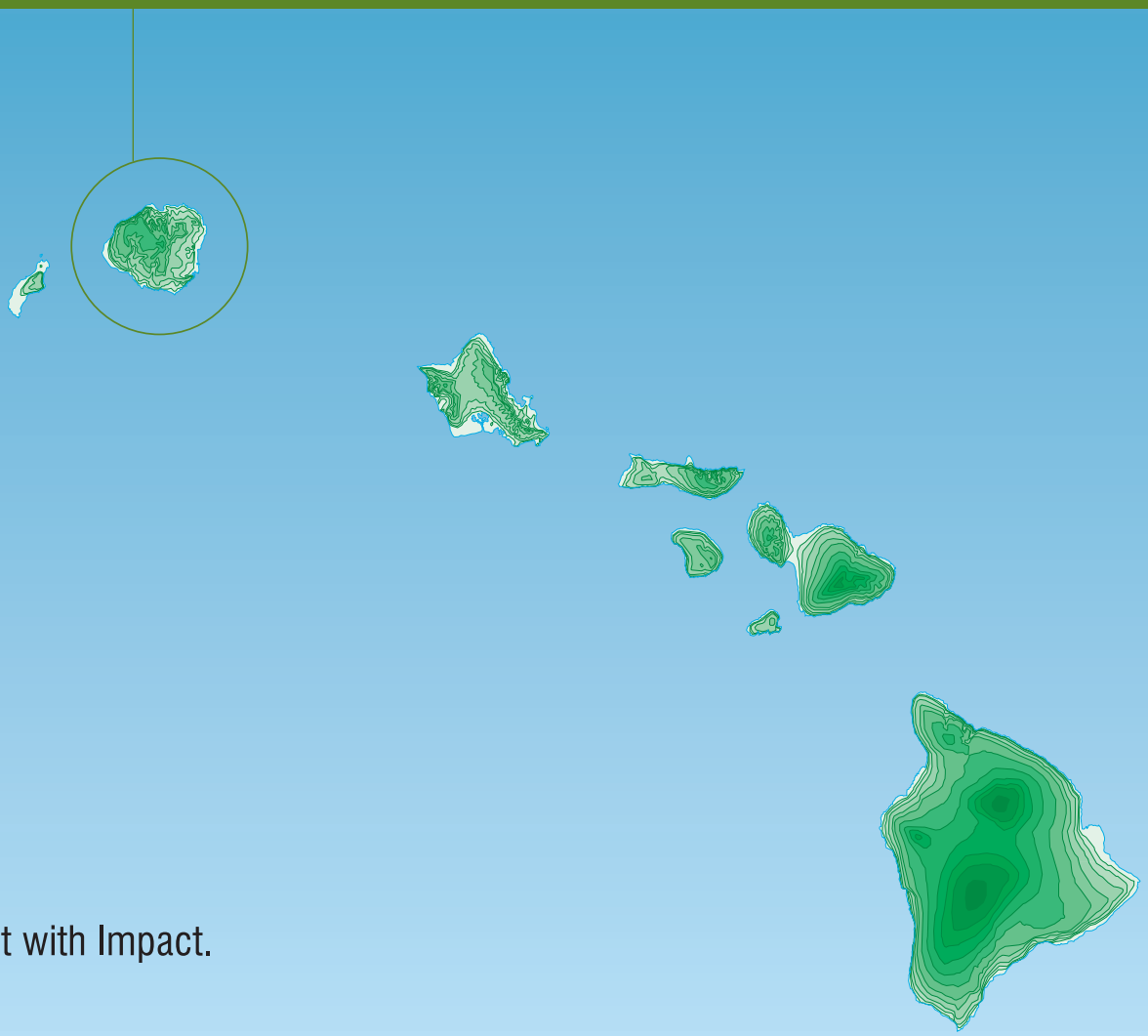
INTEGRATED SOLID WASTE MANAGEMENT PLAN

COUNTY OF KAUA'I

Department of Public Works - Solid Waste Division

March 2009



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County of Kaua'i
Integrated Solid Waste Management Plan

Table of Contents

List of Tables

Section 1

Section 2

Section 3

Section 4

Section 6

Section 7

Section 8

Section 9

Section 10

Section 12

Section 13

Section 14

List of Figures

GLOSSARY

County:	County of Kauaʻi (section 1- page 1)
The Plan:	County's Integrated Solid Waste Management Plan (s1-p1)
HHW:	Household Hazardous Waste (s1-p1)
MSW:	Municipal Solid Waste (s1-p2)
Landfill:	Kekaha Landfill (s1-p2)
DOH:	Hawaiʻi Department of Health (s1-p6)
GID:	Garden Isle Disposal (s1-p9)
KRC:	Kauaʻi Resource Center (s1-p9)
DBC:	Deposit beverage container (s1-p11)
KRA:	Kauaʻi Recycling for the Arts (s1-p13)
ADF:	Advanced deposit fee (s1-p13)
CAC:	Citizen's advisory council (s2-p1)
2020 General Plan:	20-year General Plan for Kauaʻi (s2-p1)
Transportation Plan:	Planning Department 2005 Kauaʻi Long-Range Transportation Plan (s2-p1)
EPA:	U.S. Environmental Protection Agency)s2-p3)
1994 Plan:	1994 Integrated Solid Waste Management Plan (s3-p2)
PAYT:	Pay-as-you-throw (s3-p6)
CFC:	Chlorofluorocarbons (s3-p9)
HCFC:	Hydrochlorofluorocarbons (s3-p9)
RFP:	Request for Proposals (s4-p7)
MRF:	Materials Recover Facility (s4-p7)
OCC:	Old Corrugated Cardboard (s4-p9)
CET:	Center for Ecological Technologies (s4-p20)

ACM:	Asbestos-containing materials (s5-p1)
NESHAP:	National Emissions Standards for Hazardous Air Pollutants (s5-p1)
Honolulu:	City and County of Honolulu (s5-p8)

Section 1
OVERVIEW OF EXISTING SOLID WASTE MANAGEMENT SYSTEM

1.1 Background

Per the Hawai‘i Revised Statutes, Chapter 342G, Integrated Solid Waste Management (HRS 342G), each county is required to develop an integrated solid waste management plan and revise the plan once every five years.

In 2005, the County of Kaua‘i (County) retained R. W. Beck to assist with updating the County’s Integrated Solid Waste Management Plan (the Plan) which was last revised in 1994. The Plan provides a strategy for implementing environmentally prudent and cost-effective integrated solid waste management components to enhance or upgrade the County’s existing systems. The Plan will begin with this overview of the County’s existing solid waste management system and then each subsequent section of the Plan will discuss individual solid waste programs in detail.

1.2 Introduction

With assistance from County staff, R. W. Beck gathered data to characterize how solid waste is managed within the County including a list of programs and quantities managed. A detailed cost analysis is provided in Section 12. The components of the current solid waste management system include:

- Solid waste collection;
- Transfer stations;
- Landfill;
- Recycling and bioconversion (green waste);
- Source reduction;
- Special waste management;
- Household hazardous waste (HHW) management; and
- Public education.

1.3 Solid Waste Collection

1.3.1 Residential Solid Waste Collection

The County is responsible for the curbside collection of municipal solid waste (MSW) from all single-family residences in the County (17,863 households in Fiscal Year 2005; includes some smaller multi-family dwelling buildings). Currently, the County does not have a specific legal definition of what qualifies as a residential customer. The residents pay for the service via their property tax bill[1]. Per County Ordinance 21-2.1, residents must provide their own refuse receptacles "of sufficient number to contain the refuse that will accumulate between regularly scheduled collections". The containers must not exceed 32-gallons in capacity, weigh more than 75 pounds, and must have handles and a tight-fitting lid. There is no limit on the amount of MSW that residents are allowed to set out for collection, however the County does not collect bulky items (i.e., sofas, chairs, auto parts, tires, white goods, and other items with a combined volume of more than one cubic yard) as part of its regular refuse collection service. The County collects MSW once a week from single-family residential households using rear-load collection vehicles. The refuse is collected manually and each collection vehicle has one driver and two laborers.

County collection vehicles unload at the County transfer stations where the refuse is compacted into open top transfer trailers and taken to the Kekaha Landfill (Landfill), located on the western side of the island.

1.3.2 Commercial Solid Waste Collection

In FY 2005, the County collected refuse from approximately 60 commercial establishments. The commercial refuse is collected in the same manner as residential collection – manually with rear load vehicles; each vehicle has one driver and two laborers. Commercial accounts are charged a collection fee based on the number of 32-gallon containers collected weekly, as shown below in Table 1-1.

[1] The County provides the following services from the revenue received from property taxes: refuse collection, fire and police protection, street maintenance and lighting, sewer service and recreational facilities and activities. Per the County's website, the current tax rates are $4.30 per $1,000 net assessed valuation for each single-family residential building and $4.00 per $1,000 net assessed valuation on the land.

Table 1-1
Monthly Business, Commercial and Other Nonresidential Collection Fees

Number of Cans Each Collection	Monthly Fee for Weekly Collection
1 (minimum charge)	$11.00
2	$17.00
3	$23.00
For each can over 3	$6.00 per month

The commercial businesses that do not subscribe to the County's collection service contract with private haulers, or the businesses self-haul their refuse to a transfer station or the Landfill. Private haulers are not licensed by the County or the State. Currently, there are five private haulers providing commercial refuse collection in the County:

1. Garden Isle Disposal[2];
2. Trashco;
3. Souza Clyde;
4. Kaua'i Rubbish; and
5. BLS Plumbing.

1.4 Transfer Stations

The County operates four transfer stations and transports all MSW received at the transfer stations to the Landfill via transfer trailers. See Figure 1-1 below for the locations of the transfer stations, represented by the square symbols, as well as the County's other facility locations.

[2] Currently, the vast majority of Kaua'i businesses contract with Garden Isle Disposal for solid waste management services.

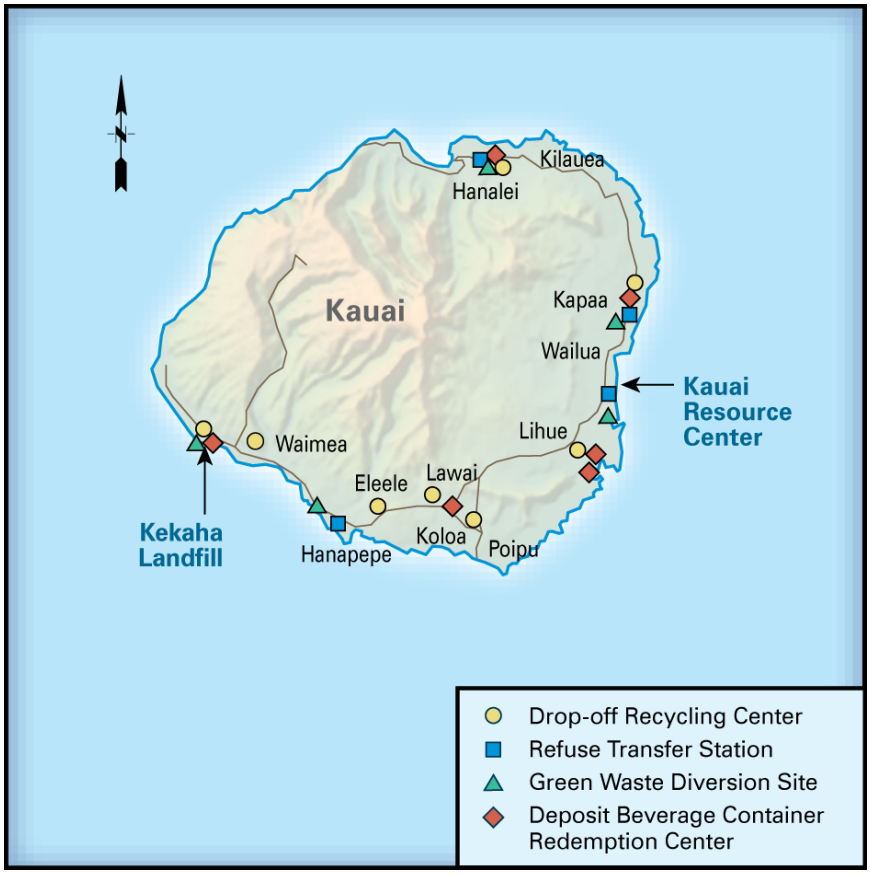

Figure 1-1: County of Kaua'i Solid Waste Management Facilities.

Table 1-2 below lists each transfer station and the total tons of MSW received in Fiscal Year (FY) 2005.

Table 1-2
Kaua'i Transfer Stations and FY 2005 Tonnage

Hanapepe	Lihue	Kapaa	Hanalei	Total
8,458	11,937	11,083	7,423	38,901

MSW and green waste are accepted from County residents at the four transfer stations free of charge. Technically, businesses are required to pay a tipping fee for dropping green waste, however, this is difficult to enforce because businesses can deliver solid and green waste in vehicles with residential license plates.

Additional information on the green waste program is discussed under Section 1.6.2 - Bioconversion.

The transfer stations do not have scales. Commercial businesses and other non-residential vehicles purchase coupons to use the transfer stations, which may be

obtained at the County Department of Motor Vehicles. The attendants do not handle cash at the transfer stations. Non-residential status is determined by license plates. Coupon fees are shown below in Table 1-3.

Table 1-3
Transfer Stations Non-residential Coupon Fees

Type of Vehicle	Coupon Fee
Automobile	$6.00
Pickup Truck – ½ ton and under	$10.00
Full-size pickup truck – up to ¾ ton	$20.00
Passenger Van	$10.00
Cargo Van – up to ¾ ton	$20.00
Small Trailer – ½ ton and under	$10.00
Trailer – up to ¾ ton	$20.00

The following materials are not accepted at the transfer stations:

- Ash;
- Bulky items and construction and demolition debris (C&D) greater than 3 feet in any dimension. [However, because the Lihue transfer station has the equipment and capacity to properly manage bulky items, they are accepted at this transfer station];
- Animal carcasses, parts, or innards; liquid waste; medical waste which has not been sterilized; and large truck and heavy equipment tires;
- Explosives;
- Pressurized containers; and
- Toxic and hazardous wastes.

The County transfer station hours of operation are 7:30 a.m. to 5:30 p.m., seven days a week, excluding County holidays. The Lihue transfer station is staffed by a three-person crew and the Hanalei, Kapaa, and Hanapepe transfer stations each are staffed with a two-person crew. The crews work four, 10-hour days.

Of the four transfer stations, Hanalei is the only site that has recycling drop-off bins. In addition, the Kekaha Landfill serves as a recycling drop-off site.

1.5 Kekaha Landfill

The Landfill is owned by the County and staffed, in part, with County employees. Landfill operations and monitoring services are contracted to Waste Management, Inc. (WMI).

In FY 2005, the Landfill received 89,156 tons of waste. Table 1-4 shows the quantity of various waste streams received at the Landfill during 2005. Per the permit renewal and modification issued by the State of Hawai‘i Department of Health (DOH) in April 2005, the peak daily disposal rate shall not exceed 600 tons per day. In FY 2005, the landfill averaged 244 tons per day.

Table 1-4
County of Kaua‘i Landfill
Disposed Waste Streams
FY 2005

Material	Quantity (Tons)
Mixed Rubbish	83,470
Mixed C&D	4,255
Sewage Sludge/GR/S [1]	1,380
Asbestos	45
Dead Animals	1
Contaminated Soils	1
Solidified Grease	1
Aggregates	3
Total:	89,156

[1] Grit and sand.

R. W. Beck conducted a composition study of the mixed rubbish waste stream in February 2006 as part of the planning process to identify materials that have the potential for landfill diversion. The results of this study are discussed in Section 2.

In April 2005, the Landfill received approval from the DOH for a vertical expansion to 85 feet. The increased elevation provides an approximate four and a half to five years of additional landfill capacity, based on annual waste receipts of approximately 90,000 tons. In addition, the County is currently in the process of requesting a lateral expansion. This expansion could yield an additional six years of capacity.

The current tipping fee paid by the private haulers and other commercial vehicles at the Landfill is shown below in Table 1-5.

Table 1-5
Commercial Tipping Fees per Ton

Type of Waste	Dollars per Ton
MSW and green wastes (except special wastes)	$56.00
Asbestos-containing materials	$70.00
Dead animals	$56.00

There is no charge to County residents who self-haul MSW or green waste to the Landfill.

Should the vehicle scale at the Landfill be inoperable, the County has in place a schedule of tipping fees by volume for commercial businesses and other non-residential vehicles as shown below in Table 1-6.

Table 1-6
Commercial Tipping Fees per Cubic Yard

Type of Waste	Dollars per Cubic Yard
Uncompacted MSW and green wastes (except special wastes). Assumes 350 lbs/c.y.	$10.00
Compacted MSW (except special wastes) and green wastes. Assumes 600 lbs/c.y.	$17.00
Asbestos-containing materials	$21.00
Dead animals	$17.00

The minimum tipping fee charge for any load is ten dollars.

The following materials are not accepted at the Landfill:

- Corrugated cardboard from business, industrial, governmental, institutional, and other non-residential sources. However based on the results of the waste assessment R. W. Beck conducted in February 2006, it does not appear that this ban has been effective since large quantities of corrugated cardboard were present;
- Ferrous and non-ferrous metal objects from business, industrial, governmental, institutional, and other non-residential sources;
- Loads from business, industrial, governmental, institutional, and other non-residential sources exceeding twenty percent (20%) green waste;
- Liquid waste, except small quantities of liquids from residential sources in containers of types and sizes typically used in residential environments;
- Medical waste which has not been rendered non-infectious through sterilization;

- Motor vehicles and automotive-type batteries;
- Toxic and hazardous wastes;
- Used motor vehicle and heavy equipment tires, whether whole, cut, sliced, chipped, or shredded; and
- White goods.

1.6 Recycling and Bioconversion

1.6.1 Recycling

1.6.1.1 Residential Drop Bin Program

The County has a voluntary recycling program (i.e., residents are not mandated to recycle). Currently there are eight drop-off sites in the County for the collection of the following items generated by residents (commercially-generated materials are not accepted in the bins):

- Corrugated Cardboard;
- Newspaper;
- Glass;
- Aluminum cans;
- Plastic bottles (#1 and #2); and
- Mixed Paper.

Table 1-7 below lists the drop bin locations and tons collected in FY 2005.

Table 1-7
Kaua'i Recycling Drop Bin Locations and Tons Collected

City/Area	Location	Tons Collected in FY 2005
Hanalei	Hanalei Transfer Station	242
Kapaa	Kojima Store	211
Lihue	K-Mart Parking Lot	175
Poipu	Brennecke's Beach Broiler	92
Eleele	Eleele Shopping Center	132
Waimea	Waimea Canyon Park	60
Kekaha	Kekaha Landfill	13
Lawai	Lawai Post Office[1]	n/a
Total:		925

[1] The site in Lawai opened in FY 2006.

Table 1-8 shows the tons of recyclable material collected by material type in FY 2005 from the drop bin locations plus the County office paper program:

Table 1-8
Kaua'i Recyclable Materials
Tons Collected

Material	Tons 2005
Cardboard	204
Newspaper	253
Glass	335
Aluminum	11
Plastic	19
Mixed Paper	103
County Office Paper	42
Total:	967

The County has a contract with Garden Isle Disposal (GID) to operate the program, including a public education campaign, providing and maintaining the drop bins, hauling recyclables when the bins are full, collecting office paper from the County's office buildings, processing all materials, and marketing the materials. Per the five-year contract, signed in 2005, the County pays GID a flat fee $14,987 per month for the above recycling services.

Most of the recyclable materials are transported off-island to markets. GID retains any revenue from the sale of recyclable material including the deposit beverage container refund and handling fees for each container, which is currently a combined total of 8¢ per container. Glass is crushed and reused locally. Both GID and JC Sandblasting crush glass and make it available as a feedstock for reuse applications such as: construction backfill, cesspool fill, asphalt mix, water filtration, and sandblasting. More information on glass recovery and recycling is included below under "Other Recycling Programs".

The County owns the Kaua'i Resource Center (KRC) located in Lihue which has served as a residential and commercial recycling drop-off site. The County contracted with Island Recycling (based in Honolulu) in April 2002 to operate the facility, however this contract was terminated in January 2006. Under this contract, Island Recycling paid the County $800 per month to use the space and equipment at the facility to provide recycling services to the County and operate a commercial recycling business. The County is in the process of procuring a new contractor to operate the facility. The County Recycling Coordinator continues to conduct some office functions out of the KRC, including the distribution of home composting bins and used oil drainer containers, coordination of County recycling programs and facilitation of recycling education programs. Also, the Kaua'i Recycling for the Arts

(KRA) continues to operate its recycled glass re-manufacturing operations in the KRC building.

Table 1-9 below lists the materials collected and recycled at the KRC in FY 2005.

Table 1-9
Recyclable Materials Collected at the Kaua'i Resource Center (in Tons)
FY 2005

Cardboard	720
White Ledger	20
Office Pack	213
Magazines	14
Newspaper	76
Plastic - #1 PET	24
Plastic - #2 HDPE	11
Aluminum Cans	59
Scrap Aluminum	86
Scrap Copper	13
Scrap Brass	0
Scrap Stainless Steel	6
Computer CPUs	38
Tires	23
Pallets	20
Total:	1,323

Currently no curbside collection service is available for residential recyclable materials in the County. Kaua'i Community Recycling Service provided curbside service to approximately 1,000 households on a subscription basis for $10.00 per month for twice a month collection. When the KRC closed, Kaua'i Community Recycling Service suspended the curbside service. As discussed in Section 4, the County plans to facilitate the reestablishment of a curbside recycling program.

Combined, the residential drop bins and the KRC diverted approximately 2,290 tons of recyclable materials in FY 2005.

1.6.1.2 Deposit Beverage Container Program

In the State of Hawai'i, a 5¢ deposit per beverage container is charged for the purchase of glass, aluminum, and plastic containers defined under the law. A 1¢ non-refundable container fee is also assessed to support the costs of recycling and program administration. Beverages included under the law are soft drinks, beer, juices, water, teas, and sports drinks. Excluded beverages include but are not limited to wine, milk, and hard liquor. Residents receive a 5¢ deposit refund per container, or an equivalent

segregated weight payment for loads of 200 containers or more, when containers are brought to a redemption center to be recycled. In turn, Certified Redemption Centers are reimbursed by the DOH for the 5¢ deposit, and also receive a handling fee, currently set at 3¢ per container. The DOH manages the deposit beverage container (DBC) program.

Currently seven privately-operated Certified Redemption Centers operate throughout the County, as well as redemption centers at the Landfill and the Koloa Fire Station that are contracted by the County and subsidized through State grant funds. Redemption centers operate on different schedules, with some offering very limited days and hours of operation. Redemption center locations and hours of operation are listed below in Table 1-10. (Retailers are not required to operate redemption centers at their stores.)

Table 1-10
Kaua'i Beverage Container Redemption Center Locations

Kapahi Reynold's Recycling 5675B Kawaihau Road Tues – Sat: 9 am to 5 pm Closed for lunch noon to 1:30 pm	Lawai Post Office Reynold's Recycling 02-3687 Kaumualii Highway Wed & Sat: 8 am to noon
Lihue Garden Isle Disposal 2666 Niumalu Road Mon – Fri: 8 am to 4 pm Closed for lunch noon to 1 pm Sat: 8 am to noon	Nawiliwili Harbor Reynold's Recycling Corner of Wilcox and Kanoa Street Tues – Sat: 9 am to 5 pm Closed for lunch noon to 1:30 pm
Kekaha Landfill Kaua'i Community Recycling Services 6900-D Kaumualii Highway Wed & Sat: 8 am to 4 pm	Hanalei Kaua'i Community Recycling Services Hanalei Community Center Tues: 8 am to 2 pm
Koloa Kaua'i Community Recycling Services Koloa Fire Station Thurs & Sun: 8 am to 2 pm	

Currently all redemption center operators are transporting the redeemed DBCs to GID in Lihue for processing and marketing. The quantity of deposit beverage containers redeemed in 2005 from the County was 12.5 million units, which converted to tons equals approximately 823 tons.

In an effort to capture more DBCs and offer recycling at public venues, the County placed hoop wire recycling bins for the collection of deposit beverage containers at seventy-six County-owned parks and neighborhood centers in January of 2006. The bins are emptied by residents/visitors who are encouraged to take the containers and redeem them for money at one of the local redemption centers.

The County hired a Recycling Specialist in March of 2005 to oversee the DBC program. The position is funded through a grant from the DOH's Beverage Container Deposit Program. The grant also funds the County-contracted redemption centers at the Landfill and Koloa, the hoop wire bins in the parks, and pays for promotional items related to the DBC program.

1.6.1.3 Puhi Metals Recycling Center

The Puhi Metals Recycling Center is a County-owned facility, privately-operated by Abe's Auto Recycler, Inc. The County pays Abe's Auto a flat fee of $46,500 per month to operate the facility. The center accepts and recycles abandoned and junked motor vehicles, white goods, scrap metal, depressurized propane tanks, and smaller motorized goods such as scooters, lawnmowers, and motorcycles from the County, the general public and commercial entities. The services provided are free of charge to residential users. Commercial users are assessed tipping fees listed below in Table 1-11.

Table 1-11
Puhi Metals Non-residential Tipping Fees

Type of Metals	Tipping Fee
White Goods	
With Freon	$20 each
Without Freon	$10 each
Scrap Metal	
Mini-Truck Load	$30 each
½ Ton Truck Load (6 ft. bed)	$45 each
¾ Ton Truck Load (8 ft. bed)	$60 each
Dump Truck Load	$300 each
Scaled Load (heavy iron/steel)	$60 per ton
Scaled Load (mixed)	$86 per ton
Scaled Load (light metal-tin/sheet)	$90 per ton
Commercial Motor Vehicles	
Up to 9,999 GVW	$125 each
10,000 to 15,000 GVW	$240 each
15,001 to 20,000 GVW	$340 each
20,001 to 25,000 GVW	$418 each
25,001 to 30,000 GVW	$490 each

White goods are segregated into two categories, those containing refrigerants or Freon (i.e. refrigerators, freezers or air conditioners) and those without refrigerants (i.e. water heaters, clothes washers and dryers, stoves and ranges).

In FY 2005, the Puhi Metals Recycling Center recycled 2,748 automobiles, 9,880 white goods, and 434 tons of scrap metal, for an approximate total of 5,675 tons of material.

1.6.1.4 Other Recycling Programs

- Business Recycling - GID is the largest commercial refuse hauler in the County who also offers recycling hauling services to businesses for a fee. The following materials are accepted for recycling by GID and processed at their facility in Lihue: OCC, white paper, mixed paper, glass, plastic, and aluminum. In FY 2005, GID reportedly collected the following quantities from commercial establishments:

Table 1-12
Commercial Recycling Tonnage Collected
By GID FY 2005

Cardboard	96
Newspaper	88
White Office Paper	44
Plastic	26
Green Waste	1,082
Tires	2
Total	1,338

- JC Sandblasting offers glass recycling hauling to businesses for a fee. Glass is processed at their facility. In FY 2005, JC Sandblasting processed 754 tons of glass.
- Backhauling - Many large retailers in the County "backhaul" their cardboard by shipping it back to the mainland in empty shipping containers. The County has collected basic data indicating that the following businesses have backhaul programs in place: Wal-Mart, Star Market, Safeway, and Food Land.
- KRA is a non-profit educational, art, and recycling organization that conducts its recycled glass manufacturing operations at the KRC building. KRA has a five year contract with the County that runs through November 2009. The County has supplied KRA with approximately $70,000 worth of equipment, as well as the studio space at KRC. KRA recycles an estimated two tons of glass per month.

  KRA offers classes and provides demonstrations on casting, glass blowing, sculpture, jewelry making, and more. Their finished products such as tiles, ornaments, jewelry, etc. are available for purchase at local retail stores or directly from KRA.

- Advance Deposit Fee (ADF) Glass Recovery and Recycling Contract. The County receives an annual grant from the State for advance disposal fees for non-deposit glass. As a result, the County has developed a grant program to reimburse glass processors who recover and reuse/recycle this glass at a rate of 6¢ per pound. No agencies presently have responded to the grant application issued in FY 2005. The County continues to work with potential grant recipients to overcome barriers to participating in the program. The State funding contract for FY 2005 provided $134,000 for the County's ongoing glass recycling program. ADF funding was reduced over the next several years due to the implementation of the deposit beverage container redemption program. It should be noted that the State ADF funding for FY 2007 was reduced to $25,000. Because of the reduced funding and limited staff to administer the program, the County did not participate in the grant program in FY 2007.
- Computer Recycling is addressed in the Section 6.
- Business Recycling. The County's Recycling Coordinator assists businesses with recycling, waste reduction, and waste diversion issues and conducts waste assessments upon request.

  In 2005, the County partnered with the Kaua'i Chamber of Commerce to offer the Mayor's Ho'ola Hou Award for Achievement in Commercial Recycling. Four businesses submitted applications and the Kaua'i Marriot in Lihue received an award for their exemplary and innovative recycling program.

1.6.2 Bioconversion

1.6.2.1 Green Waste

Residents can dispose of green waste free of charge at any of the four transfer stations or at the Landfill. Materials accepted include:

- Lawn trimmings;
- Tree trimmings (stumps, branches, leaves);
- Shrubbery; and
- Christmas trees.

The County asks that residents separate the green waste from all other waste. Residents must cut materials, such as logs and stumps that are more than 8 inches in diameter, into lengths of eight feet or less. In FY 2005, approximately 10,535 tons of green waste was collected and shredded by County operations.

There are currently two permitted green waste composters in the County:

- Heart and Soul Organics in Kilauea; and
- Kaua'i Nursery and Landscaping in Lihue.

Commercial green waste generators and landscapers may take green waste to these facilities. During 2005, an estimated 3,000 tons of commercial green wastes were composted at these facilities[3].

1.7 Source Reduction

Per the Kaua'i County Code, Chapter 21, Integrated Solid Waste Management,

"Source Reduction means the design, manufacture and use of materials to:

1. Minimize the quantity or toxicity, or both, of the waste produced; and
2. Reduce the creation of waste either by redesigning products or by otherwise changing societal patterns of consumption, use, or waste generation."

The County encourages source reduction in many ways, from fielding calls into the Recycling Office to information posted on the website.

Since October 2001, the County has distributed approximately 1,200 Earth Machine brand home composting bins free of charge to County residents. In order to receive a free bin, residents must agree to participate in an annual composting survey, and they must view a 20-minute composting training video. Based on the results of the annual survey, 648 tons of green wastes were reduced at home through backyard composting.

Listed below are various reuse activities taking place in the County:

- Aloha Shares Network. This statewide program was developed by Maui Recycling Group. In August 2005, the County received Council approval to accept ownership of the Kaua'i Aloha Shares Network. The network is an electronic reuse network that exchanges information about reusable materials in an effort to divert them from the landfill. Currently there is very little activity on the network, but the County is hoping to solicit more donations in the future.
- Pig Farms. Local pig framers currently collect food waste from certain local hotels, restaurants and the County jail to use as feedstock. While the County has been able to track some of the collections, most food collections of this type take place without the County staff's knowledge. During 2005, the County tracked 672 tons of food waste being reused in this manner.
- Habitat for Humanity. This non-profit organization accepts and reuses building supplies for low income housing construction projects. They also operate a thrift store in Hanapepe to resell building supplies and other household goods.
- Thrift Stores. Several thrift stores are located throughout the County, including:
  - Kaua'i Humane Society Thrift Store in Lihue;
  - Salvation Army Thrift Stores in Lihue and Koloa;
  - Wilcox Hospital Auxiliary in Lihue; and

[3] Source: County Staff.

- Trade Radio. Daily radio show on KONG AM 570 where callers can buy, sell, or trade reusable items.

1.8 Special Waste Management

Per Chapter 21 of the Kaua'i County Code, special wastes include "tires, asbestos-containing materials, white goods, and dead animals (except those disposed of by the Kaua'i Humane Society), and any mixed waste containing used tires, asbestos-containing materials, white goods, or dead animals. These wastes are defined as 'special' because they require special handling or processing by the County to comply with federal and state regulations".

Special waste is managed by the County as follows:

- Scrap Tires. Residential scrap tires are accepted at the four transfer stations and the Landfill at no charge. Tires from commercial users are not accepted. Commercially generated tires are accepted at Unitek Solvent Services and PS&D Tires (both in Lihue) for a fee. In FY 2005 1,038 tons of tires were shipped to Unitek's O'ahu location where they were chipped into crumb rubber and provided to AES power company as fuel. In addition, HRS 3421-23 requires tire retailers to accept the used tires at no fee when the equivalent amount of new tires are purchased.
- White Goods. White goods from residents are accepted year round at the Hanalei, Kapaa, and Hanapepe transfer stations and at the Landfill. In the Lihue area, residents must take their white goods directly to Puhi Metals. Commercially-generated white goods are not accepted at the transfer stations and must be taken to Puhi Metals where they are accepted for a fee. In FY 2005, 9,980 units of white goods were recycled at Puhi Metals Recycling, which is the equivalent to 848 tons of material.
- Asbestos-Containing Materials. The Landfill accepts Category I and Category II nonfriable asbestos-containing waste materials, as defined in 40 CFR, Part 61 of the U.S. Environmental Protection Agency's (EPA) Code of Federal Regulations. In FY 2005, the Landfill accepted approximately 49 tons of asbestos-containing material for disposal.
- Used Oil Recycling. Residential used motor oil is accepted for recycling at each of the four transfer stations, plus the Landfill. In FY 2005, the County collected 13,760 gallons of used oil. Based on a conversion factor of 8.0 pounds per gallon, the County recycled approximately 55 tons of used oil in 2005. The County also offers motor oil drainer containers free to residents. This program includes education and outreach, and is funded by the DOH.
- Propane Tank Recycling. Propane tanks pose a challenging waste stream for the County to manage. The County accepts propane tanks from residents, free of charge at three of the transfer stations (Hanalei, Kapaa, and Hanapepe), plus the Landfill, only if the valves have been removed and it can be determined that there are no fluids in the cylinders. However, the County usually rejects the propane

tanks delivered to these sites because very few people are able to depressurize because they don't have the expertise, and the professional removal fee is cost prohibitive ($25 per unit). This results in the County storing the propane tanks until they can accept pressurized tanks, and residents storing them or illegally dumping them at transfer stations or other locations.

- Battery Recycling. The County accepts lead acid and household batteries during its annual HHW collection event. Most auto parts stores will accept used batteries upon request with the purchase of a new battery. Auto service stations recycle old batteries when they install a new one. PS&D Tires accepts auto batteries for free, regardless if a new one is purchased. Daleco in Lihue accepts cadmium, rechargeable, and nickel cadmium (NiCad) batteries, for a small fee.

1.9 Household Hazardous Waste

The County sponsors an annual HHW collection event for residents to dispose of dangerous, poisonous, toxic, flammable, and other potentially harmful products. Collections are held simultaneously at each of the four transfer stations for a one-day event. Hazardous waste from businesses is not accepted through this program.

Materials accepted include, but are not limited to:

- Automotive products;
- Cleaners;
- Pesticides;
- Solvents;
- Corrosives;
- Flammables;
- Swimming pool chemicals; and
- Oil-based paint.

The County conducts an annual solicitation for a contractor to collect and dispose of the HHW. In February 2006, Honolulu-based Pacific Commercial Services performed the service. From the initial results, the quantities collected increased slightly from 2005 to 2006. More details on HHW can be found in Section 6 of this Plan.

Currently, no hazardous waste management facilities are located in the County. As a result, residents who are moving off island or need to dispose of HHW have no options. Options are also limited for small businesses to properly dispose of their hazardous waste, as hazardous waste management companies typically do not want to travel to the County to collect small volumes of materials.

1.10 Public Education

The County employs one Recycling Coordinator to manage the County's recycling program. The public outreach and education includes, but is not limited to, the following activities by the Recycling Coordinator:

- County Recycling Telephone Line – answer questions on all waste diversion topics.
- Program Promotions – create public service announcements, newspaper ads, and radio promotions for all recycling programs.
- County Website – design and update web pages containing recycling information.
- Facility Tours – host tours of the KRC for school groups, community organizations, trade associations, and legislative bodies.
- Special Events – provide information booths at large events such as the Kaua'i County Fair and Garden Fair.
- Public Drop-Ins – meet with the public upon request to discuss their experiences/issues/concerns/ideas regarding recycling.
- Public Speaking – make presentations to trade associations, youth groups, non-profit organizations, businesses, and other groups upon request.
- Radio Interviews – participate in a weekly radio interview on Trade Radio AM 570 every Friday at 10:45 a.m., and for other local radio shows upon request.
- Television Interviews – appear as a guest on local television shows upon request, such as the Mayor's talk show.
- Publications - publish and distribute the Kaua'i Recycling Guide at the KRC, at special events, and upon request.

The costs of the Source Reduction, Special Waste, HHW, and Public Education programs are included in the overall recycling program costs.

1.11 Waste Diversion Summary

As outlined above, the County has been successful in establishing a variety of solid waste diversion programs. Table 1-13 below summarizes the quantities of materials diverted from the Landfill in FY 2005.

Table 1-13
Quantities Diverted from the Kekaha Landfill
(in Tons)
FY 2005

Cardboard	1,651
Newspaper	422
High Grade Paper	88
Mixed Paper, including magazines	341
Plastic - #1 PET	50
Plastic - #2 HDPE	30
Plastic Bags	5
Glass	1,843
Aluminum Cans	70
Ferrous Metals	5,675
Nonferrous Metals	105
Tires	415
Electronics	38
Food Waste	672
Green Waste	15,730
Pallets	20
Used Oil	55
Propane Tanks	Included in Ferrous Metal Quantities
HHW	23
Total:	27,233

The following sections of this report provide more details on each of the County's programs, and include recommendations to improve these programs.

Section 2
PLANNING PERIOD PROJECTIONS AND COMPOSITION

2.1 Planning Period

The planning period for the County is fiscal years 2005 through 2013, with 2005 being the reference year, and fiscal year 2009 being the first year of plan implementation. The County chose 2005 as the baseline year as that was the most recent year with complete data on the existing solid waste management system when the County began preparing the plan. Fiscal year 2009 begins on July 1, 2008. The County felt that by the time the plan was prepared, and reviewed by DOH, the public and the County Council, that FY 2009 was a realistic date for implementing the plan. Finally, HRS requires the development of a 5-year plan, which is why 2013 is the end date.

2.2 Population Projections

In 2000, the Kaua‘i County Planning Department (Planning Department) worked with a 34-member citizen’s advisory council (CAC) to complete a 20-year General Plan for Kaua‘i (2020 General Plan). That effort stated the County’s 20-year vision and set policies for achieving that vision. One component of the 2020 General Plan was population, employment and land use projections, which will be used as the primary source for the Plan.

With respect to population projections, the County historically relied upon State projections for island-wide growth. However, during the development of the 2020 General Plan, State projections were found to be unsatisfactory and an alternative set of projections was generated. Therefore, the Planning Department worked with the CAC and developed an alternate set of population projections that combined visitor and resident population projections. These projections assumed that residential population growth will be approximately 1.72 percent per year and visitors' growth will be approximately 1.64 percent per year through the year 2020. Using information from the 2020 General Plan and data from the Planning Department 2005 Kaua‘i Long-Range Transportation Plan (Transportation Plan), R. W. Beck projected changes in permanent resident and daily visitor population as shown in Table 2-1.

For planning purposes, the combined resident and daily visitor population[1] estimates will be used to project generation, recycling and disposal quantities to assure that adequate solid waste infrastructure capacity is available for residential and visitor

[1] The Transportation Plan defines visitor as spending at least one night in a planning district.

waste. Combining residential and daily visitor population will be referred to as total daily de facto population.

Table 2-1
De Facto Population Projections[1]

Year	Resident Population	Daily Visitors	Total Daily De Facto Population[2]
2005	63,883	21,923	85,806
2006	65,000	22,300	87,300
2007	66,100	22,700	88,800
2008	67,200	23,100	90,300
2009	68,400	23,500	91,900
2010	69,600	23,900	93,500
2011	70,800	24,300	95,100
2012	72,000	24,700	96,700
2013	73,200	25,100	98,300

(1) The County Daily De facto Population does not match the sum of the District Daily De facto Population's due to rounding. The growth rates for some of the District's are quite small and rounding to the hundreds would eliminate any growth.
(2) Total Daily De facto equals Resident Population plus Daily Visitors.

2.3 Current Generation Quantities

To determine the quantity of solid waste generated in the County, R.W. Beck combined the quantity of waste disposed and recycled in 2005 to estimate the 2005 generation quantities. As discussed in Section 1, 89,156 tons of MSW was disposed in the Landfill and 27,233 tons of MSW were recycled, for a total generation quantity of 116,389 tons.

Based on a generation quantity of 116,389 tons and a de facto population of 85,806, the per capita generation rate per day is 7.43 lbs.

Generation Rate	***[(waste generation/de facto population) x 2,000]/365***
Generation Rate	***116,389/85,806 x 2000/365***
Generation Rate	***7.43 lbs./capita/day***

This generation quantity is greater than the 4.45 lbs/capita/day generation rate reported by the EPA.[2] However, this is because EPA's generation rate includes household waste and not commercial wastes. In addition, there is a disproportional amount of daily visitors to permanent residents on Kaua'i, which is a unique condition to tourist destinations such as Hawai'i. For comparison purposes, R. W. Beck estimated the City and County of Honolulu's (Honolulu) generation rate because of the similar unique condition as a tourist destination. Honolulu's 2004 integrated solid waste management plan indicates that 1,578,002 tons of MSW was generated. Honolulu has 910,000 permanent residents and 83,000 daily visitors, yielding a generation rate of 8.71 lbs/capita/day. Honolulu's generation rate is higher than Kauai's, which can be attributed to the higher level of commercial development in Honolulu.

2.4 Future Generation Quantities

To project future generation quantities for the County, R. W. Beck developed projections for each planning district as shown later in this section in Tables 2-3 through 2-7. The sum of all the districts' future generation quantities equals the total County future generation quantities as shown in Table 2-2.

Commercial development impacts the per capita generation rate. R. W. Beck used the projected commercial development estimates from the 2020 General Plan and Transportation Plan for each district, modified to reflect that an estimated 56 percent of the total quantities disposed are from commercial sources, to develop district-specific generation rates. The projected increase in the County's overall generation rate (which reflects sum of generation rate changes for individual planning districts) over the planning period is estimated to be approximately 2.08 percent per year between 2005 and 2013.

Once future generation quantities are projected, assumptions for diversion rate must be made in order to determine projected disposal quantities. Based on the waste reduction, reuse, recycling and bioconversion strategies that are presented in Sections 3, 4, 5 and 6 the quantity of waste that is diverted from disposal is projected to increase significantly during the planning period. These projections have been incorporated into Table 2-2 to calculate annual diversion and disposal quantities.

[2] Source: "USEPA Municipal Solid Waste Generation, Recycling and Disposal in the United States. Facts and Figures for 2003.

Table 2-2
Projected Quantities

Year	Total Daily De Facto Population	Generation Rate (pcd) [1]	Generation Quantity (tpy) [2]	Diversion Rate (pcd) [3]	Diversion Quantity (tpy) [4]	Disposal Rate (pcd) [5]	Disposal Quantity (tpy) [6]
2005	85,806	7.43	116,389	1.74	27,233	5.69	89,156
2006	87,300	7.57	120,620	1.74	27,710	5.83	92,910
2007	88,800	7.72	125,050	1.74	28,180	5.98	96,870
2008	90,300	7.88	129,710	1.74	28,660	6.13	101,050
2009	91,900	8.04	134,670	2.02	33,815	6.01	100,855
2010	93,500	8.20	139,860	2.56	43,716	5.63	96,144
2011	95,100	8.38	145,360	2.74	47,565	5.63	97,795
2012	96,700	8.56	151,060	2.96	52,176	5.60	98,884
2013	98,300	8.76	157,130	3.06	54,930	5.70	102,200

[1] Generation rate in pounds per capita per day. Assumes annual increase of 2.27% per year for the County based on individual planning district growth rates.
[2] Generation quantity equals the sum of all generation quantities in the specific districts in tons per year.
[3] Diversion rate in pounds per capita per day equals Diversion Quantity times 2000 lbs/ton divided by 365 days/year divided by De Facto Population.
[4] Diversion quantity in tons per year equals De Facto Population times Diversion Rate times 365 days/year divided by 2000 lbs/ton. Numbers may not calculate exactly due to rounding.
[5] Disposal rate in pounds per capita per day equals Disposal Quantity times 2000 lbs/ton divided by 365 days/year divided by Functional Population.
[6] Disposal quantity in tons per year equals Generation Quantity less Diversion Quantity.

2.4.1 Planning Districts

For planning purposes, the 2020 General Plan divides the County's towns and communities into the following five planning districts:

- **North Shore** – The North Shore Planning District extends from the Moloaa Bay on the east to Puanaiea Point on the west, which extends eight miles west along the Na Pali Coast from Haena. The North Shore includes the communities of Haena, Wainiha, Anini, Kalihiwai, Kilauea and Princeville.

- **Kawaihau** – The Kawaihau Planning District extends from the Wailua River north to Moloaa, including the large Kapaa-Wailua basin, Kealia and Anahola. The Kapaa-Wailua basin is home to a large portion of the County's population. An urban corridor extends along Kuhio Highway from Haleilio Road in Wailua to Kawaihau Road, at the north edge of Kapaa Town.

- **Lihue** – The Lihue Planning District extends north to the Wailua River and south to Haupu Ridge. This planning district serves as the main business, government and transportation center on the island. The Lihue Planning District includes the communities of Lihue, Hanamaulu, Kapaia, Niumalu, Nawiliwili, Puakea and Puhi.

- **Koloa-Poipu-Kalaheo** – The Koloa-Poipu-Kalaheo Planning District lies between Lihue and the West Side Planning Districts. From Haupu Ridge to the east, it extends along the coastline from remote Kipu Kai westward to Maha-ulepu, Poipu, Kukuiula

Bay, Spouting Horn, Lawai Bay, Makaokahai Point and Nomilu Fishpond, and Wahiawa Bay.

- **West Side** - The 2020 General Plan combines the areas of Waimea-Kekaha and Hanapepe-Eleele as part of the West Side Planning District. The West Side Planning District spans from Mana to Wahiawa.

Because each of these planning districts have unique demographic and commercial development conditions that will impact their solid waste management needs, the future generation quantities of each planning district were estimated individually. R. W. Beck used the Transportation Plan to determine population estimates and commercial development through 2020. With respect to projecting annual visitors for each of the planning districts, R. W. Beck used the total annual visitor projections form the 2020 General Plan and the percent of hotel rooms in each planning district from the Transportation Plan.

2.4.1.1 North Shore

Over the past 30 years, the North Shore has experienced a relatively high rate of population growth. In 1970, the North Shore had only approximately four percent of the County's population, by far the least of the five planning districts. By 1990, the North Shore was home to nine percent of the population.

The North Shore population is expected to keep growing, but at a slower rate than the 1970 – 2000 period. For permanent residents the estimated annual growth rate is 0.88 percent; for visitors the estimated annual growth rate is 0.61 percent. On the North Shore, only Princeville has a substantial amount of vacant land previously designated for urban development. This is consistent with the longstanding strategy to concentrate urban development within Princeville, in order to reserve other areas for agricultural, rural settlement, and open space. Kilauea is the only other residential community where significant growth would be possible. North Shore residents desire more stores and other businesses in order to avoid traveling long distances to the East Side for necessary purchases and services. Several shopping centers have been proposed on sites near Kilauea. Some sites lie on the ocean side of the highway within or close to the existing town center. Based on Planning Department projections of an annual increase of 2.15 percent of commercially developed square footage and the ratio of commercial tonnage disposed of at the landfill of 55 percent, the annual projected increase in the generation rate for the functional population is 1.18 percent. Based on these variables, Table 2-3 projects the annual quantity of solid waste from this district through 2013.

Table 2-3
North Shore Waste Generation Projections

Year	Residential Population	Daily Visitors	Total Daily De Facto Population	Generation Rate (pcd) (1)	Generation Quantity (tpy)(2)
2005	9,797	3,854	13,651	7.43	18,510
2006	9,880	3,880	13,760	7.52	18,880
2007	9,970	3,900	13,870	7.61	19,260
2008	10,060	3,920	13,980	7.70	19,650
2009	10,150	3,950	14,100	7.79	20,050
2010	10,240	3,970	14,210	7.88	20,440
2011	10,330	4,000	14,330	7.97	20,840
2012	10,420	4,020	14,440	8.06	21,240
2013	10,510	4,050	14,560	8.16	21,680

(1) Generation rate in pounds per capita per day. Assumes annual increase of 1.18% per year for the planning district.
(2) Generation quantity in tons per year equals Generation Rate times De Facto Population times 365 days/year divided by 2000 lbs/ton. Numbers may not calculate exactly due to rounding.

