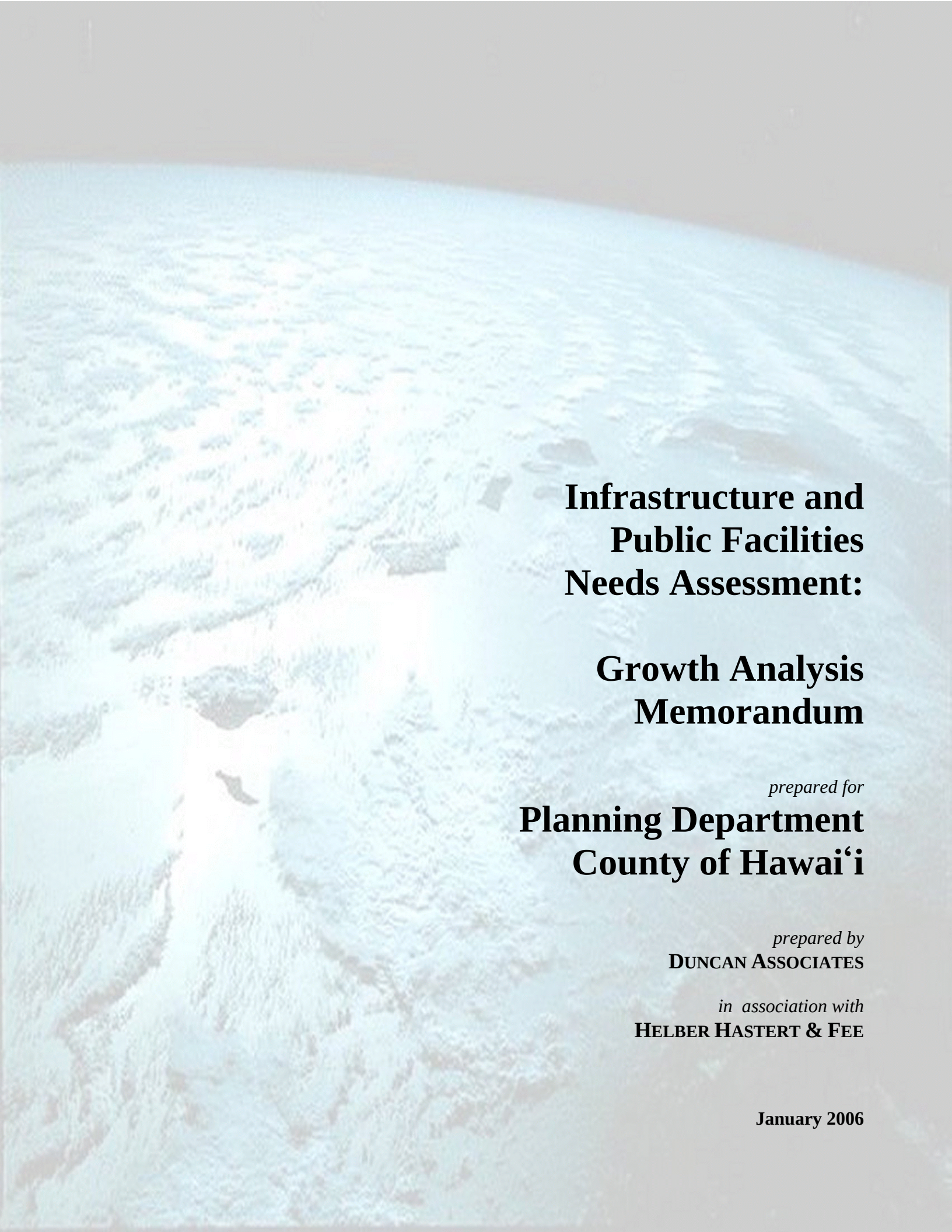


Infrastructure and Public Facilities Needs Assessment:

Growth Analysis Memorandum

prepared for

Planning Department
County of Hawai‘i

prepared by
DUNCAN ASSOCIATES

in association with
HELBER HASTERT & FEE

January 2006

Introduction

Hawai'i County is currently undertaking an impact fee study to determine the feasibility of implementing an impact fee program. An impact fee is a one-time charge on development, designed to cover the cost of growth's impact on infrastructure. Impact fees are designed to ensure that new development contributes a fair share of the cost of the capital improvements needed to serve growth.

