tax Map Keys	# Lots	Lot size	Acres	From	To	From	To	From	To	Reasons	
State-Kahaualea	1-1-01:1, 20	2		24,019	Part Ex Ag	Conservation			Ag-20	Open	Conform to Use and Hazard	
Royal Hawaiian Estates	1-1-13-19,43-53,56	1,640	.25-.5 ac.	630	Int. Ag	Rural	Ag	Rural			Conform to Use	
Fern Acres [Crescent]	1-1-35 to 42	2,021	2 ac.	4,000	Int. Ag	Rural	Ag	Rural			Conform to Use	
Eden Rock Estates	1-1-72 to 98	1,809	1 ac.	2,000	Int. Ag	Rural	Ag	Rural	Ag-3	Ag-2	Conform to Use	
Royal Gardens	1-1-66 to 71, 102 to 118	1,617	1 ac.	1,827					Ag-1	Ag-1 H	Conform to Hazard	
East Rift and South Flank	1-2,3,4	all	various		-				various	H suffix	Conform to Hazard	
Pahoa, Hawaiian Beaches area	1-5-1 to 14, 63 to 117	all	various		-				various	H suffix	Conform to Hazard	
Kehena Beach Estates	1-2-30,31	199	.25-.3 ac.	52	Orchards	Rural	Ag	Rural	Ag-1	Ag-1H	Conform to Use and Hazard	
Puna Beach Palisades	1-2-33all	72	20,000 sf	36	Orchards	Rural	Ag	Rural	Ag-1	Ag-1H	Conform to Use and Hazard	
Kalapana Black Sand	1-2-19 to 27	918	7,750 sf	202	Orchards	Rural	Ag	Rural	Ag-1	Ag-1H	Conform to Use and Hazard	
Kalapana Seaview 2007	1-2-34 to 41	693	<.25 ac.	166	Orchards	Rural	Ag	Rural	Ag-3	Ag-3H	Conform to Use and Hazard	
Pahoa	1-5-02 to 14,112 to 117				Urban Ex.	Orchards			various	various H	Conform to Use and Hazard	
Hawaiian Paradise Park	1-5-15 to 62	8,843	1 ac. +/-	9,469	Orchards	Rural	Ag	Rural			Conform to Use	
Tiki Gardens	1-6-part of 4	481	.2-.25 ac.	120	Orchards	Rural	Ag	Rural			Conform to Use	
Ainaloa	1-6-65 to 99	3,637	.2-.5 ac.	1,160	Orchards	Rural	Ag	Rural			Conform to Use	
Aloha Estates	1-8-36 to 63	1,846	.25-.3 ac.	593	Orchards	Rural	Ag	Rural			Conform to Use	
Pacific Paradise Mt. View Manor	1-8-78 to 85	606	.25-.3 ac.	145	Orchards	Rural	Ag	Rural			Conform to Use	
Glenwood Subdivision	1-8-73 & 74	152	.25-.3 ac.	53	Orchards	Rural	Ag	Rural			Conform to Use	
Pacific Paradise Development	1-8-64, 65 & 66	209	.20 ac.	49	Orchards	Rural	Ag	Rural			Conform to Use	
Hawaii Island Paradise Acres	1-8-14 to 19	449	.20 ac.	100	Orchards	Rural	Ag	Rural			Conform to Use	
Pacific Paradise Gardens	1-8-69 to 72	423	.20 ac.	95	Orchards	Rural	Ag	Rural			Conform to Use	
Cymbidium Acres	1-9-18; 19:1-13	180	.5-1.1 ac.	161	Orchards	Rural	Ag	Rural			Conform to Use	
Rural Towns	to be determined by community masterplan process				Medium Density			Urban		RTDC	Compact Rural Towns	
Waipalani	1-6 portion of 01:15,16 & 03	up to 1,000 acres			Orchards	Urban Exp.	Ag	Urban	Ag	ML/Com.	Business/Technical	
Waikahekahe	1-6-04:21,22,23,35,57	5	100-200 ac.	600	Orchards	Urban Exp.	Ag	Urban	Ag	various	New civic/commercial*	
											*Dependent on arterial dev.	
											and community approved	
											masterplanning (300 ac.	
											civic, park, schools)	