2.4.1.2 Kawaihau

The Kapaa-Wailua urban corridor is a vibrant "working town" with banks, grocery stores, hardware stores and shopping centers. The vast region between the Wailua River and the Kapaa Homesteads continues its transition from agricultural to residential use. Based on the 2020 General Plan, this planning district has substantial capacity for additional residential development.

The Transportation Plan projects a 0.18 percent annual increase for permanent residents and a 0.53 percent annual increase for visitors. Based on Planning Department projections of an annual increase of 2.02 percent of commercially developed square footage and the ratio of commercial tonnage disposed of at the landfill of 55 percent, the annual projected increase in the generation rate for the functional population is 1.11 percent. Based on this information, Table 2-4 projects the annual quantity of solid waste from this district through 2013.

Table 2-4
Kawaihau Waste Generation Projections

Year	Residential Population	Daily Visitors	Total Daily De Facto Population	Generation Rate (pcd) (1)	Generation Quantity (tpy)(2)
2005	20,080	7,986	28,066	7.43	38,060
2006	20,120	8,030	28,150	7.51	38,600
2007	20,150	8,070	28,220	7.59	39,090
2008	20,190	8,110	28,300	7.67	39,610
2009	20,220	8,160	28,380	7.75	40,140
2010	20,260	8,200	28,460	7.84	40,720
2011	20,300	8,250	28,550	7.93	41,320
2012	20,330	8,290	28,620	8.02	41,890
2013	20,370	8,330	28,700	8.11	42,480

(1) Generation rate in pounds per capita per day. Assumes annual increase of 1.11% per year for the planning district.
(2) Generation quantity in tons per year equals Generation Rate times De Facto Population times 365 days/year divided by 2000 lbs/ton. Numbers may not be exact due to rounding.

2.4.1.3 Lihue

The County's urban development is focused in and around Lihue Town. Growing residential communities in Lihue/Hanamaulu and Puakea/Puhi provide homes close to employment and shopping centers. The 2020 General Plan recommended that new growth should be concentrated in the Puhi-Lihue-Hanamaulu urban center and the Puakea project should be oriented to residential development at urban densities. Of the five planning districts, Lihue is projected to experience the highest annual increase (6.24%) in commercially-developed square footage. Lihue is projected to experience a 3.33 percent annual increase in permanent residents, but only a 0.83 percent annual increase in visitors. Applying the 55 percent factor to account for the amount of commercial tonnage disposed of at the landfill, the annual percent increase in the generation rate for the functional population is 3.43 percent. Based on these variables, Table 2-5 projects the annual quantity of solid waste from this district through 2013.

Table 2-5
Lihue Waste Generation Projections

Year	Residential Population	Daily Visitors	Total Daily De Facto Population	Generation Rate (pcd) (1)	Generation Quantity (tpy)(2)
2005	11,614	2,455	14,069	7.43	19,079
2006	12,000	2,480	14,480	7.68	20,300
2007	12,400	2,500	14,900	7.94	21,590
2008	12,810	2,520	15,330	8.21	22,970
2009	13,240	2,540	15,780	8.49	24,450
2010	13,680	2,560	16,240	8.78	26,020
2011	14,140	2,580	16,720	9.08	27,710
2012	14,610	2,600	17,210	9.39	29,490
2013	15,100	2,620	17,720	9.71	31,400

(1) Generation rate in pounds per capita per day. Assumes annual increase of 3.43% per year for the district.
(2) Generation quantity in tons per year equals Generation Rate times De Facto Population times 365 days/year divided by 2000 lbs/ton. Numbers may not be exact due to rounding.

2.4.1.4 Koloa-Poipu-Kalaheo

The Koloa-Poipu-Kalaheo Planning District is located on the southern shore, and is the driest part of the island. This Planning District is home to Kaua'i's largest resort destination, as well as some of the most active agricultural businesses. Currently, this Planning District has the second highest number of hotel rooms, with the Kawaihau Planning District having the most number of hotel rooms. However, by 2013, this Planning District is projected to have the most hotel rooms on the island as compared to the other Districts. Hotels and resort condominiums are centered around the beaches and golf courses of Poipu. Large- and small-scale agricultural activities are located principally in the coastal lands around the Kuhio Highway.

The Transportation Plan projects a 2.32 percent annual increase for permanent residents and a 3.72 percent annual increase for visitors. In addition, the amount of commercially developed square footage is projected to increase at 5.56 percent annually. Applying the 55 percent factor to account for the amount of commercial tonnage disposed of at the landfill, the annual percent increase in the generation rate for the functional population is 3.06 percent. Based on this information, Table 2-6 projects the annual quantity of solid waste from this district through 2013.

Table 2-6
Koloa-Poipu-Kalaheo Waste Generation Projections

Year	Residential Population	Daily Visitors	Total Daily De Facto Population	Generation Rate (pcd) (1)	Generation Quantity (tpy)(2)
2005	15,137	6,703	21,840	7.43	29,614
2006	15,490	6,950	22,440	7.66	31,370
2007	15,850	7,210	23,060	7.89	33,200
2008	16,210	7,480	23,690	8.13	35,150
2009	16,590	7,760	24,350	8.38	37,240
2010	16,970	8,040	25,010	8.64	39,440
2011	17,370	8,340	25,710	8.90	41,760
2012	17,770	8,650	26,420	9.17	44,210
2013	18,180	8,970	27,150	9.45	46,820

(1) Generation rate in pounds per capita per day. Assumes annual increase of 3.06% per year for the planning district.
(2) Generation quantity in tons per year equals Generation Rate times Functional Population times 365 days/year divided by 2000 lbs/ton. Numbers may not be exact due to rounding.

2.4.1.5 West Side

The West Side Planning District is known for its low-key development, dry and sunny climate, and rural lifestyle. This Planning District is diversely comprised of small towns, the high-technology Pacific Missile Range Facility, the Waimea Canyon and Kokee State Park, and coastal sand dunes. In addition, this Planning District includes broad expanses of agricultural lands and has the largest number of residents employed by agriculture (468) and is projected to have the largest amount in 2013. The West Side is projected to have a 1.52 percent annual increase in permanent residents but a 1.28 percent annual decrease in visitors. The West Side is projected to experience a 4.31 percent annual increase in commercially developed square footage. Applying the 55 percent factor to account for the amount of commercial tonnage disposed of at the landfill, the annual percent increase in the generation rate for the functional population is 2.37 percent. Based on these variables, and the Planning Department's 2005 projections for the population growth of residents and annual visitors, Table 2-7 projects the annual quantity of solid waste from this district through 2013.

Table 2-7
West Side Waste Generation Projections

Year	Residential Population	Daily Visitors	Total Daily De Facto Population	Generation Rate (pcd) (1)	Generation Quantity (tpy)(2)
2005	7,254	925	8,180	7.43	11,092
2006	7,360	910	8,270	7.61	11,480
2007	7,480	900	8,380	7.79	11,910
2008	7,590	890	8,480	7.97	12,330
2009	7,710	880	8,590	8.16	12,790
2010	7,820	870	8,690	8.36	13,240
2011	7,940	860	8,800	8.55	13,730
2012	8,060	850	8,910	8.75	14,230
2013	8,190	830	9,020	8.96	14,750

(1) Generation rate in pounds per capita per day. Assumes annual increase of 2.37% per year for the planning district.
(2) Generation quantity in tons per year equals Generation Rate times De Facto Population times 365 days/year divided by 2000 lbs/ton. Numbers may not be exact due to rounding.

2.5 Waste Stream Characterization

2.5.1 Methodology

As part of the planning process, R. W. Beck conducted a waste characterization study to determine the waste composition of the materials disposed in the County.

The study included the following steps:

- Gathered Landfill transaction data to characterize the sources of materials, extent of transactions and volume of materials received at the Landfill;
- Developed a sampling and sorting protocol to characterize the types of materials disposed by the residential and commercial sectors of the solid waste stream;
- Conducted a one week sorting event at the Landfill. A total of 52 samples were selected and sorted of at least 200 pounds each. The weight standard of at least 200 pounds is consistent with American Society for Testing and Materials (ASTM) standards and the number of samples provided is an adequate number of residential and commercial samples to draw statistical conclusions for both of these generator types with reasonable confidence intervals (i.e. margin of error).;
- Compiled the field data and entered the data into a waste characterization computer model; and

- Evaluated the results to identify the materials by weight composing the overall solid waste stream, municipal solid waste stream, residential sector, and commercial sector.

In addition, actual samples of various types of materials from the field sort were collected for a laboratory analysis. Sample materials were collected and transported to a local laboratory to test samples for their moisture content and higher heating value. The results of this analysis are included in Section 10, Alternative Waste Reduction Technologies.

The materials and their respective definitions that were sampled during the field sort included the following:

Material	Definition
PAPER	
Newsprint	Black and white newspaper newsprint including other paper normally distributed inside a newspaper such as colored advertisements, comics, fliers, tabloids.
Magazines	All magazines, excluding promotional materials printed on slick paper.
High Grade Office	High grade continuous form computer paper, white paper including bond, photocopy or notebook paper and colored ledger paper primarily from offices.
OCC and Kraft Bags	Uncoated cardboard boxes with a wavy core and not contaminated with other materials such as a wax or plastic coating wood. Includes brown paper bags.
Mixed Recyclable Paper	Box board - Uncoated; primarily used for boxes (such as cereal boxes and egg cartons), envelopes with and without windows, toilet paper cores and other mixed recyclable paper, such as promotional materials printed on slick paper.
Non-Recyclable Paper	Plastic or metal coated paper and books with bindings.
Compostable Paper	Materials that can not be recycled through tradition methods but could be composted such as paper products including wax-coated paper, napkins, paper towels, frozen food packaging, tissues, paper plates, cups, and pizza boxes.
PLASTICS	
#1 PET Beverage Containers	Clear, plastic containers coded #1 excluding those containers in the Hawai'i beverage container deposit program.
#1 PET Beverage Containers (Deposit)	Clear, plastic containers coded #1 with a Hawai'i deposit label that may include soda, water, juice, sports drink, wine coolers, and beer and are 64 ounces or less.
#2 HDPE Containers	Plastic containers coded #2 excluding those containers in the Hawai'i beverage container deposit program. Excluded containers include but are not limited to milk jugs, wine, liqueur, and syrup.

Material	Definition
#2 HDPE Containers (Deposit)	Plastic containers coded #2 with a Hawai'i deposit label that may include soda, water, juice, sports drink, wine coolers, and beer and are 64 ounces or less.
#6 Polystyrene	Packaging including blocks and plastic containers coded #6.
Other Plastic Containers	Plastic Containers coded #3, #4, #5, and #7.
Other Plastic Products	End-user products including molded toys, extruded pipes and hoses, clothes hangers, cleaning tools and razors.
Film/Wrap/Bags	Trash bags, grocery and storage bags, sheet film plastic, pallet wrap, and agricultural film.
METALS	
Aluminum Non-Deposit Beverage Containers	All beverage containers made from aluminum excluding those containers in the Hawai'i beverage container deposit program.
Aluminum Deposit Beverage Containers	All beverage containers made from aluminum with a Hawai'i deposit label that may include soda, water, juice, sports drink, wine coolers, and beer and are 64 ounces or less.
Ferrous Food and Beverage	Food and beverage containers composed primarily of tin.
Other Ferrous Metals	Ferrous metal besides containers, including clothes hangers, sheet metal products, pipes, miscellaneous metal scraps, and other magnetic metal items.
Other Non-Ferrous Scrap	Other aluminum scraps besides beverage containers. Also includes other non-ferrous metal scrap such as brass, copper, or other non-magnetic metal.
GLASS	
Glass Non-Deposit Containers	All clear, green, blue, and brown glass food and beverage containers without a Hawaii beverage container deposit label.
Glass Deposit Containers	All clear, green, blue and brown glass food and beverage containers with a Hawai'i deposit label may include soda, water, juice, sports drink, wine coolers, and beer and are 64 ounces or less.
Other Mixed Cullet	Glass items other than food and beverage containers. Includes ceramics, drinking glasses, glass plates, cooking utensils, ash trays, mirrors, or perfume bottles.
YARD WASTE	
Small Yard Waste	Debris such as grass clippings, leaves, and garden waste. In addition, brush and tree limbs of less than six inches in diameter and no longer than three feet in length.
Large Yard Waste	Limbs/trees with a diameter of six inches or more and/or more than three feet in length, as well as all tree stumps.
FOOD WASTE	Food preparation wastes, food scraps, spoiled food.

Material	Definition
WOOD	
Non-Treated	Pallets, crates, and wood not defined below as treated.
Treated	Wood that is painted, stained, treated for exterior use, or glued such as plywood.
DEMOLITION/RENOVATION/ CONSTRUCTION DEBRIS	Waste building materials including, metals, and rubble which result from construction or demolition of structures. Such waste shall also include carpets, rugs, bricks, mortar, shingles, and drywall. For purposes of this study, dedicated loads of construction and demolition debris (C&D) were not sampled in the field, but C&D commingled with mixed refuse was sampled. Moreover, the total quantities of dedicated C&D were included in the overall results by keeping these loads separate from the waste sort loads.
DURABLES	
Electrical and Household Appliances	Toasters, stereos, other small appliances and electronic equipment.
Central Processing Units/Peripherals	Computer components except for monitors.
Computer Monitors/TV's	Self-explanatory.
Cell Phones and Chargers	Self-explanatory.
Other Durables	Household furniture and mattresses.
TEXTILES AND LEATHERS	Clothing and apparel, shop rags, blankets, shoes, leather products such as wallets, purses, belts and scrap leather.
DIAPERS	Adult or infant disposable diapers, clean or soiled.
RUBBER	Rubber tubing, mats, hose, tires and some shoes.
HHW	Substances categorized by the U.S. Environmental Protection Agency (EPA) as: Corrosive, destroy human tissue or corrode metal; flammable, easily ignitable; toxic, poisonous; reactive, react violently when exposed to heat, sudden shock, pressure or other chemicals including automotive products; paints and solvents; pesticides, herbicides, and fungicides; household cleaners; lead acid batteries; other batteries; and other HHW.
MERCURY CONTAINING PRODUCTS	Thermostats, thermometers, light switches, and other items containing mercury.
SHARPS	Hypodermic needles.

Material	Definition
OTHER ORGANIC	Organic materials not classified as part of the other organic material categories.
OTHER INORGANIC	Inorganic materials not classified as part of the other inorganic, material categories such as rock, grit, soil, etc.

2.5.2 Solid Waste Composition

Table 2-8 presents the composition and quantity by material type of the municipal solid waste that is disposed at the Landfill. Table 2-8 shows this by aggregate, residential and commercial waste stream. This table does not include the approximate 5,600 tons of source-separated C&D or special wastes (sludges, asbestos, etc.).

Table 2-8
Solid Waste Stream Composition

Material Group	Material	Percent Residential Waste Stream	Percent of Commercial Waste Stream
Paper	Newsprint	5.9%	5.3%
	Magazines	3.0%	2.8%
	High Grade Office Paper	0.8%	2.3%
	OCC and Kraft Bags	5.0%	11.3%
	Mixed Recyclable Paper	7.9%	5.3%
	Non-Recyclable Paper	3.5%	3.3%
	Compostable Paper	7.8%	8.2%
Total Paper		33.8%	38.5%
Plastics	#1 PET Beverage Containers	0.6%	0.3%
Plastics	#1 PET Deposit Beverage Containers	0.4%	0.5%
Plastics	#2 HDPE Containers	1.5%	1.3%
Plastics	#2 HDPE Deposit Containers	0.0%	0.0%
Plastics	#6 Polystyrene	1.2%	2.3%
Plastics	Other Plastic Containers	0.4%	0.4%
Plastics	Other Plastic Products	3.2%	3.9%
Plastics	Film/Wrap/Bags	6.0%	6.3%
Total Plastics		13.4%	15.0%

Table 2-8
Solid Waste Stream Composition

Material Group	Material	Percent Residential Waste Stream	Percent of Commercial Waste Stream
Metals	Aluminum Non-Deposit Beverage Containers	0.0%	0.0%
Metals	Aluminum Deposit Beverage Containers	0.4%	0.4%
Metals	Ferrous Food and Beverage Containers	1.7%	1.4%
Metals	Other Ferrous Metals	2.0%	1.6%
Metals	Other Non-Ferrous Scrap	1.4%	1.1%
Total Metals		5.4%	4.5%
Glass	Glass Non-Deposit Containers	2.6%	2.0%
Glass	Glass Deposit Containers	1.5%	1.6%
Glass	Other Glass/Mixed Cullet	0.6%	0.3%
Total Glass		4.7%	3.9%
Yard Waste	Small Yard Waste	8.0%	5.5%
Yard Waste	Large Yard Waste	0.0%	0.0%
Total Yard Waste		8.0%	5.5%
Food Waste	Food Waste	15.7%	13.5%
Total Food Waste		15.7%	13.5%
Wood	Non-Treated Wood	0.3%	3.4%
Wood	Treated Wood	1.7%	1.3%
Total Wood		2.0%	4.7%
Demolition/Renovation/Construction Debris	C/R/D Debris	1.5%	1.1%
Total Demolition/Renovation/Construction Debris			1.1%
Durables	Electrical And Household Appliances	1.8%	0.7%
Durables	Central Processing Units/Peripherals	0.0%	0.1%
Durables	Computer Monitors/TV'S	0.0%	0.0%
Durables	Cell Phones and Chargers	0.0%	0.0%
Durables	Other Durables	0.3%	0.4%
Total Durables		2.0%	1.1%
Textiles and Leathers	Textiles and Leathers	3.2%	4.6%
Total Textiles and Leathers			
Diapers	Diapers	2.9%	1.7%
Total Diapers		2.9%	1.7%

Table 2-8
Solid Waste Stream Composition

Material Group	Material	Percent Residential Waste Stream	Percent of Commercial Waste Stream
Rubber	Rubber	0.2%	0.3%
Total Rubber		0.2%	0.3%
HHW	Automotive Products	0.0%	0.0%
HHW	Paints and Solvent	0.0%	0.0%
HHW	Pesticides, Herbicides, Fungicides	0.0%	0.0%
HHW	Household Cleaners	0.0%	0.0%
HHW	Lead Acid Batteries	0.0%	0.0%
HHW	Other Batteries	0.5%	0.4%
HHW	Other HHW	0.2%	0.0%
HHW	Mercury Containing Products	0.0%	0.0%
Total HHW		0.7%	0.5%
Sharps	Sharps	0.1%	0.1%
Total Sharps		0.1%	0.1%
Other Organic	Other Organic	0.8%	0.7%
Total Other Organic		0.8%	0.7%
Other Inorganic	Other Inorganic	1.8%	1.5%
Total Other Inorganic		1.8%	1.5%
Fines/Super Mix	Fines/Super Mix	3.6%	2.5%
Total Fines/Super Mix		3.6%	2.5%
Other	Other	0.3%	0.3%
Total Other		0.3%	0.3%
GRAND TOTAL		100.0%	100.0%

Section 3
SOURCE REDUCTION

3.1 Purpose

The purpose of this section is to characterize the County's current source reduction efforts and provide recommendations to improve source reduction and increase waste diversion in the County.

3.2 Background

In Kaua'i's County Code, Chapter 21, Integrated Solid Waste Management, source reduction is defined as "the design, manufacture and use of materials to:

1. Minimize the quantity or toxicity, or both, of the waste produced; and
2. Reduce the creation of waste either by redesigning products or by otherwise changing societal patterns of consumption, use, or waste generation."

3.2.1 Legislative

Per the Hawai'i Revised Statutes, Chapter 342G, Integrated Solid Waste Management (HRS 342G-2), each county shall consider the following solid waste management practices and processing methods in their order of priority:

1. Source reduction;
2. Recycling and bioconversion, including composting; and
3. Landfilling and incineration.

Per the DOH's Report to the Twenty-Third Legislature in December of 2005, source reduction:

> "is also called "waste prevention" meaning creating less waste. "Reuse", although not included in the list of priorities, means using a product over without first having to reprocess it. The product may be used for its original or intended use, or may be used in a different capacity."

Waste reduction is difficult to quantify because it avoids creation of waste in the first place. This chapter of the Plan will identify and evaluate specific measures for achieving source reduction, as outlined in HRS 342G-26, including:

- Increased efficiency in the use of all materials;
- Replacement of disposable materials and products with reusable materials and products; and
- Reduced packaging.

3.2.2 County of Kaua'i's 1994 Integrated Solid Waste Management Plan

In 1994, the County prepared an Integrated Solid Waste Management Plan (1994 Plan). Table 3-1 lists the "action items" and recommendations pertaining to source reduction and describes what, if any, actions have been taken by the County.

Table 3-1
1994 Plan Action Items and County's Efforts

Action Item	County Action
Institute Full-Cost Accounting and User Pay System (eliminate reliance on General Fund to finance waste mgmt programs & operations)	The Solid Waste programs continue to be funded by the General Fund. Residents pay for solid waste services via property taxes.
Make costs of waste management explicit (separate line item for solid waste on utility bill)	The County bills residents for solid waste services on their property tax bill, not on the utility bill.
Improve public acceptance of new costs	Because a user pay system was not implemented, this action item is not relevant.
Implement program to reduce illegal dumping	This action item was written to address illegal dumping that may have resulted from a rate increase and a user pay system.
Implement variable collection rates for residents	The County does not have a variable rate program for residential solid waste collection service. Residents are allowed to set out unlimited amounts of refuse and are not charged a direct fee.
Implement County in-house source reduction	The County does not have an official in-house source reduction program, however, County agencies have an increased awareness of waste diversion issues through ongoing participation in the County's office paper recycling program.
Implement resource exchange program	The County oversees the Aloha Shares Network, however there has been little activity by Kaua'i businesses and non-profits. The Kaua'i Resource Center facility was originally designed as a reuse facility. Multiple attempts to solicit a private operator to run a reuse program at that location have failed.
Implement home composting program	Since October 2001, the County has distributed approximately 1,200 home composting bins to County residents, schools, and community organizations.
Implement source reduction education	The County promotes source reduction and reuse by publishing reuse ideas in the Kaua'i Recycling Guide, through public outreach events, and the County website.

3.2.3 Current Source Reduction Activities

Source reduction activities are often difficult to track because they sometimes go unnoticed. Reducing waste is not as visible an activity compared to recycling. Reusing items is considered a source reduction activity because it stops waste at the source and it delays or avoids that item's entry in the waste collection and disposal system. Efforts are being made in Kaua‘i by various businesses, residents, and by the County to reduce waste at the source, as characterized below.

3.2.3.1 In-House Efforts

There is not a coordinated effort of in-house source reduction at the County. However, County agencies have an increased awareness of waste diversion issues through ongoing participation in the County’s office paper recycling program. Source reduction practices in County agencies include the following:

- Printing draft documents on the back sides of printed paper;
- Using the back sides of printed paper for scratch paper;
- Reviewing documents electronically prior to printing;
- Issuing memos electronically;
- Issuing electronic press releases to all County employees and media outlets;
- Providing electronic data, information, and reports on County website;
- Reusing manila envelopes for sending in-house documents (envelopes are used dozens of times before they are recycled); and
- “Grasscycling” (leaving grass clippings on the lawn to decompose on site) by the County Grounds Maintenance Department.

3.2.3.2 Residential and Commercial Efforts

Many businesses in the County are involved in source reduction activities by providing opportunities for residents to reuse items rather than buying new products. These companies are listed below.

- Thrift Stores. Thrift stores not only provide an opportunity for residents to donate items such as clothing and household goods, but also provide opportunities for those who need to buy these items at minimal costs. There are currently five thrift stores located in the County:
  - Salvation Army Thrift Stores in Lihue and Hanapepe;
  - Kaua‘i Humane Society Thrift Store in Lihue;
  - Wilcox Hospital Auxiliary in Lihue; and
  - Habitat for Humanity Thrift Store in Hanapepe.
- Habitat for Humanity. This non-profit organization accepts and reuses building supplies for low income housing construction projects. They resell building supplies and other household goods at their thrift store in Hanapepe.

- Trade Radio. This daily radio show on KONG AM 570 provides an opportunity for callers to buy, sell, or trade reusable items.
- Kaua'i Food Bank. This local non-profit organization partners with many businesses, grocery stores, schools, and farmers. One of their missions is to eliminate the waste of edible foods. Each month, the Kaua'i Food Bank distributes over 100,000 pounds of food and feeds almost 6,000 individuals in need.
- Foam Peanut Reuse. The County Recycling Office has a drop and swap exchange for foam shipping peanuts and bubble wrap in the lobby of the Kaua'i Resource Center. This program allows residents with a place to drop their shipping peanuts, and other residents or small businesses can pick up the materials at no charge. The County does not keep track of users or quantities, but there is an active exchange of material on a daily basis.
- Aloha Shares Network. This statewide program was developed by Maui Recycling Group. Aloha Shares is an electronic reuse network that accepts listings of surplus materials from businesses and residents and matches those donations with the "wish lists" of non-profits, churches, and schools throughout Hawai'i in an effort to divert usable material from being landfilled. In August 2005, the County received Council approval to accept ownership of the Kaua'i Aloha Shares Network. Currently there is very little activity on the network in Kaua'i, but the County is hoping to solicit more donations in the future.

Education

The County encourages source reduction and reuse in many ways, including publishing information in the Kaua'i Recycling Guide, fielding calls to the Recycling Office, having a booth and talking with residents at various community events, speaking to school children, and posting information on its website.

Most recently, the County encouraged residents to reduce waste by using canvas bags made from recycled plastic while they shop in lieu of disposable paper or plastic bags. The County distributed canvas bags to individuals who met the following criteria:

- A Kaua'i resident;
- Verbally agree to use the bag in place of disposable paper or plastic bags;
- Sign a pledge stating that they would reduce, reuse, and recycle as many materials as possible; and
- Complete an eco-quiz which has 14 questions related to waste diversion and HI 5 Bottle Bill information.

A total of 1,756 recycled plastic shopping bags were distributed to Kaua'i residents during the first year of this program. Residents obtained bags at retailers and special events, such as the County Fair and environmental conferences. Feedback from the stores was exceptionally positive. All stores said how much their customers appreciated the goodwill of the stores and County to provide free bags to them. In fact, many of their customers requested more than one bag so that they could totally avoid using disposable bags while shopping. Other feedback included new customers

attracted to the store because they wanted to receive the free bag. Most regular customers did not forget their bags, while irregular customers tended to forget them either at home or in their cars. However, the written and verbal prompts helped customers remember to bring their bags more often. All of retailers requested more bags so they could give more than one away to each customer. They have noticed a decrease in the number of disposable bags they use to bag groceries and their hope is to faze out the disposable bags because of the savings in costs and because of the threat plastic bags pose to the environment.

Home Composting

The County offers free composting bins to residents in an effort to divert compostable food and yard waste from the Landfill. Since October 2001, the County has distributed approximately 1,200 home composting bins to County residents. In order to receive a free bin, residents must agree to participate in an annual composting survey, and they must view a 20-minute composting training video. Based on the results of the most recent annual survey of compost bin recipients conducted by the County, an average of 17.32 gallons of material is diverted each month, equaling 207.84 gallons per composting bin per year. With an average weight of 7.5 pounds per gallon, the compost bin recipients are diverting approximately 1,559 pounds per composting bin per year. Assuming that 1,000 of the bins are in current use, the Home Composting program is diverting almost 780 tons of waste per year.

Waste Assessments

The County's Recycling Coordinator assists businesses with recycling, waste reduction, and waste diversion issues and conducts waste assessments upon request. The waste assessments include a site visit to understand current waste management and recycling practices. Recommendations are made for improving recycling and reducing waste generated.

3.3 Strategies for Improvement

The County has increased its source reduction efforts since the last solid waste management plan. However, expanding this component of the waste diversion hierarchy may require a substantial time requirement from County staff. The County will hire an additional recycling staff person in an effort to implement recommendations made in this and other sections of the plan.

3.3.1 In-House Efforts

The County has the opportunity to set an example for reducing waste at the source by implementing source reduction policies and directives in-house. Similar to waste assessments for businesses, the County's Recycling Coordinator should conduct site visits at all County offices and buildings to not only improve recycling efforts, but also look for opportunities to increase source reduction.

County employees will be provided with source reduction information via internal memos, newsletters, and e-mails. Waste-reducing ideas such as those listed in Section

3.2.3.1 will be conveyed in writing to employees. The Recycling Office staff will be accessible to employees who have questions, in an attempt to remove any barriers that may preclude them from practicing waste reduction.

3.3.2 Residential

3.3.2.1 Variable Rate Refuse Collection

Getting people to think about source reduction and reuse is more difficult than getting them to recycle. Source reduction is a behavioral change and may require an incentive for a person to make changes in their daily habits. One potential incentive is variable rate or Pay-As-You-Throw (PAYT) refuse collection. As discussed in Section 4, the County plans to institute a hybrid PAYT program. This should create a financial incentive for residents to reduce the amount of refuse they set out each week. This may also lead residents to develop habits such as buying products in recyclable packaging or buying products in bulk to reduce or eliminate packaging.

3.3.2.2 Expand Canvas Bag Program

The County plans to enhance the program to replace disposable shopping bags with canvas bags through the following strategies:

- Increase number of bags to be distributed.
  - Procure 10,000 recycled plastic shopping bags in FY08, which are 8,000 more bags than the previous procurement.
  - Distribute more than one bag to interested residents. Each resident will have to provide their name, contact information, and date they received additional bag on the "Additional Shopping Bag Sign-Out Form".
- Increase number of participating retailers.
  - Sign on large grocery stores to participate in program, such as Foodland, Safeway, Big Save, Star Market, and Longs, and smaller convenience stores such as Menehune Food Marts.
- Increase incentives for customers.
  - Persuade retailers to offer a 5-25 cent discount to customers for each reusable bag they bring in and use for their groceries in place of disposable paper or plastic bags.
- Develop a training program for retailers.
- Work with non-profit or community organization to distribute bags at larger retailers.
- Draft a telephone survey to follow-up on resident use of bags.
- Promote recycling program through Mayor's T.V. show, County website, and County Recycling Guide.

- Offer a variety of colors of bags to capture attention and make the bags more attractive.

3.3.2.3 On-line Materials Exchange

The County will actively promote the use of exchanges, such as the Aloha Shares Network. Currently, this on-line exchange network posts donations from individuals, businesses, organizations and government agencies. Recipients must be non-profit organizations, churches, or schools.

Other materials exchange programs match people who are looking for certain reusable items with people who are looking to discard items. One example is Freecycle at www.freecycle.org, a website that is similar to the now defunct HIMEX – Hawai‘i Materials Exchange. A Freecycle group has been started in Kaua‘i and has 57 members. Another example is www.craigslist.org, an on-line community in which people can publish classified ads at no charge. These and other on-line programs are successful at diverting material from landfills, by providing a free option to traditional advertising and allowing people to list items for sale or give away.

3.3.2.4 Household Hazardous Wastes

Beyond minimizing the quantity of waste produced, the County Code defines “source reduction” as minimizing the toxicity of waste produced. Most household hazardous wastes include ingredients that are toxic, corrosive, ignitable or explosive. This definition includes many items stored in a garage, basement, bathroom or kitchen, such as paint thinner or car batteries. However, some residents may not typically consider polishes and glues as containing these types of ingredients.

The County plans to educate residents on what types of product ingredients may be toxic, corrosive, ignitable or explosive. Also, the County will educate residents that some products may not present a hazard when used individually but could present a hazard, such as being explosive, when combined with other products. Finally, the County will encourage residents to become pro-active and cautious consumers, and encourage them to seek out products with minimal health or environmental hazards.

Beyond finding safer alternatives, residents will be encouraged to purchase products that clearly meet individual's needs.

The County does not recommend the promotion of homemade “recipes” to create items such as pesticides or cleaning materials unless these “recipes” are professionally tested and certified for safety and performance.

3.3.2.5 Plastic Bags and Styrofoam Food Packaging

Many communities in California are considering ordinances banning plastic bags used by retailers at grocery stores. The ordinances are designed to promote use of available alternatives such as compostable plastic bags, recyclable paper bags, and reuseable bags. Use of these alternatives reduces the quantities of materials needing landfilled because the alternatives can be either recycled or reused. The County should consider enacting an ordinance banning use of non-recyclable plastic bags by retailers to

promote source reduction. This approach needs to be coupled with an extensive education campaign on this issue.

As for Styrofoam and other types of non-recyclable food packaging, the County should encourage the use of alternatives such as biodegradable food packaging. These alternatives are available on island. See the website http://alohawedeliver.com. Biodegradable food packaging is considered compostable in many instances because it is manufactured primarily from corn starch. Encouraging use of these packaging alternatives to promote source reduction can be fostered through education and awareness, along with potential material bans.

3.3.3 Commercial

3.3.3.1 Technical Assistance and Waste Assessments

The County currently offers technical assistance in the form of waste assessments to businesses. The County promote this service through public education and advertising and continue to assist commercial entities reduce their waste and seek out options to prevent waste from being created in the first place. Because businesses are usually billed for solid waste collection service based on volume, to reduce the amount of refuse created already exists.

3.3.3.2 Reusable Packaging Containers

Because of the County's geography, most retail goods are transported in corrugated cardboard. Reusable packaging containers (including plastic pallets) can help businesses reduce their long-term costs while preventing unnecessary waste by[1]:

- Reduced packaging costs. While the purchase price of reusable shipping containers is generally higher than that of single-use containers, over time, the cost per reusable container per trip is lowered, making reusable containers cheaper to use than single-use packaging.
- Reduced damage. Reusable containers are usually sturdier than one-way containers because they are designed to withstand multiple uses. Switching to reusable containers can result in lower rates of damage to goods and materials shipped.
- Reduced labor costs. Freeing workers from the task of breaking down corrugated containers and removing them from assembly-line operations can offer savings, because taking reusable containers off the line can be a much simpler process.
- Avoided disposal costs. Eliminating one-way containers eliminates the need to landfill or recycle them.

The County Recycling Coordinator will provide information on reusable shipping containers and other waste reducing options to businesses through waste assessments

[1] Source: INFORM, Inc., an independent research organization that examines the effects of business practices on the environment and on human health. http://www.informinc.org/about.php

and public speaking engagements to the Chamber of Commerce and other business organizations.

A list of references for reusable shipping container information is provided at the end of this section.

3.3.3.3 Lodging Industry Source Reduction

Because the County is a major tourist destination, hotels, motels, and condominium rentals are a large contributor to the waste stream. There are many things the lodging industry can do to reduce the amount of waste generated at hotels, motels, and condos. Some examples include:

- Replace disposable napkins and utensils with reusables (serving ware, napkins, cleaning rags, etc.);
- Buy in bulk when feasible (food and beverages, condiments, cleaning products, etc.);
- Offer newspapers only to guests who request them, rather than delivering them to all rooms;
- Reduce the use of laundry products and packaging by washing linens upon request instead of automatically (this also saves water and energy);
- Install soap and shampoo dispensers in restrooms instead of using disposable amenities;
- Install air hand dryers in public restrooms to reduce the use of disposable paper towels;
- Change lighting from incandescent bulbs to longer lasting fluorescent bulbs; and
- Practice grasscycling on the property grounds.

In 2005, the County partnered with the Kaua‘i Chamber of Commerce to offer the Mayor’s Ho’ola Hou Award for Achievement in Commercial Recycling. The Kaua‘i Marriot Resort and Beach Club in Lihue received an award for their exemplary and innovative recycling program. Their waste reduction and recycling efforts are described in detail in Section 4 of this plan, but some of their more creative source reduction efforts include:

- Installation of an ozone system in the laundry that disinfects and cleans with less detergent and no bleach, requiring less rinsing for an approximate savings of two gallons of water per pound of laundry;
- Donating used mattresses to the Salvation Army and blankets to the various assistance facilities and shelters; and
- Implementing clean air initiatives. The hotel phased out its use of chlorofluorocarbons and hydrochlorofluorocarbons (CFC and HCFC) refrigerants in early 2004.

The County will continue to work with the lodging industry to promote source reduction.

3.3.4 Education

The County will consider expanding its current public education efforts regarding source reduction including, but not limited to:

- Create a page on the County's website dedicated to source reduction and reuse ideas. The page could provide tips to residents and businesses on ways to reduce the amount of waste they create. Examples of source reduction resources include:
  - EPA's "Consumer Handbook for Reducing Solid Waste": http://www.epa.gov/epaoswer/non-hw/reduce/catbook/the12.htm
  - City and County of Honolulu's Waste Prevention website: http://envhonolulu.org/solid_waste/Waste_Prevention.html
  - DOH's "Minimizing Construction and Demolition Waste" guide: http://www.hawaii.gov/health/environmental/waste/sw/pdf/constdem2.pdf
  - Minnesota Solid Waste Management Coordinating Board's Green Guardian website: http://www.greenguardian.com/buy.asp
  - Minnesota Pollution Control Agency's website: http://www.reduce.org/
  - California Integrated Waste Management Board website: http://www.ciwmb.ca.gov/WPW/
- Continue to provide free home composting bins to County residents in an effort to promote and increase backyard composting of food and yard waste.
- Consider promoting source reduction through an advertising campaign using billboards, television and/or newspaper advertisements, public service announcements, local television shows such as Russell the Rooster, etc.

As stated earlier, source reduction is a behavioral change. Educational material may not be enough to convince people to reduce the amount of waste they generate. Many times an incentive is required for a person to make changes in their daily life.

Dr. Doug McKenzie-Mohr in his book "Fostering Sustainable Behavior" [2] notes that promoting environmental values through extensive education, such as brochures, workshops, and pamphlets or identifying economic savings may change *attitudes* towards an environmental issue without markedly changing people's *behavior*. Cultural, social, emotional, and technological barriers must be identified and overcome in order to make change occur. The means by which this is done is referred to as community-based social marketing and involves four steps:

1. Identifying barriers to sustainable behavior;
2. Designing a strategy that utilizes behavior change tools;
3. Piloting the strategy with a small segment of the community; and

[2] For a more detailed discussion of this material, the entire book can be found online at www.cbsm.com

4. Evaluating the program once it has been implemented across the community.

For example, the County could evaluate a source reduction educational method for a particular business sector, such as hotels, or tests a particular residential community. Behavioral changes could be documented through surveys and then actual amounts of waste generated could be monitored over time to determine the success of the educational effort.

3.4 References

Environmental Preferable Purchasing:

http://www.epa.gov/epp/

http://www.p2.org/workgroup/epp/WhatISEPP.cfm

Reusable transportation containers:

http://www.informinc.org/xsum_deliver.php

http://www.deq.state.or.us/wmc/packaging/bp/index.htm

http://www.deq.state.or.us/wmc/packaging/bp/bpplasticpallets.pdf

http://www.moea.state.mn.us/transport/

Lodging Industry Source Reduction:

http://www.greenhotels.com/

http://www.greenbiz.com/toolbox/reports_third.cfm?LinkAdvID=6378

Section 4
RECYCLING AND BIOCONVERSION

4.1 Purpose

The purpose of this section of the Plan is to characterize each of the County's current recycling and bioconversion programs, provide alternative diversion strategies, and evaluate the strengths and weaknesses of each strategy. The goals of the strategies are to:

1. Increase diversion of materials from the Kekaha Landfill (Landfill);
2. Minimize costs to the County and customers;
3. Promote sustainability;
4. Facilitate the development of small businesses;
5. Further protect the environmental health of the County; and
6. Increase participation in upstream waste diversion programs.

To accomplish this, the County will:

- Locate recycling drop bins at transfer stations;
- Develop a County-owned Materials Recovery Facility (MRF);
- Provide every-other-week curbside collection of residential recyclable materials, with a hybrid PAYT system;
- Enhance business recycling through ordinances, technical assistance and services;
- Improve bottle redemption program;
- Increase visitor recycling;
- Facilitate recycling at special events; and
- Provide financial support for innovative recycling initiatives.

The bioconversion strategies that the County will implement include:

- Establish a weekly curbside collection system for green waste, with automated refuse collection;
- Expand the ban on the landfill disposal of non-residential green waste in Kaua'i to include residential waste and expand the ban to include disposal restrictions at the transfer stations;

- Establish a central green waste and organics processing facility to produce mulch and/or compost;
- Provide curbside collection for pre-consumer, commercial food waste;
- Assist private facilities with food waste composting;
- Further develop the "food waste to animal feed," infrastructure;
- Promote the reuse of pallets; and
- Evaluate expanding automated refuse collection to green waste and recyclables.

The composting of animal manures is not an option that is being explored since these materials are not being delivered to the Landfill in any appreciable quantities. The existing diversion of animal manures from the Landfill is accomplished by on-site management at the point of generation. This is discussed further in Section, 5, Special Wastes. The co-composting of sewage sludge and green waste is also discussed in Section 5. Strategies to enhance the County's backyard composting program were presented in Section 3, Source Reduction.

4.2 Background

4.2.1 Legislative

The State of Hawai'i statutes established the following goals to reduce the solid waste stream prior to disposal through source reduction, recycling, and bioconversion (HRS 342G-3)

1. Twenty-five percent by January 1, 1995; and
2. Fifty percent by January 1, 2000.

According to the State's "Hawai'i 2000 Plan for Integrated Solid Waste Management" published in 2000[1], the fifty percent waste reduction goal "is far from being met. Substantial growth has occurred in recycling over the past decade. However, Hawai'i's diversion infrastructure is inadequate to achieve this goal". The report goes on to list the probable barriers that contribute to the shortfall of Hawai'i's fifty percent diversion goal. They are listed below.

- A recycling ethic is not firmly rooted among Hawai'i's people and businesses.
- User fees, which require direct payment for solid waste disposal, are rare. Therefore, waste disposal appears to be cheap and easy.
- High costs of operating recycling businesses in Hawai'i continue to deter development of collection and processing infrastructure.

[1] Source: *"Hawai'i 2000 Plan for Integrated Solid Waste Management"*, July 2000. http://www.hawaii.gov/health/environmental/waste/sw/pdf/swmgmpln.pdf

- Local recycled materials markets are underdeveloped, and access to out-of-state markets is expensive due to Hawai‘i’s isolated geography.

4.2.2 County of Kaua’i’s 1994 Integrated Solid Waste Management Plan

Based on the 1994 Kaua‘i County Integrated Solid Waste Management Plan (1994 Plan), the recycling rate in 1994 was quantified at 3.5 percent[2]. Thus “action items” and recommendations to increase recycling were included in the 1994 Plan. Table 4-1 lists these recycling “action items” and recommendations and describes what, if any, actions were taken by the County. Table 4-2 lists the “action items” and recommendations pertaining to bioconversion and lists what, if any, actions were taken by the County.

While these tables show that the County did not implement all of the “action items”, the County did successfully increase the recycling rate from 3.5 percent to almost 24 percent by 2005.

[2] Additional recycling was occurring at that time, but not quantified.

Table 4-1
1994 ISWMP Recycling Action Items and County's Efforts

Action Item	County Action
Action Item 3-1: Define objectives for source separation & recycling, including achievement of the State goal of 25% diversion by 1995.	The County is currently providing residents with the opportunity to recycle. Current diversion rate is approximately 24%[1].
Action Item 3-2: Designate principal recyclable materials.	The County has added more materials to its list of accepted (marketable) recyclable materials since 1994 including: mixed waste paper, magazines, PET and HDPE beverage containers.
Action Item 3-3: Develop residential collection programs, including: ▪ 10 to 12 permanent recycling centers; ▪ Curbside collection of recyclable materials; ▪ Mobile units for special events; and ▪ Kauai Resource Exchange and Buy-Back Center.	▪ The County currently has 8 drop bin locations (up from 6 in 1994). ▪ County residents had access to a privately operated subscription-based curbside collection program. Program was discontinued in early 2006 in conjunction with the closing of the Kaua'i Resource Center (KRC). ▪ The County's Recycling Coordinator has increased the visibility of recycling by providing public education and outreach at special events. ▪ As a result of the Hawai'i Bottle Bill, there are now 6 deposit beverage container redemption centers in the County. ▪ The County opened the KRC in April 2002.
Action Item 3-5: Implement a non-residential[2] recycling policy.	In 2003, a mandatory commercial recycling plan was drafted by the County but was never implemented.
Action Item 3-6: Develop processing capacity for source separated recyclables.	The County has developed processing capacity for source-separated recyclable materials through contracts with private businesses and public/private partnerships through the opening (in 2002) of the Kaua'i Resource Center (a new operator is pending).
Action Item 3-7: Implement recovery operations for targeted waste streams such as high-grade office paper.	The County currently contracts for the collection of office paper from County buildings. Many businesses contract with private haulers for cardboard collection/recycling services.

[1] The recycling rate was calculated by adding the FY 2005 tons of waste disposed (89,156 tons) to the tons diverted (27,233) for the total tons generated of (116,389). The tons diverted (27,233) was then divided by tons generated (116,389) for a 23.40% diversion rate.

[2] The terms "non-residential" and "commercial" were used interchangeably in this section of the 1994 ISWMP. Non-residential includes government, industry, and institutions.

Table 4-2
1994 ISWMP Bioconversion Action Items and County's Efforts

Action Item	County Action
Action Item 3-4: Green Waste Diversion Strategy. Recommended that the County establish a special task force to develop a green waste reduction and diversion plan. Should include both generators and managers of green waste from both the public and private sectors. Focus on source reduction/on-site management, as well as off-site management of green wastes.	Did not establish.
Action Item 3-6: Develop processing capacity (for recyclables and organics).	Commercial establishments developed green waste processing capacity in the years following Hurricane Iniki; County used tub grinder to process green waste and later contracted with the private sector for such grinding.
Action Item 3-8: Develop a strategy and schedule for pursuing: ▪ Green waste mulch for landscaping; ▪ Co-composting of green waste and animal manure; ▪ Co-composting green waste and sewage sludge; and ▪ Bio-fuel production from: construction and demolition wastes, excess green waste with C&D waste, and low grade, non-recyclable paper.	Operations to mulch green waste for landscaping are in place. However, the County is not co-composting green waste with animal manure or sewage sludge. The County is not producing bio-fuel from organics.

4.2.3 Current Waste Diversion

The County currently has numerous programs in place to divert reusable, recyclable and compostable materials from the Landfill. These programs have contributed to a County recycling rate in 2005 of approximately 24 percent. In addition, private companies provide recycling and composting services. Table 4-3 below summarizes the quantities of recyclable material diverted from the Landfill in FY 2005, based on data received from the County.

Table 4-3
Quantities Diverted from the Kekaha Landfill (in Tons)
FY 2005

Cardboard	1,651
Newspaper	422
High Grade Paper	88
Mixed Paper, including magazines	341
Plastic - #1 PET	50
Plastic - #2 HDPE	30
Plastic Bags	5
Glass	1,843
Aluminum Cans	70
Ferrous Metals	5,675
Nonferrous Metals	105
Tires	415
Electronics	38
Food Waste	672
Green Waste	15,730
Pallets	20
Used Oil	55
Propane Tanks	Included in Ferrous Metal Quantities
HHW	23
Total:	27,233

4.3 Strategies to Improve Recycling Program

Following are discussions of strategies for increasing recycling diversion.

4.3.1 Locate Recycling Drop Bins at Transfer Stations

As discussed earlier in this section, the current program consists of 8 drop bin locations throughout the County. Five of the locations are in retail shopping parking lots, one is in Waimea Canyon Park, one is at the Hanalei Transfer Station, and one is at the Landfill.

From the public meetings held in January 2006, many residents stated that there are not enough recycling drop bins in the County. Therefore, the County will add a recycling drop bin to two additional transfer stations: Hanapepe and Kapaa. (It is not necessary to add a drop bin to the Lihue transfer station because there will be recycling drop-off service available at the KRC located adjacent to the transfer station, once a new operator is procured for that site.)

The County recognizes that space is an issue at the transfer stations. One option the County will consider is to place the recycling bins on the lower level of the transfer stations near the green waste drop-off areas. However, the accessibility to residents

could be an issue, especially during times of heavy rains. The Hanapepe transfer station green waste and tire collection area is show below in Figure 4-1.

Figure 4-1: Hanapepe Transfer Station Green Waste and Tire Collection Area.

4.3.2 Develop a County-owned Materials Recovery Facility

Currently just one recycle processor is located in the County, and this facility is not designed to accept co-mingled residential recyclables. In addition, the facility may not have adequate capacity to process the approximate 4,000 tons of recyclables that are projected to be collected through the residential curbside recycling program; the approximate 7,400 thousand tons of commercial recyclables that will be recovered due to increased commercial recycling and the disposal ban on commercially-generated corrugated cardboard and 4,800 tons of HI5 containers that are projected to be annually recovered by 2012.

Therefore, the County will begin developing a Materials Recovery Facility (MRF) to process recyclables in 2009. The County plans to contract with a private firm to operate the facility, as well as market the recyclables. The facility is scheduled to be operational by 2012. It is estimated that the facility will cost $6.15 million to construct, and approximately $625,000 a year to operate. This is based on $35 a ton inflated for 2012 or $38.24 and 16,300 tons of recyclables. The processing of $35 per ton is based on industry standards of $25 per ton and adjusted for Kaua'i. The County plans to initially contract for the operation of the MRF with a private operator, thus the actual cost per ton processing fee will be determined during the procurement process.