The purpose of this memorandum is to provide land use and demographic background data for the County's impact fee study. This memorandum consists of a comprehensive analysis of the County's growth patterns and trends.

Existing land use data is a key building block for impact fee analysis, since it is necessary for determining current levels of service. For most types of facilities, the existing level of service is, in some form, a ratio of existing capital facilities to existing development being served by those facilities. Most communities have reasonably accurate estimates of existing housing units, but many lack reliable data on existing nonresidential development. One of the best sources of such data is the local property tax assessor's office. Significant useful information on residential development is available from the US census. In particular, these data sources provide valuable information on average household size by housing type, number of bedrooms, and other characteristics that can be used in the analysis.

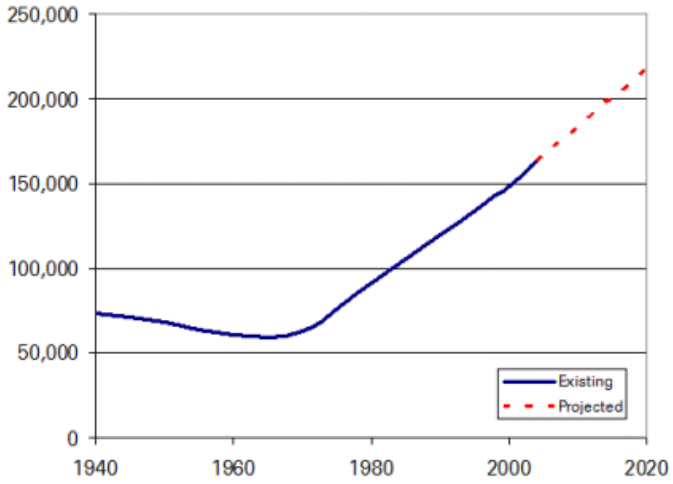
This memorandum describes existing residential and nonresidential development from the local tax assessor's database, summarizes available census information on dwelling units and average household size by housing type and number of bedrooms, estimates existing residential development based on census data, building permits and other local data, summarizes local population estimates and growth projections, and estimates existing nonresidential development.

Population

The County of Hawai'i encompasses the entire island of Hawai'i and has the largest land area of Hawai'i's counties. The land area of the County is approximately twice the combined land area of all the other islands of the State.

Traditionally, agriculture played an important role in the County's economy and much of the County's population growth and development were tied to the growth and employment needs of its agricultural economy. The island of Hawai'i's diverse climate, topography and scenic beauty along with the innovations in the travel and leisure industry have caused tourism to emerge as the primary economic activity. In addition, the County has seen substantial population growth beyond what would be expected from economic opportunities in the County's primary industries; such population growth has most likely been due to in-migration of people drawn to the quality of life in the County.

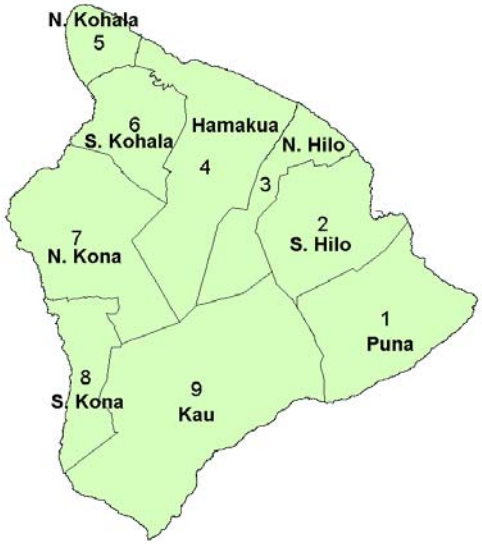
Figure 1
POPULATION GROWTH, 1940-2020



The County of Hawai'i is currently the second most populous County in Hawai'i. The 2000 U.S. Census recorded the County's population as 148,677. Figure 1 shows the population growth since 1940, and the projected growth through 2020.