Land Use District Changes

- AGRICULTURE TO RURAL
- AGRICULTURE TO URBAN
- TO URBAN UPON RURAL
- TOWN DISTRICT DESIGNATION

Puna Community Development Plan Upper Puna

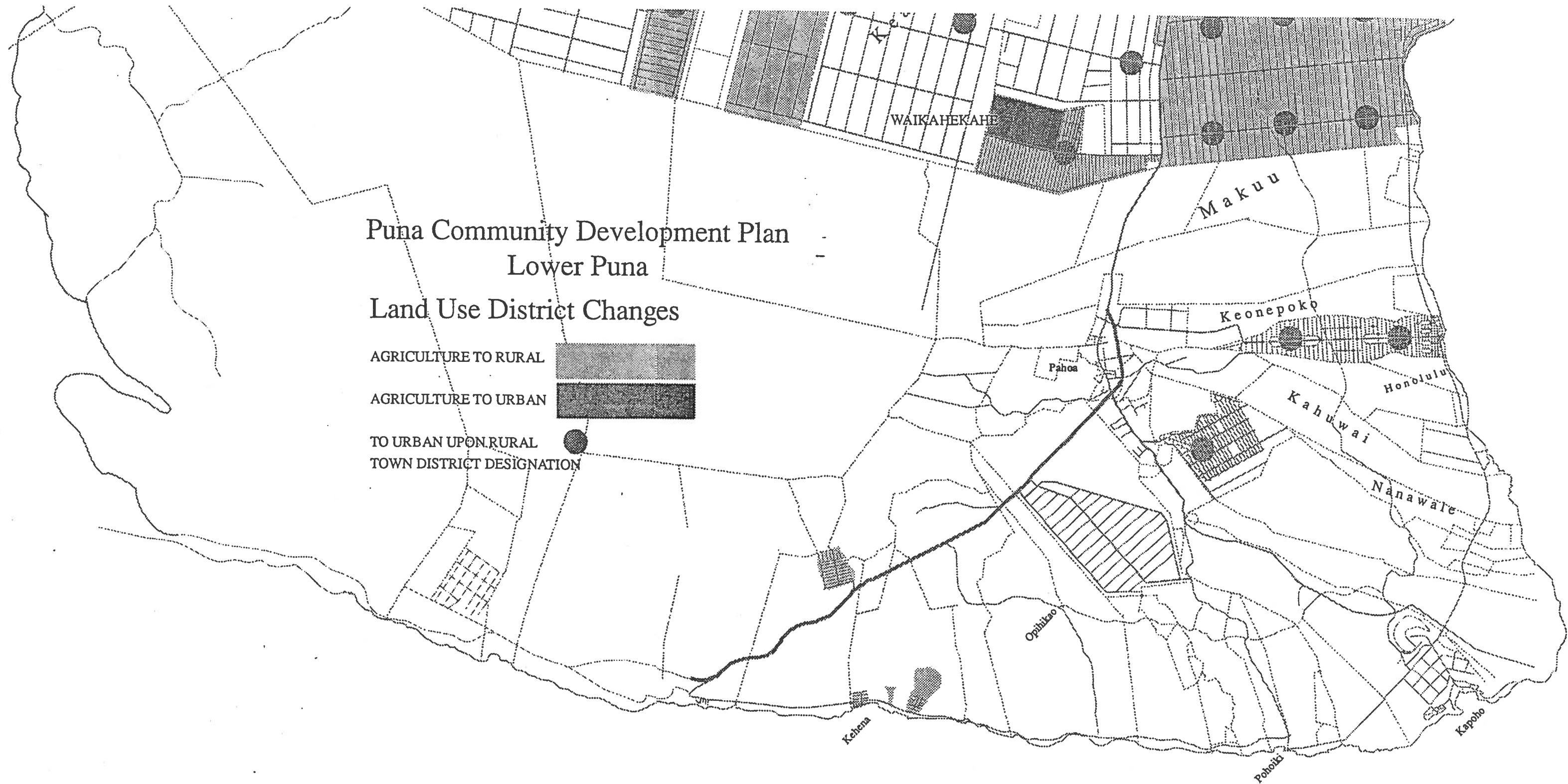
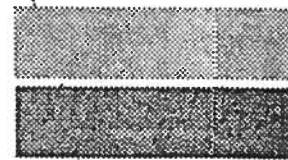


Puna Community Development Plan
Lower Puna
Land Use District Changes

AGRICULTURE TO RURAL

AGRICULTURE TO URBAN

TO URBAN UPON RURAL
TOWN DISTRICT DESIGNATION



Puna Community Development Plan
Upper Puna

General Plan LUPAG

Change Area :

Rural Town

(Medium Density, Approx. Location,
Subject to Rural Town District designation)