4.3.3 Provide Curbside Collection of Residential Recyclable Materials and Unit-Based Waste Collection

In 2012, the County will provide curbside recycling service to residential customers. While residential customers will not be charged for this service, they will be required to officially notify the County that they will participate. Residential customers will be allowed to begin participation several times a year. Upon notification, participants will receive recycling containers and information on the types of materials that can be recycled and how to prepare materials for recycling. A component of the curbside recycling services will be a provision that residents who do not actively participate will not be provided the service. The County will convene a recycling task force to define "actively participate", as well as develop strategies to encourage residents to participate.

To further increase participation in the curbside recycling program, the County will institute a unit-based solid waste collection system. This collection system is often referred to as "Pay-As-You-Throw" (PAYT). Offering different levels of service through varying sizes of refuse containers creates a financial incentive for residents to reduce the amount of refuse they set out each week which can result in an increase in the amount of recyclable materials set at the curb.

The U.S. EPA "supports this approach to solid waste management because it encompasses three interrelated components that are key to successful community programs:

1. Environmental sustainability – reduces solid waste and increases recycling;
2. Economic sustainability – allows communities to cover their solid waste costs and allows residents to take control of their solid waste bill; and
3. Equity – PAYT systems are more fair as residents who recycle are not subsidizing those who do not recycle".[3]

Volume-based systems typically use plastic bags, stickers or tags, or permanent containers – or a combination - as the unit(s) of measure by which fees are charged for solid waste collection and disposal.

- **Bags –** Bag-based systems require residents to purchase and use special plastic bags in order to discard their household waste. Bags are distributed through local retail outlets or by the public works or solid waste department. Typically, the price set for the bags covers both waste collection and disposal costs.
- **Tags/Stickers –** With this system, a tag or sticker is required to be attached to each bag of waste disposed and can be designated for specific size bags (i.e., 13 gallon, 30 gallon, etc.). Tags and stickers can be distributed and priced the same way that specialized bags are distributed and priced in a bag-based PAYT system. In addition, tags or stickers can be attached to large items that do not fit in bags.

[3] Source: U.S. EPA, Pay As You Throw website: http://www.epa.gov/epaoswer/non-hw/payt/intro.htm

- **Permanent Containers –** In container (or can) PAYT systems, households pay according to the size and number of permanent containers that they use for waste disposal. In some communities, containers are supplied by the service provider, while in other communities households supply their own containers in accordance with approved guidelines. In many communities, containers of various sizes are offered on a subscription basis by the service provider, and residents choose what size and number of containers they want to use. To save money, customers must reduce their can size (and/or number of cans) to see any savings.

The County will implement a hybrid PAYT system where all residential customers will be assessed a flat fee for residential refuse service, which will allow the set out of one cart (the County still needs to decide the size) of refuse each week and a specified number of tags to place on solid waste that cannot fit into the carts. If residential customers require additional carts or tags, they will be charged an additional amount by the County. The County will continue to provide residents with the option of disposing of waste at the transfer stations and Landfill/WTE Facility at no charge to minimize open dumping. To facilitate the success of this program, the County will pass an ordinance requiring solid waste be in a cart or have a tag to be collected, and make open dumping and littering ordinances more stringent.

4.3.4 Enhance Business Recycling

Businesses in the County have the opportunity to subscribe to recycling collection services through Garden Isle Disposal (GID). GID is the largest commercial solid waste hauler in the County and they offer recycling hauling services to businesses for a fee. The following materials are accepted for recycling by GID and processed at their facility in Lihue: old corrugated cardboard (OCC), white paper, mixed paper, glass, plastic, and aluminum.

Many large retailers in the County "backhaul" their OCC by shipping it back to the mainland in empty shipping containers. In addition, Wal-Mart and Safeway backhaul plastic shopping bags to their distribution centers. The County has collected basic data indicating that the following businesses currently have backhaul programs in place: Wal-Mart, Star Market, Safeway, and Food Land.

The County's Recycling Coordinator assists businesses with recycling, waste reduction, and waste diversion issues and conducts waste assessments upon request. In 2005, the County partnered with the Kauaʻi Chamber of Commerce to offer the Mayor's Hoʻola Hou Award for Achievement in Commercial Recycling. Four businesses submitted applications and the Kauaʻi Marriot Resort and Beach Club in Lihue received an award for their exemplary and innovative recycling program. Some of their waste reduction and recycling efforts include:

- Linen and towel reuse program;
- Recycling of white paper, cardboard, newspaper, glass, plastics, green waste, food waste, and fryer oil;
- Recycling of special waste including motor oil, tires, batteries, and scrap metal;

- Installation of an ozone system in the laundry that disinfects and cleans with less detergent and no bleach, requiring less rinsing for an approximate savings of two gallons of water per pound of laundry;
- Donating used mattresses to the Salvation Army and blankets to the various assistance facilities and shelters; and
- Implementing clean air initiatives. The hotel phased out its use of chlorofluorocarbons and hydro chlorofluorocarbons (CFC and HCFC) refrigerants in early 2004.

To further increase commercial recycling, the County will modify existing ordinances, as well as provide technical assistance and services. Details on these initiatives are outlined below.

4.3.4.1 Technical Assistance and Services

To further increase the success of commercial recycling, the County will hire a business recycling specialist who will be responsible for developing an annual business outreach plan. This plan could include information such as:

- Names of key decision-makers within the targeted firms;
- A schedule for the first round of meetings;
- Identification of materials these businesses currently dispose that could be recycled or backhauled (including pallets, plastic film/shrink wrap, as well as the previously mentioned OCC and plastic shopping bags); and
- Case studies from similar businesses, perhaps on other islands, which have successfully implemented a recycling program.

The community/business recycling specialist will then implement a business waste reduction program during the planning period that would include:

- Targeting businesses by the type of waste they generate;
- Implementing and evaluating the feedback from the commercial generator survey administered in 2006 and conducting periodic surveys in the future;
- Implementing a business waste reduction guide and waste exchange;
- Developing a business-specific page on the County's website with information about grants/loans, waste reduction, recycling, and purchasing recycled content products; and
- Working with the large retailers that backhaul materials or have established relationships with processors outside of Hawai'i to see if they would be willing to accept similar recyclable materials from other businesses or the County.

Finally, to increase the opportunity and affordability of commercial recycling, the County will develop a drop-off site for businesses at the KRC. In addition, the County will consider procuring commercial recycling services to increase competition among

service providers. It is unlikely that the County will wholly or partially financially subsidize commercial recycling.

4.3.4.2 County Commercial Ordinances

Once the enhanced business recycling program is implemented, the County will establish a work group that includes business representatives to modify existing ordinances to include the following provisions:

1. Require businesses of a certain size or producing a minimum amount of recyclable material to establish recycling programs for glass, cardboard, office paper and green waste;
2. Prohibit the disposal of commercially-generated cardboard, green waste, and glass at the transfer stations (with minimum amount in loads defined);
3. Define the amount of cardboard in a commercial load that is banned from disposal (i.e., loads containing a minimum of 1 cubic yard loose old corrugated cardboard);
4. Modify ordinance penalty fees;
5. Restructure commercial tipping fees at the Landfill and transfer stations to encourage recycling; and
6. If KRC is available, require all waste haulers to obtain a license from the County with a provision that in order to receive a license, recycling services must be provided to commercial customers.

4.3.5 Improve the Redemption Center Program

In the State of Hawai‘i, a 5¢ deposit per beverage container is charged to the purchase of glass, aluminum, and plastic containers defined under the law[4]. A 1¢ non-refundable container fee is also assessed to support the costs of recycling and program administration. Beverages included under the law are soft drinks, beer, juices, water, teas, and sports drinks. Excluded beverages include wine, milk, and hard liquor. Residents receive a 5¢ deposit refund per container, or an equivalent segregated weight payment for loads of 200 containers or more, when containers are brought to a Certified Redemption Center to be recycled. In turn, the Certified Redemption Centers are reimbursed by the Hawai‘i State Department of Health (DOH) for the 5¢ deposit, and also receive a handling fee, currently set at 3¢ per container. The DOH manages the deposit beverage container (DBC) program. With funding provided by the DOH, the County hired a Recycling Specialist in March of 2005 to oversee the DBC program in the County.

The quantity of beverage containers redeemed in fiscal year 2005 in the County was approximately 12.5 million units. The DOH keeps records of the number of beverage containers *sold* in the State and *redeemed* by County (but not the number sold by County). The totals were reported by the DOH in units, and converted to tons[5] by R.

[4] Hawai‘i Administrative Rules, Chapter 11-282, “Deposit Beverage Container Recycling”.
[5] Source for conversion factors: “Segregated Rates” established by the DOH. Website:

W. Beck. Table 4-4 below shows tons redeemed by material type in the County for fiscal year 2005. It should be noted that although the fiscal year began on July 1, 2004, the DBC program was not fully implemented until later that year. The first month in which quantities of DBCs redeemed were reported by the DOH was November 2004.

Table 4-4
Tons of Deposit Beverage Containers Redeemed in Kaua'i
Fiscal Year 2005[1]

	Aluminum	Bi-metal	Glass	Plastic	Total
November	0	-	0	0	0
December	0	-	0	0	0
January	3.8	-	42.5	1.8	48.2
February	4.6	-	74.2	2.5	81.3
March	18.8	-	89.1	9.3	117.1
April	20.7	-	100.6	9.8	131.1
May	44.2	-	153.1	16.4	213.7
June	32.7	-	179.1	19.4	231.2
Totals:	125	-	639	59	823

Notes: The totals may not equal the sum of the material categories due to rounding.
A solid waste permit from the DOH is a prerequisite for a facility to obtain certification under the Deposit Beverage Container program.
[1] Source of data: Hawai'i State Department of Health.

The State estimated approximately 510 million DBCs were sold in the state in fiscal year 2005. The State does not gather and report data on the number of DBCs sold by County.

Currently five privately-operated Certified Redemption Centers operate throughout the County, as well as one redemption center at the Kekaha Landfill that is contracted by the County and subsidized through State grant funds. To be a certified redemption center, the operator must receive a permit from the State. Once certified, the operator is eligible to be reimbursed 5¢ per container plus 3¢ per container for a handling fee.

Redemption centers operate on different schedules, with some offering very limited days and hours of operation. Redemption center locations and hours of operation are listed below in Table 4-5. Unless located in a high density, urban area, retailers that sell beverages are not required to operate redemption centers. Kauai does not have in high density, urban areas; however, nothing prohibits retailers on Kauai fro offering redemption services

http://www.hi5deposit.com/support/March05SegregatedRate_HandlingFee.pdf

Table 4-5
2005 Kaua'i Beverage Container Redemption Center Locations

Kapahi Reynold's Recycling 5675B Kawaihau Road Tues – Sat: 9 am to 5 pm Closed for lunch noon to 1 pm	Lawai Post Office Reynold's Recycling 02-3687 Kaumualii Highway Sat: 9 am to 3:30 pm Closed for lunch noon to 1 pm
Lihue Garden Isle Disposal 2666 Niumalu Road Mon – Fri: 8 am to 4 pm Closed for lunch noon to 1 pm Sat: 8 am to noon *Reverse vending machines available*	Nawiliwili Harbor Reynold's Recycling Corner of Wilcox and Kanoa Street Tues – Sat: 9 am to 5 pm Closed for lunch noon to 1 pm
Kekaha Landfill Kaua'i Community Recycling Services 6900-D Kaumualii Highway Wed & Sat: 8 am to 4 pm	Princeville Reynold's Recycling Prince Albert's Park Wed & Fri: 9 am to noon

Currently all redemption center operators are transporting the redeemed DBCs to Garden Isle Disposal in Lihue for processing and marketing.

In an effort to capture more deposit beverage containers and offer recycling at public venues, the County placed hoop wire recycling bins for the collection of DBCs at seventy-six County-owned parks and neighborhood centers in January of 2006. The bins are emptied by residents/visitors who are encouraged to take the containers and redeem them for money at one of the local redemption centers.

From the public meetings held in January of 2006, many residents stated that there are not enough redemption centers in the County, or they have to stand in line for an unreasonable amount of time to redeem their containers.

Although the six redemption centers are located in more densely populated areas, there is a need for more redemption centers, and/or the hours of the current centers need to be extended. Because some of the centers are only open on certain days for limited hours, they are not convenient for most residents. To address this, the County will attempt to site redemption centers at the transfer stations and certain recycling drop-bin locations.

At the public meetings, many people also asked why the grocery stores and places that sell DBCs are not required to take them back for redemption, as this would be more convenient for residents. At this time, the State does not require retailers to operate redemption centers at their stores. However, several supermarkets on Oahu have reverse vending machines for container redemption. The County will explore this option for Kaua'i.

4.3.6 Increase Visitor Recycling

The County's visitor population is over one million people per year. Thus, the potential impact on the County's recycling program could be significant if there was an increased effort to capture more of the recyclable materials generated by visitors.

As previously discussed, many of the larger hotels and resorts in the County are currently recycling what they generate internally (i.e., corrugated cardboard and office paper), but more effort needs to be made to offer recycling opportunities to guests.

The County also has a large number of condominium rentals and home rentals for visitor lodging. Concerted efforts will be made to ensure these dwellings have recycling collection services available or, at a minimum, recycling education and instructions are provided for the guests. In many instances, hotel and/or rental condominium cleaning staff is allowed to take deposit beverage containers that are disposed as refuse in the individual guest rooms and redeem them for the deposit. This certainly contributes to recycling; however it is not as visible as say, providing recycling containers in hotel/condominium common areas for guests to use.

Examples of strategies to increase visitor recycling that the County may implement include:

- Develop a green tourist recognition program. Condominiums and hotels that provide a separate recycling bin and information on recycling would receive recognition by the County, similar to the good housekeeping seal of approval. Proprietors of these establishments would be permitted to use the "green" seal of approval on their websites and printed materials.
- Design a recycling campaign targeted specifically toward tourists, such as "Keep the Garden Island Green". The advertisement may be placed in the in-flight magazines on the inter-island air carriers. The County may also work with the cruise lines to disseminate this message.
- Provide recycling opportunities at tourist destinations. The County may provide multi-material recycling containers at tourist destinations and harbors/ports. Corporate sponsors, such as businesses in the hospitality industry, could be approached to sponsor visitor drop-off bins to reduce the costs to the County. An example of centralized recycling containers is shown below in Figure 4-2. These containers will most likely have the recycling campaign theme printed on them or on a sign near them, as well as sponsorship signs or logos.

Figure 4-2: Multi-Material Recycling Containers the County is Purchasing for a 2007 Pilot in Three County Parks

The County recognizes the costs that will be associated with instituting a visitor recycling program and that these costs would need to be passed onto guests. Because this would increase the rates at properties with recycling programs, economic incentives or mandates would be necessary to make wide-spread recycling viable at these establishments. To determine what are the most effective and sustainable mechanisms to recycle waste from Kauaʻi visitors, the County will conduct focus groups with the representatives of the hospitality industry and these representatives will assist with the design and implementation of a tourist recycling program.

4.3.7 Facilitate Recycling at Special Events

Recycling at special events presents a significant challenge in most cases because the events involve hundreds of people, numerous activities, and can be spread over a wide area. In addition, there is limited opportunity for advanced education. In general, special events can be categorized by three primary activities: (1) street or large area activities spread over a large area; (2) contained activities (i.e., located in a specific facility, but which may differ significantly from event to event); and (3) sporting events (usually in a stadium or arena).

The County has begun to proactively address special event recycling. In FY 2007, the County used deposit beverage container funds to purchase 50 special event containers to loan to event coordinators. The County will also be providing technical advice on how to coordinate the programs. The County will also maintain a log of events throughout the year to assist event coordinators with recycling initiatives.

4.3.8 Financially Support Innovative Recycling Initiatives

The County will institute an innovative recycling grant program for businesses and non-profit organizations in an attempt to implement or expand recycling programs and increase waste diversion. One innovative recycling grant model that the County may follow is based on the State of Florida's innovative grant program.

In 1997 the Florida Legislature passed Section 403.7095(9) of the state code specifying that the Florida Department of Environmental Protection (DEP) shall make grant funds available to counties on a competitive basis for innovative programs related to recycling. The grants are for counties, municipalities, special districts, and nonprofit organizations that have legal responsibility for the provision of solid waste management services that:

- Demonstrate technologies or processes that are not in common use in Florida, represent a novel application of an existing technology or process, or overcome obstacles to recycling and waste reduction in new or innovative ways;
- Demonstrate innovative processes to collect and recycle or reduce materials targeted by the department and the recycling industry; or
- Demonstrate effective solutions to solving solid waste problems resulting from waste tires, particularly in the areas of enforcement and abatement of illegal tire dumping and activities to promote market development of waste tire products.

Because the Legislature recognized that input from the recycling industry was essential to the success of this grant program, DEP must cooperate with private-sector entities to develop a process and define specific criteria for allowing their participation with grant recipients.

Grants are limited to $150,000 - $200,000, and the applicant needs to demonstrate how the project will achieve at least two of the following three criteria:

- **Not in common use in Florida -** The proposal should provide information via survey, literature review, or some other means to support its assertions that the proposed technologies or processes are not in common use in Florida or in areas of similar size or demographics in Florida.
- **Novel application of an existing technology or process -** The proposal should provide documentation showing how the existing technology or process is novel.
- **Overcome obstacles to recycling/waste reduction in new or innovative ways -** The proposal should identify what obstacles are being addressed, explain how the proposal would overcome those obstacles, and provide documentation supporting the newness or innovation of the ways in which the proposal will address those obstacles.

The applicant must also demonstrate transferability of technology and processes used in the program and specify how the program will promote transferability, and demonstrate local support for the proposed program by the commitment of cash or in-kind matching funds.

To modify the Florida innovative grant program to meet the unique needs of Kaua'i, a grant advisory committee will be formed in 2008. This committee may also be continued to evaluate and recommend applications.

4.4 Strategies for Improving Bioconversion

As previously discussed, the strategies that the County will implement to further divert the waste stream through bioconversion goals include:

- Establish a weekly, curbside collection system for green waste, with automated refuse collection;
- Expand the ban on the landfill disposal of non-residential green waste in Kaua'i to include residential waste and expand the ban to include disposal restrictions at the transfer stations;
- Establish a central green waste and organics processing facility to produce mulch and/or compost;
- Provide curbside collection for pre-consumer organics;
- Assist private facilities with food waste composting;
- Further develop the "food waste to animal feed" infrastructure;
- Promote the reuse of pallets; and
- Evaluate expanding automated refuse collection to green waste and recyclables.

Details on these initiatives are provided below.

4.4.1 Establish Automated Refuse Collection with Curbside Green Waste Collection

The County is responsible for the curbside collection of municipal solid waste (MSW) from all single-family residences in the County. The County collects solid waste once a week using six rear-load collection vehicles. The refuse is collected manually and each collection vehicle has one driver and two laborers.

Beginning in 2009, the County will begin automating refuse collection for its residential customers. In an automated collection system, residents are provided with wheeled, plastic refuse carts and the carts are collected with vehicles that are designed to limit the amount of physical labor used to place the solid waste into the collection vehicle. Communities are converting to this type of system to reduce litter, minimize costs, improve efficiency and limit worker injuries. Currently the Counties of Honolulu and Maui have begun implementing an automated refuse collection system.

The County will automate collection by planning district, using the following schedule:

- 2009 – Lihue
- 2010 – Kapaa and North Shore

- 2011 - Koloa-Poipu-Kalaheo and West Side

By automating refuse collection, the County will be able to reduce the crew size by at least one laborer. This laborer will be transitioned to a green waste collection crew that will provide weekly green waste collection service. Green waste collection will also be provided using automated vehicles and residents will be provided with green waste carts. The County will make the transition after a planning district has been converted to automated refuse collection. For example, Lihue will receive green waste collection in 2009.

The County believes that curbside green waste collection will be necessary because the population is increasing and becoming more urbanized, which may make the practice of self-hauling green waste to drop-off sites less prevalent. It is essential to continue to divert green waste as it is one of the most cost effective materials to divert since it can be marketed on the island and comprises a substantial portion of the residential waste stream. In addition, green wastes typically have high moisture content and will decrease the BTU value of the waste stream, which may decrease the performance of the County's proposed Waste-To-Energy Facility (Section 10).

Because the provision of weekly curbside collection of green waste may significantly decrease the demand for the drop-off sites, the County will aggressively monitor their use. To minimize the potential of contaminants (such as plastics) in the green waste, the County will pass an ordinance banning the set out of green wastes in plastic bags. Green waste will be permitted to be set out in kraft paper bags and/or rigid containers marked "green waste".

4.4.2 Establish a Disposal Ban on Green Waste for Residents and at the Transfer Stations

The County is authorized to establish such a ban on the disposal of green wastes, to keep these materials out of the Landfill[6]. Landfill disposal bans are typically enforced at the point where the collection vehicle tips its load – at transfer stations and at the Landfill. Disposal bans work best in situations where the need is widely recognized and alternatives to disposal are available.

Currently, the County bans the landfill disposal of loads from businesses, industries, governments, institutions and other non-residential sources that exceed 20 percent green waste. To further divert green waste from disposal, the County will expand the ban to require residents and businesses to limit the drop-off of only incidental amounts[7] of commercial and residential green waste at the transfer stations and the Landfill. This ban will be enacted after all resident have access to and understand the curbside green waste collection system.

As stated above, a green waste disposal ban, by itself, does not guarantee the successful diversion from disposal of the desired quantities of materials. Thus, before

[6] Kauai Ordinances, Title VIII, Chapter 21, Article 7, Section 21-7.3.
[7] The County will work with internal and external stakeholders to define "incidental".

the County institutes the ban, the County will implement concurrent, complementary strategies such as:

- Ensuring the public understands the reasons for/benefits of the ban;
- Enforcement of the ban;
- Building widespread support among key stakeholders for the ban;
- Dissemination of public information on the alternatives to disposal of green waste; and
- Promotion of the beneficial uses and markets for processed green waste.

4.4.3 Establish a Central Organic Waste Processing Facility

To cost-effectively manage the additional green waste produced through the curbside collection program, the County will develop a centralized organics processing facility. The County will contract with a private vendor to construct, equip and operate the composting facility, as well as market the compost.

The centralized composting facility is necessary because the currently composting facilities are already exceeding their permitted processing capacity and are not conveniently located to County population centers. In addition, a centralized processing facility could potentially be designed to not only compost organic waste, but also disaster debris material. When identifying a site for a composting facility, a disaster debris staging area will be considered as well since a significant portion of this waste stream could be composted. More detail on disaster debris disposal is provided in Section 8. In addition to green waste, the County will evaluate the feasibility of composting of additional organics, such as food waste, non-recyclable paper and biosolids. According to the recent waste characterization study for Kaua'i, food waste represents approximately 14 percent and non-recyclable paper (such as food containers, paper towels, etc.) represents 8 percent of the municipal solid waste currently going into the Landfill.

4.4.4 Establish Collection Program for Pre-Consumer Organics

If a facility to compost organics were available, pre-consumer food waste and non-recyclable paper could potentially be collected at the curbside. Initially the County would limit this service to commercial establishments, but would evaluate expanding to residential customers. If these organics are added to the program, the County would provide wheeled carts to generators in the program. The carts are sturdy and have attached lids, helping to minimize odor and animal/insect problems that could be encountered during storage of materials between collections and when set-out at the curbside for collection. The carts could be used to hold green waste, food waste and non-recyclable paper.

4.4.5 Assist Private Facilities with Food Waste Composting

Currently, the island's private composters are not processing food waste. To encourage them to do so, these facilities would be eligible to apply for the County's innovative recycling grants to demonstrate the viability of food waste composting to DOH since their state permits would need to be modified, and help the composters overcome perceived challenges.

The County will also help to coordinate "matches" between generators of food and the composters. The experience of the Center for Ecological Technologies (CET), a not-for-profit environmental organization in Massachusetts, illustrates a similar type of role to encourage the composting of food waste.

CET completed a three and one-half year project that created a market-based infrastructure for farm composting of commercial food and other organic waste in western Massachusetts. During the project, CET served as a liaison among interested businesses/institutions, haulers and farms willing to accept their organic waste.

Assistance included locating appropriate participants, soliciting their participation and designing or improving organic waste separation, collection, storage, transportation and processing systems.

4.4.6 Further Develop the "Food Waste to Animal Feed" Infrastructure

The County will further develop the "food waste to animal feed" infrastructure by coordinating and subsidizing a food waste collection program to provide animal feed to local pig and goat farmers.

Specifically, the County will educate and encourage commercial and institutional generators of food waste to participate in a food waste diversion program. This will involve a separate collection of organic materials that are suitable for hog or goat feed, and the establishment of working relationships with the farmers who would receive the materials. The County's innovative recycling grant may be made available to interested parties to initiate a project that would demonstrate the logistical and financial aspects of a food waste to animal feed diversion effort.

4.4.7 Promote Reuse of Pallets

Most pallets generated by businesses are discarded as refuse and sent to the Landfill. Currently there are no pallet companies located in Kauaʻi so there is limited opportunity for recycling or reusing pallets. Some of the larger businesses may be backhauling pallets to the mainland via empty shipping containers.

Many municipalities on the mainland accept wooden pallets for grinding or chipping as part of their wood waste and composting program. The County will evaluate the costs and benefits of pallet chipping when the central composting facility becomes operational.

Until then, the County will evaluate the feasibility of grinding pallets with the two private firms that currently have contracts with the County to provide grinding services for wood waste.

4.4.8 Evaluate Expanding Automated Refuse Collection to Recyclables

By 2011, the County plans to complete the conversion of residential refuse service from manual to automated collection. At this time, the County will begin evaluating the benefits of provide the curbside recycling program using automated system. Using automated collection to provide curbside recycling however, the conversion will most likely require the development of a processing facility that can manage commingled recyclable materials (one stream) rather than materials that are delivered source separated. Beyond infrastructure requirements, union contracts may also need to be modified to optimize the performance of an automated collection system.

4.5 Impact on Recycling and Bioconversion Quantities

Table 4-6 shows the impact that the strategies will have on the recycling and bioconversion quantities between 2009 and 2013. Assumptions that were used to estimate these quantities follow Table 4-6 and are based on experiences in similar communities, and industry standards.

Table 4-6
Increased Diversion Quantities

Diversion Activity	2009	2010	2011	2012	2013
Promote Aloha Shares (1)	32	33	35	37	38
Establish Electronics Collection Event (2)	46	47	47	48	49
Ban Commercial Corrugated (3)	0	3,344	3,506	3,675	3,853
Ban Commercial Green Waste (4)	0	1,685	1,766	1,852	1,941
Add Drop-Off Site at Kapaa, Hanapepe, Lihue Transfer Stations (6)	857	871	885	903	917
Begin Collecting Pre-Consumer Food Waste (7)	0	0	0	0	1,718
Subsidize 100% of Residential Curbside Recycling Program with PAYT in 2012 (8)	0	0	0	3,598	3,654

Table 4-6
Increased Diversion Quantities

Diversion Activity	2009	2010	2011	2012	2013
Establish Program for Recycling at Special Events (9)	2	2	2	2	2
Implement Tourist Recycling (10)	37	38	39	39	40
Collect Green Waste Curbside in Lihue(11)	1,482	1,506	1,531	1,561	1,585
Collect Green Waste Curbside in Kapaa and North Shore (11)	0	3,875	3,938	4,016	4,078
Collect Green Waste Curbside in Poipu and West Side (11)	0	0	2,951	3,010	3,056
Increase Business Recycling (12)	0	248	260	273	286
Allow small businesses and farmers to use the HHW event (13)	0	162	165	168	171
Redemption program matures and improves (14)	2,189	2,225	2,261	2,306	2,342
Total Additional Recycling (Tons)	4,645	14,036	17,385	21,486	23,730

4.5.1 Assumptions

1. Promote Aloha Shares program. Fifteen percent of commercial durables will be diverted from landfill disposal.
2. Establish an electronics collection event. Assumes 5 percent of households participate and each participant brings 75 pounds of materials.
3. Ban commercial old corrugated cardboard (OCC). Assumes 90 percent of OCC is delivered by large haulers and 70 percent of the OCC is recovered from the haulers.
4. Ban commercial green waste. Assumes 70 percent of commercial green waste would be diverted.
5. Increase service levels at existing transfer stations. The additional diversion tonnage that this will generate is accounted for in other diversion strategies, such as a commercial ban of OCC.
6. Provide drop-off sites at designated transfer stations. Assumes 10 percent of the solid waste delivered to these facilities will be diverted as recyclable materials.

7. Begin collecting pre-consumer food waste. Assumes 25 percent of commercial food waste would be diverted.
8. Provide curbside recycling with PAYT. Assumes 70 percent of households will participate.
9. Enhance program for recycling at special events. Assumes 0.6 pounds per participant.
10. Increase tourist recycling. Assumes an additional 1 percent of newsprint, magazines, PET bottles, HDPE containers, aluminum cans and glass bottles will be recovered from tourists.
11. Collect green waste curbside. Assumes 90 percent of residential green waste that is currently disposed will be diverted.
12. Increase business recycling. Assumes an additional 20 percent of high grade office paper, mixed paper, non-redemption glass bottles, plastic containers, aluminum, and non-treated wood would be recovered.
13. Redemption program matures and improves. Assumes 80 percent of bottle bill materials can be diverted from disposal.
14. Based on applying the 2005 tons per capita per year upstream diversion rate to future populations.

Section 5
SPECIAL WASTES

5.1 Definitions

Special wastes are those components of the waste stream that require special handling due to their size or physical, chemical or biological composition for proper processing or disposal. Special wastes, as defined by H.B. 324 include:

- Asbestos;
- Agricultural wastes;
- Infectious medical wastes;
- Abandoned and derelict vehicles;
- Sewage sludge;
- Waste combustion ash;
- White goods;
- Tires;
- Used motor oil; and
- Lead acid batteries.

Also generally regarded as special waste, although not specifically mentioned in H.B. 324, are:

- Household batteries;
- Propane tanks;
- Used cooking oil; and
- Construction and demolition materials.

The following subsections present how the 1994 Plan proposed to manage these materials and how they are currently managed. Also, any key issues associated with the current management of these materials and strategies to address these issues are presented.

5.1.1 Asbestos

Federal regulations governing the handling, transportation and disposal of asbestos-containing material (ACM) are known as the National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR Part 61). Requirements for asbestos

disposal include maintenance of waste shipment records, maintenance of records of location and quantity of waste disposed, and standards for covering the waste. Homeowners are exempt from federal regulations regarding the disposal of ACM.

Examples of activities that generate ACM include:

- Demolition of buildings containing asbestos;
- Maintenance of existing/operational facilities or systems that have asbestos insulation; and,
- Asbestos abatement projects.

The DOH is the agency responsible for enforcing federal and local asbestos regulations. Currently, the ACM disposed at the Landfill requires a generator's waste profile sheet that must be completed by the generator and approved by the Landfill. Then the generator must schedule a time for the ACM to be disposed at the Landfill. Upon delivery, the hauler must report to the Landfill office so the load can be inspected and to ensure that all of the necessary documents are accurately completed. Landfill personnel escort the hauler to a designated area.

The ACM is buried under non-asbestos containing refuse or cover soil in a specific disposal area designated each day for asbestos, which is separate from the active working area. The designated area is posted with warning signs to identify and restrict access to the regulated areas. Access to this area shall be limited to trained, and protected personnel only.

Once the ACM load is placed on the ground, usually at the toe of a previously filled waste slope, the load is covered by at least two feet of soil. No equipment is permitted to run over the asbestos until another two feet of MSW is place on the pile.

As an option, an asbestos load may be placed in a trench. The dozer operator will excavate a trench or pit in a location of the landfill that had been previously filled. Trenches may be cut at the base of the working face or, preferable, in an area separate from the working face. The trench should not be within 10 feet of the landfill perimeter or the side slopes of any fill area or within 10 feet of the final cover. During 2005, a reported 49 tons of ACM were disposed at the Landfill.

5.1.1.1 1994 Plan Recommendations

The 1994 Plan recommended that disposal methods for ACM should be monitored to ensure that these materials are deposited in a separate cell at the Landfill, that the cover material is placed immediately after each shipment of asbestos waste is received, and that proper records are maintained by the Landfill operator.

The 1994 Plan also recommended that County personnel should be properly trained to recognize ACMs, and take appropriate precautions when handling demolished building refuse. Based on the Landfill asbestos management plan, the 1994 Plan recommendations have been implemented.

5.1.1.2 Plan Recommendations

The primary issue associated with the management of ACMs is assuring that they remain segregated from the municipal waste stream. Therefore, if the County uses a waste-to-energy facility for final solid waste management of County waste as discussed in Section 10, the County will institute a policy that ACMs will not be accepted at the WTE facility and the generator must arrange for separate disposal. Also, as discussed in Section 8, the County will develop a landfill to support the WTE facility that will be able to accept asbestos.

5.1.2 Agricultural Wastes

Agricultural wastes include animal and plant residues from agricultural process that require special handling. Agricultural wastes include manure, carcasses, sludge from rendering plants and food processing wastes. Most agricultural waste is processed though bioconversion at the site where it is generated. For example, manure is used as fertilizer or spread on the fields. Pig and dairy farmers usually wash down the barns, creating a potential wastewater problem. However, the largest hog producer on the island (approximately 1,000 head) uses a settlement pond to contain the wastes[1].

The County is not responsible for agricultural waste and the responsibility for treatment and disposal belongs to the generator. The dust, odors and smoke from the disposal of agricultural waste are regulated by the DOH. The regulations reduce the impact for agricultural operations on nearby residential areas.

5.1.2.1 1994 Plan Recommendations

The 1994 Plan identified concerns about agricultural chemicals generated by small farmers, such as fertilizers, pesticides and herbicides. Specifically, small farmers are not likely to hire contactors to dispose of unwanted chemicals due to the expense involved. The Plan recommended that the County's household hazardous waste program should be broadened to include farm chemicals from small quantity generators.

5.1.2.2 Plan Recommendations

The Hawai‘i Department of Agriculture currently provides occasional collection events for farmers to dispose of their unwanted pesticides and similar materials. Between collection events, there is the potential for such materials to be disposed in the MSW stream. To address this, the County will allow farmers to bring a limited amount of agricultural products to the HHW collection events for a fee.

Additionally, the County will consider including manure (particularly from the large producer) in any new bioconversion effort that might be planned. The manure offers a source of nitrogen that is beneficial for the composting process.

[1] Source: Mr. Bill Spitz, Agricultural Specialist for the County of Kaua'i, 10-06-06.

5.1.3 Infectious Medical Wastes

Hawai'i administrative rules (Title 11, Chapter 104.1) refers to infectious medical waste as "any waste which may contain pathogens capable of causing an infectious disease and shall include, but not be limited to, wastes in the following categories:

- Infectious isolation waste;
- Cultures and stock infectious agents;
- Blood, blood products and body fluids;
- Pathological waste;
- Contaminated sharps; and
- Contaminated animal carcasses, body parts and bedding.

Facilities that may contribute to the infectious waste stream in the County include hospitals or clinics, nursing homes, medical laboratories, funeral homes, dental offices, livestock operations and households.

The DOH is the regulatory authority responsible for regulation of infectious medical waste management practices in the County. Chapter 104.1, Title 11, states the following:

Infectious waste shall be incinerated, sterilized or chemically disinfected by methods recommended for waste treatment by Centers for Disease Control's Recommendations for Prevention of HIV transmission in Health-Care Settings, or the CDC update. "Universal Precautions for Prevention of Transmission of HIV Immunodeficiency Virus, Hepatitis B Virus and Other Blood Borne Pathogens in Health-Care Settings"; or the U.S. EPA's "Guide for Infectious Waste Management," May 1986; or Part 1910 of Title 20 of the Code of Federal Regulations, Subpart Z, before their disposal; or by other methods approved by these agencies or the department.

In general, regulations require that infectious medical waste must be sterilized (rendered non-infectious) or incinerated. If waste is sterilized, the bag must indicate sterilization.

The Mahelona Hospital/Hawaiian Health Systems Corporation has closed its incinerator and uses a specialized contractor to ship its infectious waste off-island. The Veteran's branch of the Mahelona Hospital/Hawaiian Health Systems Corporation uses a co-generation system to manage infectious waste. Wilcox Memorial reports that they process their routine medical wastes through their autoclave to sterilize the materials before transportation to the Landfill.

The Landfill does not accept infectious waste that has not been sterilized, and generators of infectious waste must contract with private companies to properly manage this material.

5.1.3.1 1994 Plan Recommendations

The 1994 Plan identified infectious medical waste that is generated by self-treating individuals as an issue that needed to be addressed. The 1994 Plan recommended that the County should request a statewide mailing of information by the DOH. The information would be sent to all home generators of medical waste. The information should identify the risks associated with improper disposal, and should describe the accepted methods for disposal. In addition, the 1994 Plan recommended that strict waste acceptance criteria, waste screening, aggressive reporting and pursuit of violators should be employed to minimize the risk to sanitation workers and public health.

5.1.3.2 Plan Recommendations

The risk of needle-sticks to waste collection and processing personnel remain an issue. To address this, the County will re-issue public information on the proper handling, storage, and disposal of sharps, particularly that which is residentially generated.

5.1.4 Abandoned and Derelict Vehicles

The primary origins of abandoned and derelict vehicles are private individuals. Many vehicles are abandoned in vacant lots, backyards, and on the street. Abandoned vehicles pose environmental problems and they provide vector habitats.

To manage vehicles abandoned on public property, the County operates an Abandoned/Derelict Vehicle Program. The Solid Waste Division's Abandoned Vehicle Coordinator works with the Police Department to properly remove illegally abandoned vehicles according to the specific requirements of the related County Ordinances and Hawai'i Revised Statutes. The vehicles are taken to the Puhi Metals Recycling Center, where they are stored for 30 days. During that time, an owner may reclaim the vehicle after paying all citations, towing charges and storage fees. If the vehicle is not claimed in 30 days, it is recovered and disposed. More specifically, the parts are harvested and sold. After that, the shell is compressed and shipped off-island (currently to Schnitzer Steel in O'ahu).

The County has a contract with Abe's Auto Recycler, Inc (Abe's Auto). Abe's Auto operates the Puhi Metals Recycling Center, which is owned by the County.

5.1.4.1 1994 Plan Recommendations

The previous plan recommended that the County develop an ordinance which allows for an annual advance disposal fee to be attached to the vehicle licensing and registration charges. The idea was to provide funds to support the abandoned vehicle program.

5.1.4.2 Plan Recommendations

The County's program does not collect vehicles from private property. This is problematic for property owners with large parcels of land that are used as illegal dumping grounds for materials including abandoned vehicles. However, because it

will not be possible to determine if the property owner is completely disassociated with the abandoned vehicle(s), the program will continue to be limited to vehicles on public property

5.1.5 Sewage Sludge

Sewage sludge refers to the residual solids and semi-solids separated during the treatment of wastewater by municipal and private wastewater treatment plants. Sewage sludge is also commonly referred to as biosolids. These two terms refer to the same type of material, with the notable difference that the term "biosolids" is defined as treated sewage sludge that specifically meets EPA pollutant and pathogen requirements for land application and surface disposal.

The County lacks heavy industry and therefore sewage sludge on the island is generally low in heavy metals, devoid of potentially toxic chemicals and is not considered a hazardous material. The Landfill currently accepts dewatered sludge from municipal wastewater treatment plants and private treatment plants. The sludge must pass a paint filter test in order for it to be accepted at the landfill.

In 2005, approximately 1,380 tons of sewage sludge waste was disposed of at the Landfill. A small amount of sludge is currently diverted from the landfill for use as a soil amendment by private contractors.

5.1.5.1 Plan Recommendations

The 1994 Plan indicated that discussions with various landscape contractors, nursery operators and compost manufacturing facilities revealed that most, or potentially all, sludge produced and currently landfilled could be processed into compost for landscaping, golf courses or other ornamental agriculture.

The 1994 Plan recommended that the County shift its policies toward encouraging marketing and utilization of sludge by-products and encourage municipal sludge producers to find private markets for dewatered sludge.

County officials are in the process of making plans for growth in green waste composting and are considering the inclusion of biosolids as an additional component of their organic composting activities.

5.1.5.2 Increasing Diversion of Sewage Sludge

Biosolids are nutrient-rich materials and can be safely recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth. Some concerns have been raised about the safety of such practices due to the presence of persistent chemicals and heavy metals. However, recent projects using high quality biosolids from communities with little or no industrial input, and hence little contamination, have proven safe and successful in returning nutrients to the soils. U.S. studies reflect that when sewage from major industries can be excluded, the sludge is effectively clean of these contaminants and can safely be used as compost. In addition, biosolids must meet stringent standards spelled out in the Federal and state rules before they can be approved for use as a fertilizer.

The greatest opportunity for increased diversion from the County's waste stream is through recovery of organic materials. It can reduce landfill reliance, while providing growth opportunities for local businesses and products of value to tourism, agricultural, and landscape industries.

A number of alternatives to disposal have been implemented in Hawai‘i and throughout different parts of the country. The most prominent of these techniques involve centralized composting:

- Municipal or government operated composting (primarily “clean green” but often integrating biosolids); or,
- Commercial co-composting (biosolids or food waste, open or in-vessel systems).

As is the case in many specialized solid waste management activities, public/private relationships, are essential to the success of any type of organics diversion.

Provided below are two examples of existing biosolids/sewage sludge composting facilities in Hawai‘i.

EKO Compost - Biosolids/Sewage Sludge Composting Firm in Maui

Maui County has historically provided support for recycling businesses, primarily through an active grant and contracting program. EKO Systems, Inc. (EKO) has received assistance from the County through a contract for green waste processing and composting services.

In 1995, Maui County put out an RFP for sludge and green waste composting. EKO submitted a proposal and was awarded the contract. The County has renewed the contract several times since entering into the original contract. The County provided the site and infrastructure for EKO’s Maui composting operation. EKO operates the facility and markets the product. For these services, the County pays EKO on a per-ton basis for both sewage sludge and green waste. The tip fee for each is $55.00 per ton. This is somewhat unusual in that usually differential tip fees are used for various feedstocks.

With support from the County, EKO diverts all of the green waste and sewage sludge arriving at the Central Maui Landfill. Sewage sludge is trucked to the Maui EKO facility by the County. Green waste is delivered to EKO’s facility by self-haulers.

The sewage sludge, which adds valuable nutrients, is mixed with the green waste and is composted using an aerated static pile composting process. The compost product is subsequently sold by EKO. The Maui EKO facility also accepts fats, oil and grease as part of their agreement with the County. These are handled by a subsidiary of EKO called Pacific Biodiesel.

In 2005, EKO received approximately 23,000 tons of biosolids from the county, 23,000 tons of green waste and 5,000 tons of fats, oil and grease.

EKO can accept food waste into their system; however to date they have chosen not to accept food waste as feedstock. This decision is due to trying to integrate food waste into the composting system in one of their California facilities, but they found that it

lead to contamination primarily due to glass and odor issues. EKO is working to resolve these issues before introduction food waste into their Maui facility.

Applicable regulations include: EPA Part 503, storm water and other permits they have with Maui County, and Hawai‘i state rules.

Biosolids Treatment Facility - Kalaeloa, O‘ahu

Located on Navy land at the former Naval Air Station at Barbers Point in O‘ahu is the Navy’s Biosolids Treatment Facility (owned and operated by NAVFAC Hawai‘i). The facility covers approximately 20 acres and combines biosolids with green waste, co-composting the two feedstocks and producing a beneficial end-use product (a soil additive or compost product).

In 1998, Honolulu entered into an intergovernmental pilot project agreement with the Navy to compost city sludge from their Honouliuli Wastewater Facility for one year. Then in 2000, Honolulu initiated a contract with the facility for co-composting of green waste and sewage sludge. The facility accepts sewage sludge from various Department of Defense facilities in addition to the material it accepts from the City and County. Together these sources provide the facility with approximately 323 wet tons of sludge per week. All loads are trucked to the NAVFAC facility in covered, leak-proof containers. Department of Defense biosolids are composted separately from Honolulu biosolids.

As part of the Navy’s permit to operate the NAVFAC Hawai‘i facility, certain steps are required before they can distribute the composted product generated from Honolulu biosolids. The DOH reviews the facility’s time and temperature data logs and lab sample results on fecal coliform, and must then give approval for release of the product. Honolulu is responsible for the distribution of all compost originating from its biosolids.

5.1.5.3 Plan Update Recommendations

Currently the County disposes sewage sludge in the Landfill. The County plans to work with the private composting facilities on the island to modify permits to enable them to accept sewage sludge, or develop a new centralized facility to accept and compost this material.

5.1.6 Combustion Ash

The County does not have incineration or WTE facilities for municipal solid waste, and no hospitals still operate its incinerator for infectious medical waste. As discussed previously, the ash from that process is disposed at the Landfill.

5.1.6.1 1994 Plan Recommendations

The 1994 Plan identified bagasse incinerators associated with sugar cane processing as the primary source of ash. It also stated that additional investigation of the toxicity of the ash should be pursued if construction and demolition debris is incinerated.

5.1.6.2 Plan Recommendations

To accommodate a waste-to-energy facility as proposed in Section 10 of the Plan, a separate monofill for disposal of the ash will be developed. The ash will be tested in compliance with DOH requirements and the monofill will be developed to exceed DOH requirements. Section 8 of the plan provides more detail on the ash monofill.

5.1.7 White Goods

White goods are major appliances composed primarily of metal. White Goods from residents are accepted year round at the Hanalei, Kapaa, and Hanapepe transfer stations and at the Landfill. In the Lihue area, residents must take their white goods directly to Puhi Metals. Commercially-generated white goods are not accepted at the transfer stations and must be taken to a private facility where they are accepted for a fee. Some private facilities may accept used appliances for free or with fees paid, depending on the appliance condition.

The County stages the appliances at each of the above County sites and then segregates them into materials that contain refrigerants and materials that do not contain refrigerants. A private contractor is used to periodically remove the stockpiles and haul them for processing and recycling to the Puhi Metals Recycling Center. In FY 2005, 9,980 units of white goods were recycled at Puhi Metals Recycling, which is the equivalent to 848 tons of material.

5.1.7.1 1994 Plan Recommendations

The 1994 Plan identified strategies that could be adopted to comply with the June 30, 1994 state landfill ban of these materials. The strategies were to: 1) levy an additional $5.00 surcharge on the sale of new appliances to provide funds for the County to perform refrigerant recovery; or 2) contract with a scrap metal dealer to perform this service and recycle the metals.

5.1.7.2 Plan Recommendations

The County will consider instituting a charge for accepting white goods from residents. This would help to defray the costs associated with handling these materials. However, the provision of no-charge drop-off services for white goods is a valuable tool in minimizing the illegal dumping of these items.

5.1.8 Tires

Residential scrap tires are accepted at the four transfer stations and the Landfill at no charge. Tires from commercial users are not accepted. Commercially generated tires are accepted at Unitek Solvent Services and PS&D Tires (both in Lihue) for a fee.

The tires collected at the County's five sites are removed weekly by a private contractor for recycling. In FY 2005, 415 tons of tires were shipped to Unitek's O'ahu location where they were chipped into crumb rubber and provided to AES power company as fuel.

5.1.8.1 1994 Plan Recommendations

The 1994 Plan discussed the June 30, 1994 landfill disposal ban on tires and identified the County's plans to encourage the private sector to develop solutions.

5.1.8.2 Plan Recommendations

Similar to the situation with white goods, the County will consider charging a fee to accept scrap tires at its facilities. However, as with white goods, the illegal dumping of tires may become a greater problem if the no-charge drop-off opportunities were removed. The County will promote that tire retailers are required to accept tires from passenger and commercial vehicles at no fee when an equivalent amount of new tires are purchased, and monitor retailer compliance using "secret shoppers." The County will report non-compliant retailers to DOH.

5.1.9 Used Motor Oil

Residential used motor oil is accepted for recycling at each of the four transfer stations, plus the Landfill. The County has in place a contract with a private company to regularly remove the used oil that has been collected. In FY 2005, the County collected 13,760 gallons of used motor oil. Based on a conversion factor of 8.0 pounds per gallon, the County recycled approximately 55 tons of used oil in 2005. The County also offers motor oil drainer containers free to residents. This program includes education and outreach, and is funded by the DOH.

5.1.9.1 1994 Plan Recommendations

The 1994 Plan noted that the County's used oil collection was interrupted as a result of Hurricane Iniki, and "…contractual difficulties…" delayed the program's reinstatement. The Plan recommended that the program be reinstated.

5.1.9.2 Plan Recommendations

The costs of the program and the funding by the DOH will be monitored to ensure that the state support is adequate to fully fund this program. If funding becomes insufficient, the County will consider requesting an increase in funding for this program when evaluating the County's priorities pertaining to state appropriations.

5.1.10 Lead Acid and Household Batteries

The County accepts lead acid and household batteries during its annual HHW collection event. Most auto parts stores will accept used batteries upon request with the purchase of a new battery. Auto service stations recycle old batteries when they install a new one. PS&D Tires accepts auto batteries for free, regardless if a new one is purchased. The company in Lihue that accepted, for a small fee, cadmium, rechargeable, and nickel cadmium (NiCad) batteries is now out of business.