The County of Hawai'i's population growth has remained relatively constant over the last two decades, with a slight decline from an annual rate of 2.71 percent in the 1980s to 2.14 percent in the 1990s. According to population projections provided in the medium series projections in the *Hawai'i County General Plan*, Hawai'i County's population is expected to grow at about 1.9 percent a year over the next two decades. Under this growth assumption, the County's population is expected to be about 217,718 in 2020.

Figure 2
JUDICIAL DISTRICTS



As shown in Table 1, while the overall County population growth has been fairly constant, certain districts have experienced much more rapid growth than the County as a whole. The Districts of Puna, South Kohala and North Kohala have experienced the most rapid growth during the 1980s and 1990s. During the 1990s Puna grew annually by 4.19 percent, South Kohala grew annually by 3.69 percent and North Kohala grew by 3.47 percent per year.

Table 1
HAWAII COUNTY POPULATION GROWTH

Judicial District	1980	1990	2000	Annual Growth Rate 80-90	90-00
1-Puna	11,751	20,781	31,335	5.87%	4.19%
2-South Hilo	42,278	44,639	47,386	0.54%	0.60%
3-North Hilo	1,679	1,541	1,720	-0.85%	1.10%
4-Hamakua	5,128	5,545	6,108	0.78%	0.97%
5-North Kohala	3,249	4,291	6,038	2.82%	3.47%
6-South Kohala	4,607	9,140	13,131	7.09%	3.69%
7-North Kona	13,748	22,284	28,543	4.95%	2.51%
8-South Kona	5,914	7,658	8,589	2.62%	1.15%
9-Kaʻū	3,699	4,438	5,827	1.84%	2.76%
Total	92,053	120,317	148,677	2.71%	2.14%

Source: County of Hawai'i Data Book, Section 1 <http://www.hawaii-county.com/>.

In addition to the resident population, Hawai'i County has a significant tourist population. Table 2 shows the resident population and visitor industry projections through 2020. Based on data from the *Hawai'i County General Plan*, there were 1,265,700 visitors and 10,041 hotel rooms in the County in 2000. The average daily visitor census data illustrates the significance of tourism and its effect on the County's functional population; under the assumptions used in forecasting total visitors, the average daily number of visitors is projected to increase by 2.00 percent annually, from 21,831 in 2000 to 32,440 in 2020. The County's functional population is the total resident population plus the average daily visitor count.

Table 2
HAWAII COUNTY POPULATION AND VISITORS

Year	Resident Population	Avg. Daily Visitors	Hotel Rooms
1985	105,900	8,040	7,511
1990	120,317	16,970	8,952
1995	137,290	18,650	9,575
2000	148,677	21,831	10,041
2005	159,908	24,103	10,513
2010	176,937	26,612	10,892
2015	195,965	29,382	11,200
2020	217,718	32,440	11,452

Source: Hawai'i County General Plan, Table 1-5; Average Daily Visitor Census, 1985 to 2000, from *Hawai'i County Data Book*, Table 7.3, data from 2005-2020 derived used total visitor growth rate projected increase of 2% per year from *Hawai'i County General Plan*.

Average Household Size

When calculating an impact fee, data on average household size for various types of housing units is a critical component. The most recent and reliable data on average household size in Hawai'i County is the 2000 U.S. Census. As shown in Table 3 below, average household size varies by housing type, ranging from 1.99 persons per mobile home unit to 2.87 persons per single-family detached unit.