Volcano

LUPAG
to Rural

LUPAG
to Rural

Keau

LUPAG to
Urban Expansion

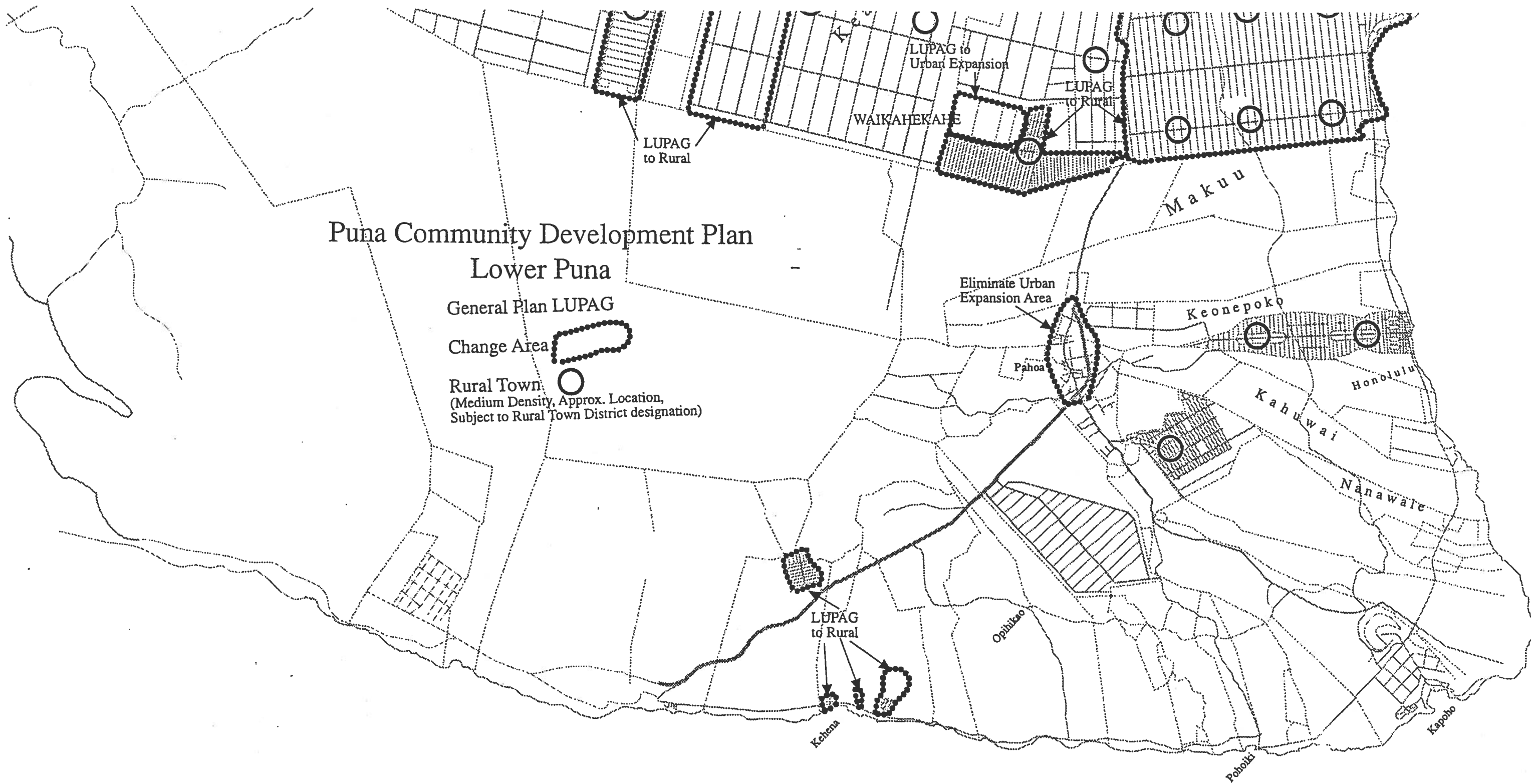
LUPAG to
Urban Expansion

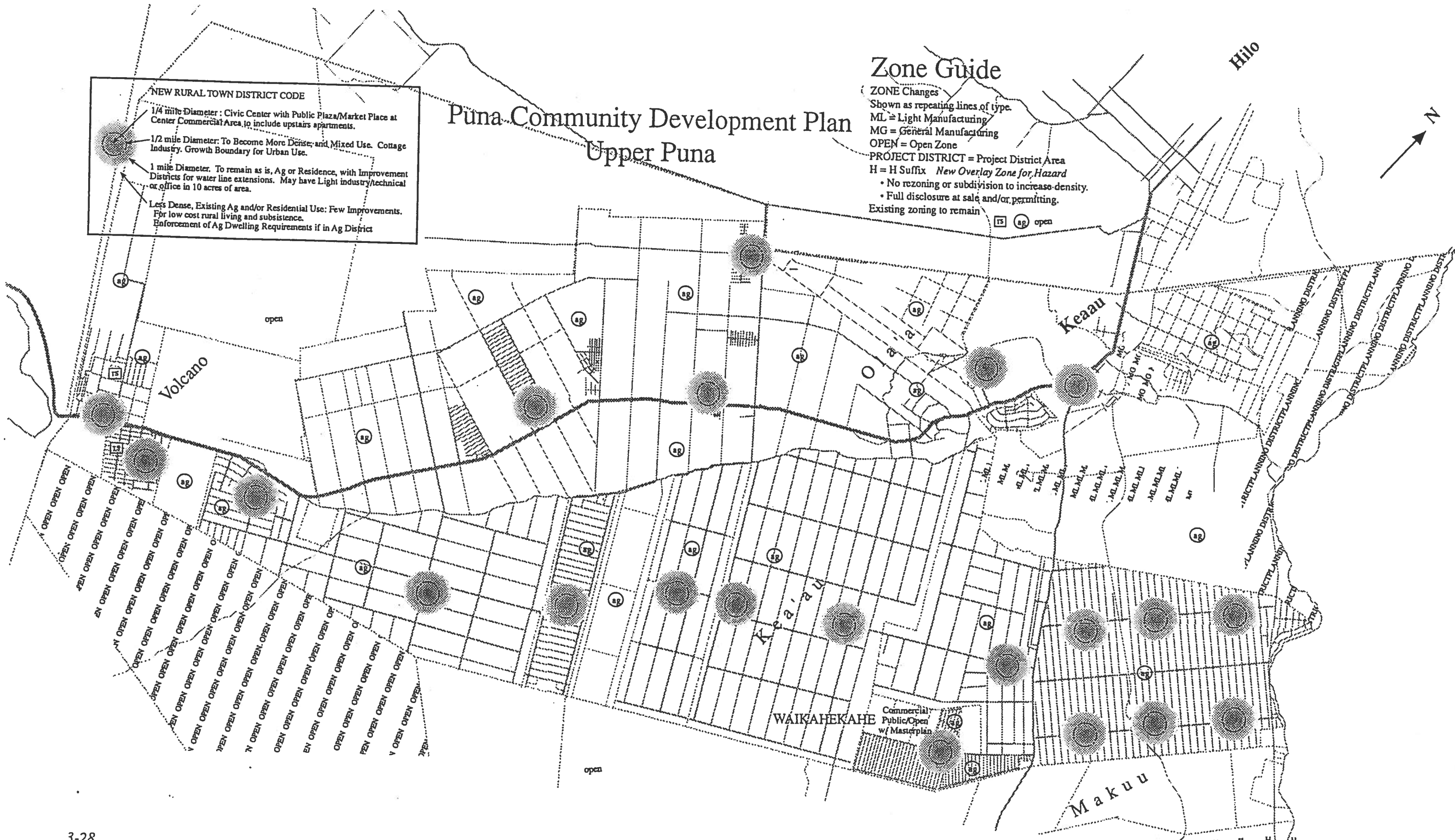
WAIKAEKAHE

LUPAC
TO Press

LUPAG
to Rural

M a k u u





NEW RURAL TOWN DISTRICT CODE

1/4 mile Diameter: Civic Center with Public Plaza/Market Place at Center Commercial Area, to include upstairs apartments.

1/2 mile Diameter: To Become More Dense; and Mixed Use. Cottage Industry. Growth Boundary for Urban Use.

1 mile Diameter: To remain as is, Ag or Residence, with Improvement Districts for water line extensions. May have Light industry/technical or office in 10 acres of area.

Less Dense, Existing Ag and/or Residential Use: Few Improvements. For low cost rural living and subsistence. Enforcement of Ag Dwelling Requirements if in Ag District

Zone Guide

ZONE Changes
Shown as repeating lines of type.

ML = Light Manufacturing
MG = General Manufacturing
OPEN = Open Zone

PROJECT DISTRICT = Project District Area

H = H Suffix New Overlay Zone for Hazard

- No rezoning or subdivision to increase density.
- Full disclosure at sale and/or permitting.

Existing zoning to remain

Zone Guide

ZONE Changes

Shown as repeating lines of type.

ML = Light Manufacturing

MG = General Manufacturing

OPEN = Open Zone

PROJECT DISTRICT = Project District Area

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• No rezoning or subdivision to increase density.

• Full disclosure at sale and/or permitting.