5.1.10.1 1994 Plan Recommendations

The 1994 Plan described the State's take-back regulations that require retailers to accept used lead-acid batteries upon the sale of new ones. The Plan recommended the County implement a public awareness program to educate consumers on the proper methods of disposal for lead-acid batteries.

The only mention of batteries from residential sources was that they could be brought to the County's HHW collection events.

5.1.10.2 Plan Recommendations

Because the local outlet for collecting household batteries is no longer available, the County will consider both short- and long-term approaches to this issue. Short term, the County will continue the inclusion of household batteries in its HHW collection events, and allow commercial establishments to bring a limited number of batteries to HHW events for a fee.

The County will also research off-island markets for such batteries, and identify the logistics and costs of collecting and shipping the batteries. Collection points will be considered for the drop-off recycling facilities at the County's transfer stations and the Landfill. Alternatively, the County may request that various retailers serve as collection points. The County would then receive the batteries from all of the retailers involved and consolidate them for shipping to market.

Finally, HRS 3421-2 requires retailers of lead acid batteries to take back used lead acid batteries from passenger and commercial vehicles at no fee when an equivalent amount of new batteries are purchased. The County will promote that retailers are required to take back used lead acid batteries, and will monitor retailer compliance using "secret shoppers." The County will report non-compliant retailers to the DOH.

5.1.11 Propane Tanks

Previously, the County accepted propane tanks only if they were depressurized with the valves removed and there was no fluid in the cylinders. However, this has resulted in the County usually rejecting the propane tanks delivered to these sites because very few people were able to depressurize them and the professional removal fee was cost prohibitive ($25 per unit). This resulted in people storing them or illegally dumping them at transfer stations or other locations.

5.1.11.1 1994 Plan Recommendations

Propane tanks were not specifically discussed in the 1994 Plan.

5.1.11.2 Plan Recommendations

The County will continue its development of a program that would provide a safe and cost-effective means of handling propane tanks. In 2006, the County contracted with a qualified company that accepted and processed propane cylinders would help to alleviate the short term issues. The County required the contractor to depressurize the

tanks, ensure that they are empty, and recycle the remaining metals. The County considers this program successful and will continue it until a more appropriate alternative is available.

Long term, the County will most likely support state legislation that requires advance disposal fees on propane tanks. This would provide funding for a safe and cost-effective infrastructure to recover propane and recycle the metal. Therefore, the County will work with other Hawai'i counties to introduce such legislation.

5.1.12 Used Cooking Oil

Kaua'i Grease Traps is the only company in the County that collects used cooking oil from businesses. They conduct this service for a fee in conjunction with grease trap servicing. The used cooking oil is sold to a company in Honolulu that recycles it into biodiesel fuel. This not only diverts the used cooking oil from disposal (both proper and otherwise), but also helps to create a less polluting fuel. A representative of Kaua'i Grease Traps estimates that an average of approximately 40,000 gallons or 150 tons[2] of cooking oil is recycled annually. They also report that they are planning to open their own biodiesel plant in the County. Currently in the permitting stages, the plant is expected to come on line in 2007 or 2008.

5.1.12.1 1994 Plan Recommendations

Used cooking oil was not included in the 1994 Plan.

5.1.12.1 Plan Recommendations

Kaua'i Grease Traps estimates that approximately 25 percent of the cooking oil that is generated by restaurants is likely being disposed at the Landfill. If this is occurring, the county will consider taking steps to divert the material. This might include an ordinance that requires businesses generating more than a minimum amount of cooking oil to recycle it[3], and inspecting refuse dumpsters at restaurants to monitor compliance.

5.1.13 Construction and Demolition Materials

Construction and demolition materials (C&D) are included in this section because they represent a discrete waste stream and may pose materials handling challenges. In many instances, C&D are delivered to the Landfill for disposal in collection vehicles, such as roll-offs, dedicated for collection and transport from specific construction job sites. The waste composition study conducted as part of the SWMP estimated that the overall solid waste stream (all materials landfilled) included approximately 6% C&D in FY2005. The C&D waste stream may vary considerably over time because quantities disposed are directly influenced by the scope of residential and commercial building activities occurring. Presently, activities to source separate and recover these materials is very limited in the County.

[2] Based on each gallon of cooking oil weighing 7.5 pounds.
[3] Honolulu currently has a used cooking oil disposal ban for restaurants.

5.1.13.1 1994 Plan Recommendations

Specific recommendations on managing C&D materials were not included in the 1994 Plan.

5.1.13.2 Plan Recommendations

Many U.S. communities are actively focusing on recovery of select materials within the C&D waste stream. Approaches include upstream diversion through enactment of ordinances mandating source separation of recoverable materials (i.e., old corrugated containers, metals, etc.) at the job site. These materials are then processed and transported to an end market. An additional approach being used is processing the materials downstream to identify and separate (mechanically and manually) recoverable materials. In other words, C&D processing facilities are developed to receive and process materials at or near transfer stations and landfills.

The County should consider a dual approach focusing on both potential upstream and downstream management options. First, the County should consider establishing a task force composed of stakeholders including C&D generators, haulers, recyclers, and representatives from DOH. The task force should be charged with identifying barriers to recovery of C&D and recommended approaches to foster recovery. For example, permitting issues for reuse of certain materials such as wallboard has been identified as a barrier. The task force also would be tasked with making specific recommendation related to ordinances for fostering upstream source separation and recovery.

Second, the County should consider promoting the development of a public/private partnership to address downstream recovery of C&D materials. One approach used more frequently by local communities is to distribute a Request for Interest (RFI) to firms with capabilities and interest in providing the services of processing mixed C&D for recovery. The approach could be similar to the one used for the Puhi Metals Recycling Facility where the County offers an incentive by providing the land for use at a minimal cost. The overall objective is to determine whether downstream recovery would be a viable option in the County.

Section 6
HOUSEHOLD HAZARDOUS WASTE & ELECTRONIC WASTE

The purpose of this section is two-fold: (1) characterize the County's current HHW collection program, provide strategies for improving the program, and evaluate the strengths and weaknesses of each strategy; and (2) address used electronics collection and recycling and provide program strategies for the County to consider. The goals of the strategies are to:

1. Increase diversion of HHW and used electronics from the Landfill;
2. Minimize the cost to recycle or manage HHW and used electronics;
3. Further protect the environmental health of the County;
4. Provide an opportunity for small businesses and farms to properly manage hazardous wastes and electronics; and
5. Achieve a high participation rate in both the HHW and electronics recycling programs.

To achieve both the HHW and electronics recycling program goals, the County plans to:

- Expand the number of HHW collection events, and type of generators who have access to the collection events;
- Provide an annual electronic waste collection event; and
- Accept used electronics and HHW year-round at a County-owned collection facility.

6.1 Background

6.1.1 Legislative

6.1.1.1 Hazardous, Household Hazardous & Universal Waste

Hazardous waste is regulated under the federal Resource Conservation and Recovery Act (RCRA), Subtitle C. Per this federal law, hazardous waste exhibits at least one of four characteristics – ignitability, corrosivity, reactivity, or toxicity.

Hazardous waste is defined in the Hawai‘i Administrative Rules (HAR), Title 11, DOH Chapter 261-3 and in the HRS, Chapter 342J-2 (*Hazardous Waste*) as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or

physical, chemical, or infectious characteristics may: (1) Cause or significantly contribute to an increase in mortality or an increase in a serious irreversible or incapacitating reversible illness; or (2) Pose a substantial existing or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed".

Household-generated hazardous waste (such as automotive products, cleaners, pesticides, herbicides, paints and solvents), is exempt under both the RCRA rules of the Code of Federal Regulations (40 CFR Part 261.4)[1] and the HAR, Title 11, Department of Health, Chapter 261[2]. HAR 11-261-4(b)(1) states that the following solid wastes are not hazardous wastes and are exempt from regulation: solid wastes derived from households (including single and multiple residences, hotels and motels[3], bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).

The HRS Chapter 342G-1, defines "household hazardous waste" as "those wastes resulting from products purchased by the general public for household use which, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial known or potential hazard to human health or the environment when improperly treated, disposed of, or otherwise managed".

Also exempt under the Federal and State (HAR 11-261-5) rules are conditionally exempt small quantity generators (CESQGs). CESQGs are small businesses that generate 100 kilograms or less (approximately 220 pounds or 25 gallons) of hazardous waste per month.

Per the EPA, the federal Universal Waste regulations (40CFR Part 273) streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs). The rule is designed to reduce hazardous waste in the MSW stream by making it easier for universal waste handlers to collect these items for recycling or proper disposal. The State rules (HAR 11-273-5) address the applicability of the universal waste rules to households and CESQGs and exemptions are in 11-261-4(b)(1) and 11-261-5 respectively. However, the State Universal Waste rules mention only thermostats under mercury-containing equipment and do not mention fluorescent lamps which may contain mercury. The State Universal Waste rules do not address batteries or pesticides.

[1] Electronic Code of Federal Regulations: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr;sid=4990e762d7b81851bef18f82dc851826;rgn=div5;view=text;node=40%3A25.0.1.1.2;idno=40;cc=ecfr#40:25.0.1.1.2.1.1.4

[2] Hawai'i Administrative Rules: http://www.hawaii.gov/health/about/rules/11-261.pdf

[3] Although wastes generated by hotel guests are non-hazardous and are not regulated under hazardous waste rules, hazardous wastes generated by hotel activities and operations are regulated. See the State DOH/Solid & Hazardous Waste Branch's "Regulatory Education: Hotels Bulletin" at: http://www.hawaii.gov/health/environmental/waste/sw/pdf/200512wmin.pdf

6.1.1.2 Used Electronics

Used electronics or "e-waste" includes discarded computers, cell phones, televisions and other electronic products. Those with cathode ray tubes (CRTs), such as color computer monitors and televisions, are considered hazardous when discarded because of the presence of lead in the CRT. (Lead is not considered an environmental problem while the monitor or television is intact; however the lead can leach when compacted or broken and create an environmental hazard.) Also, liquid crystal displays (LCDs) from flat screen panels and laptop computers are considered hazardous by the State of Hawai'i[4].

In addition to lead, electronics can contain chromium, cadmium, mercury, beryllium, nickel, zinc, and flame retardants. When electronics are not disposed of or recycled properly, these toxic materials can present problems. Based on studies conducted by the EPA, the CRTs and LCDs will fail the Toxicity Characteristic Leaching Procedure (TCLP) test for heavy metals.

Because the quantities of e-waste have been rapidly increasing, many state and local governments are experimenting with collection, donation, and recycling of used electronic products, as well as ways to involve producers of electronics in helping to recover these products at end-of-life. Currently there is no legislation in Hawai'i regulating the disposal or recycling of *household* electronics. Household amounts can be landfilled. Commercial generators of electronic waste cannot dispose of these materials in a municipal landfill and must follow hazardous waste rules HAR 11-261-3 if the amounts of lead, mercury, cadmium, chromium, etc. cause them to test hazardous under State and Federal laws.

In 2005, the Hawai'i State Legislature introduced a bill (HB475 and SB1004) for "an act relating to electronic waste". The bill was to establish a task force to prepare a statewide policy and plan for the management of electronic waste. Per the bill, "the task force shall:

1. Determine whether electronic waste disposal in landfills should be banned;
2. Determine who should be responsible for appropriate disposal or recycling of electronic waste, e.g., manufacturers, retailers, consumers, waste handlers, or a combination;
3. Evaluate and recommend strategies for the safe disposal of electronic waste;
4. Evaluate and recommend disposal and recycling options other than landfill disposal, including but not limited to parts harvesting, reuse, resale, donation, and demanufacturing;
5. Evaluate and recommend strategies for state and county governments to reduce, dispose, and recycle electronic waste generated by their respective agencies. This includes but is not limited to determining whether and how to implement a policy regarding the preferential sale or donation of surplus and obsolete computer and electronic equipment to other agencies and Hawai'i's public schools;

[4] Per a memo from the State DOH to the City and County of Honolulu and PVT Land Company, dated June 9, 2006.

6. Evaluate and recommend ways of reducing electronic waste;
7. Evaluate and recommend funding strategies to implement statewide electronic waste management; and
8. Recommend a plan and timetable for implementing statewide electronic management."

The task force was to submit a report on its actions and recommendations, including proposed legislation no later than twenty days prior to the convening of the regular session of 2006. The bill was carried over to the 2006 regular session but was never passed.

6.1.2 County of Kaua'i's 1994 Integrated Solid Waste Management Plan

In 1994, the County developed the 1994 Plan, not long after Hurricane Iniki had caused substantial damage to the island in 1992. A two-day HHW collection event was held in October of 1992 and was funded by the Federal Emergency Management Agency (FEMA). A second HHW collection event, jointly sponsored by the State and the County, was held in November of that same year. The HHW section of the 1994 Plan included recommendations to continue sponsoring HHW collection events, as part of the County's overall solid waste program, and not just as disaster-related events. Table 6-1 lists the "action items" and recommendations from the 1994 Plan pertaining to the County's HHW program and describes what, if any, actions were taken by the County.

Table 6-1
1994 Plan HHW Action Items and County Efforts

Action Item	County Action
Coordinate HHW efforts with the State in an effort to: ▪ Reduce costs; ▪ Minimize liability; ▪ Achieve economies of scale using State-coordinated transport and disposal; and ▪ Access State technical resources.	The State does not offer any type of assistance, nor does it coordinate efforts among counties.
Implement promotion and education including: ▪ Description of HHW materials accepted at collection events. ▪ Description of environmental and health hazards of improper use and disposal of HHW products. ▪ Promotion of minimizing HHW through substitution or changing consumption patterns.	The County does provide information regarding the annual HHW collection event on its website, including a description of materials accepted at the event. The website also warns of the dangers of flushing HHW down the drain or pouring into storm sewers. Promotion of the annual HHW event includes ads in the local newspaper, radio ad campaigns, and banners placed at the transfer stations prior to the events listing the dates and times. The County recycling office fields calls throughout the year regarding HHW and proper disposal options. Upon request, callers receive notification of the upcoming annual collection events.
Establish permanent collection sites for quarterly collection of HHW.	The County has not established a permanent HHW collection site or sites.
Investigate the feasibility of including small commercial generators in the HHW collection program.	The County has not investigated the feasibility of including small commercial generators in the HHW collection program.
Investigate collection of latex paints.	The County has not investigated collecting latex paints at the annual event. County staff encourages residents to dry out latex paint and dispose of it with regular refuse.

6.1.3 Generation Rates

R. W. Beck estimated the County's generation rates for HHW and e-waste below.

6.1.3.1 HHW Generation Rates

To determine the estimated quantity of HHW generated in the County, R. W. Beck summed the total 2005 quantity of residential HHW disposed, 271 tons, with the 2005

quantity of HHW diverted (i.e., recycled, fuel-blended, or disposed at a hazardous waste facility) 24.50 tons, which yields a 2005 residential generation quantity of 295.50 tons. Based on the County's residential population of 63,883, the HHW generation rate is 0.025 pounds per capita per day or 9.25 pounds per capita per year. This is slightly less than the EPA estimate of 10.7 pounds per capita per year.

6.1.3.2 E-Waste Generation Rates

According to the Electronic Industries Alliance (EIA), the average American produces 2.5 pounds of used CPUs/peripherals, computer monitors/TVs, cell phones and chargers annually. Applying this statistic to the County's residential population of 63,883 yields a 2005 quantity of approximately 80 tons of used electronics annually.

Per R. W. Beck's waste characterization conducted at the Landfill in February of 2006, no used CPUs/peripherals, computer monitors/TVs, cell phones and chargers were found in the samples of disposed residential waste. However, there was approximately 30 tons of e-waste found in the commercial waste stream. It appears Kaua'i residents are similar to other electronic consumers, and may be stockpiling used electronics in their home.

6.2 Household Hazardous Waste

6.2.1 Current HHW Collection Program

The County provides an annual, two-day collection event for residents to drop-off HHW materials, free of charge, at the four County transfer stations. Commercial and institutional waste is not accepted. The events are held at two transfer stations each day from 8:30 a.m. to 2:30 p.m. Each year the County contracts with a hazardous materials handling/disposal company to provide collection, packaging, transportation, recycling and disposal services.

During the collection events, the County Recycling Coordinator monitors the events by observing and documenting quantities of HHW collected and answering questions from the public, while the transfer station staff assists in directing the public to the HHW drop-off area where the contracted vendor is mobilized to accept and properly package the HHW materials.

In preparation for the annual event, the County places large display ads in the local newspaper, conducts radio ad campaigns, and hangs banners at the transfer stations prior to the events listing the dates and times. The County website provides a list of the items accepted at the HHW collection events and has HHW information accessible year-round. The County recycling office fields calls throughout the year regarding HHW and proper disposal options, and collects names and phone numbers of people storing HHW who want to be contacted directly in advance of the events.

The County has provided annual HHW collection events since 2002. The estimated quantities of material collected from the events are shown below in Table 6-2.

Table 6-2
Estimated Quantities of HHW Collected per Year

Year	Pounds	Tons
2002	49,870	24.94
2003	73,846	36.92
2005	48,998	24.50

Comparing the quantities collected per year, more material was collected in 2003 than in other years. There is no known reason for this increase. The amounts collected in 2002 and 2005 were similar, and there was a 24 percent increase in the amounts collected in 2006 compared to 2005. [The 2006 data is not included in the above table.]

The contracted vendor is required to collect participant information (name, address, description of materials, estimated quantities, and signature) from every resident who drops off HHW materials. Participation data is available for only the last two events and is shown below in Table 6-3.

Table 6-3
HHW Collection Event Participation Data

Transfer Station	2005	2006
Kapaa	94	92
Hanalei	39	60
Lihue	74	78
Hanapepe	85	92
Total Number of Participants:	292	322

The Hanalei site saw the largest increase in number of participants in 2006 compared to 2005. When the participation data is compared to the total quantities collected, the average pounds per participant was 168 pounds in 2005 and 191 pounds in 2006.

To compare the quantities collected per site, Table 6-4 lists the quantities (in units and drums) of HHW collected from each of the transfer station sites in 2006. The largest amount of batteries was collected in Lihue and Hanapepe. The least amount of HHW was collected in Hanalei, while the quantities of other materials were fairly evenly distributed among the Kapaa, Lihue, and Hanapepe sites.

Table 6-4
2005 HHW Quantities Collected per Site[1]

	Transfer Station			
	Kapaa 2/25/05	Hanalei 2/25/05	Lihue 2/26/05	Hanapepe 2/26/05
Automotive batteries (each)	105	47	187	205
Industrial batteries (each)	8	7	6	4
Oil-based paints/solvents (55-gal drum)	9	5	11	12
Flammable, toxic material (55-gal drum)	2	2	2	2
Toxic solid – pesticides (55-gal drum)	0	1	0	1
Aerosols				
20-gal drum	3	2	3	2
5-gal drum	0	1	0	0
Acidic materials				
55-gal drum	1	0	1	1
20-gal drum	0	1	0	0
Alkaline materials				
55-gal drum	2	1	1	1
20-gal drum	0	2	0	0
Non-regulated oily water (55-gal drum)	1	0	1	0
Alkaline batteries				
20-gallon drum	1	0	1	0
5-gal drum	0	2	0	1
Ni-Cd batteries (5-gal drum)	1	1	1	0
Lithium batteries (5-gal drum)	0	0	0	1
Mercury (5-gal drum)	1	0	0	0

[1] The quantities are not listed as weights, but rather by the number of units (for batteries) or the number of drums used to package the waste in preparation for transport.

Each year the County contracts with a hazardous materials handling/disposal company to collect, package, transport, recycle, and dispose of HHW collected at the annual two-day event. The total contract cost was $50,834 in 2005. The quantities collected were estimated to be 28.78 tons, which calculates to approximately $0.88 per pound.

6.2.2 Plan Recommendations for HHW

6.2.2.1 Expand the Number of HHW Collection Events and the Type of Generator that Can Use the Event

In an attempt to collect more HHW materials and/or reach more households, the County may increase the number of HHW collection events held each year. In the County's future Invitation for Bids (IFB) for collection and management of HHW, the County will require a base proposal for one annual event at four transfer stations, then ask for alternate bids for pricing on two events per year, as well as separate events for small businesses and farmers. The proposals' pricing may help the County determine if expanding the current program is financially feasible.

In addition, the County will establish separate collection days where small businesses and farmers, which are regulated as CESQGs, could bring hazardous materials. These generators are not likely to hire contactors to dispose of unwanted chemicals due to the expense involved. This concern is reflected by the fact that the waste composition study estimates that 0.5 percent of the commercial waste stream consists of hazardous materials. This percentage translates to 233 tons of this material being landfilled in 2005. The County may consider charging a nominal fee and requiring participants to register in advance.

The County will add fluorescent lamps to the annual collection events. Fluorescent light bulbs and high intensity discharge (HID) lamps contain mercury. The typical fluorescent lamp contains approximately 40 milligrams of mercury, if improperly handled, can create a serious threat to the environment. The transport and recycling/disposal of fluorescent lamps could be added to the current HHW contract or contracted separately with a fluorescent lamp recycler. Similar to the HHW materials disposal contract, the IFB process may result in a lower per unit recycling cost. County staff may collect the lamps and prepare them for shipment at each HHW collection event and the lamp recycler could arrange for transport after the event. In the alternative the County could request proposals from lamp recyclers to attend each collection event with their own staff, equipment and vehicle.

6.3 Electronics Recycling

A recent study by the National Recycling Coalition (NRC) estimates that over 20 million personal computers became obsolete in the United States in 1998. Between 1997 and 2007 nearly 500 million personal computers will become obsolete – almost two computers for each person in the United States[5]. Some studies predict that a large number of televisions will be disposed when high definition television becomes widely available. Many used televisions, monitors, printers, and other types of electronic equipment are finding their fate in attics, basements, and warehouses. Businesses and households keep these products because they believe that they may

[5] Source: National Recycling Coalition, http://www.nrc-recycle.org/resources/electronics/managing.htm

still be valuable, but the longer equipment remains in storage, the less useful it becomes.

While end-of-life electronics were not detected in the residential waste stream during the waste characterization study that was conducted at the Landfill as part of this plan update, this does not mean that used electronics are not being produced by Kaua‘i generators.

To help address these issues, and as part of the development of this Integrated Solid Waste Management Plan, we have provided a description of the current e-waste management program in the County and provided recommendations for improvement.

6.3.1 Current E-Waste Collection and Recycling Program

At this time, there are no businesses that accept electronics for recycling in the County. On its website, the County suggests that electronics in useable condition be donated to a non-profit agency for reuse, and mentions that certain electronics manufacturers offer recycling options for a fee.

In the past, the KRC operated by Island Recycling (based in Honolulu) accepted computer monitors (not television monitors), CPUs, and printers, for recycling. In fiscal year 2005, approximately 38 tons of electronics were collected at the KRC. Island Recycling transported the materials to an electronics recycler/refurbisher in California. The County terminated the operating contract with Island Recycling in January 2006.

6.3.2 Plan Recommendations to Increase Electronics Recycling

6.3.2.1 Provide an Annual E-Waste Collection Event

To divert increased quantities of e-waste from the Landfill, the County will provide an annual electronic waste collection event. The County will consider having the collection events at the four transfer stations, public parking lots or at the KRC. Similar to the HHW collection events, the County may have a separate collection day where small businesses and institutions could deliver used electronics for a fee. Due to the potential for a large volume of used electronics from individual businesses or institutions, these establishments will be required to register in advance and indicate the number of units that will be brought to the event.

6.3.2.2 Support State Legislation

The County will urge the State legislature to develop a statewide solution and funding source to address this growing problem, potentially to implement an Advanced Disposal Fee so that a fee on the sale of electronics is generated to support end of life management.

6.3.2.3 Develop a New Permanent HHW and Electronics Collection Facility

Ultimately, the County will consider developing a permanent facility to collect HHW and electronics. The County would contract with a private vendor to process, recycle, reuse and market the materials, as well as properly dispose of materials that cannot be recycled or reused.

After years of HHW and electronic collection events, an increasing number of municipalities on the mainland are investing in permanent HHW collection and processing facilities. A permanent facility provides several benefits to a municipality including:

- **Convenience to the residents.** A permanent site provides residents with a year-round option to properly dispose of HHW and electronics, rather than having to store the materials until the next collection event. Some residents are unable to store materials due to circumstances such as a death in the family or moving off island.
- **Product exchange or reuse center.** Many facilities are designed to include a product exchange area in which usable products are made available for residents to take free of charge. Likely items in a reuse program include paint, household cleaners, automotive products and computer products. By offering these materials for reuse, the County could potentially realize savings from avoided disposal costs. Most product exchange programs require the resident or "customer" to sign a liability waiver that states they are over the age of 18 and they will use the product for its intended purpose. Legal counsel should be consulted to provide applicable indemnification language.
- **Potential to reduce disposal costs.** A permanent facility would provide the County with the ability to bulk materials such as flammable liquids and oil-based paint. Bulking liquid waste provides cost savings through the transporting of drums of waste rather than boxes or labpacks.
- **Potential to reduce transportation costs.** Because the total quantities collected from an annual event fluctuate depending on participation, weather and other unknown circumstances, it is possible that some events result in partially full drums or containers, or partially full loads (i.e., half a barge or half a shipping container). A permanent facility would allow the County to arrange for transportation when it has a full load, rather than transporting materials on a per-event basis.

Permanent HHW and Electronics Facility Design/Overview

To better understand what would be required to build a permanent HHW and electronic collection facility, the recommended design features are listed below. There are no federal regulations regarding the construction of a permanent HHW and electronic collection facility, however a solid waste management facility permit is required in most states, along with the need to meet local and state building and fire code requirements.

- A parcel of land large enough to accommodate the building, a small parking area, an entrance and exit for vehicle traffic, and a turning area for trucks to haul the HHW and electronics.
- A steel-sided, fully enclosed building with sufficient height to allow for the loading of a semi-trailer from a ramp or a loading dock. The facility should have a receiving area, a bulking area for paints and flammable liquids, and separate storage rooms for labpacked materials and fluorescent bulbs. Other design aspects include restrooms, a decontamination station, an office, a product exchange room, and a storage room for items such as personnel protection equipment and incidentals. The building should be designed with a catch basin under the foundation to which all liquid materials would flow in the event of a spill.
- A pre-engineered hazardous material storage locker for the storage of drums of bulked flammable liquids, and other hazardous materials. These non-combustible units are fire rated and have either a sprinkler system or a chemical suppression system.

The size of the facility would be determined by a number of factors including the quantities of materials expected, the needs of the County, and local zoning requirements. At minimum, a one to two-acre site with building dimensions of 3,000 to 5,000 square feet would be required. As an example for a similar size community, Figures 6-1 through 6-3 below show a 3,000 square foot permanent HHW collection facility built for the City of Fargo, North Dakota (population 90,600)[6] in 1998 in which R. W. Beck assisted with the design.

Figure 6-1: Front view of HHW Collection Facility, Fargo, ND.

[6] Source: U.S. Census Bureau, 2000.

Figure 6-2: Rear View of HHW Collection Facility, Fargo, ND.

Figure 6-3: Pre-Engineered Hazardous Material Storage Locker, Fargo, ND.

County staff operating the facility would need to be trained under the Occupational Safety and Health Administration's (OSHA) guidelines, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training, and/or other requirements as determined by the State of Hawai'i. The HAZWOPER training includes topics such as protection against hazardous chemicals, elimination of hazardous chemicals, safety of workers and the environment, and OSHA regulations.

Table 6-5
City of Fargo, North Dakota
HHW Quantities Collected

Annual Event	1993	1994	1995	1996	1997	1998
Tons of HHW Brought to Annual Event	15.6	19.1	14.2	32.0	37.3	30.0
Cost per Pound[1]	$1.89	$1.68	$1.47	$0.90	$0.73	$0.82
Permanent Facility	1999[2]	2000	2001	2002	2003	2004
Tons of HHW Brought to the Permanent Facility[2]	32.2	43.6	46.8	49.9	73.1	73.4
Tons brought to facility that were diverted through the Product Exchange	3.8	7.6	12.8	14.9	26.4	21.6
Total Tons Diverted	36.0	51.2	59.6	64.8	99.5	95.0
Cost per Pound[3]	n/a	$1.39	$1.07	$1.13	$0.71	$0.65

[1] Includes labor costs for City staff and contracted disposal costs for each annual event.
[2] Does not include the amount diverted through the product exchange.
[3] Permanent facility costs do not include construction costs. The City of Fargo paid for the permanent facility using a portion of landfill tipping fees that were directed to an Enterprise Fund. Permanent facility program costs were not available for 1999.

As experienced by the City of Fargo, most HHW and electronic facilities realize economies of scale over time due to increased quantities of HHW and electronics collected and improved program efficiencies. As reflected above in Table 6-8, the City of Fargo saw an increase in the quantities collected as the program matured and the cost per pound generally declined over the years. Also, the tons diverted through the product exchange increased over time. The product exchange tons plus the tons brought to the permanent facility equaled much higher quantities in one year than quantities collected in an annual event.

6.3.2.4 Mobile Collection Events in Conjunction with a Permanent Collection Facility

The County will consider providing mobile collection to supplement the development of a permanent HHW and electronics collection facility. Similar to the special collection events, certain days could be designated for collection from small businesses and farmers. Mobile collection events could take place at a school, church, or public facility with a large parking lot.

A collection vehicle, such as a box truck and/or a trailer would be needed to conduct the mobile events. The County could coordinate the events and perhaps provide two or three staff persons to help with the collection, and request volunteers to assist with the traffic and unloading of the vehicles. To provide a full service program, the same HHW and electronics that are accepted at the permanent site should be collected at the mobile events. All HHW and electronics collected at the mobile events would be

transported to the permanent HHW and electronics collection facility for consolidation.

The U.S. Department of Transportation (USDOT) sets standards applicable to transporters of hazardous waste (40 CFR 263), and general requirements for shipments, packaging, and labeling waste (49 CFR 172). Because HHW is exempt from the hazardous waste rules, some states do not require a mobile HHW unit to placard the vehicle or manifest its contents. However, USDOT training would be required of staff. Training includes hazardous materials transportation regulations, USDOT hazard classification, communications, packaging standards, and security plans.

With the County's present experience with collection events, transitioning to mobile collection events would be a logical program upgrade.

6.3.2.5 Use an Existing County Facility as an HHW and Electronics Collection Facility

The County may also consider using an existing County-owned facility as an HHW and electronics collection facility. If large enough, a County facility could be used as a drop-off site for residential HHW and electronics, and perhaps eventually CESQG waste. The size of the facility would determine if it would strictly be used as a collection and storage site or if any preliminary processing could be done on-site (such as bulking oil-based paints into 55-gallon drums). At least one hazardous materials storage locker (see Figure 6-3) would be required to store the waste. The storage locker would require electricity and most likely require a concrete slab be poured for its placement. The storage locker should be enclosed with a chain-link fence for safety reasons, as should the entire facility if possible. This may deter, but probably not eliminate, illegal dumping of HHW and electronics at the site.

An appointment-based drop-off policy or very limited hours of operation would be preferable to operate the program, keeping staffing costs to a minimum. County staff operating the facility would need to have 40 hours of OSHA HAZWOPER training (as discussed earlier in Section 6.1.2.3), and/or other requirements as determined by the State of Hawai‘i.

A contracted vendor could be scheduled for quarterly, semi-annual, or on-call collections to package, transport, and dispose and/or recycle the HHW and electronics materials.

The County would need to review local zoning ordinances to ensure this type of use would be allowable in a building/location chosen by the County. Depending on the facility, the County may also be required to apply for a solid waste management facility permit.

Section 7
KAUA‘I PUBLIC EDUCATION AND INFORMATION COMPONENT

7.1 Purpose

The purpose of Section 7 is to identify the public education and information components associated with successfully implementing the Plan.

7.2 Legislative

Per Chapter 342G-26(g) of the Hawai‘i Revised Statutes, the public education and information component of the Plan shall describe the programs that the County will use, in coordination with the efforts of the Department of Health, to:

- Provide comprehensive and sustained public notice of the options for alternative source reduction, recycling and bioconversion, and for the proper handling of household hazardous and special wastes; and
- Distribute information and education materials regarding general solid waste issues through the media, schools and community organizations.

7.3 1994 Plan

7.3.1 Recommended Action Items

The 1994 Plan included a variety of actions that the County would adopt, either by itself or through contracts with companies and nonprofit organizations that specialize in promotional and educational activities. It was designed with the waste stream analysis in mind, designating the largest groups of materials as possible "first targets" for promotional and educational programs.

The 1994 Plan considered the “Educational and Informational” component of the plan to be an essential in assuring that waste reduction goals were reached, reuse was encouraged, and sufficient recovered materials for successful business development for Kaua‘i and the State was provided in the field of recycling.

Table 7-1 displays the educational action items that were included in the 1994 Plan and indicates if these action items were subsequently implemented.

Table 7-1
Status of 1994 Educational Action Items

Number	Action	Was Action Item Implemented
7-1	Develop long-rage educational strategies	Yes
7-2	Develop overall theme for program, including logos and slogans	Partially[1]
7-3	Identify target groups for educational programs	No
7-4	Identify topic areas for educational programs	Yes
7-5	Develop and implement public awareness programs for costs of current and future waste management and recycling programs	No
7-6	Develop and implement education for County in-house source reduction and recycling programs	Yes
7-7	Develop and implement source reduction programs for residents	No
7-8	Develop and implement educational programs for backyard residential composting program	Yes
7-9	Develop and implement educational programs for non-residential source reduction	No
7-10	Develop and implement educational programs for non-residential green waste	Yes
7-11	Develop and implement educational programs for recycling businesses and economic development	No[2]
7-12	Develop and implement household hazardous products educational programs	Yes
7-13	Develop and implement guidelines for other items (tires, used oil, batteries, cars, and appliances)	Yes
7-14	Develop educational guidelines for the purchase of items made from recycled materials	No

[1] A logo contest was conducted in 2002, and a logo was selected, but it is not used on a regular basis or incorporated into an overall program theme with slogan.

[2] The County did not implement education programs for businesses and economic development. However, the KRC provided an economic development opportunity for recycling businesses, and the County has provided technical assistance for recycling businesses.

Table 7-1
Status of 1994 Educational Action Items

7-15	Develop and implement tourist industry promotional and educational programs for waste reduction and recycling		No
7-16	Develop awards programs	Yes	
7-17	Develop educational evaluation guides and questionnaires[3]	Yes	
7-18	Develop and implement educational programs for a Resource Exchange[4]	Yes	

7.3.1 Basic Promotional Program

The 1994 Plan also included approaches for media relations such as news stories, ongoing information and special events. The 1994 Plan also recommended the development of multilingual information that would be disseminated through all media sources and available in Hawaiian, Ilicano, Japanese, Chinese, and other languages. Specific plan recommendations were as follows:

7.3.1.1 Television

Television is a powerful means of conveying a message to the populace, especially through local cable shows on public access stations and Honolulu-produced shows and newscasts. Purchasing air time can be expensive, so making use of free coverage, which is readily available for many stories and events, especially as a follow-up to a hurricane, is preferable.

All stations on O‘ahu run human interest stories on their evening news shows, and recycling and waste reduction are very popular subjects. Stories focusing on the recycling efforts being conducted by children can also attract attention and be turned into a segment seen, not only by the people of Kaua‘i, but by the entire state.

The local cable and public access stations are available for the airing of locally produced videos and activities. Perhaps the regular filming of County Council meetings dealing with solid waste and recycling related issues, as well as public hearings, would provide an inexpensive means of reaching a larger segment of the populace.

7.3.1.2 Radio

Local radio stations are very well listened to on Kaua‘i and offer the opportunity for exposure and education. Like television, paid air time can be expensive, but there are

[3] Through the County’s canvas bag distribution, recipients are required to complete a recycling quiz.

[4] The County provides education about the various recycling opportunities on the Island, including the Kauai Resource Center, when it was opened. There is no longer a “Resource Exchange”.

many opportunities to be heard for free. PSAs, news releases, talk show interviews, call in comment and request lines, and DJs looking for human interest and current event topics for discussion are avenues to pursue.

7.3.1.3 Print Media

Printed material is essential to promoting a successful media-based program, and there are many opportunities for reaching the public. These materials include both Kaua‘i newspapers, newsletters of local community groups (Rotary, Chamber of Commerce, Contractors' Association, etc.), local and state-wide business magazines, the Honolulu dailies, and any other state-wide publications read by the people of Kaua‘i, such as the airline magazines.

Articles written by and interviews of the Mayor, State Representatives, County Council members, local citizens, students, and business leaders, can get the word out to Kaua‘ians in an educational and promotional manner.

7.3.1.4 Brochures, Signs, and Other Printed Material

Brochures, signage, and other such printed material for individual distribution can be successful if created as a useful information sheet that the public can refer to for help (e.g., hang on refrigerator in the home or on the bulletin board at work). Many communities have distributed thousands of brochures that provide clear information to their citizens. There are varying degrees of success with such handouts, but most successful communities have them available. The important element here is to not create more "waste", but to offer material that is useful.

Basic "how to" and "what to" recycle brochures will provide ongoing information and instructions that can be reused as needed.

7.3.1.5 Questionnaires

Questionnaires, both written and verbal, provide important benchmark input from the public. Radio talk shows using pre-arranged questions offer a great opportunity for people to express their views and seek additional information. They can also be an invaluable means of determining the level of understanding and acceptance in the community for various aspects of a particular program.

7.3.1.6 Workshops, Meetings, Public Events

Workshops, meetings, fairs, and other public events create the opportunity for promoting new aspects of the County's waste reduction, recycling, and composting programs. Often organizations are willing to provide complimentary booth space at these events. The creation of a mobile display with a variety of messages would be an effective means of keeping these waste reduction programs visible to the people of Kaua‘i.

7.3.1.7 Tourist Industry Participation

The tourist industry can play a vital role in the success of any waste reduction and resource recovery program, not only by their own aggressive programs, but by informing the public as to their waste reduction programs. Hotels can provide attractive recycling containers for public usage around soda machines and have printed information cards explaining their conservation efforts. These cards can be in the form of attractive dining room table and guest room signs, for example: "We are committed to keeping Kauaʻi beautiful for your next trip."

Litter bags for all rental cars with a printed message to "Keep Kauaʻi the Paradise You Love" will assist in the reduction of possible litter. Many travelers to our state are amazed at the lack of recycling programs, and especially at the amount of litter and debris littering both urban and rural roadsides in addition to commercial and public street fronts. The last litter study, conducted in 1993, found that on the islands of Oahu and Maui, fifteen percent of all visible litter was attributed to candy, gum, snack and ice cream wrappers, over twelve percent was bottle bill related products, and almost eleven percent was miscellaneous plastics. A large portion of the island's visitors recycle in their own communities and expect Hawaii to be the leader on this front.

7.3.1.8 School Participation

Working actively with the schools on an ongoing basis will provide numerous and successful educational opportunities. Work with the state and local schools to create displays geared toward arriving visitors at the display areas at the airport.

7.3.1.9 Award Programs

The creation of award programs for individuals, communities, businesses, and schools that recognize the successes these groups have as "waste stoppers," is important in Kauai. The community should seek joint participation of local businesses and organizations in these awards and tie-in the presentations to concerts, fairs, and other existing public events.

One such award could be for students' photos and videos that teach about waste problems and create solutions. Students are very creative and these photos and videos can provide material for media coverage and showings at public events.

7.3.1.10 County Employees and Programs

Employ all County workers as leaders in the community who are themselves creators of solutions for Kauaʻi. Design a specific awards category to honor those who take the lead.

The County has the opportunity to promote recycling and waste reduction at all its parks and beaches by encouraging public adoption of these areas and providing containers for aluminum cans and glass bottles (commingled would be adequate).

All offices must commit to aggressive waste reduction and recycling programs, with proper employee training and enforcement.

"Get serious about waste!" or some other slogan might be the new motto for all County workers who are part of the problem and become leaders creating the solutions.

7.4 Recommendations for Improvement

7.4.1 Implement 1994 Action Items

As demonstrated from above, the 1994 Plan included detailed and comprehensive strategies for educating key stakeholders on solid waste management issues, as well as issues related to reduction, reuse, recycling, bioconversion and "closing the loop." Many of these recommendations were successfully implemented, but staffing and funding limitations prevented the County from instituting all of the action items. Consequently, as a first step, the County will develop a timeline for addressing the action items seen in Table 7-1.

7.4.2 Develop Specific Educational Action Items for Future Initiatives

As discussed throughout the 2005 plan, the County will be instituting the following initiatives to further increase landfill diversion and increase the efficiency of the County's solid waste management system:

- Automate refuse collection;
- Institute automated curbside green waste collection;
- Assess a residential solid waste management fee;
- Construct a centralized organics composting facility;
- Enhance the business recycling program;
- Provide an electronics collection event and ultimately develop a permanent recycling facility for household hazardous wastes and electronics;
- Upgrade each of the solid waste transfer stations;
- Implement curbside residential recycling and hybrid Pay-As-You Throw; and
- Site a waste-to-energy facility and residual waste/ash landfill.

Each of these solid waste management initiatives will require some-type of stakeholder education to facilitate their success. Consequently, the following provides an overview of education tactics that the County will adopt to support these programs.

7.4.2.1 Automated Refuse Collection

- **Key Stakeholders** – Residents, Vehicle drivers, mechanics, County customer service representatives and government officials.

- Residents – At least 2 months prior to initiate the program, residents will need to be educated that the program will begin and that they will receive refuse carts to use instead of their individual containers. At a minimum, residents need to be educated on 1) the benefits of this new program; 2) how to containerize their refuse and 3) how to place their cart at the curb.
- Vehicle drivers – Vehicle drivers will need to be educated on how to operate the new vehicles, as well as on preventative vehicle maintenance. In addition, converting to an automated refuse collection system will most likely increase route size and vehicle drivers will need to be educated on the new routes. Finally, since vehicle drivers are the "front line" person for the refuse division, it is important that they are trained on how to respond to questions/concerns about the program.
- Mechanics – Automated vehicles have a more sophisticated hydraulic system than manual vehicles. To optimize the performance of the vehicles, the County will need to assure that adequate training is provided to all refuse vehicle mechanics.
- County customer service – During the start up phase of a new refuse collection system, a certain percent of residents will express concerns about the change in how they can set out garbage. It is essential that all customer service representatives are thoroughly educated on the automated refuse collection system, its benefits and potential concerns that residents may have (i.e. Why do I have to keep all of my garbage in the cart?).
- County officials – For the automated refuse collection to be a success, it is imperative that County officials fully support the enforcement of new solid waste ordinances, especially during the first several months when customers are adjusting to the new system. Therefore, County officials need to be educated that initial complaints by residents are typical but should eventually subside.

7.4.2.2 Residential Curbside Green Waste Collection

- **Key Stakeholders** – The key stakeholders and educational messages for the green waste collection program are the same for both automated refuse and green waste collection program, with the following exceptions:
  - Residents – The County is proposing every other week collection schedule for green waste. Therefore, residents will need a permanent reminder, such as a calendar, to facilitate the success of the program. Also, unlike refuse, green waste quantities can vary substantially throughout the year. Therefore, the County will need to develop policies about "additional quantities of green waste" and an education campaign about the policies, including set-out requirements.

7.4.2.3 Residential Solid Waste Management Fee

- **Key Stakeholders** – Residents, County customer service, County officials.
  - Residents – While the assessment of a residential user fee is necessary for the financial sustainability of the County's solid waste management system, it will most likely generate opposition amongst a portion of the County's residential customers. Therefore, the County will need to conduct the following educational activities:
    - Meet with editorial boards;
    - Conduct public meetings; and
    - Schedule interviews on local radio shows.
  - County Council - Inform the County Council about the need for an ordinance to implement the user fee.
  - County Customer Service – Educate County customer service representatives on the solid waste fee and why it is necessary. The County will also provide customer service representatives training on dealing residents upset with the fee.

7.4.2.4 Construct a Centralized Composting Facility

- **Key Stakeholders** – Adjacent residents and businesses, Department of Health and facility customers,
  - Adjacent residents and business – To site the centralized composting facility, the County will need to educate adjacent residents and business on the composting process and address their concerns about potential odors, surface water run-off and increased vehicle traffic. The need for this education will be even greater if the facility accepts food waste and/or biosolids.
  - Department of Health – Based on feedback from private compost facility operators in Kaua'i, the Department of Health has been reluctant to allow the composting of food waste – especially post-consumer food waste. Therefore, the County will need to educate the Department of Health on food waste composting and the technology that will be used in Kaua'i to create compost as well as test the final product.
  - Facility customers – Depending upon the type of technology that is selected, facility customers who bring raw materials to the composting facility will need to be educated on how to bring the materials (i.e. no plastic bags), as well as facility operating hours and the type of materials that can be delivered to the site.

7.4.2.5 Enhance Business Recycling Program

- **Key Stakeholder** – Businesses
  - Businesses - To further increase the success of commercial recycling, the County will hire a business recycling specialist who will be responsible for the following tasks:
  - Business Assistance: Conduct on site waste assessments and recommendations for implementing and improving comprehensive waste diversion programs in all business sectors, including multi-unit dwellings. Provide assistance with educational materials, staff training, and ongoing program evaluation.
  - Draft and Implement Business Recycling Ordinances: Revise current ordinances as necessary, and implement new ordinances. Revise ordinances requiring businesses to recycle cardboard and green waste, creating provisions to enforce ordinances using penalties or license revocation. Draft and implement new ordinances requiring glass and paper recycling for businesses of a certain size. Develop internal enforcement policies, staffing, and training. Oversee enforcement of ordinances on an ongoing basis.
  - Ordinance Compliance Outreach: Develop and distribute an education and outreach campaign to assist businesses in the area of ordinance compliance.
  - Special Event Recycling: Develop a comprehensive program to assist outside event coordinators with event recycling. Create a tool kit addressing such factors as site layout, collection containers, hauling, education, monitoring, and program evaluation. Develop a list of local events and coordinators to proactively assist with recycling. Purchase containers to loan out for events and create a loan system and policy. Develop a list of groups available to collect containers generated at special events.
  - Increase Visitor Recycling: Work with the Chamber of Commerce and the hospitality industry to not only ensure that convenient recycling services are available to visitors, but also create an awareness of the importance of recycling through public education, outreach, and advertising campaigns.
  - Aloha Shares Network: Promote and manage the Aloha Shares Network, an electronic network of reusable goods available from local businesses. Update donor and recipient lists, facilitate exchanges, and track material diverted through the program.
  - Assistance with backhauling programs for pallets, plastic film/shrink wrap, Identification of materials these businesses currently dispose that could be recycled or as well as the previously mentioned OCC and plastic shopping bags.
  - Develop a business-specific page on the County's website with information about grants/loans, waste reduction, recycling, and purchasing recycled content products.

- Construction and Demolition Debris: Facilitate C&D diversion by providing technical assistance to developers. Work with DOH to explore new diversion options for materials that are currently not diverted such as dry wall and painted wood.
- Household Hazardous Waste Program: Assist with the expansion of the current County program to include collection of Hazardous Waste from small quantity commercial generators for a fee.
- Food Waste Recycling: Develop a comprehensive database of current food waste diversion to pig farmers. This data will be used to develop a pilot program in the future.

7.4.2.6 Household Hazardous Waste and Electronics Recycling

- **Key Stakeholders** – Generators, residents/businesses adjacent to the facility and State Legislators.
  - Generators – Currently, the County provides periodic collection events for homeowners that generate household hazardous waste (HHW). However, the Updated Plan calls for the expansion of this program to allow farms and businesses to bring small quantities of hazardous materials to the collection events for a nominal fee. Therefore, the County will need to educate the agricultural and business community on what materials they can bring and in what quantities. The County may want to consider allowing farms and businesses to bring the materials on a separate day to avoid congestion and confusion at the collection events.
  - Residents and Businesses adjacent to the facility – Ultimately, the County plans to develop a permanent facility for the staging of HHW and electronics. The processing of these materials would be done by a professional contractor and will most likely occur off the Island. Even though the materials that will be delivered to this site can be found in most homes, there will most likely be concern from adjacent residents and businesses about the siting of this facility. Therefore, the County needs to educate these stakeholders on what materials will be accepted, how these materials will be handled, safety procedures, qualifications of the contractor and emergency response plans if an incident were to occur.
  - State legislators – Electronics are the fastest growing components of the solid waste stream and are projected to increase at an even faster pace. If local government is the only funding source for the recovery of these materials, the continuation of other recycling programs may be jeopardized. Throughout the United States, legislation is being introduced and enacted that requires electronic manufactures and consumers to serve as a financial partner in the recycling of this product. The County will work with other Hawai‘i counties to educate State Legislators on the need for similar legislation in Hawai‘i.