Table 3
AVERAGE HOUSEHOLD SIZE BY HOUSING TYPE

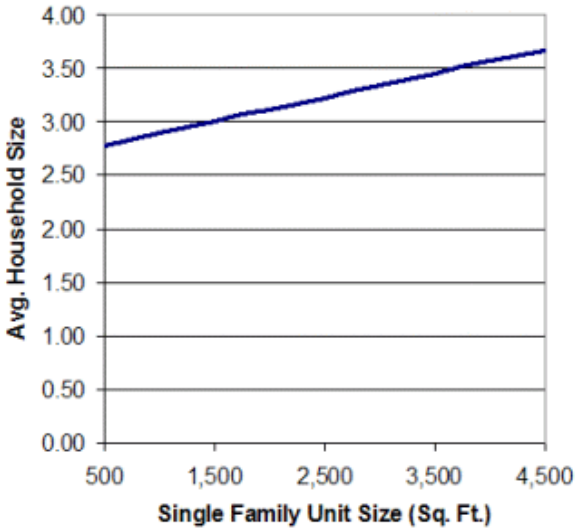
Housing Type	Household Population	Occupied Units	Avg. HH Size
Single-Family Detached	123,431	42,984	2.87
Multi-Family	21,904	9,704	2.26
Mobile home	591	297	1.99
All Housing Types	145,926	52,985	2.75

Source: 2000 U.S. Census for the County of Hawai'i, Summary File 3 (sample data).

For single-family units, the County may desire to vary the fees by the size of the dwelling unit. While the only measure of dwelling unit size recorded by the Census Bureau is bedrooms and total rooms in the dwelling unit, it is recommended that the fees be based on square footage rather than number of bedrooms or rooms in a unit. Although some municipalities charge impact fees on the basis of bedrooms, it can be an administrative challenge to determine the number of bedrooms when there is a financial incentive to disguise bedrooms as something else (a den or storage room, for example). An alternative is to translate bedrooms or total rooms into size categories.

To determine a relationship between the unit square footage, bedrooms and household population in Hawai'i County, the consultant compiled data on all 630 single-family homes listed for sale in the County from the National Association of Realtors website (www.realtor.com) on October 19, 2005. These on-line listings give square footage and the number of bedrooms for each home offered for sale. A variable for average household size was added, consisting of the average household size multipliers by housing type and number of bedrooms derived from 2000 U.S. Census sample data. Regression analysis was then performed to determine the relationship between unit size in square feet and persons residing in the unit. Both linear and logarithmic regressions were performed. The linear regression was statistically significant, with the linear equation accounting for 35 percent of the variation.[1]

Figure 3
RESIDENTS BY UNIT SIZE



[1]The linear equation for single-family units is y = 0.000223 * x + 2.6732 (r-square = 0.354597), where x is square feet of living area and y is household size.

The resulting linear equation (shown in Figure 2) shows the relationship between household size and dwelling unit size for single-family unit. The graphed relationship shows that there is a strong correlation between household size and unit size, and that the larger the unit the more people it is likely to contain. As can be seen in Table 4, a single-family detached unit with less than 1,000 square feet has an average of 2.78 persons, while a unit with 4,000 square feet averages 3.68 residents.

Table 4
SINGLE-FAMILY HOUSEHOLD SIZE BY SQUARE FEET

Dwelling Size Category	Approximate midpoint (sq. ft.)	Average Household Size
Less than 1,000 sq. ft.	500	2.78
1,000 - 1,999 sq. ft.	1,500	3.01
2,000 - 2,999 sq. ft.	2,500	3.23
3,000 - 3,999 sq. ft.	3,500	3.45
4,000 sq. ft. or more	4,500	3.68

Source: Average household size is derived by substituting the midpoint for x and solving for y in the equation described in the preceding text.

If the calculated fees are based on dwelling unit size, it is recommended that the fees be based on square footage rather than number of bedrooms. This cost per square foot approach will not only avoid any type of confusion that might arise when trying to establish how many rooms a new unit might have, it also avoids sharp jumps in the fee that will occur at thresholds between the different size categories.

Existing Residential Units

Estimating the number of existing residential dwelling units is a key building block for any impact fee analysis, since it is essential for determining the existing level of service. This is critical because a fundamental principle of impact fees is that new development should not be charged for higher level of service than is being provided to existing development. Without an accurate estimate of existing residential units, it is impossible to accurately determine the existing level of service.