Existing zoning to remain

TS ag open

NEW RURAL TOWN DISTRICT CODE

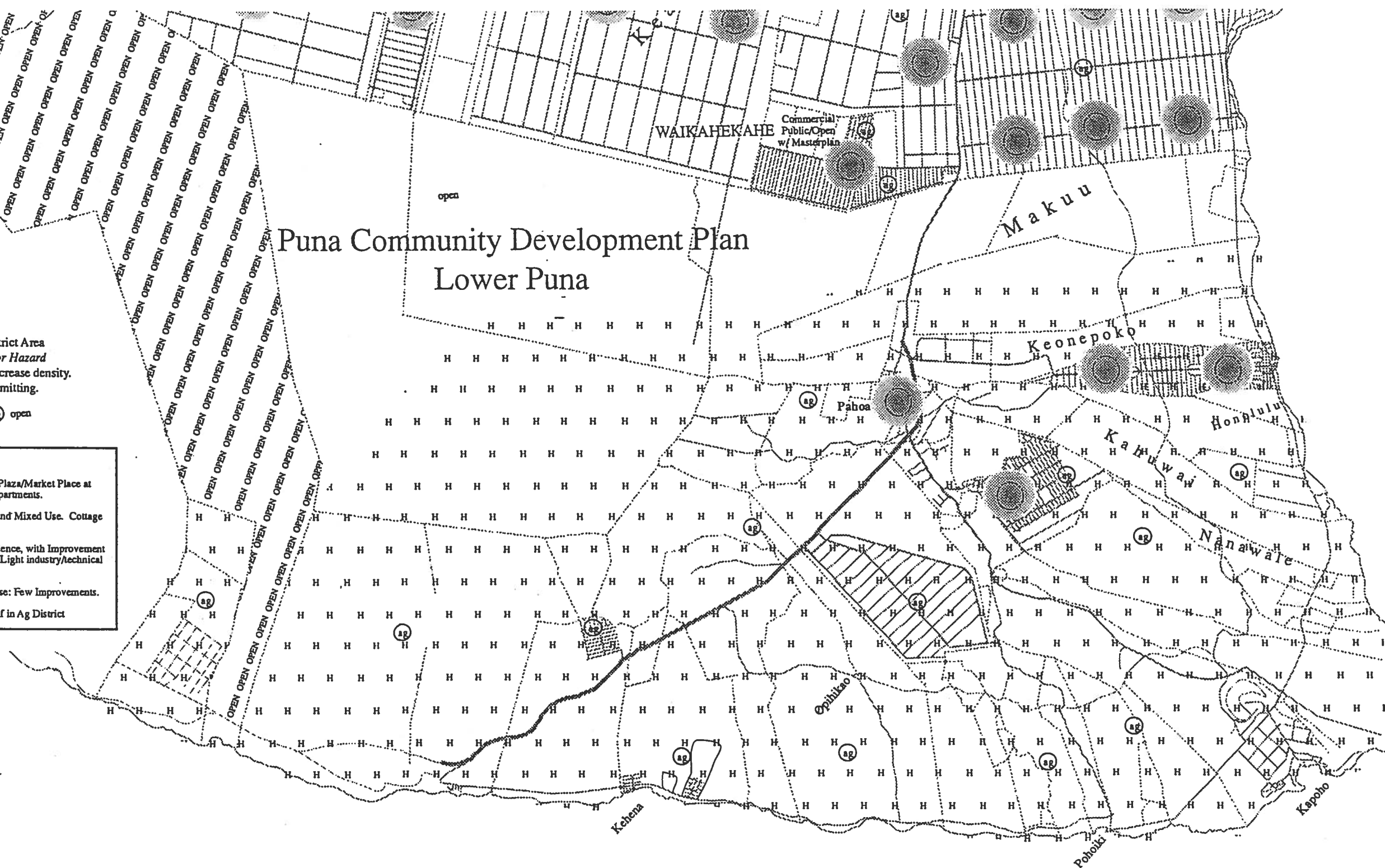
1/4 mile Diameter: Civic Center with Public Plaza/Market Place at Center Commercial Area to include upstairs apartments.

1/2 mile Diameter: To Become More Dense, and Mixed Use. Cottage Industry. Growth Boundary for Urban Use.

1 mile Diameter: To remain as is, Ag or Residence, with Improvement Districts for water line extensions. May have Light industry/technical or office in 10 acres of area.

Less Dense, Existing Ag and/or Residential Use: Few Improvements. For low cost rural living and subsistence. Enforcement of Ag Dwelling Requirements if in Ag District

Puna Community Development Plan Lower Puna



TRANSPORTATION

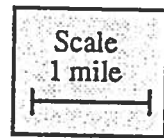
Primary Arterial
to be widened

Secondary Arterial
as shown in General Plan

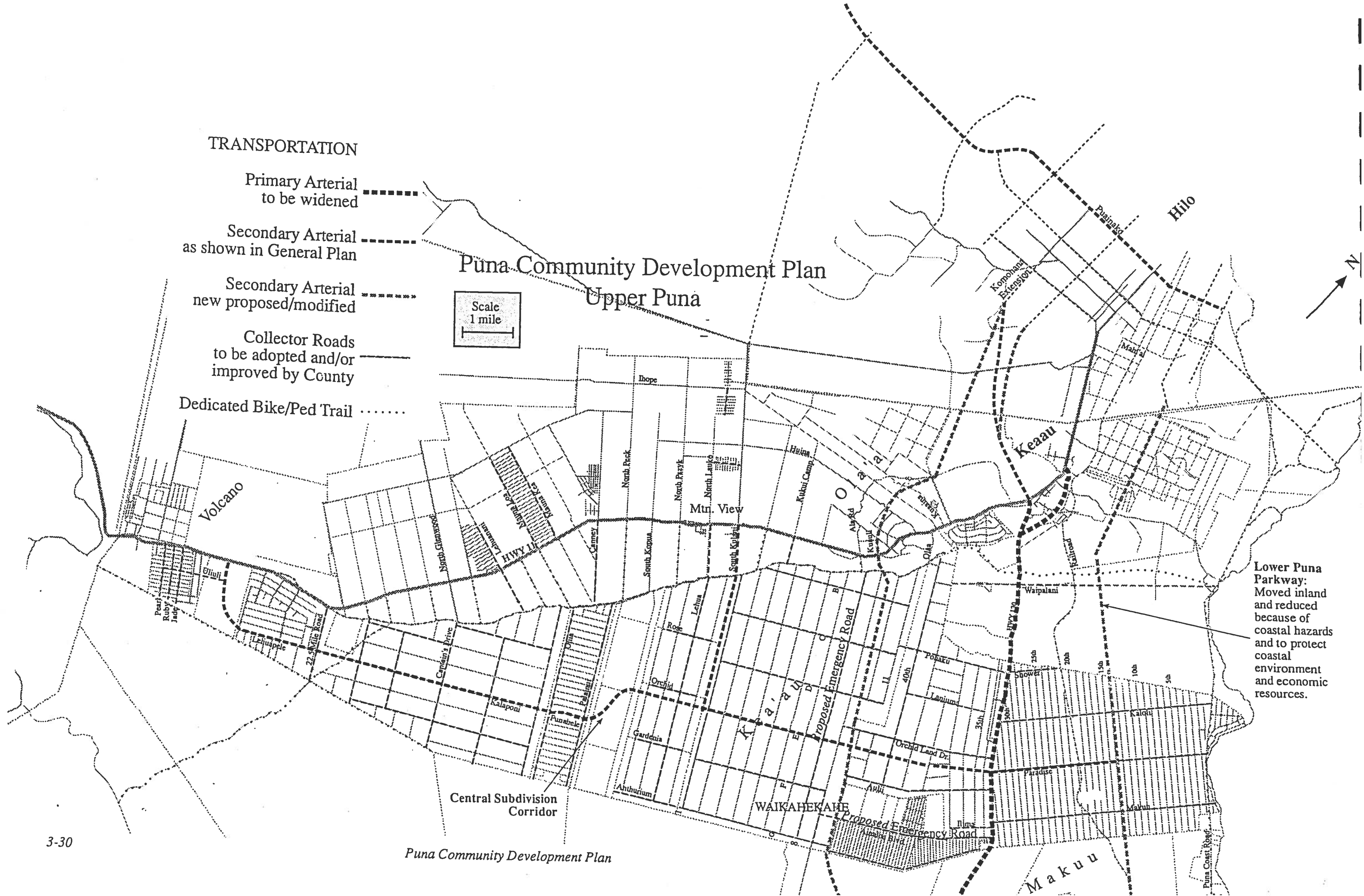
Secondary Arterial
new proposed/modified