7.4.2.7 Solid Waste Transfer Station Upgrades

- **Key Stakeholders** – Transfer station operators and transfer station customers.
  - Transfer station operators – The County will need to educate the transfer station operators on the pending site renovation and solicit their input on what changes could be made to make the site operate more efficiently.
  - Transfer station customers – At least one month prior to transfer station renovations, County transfer station customers will need to be notified if the upgrades interrupt service at the transfer stations. Due to the significant impact this could have on the County's solid waste management system, the County should plan to mail all residents and businesses a construction/closure schedule and reinforce this letter with paid advertising. The County should also plan to have an employee at the closed site to direct customers to a different transfer station.

7.4.2.8 Curbside Recycling and Pay-As-You-Throw

- **Key Stakeholders** – Residents, vehicle operators, County customer service
  - Residents – If the County is going to invest in a curbside recycling program, it is essential that the majority of County residents participate. While charging a higher fee for setting out large quantities of waste (Pay-As-You – Throw) will serve as an economic incentive to participate, this may not be enough of a motivator for certain residents. If participation in the curbside recycling program is lower than the County's goal of 70 percent, the County will use the techniques from Dr. Doug McKenzie-Mohr's book "Fostering Sustainable Behavior." According the Dr. McKenzie-Mohr, it is difficult to promote environmental values if the County only uses educational outreach, such as brochures, workshops, and pamphlets or is there economic savings (Pay-As-You-Throw). Educational outreach may change *attitudes* towards an environmental issue, but will not markedly changing people's *behavior*. Cultural, social, emotional, and technological barriers must be identified and overcome in order to make change in behavior occur. The means by which this is completed is referred to as community-based social marketing and involves several steps:
    1. Determining the impact and probability of activities to be promoted and targeting appropriate behaviors;
    2. Identifying benefits and barriers to sustainable behavior through research, observation, surveys, and focus groups;
    3. Designing a strategy that utilizes behavior change tools;
    4. Piloting the strategy with a small segment of the community; and
    5. Evaluating the program once it has been implemented across the community.

If necessary, the County will apply these steps to increasing participation in the curbside recycling program. Beyond increasing participation, the County will need to educate residents on what materials can be set-out and why there is a limit on the amount of solid waste that the County will accept.

- Vehicle operators – Vehicle operators will need to be educated on how to identify non-recyclables in the recycling container and about the limit on what they can collect from residents.
- County customer service – As residents will have questions about both the curbside and PAYT program, the County's customer service department will need to be briefed.

7.4.2.9 Facility Siting

- **Key Stakeholders** – County residents, business and officials. Siting a new solid waste processing/disposal facility is almost always controversial. However, if the County uses the expertise of solid waste and public relation professionals, County officials and the local community, a dialogue can be created that will facilitate the successful siting of the waste-to-energy facility and associated residual waste/ash landfill. Therefore, the County will procure the professional services of solid waste and public relation firms to assist with this educational initiative.

7.4.3 Adopt a Continuous Improvement Process

Fortune 500 companies throughout the United States have begun to realize that many programs are developed and implemented without measurable goals, identification of specific target audiences, strategies to meet the goals, and monitoring mechanisms. In response, program managers are often required to develop continuous improvement plans, before a recommended program is even considered. The County will embrace this private sector philosophy and annually apply this continuous improvement process to County programs that either have been or will be implemented. For each initiative, the County will identify the goal(s), target audiences, implementation tactics (including staffing and financial resources), timelines and monitoring mechanisms.

Although implementing a continuous improvement process may be time consuming, the County will accomplish the following:

- **Define success** - For example, elected officials may consider a special collection event for a material such as HHW a success if no one calls their office to complain about long wait-times. The local fire department may consider the HHW collection event a success if no explosives are brought to the event. Local recycling organizations may consider the event a success if all types of HHW are accepted and the County may define success if there is a notable increase in the number of households that participate.

  As demonstrated, different stakeholders will have different definitions of success, which may sometimes contradict each other. For example, a high participation rate could result in long wait-times. Through the continuous improvement process, all definitions of success will be identified, evaluated for possible

conflicts, and strategic plans will be developed to meet all goals and minimize conflicts.

- **Improve cost effectiveness** - Keeping with the HHW example, if it is determined that one of the goals of the HHW program is to increase participation, the continuous improvement process would then develop a strategy to reach that goal. To illustrate, if the County's goal is to increase participation, does that mean all County residents or just a particular segment? The HHW event may have good representation by senior citizens, but not individuals between from a particular demographic group, such as multi-family households. If the County wants to target this demographic group, newspaper advertising may be considered since it is relatively inexpensive. However, it may be an extremely expensive medium to reach this demographic group if readership within this age group is not high. Conversely, radio advertising may be more expensive than newspaper advertising. However, the County may be able to select a radio station that has high ratings with this demographic group, making the cost for this target audience less expensive. As part of the continuous improvement process, evaluations such as these are needed.
- **Develop monitoring mechanisms for non-quantifiable goals** - Programs such as special collection events have some components that are extremely easy to quantify such as cost per ton collected and number of participants. Non-quantifiable goals, such as the ability of the outreach campaign to reach the intended target audience, are equally important. Through the continuous improvement process, non-quantifiable goals such as this will be identified and monitoring mechanisms developed.
- **Institutionalize knowledge** - As with any public or private agency, the potential exists for programmatic and/or operational knowledge to be lost when a project manager departs the organization. Through the continuous improvement process, this knowledge will be documented for future use.
- **Reduce mistakes and duplicate successes** - As part of the continuous improvement process, a summary report is prepared which evaluates:

  Was the target audience reached?

  Were the goals met?

  Were the strategies to meet the goals successful?

  Are the monitoring mechanisms effective?

Through this summary report, the County will be able to learn from previous experiences and duplicate successful endeavors in future solid waste management programs.

Section 8
TRANSFER STATIONS AND LANDFILLS

8.1 Purpose

The purpose of this Section is to assess the adequacy of the County's transfer stations and disposal facilities based on existing solid waste management needs, as well as to project future facility needs based upon anticipated changes in the waste stream.

8.2 Transfer Stations

8.2.1 1994 Plan

The transfer station section of the 1994 Plan included recommendations to continue operating the four existing transfer stations, as part of the County's overall solid waste program. An additional transfer station was proposed for Koloa to serve the populations of Poipu, Koloa Lawai, Kalaheo, and Omao. The proposed transfer station was to reduce the hauling distance between Koloa and Hanapepe. The County's waste collection trucks would have a moderately shorter haul to Koloa transfer station than to Hanapepe, where they were based.

A site just northwest of Koloa town was identified and approved by the County Planning Commission. An engineering report and environmental assessment were completed in 1990. However, the residents were unable to reach a consensus in selecting a site. Thus, the County did not proceed in developing the Koloa Transfer Station.

Since the 1994 Plan, the County has expanded the functions of the transfer stations to collect green wastes and special wastes, such as white goods, scrap metals, used tires, used motor oil, lead-acid batteries, and propane tanks. The Hanalei Transfer Station added recycling drop bins on-site for the collection of recyclable materials.

8.2.2 Existing Transfer Stations

Waste transfer stations play an important role in the County's waste management system, serving as a link between a community's waste collection program and a final disposal facility. The primary reason to use transfer stations is to reduce the cost of transporting waste to disposal facilities. This is achieved through consolidating smaller loads from household collection vehicles into larger transfer vehicles enabling collection crews to spend less time traveling to and from distant disposal sites and more time collecting waste. The transfer stations also allow residents to properly

dispose of materials on days other than their scheduled collection days, and source-separated green waste may also be delivered there. At Hanalei Transfer Station, residents can drop-off source-separated recyclables.

Businesses may use the transfer stations for the following fee schedule:

Table 8-1
Transfer Stations Non-residential Coupon Fees

Type of Vehicle	Coupon Fee
Automobile	$6.00
Pickup Truck – ½ ton and under	$10.00
Full-size pickup truck – up to ¾ ton	$20.00
Passenger Van	$10.00
Cargo Van – up to ¾ ton	$20.00
Small Trailer – ½ ton and under	$10.00
Trailer – up to ¾ ton	$20.00

Transfer stations are in operation at Hanapepe, Lihue, Kapaa, and Hanalei as shown in Figure 8-1 below.

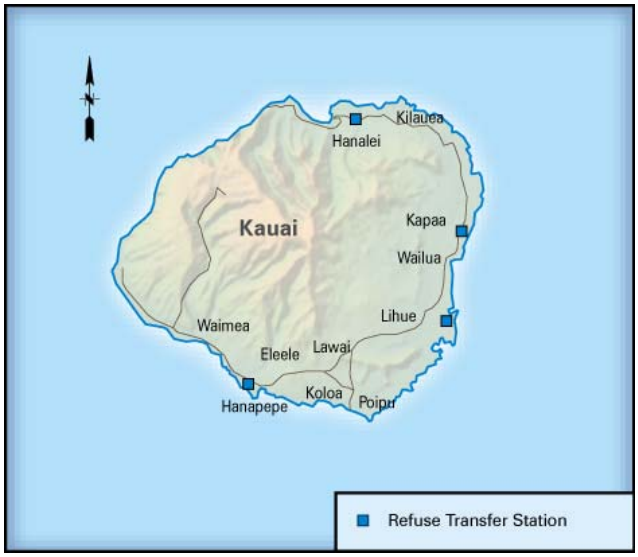

Figure 8-1: County Transfer Station Locations

Although cost-effectiveness will vary, transfer stations generally become economically viable when the one-way hauling distance to the disposal facility is greater than 15 to 20 miles. However, it should be noted that transportation conditions (i.e., traffic, road quality, size of vehicles used and collection routing) will impact the benefit of direct-haul versus consolidating refuse at a transfer station. As shown by

Table 8-2, only one of the transfer stations fall within the range of 15 to 20 miles from the Landfill.

Table 8-2
One-Way Distances from Existing Transfer Stations to the Kekaha Landfill (miles)

Transfer Station	To Kekaha Landfill
Hanalei	61
Hanapepe	9
Kapaa	36
Lihue	28

8.2.3 Transfer Station Assessment

During July, 2006, R. W. Beck conducted a comprehensive site assessment of the four existing transfer stations. In addition, R. W. Beck interviewed the County staff to understand better existing transfer operations.

Table 8-3 profiles each transfer station's address, operating hours, material accepted, staffing, rolling stock (including mobile equipment and trailers), traffic circulation safety, average daily solid waste received, average daily solid waste received limits according to DOH permits, and the DOH permit limits for special waste handling.

County employees screen solid waste received at transfer stations to identify hazardous materials, bulky wastes, and special wastes. Commercial waste haulers must purchase coupons from the County to deliver solid waste to the transfer stations. Commercial solid waste generators do not use the transfer stations very frequently. There is no tipping fee for residential waste delivery. None of the transfer stations have scales to weigh the outgoing solid waste transfer trailers, or collect special wastes and recyclables. Since truck scales are not located at the transfer stations, the County does not determine the daily solid waste volumes upon receipt at transfer stations. The materials received are loaded into transfer trailers and weighed at the Kekaha Landfill.

Table 8-3
County of Kaua'i
Transfer Station Operating Profiles and Permit Limits (July 2006)

Parameter	Hanalei	Hanapepe	Kapaa	Lihue
Address	5-3781 Kuhio Highway, Hanalei	4380 Lele Road, Hanapepe	5051 Kahi Road, Kapaa	3450 Ahukini Road, Lihue
Operating Hours	7:15 a.m. – 5:15 p.m. Monday – Sunday	7:15 a.m. – 5:15 p.m. Monday – Sunday	7:15 a.m. – 5:15 p.m. Monday – Sunday	7:15 a.m. – 5:15 p.m. Monday – Sunday
Site Area (acres)	1.454 acres	5.69 acres	12.451 acres	4.458 acres
Materials Accepted	Mixed Waste, Recyclables, Green waste, White Goods, Scrap Metals, Used Tires, Used Motor Oil, Lead-Acid Batteries, and Propane Tanks without fluids	Mixed Waste, Green waste, White Goods, Scrap Metals, Used Tires, Used Motor Oil, and Propane Tanks without fluids	Mixed Waste, Green waste, White Goods, Scrap Metals, Used Tires, Used Motor Oil, Lead-Acid Batteries, and Propane Tanks without fluids	Mixed Waste, Green waste, Used Tires, Used Motor Oil, Lead-Acid Batteries, and Propane Tanks without fluids
Staffing (per shift)	1 Attendant, 1 Operator	2 Attendants, 1 Operator (1 attendant dedicated to green waste)	2 Attendants, 2 Operator (1 attendant dedicated to green waste)	1 Attendant, 2 Operators
Rolling Stock	Stationary Compactor 2 95-cy Enclosed Trailers	Stationary Compactor 3 75-cy Enclosed Trailers	Stationary Compactor John Deere 410D Backhoe/ Front-End Loader 2 75-cy Enclosed Trailers	John Deere 410G Backhoe/ Front-End Loader 3 100-cy Open Top Trailers
Average Weekly Loaded Transfer Trailers (number)	7	10	13	14-16
Traffic Circulation Safety	Poor	Good	Fair	Good
2005 Average Solid Waste Received (Tons/Day[1])	21	24	31	34
DOH Permit – Daily Average Solid Waste Receipt Limit (tons/day)	20	20	20	30

Table 8-3
County of Kaua'i
Transfer Station Operating Profiles and Permit Limits (July 2006)

Parameter	Hanalei	Hanapepe	Kapaa	Lihue
DOH Permit – Green waste Storage On-site (cubic yards (cy)/day)	Store in two 30-cy roll-off containers Load containers every other day 120 cy on-site maximum	2,500 cy unprocessed maximum in windrow piles with 15-foot buffer zones between piles and site boundaries	1,500 cy at drop-off area and 2,500 at processing area unprocessed maximum in windrow piles with 15-foot buffer zones between piles and site boundaries	1,500 cy unprocessed maximum in windrow piles with 15-foot buffer zones between piles and site boundaries
DOH Permit – White Goods Storage	350-square foot area or 40 pieces maximum Remove monthly minimum	350-square foot area or 40 pieces maximum Remove monthly minimum	350-square foot area or 80 pieces maximum Remove monthly minimum	
DOH Permit – Scrap Metals Storage	300-square foot area maximum Remove monthly minimum	300-square foot area maximum Remove monthly minimum	300-square foot area maximum Remove monthly minimum	
DOH Permit – Use Tire Storage	100 maximum Remove weekly minimum	150 maximum Remove weekly minimum	100 maximum Remove weekly minimum	100 maximum Remove weekly minimum
DOH Permit – Lead–Acid Battery Storage	Two pallets maximum on an impervious surface with berms/catch pans or in a cover leak-proof container Remove monthly minimum	Two pallets maximum on an impervious surface with berms/catch pans or in a cover leak-proof container Remove monthly minimum	Two pallets maximum on an impervious surface with berms/catch pans or in a cover leak-proof container Remove monthly minimum	Two pallets maximum on an impervious surface with berms/catch pans or in a cover leak-proof container Remove monthly minimum
DOH Permit – Propane Tanks Storage	20 tanks maximum Remove weekly minimum	20 tanks maximum Remove weekly minimum	20 tanks maximum Remove weekly minimum	20 tanks maximum Remove weekly minimum

Notes:
[1]The transfer stations operate 352 days per year and close for 13 public holidays.

Based on R. W. Beck's observations and recommendation, the County will complete the following action items to optimize the performance of the transfer stations

8.2.3.1 Add Signs along Approach Routes

The County will provide signs from both directions along the highway approaching each transfer station. The approach signs will make it easier for new customers to find the transfer stations and promote safety at the facility entrances.

8.2.3.2 Update Entrance Signs

The County will update the facility entrance signs to indicate the acceptable materials received, including green waste, recyclables, and certain special wastes.

8.2.3.3 Improve Traffic Circulation with Signs

The County will provide clear signs to direct travel through the site. To reduce the crossing of traffic, improved traffic circulation will maximize one-way movement by vehicles at the transfer station sites.

8.2.3.4 Provide One-Stop Service

Attendees at the public meeting conducted in February 2006 and Solid Waste Advisory Committee members have suggested that the County provide drop-off recycling and bottle bill redemption center services at all the transfer stations. Currently, the Hanalei Transfer Station is the only transfer station that has recycling drop bins. The County will attempt to accommodate the request for drop off recycling. The County will not be able to provide bottle bill redemption centers at the Transfer Stations due to the space requirements associated with this service.

At a minimum, the County will evaluate adding recycling drop bins to the Hanapepe and Kapaa Transfer Stations. Since the new contractor will provide recycling drop-off services at the Kaua‘i Resource Center, residents visiting the Lihue Transfer Station will be provided the opportunity to drop-off recyclables at the adjoining site. This approach will increase recycling diversion and will provide added convenience to the residents.

8.2.3.5 Provide Efficient Handling of Green Wastes

From the review of the transfer station operations, residents unload delivered green wastes onto the ground. At the end of an operating day, front-end loader operators place the material into roll-off containers or transfer trailers. This double handling of green wastes is inefficient. In the future, the renovation of existing transfer stations will include a separate loading location for green wastes. Residents will deposit green wastes into a transfer trailer or roll-off container directly, thus eliminating the reloading of material again.

8.2.3.6 Process Green Waste Off-site

The green wastes processor at the Hanapepe Transfer Station grinds the green wastes on-site. In the future, the County will consider transporting the green wastes off-site for processing when the centralized composting facility is developed. If the green wastes are loaded directly, off-site grinding can be facilitated.

8.2.3.7 Change Transfer Loading at Compactor Stations

The County will renovate the compactor transfer stations and upgrade to open top trailer loading as is used at the Lihue Transfer Station. A front-end loader will tamp the material into the open top transfer trailers. Based on our review, the County finds

it difficult to locate parts to repair the aged compactors at the Hanalei, Hanapepe, and Kapaa Transfer Stations. If a power failure occurs at a compactor transfer station, the County is unable to operate the facility because of the lack of a back-up approach. During long-term power outages, particularly from a hurricane, the compactor downtime would create difficulties in operating the transfer stations. With open top transfer station operations, diesel engine front-end loaders can operate during power outages. The redesign of the stations will most likely incorporate two loading locations: one, for the solid waste and the second, for the green wastes.

8.2.3.8 Repair and Improve Open Top Trailer Transfer Station at Lihue

Based on our limited review, it appears that the Lihue Transfer Station requires repair to the building columns near the entrance and the building structure near the loading hopper. Bollards near the building columns will assist in protecting the building from trucks and mobile equipment. In addition, the County may want to add an outdoor green waste loading location and connect the facility to sanitary sewer service. At this time, wash water from the tipping floor and the sanitary wastewater flow into a storage tank that is pumped and transported off-site for disposal.

Table 8-4 lists the recommended improvements at the four existing transfer stations.

Table 8-4
County of Kaua'i
Transfer Station Improvements (2009-2013)

Improvement	Hanalei	Hanapepe	Kapaa	Lihue
Reconfigure sites to facilitate drop-off recycling		●	●	
Add signs along approach routes	●	●	●	●
Update entrance signs	●	●	●	●
Improve traffic circulation with signs	●	●	●	●
Provide one-stop service (Add recycling drop bins)		●	●	●
Expand lower site level by acquiring additional land	●			
Repair damaged building and improved loading hopper				●
Stop grinding green wastes on-site	●			
Develop short-term system for transporting green wastes off-site more frequently	●	●	●	●
Reconfigure site activities	●	●	●	●
Add separate green wastes and solid waste loading/transfer	●	●	●	
Add separate outdoor green wastes loading/transfer				●
Revise traffic circulation signs as needed	●	●	●	●
Add secure fencing and gates	●		●	
Remove compactor and transfer hopper	●	●	●	
Replace employee office/support buildings	●	●	●	
Extend paved roadway on upper level			●	
Widen paved lower roadway	●	●		
Repave existing roadway	●	●	●	●
Improve storm water collection	●	●	●	●
Replace cesspool and add septic system on-site	●			
Connect site to public sewer				●
Purchase additional rolling stock (trailers and front-end loaders)	●	●	●	●
Prepare DOH permit modification applications (1)	●	●	●	●
Prepare design and construction documents	●	●	●	●
Construct improvements (Year)	**2011**	**2010**	**2009**	**2009**

Notes:

(1) The DOH requires transfer stations to renew their solid waste permits every five years or when significant modifications to the facilities or operations occur.

8.2.4 Future Needs

Table 8-5 presents the waste delivery rate for solid waste received at the transfer stations in the four planning districts during 2005. The waste delivery rate is the annual solid waste received at a transfer station in tons per year divided by the solid waste generated in a planning district in tons per year. The previous Section 2.4.1 defines the five solid waste planning districts on the island. The calculated waste delivery rate varies from 40 percent at the Hanalei Transfer Station to 76 percent at the Hanapepe Transfer Station. Since a transfer station does not exist in the Koloa-Poipu-Kalaheo Planning District, residents likely rely on curbside collection or haul their refuse to the Hanapepe Transfer Station increasing its participation rate. Otherwise, this analysis assumes that waste originated within the respective planning district.

Table 8-5
Existing Transfer Station Solid Waste Received (tpy) and Contribution from Planning District (%)

Improvement	Hanalei	Hanapepe	Kapaa	Lihue
2005 Received (tpy) (1)	7,423	8,458	11,083	11,937
2005 Planning District Generation (tpy) (2)	18,510	11,091	38,057	19,078
2005 Resident Participation Rate (%) (3)	40%	76%	29%	63%

(1) From Table 1-2

(2) From Tables 2-3 through 2-6

(3) The waste delivery rate is the annual solid waste received at a transfer station in tons per year divided by the solid waste generated in a planning district in tons per year.

Table 8-6 projects future participation rates by residents at the existing transfer stations[1]. Based on this analysis, each of the four transfer stations will exceed its current DOH permit for daily waste receipt limit. However, the County will most likely be able to be remedied by a permit modification versus a facility modification.

In addition the County may need to construct a new transfer station in the Koloa-Poipu-Kalaheo Planning District. The solid waste quantity projections indicate this planning district will have the highest growth rate on the island. However, the waste delivery rate at the Hanapepe Transfer Station would likely be reduced if County develops a new transfer station in the Koloa-Poipu-Kalaheo Planning District.

Finally, the County might consider siting a central solid waste processing facility in Lihue or Koloa-Poipu-Kalaheo planning districts because these two planning districts are centrally located with respect to the quantities of solid waste generation on the island (i.e., centroid). If a central solid waste processing facility is located in one of these two planning districts, the County would not likely construct a new transfer station in Koloa-Poipu-Kalaheo Planning District, and may reduce or eliminate operation of the Kapaa and Lihue Transfer Stations. The new central processing facility could include a convenience center for residents to deliver solid waste, green

[1] It is assumed that a portion of the waste that is currently delivered to the Hanapepe Transfer Station will shift to the Koloa-Poipu-Kalaheo Transfer Station if it is built.

waste, or special wastes. These changes would increase the efficiency of the County's transfer operations.

Table 8-6
Future Transfer Station Solid Waste Received (tpy and tpd) by Planning District

	Hanalei	Hanapepe	Kapaa	Lihue	Koloa-Poipu-Kalaheo District
Future Waste Delivery Rate (%) [1]	40%	60%	29%	63%	60%
2010 Received (tpy) [2]	8,180	7,940	11,810	16,390	23,660
2010 Average Daily Received (tpd) [3]	23	23	34	47	67

[1] The waste delivery rate is the annual solid waste received at a transfer station in tons per year divided by the projected solid waste generated in a planning district in tons per year.
[2] From Tables 2-3 though 2-7. Please note, these projections do not match the projected tonnage shown in Section 12, as the analysis in Section 12 is based on the 4 existing transfer stations.
[3] The transfer stations operate 352 days per year and close for 13 public holidays.

Because the County will collect recyclables and green wastes curbside (Section 4), the residents' need for transfer station service should diminish. If so, the County could possibly reduce the operating hours or days for the transfer stations.

8.3 Kekaha Landfill

The Landfill is located on the leeward coastline of Kaua'i near the town of Kekaha. It is currently the primary solid waste disposal site on the island. The Landfill consists of two disposal areas (Phase I and Phase II). The Phase I area is a closed, unlined landfill with an estimated 1,717,245 cubic yards of waste in place. The Phase II area is a RCRA Subtitle D lined landfill with approximately 1,810,360 cubic yards in place (as of the May 19, 2006 aerial survey). The Phase II landfill is permitted to an elevation of 85 feet above mean sea level (MSL) for an estimated capacity of 2,194,860 cubic yards.

The Landfill is owned by the County and staffed with County employees. Landfill operations and monitoring services are contracted to Waste Management, Inc.

In FY 2005, the Landfill received 89,156 tons of waste. Table 8-7 shows the quantity of various waste streams received at the Landfill during 2005. Per the permit renewal and modification issued by the State in April 2005, the peak daily disposal rate shall not exceed 600 tons per day. In FY 2005, the landfill averaged 244 tons per day.

Table 8-7
County of Kaua'i Landfill
Disposed Waste Streams
FY 2005

Material	Quantity (Tons)
Mixed Rubbish	83,470
Mixed C&D	4,255
Sewage Sludge/GR/S [1]	1,380
Asbestos	45
Dead Animals	1
Contaminated Soils	1
Solidified Grease	1
Aggregates	3
Total:	**89,156**

[1] Grit and sand.

The current tipping fee paid by the private haulers and other commercial vehicles at the Landfill is shown below in Table 8-8.

Table 8-8
2005 Commercial Tipping Fees per Ton

Type of Waste	Dollars per Ton
MSW and green wastes (except special wastes)	$56.00
Asbestos-containing materials	$70.00
Dead animals	$56.00

There is no charge to County residents who self-haul MSW or green waste to the Landfill.

Should the vehicle scale at the Landfill be inoperable, the County has in place a schedule of tipping fees by volume for commercial businesses and other non-residential vehicles as shown below in Table 8-9.

Table 8-9
County of Kaua'i
Commercial Tipping Fees per Cubic Yard

Type of Waste	Dollars per Cubic Yard
Uncompacted MSW and green wastes (except special wastes). Assumes 350 lbs/c.y.	$10.00
Compacted MSW (except special wastes) and green wastes. Assumes 600 lbs/c.y.	$17.00
Asbestos-containing materials	$21.00
Dead animals	$17.00

The minimum tipping fee charge for any load, including a load form a single automobile, is five dollars.

The following materials are not accepted at the Landfill:

- Corrugated cardboard from business, industrial, governmental, institutional, and other non-residential sources. However, based on the results of the waste characterization R. W. Beck conducted in February 2006, it does not appear that this ban has not been enforced since large quantities of corrugated cardboard are still being disposed.;
- Ferrous and non-ferrous metal objects from business, industrial, governmental, institutional, and other non-residential sources;
- Loads from business, industrial, governmental, institutional, and other non-residential sources exceeding twenty percent (20%) green waste;
- Liquid waste, except small quantities of liquids from residential sources in containers of types and sizes typically used in residential environments;
- Medical waste which has not been rendered non-infectious through sterilization;
- Motor vehicles and automotive-type batteries;
- Toxic and hazardous wastes;
- Used motor vehicle and heavy equipment tires, whether whole, cut, sliced, chipped, or shredded; and
- White goods.

8.3.1 Future of Kekaha Landfill

The future of the Landfill is tied to the remaining airspace, the future rate of waste received and the amount of compaction achieved.

According to the WMI of Hawai'i 2006 Site Data and Report Summary, the remaining permitted airspace of the Landfill is 384,500 cubic yards as of May 19, 2006. In order

to increase the Landfill's capacity, the County is currently applying for a northwest horizontal expansion of the Phase II area.

It is estimated that the northwest horizontal expansion would increase the remaining airspace of the Landfill by 370,000 cubic yards. In addition to the completion of the northwest horizontal expansion, the possibility of expanding the Phase II landfill to the southwest over the northeast sideslope of the closed Phase I landfill (i.e., piggy-back over the unlined landfill) is being considered. If the Phase I sideslope expansion is completed in conjunction with the northwest horizontal expansion, it would add approximately 350,000 cubic yards of airspace for a total horizontal expansion volume of 720,000 cubic yards. The remaining permitted capacity options are summarized in the Table 8-10 below.

It should be noted that it is the County's assumption that a vertical expansion of the landfill is not a possibility; and therefore, has not been considered in its remaining capacity calculations.

The estimated closure date of the Landfill has been estimated based on projected disposal quantities shown on Table 2-2. The basis for the projections is described in Section 2.4, Future Generation Quantities.

The airspace density for the Landfill is 1,300 pounds per cubic yard. This density was estimated by WMI in their 2006 Site Data and Report Summary. R. W. Beck has reviewed this airspace utilization factor and has used this density in the estimated closure date calculations.

Table 8-10
Airspace Utilization

	Additional Expansion Volume (CY)	Remaining Capacity (cy)	Estimated Closure Date
Current Permit	N/A	384,500	January 2009
Northwest Horizontal Expansion[1]	370,000	754,500	June 2012
Southwest Horizontal Expansion Over Phase 12	350,000	1,104,500	January 2014

Assumptions:

Projected waste quantities based on disposal quantities shown in Table 2-2
Airspace Utilization Factor (AUF) = 1,300 lbs/cubic yard

Notes
[1] Assumes a 200-foot horizontal expansion to the northwest
[42]Assumes a southwest horizontal expansion over the northeast sideslope of the Phase I area (i.e. piggy-back over unlined landfill), completed in conjunction with the northwest horizontal expansion

As shown in Table 8-11 above, the Landfill is projected to reach capacity in approximately January 2009 unless an expansion is completed. A northwest horizontal expansion will provide approximately 370,000 cubic yards of increased capacity and would lengthen the life of the landfill to approximately May 2011. If the landfill was expanded northwest and to the southwest over the unlined, Phase 1 area,

the landfill would gain a total of 720,000 cubic yards of capacity and would extend the life of the landfill to approximately January 2014.

8.3.2 Planning Level Cost Estimate

As discussed in Section 10, the Landfill will be replaced with a Waste-to-Energy facility (WTE) once it reaches final capacity in 2013. However, the County will continue to need a Subtitle D Landfill that will contain an ash monofill and provide disposal capacity for the MSW that is considered by-pass – generated when the WTE is closed for maintenance or should not be processed via WTE[2] (by-pass waste).

8.3.3 New Subtitle D Landfill

Even if the County significantly reduces reliance on landfill disposal through upstream diversion activities such as green waste composting and a WTE facility, a new, Subtitle D landfill will still be required. The role of this landfill will be to manage the ash and by-pass waste from the WTE facility. By-pass waste includes the non-combustible County-collected solid waste, construction and demolition debris and commercially-collected solid waste that can not be processed at the WTE facility (unprocessable Waste). Unprocessable waste is typically bulky items, such as large durables and white goods, and waste that can not be combusted, such as concrete. In addition, if Kaua'i were to experience a significant man-made or natural disaster, the WTE facility (Section 1.5.3) may not be able to handle the significant increase in waste material or may not be able to operate because of energy limitations. Therefore, to assure that adequate disposal capacity is available, the County will begin siting a new, Subtitle D landfill immediately. The process outlined in Section 11, Facility Siting Strategy, will be used as the framework for the new Subtitle D landfill siting process. Since a significant portion of disaster debris could be comprised of organic materials, the County will attempt to site the facility in close proximity of the composting facility.

Initially, a 5-acre lined landfill will be constructed. The initial cell will consist of one, 2-acre cell for separate disposal of ash and one, 3-acre cell for by-pass waste. Landfill expansions occur approximately every 5 years thereafter. The lined landfill area will expand to a total of 8 cells over 20 acres during the 20-year life of the facility. The total facility size. A facility of this size, with a 500 foot buffer, would require 86 acres. It should be noted a 500 foot buffer is just a suggested perimeter. The actual size of the buffer will be determined when a specific site is selected. Also, the County may select site larger than 86 acres if that is more appropriate.

During the first year of operation, 2013, it is estimated that the new landfill will receive approximately 7,000 tons of by-pass waste and 10,000 tons of ash. In addition, the facility will receive 5,000 tons of construction and demolition debris and 2,300 tons of commercial waste that is not combustible.

[2] These wastes include certain construction and demolition debris materials and bulky items, sludge, asbestos-containing materials and aggregate.

The cost associated with operating, expanding and closing the Landfill and developing a new, Subtitle D landfill are estimated below in Table 8-11 with the net per household costs ranging from an estimated $11.73 to $16.08 over the five year planning period.

Table 8-11
Landfill Costs and Revenues

Action Item	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Expand Kekaha Landfill[1]	$570,100	$ 570,100	$570,100	$ 570,100	$570,100
Baseline Kekaha Landfill Costs[2]	$5,458,400	$5,594,300	$5,907,600	$6,161,900	$6,515,800
Develop new Subtitle D Landfill[3]	0	0	$48,900	$781,900	$781,900
Operate/Maintain New Subtitle D Landfill[4]					$2,454,300
Total Costs	$6,028,500	$6,164,400	$6,526,600	$7,513,900	$10,322,100
Kekaha Landfill Revenues[5]	$3,442,600	$3,282,700	$3,338,900	$3,713,400	$0
New Subtitle D Landfill Revenues From Commercial Haulers[6]					$737,300
New Subtitle D Revenue From WTE Facility by-pass materials[7]					$1,717,000
Total Revenues	$3,442,600	$3,282,700	$3,338,900	$3,713,400	$2,454,300
Net Cost to the County	$2,585,900	$2,881,700	$3,187,700	$3,800,500	$7,867,800
Households[8]	**24,400**	**24,800**	**25,200**	**25,700**	**26,100**
Total Cost to the County Per Household Per Month	**$20.59**	**$20.71**	**$21.58**	**$24.36**	**$ 32.96**
Net Cost to the County Per Household Per Month	$8.83	$9.68	$10.54	$12.32	$25.12

Section 9
MATERIALS MARKETING AND PROCUREMENT

9.1 Purpose

Hawai‘i Statutes (HRS 342G) require that county integrated solid waste management plans include a *marketing and procurement of materials* element. This section provides a foundation for the element by presenting information and options for consideration by County officials and stakeholders.

This section broadly covers recycling market development practices and options. The overriding goals of recycling market development are to:

- Promote the long-term vitality of recycling programs by increasing demand for recovered materials, increasing market revenue, and/or improving marketing practices; and
- Provide additional benefits such as creating local jobs, strengthening local businesses, and increasing waste diversion levels and associated environmental benefits.

The following provides background on current and past market development efforts, summarizes current markets and marketing practices, and evaluates options.

9.2 Background

This subsection provides background on recycling market development efforts in the County, including a synopsis of the relevant section of the 1994 Plan, and an overview of County and State efforts.

9.2.1 The 1994 Kaua‘i Marketing and Materials Procurement Element

In the 1994 Plan, the *Marketing and Materials Procurement* Chapter included:

- A summary of available information, current market conditions and marketing activities for newspaper, corrugated containers, office paper, glass containers, aluminum cans and green waste;
- Identification of key challenges; and
- A market development strategy, including generic market development steps and commodity-specific recommendations.

Most of the challenges identified in the 1994 Plan are related to the County's remote location, small population and low recycling volume, and will consequently remain unavoidable barriers for the foreseeable future. The result of these challenges is chronically low net revenue from recyclable sales and an inability to build on-island markets for most recyclable materials. These challenges are discussed further in subsequent sections.

In contrast, one key challenge identified in 1994 has dissipated, as national and global recycling markets have matured. The 1994 Plan identified the "biggest challenge to recycling in Hawai'i today" as the increase in material supply resulting from hundreds of new recycling programs on the West Coast. Since 1994, off-island demand for many recycled commodities has soared, including scrap paper, plastics, metals and color-sorted glass. While in 1994 there was widespread concern over a potential massive glut of recycled materials generated in rapidly growing municipal recycling programs, today industries have retooled and now rely on these recycled raw materials for their survival. In fact, several industry trade associations have identified concerns over the quantity and/or quality of recyclable material supply as a critical issue, and are actively seeking to strengthen recycling supplies through a range of public-private partnerships.

The 1994 Plan grouped market development techniques into two broad categories:

- Off-island marketing techniques, including:
  - Cooperative marketing;
  - Quality control in materials collection and processing; and
  - Backhauling and shipping rate structuring.
- On-island marketing, including:
  - Coordination with local economic organizations;
  - Research potential uses and industries;
  - Incentives to private sector businesses; and
  - Define user requirements.

The 1994 Plan next evaluated each recyclable commodity and recommended specific approaches, along with a program for monitoring, researching and re-evaluating options for each commodity. The recommendations emphasized the above off-island techniques for all scrap paper grades and aluminum, and the above on-island techniques for recycled glass and green waste.

Finally, the 1994 Plan summarized recycled product procurement activities at the local, state and national level, and listed 12 "imperative recommendations" for County implementation, along with seven "secondary recommendations".

Since 1994, the County has achieved some successes consistent with the 1994 recommendations, including development of on-island uses for glass and compost/mulch produced from green waste. However, resources have generally been

insufficient for the County to fully implement the aggressive and challenging program recommendations in the 1994 Plan.

9.2.2 Current Practices in Kaua‘i

As a result of both public and private sector efforts, the County has generally managed to overcome the important marketing barriers that make recycling so challenging in a low-population, remote, island community. However, these market barriers continue to threaten the sustained viability of the County's recycling programs. Following is a brief synopsis of market development related practices in the County.

9.2.2.1 County Activities

The County is responsible for funding much of the island's recycling collection and processing infrastructure, as described in Section 4 – Recycling and Bioconversion. As a materials processing and marketing facility, the KRC is a vital component of the County's marketing infrastructure. The closure of the KRC in January 2006 has dealt a severe blow to this infrastructure. Without the processing and marketing capacity the facility provided, the recycling collection programs operated by the Kaua‘i Community Recycling Service were left without an affordable local outlet for processing and marketing their materials, and the viability of resuming collection services will be reevaluated when the facility reopens. Garden Isle Disposal also processes and markets recyclables on Kauai, and are currently the only processor on island.

The County administers the Glass Recycling Program with funding and authorization from the State of Hawai‘i's ADF program. The program has previously provided up to $200 per ton of non-deposit glass recycled and reused (with a share going to generators of waste glass). On-island glass markets are essential due to the prohibitively high cost of transportation to mainland markets. For this reason, this program is very important to continued successful glass recovery and use. The FY 2006 funds offered by the State were reduced, resulting in the County issuing a grant program that offered six cents per pound, or $120 per ton for glass processing. Unfortunately, no firms in the County are taking advantage of this program. One local recycler raised concerns regarding the program, including an insufficient payment rate, reduction in total funds available, time consuming and costly administrative requirements; and the fact that not allowing payment for containers covered under the deposit beverage container system makes the scope too narrow and not worth the effort. State regulations do allow the County to use ADF funds for both deposit and non-deposit containers; however, because the 1.5¢ ADF is not paid on deposit containers, County program funding has decreased in recent years. While funding to the County under this program in FY 2006 was approximately $134,000, only about $25,000 is available for FY 2007.

During development of the KRC, the County actively explored its potential role as a reuse market, and used about $10,000 provided by the federally funded Clean Hawai‘i Center to promote the new center. The County also funded an evaluation of potential recycling-based business enterprises which could potentially be profitable in the

County. This study was used as a basis for efforts which ultimately culminated in founding of the Recycling for the Arts organization (described below).

Finally, the County has promoted recycled product procurement through adoption of a local governmental procurement policy, testing of recycled glass as road base and in paving operations as glasphalt, and testing of compost and mulch produced from local green waste. The County also is currently using recycled glass in an educational display at the KRC, and has previously sought (unsuccessfully) to incorporate recycled glass into a bike route paving project. To date, however, the County has not used recycled products in great quantities, nor has it purchased locally produced products like glass aggregate or green waste compost or mulch on an ongoing basis.

9.2.2.2 Private Sector Activities

Several Kaua‘i businesses are involved in processing and marketing recyclable materials off-island, including: Abe’s Auto Recycling (ferrous metals, propane tanks and appliances), Garden Isle Disposal (scrap paper, glass and plastics), Unitek (scrap tires, solvents and oil filters) and PS&D (scrap tires and auto batteries). Once a firm is awarded a contract to operate the KRC, the processing and marketing of recyclable materials at this facility will resume.

Kaua‘i also has several on-island users of recycled materials and products that provide a local market for materials that are not economically feasible to be shipped to off-island markets. These local markets are described below.

- Green waste is processed into compost and mulch by two local businesses - Kaua‘i Nursery & Landscaping and Heart & Soul Organics, and sold to landscapers and residents.
- KRA provides a local market for approximately 24 tons of recycled glass per year, and undertakes a variety of educational and promotional activities designed to encourage artistic entrepreneurship using recycled glass as a raw material. KRA has a five year contract with the County that runs through November 2009. The County has supplied KRA with approximately $70,000 worth of equipment, as well as studio space at KRC. KRA, however, is responsible for raising funds to cover its ongoing expenses, including significant monthly electricity bills. KRA offers classes and provides demonstrations on casting, glass blowing, sculpture, jewelry making, and more. Their finished products such as tiles, ornaments, jewelry, etc. are available for purchase at local retail stores or directly from KRA.
- JC Sandblasting collects glass from commercial businesses and accepts glass from other Kaua‘i recyclers, and processes the glass to 3/8 inch mesh for use in its sandblasting projects, or distributes it (at or near cost) to businesses and residents for use as drainage medium, road base and other applications.
- Several pig farmers collect food waste from a number of on-island restaurants for use as feed. The County conducted a brief study on these activities in 2004 and tracked approximately 670 tons of food waste per year being diverted in this manner. It is probable that more food waste is being diverted than what was tracked in that study.

- Several thrift stores provide a market for reusable items including household and building products.
- Habitat for Humanity reuses building materials to build low income housing. They also operate a thrift store at their facility in Hanapepe.

County marketing practices and current market conditions are described more fully later in this issue paper, including identification of challenges and opportunities to strengthen current efforts.

9.2.3 Current State Practices

The State of Hawai‘i has some recycling market development activities underway. The Clean Hawai‘i Center is a program of the Department of Business, Economic Development and Tourism (DBEDT), which was originally established through a grant from the U.S. EPA’s Jobs Through Recycling Program. The Center has previously researched and assisted in the development of facilities and businesses involved in marketing and/or using recyclable or reusable products, including providing approximately $10,000 to help promote the KRC.

The State administers an environmentally preferable product procurement program that is intended to promote the use of recycled content products, along with other products that provide comparative environmental benefits. The Center’s web site includes a *Buying Recycled Products in Hawai‘i* fact sheet, a *Final EPP Management Action Plan* prepared in February 2006, and an *Environmental Product Guide* prepared in 2005. The Center is currently conducting a survey to evaluate the results of its program. The State has adopted a specification for using recycled glass in asphalt products, though no actual use has been verified.

The DOH administers the deposit beverage container program, which was implemented in 2004 and provides incentives for collection of source separated glass, plastic and aluminum at redemption centers. The program also includes a State-administered fund used to make redemption payments to consumers and to pay participating redemption centers a 2 to 3¢ handling fee. While there are currently no specific market development components of the program, State staff indicate that they may undertake a market development analysis in coming years that could lead to exploration of such activities as backhauling of recyclable materials by firms shipping product to Hawai‘i and/or enhanced development of on-island infrastructure for recycled glass product applications.

As described above under County activities, the State’s glass ADF program provides funds for an incentive system for non-deposit glass recycling collection, processing and reuse. The program is administered through each County separately, which has a degree of flexibility in structuring how the program is operated in each County. Since the adoption of the deposit beverage container program, only glass beverage containers not included in the deposit are covered by the ADF. Moreover, a portion of funds were recently allocated to other uses by the Hawai‘i Legislature; and consequently, overall program funds have declined markedly in recent years.

9.3 Summary of 2005/2006 Markets

9.3.1 Market Overview

Table 9-1 summarizes marketing practices, market trends, barriers and opportunities within the County for several categories of recyclable materials.

Most recyclable materials are transported to off-island markets on the mainland or to the Pacific Rim. Some, including paper, tires, solvents, used oil and oil filters, are barged to O'ahu for handling and/or shipment by brokers or dealers. Others, including scrap plastics, are typically shipped directly to markets from Kaua'i, although shipments may be arranged through a broker or dealer on the mainland. Because of the low volume and high transportation costs (especially those materials that currently require inter-island barging,) prices received for the County's recyclable materials are systematically low. As identified in Section 4, currently private sector firms are responsible for all marketing of recyclable materials in the County, and they retain all market revenue received.

On-island uses are limited to glass, green waste and food waste, each of which is processed and distributed by private sector firms. Each of these materials is typically either sold at a very low value or given away to County residents and businesses.

As mentioned above, the key barriers to strengthening recycling markets involve the County's remoteness, low population and low volume of recyclable materials, and will remain fundamental challenges for the foreseeable future. These barriers result in chronically low market revenues and difficulty in developing on-island markets.

The key opportunities for market development include enhancing on-island use of glass and green waste, and exploring reduction of shipment costs through backhauling or improved market relationships.

The following sections summarize the information presented in Table 9-1 for each recyclable category.

Table 9-1
Summary of 2005/06 Markets for Recyclable Materials

Material Category	Current Marketing Practices	Market Outlook	Barriers	Opportunities
Paper (old newspapers, corrugated containers, white office paper, and mixed paper)	Barged to brokers/dealers in O'ahu who market to Pacific Rim and Mainland. Net price received typically much less than West Coast average due to transportation costs.	Generally sustained strong demand with periodic price swings. Periodic delays marketing mixed paper.	Low volume/remoteness result in high shipping cost and low net revenue. Insufficient volume for on-island development.	Improved transportation through cooperative marketing, backhauling and market negotiation.
Glass (deposit beverage containers, non-deposit containers and plate/window glass)	Used on-island in sandblasting, road base, arts and other applications. Typically very low or no value.	Tenuous. Future on-island demand uncertain. Mainland markets strong for color-sorted cullet.	Lack of capacity for producing fine ground glass. Lack of acceptance in roads and other glass aggregate applications. High shipping cost to send to mainland market.	Increase County use of glass aggregate. Enhance ADF funding program. Facilitate and promote all on-island uses.
Plastics (PET and HDPE containers)	Shipped directly to Pacific Rim and Mainland markets by arrangement of broker on mainland.	Sustained good demand with periodic price swings. Possible long-term reduction in demand.	Insufficient volume for on-island uses. Long term storage of source separated plastic while accumulating a container load of material (can take up to 1 year for HDPE plastic)	Improved transportation through cooperative marketing, backhauling and market negotiation.
Green Waste (yard, leaf and woody debris)	Marketed on-island as compost and mulch products.	Steady.	Lack of acceptance by County and other potential large-quantity users.	Cooperative marketing initiative. Increase County use. Promote State and/or national compost standards.
Food Waste	Used on-island by several pig farmers. Low value application.	Steady.	Farmers not being reimbursed for pickup and can be unreliable.	Improved pricing and availability.
Used Oil and Oil Filters	Barged to O'ahu and used as boiler fuel. Cleaned filters sold as scrap.	Steady.	Permit restrictions limit O'ahu fuel market.	Expansion of permitted capacity for O'ahu end-users.
Metals (aluminum cans, ferrous and nonferrous scrap, appliances)	Some metals from Puhi Metals are shipped to Oahu for processing, other are directly marketing the mainland.	Strong demand. Prices currently at all time high.	Insufficient volume for on-island use.	Improved transportation through cooperative marketing, backhauling and market negotiation.
Tires	Barged to O'ahu for use as tire-derived-fuel in utility boiler.	Steady.	Permit limits on fuel use. Supply quality, low volume and lack of acceptance limit engineering uses.	Expand permitted capacity at utility boiler. Fund State processing facility and promote sound uses in engineering applications.

Table 9-1
Summary of 2005/06 Markets for Recyclable Materials

Material Category	Current Marketing Practices	Market Outlook	Barriers	Opportunities
Electronics (TVs, computers, monitors, other consumer electronics)	Not currently recycled on Kaua'i.	Strong processor demand on mainland and strong Pacific Rim markets.	Low volume and processing cost limit collection and processing. No recyclers on island.	State electronics law to fund collection and processing program.

9.3.2 Paper

In the County, scrap paper is currently marketed by GID, and will also be marketed by the new operator of the KRC, once a new operator is selected. In fiscal year 2005, over 2,200 tons of scrap paper were marketed, nearly 75 percent of which was OCC. Some OCC and office paper may also be marketed by certain commercial firms such as home supply stores or institutions. GID ships old newspapers, OCC, white office paper and mixed paper by barge to brokers in O'ahu, who then ship the materials to markets in the Pacific Rim and on the mainland. Prices received by GID are significantly lower than average prices published by Waste News for the west coast region of the U.S. due to the high cost of inter-island shipping and the low market leverage afforded such a small supplier. For example, recent receipts from one Kaua'i recycler indicated between $19 and $30 per ton for old newspapers, whereas the west coast average price was $67.50 per ton; OCC pricing of $40 per ton compared to west coast average price of $82.50 per ton; and mixed paper pricing of $24 per ton compared to a west coast average of $65 per ton.

Currently scrap paper markets are generally quite strong, and the outlook is for continued strong demand for the foreseeable future. However, scrap paper prices are notoriously volatile and can be expected to fluctuate as they have historically.