To estimate existing residential units, the consultant first analyzed the number of building permits issued since 2000. Over the last five years and eight months, the County has issued 9,066 permits for single-family detached units and 2,798 multi-family permits, for a total of 11,864 new residential units.

Table 5
RESIDENTIAL BUILDING PERMITS, 2000-2005

Housing Type	2000	2001	2002	2003	2004	2005	Total
Single-Family Detached	1,196	1,081	1,199	1,852	2,133	1,605	9,066
Multi-Family/Other	347	258	275	493	944	481	2,798
Total	1,543	1,339	1,474	2,345	3,077	2,086	11,864

Source: County of Hawai'i building permit data by building type; 2005 data through August.

The consultant then added the number of new building permits to the number of housing units recorded in the 2000 U.S. Census. Since the census enumeration occurred on April 1, 2000, adding five years and eight months of building permits yields a reasonable estimate of dwelling units as of approximately December 1, 2005. It is estimated that Hawai'i County currently has about 57,297 single-family units and 17,241 multi-family units and other units, for a total of about 74,538 existing dwelling units.

Table 6
RESIDENTIAL UNITS BY TYPE, 2005

Housing Type	2000 Units	2000-2005 Permits	2005 Estimate
Single-Family Detached	48,231	9,066	57,297
Multi-Family/Other	14,443	2,798	17,241
Total	62,674	11,864	74,538

Source: 2000 units from the U.S. Census; 2000-2005 building permits by housing type from Table 5.

Existing Nonresidential Land Use

In addition to estimating existing residential units, it will also be necessary to estimate existing nonresidential floor area in Hawai'i County. The consultant was able to obtain nonresidential floor area and corresponding land use codes for existing parcels of land in Hawai'i County from the County Tax Assessor. The square footage for existing nonresidential development in Hawai'i County was estimated by summing the total square footage for all applicable parcels. Table 7 summarizes the nonresidential development in Hawai'i County by land use. It is estimated that the County currently has about 24 million square feet of nonresidential development, of which 9 million square feet is commercial/retail space, 4 million square feet is office space, 2 million is institutional space and 9 million is industrial/warehouse space.

Table 7
NONRESIDENTIAL LAND USE, 2005

Land Use	Existing Sq. Ft.
General Retail	4,120,214
Auto Sales	80,112
Bank	203,856
Convenience Store/Service Station	146,028
Hotel/Motel	3,742,488
Movie Theater	63,712
Restaurant, Sit-Down	635,613
Restaurant, Fast Food	57,141
Subtotal, Commercial/Retail	9,049,164
General Office	3,766,361
Medical Office	268,618
Subtotal, Office	4,034,979
Airport	83,984
Auditorium/Theater	262,282
Funeral Home	17,050
Hospital	245,374
Library	104,917
Nursing Home	215,819
Religious Institution	401,833
School	608,152
Social/Fraternity Hall	221,158
Tennis/Racquet Club	95,131
Subtotal, Institutional	2,255,700
Industrial	417,246
Warehouse	7,956,165
Mini-Warehouse	248,253
Subtotal, Industrial and Warehousing	8,621,664
Total Nonresidential Square Footage	23,961,507

Source: Hawai'i County, October 5, 2005; data derived from tax records; data as of January 1, 2005 assessment date for 2005 tax year.

Nonresidential growth appears to be outpacing residential construction, based on building permit data. Since the year 2000, the number of housing units has increased by about three percent annually, while nonresidential square footage has been increasing by almost six percent annually.

Table 8
GROWTH RATES, 2000-2005

Land Use	2000 Census	2000-2005 Permits	2005 Estimate	Annual Increase
Single-Family Detached	48,231	9,066	57,297	2.91%
Multi-Family	14,056	2,762	16,818	3.04%
Total Residential Units	62,287	11,828	74,115	2.93%
Total Nonresidential Sq. Ft.	17,233,626	6,727,881	23,961,507	5.65%

Source: Residential data from Table 6; 2005 nonresidential square footage estimate from Table 7; 2000-2005 nonresidential permit data from County of Hawai'i for January 1, 2000 through August 31, 2005; 2000 nonresidential estimate is difference.