Collector Roads
to be adopted and/or
improved by County

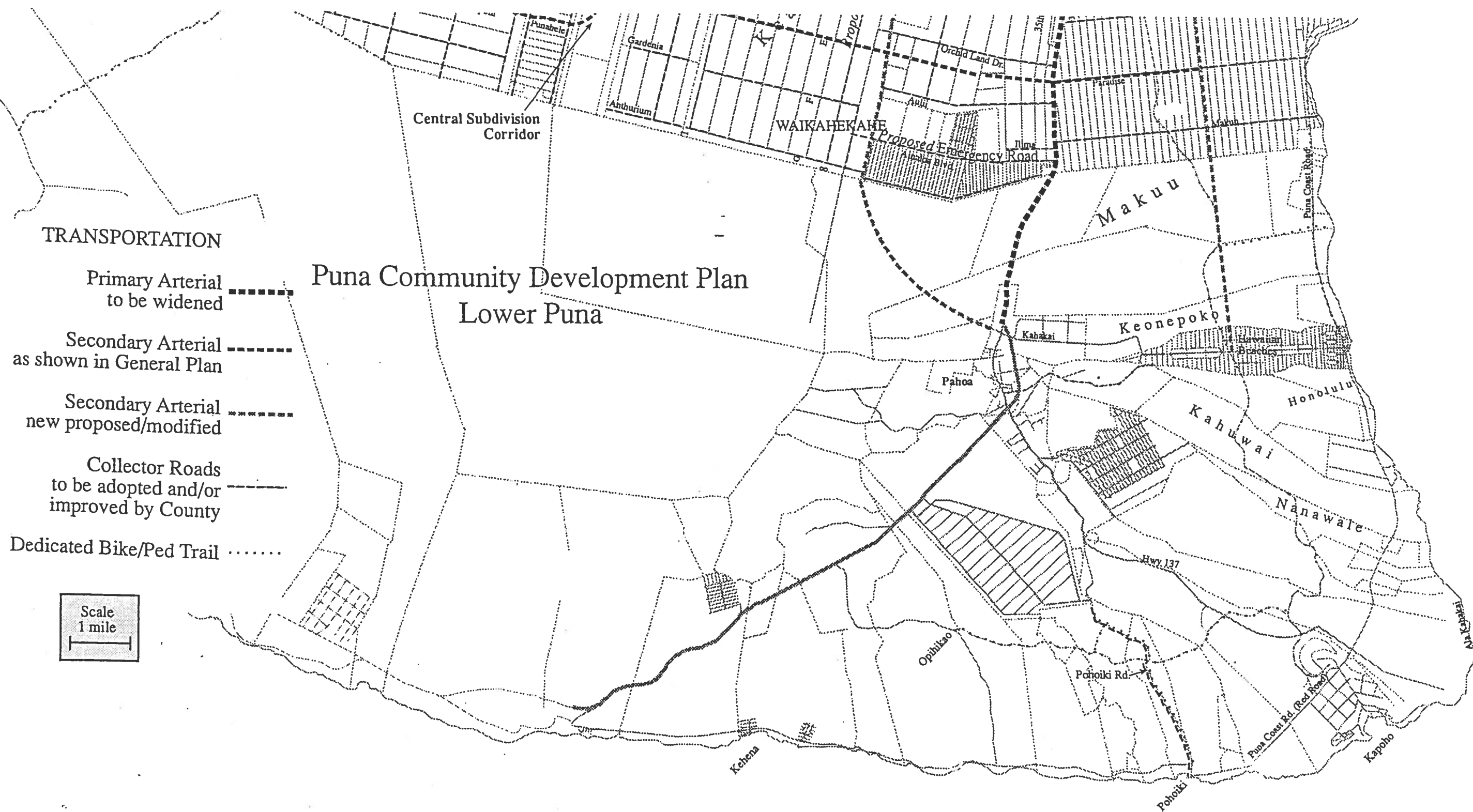
Dedicated Bike/Ped Trail



Puna Community Development Plan Upper Puna



Lower Puna Parkway:
Moved inland
and reduced
because of
coastal hazards
and to protect
coastal
environment
and economic
resources.