The key barriers to enhancing scrap paper marketing are related to the County's remoteness and small population. On-island market development of paper manufacturing facilities is not an option. Although some quantity of scrap paper may be used in innovative, cottage scale uses such as old newspaper in animal bedding and shipping applications, such uses are not likely to use large quantities and may never reach as high a price as the open market, notwithstanding high transportation costs. Opportunities to enhance scrap paper marketing include identifying lower cost transportation alternatives (e.g., through backhauling) and increased cooperation among recycling in the County and on other Hawaiian islands to strengthen the negotiating position in the market place.

9.3.3 Glass

Over one thousand tons of recycled glass is currently used annually in on-island applications. Currently, both JC Sandblasting and GID process recycled glass for reuse. These firms are able to crush glass into a course 3/8 inch cullet, but are unable to produce large quantities of fine glass, as is needed in certain applications like glasphalt or some glass art products. JC Sandblasting uses recycled glass in sandblasting and distributes glass to firms and residents who use it in road base, drainage, backfill and other applications, generally as a substitute for rock aggregate. These uses typically have no or very low value. Kaua'i Recycling for the Arts uses recycled glass to produce a wide range of pressed and blown glass products.

Currently no recycled glass from Kaua'i is shipped off-island. Some recycled glass from O'ahu is shipped to glass container manufacturers on the mainland. Use of recycled glass in glass container manufacturing has increased significantly over the

past 15 years. Demand for clean, color-sorted glass is strong, especially as the rise of single-stream recycling collection programs on the mainland has resulted in recycled glass supplies of decreasing quality. Prices however have remained stable, albeit weak, and are presently approximately $6 per ton for green, $18 per ton for brown, and $28 per ton for clear glass on the west coast.

The key barriers to strengthening on-island recycled glass markets are the lack of acceptance of recycled glass in aggregate applications (e.g., drainage medium, road base or in glasphalt), the lack of processing capacity for consistently high quality supplies of finely ground glass, and the difficulty of marketing large quantities of fine recycled glass art products as produced by KRA. The main barrier to enhancing off-island marketing of recycled glass is the high cost of transportation, along with the lack of an on-island processing infrastructure. A threat to the long-term vitality of on-island glass recycling is the small number of firms involved in processing and using glass. As with the temporary closure of the KRC, any disruption in glass recycling infrastructure could result in the loss of fragile on-island markets. Another barrier is the apparent lack of interest among County recyclers in the Recycled Glass Program funding, possibly due to the reduction in payment amount (compared to historical values), funding levels and administrative requirements.

The main opportunities to enhance recycled glass markets are to work jointly with suppliers and end-users to increase on-island demand, especially by the County and other potentially large users of recycled glass aggregate, and to generally promote and facilitate the consistent, long-term use of recycled glass. One particular opportunity is to work with a local concrete company, Glover, who conducts large-scale road paving projects. Glover had expressed an interest in crushing glass and using it as a base for new projects in the County, but has not been responsive to further contacts from the County.

9.3.4 Plastics

High density polyethylene (HDPE) and polyethylene terephthalate (PET) plastic containers are currently marketed by GID, which handles materials collected at the deposit beverage container redemption centers, as well as materials collected at the County drop bin locations. In FY 2005, about 54 tons were marketed. This quantity is likely to increase with the new deposit beverage container program, which was only in place for approximately half of FY 2005. These materials are shipped directly to plastics re-processors in the Pacific Rim as well as on the mainland, under coordination with a mainland broker. Little or no revenue is received for these materials. Current west coast average prices are 14.5¢ per pound for baled, colored HDPE; 24.5¢ per pound for natural HDPE; and 16¢ per pound for PET.

Demand for recycled HDPE and PET containers by reclaimers in the U.S. and the Pacific Rim is very strong, although prices are subject to fluctuations. Many reclaimers are concerned that they are not able to secure sufficient supply, especially as national recycling rates for plastic containers have been falling and exports rising.

Due to the low volume of recovered plastic in the County, and even statewide, developing reclaiming capacity is not an option. The main barriers to enhancing off-island markets for recycled plastic involve the low volume and remoteness of Kaua‘i.

Opportunities to enhance marketing include increasing cooperation among the Hawaiian Counties’ recyclers to boost volume and strengthen market leverage. Market outlets for other grades of plastic, whether mixed or sorted, are available in the Pacific Rim and the mainland. However, given the very low quantity likely to be collected in the County, and the very low market value, marketing recycled plastics beyond PET and HDPE may incur a net cost, while not increasing the County’s overall diversion rate appreciably.

9.3.5 Green Waste

Approximately 15,000 tons of green waste is currently processed at two facilities in the County: Kaua‘i Nursery & Landscaping, and Heart & Soul Organics. These firms produce mulch and compost products, which they sell to landscapers and residents, and use in their own operations. Demand for their products is apparently adequate, though stronger demand and the ability to sell at a higher value would greatly benefit these operations and could lead to increased diversion of organics.

According to one producer, a barrier to strengthening on-island compost markets is the relatively low nutrient value of compost produced in the County. The woody green waste typically used does not contain high amounts of nitrogen, and other organic scrap materials that would improve their product, such as fishing waste, are not available in sufficient quantities. Furthermore, according to one producer, using food waste is difficult due to permitting and other DOH regulations. An additional barrier to strengthening on-island mulch and compost markets is the low demand by County agencies which could potentially provide a significant market. Although lack of product standards is often cited nationally as an impediment to compost market development, this may be less of an issue in the County since any national standard may not be applicable to the particular mix of feedstocks available on-island.

Opportunities to strengthen the organics market include assisting producers to enhance the quality of their product through use of additional nutrient-rich feedstocks. Second, target cooperative marketing and promotion efforts aimed at potential large quantity buyers such as County agencies and agricultural operations.

9.3.6 Used Oil

Some of Kaua‘i's used oil and oil filters are shipped by Unitek to their facility on O‘ahu. There, the used oil is filtered and sold for use as fuel in a utility boiler, and the filters are cleaned and sold as scrap metal to a processor on the mainland. Demand is sufficiently strong for these materials.

In 2005, 46,169 gallons of used oil was burned at Kaua‘i Island Utility Cooperative's (KIUC) Port Allen Generating Station. After being tested for metals and other contaminates, the used oil was used as fuel in the Utility’s boiler to generate electricity. KIUC’s air permit allows the Utility to burn up to 15,000 gallons per

month or 180,000 gallons per year of used oil. Thus additional capacity for using more used oil as fuel is available in the County.

9.3.7 Metals

Puhi Metals, a County-owned facility operated by Abe's Auto Recycling in Lihue, is responsible for processing and marketing scrap metals, white goods and propane tanks. The company ships these materials directly to Oahu for processing, and ultimately to markets on the mainland. Prices for scrap metals are currently at an all time high. Although future swings in price and demand are inevitable, there is likely to continue to be sufficient off-island demand for all materials recovered. Even during an historic market low several years ago, Puhi Metals reports it was able to move all materials to market without a problem, though prices were relatively low. Markets for tin cans, as with ferrous metals, are generally strong, with market values at about $150 per ton in the Pacific Rim, excluding transportation costs. According to the Steel Recycling Institute, tin cans also can simply be processed along with miscellaneous ferrous metals. The current market value for the commingled metals is about $200 per ton. Due to the market for tin cans, the County should evaluate adding them to the drop-bin program.

No significant barriers exist to continued off-island marketing of metals, though as with other recyclable materials, recyclers would benefit from reduced transportation costs that may potentially be attainable through identification of backhaul or other opportunities.

9.3.8 Tires

Unitek Solvent Services and PS&D Tires (both in Lihue) are responsible for marketing scrap tires. Tires are barged to Unitek's facility in O'ahu where they are chipped for use as tire-derived-fuel at the AES power company. AES is limited to no more than 1 percent tires in their fuel mix, and consequently scrap tires must sometimes be shipped to processors on the mainland.

Barriers to strengthening scrap tire demand include permitted tire use restrictions at the AES power facility in O'ahu, the lack of sufficient infrastructure for producing tire-derived aggregate or ground rubber products, poor processing economics caused by low volume, and lack of demand for tire-derived-aggregate (TDA) in engineering applications.

Opportunities include exploring expansion of scrap tire processing capabilities in O'ahu and joint-island development of on-island demand for TDA in engineering applications or ground rubber in horticultural or equestrian applications.

9.3.9 Electronics

Since the closure of the KRC, there are no opportunities to recycle electronics in the County. Previously, Island Recycling accepted monitors and computer towers (central processing units or CPUs) from residents.

Nationally, electronics recycling is growing rapidly, especially in California where funding through a new state law is resulting in a very robust processing infrastructure. Processors typically dismantle computer monitors, CPUs and other accessories and sell the components to markets domestically and in the Pacific Rim. Separate streams include wires, glass, CPU units and mixed plastics. Electronics are also sometimes baled and shipped to the Pacific Rim without processing. However, this practice has been strongly criticized due to the potentially harmful impacts to communities abroad, where lax environmental standards have been documented and sometimes lead to significant exposure to harmful substances and pollution of water supplies.

Barriers to electronics market development in the County include the low volume and generally poor economics of electronics processing. Opportunities to enhance electronics recycling markets include adoption of a state program to provide funds to collectors and processors, and facilitation of electronics repair and reuse on-island. Discussion on the County's plans to manage used electronics will be discussed in the Plan's Section on household hazardous wastes.

9.3.10 Other Materials

Additional waste materials that could potentially be targeted in market development efforts include:

- C&D Debris - Some C&D materials such as gypsum and untreated wood could be used in compost or mulch, and pavement and stone can be crushed and reused as aggregate. Other C&D materials may be salvaged for reuse. It should be noted that Kaua'i Nursery & Landscaping attempted to obtain a permit from the DOH to process gypsum as a compost amendment, but was denied.
- Plastic Film – According to the 2006 Kaua'i Waste Stream Characterization Study, over 5,200 tons of plastic film and bags are annually disposed. Currently no processors for these materials are located in Hawai'i. Wal-Mart is recycling plastic film in other parts of the United States. The County should consider working with Wal-Mart to explore the opportunity of backhaul of the plastic film from Kaua'i.
- Pallets - There is currently no recycling opportunity for this material. Previously, Island Recycling accepted pallets at the KRC and collected as much as 18 tons per month. These pallets were repaired and shipped to O'ahu where they were reused. Kaua'i Nursery & Landscape has been unsuccessful in obtaining a permit to accept pallets through the DOH. If they were permitted to accept pallets, they would charge a tipping fee for this item.
- Universal Wastes - These include hazardous waste that is typically disposed by households and small businesses along with garbage, such as batteries, fluorescent tubes and solvents. These materials are already handled by businesses in the County such as Delco, PS&D and Unitek, and there is little opportunity to build on-island markets.

9.4 Market Development Options

9.4.1 Summary of Objectives and Options

The County has experimented with innovative approaches to recycling and market development for over 15 years. Even with a relatively low level of funding, there have been notable successes, including the use of recycled glass in art products by KRA, use of recycled glass aggregate in a variety of applications, and on-island green waste compost production and use. Yet, the long-term vitality of these recycling markets in the County remains vulnerable to even small infrastructure disruptions.

As identified above, the overriding goals of market development are to:

- Promote the long-term vitality of recycling programs by increasing demand for recovered materials, increasing market revenue and/or improving marketing practices; and
- Provide additional benefits such as creating local jobs, strengthening local businesses, and increasing waste diversion levels and associated environmental benefits.

The County can make the most effective use of its scarce resources by targeting relatively narrowly-defined objectives that build on its past on-island market successes. This can be accomplished by strengthening demand for glass and organic materials, while striving to strengthen marketing infrastructure through cooperation with private firms and other counties throughout Hawai‘i, especially related to reducing transportation costs, increasing market revenue and expanding in-state markets for materials like tires and electronics. Finally, the County could also promote stronger recycling markets through adoption of County procurement and product stewardship policies. These three objectives and identified market development options are summarized in Table 9-2 below. The subsequent sections describe the options in greater detail.

Table 9-2
Summary of Market Development Objectives, Opportunities and Barriers

Objective	Opportunities
1) Nurture existing on-island markets to maximize their long term sustainability.	1-1) Increase institutional capacity for promoting recycling market development and developing partnerships. 1-2) Increase county use of recycled glass and organic products. 1-3) Facilitate expanded range of materials used in on-island compost and mulch production, including gypsum, pallets, food waste and other organic materials 1-4) Seek to restructure the glass recycling program.
2) Work cooperatively with other Hawai'i counties and private sector partners to strengthen State recycling market infrastructure.	2-1) Evaluate opportunities to reduce transportation costs and increase market revenue through backhauling and cooperation among Hawai'i recyclers. 2-2) Promote expansion of Hawai'i processing capacity and end-use demand for scrap tires. 2-3) Promote expansion of Hawai'i processing capacity for scrap electronics.
3) Generally strengthen off-island recycling markets through County policies and support for appropriate State and national policies	3-1) Strengthen Kaua'i County's recycled product procurement policy and practices. 3-2) Promote enhanced State and federal market development efforts and funding. 3-3) Adopt a County product stewardship policy and support State and national product stewardship efforts.

9.4.2 Maximize the Sustainability of On-Island Recycling Markets[1]

Option 1-1: Increase institutional capacity for promoting market development and developing partnerships.

Estimated cost: $5,000 - $100,000 per year for expanded market development staff and funding resources, with possible payback through identification of new outside funding and partnerships.

The County's greatest recycling market development asset is the enthusiasm and commitment of its residents and businesses. Through perseverance, the Kaua'i business community has successfully found on-island uses for 1,843 tons per year of recycled glass and approximately 15,000 tons per year of organic materials collected through County and private sector programs. However, these markets are vulnerable

[1] The County ISWMP does not allocate funding for these individual options.

and tenuous. Even a single disruption, such as the temporary loss of the Kaua‘i Resource Center, can have a ripple effect which may take months to rebound.

Therefore, the County will increase its capacity to nurture on-island markets by providing coordination, facilitation, information and encouragement to on-island market players. This will be completed through a variety of means, including:

- Create a new County recycling/business coordinator position to work with collectors, processors and existing and potential users of recycled glass and compost/mulch;
- Seek funding and partnerships from the State, federal government, industry trade associations, foundations, and on-island private businesses;
- Provide funding through the County's innovative recycling grant (Section 4) to County agencies and firms interested in experimenting with the use of recycled glass or organics products; and
- Encourage the Kaua‘i Community College to evaluate and promote on-island glass and organics products.

Option 1-2: Increase County use of recycled glass and organic products.

Estimated Cost: $2,000 - $50,000 for initial evaluation to determine ongoing costs and benefits.

The County has experimented with the use of recycled glass aggregate products and mulch/compost, but has not become a steady user of these products. By expanding regular use, the County can both provide a steady outlet for these products and set an example for others on the island. Use of glass in road base and other applications requires a commitment of County staff to take the time and expense to re-evaluate current practices and test new products. Consequently, some level of funding or at least recognition of increased employee time should be expected. Ideally, the County will secure funding for a short-term test documenting benefits and costs, and establish a firm County policy based on the results regarding future use. As discussed further below, the most effective County procurement policy is one that explicitly requires recycled content products in bid specifications. By establishing a known and relatively predictable demand, on-island producers may be able to invest to grow their production levels.

Option 1-3: Facilitate expanding the range of materials used in on-island compost and mulch production.

Estimated Cost: $100,000 - $200,000 for a one-time study and technical assistance effort.

The two main producers of compost and mulch in the County use green waste collected at transfer stations and the KRC, as well as materials directly hauled to their facilities. Technically, these operations could make use of additional waste materials, potentially including food waste, pallets, non-treated wood debris from construction sites and gypsum. Each of these waste streams presents unique obstacles and/or concerns, principally related to permitting. Kaua‘i Nursery & Landscaping recently

submitted a permit application which would have allowed them to begin use of food waste and gypsum. However, the application was denied due to concerns by the State DOH. These materials are currently used to produce compost products by other facilities in other states. Unlimited Construction, a local firm, also provided documentation to the County in an effort to document the ability to safely use gypsum and other construction products in mulch and composting operations.

The County, potentially with assistance from the State, will fund a feasibility study to better document all concerns and barriers related to increased use of all other organic waste materials, compile research results and precedents from Hawai‘i and other states and, as determined to be appropriate, provide technical assistance to compost producers in the County seeking to expand use of other organic waste materials.

9.4.3 Work Cooperatively with other Hawai‘i Counties and Private Partners to Strengthen State Recycling Markets

Option 2-1: Evaluate opportunities to reduce transportation costs and increase market revenue through backhauling and cooperation among Hawai‘i recyclers.

Estimated cost: $10,000 - $200,000 for a one time evaluation and partnership outreach effort (range depends on funding commitments from partners).

The remote location and small population of the County results in chronically low market revenue for recyclable materials due to high transportation costs and poor market negotiating leverage. According to State and County officials, however, there has not been a systematic attempt to facilitate greater cooperation by Hawai‘i recyclers in marketing materials, or to reach out to potential partners in providing transportation services. Therefore, the County will allocate funding and/or seek other funding sources to conduct a thorough evaluation and outreach effort to potential partners. The project could explore the establishment of a cooperative recyclable materials marketing organization among recyclers in the County and/or other Hawaiian islands, and seek to secure commitments from retailers, distributors and others to provide low-cost transportation services for recyclable materials.

Option 2-2: Promote expansion of Hawai‘i processing capacity and end-use demand for scrap tires.

Estimated Cost: $100,000 for a one-time evaluation and promotion effort. Additional equipment investment and/or ongoing costs possibly required.

Currently, Unitek Solvent Services operates a scrap tire chipping service on O‘ahu that provides tire-derived-fuel (TDF) to the AES power facility. The volume is limited by a strict permit restriction at the AES facility, and consequently scrap tires from Kaua‘i and other Hawaiian islands are often shipped to the mainland for processing and/or disposal.

Potentially, O‘ahu scrap tire processing capacity could be enhanced to produce a TDA product suitable for a range of uses in the islands. This would likely require an investment in equipment along with expanded demand for TDA or TDF products. Demand could be increased through a permit adjustment at the AES facility, or by increasing State and/or local use of TDA in light weight fill or other applications. TDA is a rapidly growing market and, in certain applications, provides substantial cost and performance benefits over competing materials. Especially given the high cost of importing aggregate to Hawai‘i, TDA may have a particularly strong niche here.

The County will propose a joint project to explore and promote expansion of scrap tire markets in O‘ahu, which would benefit the County directly and reduce the cost of the study. A possible funding source would be an allocation of funds from the $1 retail fee paid by importers of new tires to Hawai‘i. According to State staff, the fee has been temporarily suspended because the amount in the fund has reached a threshold maximum. However, the fee may be reinstated in the future. To support investment in recycling infrastructure, legislation may be required. This approach has been successfully implemented in several other states.

Option 2-3: Promote expansion of Hawai‘i processing capacity for scrap electronics.

Estimated cost: Staff and elected official time to propose and support State and federal efforts.

Hawai‘i currently does not have processing capacity for scrap electronics and there are currently no opportunities to recycle electronics in the County. While it is possible to bale whole electronic devices for shipment to Pacific Rim markets, this practice has been severely criticized for leading to harmful environmental exposures in areas with lax environmental laws or enforcement. A new law in California requires payment of a retail fee upon purchase of new televisions or computer monitors, with the funding used to subsidize “free and convenient” collection and processing of electronics. The law has lead to a robust and growing processing infrastructure for electronics, both those covered under the law and others. The County could petition the State to adopt a similar law, and/or lend its support to efforts to adopt a voluntary or mandated system at the federal level.

California is not alone in proactively addressing the growing electronics waste stream. An overview of how other states are actively addressing electronics is provided in Table 9-3.

Table 9-3
Examples of State Electronics Recycling Legislation

State	Type Of Law	Status as of 7/19/05
Arkansas	Starting January 1, 2008, State-agency generated computers, monitor's, TVs, audio and stereo equipment, VCRs, keyboards, printers, telephones and fax machines will be banned from landfill disposal.	Signed by the Governor on March 21, 2005.
California	An advance recovery fee (ARF) assessed on any device with a cathode ray tube or any flat-panel device; graduated fee system; manufacturer must submit a collection and recycling plan; retailers can retain 3% administrative fee; fines for non-compliant retailers. State fund reimburses collection and processing costs.	Became effective January 1, 2005.
Illinois	Commissions a study to identify effective means for recycling e-waste.	Waiting for the Governor's signature.
Louisiana	Commissions a study to identify effective means for recycling e-waste and how it should be funded.	Passed House and Senate.
Maine	Manufacturers must submit collection, reuse, recycling plans to state; municipalities must transport waste electronics to a consolidation site; manufacturers shall pay for the consolidation, based on market share. Cost can not be separate line item, nor charged at end of product life. Landfill ban on e-waste beginning January 2006. All manufacturers must comply by January 2006, or may not sell products in state.	Bill passed in 2003 and signed by Governor; took effect January 1, 2005. Administrative rules pending.
Minnesota	Established a county-by-county collection system, with manufacturers being responsible for funding the program or creating their own plan.	Became effective July 1, 2006.
Washington	Commissions a study to identify effective means for recycling e-waste.	Passed in May of 2004.

9.4.4 Strengthen Recycling Markets through Government Policies

Option 3-1: Strengthen County's recycled product procurement policy and practices.

Estimated cost: $20,000 to $30,000 for a one-time evaluation and revision of standard County bid specifications, and estimate of ongoing costs and benefits.

Option 1-2 focuses on the need for County purchase of two specific recycled product categories critical to on-island market development: recycled glass and organic products. Additionally, the County could promote stronger recycling markets through broad purchase of recycled products in all facets of its operations. County agencies are encouraged to follow a state recycled product procurement policy (HRS 103D-105). However, according to the County's Purchasing Department, Kaua'i and other County purchasing department are not procuring a significant amount of recycled-content products because 103D-105 only encourages, rather than mandates, them to do so. The County did establish a Recycled Oil Act Program Policy in 2004 provides a preference for oil products containing the greatest percentage of recycled oil. While federal guidelines require purchase of recycled products when the purchase involves over $10,000 and federal funds are used for a portion of the purchase.

Procurement policies at the local level can generally be structured in one of three ways:

- The least effective is to offer a preference for recycled products, but without a price preference or specific specification to purchase recycled. The current County policy is an example of this approach, and many other local and state governments have adopted similar policies.
- A somewhat more effective approach is to offer a price preference. For example, certified recycled products may be given a five or ten percent price advantage during competitive bid solicitations. This approach can lead to greater purchasing than a mere preference policy, but still is problematic because purchasers and bidders may not respond because bids are often adjusted to the solicitation terms and may lead to higher priced purchasing in general. Another form of price preference is to provide a source of funding to cover the difference between recycled products and conventional products. An example of this approach is the State of California's incentive payments for use of recycled rubber in asphalt paving projects. This can be an effective approach, but requires an incentive to encourage or mandate use of recycled products, and also requires a funding source.
- The most effective recycled product procurement policy is generally acknowledged to be a direct, unambiguous adoption of bid specifications to require recycled product use. This approach can lead to the lowest price recycled products and provides by far the most effective market signal to trigger increased investment and interest among vendors.

The County will evaluate its purchasing specifications to identify opportunities to change bid specifications to provide a clear preference for recycled content products. The federal bid specifications can serve as a guide for this effort. The evaluation will analyze the potential price implications.

Option 3-2: Promote enhanced State and federal market development efforts and funding.

Estimated cost: Staff and elected official time to propose and support State and federal efforts.

The EPA and the State of Hawai‘i have offered a range of recycling market development funding, assistance and services in the past. The County will petition both to increase the level of support. Examples include:

- Broad funding solicitations for analyzing and pursuing recycling markets and opportunities (i.e., to support options identified in this paper).
- Allocation of deposit beverage container program funds to strengthen on-island glass recycling programs and/or cooperative marketing and transportation efforts (i.e., Options 1-2 and 2-1), or to fund County staffing and exploration of on-island partnerships (i.e., Option 1-1).
- Adoption of additional funding mechanisms to support recycling market development similar to the ADF program (i.e., Options 2-2 and 2-3).
- Reinstatement of the EPA's *Jobs Through Recycling Program* to provide funds for state and local recycling market development efforts.

Option 3-3: Adopt a County product stewardship policy and support State and national product stewardship efforts.

Estimated Cost: $250 to become a member of the Product Stewardship Institute and staff time to become actively involved and support stewardship efforts.

Nationally, many state and local government agencies are aggressively calling for greater product stewardship – the sharing of responsibility and costs for waste management and recycling by all entities involved in producing, selling and consuming products. Since local governments already hold nearly complete responsibility, this generally translates to requests upon manufacturers and retailers to play a greater role, including making commitments to ensure products are designed for recycling or reuse, to use recycled content in their products and in some cases to directly support the achievement of recycling goals, including providing funding and assistance. Efforts include proposals for state and national legislation (e.g., covering electronics, beverage containers and mercury containing products) and efforts to forge voluntary agreements (e.g., covering household batteries and carpets). The EPA has been heavily involved in many of the voluntary efforts, and its Resource Conservation Challenge is one vehicle being used to engage industry. The Massachusetts-based Product Stewardship Institute serves as a forum for local and state agencies, and has secured dozens of members, including the State of Hawai‘i.

To help support these efforts, the County will explicitly join the Product Stewardship Institute and publicly call for greater product stewardship policies at the State and federal levels. The County will also become an active partner with industry as opportunities are identified, as discussed under Option 1-1.

Section 10
ALTERNATIVE DISPOSAL TECHNOLOGIES

10.1 Background

R. W. Beck worked with the Solid Waste Advisory Committee (SWAC), and County staff and officials to evaluate a variety of downstream technologies, other than landfilling, to ultimately manage the portion of Kauai's solid waste stream that is not targeted upstream to be reduced, reused, recycled or composted. The first step in this analysis was to review different alternatives to landfill disposal. With input from County staff, the following four options were selected for review:

- Anaerobic Digestion;
- Waste-To-Energy (WTE);
- Pyrolysis/ Gasification; and
- MSW Composting.

Table 10-1 represents an overview of the alternatives presented to the SWAC for consideration.

Table 10-1
Kaua'i County ISWMP
Alternative Solid Waste Reduction Technologies Matrix

Technology	Applicability to Kaua'i Waste Stream	Commercial Status	Risks (i.e., technology, environmental, financial)	Waste Diversion Potential
Anaerobic Digestion (AD)	Based on a 2006 waste characterization analysis, the overall waste stream is composed of nearly 70% of organics including, but not limited to, food waste, yard waste, paper, and wood. This estimate excludes the yard waste that is separated from the mixed refuse by homeowners and business that is managed separately at the various transfer stations. AD can be applied to this fraction of the waste stream to convert organics into biogas and digestate (i.e., solid residues).	A few pilot facilities using MSW as feedstock have operated in the U.S. in the past. The wastewater treatment industry has used AD to manage biosolids and generate biogas for decades. There are more than 100 commercially operating facilities using the organic fraction of the MSW stream and/or organic industrial wastes located in Europe, with a few in other locations including Canada.	Technology risks may include inadequate materials processing because of an underperforming digestion process caused by contaminated feedstock, inadequate moisture content, etc. Environmental risks may include odor from pre-processing and/or digestion activities, exceedance of air emissions limits when using the biogas as a fuel, and the inability to site a facility due to perceived threats to water, air, and property values. Financial risks may include lack of markets for biogas and/or residues and failure to receive adequate quantities of materials to ensure needed economies of scale.	Volume reduction is projected up to 75% assuming the pre-processing of the feedstock to remove non-organics and the beneficial reuse of digestate. Without beneficial use of the digestate, the potential volume reduction is projected to be approximately 60%.

Table 10-1
Kaua'i County ISWMP
Alternative Solid Waste Reduction Technologies Matrix

Technology	Applicability to Kaua'i Waste Stream	Commercial Status	Risks (i.e., technology, environmental, financial)	Waste Diversion Potential
Waste-to-Energy	Based on the 2006 waste characterization analysis, the overall waste stream is composed of approximately 85% combustible materials by weight.	MSW combustion is a fully commercialized processing technology with nearly 90 WTE projects (mass burn and RDF) operating in the U.S. alone. Many others are operating throughout the world. Most of the facilities in the U.S. are sized to process, on average, approximately 1000 tons per day. Some smaller WTE facilities of less than 250 TPD (i.e. limited economies of scale) are operating in the U.S, but in many instances struggle to remain economically competitive with landfill disposal options. Many of these smaller WTE facilities have had to be retrofitted for additional air pollution control equipment in the last decade, which has dramatically increased overall costs.	Technology risks may include inefficient energy production due to waste variability, as well as excessive unscheduled maintenance. Environmental risks may include odor at tipping floor/pre-processing stage, exceedance of air emissions limits, metals in ash, and inability to site a facility due to perceived threats to water, air, and property values. Financial risks may include high operating costs and variability in energy sales.	Volume reduction for WTE facilities is 75% to 80%, depending on the type of technology and system that is used. .

Table 10-1
Kaua'i County ISWMP
Alternative Solid Waste Reduction Technologies Matrix

Technology	Applicability to Kaua'i Waste Stream	Commercial Status	Risks (i.e., technology, environmental, financial)	Waste Diversion Potential
Pyrolysis/Gasification	This technology process converts the carbon-based portion of the waste stream into a syngas that can be used to generate electricity or fuels. The carbon content of the waste stream has not been specifically measured. However, the organic content which is carbon- based composes approximately 70% of the waste stream. The carbon content of the overall waste stream would exceed this value.	There are a handful of commercially-operating gasification plants operating worldwide using MSW as feedstock. A small number of pilot facilities reportedly are operating or have operated in the U.S. using pre-processed MSW as feedstock to produce syngas. Operating data is very limited for the application of this technology to MSW and thus this technology is not considered fully commercialized. The technology has been used for other types of feedstock such as coal and uniform types of biomass. Plasma arc thermal gasification, a variation of conventional gasification, has reportedly been used in Japan to manage pre-processed	Technology risks may include inadequate materials processing because of underperforming gasification process due to lack of uniform feedstock and/or issues associated with scaling up demonstration projects. Environmental risks may include odor at the pre-processing stage, air emissions when using the syngas as a fuel in a boiler, disposal or residues (i.e., char, silica, slag, and ash), and inability to site a facility due to perceived threats to water, air, and property values. Financial risks may include lack of markets for sales of syngas and uncertain capital and operating costs due to lack of full-scale projects with MSW as the feedstock.	Volume reduction for pyrolysis/gasification can theoretically reach up to 90% with limited pre-processing. However, limited operating data using MSW as feedstock exits to confirm this projection.

Table 10-1
Kaua'i County ISWMP
Alternative Solid Waste Reduction Technologies Matrix

Technology	Applicability to Kaua'i Waste Stream	Commercial Status	Risks (i.e., technology, environmental, financial)	Waste Diversion Potential
		MSW and other types of homogeneous solid wastes, such as auto shredder fluff in commercially proven settings .		
MSW Composting	The overall waste stream on Kaua'i has a disproportionately large quantity of compostable materials as compared to most other U.S. communities and their MSW streams. Food wastes, yard wastes and compostable paper alone compose nearly 30% of the waste stream. MSW aerobic composting converts the organic portion of the waste stream into a compost product that can have a beneficial reuse as a soil conditioner and/or erosion control.	MSW composting facilities were first developed in the 1960s in conjunction with the Solid Waste Disposal Act. A renewed interest in this technology emerged in the 1980s with many states passing legislation promoting landfill diversion and recycling. By the early 1990s there were more than 15 commercially-operating MSW composting facilities in the U.S. However, the overall number of MSW composting facilities has not grown over the last decade. In 2000, *BioCycle* reported 16 commercially-operating MSW composting facilities. The trend in solid waste composting over the last five years has been the development of source-separated organic	Technology risks may include limited materials decomposition because of insufficient pre-processing of non-combustibles. This occurrence may result in extensive quantities of residuals needing disposal. Environmental risks may include odor from pre-processing and/or the composting process, potential for metals in the compost end-product, and inability to site a facility due to perceived threats to water, air, and property values. Financial risks may include lack of markets for the compost by-product and failure to receive adequate quantities of materials to ensure economies of scale.	Volume reduction for MSW composting is projected up to 70% assuming the pre-processing of the feedstock to remove the non-combustibles and the successful marketing of the compost by-product for beneficial reuse. The actual operating history of many MSW composting facilities over the last 10 to 15 years has generally reflected a volume reduction level less than 70%. However, the development of source-separated organics composting facilities offers an opportunity for greater volume reduction.

Table 10-1
Kaua'i County ISWMP
Alternative Solid Waste Reduction Technologies Matrix

Technology	Applicability to Kaua'i Waste Stream	Commercial Status	Risks (i.e., technology, environmental, financial)	Waste Diversion Potential
		composting facilities for residential and commercial organics programs in such communities as San Francisco, San Jose, Seattle, and others.		

Based on the feedback received from the SWAC, the list of four technologies was narrowed to two preferred technologies --- WTE and Anaerobic Digestion for further analysis. This analysis included developing planning level cost information using the estimated tonnages from the Kaua'i County waste stream to size the various facilities.

Specific feedback was gathered from the SWAC before moving ahead with the detailed planning level costs analysis of these two options. Issues identified for further assessment included the following:

- Commercial viability of applying anaerobic digestion technology to MSW as feedstock;
- The financial feasibility of a WTE facility that would receive only County collected solid waste; and
- The cost and land use impacts associated with WTE as compared to the continued use of a landfill for the ultimate disposal of County waste.

Through additional discussions, the SWAC excluded anaerobic digestion from further consideration. This was based on concerns that this technology is used in Europe to manage only source separated organics and is not presently used in the United States to manage MSW at a commercially operating facility.

As reflected above in Table 10-1, environmental risks associated with WTE were included as part of the evaluation. Specifically, combustion of solid waste to produce energy results in the emitting of nitrogen oxides, sulfur dioxides, carbon dioxide and trace amounts of toxic pollutants, such as mercury and dioxins. Variation in the composition of solid waste influences the extent and types of these emissions. Displacement of the need for fossil fuels to generate power through WTE may offer net greenhouse gas reductions.

Air pollution control technologies for WTE facilities are used to effectively reduce air emissions. However, specific health concerns related to the emitting of mercury, lead, dioxins, and furans have been identified. Exposure above defined limits for these toxic pollutants may pose health risks.[1] EPA has promulgated new rules that apply to air emissions for new and existing municipal waste combustors, including WTE.[1] These rules are targeted to reduce toxic air emissions (dioxins, lead, cadmium, and mercury), as well as overall air emissions from municipal waste combustors through maximum achievable control technology (MACT).

As for the other two issues described above, a comparative analysis was conducted. Table 10-2 summarizes the planning level costs and land use associated with the two WTE and continued landfilling options. The detailed assumptions for each option associated with the comparative analysis follow the summary table.

[1] U.S. EPA.gov/oar/toxicair

Table 10-2
Disposal Option Comparisons

	WTE Facility with an Upfront Recycling Facility for All County-Disposed Waste [1]	WTE Facility for Only County-Collected Disposed Waste[2]	Landfill for All County Disposed Waste
Development Costs	$95 to $106 million	$46 to 52 million	$12 million for first 5 year cell
2013 Annual Operating Expenses (Including annual debt service)	$21 to $25 million	$8 to $9 million	$7.8 million
Annual Revenue From Energy Sales	$6 to $7 million	$2.4 to $2.7 million	$0
Annual Cost ($/ton)	$118 to $138[3]	$121 to $139 per ton[3]	$77 per ton
Waste Requiring Landfill Disposal	25,000 to 30,000 tons	14,000 to 17,000 tons[4]	102,200

1 Includes a mixed stream pre-processing material recovery facility. It is estimated that this facility would recover 10% of the waste stream
2 Does not include pre-processing material recovery facility
3 Includes disposal costs for ash and unprocessable waste
4 Does not include the approximately 70,000 tons of commercial waste that will require disposal

10.1.1 WTE for All County Disposed Waste

The data in this document represent planning level cost estimates to determine a range of first-year tipping fees for the WTE facility that is designed to accept all combustible solid waste in the County that can not be recycled or composted. This data is not intended for project financing and is intended for comparison to other alternative technologies. If the County decides to move forward with the development of the proposed WTE facility, a more detailed analysis would need to be completed. For planning purposes, the implementation time required for the proposed facility is approximately five years.

- Pre-Processing/Mixed Waste Recovery Facility:
  - 10 percent of the incoming material would be considered "unprocessable" and disposed;
  - 10 percent of the incoming material would be recycled through the mixed stream, pre-processing material recovery facility;
  - The facility would be initially sized to process 450-tpd of waste. Long-term the facility could require expansion; and
  - In 2013, the facility will process approximately 126,260 tons of material.
- WTE Processing Capacity:
  - Approximately 80 percent of the waste that is received is processed;
  - 90 percent annual facility availability factor;

- At the 450-tpd rated capacity, the WTE facility will process a maximum of 147,800 tons per year with the assumed availability factor; and
- In 2013, the WTE facility will receive approximately 126,260 tons.

- WTE Capital Cost. The estimated capital cost includes provision for the construction of the WTE facility excluding electrical interconnection. The 450-tpd facility would consist of two furnace-boilers. The estimate assumed the following components:
  - No direct costs for 6 to 8 acres of land for facility site;
  - Waste Receiving and Storage – three days enclosed waste storage;
  - Waterwall Furnace-Boilers – grate, low NO_X units, SNCR systems, flue gas recirculation, auxiliary fuel burners, and economizers;
  - Air Pollution Control Equipment – spray dryers, baghouses, carbon injection, continuous emissions monitoring system, and stack; and
  - Balance of Plant – operations control center, metals recovery from residue, 14-MW turbine-generator, air-cooled condenser, and water treatment system.
- WTE Capital "Hard" Cost – $180,000 to $201,000 per tpd of installed capacity for 450-tpd (2013 dollars), which is equivalent to approximately $81 to $91 million.
- Pre-processing/Mixed Waste Recovery Facility Capital "Hard" Cost - $27,000 to $32,000 per tpd of installed capacity for 450 tpd (2013 dollars) which is equivalent to $14 to $16 million.
- WTE Project Development "Soft" Cost – 15 percent of the Capital Cost includes engineering, permitting, financing, air emission offsets, spare parts, start-up, and contingency, which is equivalent to $12 to $14 million.
- Pre-processing/Mixed Waste Recovery Facility Project Development "Soft" Cost – 15 percent of the Capital Cost includes engineering, permitting, financing, air emission offsets, spare parts, start-up, and contingency, which is equivalent to $1.8 to $2.4 million.
- Annual Debt Service Requirements:
  - Financing costs of 2 percent of the principal amount of the bond issue;
  - Interest rate on the bonds of 5 percent;
  - Revenue bonds with 20 years of operation and a principal repayment period of 20 years; and
  - Level debt service payments for 20 years.
- Operating & Maintenance (O&M) Expenses:
  - The O&M expenses include provision for labor, parts and supplies, extraordinary renewals and replacements, general and administration, operator profit, electricity, fuel, and "normal" pass-throughs such as

chemicals, insurance, and utilities. This does not include property taxes, host fees, or residue disposal;

- Pre-processing/Mixed Waste Recovery Facility O&M Expenses - $30 to $35 per ton of solid waste processed; and
- WTE Facility O&M Expenses – $77 to $89 per ton of solid waste processed at 450 tpd (2013 dollars).

- Pre- and post-processing Waste Generation and Disposal:
  - For planning purposes, R. W. Beck estimates that all of the "unprocessable" waste will require landfill disposal;
  - This landfill will require at least 90 acres for the footprint and the supporting infrastructure (i.e. roads, leachate management) and a 500 foot buffer[2];
  - 15-20 percent (on a weight basis) of the solid waste processed will require landfill disposal as combustion residue. In 2013, the facility will generate approximately 14,000 to 18,700 tons of residue; and
  - In 2013, the County will dispose of the "unprocesseable" waste and residue at a monofill cell in the landfill for $101 per ton.
- Electricity Production Capability and Revenues:
  - Net electrical generation will range from 475-525 kWh per ton of waste processed, assuming solid waste with a higher heating value ("HHV") of 5,000-5,200 Btu per pound[3]; and
  - In 2013, the facility will deliver the excess power to Kaua'i Island Utility Cooperative (KIUC) at the energy charge of $0.131 per kWh. This value was obtained from the *Renewable Energy Technology Assessments* report issued by KIUC in 2005. In future years, KIUC will likely begin paying a capacity charge as well.
- Pre-Processing/Mixed Waste Recovery Facility Revenues:
  - For this analysis, it was conservatively estimated that the County would not receive revenue from materials recovered at the pre-processing/mixed waste recovery facility.
- Post-Processing Revenues:
  - R. W. Beck conservatively estimates no revenues being generated from the sale of ferrous metals.
- Schedule:
  - Two years to obtain permits, site facility, select a vendor, and obtain financing; and
  - Three years to construct and acceptance test the facility.

[2] Depending on the site location and configuration, a 500 foot buffer may not be necessary.
[3] The feedstock at a WTE facility with a pre-processing system has a higher BTU value than at a facility without pre-processing.

10.1.2 WTE for Only County Collected and Disposed Waste

The data in this document represent planning level cost estimates to determine a range of first-year tipping fees for the WTE facility that is designed to accept only County-collected solid waste in the County that requires disposal. This facility would not include an up-front pre-processing/recycling facility. This is due to the County delivering 40,000 to 50,000 tons per year of waste, and a pre-processing facility would only capture 10 percent of that. This of facility could cost approximately $10 million to construct. Therefore, the County opted for other recycling programs such as source-separated curbside recycling that could recover similar quantities and require a facility that is only $2 to $4 million to construct. In addition, a source separated system will produce a final product that is significantly less contaminated with residual waste, which makes the product more attractive to recycling brokers and end users. "Unprocessables" would still be diverted from the boiler units, but the remaining waste stream would not be processed for recyclables.

This data is not intended for project financing and is intended for comparison to other alternative technologies. If the County decides to move forward with the development of the proposed WTE facility, a more detailed analysis would need to be completed. For planning purposes, the implementation time required for the proposed facility is approximately five years.

- Waste Processing Capacity:
  - 85 percent annual facility availability factor[4];
  - At 200 tpd, the facility will process a maximum of 62,050 tons per year; and
  - In 2013, the facility will process 40,500 tons.
- Capital Cost. The estimated capital cost includes provision for the construction of the facility excluding electrical interconnection. The 200-tpd facility would consist of one furnace-boiler. The estimate assumed the following components:
  - Waste Receiving and Storage – three days waste storage;
  - Waterwall Furnace-Boiler – grate, low NO_X units, SNCR systems, flue gas recirculation, auxiliary fuel burners, and economizers;
  - Air Pollution Control Equipment – spray dryers, baghouses, carbon injection, continuous emissions monitoring system, and stack;
  - Balance of Plant – metals recovery from residue, 16-MW turbine-generator, air-cooled condenser, and water treatment system;

[4] A WTE facility that would receive only County collected waste would consist of one boiler, while a WTE for all County waste would consist of two boilers. Because the WTE facility for only County collected waste would not have a back-up boiler, this facility would not operate as many days a year as a facility that can use the second boiler as a back-up boiler.

- Capital "Hard" Cost – $197,000 to $220,000 per ton of installed capacity for 200 tpd (2013 dollars), which is equivalent to approximately $39 to $44 million; and
- Project Development "Soft" Cost – 15 percent of the Capital Cost includes engineering, permitting, financing, air emission offsets, spare parts, start-up, and contingency, which is equivalent to approximately $6 to $7 million.

- Annual Debt Service Requirements:
  - Financing costs of 1.5 percent of the principal amount of the bond issue;
  - Interest rate on the bonds of 5 percent;
  - Revenue bonds with 20 years of operation and a principal repayment period of 20 years; and
  - Level annual debt service payments for 20 years are projected at $4.3. million.
- O&M Expenses:
  - The O&M expenses include provision for labor, parts and supplies, extraordinary renewals and replacements, general and administration, operator profit, electricity, fuel, and "normal pass throughs" such as chemicals, insurance, and utilities. This does not include property taxes, host fees, or residue disposal. We have assumed the County will pay for unprocessible waste disposal at the County Landfill; and
  - O&M Expenses – $77 to $89 per ton of solid waste processed at 200 tpd (2013 dollars).
- Residue Generation and Disposal:
  - 10 percent of the waste that is received at the facility will be unprocessable and require landfill disposal;
  - 10-15 percent (on a weight basis) of the solid waste processed will require landfill disposal as combustion ash; and
  - In 2013, Kaua'i County will dispose of the residue at a monofill cell in the landfill for $101 per ton.
- Electricity Production Capability and Revenues:
  - Net generation of approximately 450 – 500 kWh per ton of waste processed, assuming solid waste with a higher heating value ("HHV") of 4,500 – 5,000 Btu/lb.; and
  - In 2013, the facility will deliver the excess power to KIUC at the energy charge of $0.131 per kWh. This value was obtained from the *Renewable Energy Technology Assessments* report issued by KIUC in 2005. In future years, KIUC will likely begin paying a capacity charge as well.
- Ferrous Metal Recovery and Revenues:

- Ferrous content in processible waste is 3 percent by weight. Residue screening and magnetic separation will remove larger ferrous metal. The County is not projecting any revenue from the sale of the ferrous metal. The recovery rate will vary between 50 and 70 percent.

- Schedule:
  - Two years to obtain permits, site facility, select a vendor, and obtain financing; and
  - Three years to construct and acceptance test the facility.

10.1.3 Landfill for All County Waste

To construct a new landfill on Kaua‘i, the County would need to construct a lined landfill with leachate collection, as well as related facility infrastructure (e.g., roads, scale house, offices, etc.). These costs do not include real estate or permitting costs).

10.1.3.1 Planning Level Cost Assumptions

- In 2013, the facility will receive 102,200 tons of solid waste.
- The components of the landfill will include:
  - An initial cell of 15 square acres;
  - Each cell has 5 years of capacity;
  - A total of six cells would be developed;
  - One leachate collection pond;
  - One maintenance building;
  - Two scales;
  - One office building;
  - Access roads; and
  - A public drop-off area for solid waste, green waste and recyclables.
- Capital Development “Hard Costs” for first cell - $10 million in 2013 dollars.
- Capital Development “Hard Costs” for each additional cell - $7 million in 2013 dollars.
- Capital Development “Hard Costs” for the 30-year life of the facility - $45 million.
- Capital Development “Soft” Costs for the 30-year life of the facility– 15 percent of the Capital Costs includes engineering, siting, permitting and financing, which are equivalent to $7 million.
- Annual Debt Service Requirements:
  - Financing costs of 2 percent of the principal amount of the bond;

- Interest rates on the bonds of 5 percent;
- Revenue bonds with 5 years of operation for each cell and a principal repayment period of 5 years; and
- Level debt service payments of 5 years.

- O&M Expenses:
  - The O&M expenses include provision for labor, parts and supplies, administration, operator profit, electricity, fuels. Insurance and utilities; and
  - The O&M Expenses - $68 per ton[5] .
- Schedule:
  - Three years to obtain permits, site facility, select a vendor, and obtain financing; and
  - Two years to construct the facility.

After review of this information, the majority SWAC members recommended a WTE facility for only County-collected and disposed waste due to the following.

The SWAC had concerns the County would not be able require private waste haulers to deliver their solid waste to a County facility. This is referred to as flow control. However, since the SWAC reviewed this information, the United States Supreme Court ruled in *United Haulers Assoc., Inc. v. Oneida-Herkimer Solid Waste Management Authority,* that local governments may direct the flow of solid waste to County owned solid waste management facilities if the purpose of such designation is to promote environmental benefits and/or generate revenues to support local governmental solid waste programs. However, this ordinance should be supported by a plan explaining the need for flow control in the context of the local government's specific solid waste management system.

In addition, the majority of SWAC members recommended WTE over landfill disposal as it met one of their primary goals of reducing reliance on landfill disposal. These SWAC members considered this goal more important than economics, since as shown in Table 10-1, WTE is a more expensive system than landfill disposal.

[5] Based on 2005 contract cost of $56 per ton and inflated 3 percent annually until 2013.

Section 11
FACILITY SITING STRATEGY

11.1 Purpose

The purpose of the siting strategy is to provide a fair and objective process by which solid waste management facilities may be sited. This strategy seeks to address the concerns of all interested parties. The final decision on sites for facilities will be recommended by the Mayor and approved by the Kaua'i County Council.

According to Section 342G-27 of Hawai'i Revised Statute, all county solid waste management plans shall contain a siting element for solid waste management facilities used for source reduction, recycling, bioconversion, and disposal facility capacity. Revisions will be made to the siting strategy to incorporate changes in law.

11.2 Principles

Flexibility will be required in the siting process. While affording this latitude, the following principles will be the basis for applying the siting process:

- During preliminary site evaluations all potential sites shall be considered;
- Site selection must be a process fully open to all in order to foster trust in the process;
- The potential impact upon property values and quality of life both for individuals and neighborhoods adjacent to a solid waste facility must be fully acknowledged;
- Negotiations are the preferred method to resolve issues;
- Prior to any decision, there must be full research and disclosure of all facts and proposals;
- The need for the proposed facility, its impacts, and the results of not siting the facility must be considered by all parties in the negotiations;
- The County must plan, and act, in advance of need, i.e., avoid crisis management. This may include hiring a public outreach firm;
- It is essential that all parties have access to information and that mediation be used for dispute resolution when direct negotiations are unsuccessful;
- The word "public" has many, often separate, meanings including governments, neighborhoods, and individuals, but all types of interests should be considered; and
- All final decisions shall reside with the Mayor and Kaua'i County Council.

11.3 Site Selection Process

The proposed site selection process will be comprised of the four following stages:

Stage 1 - Establish a Siting Task Force;

Stage 2 - Identify "Excluded Sites" and Develop County-Specific Siting Criteria;

Stage 3 - Define Ranking Criteria and Rank Available Sites; and

Stage 4 - Select Preferred Sites.

Figure 11-1 presents an overview of the process.

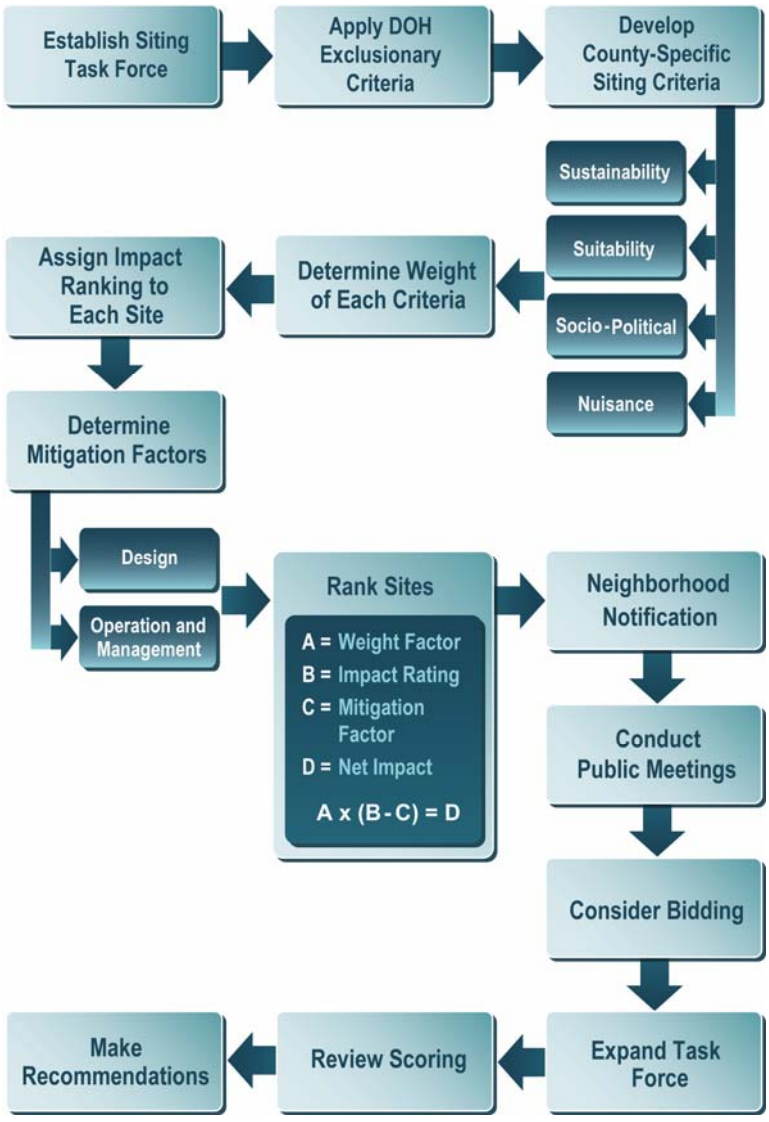

Figure 11-1: Siting Strategy Process

11.3.1 Stage 1 – Establish Siting Task Force

Stage 1 encompasses the formation of a Siting Task Force which will conduct the siting process. In addition to members of the Task Force being appointed, decisions regarding how and who will conduct mediation if necessary will be made, and the pertinent preliminary information that the Task Force will use to make its recommendations will be compiled.

The County will provide the Task Force with support and assistance in making site recommendations for facilities through extensive public involvement. Appointment of Siting Task Force: The Mayor and County Council will appoint the members of the Task Force. The Task Force will include but not be limited to representatives of the following:

- County Agency representatives, such as the Planning Department and Economic Development Department;
- Representatives from Kaua‘i communities;
- Environmental and neighborhood organizations;
- Kaua‘i cultural groups;
- Business community;
- Public;
- Waste industry representatives;
- Solid Waste Advisory Committee representatives; and,
- DOH representative(s).

These individuals will comprise the core of the Siting Task Force. Other members will be added when the process becomes more site specific. The County will provide staff assistance and consultants as required and approved by the Mayor and County Council.

11.4 Stage 2 – Identify “Excluded” Sites and Develop County-Specific Siting Criteria

11.4.1 General

During the implementation phase of the County’s Plan, the County shall require the use of siting criteria for all new, solid waste facilities. These criteria would assist in narrowing the number of possible areas to potential sites for further consideration under Stage 3. The criteria are divided into exclusionary and ranking categories.

11.4.2 Eliminate Excluded Sites

The exclusionary criteria can be those that are mandated by the EPA and the DOH, or County-specific. County government or a County representative will work with the County's Planning Department and use a Geographic Information System (GIS) to apply the exclusionary criteria to all areas of the island to eliminate these sites from further consideration. These areas will most likely include[1]:

- Special management areas;
- Tsunami inundation areas;
- Areas within 1,000 feet of shoreline;
- Federal government lands
- Areas within 100-year flood zones;
- Wetland areas;
- Areas with unacceptable topography, slope 33.33 degrees;
- Areas within 1,000 feet of water well;
- Areas within 300 feet of perennial streams;
- Areas within 1,000 feet of surface area;
- State conservation lands
- Areas with 0.5 mile of urban lands; and,
- Areas with 10,000 feet of airport runways.

11.4.3 Develop County-Specific Criteria

The Task Force would then develop County-specific siting criteria for areas of the County that are not excluded based on the EPA's and DOH's siting regulations. The process of developing County-specific criteria may involve multiple meetings of the Task Force. These County-specific criteria would be applied separately for each facility.

The County-specific criteria will be divided into four general categories: sustainability criteria; suitability criteria; socio-political criteria; and nuisance criteria. These criteria will be applied to all solid waste facilities. These criteria could include but would not be limited to the following:

11.4.3.1 Sustainability Criteria

- Endangered Species - Sites would minimize the affect on the habitat of known rare or endangered species.
- Screening - To the extent practical, natural screens such as trees and topography would be used when selecting sites.
- Aquifer Location - Aquifers would be considered when locating facilities. The potential impacts on aquifer and public water supplies would be evaluated.

[1] Prior to beginning the siting process for a solid waste management facility, the County will review Federal, State and local regulations to identify the most recent exclusionary siting criterion.

- Air Quality - Sites would minimize adverse impacts on air quality. Such factors as buffer zone distances, natural air currents, prevailing winds, and facility design should be considered with relation to air quality especially for landfills and composting facilities.
- Archeology - Sites would not impact known archeological or historical locations. For example, a facility may not be sited in a known archeological or historic location, but additional traffic near the location may adversely impact its integrity.
- Cost – The cost of acquiring and develop property for a will impact the ability of that facility to operate in a cost-effectively and compete in the market place.

11.4.3.2 Suitability Criteria

Suitability criteria encompass those aspects having to do with the location, size, shape, use, and accessibility of the site.

- Site Location - While still satisfying other criteria, the facility would be located as close as possible to the waste generation areas to minimize the transportation of waste. For areas with widely dispersed waste generation, a system of facilities may be more economical, using transfer stations to service a single solid waste management facility or siting more than one waste management facility. Environmental and/or public opinion factors may outweigh the economic savings of such a location and require a more remote site.
- Traffic - Sites would minimize congestion and adverse safety effects of facility traffic on the existing traffic flows in the vicinity of the site. Turning functions, site distance from areas of heavy traffic, congestion, facility traffic volume, noise, and aesthetics are examples of factors to consider.
- Accessibility - The facility should be easily accessible from major roadways. The number and type of trucks and transfer vehicles that would be using the facility should be considered. Transporting waste through residential or commercial areas would be minimized. Good access from appropriate roads will minimize impact on residential streets, reduce impact on normal traffic flow, and lower transportation time and expense.
- Site Size and Shape - Sites would be large enough for the facility buildings and structures, construction areas and open space buffer areas. There would be sufficient space to accommodate such elements as optimum vehicle movement, parking areas, queuing space, and private vehicle/truck separation.
- Land Availability - Sites would be readily available for acquisition at a reasonable cost. Preferably site acquisition would not require condemnation of properties.
- Single Ownership - Sites would be comprised of a single piece of property in order to limit the number of parties involved.
- Existing Land Use - Sites would be located a reasonable distance away from residential, community, and commercial development. However, the site would be conveniently located.
- Existing Zoning – Site use would be compatible with existing zoning.

- Access to Utilities - Sites would have ready access to required utilities. These would include electricity for purchase and sale of power (as appropriate), potable water, process water, wastewater disposal, and telephone. Utilities would have adequate capacity to supply the facility with its design requirements.
- Access to Markets - Convenient access to the markets for materials recovered at a facility may be an important factor, depending upon the type of facility and the materials. Market determination is usually based on the market value of the material and the transportation cost to markets.
- Topography - Sites would have topographic characteristics which are compatible with the type of facility being sited.
- Soils - Soils of the site should be adequate to support structures, roads and highways without adverse impacts or excessive costs. Some soils types and properties may make development of a site difficult due to excessive costs or difficulty in providing adequate structural support.

11.4.3.3 Socio-Political Criteria

- Impact on Surrounding Areas - Sites should cause minimal environmental or economic impacts (including impact on property values) on surrounding areas. Public opinion could be a major factor in the relative importance of this criterion.
- Environmental Justice – No sites should place an excessive environmental burden on a particular race, color, national origin, or income group;

11.4.3.4 Nuisance Criteria

- Noise - Sites should have a minimum adverse impact on noise levels in surrounding residential or other noise-sensitive areas. Noise levels may result from traffic to and from the facility, construction and operation of the facility. Attempts should be made to maintain background or ambient levels.
- Dust - Depending upon facility type, if dust is a factor to be considered, topography and prevailing winds should be considered.
- Odor - Where odor may be a problem, potential sites should be situated so as not to exacerbate the problem due to common temperature inversions, topography or prevailing winds.

11.5 Stage 3 - Define Ranking Parameters and Rank Available Sites

11.5.1 General

Available sites would be ranked relative to one another to assist the Task Force in developing its recommendations to the County Council. The system would compare the suitability of sites for a particular type of facility.

Since the County criteria are broad based in nature, and apply to the siting of all types of solid waste facilities, a scoring system would be used. This system would allow the Task Force to develop a ranking on a facility specific basis. It permits some factors to be given greater influence than others.

After determining the weight factor for each of the criteria, an impact rating would be assigned. The impact ratings are site specific and provide a relative measure of how the various criteria would be affected for each site.

Mitigation factors are those aspects which lessen the impact rating. These mitigation factors may come about as a result of guidelines for operational procedure for each type of facility, or as part of the compensation package agreed upon during the bidding process. These mitigation factors are divided into three general categories: operations and management, design, and compensation. These factors could include but are not limited to the following.

11.5.1.1 Operations and Management

- Traffic Routing;
- Traffic Safety Devices;
- Traffic Safety Enforcement;
- Street Cleaning;
- Nuisance (e.g. odor control, dust, litter control);
- Wheel Washing;
- Right for Local Inspection; and
- Commitment to Ongoing Communications with Neighbors.

11.5.1.2 Design

- Landscaping/Berming;
- Final Land Use Plan;
- Local Ordinance Compatibility;
- Fencing; and
- Development of Non-fill Areas.

11.5.1.3 Compensation

- Host Community Fees;
- Development of Public Buildings or Infrastructure; and
- Complementary Services, (i.e., no charge to use the facility).

11.5.2 Scoring and Ranking

For each criteria the Weight Factor (A), would be multiplied by the difference between the Impact Rating (B) and the Mitigation Factor (C) to determine the Net Impact D. The formula is as follows:

$$A \times (B - C) = D$$

The Net Impact scores would be totaled to provide an overall impact. This process would be duplicated for each potential site.

The Task Force would consider the overall impact and then recommend preferred sites. These sites would be recommended to the Mayor and County Council for its consideration.

County staff or their representatives would meet with neighbors and community representatives associated with the potential sites. The County would provide written detail on the specifics of the proposed facility including purpose, design, construction, capacity, operational procedures, and performance guarantees.

11.6 Stage 4 - Selecting Preferred Sites

To narrow the list of available sites to the most appropriate and preferred site(s), the County would complete the following tasks:

1. Neighborhood Notification: The County would transfer information and explanation of site selection process to those where potential sites for future solid waste management facilities exist.
2. Public Meetings: Public meetings would be conducted to explain DOH exclusionary criteria and County-specific siting criteria. Residents and property owners within a reasonable distance of the site(s) would be notified, invited, and encouraged to attend Task Force meetings. .
3. Bidding: Any group, community, private entity, or land owner may initiate this offering, or bidding process. This offer should not be vetoed outright by others. If no offers are presented, the Task Force would review other potential areas for sites.
4. Weighting and Scoring: The Task Force would select weighting values for the County Criteria. The weighting values are facility specific with the value for identical criteria remaining the same for each site.
5. Expand Task Force: Representatives from the political jurisdictions most directly affected shall be added to the Task Force by the Mayor.
6. Review of Scoring: The Task Force would review scoring, based upon additional information provided through the public meetings and the expanded Task Force.
7. Recommendations: The Task Force would recommend preferable sites to the County Council based on the application of the criteria.

11.7 Mediation Process

Non-binding mediation would be used to help avoid and resolve conflicts, disputes, and impasses associated with siting of solid waste facilities. A mediator or otherwise disinterested third party would be brought into the siting process to assure all sides that their views and inputs will be fairly considered. The mediator would act as a link for opposing interests, fostering communications, and encouraging cooperation. The mediator would clarify issues and concerns, offer constructive suggestions, possible compromises, and potential solutions.

A mediator should be used when the parties need help in establishing communications. The mediator may be used under circumstances when:

- Excessive personal time on the part of Task Force members or County would be demanded;
- The direction of a negotiated outcome is contrary to current County policy;
- The parties need help in establishing communication;
- Special group process skills are needed;
- Sensitive information is involved;
- Fresh ideas/potential solutions are needed;
- Negotiations are threatened by disagreements within groups; or
- An aspect of the process is not working.

A mediator would be selected by the County, with the recommendation of the Task Force, at the beginning of the siting process. This would help assure that the siting process is evenly and fairly addressed. One basis in which the mediator would be selected is impartiality.

The mediation process would be helpful for difficult issues. The preferred way to avoid an impasse is to have a mediator address issues before conflict arises. The County Public Works Department would develop lines of communication with interested parties and would coordinate the selection process. The County Public Works Director would be charged with identifying the various interest groups and incorporate them into the selection process.

Section 12
SOLID WASTE SYSTEM COST ANALYSIS

12.1 Purpose

The purpose of this section is to present the key assumptions, methodology and results of the solid waste system cost analysis. The solid waste system cost analysis evaluated the costs of operating and maintaining the solid waste system under conditions detailed in the Plan.

12.2 Background

As mentioned earlier in this report, an Integrated Solid Waste Management Plan was prepared for the County in 1994. This 1994 Plan included the evaluation of solid waste program costs and an analysis of possible user fees based on a PAYT philosophy. At the time this 1994 Plan was adopted, there appeared to be moderate public support for the implementation of a volume-based solid waste user fee for residential collection customers. However, to date, a solid waste user fee for residential collection customers has not been implemented.

12.3 Introduction

R.W. Beck developed a financial model for the period FY 2003-FY 2013. The first three years summarize the Kaua‘i County Solid Waste Division’s (Division) financial performance from FY 2003-FY 2005. Estimates are provided for FY 2006 and budget data are used for FY 2007. Projections for FY 2008-FY 2013 are based on the key assumptions discussed later in this section.

Approximately 65 percent[1] of the Division’s operating and maintenance expenses are paid for by assistance from the County (General Fund). Solid waste tipping fees and other revenues pay for the remaining 35 percent of operating and maintenance expenses. Division capital expenses have been funded entirely through the General Fund. One of the objectives of the ISWMP is to provide an estimated level of Residential Collection Fees required to reduce and ultimately eliminate solid waste funding from the General Fund.

This section describes the key assumptions, methodology and results used to support this objective.

[1] Based on 3-year historical average of General Fund Assistance divided by average of Total Expenditures (See Table 12-9 for details).

12.4 Key Assumptions

- The study period is defined as FY 2009 – FY 2013, also referred to in previous plan sections as YR 1 – YR 5.
- General inflation is assumed to be 3 percent per year over the entire time period. While current inflation estimates may be somewhat higher due to strong economic growth and oil prices, we assume that general inflation over the study period may be somewhat lower.
- Additional expense escalator is assumed to be 4 percent based on discussions with County staff. The additional expense escalator takes into account increases for certain operating expenses that are increasing at a higher rate than general inflation.
- Growth in customers and tonnage is based on the Transportation Plan as described in Section 2.
- 10 percent of the tonnage collected at the transfer stations is attributed to commercial customers; the remaining 90 percent is attributed to residential customers.
- 56 percent of the tonnage collected at the landfill is attributed to commercial customers; the remaining 44 percent is attributed to residential customers.
- Capital cost projections reflect the Division's current capital projections and include expenditures based on the WTE diversion scenario.
- Currently, all capital costs are paid for through assistance from the General Fund.

12.5 Methodology

The methodology used to develop the financial plan and user fee recommendations consisted of the following steps:

- Historical operating data, revenues and cost data for the period FY 2003-2005 were collected and analyzed to understand the baseline level of operations of the Division. We worked with County staff to understand historical changes in the various accounts in order to more accurately project account levels in the future.
- Actual and budget data for FYs 2006 and 2007 were similarly analyzed to understand the reasons for significant fluctuations in costs and revenues, if any.
- Working with County staff, we determined future impacts to cost accounts based on their expectations for future system performance. This assumes a status quo or baseline operating level.
- Projections for future revenues and operating costs for the period FY 2008-FY 2013 were developed.
- A financial operating statement showing historical and projected revenues, operating expenses for overall Division financial performance was developed.

- A cost-of-service analysis was completed for FY 2007 to determine unit costs for the various key solid waste system operating functions.

12.6 Summary of Results

Three financial analyses were prepared to analyze the projected Division operating and capital costs through FY 2013. A summary of the results follows:

Baseline Costs. Capital and operating costs, assuming *current level* of operations, were projected through FY 2013. Using cost per household per month as a basis, the FY 2009 cost was $29.40, increasing to $44.80 in FY 2013.

Recommended System Costs. Capital and operating costs, assuming the *recommended level* of operations, were projected through FY 2013. Using cost per household per month as a basis, the FY 2009 cost was $35.80, increasing to $85.90 in FY 2013.

Recommended System Costs Plus User Fee and PAYT. Capital and operating costs, assuming the *recommended level* of operations *plus a $12 monthly user fee starting in FY 2010 and PAYT component starting in FY 2013,* were projected through FY 2013. Using cost per household per month as a basis, the FY 2009 cost was $35.80, increasing to $70.77 in FY 2013.

Additional information on these results is provided later in this section and in Appendix A.

12.7 Projections of Customer Accounts, Solid Waste Managed and Operating Revenues

12.7.1 Residential Solid Waste Collection Accounts

Residential and commercial solid waste collection accounts were projected using the same growth assumptions described in Section 2. The projections assume that residential population growth will be approximately 1.72 percent per year and growth in commercial square footage will be approximately 4.84 percent[2] per year through the year 2013. These growth assumptions were applied to current household and commercial accounts to project accounts throughout the study period. Table 12-1 provides historical and projected accounts from FY 2003 – FY 2013.

[2] The 4.84 percent average annual growth in commercial square footage is based on the overall growth in commercial square footage for the County.

Table 12-1
Historical and Projected Division Accounts
Fiscal Years 2003-2013

	(1) Historical			(2) Estimate	Budget	Projected	'03-'08 Average Annual Growth
Customer Accounts	2003	2004	2005	2006	2007	2008	
Residential Households (3)	17,439	17,700	17,863	18,170	23,480	23,880	6.49%
Commercial	n/a	n/a	60	63	66	69	n/a
Total Customer Accounts	17,439	17,700	17,923	18,233	23,546	23,949	6.55%
Total Customer Accounts (rounded)	17,400	17,700	17,900	18,200	23,500	23,900	6.55%

	Projected (2)					'09-'13 Average Annual Growth
Customer Accounts	2009	2010	2011	2012	2013	
Residential Households	24,290	24,710	25,140	25,570	26,010	1.73%
Commercial	72	75	79	83	87	4.84%
Total Customer Accounts	24,362	24,785	25,219	25,653	26,097	1.73%
Total Customer Accounts (rounded)	24,400	24,800	25,200	25,700	26,100	1.70%

(1) Per the Division.
(2) Based on previous years' customer accounts times the growth rates for Residential Population and Commercial Square Footage, from the Kaua'i Long-Range Land Transportation Plan.
(3) Per the Division, FY 2007 includes an additional 5,000 households which had not been accounted for in previous years.

12.7.2 Solid Waste Quantities

Waste quantities were projected in Section 2 assuming an average annual growth rate of 3.8 percent for the County[3]. This is an average growth rate based on district-specific projections of waste quantities which used district-specific growth assumptions for population and commercial square footage. As detailed in Section 4, additional recycling activities will increase the amount of tonnage diverted from the landfill. Historical proportions of solid waste disposed, recyclable materials, solid waste transferred by residential, commercial and private hauler customers were applied to the projected total waste generated and disposed from Section 2.

Table 12-2 and Table 12-3 provide historical and projected waste quantities from FY 2003 – FY 2013.

[3] The average annual growth rate of 3.8% used in Section 2 is based on the growth rate from FY 2005 to FY 2020. The projected average annual growth rate of 3.93% shown in Table 12-3 is based on FY 2009 to FY 2013.

Table 12-2
Historical Waste Quantities
Fiscal Years 2003-2008

	Historical			(2) Estimate	(2) Budget	(2) Projected	'03-'08 Average Annual Growth
	2003	2004	2005	2006	2007	2008	
SOLID WASTE DISPOSED BY FUNCTION							
Solid Waste Generated							
Solid Waste Disposed (1)	81,062	86,465	89,156	92,910	96,870	101,050	4.51%
Recyclable Materials (1)	20,294	55,587	27,233	27,710	28,180	28,660	7.15%
Total Solid Waste Generated (1)	101,356	142,052	116,389	120,620	125,050	129,710	5.06%
Solid Waste Disposed (3)							
Solid Waste Transferred	34,169	37,775	38,902	40,100	41,800	43,610	5.00%
Solid Waste Direct-Haul	46,893	48,690	50,254	52,810	55,070	57,440	4.14%
Total Solid Waste Disposed	81,062	86,465	89,156	92,910	96,870	101,050	4.51%
SOLID WASTE DISPOSED BY GENERATOR							
Residential and Commercial & Private Hauler Waste Disposed (3)							
Residential	35,326	37,770	39,229	40,880	42,620	44,460	4.71%
Commercial & Private Hauler	45,737	48,695	49,927	52,030	54,250	56,590	4.35%
Total Residential and Commercial Waste Disposed	81,062	86,465	89,156	92,910	96,870	101,050	4.51%

(1) Historical data per: MSW Intake @ Kekaha Phase II by Origin, County of Kaua'i - Solid Waste, Materials Summary, and assumes Residential Mixed Rubbish of 44% and total Commercial Mixed Rubbish of 56%, based on tons disposed at landfill by residential and commercial customers in FY 2005.
(2) Estimate, Budget and Projected data for Solid Waste Disposed, Recyclable Materials and Total Solid Waste Generated per Section 2.
(3) Results from a 1997 Division study determined that 90% of the solid waste direct haul tonnage was from residential customers and 10% from commercial customers. Includes construction and demolition debris, sewage sludge, asbestos, animals and soils.

Table 12-3
Projected Waste Quantities
Fiscal Years 2009-20013 (YR 1-YR 5)

	Projected					'09-'13 Average Annual Growth
	2009	2010	2011	2012	2013	
SOLID WASTE DISPOSED BY FUNCTION						
Solid Waste Generated						
Solid Waste Disposed (1)	100,855	96,144	97,795	98,884	102,200	0.33%
Recyclable Materials (1)	33,815	43,716	47,565	52,176	54,930	12.90%
Total Solid Waste Generated (1)	134,670	139,860	145,360	151,060	157,130	3.93%
Solid Waste Disposed (2)						
Solid Waste Transferred	43,540	41,500	42,200	42,680	44,100	0.32%
Solid Waste Direct-Haul	57,315	54,644	55,595	56,204	58,100	0.34%
Total Solid Waste Disposed	100,855	96,144	97,795	98,884	102,200	0.33%
SOLID WASTE DISPOSED BY GENERATOR						
Residential and Commercial & Private Hauler Waste Disposed (2)						
Residential	44,380	42,300	43,030	43,510	44,970	0.33%
Commercial & Private Hauler	56,475	53,844	54,765	55,374	57,230	0.33%
Total Residential and Commercial Waste Disposed	100,855	96,144	97,795	98,884	102,200	0.33%

(1) Solid Waste Disposed, Recyclable Materials and Total Solid Waste Generated per Section 2, and include the waste reduction, reuse, recycling and bioconversion strategies that are presented in Sections 3, 4, 5 and 6.
(2) Estimate, Budget and Projected quantities are based on the historical (FY 2003 – FY 2005) average of the waste stream to the Solid Waste Generated. Includes construction and demolition debris, sewage sludge, asbestos, animals and soils.

Annual revenues of the Division primarily consist of a collection fee paid by the commercial customers, coupons which are by purchased by commercial customers at the Treasury Division, and collected at the transfer stations and disposal fees assessed at the landfill. A 10 percent rate increase on existing fees has been assumed in FY 2009 and FY 2012. Currently, the Division does not impose user fees on its residential customers. Tables 12-4 and 12-5 provide historical and projected operating revenues from FY 2003 – FY 2013.

Based on the diversion scenario chosen, it is assumed that revenues from the Landfill will cease after FY 2013, and the WTE facility will generate electric revenues of approximately $2.4 million - $2.7 million in FY 2013. (See Section 10 for details).

Table 12-4
Historical Division Operating Revenues
Fiscal Years 2003-2008

	Historical (1)			(1) Estimated	(1) Budget	(1) Projected	'03-'08 Average Annual Growth
	2003	2004	2005	2006	2007	2008	
Transfer Station Tipping Revenues							
Automobiles	$0	$0	$0	$0	$0	$0	n/a
½ ton Truck/Trailer	8,500	7,490	8,860	7,500	7,500	7,800	-1.70%
¾ ton Truck/Trailer(3)	11,160	11,660	5,660	10,000	10,000	10,400	-1.40%
Total Transfer Station Tipping Revenues	$19,660	$19,150	$14,520	$17,500	$17,500	$18,200	-1.53%
Commercial Collection Fee Revenues	$10,660	$10,338	$10,455	$9,000	$9,000	$9,400	-2.48%
Kekaha Landfill Disposal Revenues (4)	$2,417,015	$2,675,748	$2,313,756	$2,450,000	$2,450,000	$3,450,200	7.38%
Total Revenues	$2,447,335	$2,705,236	$2,338,731	$2,476,500	$2,476,500	$3,477,800	7.28%

(1) Sources: Historical data per Schedule of Revenues, Expenditures and Changes in Fund Balance and County Staff. Estimate and Budget data per County Staff.
(2) Projected Tipping Revenues based on the average annual growth in waste transferred. Commercial Collection Fee Revenues based on the average annual growth in commercial customer accounts. Landfill Disposal Revenues based on estimate of annual average growth in disposal quantities of commercial and private hauler direct-haul tonnage.
(3) FY 2005 revenues for 3/4 ton Truck/Trailer are unusually low for unknown reasons, per County Staff.
(4) In FY 2008 the County increased the tip fee from $56/ton to $80/ton.

Table 12-5
Projected Division Operating Revenues
Fiscal Years 2009-20013 (YR 1-YR 5)

	Projected					'09-'13 Average Annual Growth
	2009	2010	2011	2012	2013	
Transfer Station Tipping Revenues						
Automobiles	$0	$0	$0	$0	$0	n/a
½ ton Truck/Trailer	8,600	8,200	8,300	9,200	9,500	2.52%
¾ ton Truck/Trailer	11,400	10,900	11,100	12,300	12,700	2.74%
Total Transfer Station Tipping Revenues (1)	$20,000	$19,100	$19,400	$21,500	$22,200	2.64%
Commercial Collection Fee (1)	$10,300	$9,800	$10,000	$11,100	$11,500	2.79%
Kekaha Landfill Disposal Revenues (2)	$3,442,600	$3,282,700	$3,338,900	$3,713,400	$0	n/a
New Subtitle D Landfill Revenues (3)	$0	$0	$0	$0	$2,454,300	n/a
WTE Energy Revenues (4)	$0	$0	$0	$0	$2,550,000	n/a
Total Revenues	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000	9.75%

(1) Projected Tipping Revenues based on the average annual growth in waste transferred. Commercial Collection Fee Revenues based on the average annual growth in commercial customer accounts. Landfill Disposal Revenues based on estimate of annual average growth in disposal quantities of commercial and private hauler direct-haul tonnage.
(2) Assumes that Landfill Disposal Revenues cease after FY 2012 once the WTE Facility is fully operational in FY 2013.
(3) Based on a tip fee of $101/ton and approximately 5,000 tons of construction and demolition debris and 2,300 tons of unprocessable waste collected by commercial haulers, approximately 17,000 tons of by-pass waste and ash from the WTE facility.
(4) See Section 10 in the ISWMP for details, assumes $2.4M to $2.7M of projected revenues from energy sales.

As will be discussed later in further detail, one of the key tasks in this study was to determine the annual revenue required to be derived from residential and commercial collection user fees so that, when combined with the Division's other revenue sources, total revenues will be sufficient to pay all of the Division's operating expenses and (any future) debt service. The Division currently depends on assistance from the General Fund to pay for some operating expenses and all capital expenses.

12.8 Operating Expenses

Annual operating expense projections include direct salary costs, fringe benefits, equipment and current expenses for collection, transfer station, disposal, recycling and green waste operations provided by the Division. Table 12-6 summarizes the Division's historical operating expenses.

Table 12-6
Historical Division Operating Expenses
Fiscal Years 2003-2008

	Historical (1)			(1) Estimated	(1) Budget	(2) Projected	'03-'08 Average Annual Growth
	2003	2004	2005	2006	2007	2008	
Residential Collection	$776,600	$839,900	$1,347,100	$1,395,100	$2,136,700	$1,458,300	20.32%
Commercial Collection	18,200	25,800	33,500	35,700	34,800	37,100	15.31%
Transfer Station	1,108,200	1,153,600	1,620,700	1,882,400	2,335,600	2,396,600	16.68%
Landfill	3,201,400	3,622,200	4,343,600	4,842,300	4,847,800	5,237,900	10.35%
Recycling	1,019,800	895,200	974,900	1,424,100	1,448,700	1,355,400	1.81%
Green waste	137,400	575,900	692,900	577,700	800,200	832,200	43.37%
Total Operating Expenses	$6,261,600	$7,112,600	$9,012,700	$10,157,300	$11,603,800	$11,317,500	43.37%

(1) FY 2003 - FY 2005 per Budget Preparation worksheet. FY 2005 includes Additional Expenses per County Staff. These services are provided to the Solid Waste Division by other County departments. Source: FY 2006 and FY 2007 per approved budget.
(2) Projected data based on previous year's expense times either the 3.0 percent general inflation or 7.0% additional expense escalator.

The large increase in green waste expenditures between FY 2003 and FY 2004 is based on an additional $429,000 of expenses for green waste processing. The large increase in total operating expenses between FY 2004 and FY 2005 is due to additional expenses for services by other departments that are provided to the Division. Additional expenses include services provided by the Highway Division for assistance with bulky item pickup, fuel and fleet maintenance costs.

Budgeted FY 2007 Recycling expenses include an increase of approximately $376,000, due primarily to increases in white goods hauling expenses; however, this program will cease operation after 2007.

12.8.1 Key Assumptions Used in Projecting Operating Expenses

The key assumptions used in the projection of operating expenses are as follows:

- General inflation for the study period is assumed to be 3 percent.
- Additional expense escalator is assumed to be 4 percent for certain expenses.
- The additional expense escalator of 7 percent is applied to Administrative, Salaries and Benefits, Central Services Cost, Utilities, Other and Other Contractual Services expense categories.
- Recommended ISWMP Programs and Strategies will begin in FY 2009.
    - Landfill operations will cease after FY 2013, but a low level of support will be maintained in subsequent years.
    - WTE Facility will be operational in FY 2013.

Table 12-7 summarizes the Division's projected operating expenses.

Table 12-7
Projected Division Operating Expenses
Fiscal Years 2009-2013 (YR 1 – YR 5)

	Projected (1)					'09-'13 Average Annual Growth
	2009	2010	2011	2012	2013	
Residential Collection	$1,541,000	$1,628,900	$1,722,400	$1,822,000	$1,927,900	5.76%
Commercial Collection	38,900	41,000	43,200	45,400	47,800	5.29%
Transfer Station	2,167,300	2,294,300	2,429,600	2,573,600	2,726,700	5.91%
Landfill	5,458,400	5,594,300	5,907,600	6,161,900	6,515,800	4.53%
Recycling	1,272,100	1,316,800	1,363,300	1,411,800	1,462,300	3.54%
Green waste	865,700	900,700	937,500	976,200	1,016,700	4.10%
WTE Operating Costs	0	0	0	0	4,004,200	n/a
Recommended ISWMP Programs and Strategies	2,001,500	4,450,000	7,583,400	2,341,000	5,972,900	31.43
Total Operating Expenses	$13,344,900	$16,226,000	$19,987,000	$15,331,900	$23,674,300	15.41%

(1) Based on previous year's expense times either the 3.0% general inflation or 7.0 percent additional expense escalator.

12.8.2 Residential Collection Expenses

Residential collection costs are based on providing services to the Division's 17,900 customers, which includes approximately 30 duplexes in FY 2005. Residential collection costs also include internal administrative costs, and costs associated with collecting bulky items and depositing them at the County landfill. Costs that were split between residential and commercial collection were allocated 99.5 percent to residential and 0.5 percent to commercial. This split is based on the percent of residential customers as compared to the total number of customers served by the Division.

12.8.3 Commercial Collection Expenses

Commercial collection costs are based on providing services to the Division's 80 commercial customers in FY 2005 and internal administrative costs. As mentioned above, costs that were split between residential and commercial collection were allocated 99.5 percent to residential and 0.5 percent to commercial. This split is based on the percent of commercial customers as compared to the total number of customers served by the Division.

12.8.4 Transfer Station Expenses

Transfer station costs are based on providing service at the Division's four transfer stations and internal administrative costs. Based on a study completed by the Division in 1997, it is estimated that approximately 90 percent of the waste received at the transfer station is from residential customers, the remaining 10 percent is from commercial customers. Projections include approximately $690,000 in FY 2007 and $640,000 in FY 2008 for purchases of heavy equipment.

12.8.5 Landfill Expenses

Landfill expenses include post closure fees, the fee paid to Waste Management for operations of the landfill, the solid waste surcharge paid to the State and internal administrative costs. It is estimated that approximately 44 percent of total landfill tonnage is from residential customers and the remaining 56 percent from commercial customers. Increases in this category reflect annual increases of approximately 4.6 percent, which are based on the growth in tonnage quantities and inflation adjustments per contractual agreement with Waste Management for FY 2008.

Based on the diversion scenario, it is assumed that the Landfill will cease operations after FY 2012.

12.8.6 Recycling Expenses

Recycling expenses include the contract with Garden Isle Disposal to operate the Kaua'i Recycles drop-off sites, HHW program, public education, electronics recycling, white goods hauling and Kaua'i Recycle Center, as well as internal administrative costs.

12.8.7 Green Waste Expenses

Green waste expenses include processing of green waste, internal administrative costs, salaries, equipment costs as well as costs for contracted services. Budgeted FY 2007 includes an increase of approximately $232,000 for expenses related to green waste processing.

12.8.8 Recommended Plan Program & Strategies

Beginning in FY 2009, recycling will incur an additional $536,500 per year; this will increase to approximately $1.9M by FY 2013. This increase is based primarily on the implementation of residential curbside recycling program, operating costs for the materials recovery facility (MRF) and additional staff. See Table 6 in Appendix A for more details.

Additional green waste expenses of approximately $6.3 million will be incurred over the FY 2009-FY 2013 period as curbside green waste collection is implemented. See Table 6 in Appendix A for more details.

As detailed in Section 10, a WTE Facility will be constructed and operational by FY 2013. It is assumed that annual operations for the facility will be approximately $4.7 million in FY 2013.

12.9 Capital Expenditures

Capital expenditures are based on a combination of the Division's project-specific capital expenditure budget for the time period FY 2009 to FY 2013, which are based on existing operating conditions, and additional capital expenditures identified in the Plan.

12.9.1 Key Assumptions

The key assumptions used in the projections of capital expenditures and funding sources are as follows:

- The recommended capital expenditures were estimated based on industry experience and adjusted for inflation of 3.0 percent.
- Approximately 93 percent of the capital expenditures over the planning period will be funded through long-term debt, which is assumed to be issued at a rate of 5.0 percent with a repayment period of 20 years.
- Approximately 7 percent of the capital expenditures over the planning period will be funded through short-term debt, which is assumed to be issued at a rate of 5.0 percent with a repayment period of 10 years.
- Bond financing expense is assumed to be 1.5 percent.
- More than $98.6 million in bonds will be sold by the County over the planning period (FY 2009-FY 2013) to fund capital projects.

Table 12-8 summarizes the projected capital expenditures and sources of funds for the period, FY 2009 – FY 2013. It is assumed that all of the capital expenditures will be funded through a combination of short-term and long-term debt. It is assumed that the Division will be responsible for all future debt service payments.

Table 12-8
Projected Capital Expenditures and Sources of Funding
Fiscal Years 2009-2013

	Projected				
	2009	2010	2011	2012	2013
Projected Capital Expenditures (1,2)					
Puhi Metals Recycling Center Site	$0	$0	$615,300	$0	$0
Materials Recovery Facility (MRF)	650,000	1,030,000	4,774,100	0	0
Central Composting Site	0	669,500	4,758,100	437,100	5,953,900
Kekaha Landfill Lateral Expansion	7,000,000	0	0	0	0
Development of New Subtitle D Landfill	0	0	636,500	9,834,500	0
Construction of Waste-To-Energy Facility	0	0	17,080,500	17,592,900	18,120,700
Construction of a HHW & Electronics Recycling Center	0	0	708,900	0	0
Upgrade Kapaa Refuse Transfer Station	0	2,482,300	0	0	0
Upgrade Hanalei Transfer Station	0	0	1,591,400	0	0
Upgrade Hanapepe Transfer Station	0	0	1,591,400	0	0
Upgrade Lihue Transfer Station	0	0	1,591,400	0	0
Total Capital Expenditures	$7,650,000	$4,181,800	$33,347,600	$27,864,500	$24,074,600

(1) Source: Capital expenditures are based on the Division's project-specific capital expenditure budget for FY 2009 to FY 2013. Additional capital expenditures have been included based on the ISWMP.
(2) Project costs include 3.0% annual inflation.

12.9.1.1 Puhi Metals Recycling Center Site

The Division is planning for the installation of a fourth groundwater well at this site at a cost of approximately $80,000 (in FY 2009 dollars). The purpose of these wells is to monitor and detect potential groundwater contamination at the site. The addition of this well will provide enhanced monitoring and detection capabilities. Plans to purchase the Puhi Metals site in the future are under consideration. The current estimated costs to purchase the land from Grove Farm are $500,000 (in FY 2009 dollars). These expenditures are expected to occur in FY 2011.

12.9.1.2 Materials Recovery Facility (MRF)

The County will begin the planning and siting process in 2009 for a Materials Recovery Facility (MRF) to process recyclable materials. The County plans to consider working with a private firm to operate the facility, as well as market the recyclable materials. The facility is tentatively scheduled to be operational by 2012. It is estimated that the facility will cost $5.5 to $6.5 million (escalated) to construct, and approximately $650,000 a year to operate starting in FY 2012, assuming the facility processes between 15,000 and 17,000 tons of residential and commercial recyclable materials annually.

12.9.1.3 Central Composting Site

The County will develop a centralized organics processing facility starting in FY 2010. The County will contract with a private vendor to construct, equip and operate the composting facility, as well as market the compost. Total construction costs are estimated at $11,818,600.

12.9.1.4 Kekaha Landfill Lateral Expansion

A lateral expansion of the Landfill is estimated to provide an additional 5-6 years of capacity under current operating conditions. The total project costs are estimated to be approximately $7,000,000 and include costs for planning (EA/EIS, permits, engineering studies), design (plans, construction specs, bid documents) and construction (construction and construction management). The project is expected to begin in FY 2009 and be completed by FY 2011. More detail on these costs and related assumptions are provided in Section 8.

12.9.1.5 Development of New Subtitle D Landfill

Per Section 8, the Division will begin financing construction on a New Subtitle D Landfill in FY 2009, at a cost of $10,471,000. Construction on the New Subtitle D Landfill will begin in 2011. Initially, a 5-acre lined landfill will be constructed. The initial cell will consist of one, 2-acre cell for separate disposal of ash and one, 3-acre cell for by-pass waste. Landfill expansions occur approximately every 5 years thereafter. The lined landfill area will expand to a total of 8 cells over 20 acres during the 20-year life of the facility. The total facility size, including a 500 foot buffer, is 86 acres. More detail on these costs and related assumptions are provided in Section 8.

12.9.1.6 Construction of a Waste-To-Energy Facility

Per Section 10, construction of the Waste-To-Energy Facility includes provision for the construction of the facility excluding electrical interconnection. The 200-tpd facility would consist of one furnace-boiler. The average estimated construction cost is $52,794,100 and completion is estimated for FY 2013. Annual debt service payments for a 20 year period are projected at $4.3 million. See Section 10 and the Recommended Action Plan for planning level costs. The estimated monthly costs per household for development of the WTE is $28 based on a facility sized for 200 TPD. However, this does not consider the offset from the sale of energy. See footnote #12 for Table 1-7 in the Recommended Action Plan.

12.9.1.7 Construction of a HHW & Electronics Recycling Center

As detailed in Section 6, it is assumed that the Division will construct a HHW & Electronics Recycling Center in FY 2011. The total project cost is estimated to be $708,900.

12.9.1.8 Upgrade Transfer Stations

Tables 8-3 and 8-4 in Section 8 of the Report detail recommended upgrades to the transfer stations. It is assumed the upgrades at the Kapaa Refuse Transfer Station will cost approximately $2,482,300 in FY 2010. Upgrades at the Hanalei, Hanapepe and Lihue transfer stations will each cost approximately $1,591,400 in FY 2011.

12.10 Financial Planning Analysis Results

The previous sections summarize the individual components of the financial plan including:

- Customer and quantity projections;
- Revenue projections;
- Operating expense projections; and
- Capital expenditure and financing projections.

Table 12-9 summarizes the Division's revenues and expenses.

Future revenues from residential collection fees, which are projected to be implemented in FY 2010, will offset General Fund assistance of Division operations.

Typically, enterprise based funds use financial benchmarks such as debt service coverage and level of operating reserve to determine the adequacy of projected revenues. An estimate of a certain number of days of operating expenses (e.g. 30 to 45 days, is often used) as a basis for an estimate of an end of year operating fund balance. This balance is often maintained to be used as an emergency resource. As the Division is part of the County, in this scenario, a minimum balance for the operating fund was not established, and end of year balances are equal to $0.

Table 12-9
Projected Operating Statement
Fiscal Years 2009-2013

	Projected (1)				
	2009	2010	2011	2012	2013
REVENUES					
Transfer Station Tipping Fees	$20,000	$19,100	$19,400	$21,500	$22,200
Commercial Collection Fee	10,300	9,800	10,000	11,100	11,500
Landfill Disposal Fees	3,442,600	3,282,700	3,338,900	3,713,400	0
WTE Energy Revenues	0	0	0	0	2,550,000
Total Tipping & Disposal Revenues	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000
RESIDENTIAL COLLECTION FEE REVENUES (2)	$0	$3,571,200	$3,737,700	$3,926,200	$4,733,300
OTHER REVENUES					
Rents and Concessions	$12,000	$12,000	$12,000	$12,000	$12,000
Interest	0	0	0	0	0
Total Other Revenues	$12,000	$12,000	$12,000	$12,000	$12,000
TOTAL REVENUES	$3,484,900	$6,894,800	$7,118,000	$7,684,200	$9,783,300
OPERATING EXPENSES					
Residential Collection	$1,541,000	$1,628,900	$1,722,400	$1,822,000	$1,927,900
Commercial Collection	38,900	41,000	43,200	45,400	47,800
Transfer Station	2,167,300	2,294,300	2,429,600	2,573,600	2,726,700
Landfill	5,458,400	5,594,300	5,907,600	6,161,900	6,515,800
Recycling	1,272,100	1,316,800	1,363,300	1,411,800	1,462,300
Green waste	865,700	900,700	937,500	976,200	1,016,700
WTE Operating Costs	0	0	0	0	4,004,200
Recommended ISWMP Programs And Strategies	2,001,500	4,450,000	7,583,400	2,341,000	5,972,900
TOTAL EXPENDITURES (3)	$13,344,900	$16,226,000	$19,987,000	$15,331,900	$23,674,300
NET OP. REVENUES	($9,860,000)	($9,331,200)	($12,869,000)	($7,647,700)	($13,891,000)
GENERAL FUND ASSISTANCE (4)	$10,483,000	$10,418,900	$16,911,300	$13,959,500	$22,163,600
FUNDS AVAILABLE FOR CAPITAL EXPENDITURES	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
DEBT SERVICE	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
CASH FINANCED CAPITAL	0	0	0	0	0
TOTAL CAPITAL RELATED EXPENSES	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
NET INCOME	$0	$0	$0	$0	$0
RECOMMENDED RESIDENTIAL SOLID WASTE FEE per RESIDENTIAL/MULTI-FAMILY UNIT ($/Month) (5)	$0.00	$12.00	$12.36	$12.73	$13.11
PAYT Component (6)	$0.00	$0.00	$0.00	$0.00	$2.00
TOTAL COLLECTION FEE	$0.00	$12.00	$12.36	$12.73	$15.11

(1) Source: Projected Capital Expenditures and Sources of Funds per County staff, includes 3% annual inflation.
(2) Additional Rate Revenue based on implementation of a Residential collection fee of $12/month starting in FY 2010.
(3) Total expenditures include additional costs incurred by other County Divisions that provide solid waste services.
(4) Based on Total Revenues less Total Expenditures plus Total Capital Expenditures and maintaining a Net Income equal to zero.
(5) Based on implementing a Residential Solid Waste Fee in FY 2010. FY 2011 and beyond increase by annual inflation of 3 percent per year.
(6) The PAYT component is assessed to households that do not participate in the additional recycling efforts. This fee represents the incremental disposal costs incurred as a lack of their participation in the recycling efforts.

The results of Table 12-9 indicate that additional sources of revenue collected from the WTE Facility and the Recommended Residential Solid Waste Fee will not be sufficient to cover the Division's Operating and Capital Related Expenses, which include the recommended ISWMP Programs and Strategies. The General Fund Assistance which is projected at approximately $10.5M in FY 2009 will increase to more than $22.2M by FY 2013. Using cost per household per month as a basis, the FY 2009 cost was $35.80, increasing to $70.77 in FY 2013. See Appendix A, tables 9 and 10 for more information.

12.11 FY 2007 Cost of Service Results

The design of an equitable solid waste fee typically starts with a cost-of-service analysis that includes the appropriate allocation of revenue requirements to each cost center. The allocation among the various cost centers takes into account direct costs that are associated with the cost center, such as labor, equipment and supplies, as well as indirect or overhead costs. By allocating costs in this way, a rate structure can be developed to appropriately recover costs from customers that are benefiting from the services of the respective cost center.

Budgeted FY 2007 operating and maintenance expenditures of the Division were allocated to the following cost centers: collection, transfer stations, landfill, recycling, and green waste based on input from County staff. Capital expenditures are not included since these costs are currently entirely paid for by the County. For future planning, capital costs will be included as part of the cost of service.

Table 12-10 summarizes the total costs, units of service and unit costs for each of the cost centers. These results represent the baseline operating scenario. See Appendix B for further details regarding the FY 2007 Operating Cost of Service Analysis.