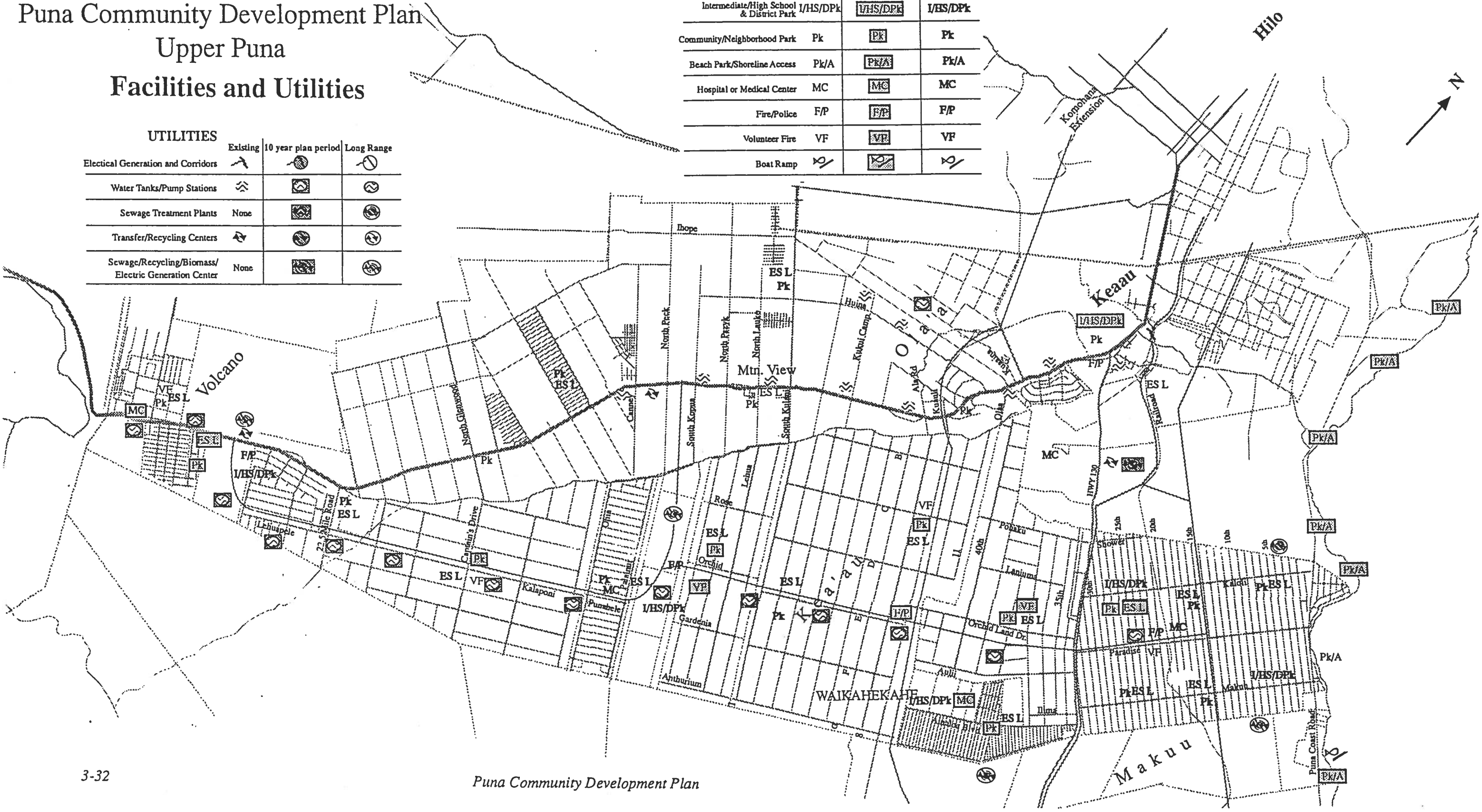


Puna Community Development Plan
Upper Puna
Facilities and Utilities

UTILITIES

	Existing	10 year plan period	Long Range
Electrical Generation and Corridors			
Water Tanks/Pump Stations			
Sewage Treatment Plants	None		
Transfer/Recycling Centers			
Sewage/Recycling/Biomass/ Electric Generation Center	None		

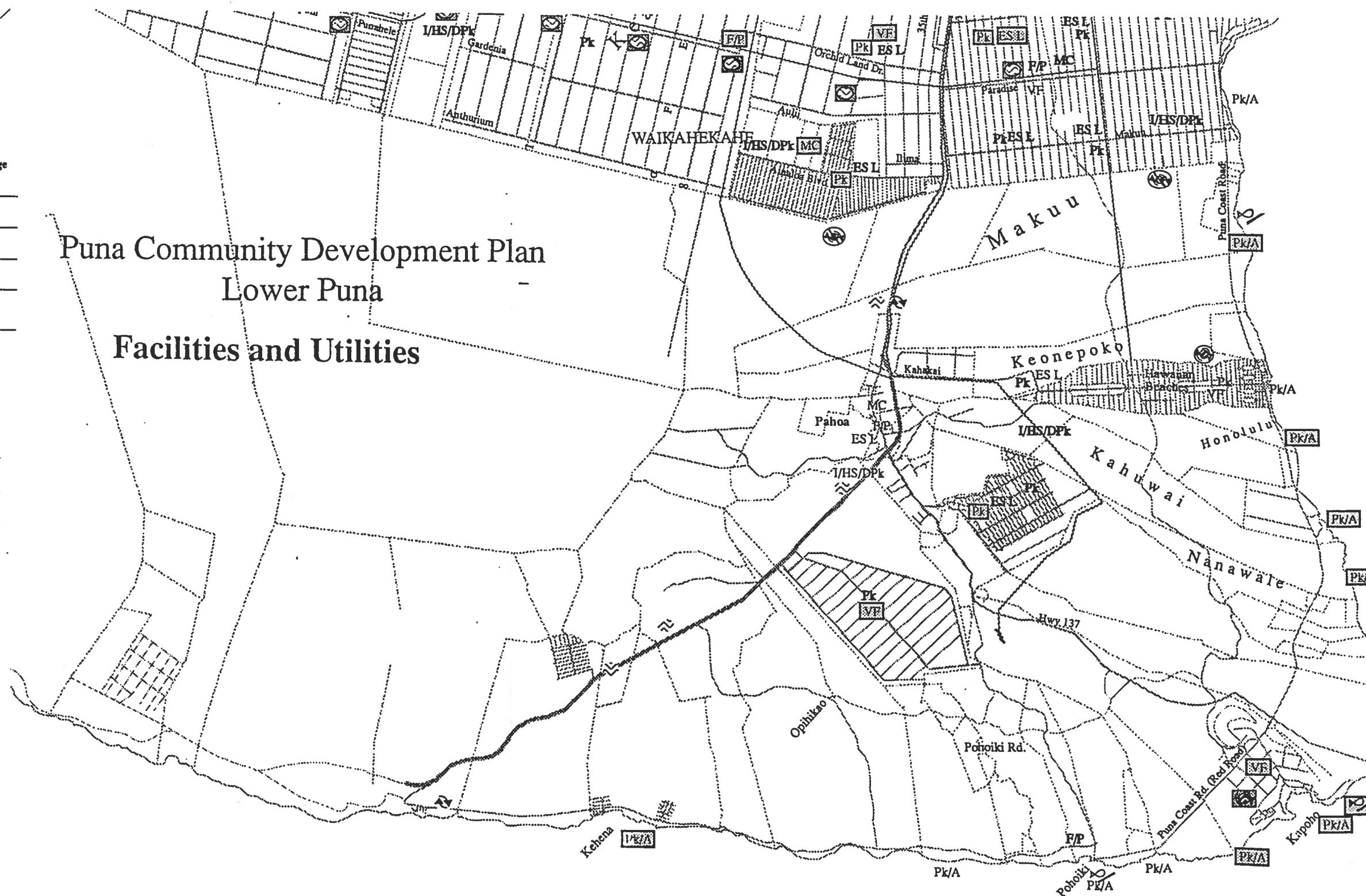
COMMUNITY FACILITIES			
	Existing	10 year plan period	Long Range
Elementary School and Library	ES L		ES L
Intermediate/High School & District Park	I/HS/DPk		I/HS/DPk
Community/Neighborhood Park	Pk		Pk
Beach Park/Shoreline Access	Pk/A		Pk/A
Hospital or Medical Center	MC		MC
Fire/Police	F/P		F/P
Volunteer Fire	VF		VF
Boat Ramp			



UTILITIES			
	Existing	10 year plan period	Long Range
Electical Generation and Corridors			
Water Tanks/Pump Stations			
Sewage Treatment Plants	None		
Transfer/Recycling Centers			
Sewage/Recycling/Biomass/ Electric Generation Center	None		

COMMUNITY FACILITIES			
	Existing	10 year plan period	Long Range
Elementary School and Library	ES L		ES L
Intermediate/High School & District Park	I/HS/DPk		I/HS/DPk
Community/Neighborhood Park	Pk		Pk
Beach Park/Shoreline Access	Pk/A		Pk/A
Hospital or Medical Center	MC		MC
Fire/Police	F/P		F/P
Volunteer Fire	VF		VF
Boat Ramp			

Puna Community Development Plan Lower Puna Facilities and Utilities



3.3.7. Map Notes

State Land Use District Boundary Amendments

- Waikahekahe is shown here as proposed to be in the Urban District. However, this should be subject to long term master planning to develop a civic and commercial area in which up to half of the area is reserved for parks and public civic uses.
- Rural District Designation for subdivisions is for State land use District change only, not zoning change.
- The Waipalani Urban Expansion Area is proposed to be a mixed use area of educational, technical, office and light industry. It is not intended for additional residential or other urban uses.
- The Urban areas shown for RTDs is conceptual only, and subject to changes according to the Community-Based Master Planning process. See the sample Hawaiian Paradise Park plan in the Appendix for an example of a master plan based upon this concept.

General Plan LUPAG Changes

- Waikahekahe is shown here as proposed Urban Expansion. However, this should be subject to long term master planning to develop a civic and commercial area in which up to half of the area is reserved for parks and public civic uses.
- A new proposed Rural Designation for subdivisions is for LUPAG change only, not zoning change.
- The Waipalani Urban Expansion Area is proposed to be a mixed use area of educational, technical, office and light industry. It is not intended for additional residential or other urban uses.
- The Urban Expansion Area shown on the LUPAG Map for Pahoa is proposed to be removed because of its location in Lava Flow Hazard Zone 2.
- The Medium Density areas shown for RTDs is conceptual only, and subject to changes according to the Community-Based Master Planning process. See the sample Hawaiian Paradise Park plan in the Appendix for an example of a master plan based upon this concept.

Zone Guide

- The Waipalani Light Manufacturing (ML) Area is proposed to be a mixed use area of educational, technical, office and light industry. It is suggested that additional zoning categories may be appropriate to designate and protect these types of uses so that they will be attractive to desired industries and institutions.
- The Project District Area shown for King's Landing and the coastal area of Keaau is proposed because of the cultural, archeological, and environmental sensitivity of the area and because of the tsunami risk in this low-lying coastal area.
- The locations shown for RTDs are conceptual only, and subject to changes according to the Community-Based Master Planning process. See the sample Hawaiian Paradise Park plan in the Appendix for an example of a master plan based upon this concept.
- The Open Zoning for Kahaualea is to bring its current agricultural zoning into consistency with it Conservation District status.

Transportation

- The corridors shown at 15th in Hawaiian Paradise Park, at 9 and 1/2 in Hawaiian Acres and the Central Subdivision corridor are located approximately, subject to subsequent state engineering studies and archives for more precise placement.
- This map does not show the Coastal Parkway. It is recommended that it be redesignated.

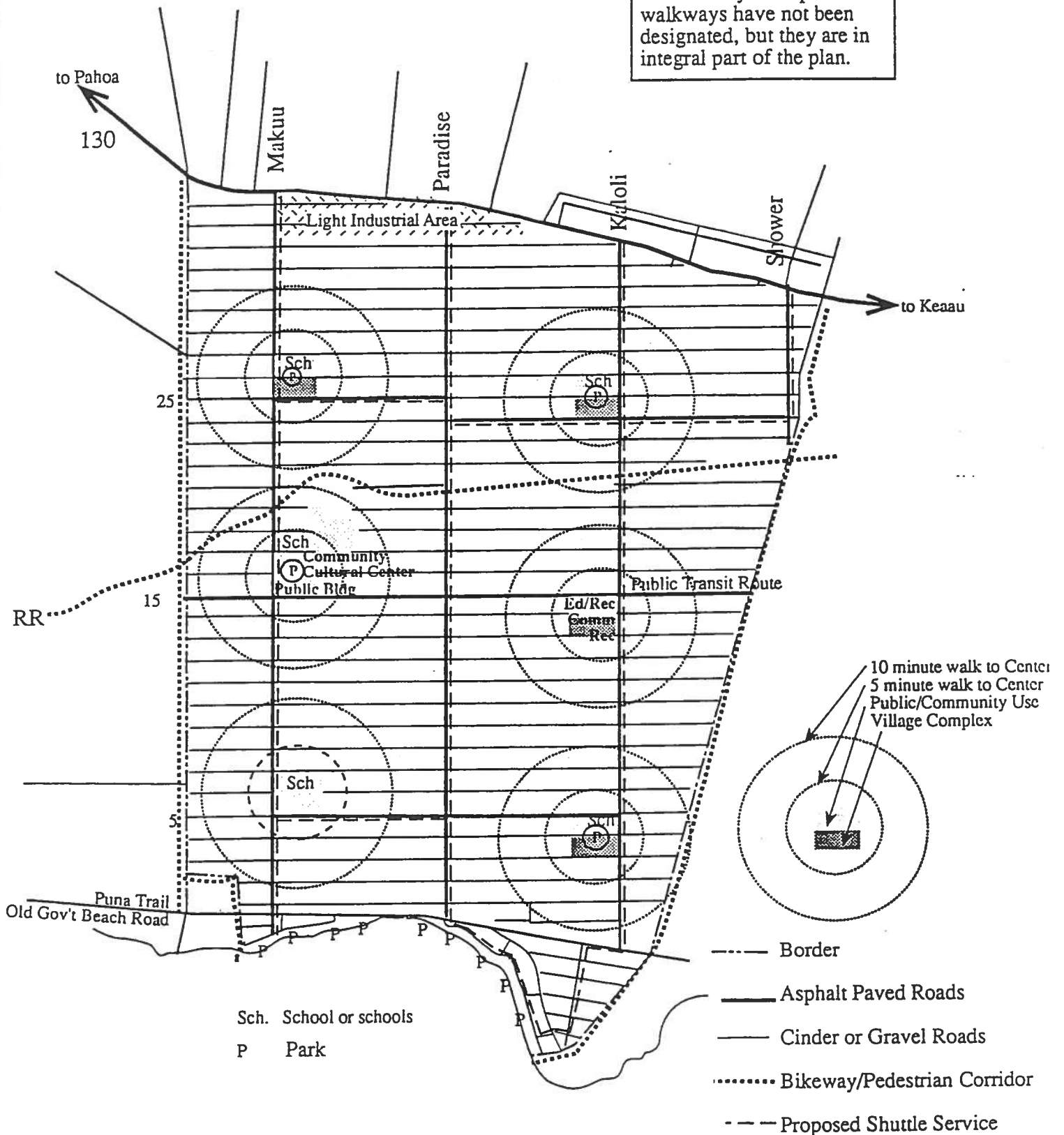
Map Notes continued

Facilities and Utilities

- F/P locations for Fire and Police indicate either both facilities or just fire stations.
- School locations are conceptual. Locations should be determined in collaboration with Department of Education.
- Utilities corridors are located approximately but should, in general, follow transportation corridors.
- Locations for public facilities, including water booster stations, beyond the needs of the ten-year planning period, are shown because of the large number of existing subdivision lots with no set-asides for public facilities.
- The shoreline Park/Access locations are taken from the Hawaii Island Shoreline Access Plan of 1979.

Hawaiian Paradise Park Master Plan Proposal

All bikeways and pedestrian walkways have not been designated, but they are in integral part of the plan.



Selected Resource List

(See also the Resource List in the Technical Reference Report for the Puna Community Development Plan, January 1992. County of Hawaii, Planning Department.)

Hawaiian Heritage of Puna

Emerson, Nathaniel B.

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**GENERAL PLAN AMENDMENT
PROPOSALS**

Puna CDP General Plan Amendments Proposals

Additions [Deletions]

LAND USE: RESORT STANDARDS

Lodge:

A lodge is a small hotel located as part of an existing community or as "lodgings" in an area of interest. It is different than other resort uses in that it is a place to stay rather than a "destination" itself. It shall have utilities appropriate to the area in which it is located, but must meet all applicable standards of health and safety.

Maximum hotel and condominium-hotel units: up to 50

Resort acreage: No minimum but density shall not exceed what is appropriate for the area.
For example: in a medium density area, density shall be what is allowed for
multi-family.

Employee housing should be considered as a requirement if the Lodge is so remotely located from residential areas as to make getting to work a hardship for potential employees.

Transportation, Courses of Action for Puna

- The present Puna Coast Road, eventually to connect with the Chain of Craters Road, should be developed as a scenic [parkway] road along the coast. Alignment should basically follow the existing road from the Kalapana end of the Chain of Craters Road to [the proposed extension of of the Saddle Road to the vicinity of the Hilo Airport] Kapoho.

- Major collector roads should run from:

[Opihikao to the Puna Road.]

[Volcano Road to the coast parkway along the Puna-South Hilo boundary.]

Volcano Road to the Saddle Road above Hilo along the existing Kulani Road.

[Upper portion of the National Park to a point approximately 2 miles west of Kalapana.]

RECREATION General Use Parks Courses of Action for Puna

- [• Implement the County of Hawai'i Park Development Plan for Kalapana-Kaimu area.]
- [• Recommend that the State develop the ancient canoe landing site as a recreation site.]

General Plan LUPAG Changes

- Add Waikahekahe Urban Expansion area, subject to long term master planning to develop a civic and commercial area in which up to half of the area is reserved for parks and public civic uses.
- Rural Designation for Cymbidium Acres, Royal Hawaiian Estates, Eden Roc, Fern Acres, Aloha Estates, Glenwood Subdivision, Pacific Paradise Mountain View Manor, Pacific Paradise Development, Hawaii Island Paradise Acres, Pacific Paradise Gardens, Tiki Gardens, Ainaloa Estates, Hawaiian Paradise Park, Kalapana Black Sand , Kalapana Seaview, Puna Beach Palisades, and Kehena Beach Estates.
- Add Waipalani Urban Expansion Area for mixed use area of educational, technical, office and light industry. Show as Industrial if appropriate.
- Add Industrial area around Keaau sugar mill.
- Remove Urban Expansion Area shown on the LUPAG for Map for Pahoa and for King's Landing.
- Add Urban areas according to future adopted Community Master Plans.

General Plan Transportation and Facilities Map

- Show corridors at 15th in Hawaiian Paradise Park, and at 9 and 1/2 in Hawaiian Acres.
- Redesignate the Coastal Parkway as a scenic road.
- Indicate subdivision collector roads for those subdivisions with master plans.
- Indicate additional facilities as designated on CDP Facilities map.