Table 12-10
FY 2007 Operating Cost of Service

	Estimated FY 2007 Unit Cost			
	Cost	Units of Service	Unit	Unit Cost
Residential Collection	$2,136,700			
Commercial Collection	34,800			
Total Collection	$2,171,500	23,546	customers	$7.70 $/month/customer
Transfer Station	$2,335,600	41,800	tons	$55.90 $/ton
Landfill	4,847,800	96,870	tons	$50.00 $/ton
Greenwaste & Recycling	2,248,900	28,180	tons	$79.80 $/ton
Total Costs	$11,603,800			$32.30 per household/month[1]

[1] Net of existing revenues of approximately $2.5 million.

If the Division were to implement a user-fee that recovered all its costs, it is estimated that the user fee for FY 2010 would be $35.75 per month per residential household. In discussions with County staff, it was determined that a flat rate user fee of $12/household/month, approximately, 34 percent of the estimated cost of service, would be an appropriate level for consideration by the County for implementation.

As part of the Division's goal of increasing diversion, a PAYT fee is proposed to be implemented in FY 2013 (YR 5), when the curbside recycling and green waste initiatives are fully operational. The PAYT fee estimated at $2.00 per household in FY 2013 is intended to provide a financial incentive for residents to participate in the curbside recycling program. Households not participating in curbside recycling would pay the flat rate user fee plus the PAYT fee. The PAYT fee is based on the additional cost of disposing materials that could have been recycled.

12.12 Collection Fee Analysis

12.12.1 Introduction

The Division is planning to implement new solid waste user fees for residential households in FY 2010. This would enable the Division to move closer to operating on an enterprise fund basis. While the recommended user fee level for FY 2010 ($12/household/month) is about one-third of the full cost of service, the implementation of this fee is a step towards operating as a self-sufficient enterprise fund. Under a full cost of service-based user fee, the amount of revenues collected through the solid waste user fee, as well as transfer station and landfill revenues, would be sufficient to pay for required O&M and capital expenditures. Only one county in the state, Maui County, has implemented solid waste user fees to-date. The

current automated and manual residential solid waste user fee for Maui County is $12 per month. Maui residents on the automated system are limited to one 96-gallon can with twice a week pick-up. Maui County plans to move to once a week pickup. Residents on the manual system are limited to six 32-gallon cans with once a week pick-up. Revenues under current rates recover approximately 60 percent of Maui County's cost-of-service. Honolulu has automated collection with twice a week pickup. They have considered solid waste user fees for decades but have not implemented these fees. The County of Hawai'i does not provide residential collection of solid waste.

12.12.2 Key Rate Implementation Issues

As noted earlier in this section, the results of the last ISWMP indicated that there was moderate support for residential solid waste user fees. Based on the results of SWAC meetings in the current update of the ISWMP, it appears that support for a residential solid waste user fee has increased. In addition to the analysis yet to come, a number of issues will need to be considered in the implementation of such a fee.

12.12.2.1 Billing Administration Options

The Division has the option of expanding the existing system that is now used to administer and collect commercial collection fees to also collect residential solid waste user fees. This expansion may require the County to consider creating a separate collections division in the Finance Department to handle the increased work load. The additional costs for this service could be charged to the Solid Waste Division.

Alternatively, since the solid waste residential customer base appears to be similar in size to the Department of Water (DOW) customer base, the Division may want to explore the possibility of paying the DOW a fee to administer and collect solid waste user fees. The County will also explore placing solid waste user fees on the real property tax bill.

12.12.2.2 Confirm Legality of Solid Waste User Fee

Meet with corporation counsel or other applicable agencies to confirm legality of fee implementation as planned (flat monthly fee for all residents) and requirements for rate ordinance.

12.12.2.3 Stakeholder Education and Involvement Efforts

The concept of an enterprise fund is an important piece of information that needs to be communicated to stakeholders (customers and decision makers) and can lay the groundwork for greater acceptance of solid waste user fees. It can be anticipated that there will be resistance from customers who question the need for such fees without a corresponding reduction in property taxes (which are currently being used in part to fund solid waste services).

We recommend that the Division undertake an active and deliberate campaign to educate and inform the public about the need for the user fees. While there are various ways to do this, a general approach would include the following messages:

- Who we are – information and background about the Division and the solid waste program, its current operations and future plans and goals.
- What we do – information about collection and disposal services including statistics of service levels.
- What it costs to provide service – certain output from the financial plan can be shared with stakeholders including future capital projects.
- How other solid waste utilities charge for service – examples of other comparable size utilities rates and charges.
- Proposed user fees for solid waste program customers – discussion of the specific elements of the user fee proposal.

A consistent message should be presented at public meetings around the island and at focused meetings with specific customer groups, such as small businesses or political entities like the County Council. The County may want to consider enlisting the services of a public relations firm to assist Division staff in the implementation of this approach.

12.12.2.4 Customer Service Training

New user fees will most likely generate a number of customer inquiries in the first few months of implementation. Additional staff positions will need to be included in the financial plan to address customer service related issues. Training for these staff should include information similar to that provided at public hearings as described earlier. In addition, general customer service training on issues such as billing administration and revenue collection needs to be conducted prior to a user fee implementation.

Section 13
ENERGY BALANCE

13.1 Purpose

Energy is a valuable and critical resource within the State of Hawai‘i. Because Hawai‘i is isolated from the U.S. mainland, its energy infrastructure and consumption are unique amongst the States. Hawai‘i depends heavily on imported fossil fuels to meet energy demand. Close to 90 percent of Hawai‘i’s energy comes from petroleum and petroleum-fired plants supply more than three-fourths of Hawai‘i’s electricity generation. The remaining ten percent is a combination of synthetic natural gas, coal and renewable energy[1].

In Kaua‘i, purchase of fuel constitutes a substantial flow of money out of the local economy. Replacement of imported fuel with renewable energy produced on Kaua‘i would provide jobs and retain money to circulate and strengthen the island’s economy[2]. Renewable energy opportunities include generating energy from solid waste or from biomass crops; producing liquid fuels from biomass crops; and developing solar and wind generation facilities, either large- or small scale. Developing additional hydro-electric power should be considered[3].

Therefore, this Plan section evaluates the impact of key components of the Kaua‘i proposed solid waste management system on reducing dependency on fossil fuels and increasing the amount of energy that is created through converting waste to energy.

13.2 Background

13.2.1 Legislative

HRS 342G-26 (d) requires that the energy component of the Plan describe the programs by which the county will investigate or incorporate ways of increasing the energy efficiency of the solid waste management process, including the assessment of energy and fuel-production options such as composting, anaerobic digestion, acid hydrolysis, or a combination thereof. The energy component shall identify and assess:

- The amount of energy input, including, but not limited to, electrical power, gasoline, diesel fuel, coal, natural gas, propane, kerosene, and heating oil required

[1] Energy Information Administration – State Energy Profiles: July, 2007.
[2] 20-Year General Plan for Kaua‘i.
[3] Ibid

by the plan for the accomplishment of collection, recycling, composting, bioconversion, waste handling, disposal and landfill;

- The amount of energy produced from waste, including electricity, natural gas, hydrogen and liquid fuels such as ethanol or methanol;
- The net energy use or energy production to the solid waste program. Where feasible, this assessment shall include energy used in the original manufacture of these goods. National averages of energy consumed may be incorporated in these estimates; and
- Methods by which energy use may be decreased or net energy or fuels production may be increased.

13.2.2 1994 Plan

The 1994 Plan recognized that certain components of the solid waste system could not be effectively changed in the short term to address important energy issues. The location of the Kekaha Landfill was one such issue. However, the 1994 Plan recommended that when future solid waste management facility sites are evaluated, the energy impacts associated with hauling due to distance and traffic should be considered. Also, the 1994 Plan recommended that as existing equipment requirements and fuels suppliers were replaced by another system, that ultimate impacts be considered.

To achieve short-term benefits, the 1994 Plan focused on a few key policy, program, or operational issues that would yield significant energy impacts. For each recommendation, the energy advantages and disadvantages are included, as well as the status of the County implementing the recommendation.

Recommendation 1: Community-Based Curbside Recycling		
Energy Advantages	Energy Disadvantages	Implementation Status
▪ County-wide roadside recyclables collection with special routes is not required; trucks will not operate in areas where high participation is not anticipated. ▪ Residents of various communities will take ownership in the available collection program and are able to participate in implementing energy and cost-saving elements suited to their area. ▪ Greater personal and community involvement in recycling process has the potential to elevate the general awareness of environmental and energy issues.	▪ Many residents or businesses wishing to recycle will have to individually deliver their material to the nearest available drop-off collection site; this has the potential for waste energy. ▪ Less total material may be recovered then from island-wide comprehensive roadside collection effort; this may result in lowered energy efficiency if less total material is available to ship or market. ▪ Greater diversity in the types of collection vehicles and strategies could result in a wide range of program costs and energy impacts.	▪ Recommendation was not implemented.

Recommendation 2: (a) Institute fill-cost accounting, (b) make waste management costs explicit, and (c) Implement variable rates for collection		
Energy Advantages	Energy Disadvantages	Implementation Status
▪ Community awareness on environmental and energy issues will be increased; residents will be provided with financial incentives for personal action. ▪ Incentives will be provided to generate less waste and consume fewer products that produce waste; this will reduce the amount of energy used to ship the material to the island.	▪ Illegal dumping may increase; energy will be expended in cleaning-up and enforcing this situation. ▪ Daily or weekly volumes of waste may be reduced; this could lower the energy efficiency of public and private collection operations.	▪ Recommendation was not implemented.

Recommendation 3: Establish Kaua'i Recycling Stations		
Energy Advantages	Energy Disadvantages	Implementation Status
▪ Most residents will have a reduced distance to travel to deliver hurricane-related, source-separated green waste, C&D debris, appliances and bulky items. ▪ Resource exchanges will facilitate the reuse of building and other reusable materials; reducing energy expenditures in bringing new materials to the island and transporting material to the landfill. ▪ Material processing and diversion at the sites will reduce the quantity of material to be transported for landfill disposal and will make secondary material available to local and global markets, saving energy required to manufacture from virgin feed stock. ▪ Biofuel will become available for energy recovery and power generation.	▪ Energy will be expanded in developing and operating the sites. ▪ Ongoing benefits from energy already expended in developing temporary sites will be reduced.	▪ The Kaua'i recycling stations, known as the Kaua'i Recycling Drop Bin Program were established. The Recycling Drop Bins do not accept source separated green waste, C&D debris or bulky items. However, each of the County's 4 transfer stations and the Kekaha Landfill accept source-separated green waste and the transfer stations accept C&D that is less than 3 feet in length. The Lihue Transfer Station accepts bulky items. ▪ A resource exchange was not established at the Kaua'i drop bin sites and biofuel was not produced.

Recommendation 4: Contract for (a) processing of various hurricane debris, (b) construction and possible operation of the Kekaha Phase II landfill. And (c) other facility or program operations (including recyclables collection and green waste processing. Where appropriate, contractors or proposers will be asked to identify energy ratings and/or power and fuel requirements of their proposed equipment and operations; for certain operations, vendors will be required to submit reports on their energy utilization		
Energy Advantages	Energy Disadvantages	Implementation Status
▪ Competitive contracting requires operators to minimize their costs of operating; this generally equates to minimizing their expenditures for wasted energy.	▪ The County has limited control over the equipment selected by contractors and their attention to maintaining energy efficient operations.	▪ The County has contracted for the operation of the Kekaha Phase II landfill and green waste processing. ▪ The County has not experienced another hurricane since the 1994 Plan. ▪ The County did not institute a curbside recycling program, but does contract with a private company to transport and process the recyclables from the community drop-bin program.

Recommendation 5: Develop long-range educational strategies, themes and logos		
Energy Advantages	Energy Disadvantages	Implementation Status
▪ Energy advantages of adopted program can be communicated. ▪ Community awareness on environmental and energy issues will be increased.	▪ Solid waste educational strategies my conflict with messages and information provided by other agencies addressing energy and other resource issues.	▪ Program was not implemented.

13.3 Plan Impact on Energy Balance

While most activities associated with operating a solid waste management system have some impact on energy consumption, the following components of the Plan will most likely have the most significant impact:

- Curbside collection and processing of residential mixed recyclables;
- Curbside collection and composting of green waste; and
- Converting waste into energy.

Therefore, the impact of these components of the proposed County solid waste management system were analyzed using the EPA WARM Model.[4] To compare the impact of these proposed initiatives to 2005 activities, all analysis was based on 2005 generation quantities with landfill diversion and disposal quantities being adjusted based on the recommended program.

13.3.1 Curbside Collection and Processing of Mixed Recyclables

As discussed in Section 4, the County plans to implement every other week curbside recycling program to coincide with a variable rate pay structure (Pay-As-You-Throw) for County residential customers. As shown in Table 13-1, 13,063 tons of the residential materials that will be targeted for the curbside recycling program were generated in 2005. Of that generation quantity, 2,518 tons were recycled at the drop-off sites or delivered were delivered to the KRC and 10,574 tons were landfill disposed.

Table 13-1
Baseline Recycling Quantities for Targeted Materials

Material	Tons Generated	Tons Recycled	Tons Landfilled
Aluminum Cans	206	70	136
Glass	3,334	1,843	1,491
HDPE	592	30	562
PET	428	50	378
Corrugated Cardboard	1,922	96	1,825
Newspaper	2,244	88	2,156
Mixed Paper	4,337	341	3,966
TOTAL	13,063	2,518	10,514

As shown in Table 13-2, if the County institutes a curbside recycling program, an additional 2,507 tons of these materials would be recycled[5].

[4] www.epa.gov
[5] This is based on 2005 waste stream disposal quantities for targeted materials.

Table 13-2
Additional Residential Recycling Quantities

Material	Baseline Generation	Additional Tons Recycled	Total Tons Recycled	Tons Landfilled
Aluminum Cans	206	40	110	96
Glass	3,334	639	2,482	852
HDPE	592	114	144	448
PET	428	82	132	296
Corrugated Cardboard	1,922	369	465	1,457
Newspaper	2,244	431	519	1,726
Mixed Paper	4,337	832	1,173	3,164
TOTAL	13,063	2,507	5,024	8,039

To calculate the impact of recycling on energy use, the following assumptions were entered into the WARM model:

- The landfill that serves Kaua‘i does not have a landfill gas recovery system;
- On-land transportation for the collection of recyclables is 20 miles;
- The distance to recycling markets is 3,500 container ship miles; and
- 10.24 container ship miles is equivalent to 1 land truck mile[6] [7]

As shown in Tables 13-3 and 13-4, over 50,000 mm BTUs of energy will be saved by converting from a drop-off program for recyclables to a curbside collection program for recyclables.

[6] The WARM Model requires that land miles be used.
[7] Based on data from EPA’s Smart Way Transportation Initiative.

Table 13-3
Existing Recycling Program
Energy Savings

Commodity	Tons Recycled	Tons Landfilled	Total Million BTU
Aluminum Cans	70	136	-14,329
Glass	1,843	1,491	-1,752
HDPE	30	562	-1,229
PET	50	378	-2,418
Corrugated Cardboard	96	1,825	-518
Newspaper	88	2,156	-334
Mixed Paper	341	3,996	-5,606
TOTAL	2,518	10,544	-26,186

Table 13-4
Proposed Recycling Program
Energy Savings

Commodity	Additional Tons Recycled	Tons Landfilled	Total Million BTU
Aluminum Cans	40	96	-22,574
Glass	639	852	-2,924
HDPE	114	448	-6,999
PET	82	296	-6,726
Corrugated Cardboard	369	1,457	-6,092
Newspaper	431	1,726	-7,309
Mixed Paper	832	3,164	-24,444
TOTAL	2,507	8,039	-77,068

The above represents the incremental benefit by adding a curbside recycling program to the County's existing residential recycling system of drop-off recycling and KRC.

According to the WARM model, the net energy benefits of the new program are equivalent to:

- Annual energy consumption for 269 households;
- 8,773 barrels of oil; and
- 406,826 gallons of gasoline.

The net benefits take into account the energy that was used to collect, process, and transport recyclables.

13.3.2 Curbside Collection and Composting of Green Waste

As discussed in Section 4, the County will institute a curbside collection program for green waste. In 2005, an estimated 13,488 tons of residential green waste were generated. Of that amount, 10,535 tons were composted or mulched, and 2,953 tons were landfill disposed. When the County institutes the curbside collection and composting, it is projected that an additional 2,658 tons of yard waste will be composted.[8]

For the WARM model, it was assumed that all green waste would be processed and composted on Kaua‘i and collection routes would be 20 miles in length. Converse to the results of the energy analysis of the curbside collection and processing of mixed recyclables, converting from a drop off to curbside collection program for green waste is projected to increase energy consumption by 150 mm BTUs. This is because creating compost from green waste does not necessarily displace the use of raw materials, which use oil for transportation and production, when manufacturing a product. In other words, for the purposes of this analysis we have not assumed compost displaces solid conditioner or another similar product that is manufactured and imported to Kaua‘i. With future evolution and maturity of the markets for compost, this assumption may need to be modified to accurately reflect the comparison. Therefore, the results of our analysis presently suggest the energy required to transport and compost green waste is not offset by energy savings from the production process and its reuse.

According to the WARM the increase energy use is equivalent to:

- Annual energy consumption for one household;
- 26 barrels of oil; and
- 1,203 gallons of gasoline.

The net benefits take into account the energy that was used to collect and compost green waste.

13.3.3 Converting Waste into Energy

When the Landfill closes, the County will plans to replace this facility with a WTE facility. For the WARM Model, it was assumed that 90 percent of the 36,727 of residential solid waste that was landfill disposed in 2005 would be combusted at the WTE facility. It was also assumed that the landfill would not have a landfill gas recovery system and collection routes would be 20 miles in length.

By converting 90 percent of the residential waste that was landfill disposed into energy through combustion, 66,553 mm BTUs of net energy will be saved. According to the WARM model, this is equivalent to:

[8] This is based on the 2005 quantities of yard waste that was landfill disposed.

- Annual energy consumption for 351 households;
- 11,485 barrels of oil; and
- 413,899 gallons of gasoline.

Because this waste steam is already being collected, the net benefits only include the energy used to convert this waste steam into energy.

13.4 Summary

As demonstrated by the WARM model results, the key components of the proposed solid waste management system will yield a net energy savings of approximately 117,285 mm BTUs of energy, which is equivalent to:

- Annual energy consumption for 619 households.
- 20,232 barrels of oil.
- 819,522 gallons of gasoline.

Section 14
RECOMMENDED ACTION PLAN

14.1 Overview

In January of 2006, the County of Kaua‘i began the process of updating its integrated solid waste management plan (ISWMP or Plan). Kaua‘i’s previous ISWMP was prepared in 1994. The purpose of the updated ISWMP is two-fold. First, the ISWMP must comply with the State of Hawai‘i Solid Waste Management Act of 1991 (State Act) that requires Hawai’i counties to manage solid waste by following these priorities:

- First, reduce the amount of waste generated;
- Second, recycle and compost materials; and
- Third, landfill and incinerate the remaining materials.

The State Act also established the goal that 25 percent of the solid waste stream was to be diverted from landfilling and incineration by 1995, and 50 percent of the waste stream should be diverted by 2000.

Second, the Plan should embrace a specific set of Kaua‘i-specific guiding principals that were identified through a series of public meetings and by the Solid Waste Advisory Committee established by the Mayor. These guiding principals include:

- **Increase diversion** – Between 1994 and 2005, the County increased diversion from the Kekaha Landfill (Landfill) from a reported quantity of approximately 3 percent[1] to almost 24 percent. While the County did not achieve the State Act’s goal, this is a significant increase that the County, as well as it residents and businesses, should take pride in accomplishing. This updated ISWMP includes mechanisms to enhance the performance of existing waste diversion programs, identifies new waste streams to target for diversion, provides funding for innovative diversion programs and explores new technologies to further reduce reliance on landfill and incineration. By 2013, the County is projected to increase upstream diversion to 35 percent.
- **Minimize cost to the County and customers** – As detailed in Section 13, the County’s FY 2007 solid waste management program operating and management expenditures are approximately $11.6 million, which is approximately 8 percent of the County’s total public works operating expenditures for FY 2007. While the ISWMP identifies strategies to aggressively divert waste and retain high levels of

[1] More recycling was most likely occurring at that time, but was not quantified.

customer satisfaction, these strategies will be balanced with sound financial management practices that include:

- Identifying opportunities to increase efficiencies and reduce costs of solid waste management operations;
- Targeting waste streams, such as green waste, that potentially yield the greatest diversion quantities for the dollars invested;
- Facilitating "buy recycled" initiatives amongst Hawaii counties to increase the value and reduce the cost of recycling materials; and
- Working with the State to introduce legislation that places some responsibility for management of the materials on the manufacturers of various consumer products (e.g. electronics).

- **Establish a direct relationship between the scope of the services provided and the fees charged (i.e., user fee) to promote equity among customers** – Because residents pay for solid waste collection and disposal services through the general fund, a limited correlation currently exists between creating large amounts of solid waste and the environmental and economical costs associated with managing solid waste. Therefore, the ISWMP includes recommendations to assess a residential solid waste user fee for solid waste management services, and assess a higher fee to residents who choose to dispose large quantities of solid waste rather than participate in the County's waste diversion programs.
- **Promote sustainability** – To promote sustainability, the Plan includes strategies to:
  - Limit the use of products made from mined or harvested natural resources by increasing recycling and composting and increase the use of recycled content materials;
  - Reduce reliance of fossil fuels by using solid waste to create energy;
  - Create a financial incentive to produce less solid waste;
  - Assure that residents have convenient and affordable mechanisms to properly manage solid waste rather than dispose of it on the land and waters of Kaua‘i; and
  - Prevent materials such as electronics and household hazardous waste (HHW) from being managed in communities that lack adequate regulations to protect human and environmental health.
- **Facilitate business development** - The ISWMP will foster business development through technical and financial assistance to provide innovative recycling and composting programs to Kaua'i. The ISWMP also includes policies to aggressively divert commercially generated materials such as corrugated cardboard and green waste. The businesses community of Kaua'i will play a critical role in identifying the most effective and equitable processes for instituting these policies. Lastly, developing of local markets for end-use of the recycled materials will be a priority and foster business development.

- **Increase participation in solid waste diversion programs** - Dr. Doug McKenzie-Mohr in his book "Fostering Sustainable Behavior"[2] notes that promoting environmental values through extensive education such as brochures, workshops, and pamphlets or identifying economic savings, may change *attitudes* towards an environmental issue without markedly changing people's *behavior*. Cultural, social, emotional, and technological barriers must be identified and overcome in order to make change in behavior occur. The means by which this is completed is referred to as community-based social marketing and involves several steps:

  1. Determining the impact and probability of activities to be promoted and targeting appropriate behaviors;
  2. Identifying benefits and barriers to sustainable behavior through research, observation, surveys, and focus groups;
  3. Designing a strategy that utilizes behavior change tools;
  4. Piloting the strategy with a small segment of the community; and
  5. Evaluating the program once it has been implemented across the community.

To maximize participation in the County's waste diversion programs, the County will implement community based social marketing strategy as described above whenever possible.

14.2 Development of the Plan

In February of 2006, three public meetings were conducted to inform Kaua'i residents and businesses about the planning process and obtain their perspective on what is working with the County's solid waste management system and what would they like to see the Plan address.

To further identify key issues that the Plan should address the Mayor appointed the SWAC members, which included the following representatives:

- Jean Camp, Resident
- Jeffrey Deren, Kaua'i Island Utility Cooperative
- Jeff Kaohi, Resident
- Ray Maki, Permaculture Kaua'i
- Keith Nitta, Kaua'i County Planning Department
- Bill Cowern, Kaua'i County Farm Bureau
- Larry Dill, Princeville Operating Company, LLC
- Mike Furukawa, Grove Farm Properties
- Steven Kaui, Garden Isle Disposal
- Rhoda Libre, Kaua'i Westside Watershed Council

[2] For a more detailed discussion of this material, the entire book can be found online at www.cbsm.com.

- Lane Otsu, State of Hawai'i Department of Health
- Glenn Sato, Kaua'i Office of Economic Development
- James Trujillo, Resident
- Diane Zachary, Kaua'i Planning and Action Alliance
- Kathleen West-Hurd, Resident

Between February and November of 2006, the SWAC convened eight times to discuss various issues associated with the ISWMP. To broaden the internal and external solid waste planning objectives, the SWAC meetings were supplemented with a County Council work session in December 2005. Finally, all reports that were submitted to the SWAC were posted on the County's website, along with all SWAC meeting minutes and agendas.

14.3 Key Waste Collection and Upstream Diversion[3] Action Items

Based on the State Act and the guiding principals, following is a five-year chronological approach for implementing the ISWMP[4]. As shown below, the majority of new upstream diversion programs, policies and strategies are scheduled to begin within the first four years of Plan implementation. The County has chosen this aggressive schedule because the Kekaha Landfill is projected to reach capacity by 2013. To site, finance, permit, develop and construct a replacement solid waste facility is likely to require at least five years. Therefore, maximizing diversion can extend the operating life of the existing facility until additional capacity becomes available.

Detailed information on diversion programs for five years is provided below. The projected annual impact on diversion quantities and County expenditures are provided in Table 1-1 and 1-2, respectively. Please note that the estimated expenditures represent planning level costs. The aggregate annual impact on disposal requirements is shown in Table 1-3.

14.3.1 Year 1

14.3.1.1 Administration

- Add staff - Currently the County-funded Solid Waste Management Division's administrative staff includes a solid waste programs administrator, recycling coordinator, contract specialist, operations superintendent, office manager, abandoned vehicle coordinator, and clerk. To fully implement the ISWMP, we recommend the County expand the solid waste staff during the first year of Plan implementation to include:

[3] Upstream Diversion is defined as diversion that occurs at the point of generation or where the generator participates in the diversion process.
[4] The State Act requires that solid waste management plans be updated every 5 years.

- A deputy assistant to the solid waste programs administrator to oversee Plan implementation that includes assisting in the procurement of service providers, siting of solid waste facilities, communicating with other County offices and the State Department of Health (DOH), preparation of program budgets and evaluating Plan performance;
- A business waste diversion specialist to work with businesses and the hospitality industry to increase recycling, focus on business education and outreach, special events recycling, develop County procurement policies, manage and promote the Aloha Shares Network, modify County ordinances to facilitate business recycling, design and institute a tourist recycling program, and enforce bans targeted toward business; and
- A collection specialist to coordinate and oversee the implementation of the automated collection system and the institution of curbside green waste collection. This individual will be responsible for reconfiguring collection routes, procuring new vehicles and carts, overseeing the development of ordinances to support the new collection systems, training collection crews and fleet maintenance personnel and managing the education of County customers and stakeholders.

- Establish a solid waste collection fee of $12.00 per household per month. There would be no limit on the number of containers set out by customers until all of the routes are converted to automated collection at the end of YR 3 and curbside recycling is available in YR 4. The fee would be established to recover a portion of the costs incurred to provide solid waste service to County residents. The level of the fee should be based on affordability issues balanced with a strategy to recover the full costs of service over time. Starting in YR 4, customers will be allowed to set out only one 96-gallon cart and an additional fee will be implemented for residential customers who require additional solid waste collection services. More information on this Pay-As-You-Throw system is provided in YR 4 action items.

14.3.1.2 Source Reduction

As previously discussed, reducing the amount of solid waste generated is the State's preferred method for managing solid waste. Currently, County agencies have an increased awareness of waste diversion issues through ongoing participation in the County's office paper recycling program. Many opportunities are available for residents and businesses to reuse items or reduce solid waste rather than producing solid waste. These opportunities include:

- Thrift Stores;
- Habitat for Humanity;
- Trade Radio on KONG AM 570;
- Kaua'i Food Bank;
- Aloha Shares Network;
- Home Composting; and
- Education.

The County will continue to facilitate or provide source reduction opportunities to the residents and businesses of Kaua‘i. Specific initiatives include:

- Proactively promote the Aloha Shares Network; and
- Enhance the backyard composting campaign.

14.3.1.3 Collection

The County is responsible for the curbside collection of municipal solid waste (MSW) from all single-family residences in the County (17,863 households in FY 2005; includes some smaller multi-family dwelling buildings[5]). The County collects solid waste once a week using six rear-load collection vehicles. The refuse is collected manually and each collection vehicle has one driver and two laborers. Communities throughout the United States, including Honolulu and Maui, are converting from manual collection to automated collection. In an automated collection system, residents are provided with wheeled, plastic refuse carts and the carts are collected with vehicles that are designed to limit the amount of physical labor used to place the solid waste into the collection vehicle. Communities are converting to this type of system to reduce litter, minimize costs, improve efficiency and limit worker injuries.

The Plan recommends that the County begin the transition from manual to automated collection as follows:

- The County will phase in automated collection in each of the five collection districts between YR 1 and YR 3. Converting to an automated collection system will reduce staffing requirements for solid waste collection by one laborer per crew. The County will re-assign that individual to the curbside green waste collection;
- The County plans to automate just the Lihue area in YR 1;
- The County will conduct a collection and fleet maintenance efficiency study; and
- The County will contract with a professional firm to manage the implementation of the automated collection program.

14.3.1.4 BioConversion

The County presently provides five locations where residents may drop off their green waste at no charge. Businesses can drop-off green waste for a fee.

[5] The County conducted a customer audit in 2006, and identified an additional 5,000 customers. These additional customers are reflected in the 2007 household estimates.

The County contracts with two private firms to provide grinding services, producing mulch which is available for landscaping. These facilities also accept green waste from private waste haulers, businesses and landscapers. In 2005, a total of 11,648 tons of County-collected green waste and approximately 4,000 tons of privately-collected green waste were handled by these facilities. In addition, the County bans the landfill disposal of refuse loads from businesses, industries, governments, institutions and other non-residential sources that exceed 20 percent green waste.

While the current green waste program and policies are estimated to be diverting approximately 70 percent of the green waste that is generated, over 5,000 tons of green waste is estimated to have been disposed in FY 2005. In addition, as more people move to Kaua'i from communities with curbside green waste collection, they may be less likely to transport their green waste to a transfer station and instead, will choose to include this material with their general solid waste. Finally, it is estimated that over 8 percent of the commercial waste stream is comprised of green waste. This may be an indicator that limiting the commercial green waste at the Landfill may not be sufficient. Therefore, in YR 1, we recommend the County:

- Begin planning for the development of a centralized composting facility;
- Enact legislation banning the use of plastic bags for setting out green waste at the curb to facilitate material handling;
- Require residents and businesses to limit the drop-off of only incidental amounts[6] of commercial and residential green waste at the transfer stations and the Landfill; and
- Begin providing weekly curbside green waste collection services in collection districts that have been converted to automated collection. An estimated third of the operating costs associated with providing every week green waste collection is likely to be off-set by the projected savings from converting to automated solid waste collection.

In addition to instituting curbside green waste collection, the County will aggressively promote the use of backyard composting bins as an alternative to residents keeping their green waste for two weeks between collections, as well as promoting the benefits of using green waste mulch and compost at home.

14.3.1.5 Recycling

Drop-Bin Program

The County has numerous programs in place to divert reusable and recyclable materials from landfill disposal. These programs have contributed to a County recycling rate in 2005 of approximately 24 percent. The majority of residential recyclables are collected via the County's drop-bin program. Currently there are eight drop-off sites in the County for the collection of the following items generated by residents (commercially-generated materials are not accepted in the bins):

[6] The County will work with internal and external stakeholders to define "incidental".

- Cardboard
- Newspaper
- Glass
- Aluminum Cans
- Plastic bottles (#1 and #2)
- Junk mail (Mixed Paper)

A program gap in the drop-bin program that was identified during the public meetings and by the SWAC is that all transfer stations should have a recycling drop-bin. Currently only the Hanalei Transfer Station and the Kekaha Landfill have a recycling drop-bins. Because the transfer stations have a high volume of residential traffic, the potential exists to divert a significant amount of additional materials. Therefore, the Plan recommends that the County add drop-bins at the Kapaa and Hanapepe Transfer Stations. The County may add a drop bin at the Lihue transfer station if the KRC does not become operational. It should be noted that siting drop-bins at these facilities will require the County to reconfigure the site layout at each facility and modify how green waste is handled.

Materials Recovery Facility

There is currently one recyclable materials processor located in the County and it has limited capacity and capability to process co-mingled materials. The County anticipates implementing a residential curbside recyclable materials collection program in Year 4 of the planning period. The new collection program is projected to increase the quantity of materials collected for processing. As a result, there is a need to develop co-mingled recyclable materials processing capacity.

The County plans to begin developing a processing facility in Year 1. This process will include sizing the facility (anticipated tonnage throughput), identifying potential sites, and developing planning level capital cost estimates to include in its capital improvement program budget.

Business Recycling

In addition to adding recycling drop-bins at the transfer stations, we recommend the County modify its ordinances to allow commercial establishments to use the drop-bin program if Kaua‘i Resource Center (KRC) does not resume operations. Businesses would be limited to the amount of material they could bring during a 24-hour period (i.e., one pick-up load). This will reduce the overflowing of recycling drop-bins. Due to the expected increase in volumes of material, the County’s annual budget to service the drop-bins at sites in commercially developed areas, such as Kapaa, is projected to double in YR 1. Finally, through the hiring of a business recycling specialist, the County will implement a comprehensive business waste reduction/recycling program.

Once the business program is fully operational, the County will work with the business community to modify existing ordinances to:

- Require businesses of a certain size or producing a minimum amount of recyclable material to establish recycling programs for glass, cardboard, office paper and green waste;
- Prohibit the disposal of commercially-generated cardboard, green waste, and glass at the transfer stations (with minimum amount in loads defined);

- Define the amount of cardboard in a commercial load that is banned from disposal (i.e., loads containing a minimum of 1 cubic yard loose old corrugated cardboard);
- Modify ordinance penalty fees;
- Restructure commercial tipping fees at the Landfill and transfer stations to encourage recycling; and
- If an affordable recycling processing option is available, all waste haulers will be required to obtain a license from the County with a provision that in order to receive a license, recycling services must be provided to commercial customers.

Enhance Bottle Bill Program

Based on a waste composition study conducted by the County in February 2006, approximately 2.4 percent of the waste stream was comprised of deposit containers, which is equivalent to over 2,000 tons of deposit containers. When public meetings were conducted during the same month, frustration about the location and operating hours of the redemption centers was a key public issue. Improving the performance of the bottle bill redemption program will include priority initiatives such as pursuing the redesign of the transfer stations to facilitate the location of redemption centers at transfer stations.

14.3.1.6 Special Waste Management

Special wastes are those components of the waste stream that require special handling due to their size or physical, chemical or biological composition for proper processing or disposal. Special wastes, as defined by Hawaii State Law H.B. 324 include:

- Asbestos;
- Agricultural wastes;
- Infectious medical wastes;
- Abandoned/derelict vehicles;
- Sewage sludge;
- Waste combustion ash;
- White goods;
- Tires;
- Used motor oil; and
- Lead acid batteries.

Also generally regarded as special waste, although not specifically mentioned in H.B. 324, are:

- Household batteries;
- Propane tanks; and
- Used cooking oil.

Currently, there are programs available to manage these special wastes and the County will not institute any new initiatives in YR 1. However, strategies to improve the effectiveness and convenience of some programs will be introduced in subsequent years. See Section 5.1.13 for recommendations for recovery of Construction and Demolition materials.

14.3.1.7 Electronics/HHW Management

At this time, no businesses that accept electronic waste or e-waste for recycling are located in the County. In the past, KRC operated by Island Recycling (based in Honolulu) accepted monitors and central processing units (CPUs) for recycling. In fiscal year 2005, approximately 38 tons of electronics were collected at the KRC. In an effort to continue to divert e-waste in the short term, the County will provide an annual electronic waste collection event, and will continue to recover HHW through special collection events. In the long-term, the County will develop a permanent facility for electronics and HHW. Please see action items based in YR 4.

14.3.1.8 Education

The County's estimated visitor population is over 8 million people per year, which has a substantial impact on the quantity of solid waste produced. To encourage visitors to recycle, as well as remind them of their responsibility to help protect the land, water and air, the County will work with the Kaua'i Visitor's Bureau and a professional advertising firm to design and implement an environmental advertising campaign. The County will also ensure that recycling opportunities are available at tourist destinations. Finally, the County will work extensively with the hospitality industry to encourage "green behavior" while on the island of Kaua'i.

Another education component will be required when the County phases in automated collection in each of the five collection districts between YR 1 and YR 3. The residents, as well as County employees, will need to be educated on the automated solid waste and green waste collection programs.

14.3.1.9 Market Development

Fran McPoland, the White House coordinator of the first America Recycles Day stated "If you are not buying recycled, you are not recycling". While considered an overly assertive statement by some, it brought national attention to the dilemma that sustainable markets for recyclable materials must be developed if recycling was to remain successful. To increase markets for recycled-content materials, we recommend the County strengthen its recycled product procurement policies and practices. For example, the County should consider offering a price advantage during competitive bid solicitations or provide a source of funding to cover the difference between recycled products and conventional products.

14.3.2 Year 2

14.3.2.1 Source Reduction

- Begin working with other Hawai'i counties to introduce Extended Producer Stewardship legislation in Hawai'i.[7]
- Institute a new campaign to promote backyard composting of green waste and purchase more compost bins.

14.3.2.2 Collection

- Convert the Kapaa and North Shore collection districts to automated refuse collection.

14.3.2.3 Bioconversion

- Begin providing curbside collection of green waste in the Kapaa and North Shore collection districts.
- Site, design, and permit a centralized organics composting facility.
- Identify and evaluate potential operators for the proposed centralized organics composting facility.

14.3.2.4 Recycling

- Institute an innovative recycling grant for private businesses, communities, and non-profit organizations. Examples of possible grant categories include: buy-recycled promotions, capital assistance funds, market development, and education and outreach initiatives.
- Evaluate procuring point of generation recycling collection for commercial establishments.
- Continue with the MRF planning and development including finalizing the facility site, completing the detailed design, and initiating the construction through procurement of a contractor

14.3.2.5 Special Waste Management

- Disseminate information to medical establishments and pharmacies on the proper handling of sharps.

14.3.2.6 Electronics/HHW Management

The County provides annual collection events for residents to drop-off household hazardous Waste (HHW) materials, free of charge, at all four County transfer stations. Commercial and institutional waste is not accepted. Although commercial and

[7] Product stewardship is a principal that directs all those involved in the life cycle of a product to take shared responsibility for reducing the health and environmental impact that result from the production, use and end-of-life management of the product.

institutional hazardous waste is banned from landfill disposal, the 2006 waste characterization study indicated that over 230 tons of commercial hazardous wastes are annually disposed. In addition over 270 tons of residential HHW materials are annually disposed. To address this issue, the County will:

- Consider increasing the frequency of the collection events if the participation focus groups indicate this is a barrier to participation; and
- Allow farmers and commercial establishments to bring HHW to collection events for a fee. The County will require these generators to pre-register with the County and make appointments for the delivery of these materials.

14.3.2.7 Education

- Develop and implement a program to facilitate waste reduction and recycling at special events. The County has already begun to proactively address special event recycling.
- Promote "food waste to animal feed" programs to local farmers and restaurants. Local pig farmers currently collect food waste from certain local hotels, restaurants and the County jail to use as feedstock. However, the tracking of these waste diversion activities has not been consistent. A formal tracking system will be implemented by the County through collaboration with the generators and farmers.
- Educate Kapaa and North Shore residents on automated collection and green waste collection.

14.3.2.8 Market Development

- Conduct workshops with the building industry on Leadership in Energy and Environmental Design (LEED) certification and vendors of green building products.

14.3.3 Year 3

14.3.3.1 Administration

- Determine process for updating the ISWMP and gather preliminary data.

14.3.3.2 Source Reduction

- Encourage residents to purchase products, such as cleaning products, with minimal health or environmental hazards.
- Educate residents on the environmental and economic costs associated with the generating and management of solid waste.
- Work with the schools to incorporate source reduction education into the curriculum.

- Begin developing Unit Based/Pay-As-You-Throw pricing policies and educational materials for program implementation.

14.3.3.3 Collection

- Convert the Koloa-Poipu-Kalaheo and West Side collection districts to automated collection.

14.3.3.4 Bioconversion

- Begin providing curbside collection of green waste in the Koloa-Poipu-Kalaheo and West Side collection districts.
- Construct a centralized organics composting facility.
- Commence operations of the centralized organics composting facility by Year's end.

14.3.3.5 Recycling

- Begin planning for the implementation of a residential curbside recycling program to begin Year 4. [a1]This new program will include providing recycling containers to residents, as well as collecting, processing and marketing the materials. The County plans to consider implementation of a co-mingled automated collection program in conjunction with a hybrid "PAYT" system providing financial incentives to recycle.
- Complete the construction of the MRF

14.3.3.6 Special Waste Management

- Evaluate co-composting of biosolids at the centralized composting facility.

14.3.3.7 Electronics/HHW Management

- Identify a site for a permanent electronics/HHW collection facility, and procure vendor(s) to transport and manage electronics and HHW .

14.3.3.8 Education

- Educate Poipu and West Side residents on automated collection and green waste collection.
- Provide technical assistance to private facilities on food waste composting.
- Conduct benefits/barriers analysis to determine why residents participate or do not participate in upstream diversions programs.
- Develop a new campaign to promote the residential, curbside recycling program based on the incentive/barriers analysis.

14.3.3.9 Market Development

- Conduct a feasibility study to identify concerns and barriers associated with the large scale composting of organic waste materials. The main producers of commercial compost and mulch in the County use green waste collected at transfer stations as well as materials directly hauled to their facilities. These operations could make use of additional waste materials, potentially including pre-consumer food waste, pallets, non-treated wood debris from construction sites and gypsum. However, each of these waste streams presents unique obstacles and/or concerns.

14.3.4 Year 4

14.3.4.1 Administration

- Begin updating ISWMP.

14.3.4.2 Source Reduction

- Institute a hybrid Pay-As-You-Throw (PAYT) collection program whereby all residents pay an additional incremental fee if they require more than one cart for weekly refuse collection. In addition, for large general solid waste items[8] that cannot be contained in a cart, residents will annually receive a specified number of tags (i.e., 24 per year). Additional tags would need to be purchased from the County.

14.3.4.3 Bioconversion

- Operate the centralized composting facility accepting green waste only.

14.3.4.4 Recycling

- Institute an every-other-week residential curbside recycling program in conjunction with PAYT. With the implementation of the PAYT program, it is estimated that 70 percent of the households will participate and each participating household will set out approximately 400 pounds of recyclable materials annually[9] and divert approximately 3,500 tons of material (excluding redemption containers).
- Evaluate the need for all of the recycling drop-bin sites.

14.3.4.5 Electronics/HHW Management

- Begin operating a permanent electronics/HHW collection facility. The County will contract with a private vendor(s) to transport and manage the electronics and

[8] I.e., small tables or chairs. This does not include bulky items such as white goods or large furniture.
[9] This estimate is based on other communities with curbside recycling programs in states with bottle redemption requirements.

HHW. The facility will only serve ass a temporary staging area for these materials.

- Cease providing special collection events for electronic waste and HHW.

14.3.4.6 Education

- Institute a comprehensive campaign on PAYT and curbside recycling.
- Promote the new permanent electronics/HHW collection facility.

14.3.4.7 Market Development

- Promote expansion of Hawai‘i processing capacity and end-use demand for scrap tires. Opportunities include exploring expansion of scrap tire processing capabilities in O‘ahu and joint-island development of on-island demand for tire-derived aggregate in engineering applications or ground rubber in horticultural or equestrian applications.

14.3.5 Year 5

14.3.5.1 Administration

- Finalize update of ISWMP.

14.3.5.2 Collection

- Begin collecting pre-consumer food waste from commercial generators.

14.3.5.3 Bioconversion

- Begin to accept and process pre-consumer food wastes and, potentially biosolids, at the centralized organics composting facility.

14.3.5.4 Recycling

- Evaluate effectiveness of the residential curbside recycling program in conjunction with the PAYT .

14.3.5.5 Electronics/HHW

- Ban the disposal of electronics/HHW.

14.3.5.6 Education

- Educate generators on the electronics/HHW ban.

14.4 Upstream Diversion Quantities

Table 1-1 shows the estimated quantity of materials that will be annually diverted as a result of implementing the ISWMP. Assumptions for these upstream diversion

estimates are shown in the footnotes of Table 1-1. These assumptions represent performance parameters based on similar types of programs implemented in other communities.

Table 1-1
Increased Upstream Diversion Quantities
(TPY)

Action Item	YR 1	YR 2	YR 3	YR 4	YR 5
Promote Aloha Shares [1]	30	32	33	35	37
Establish Electronics Collection Event [2]	45	46	46	47	48
Ban Commercial Corrugated [3]		3,190	3,344	3,506	3,675
Ban Commercial Green Waste [4]		1,607	1,685	1,766	1,852
Increase Service Levels at Existing Transfer Stations [5]					
Add Drop-Off Site at Kapaa, Hanapepe, Lihue Transfer Stations [6]	839	853	868	883	898
Begin Collecting Pre-Consumer Food Waste [7]					1,718
Provide Residential Curbside Recycling Program with PAYT [8]				3,520	3,580
Enhance Program for Recycling at Special Events [9]	2	2	2	2	2
Implement Tourist Recycling [10]	270	274	279	283	288
Collect Green Waste Curbside in Lihue [11]	1,300	1,322	1,345	1,368	1,392
Collect Green Waste Curbside in Kapaa and North Shore [11]		3,853	3,920	3,988	4,056
Collect Green Waste Curbside in Poipu and West Side [11]			2,991	3,043	3,095
Increase Business Recycling [12]		237	248	260	273
Allow small businesses and farmers to use the HHW event [13]		159	161	164	167
Redemption program matures and improves [14]	2,142	2,179	2,217	2,256	2,294
Additional Upstream Diversion	4,628	13,754	17,139	21,121	23,375
Baseline Upstream Diversion[15]	29,170	29,680	30,180	30,690	31,200
TOTAL Upstream Diversion	33,798	43,434	47,319	51,811	54,575

1Promote Aloha Shares program- 15% of commercial durables will be diverted from landfill disposal.
2 Establish an electronics collection event- Assumes 5% of households participate and each participant brings 75 pounds of materials.
3 Ban commercial Old Corrugated Cardboard (OCC) - Assumes 90% of OCC is delivered by large haulers and 70 percent of the OCC is recovered from them.
4 Ban commercial green waste. Assumes 70% of commercial green waste would be diverted.
5 Increase service levels at existing transfer stations – The additional diversion tonnage that this will generate is accounted for in other diversion strategies, such as ban commercial OCC.
6 Provide drop-off sites at designated transfer stations – Assumes 10% of the solid waste delivered to these facilities will be diverted as recyclable materials.
7 Begin collecting pre-consumer food waste. Assumes 25% of commercial food waste would be diverted.
8 Provide curbside recycling with PAYT. Assumes 70% of households will participate and 400 lbs/hh/month. This poundage estimate is based on communities in states with bottle redemption programs and separate green waste collection.
9 Enhance program for recycling at special events – Assume 0.6 pounds per participant
10 Implement tourist recycling. Assumes an additional 1% of newsprint, magazines, PET Bottles, HDPE containers, aluminum cans and glass bottles will be recovered from tourists.
11 Collect green waste curbside. Assumes 90% of residential green waste that is currently disposed will be diverted .
12 Increase business recycling. Assumes an additional 20% of high grade office paper, mixed paper, non redemption glass bottles, plastic containers, and aluminum, and non-treated wood would be recovered.
13 Allow small businesses and farmers to use the HHW event. Assumes 50% of commercial HHW would be diverted.
14 Redemption program matures and improves. Assumes 80% of bottle bill materials can be diverted from the Landfill.
15Assmumes the per capita upstream diversion rate remains constant. Increased upstream diversion quantities due to increased population, tourists and commercial establishments.

Table 1-2 estimates the incremental costs and revenue of implementing the identified diversion programs. The information in the table below represents planning level cost estimates. Actual program costs upon implementation may vary.

Table 1-2
Incremental Collection and Upstream Diversion Costs
(TPY)

Action Item	YR 1	YR 2	YR 3	YR 4	YR 5
Increased Staff/Benefits [1]	$269,200	$288,000	$308,200	$329,800	$352,900
Conduct Operational Efficiency Study	$100,000	$0	$0	$0	$0
Educate Residents on Automated Collection then PAYT	$10,000	$5,000	$5,200	$25,000	$6,000
Purchase Automated Carts [2]	$396,300	$396,300	$396,300	$396,300	$396,300
Replace Packer Trucks with Automated Vehicles [3]	$120,000	$60,000	$61,800	$63,700	$65,600
Operate Automated Collection [4]	-$93,200	-$199,500	-$320,300	-$342,700	-$366,700
Provide Curbside Green Waste Collection [5]	$279,600	$598,600	$960,900	$1,028,200	$1,100,200
Process Additional Green Waste[6]	$65,000	$261,000	$432,000	$453,000	$474,000
Promote Backyard Composting	$30,000	$1,030	$32,000	$1,090	$34,000
Conduct Market Analysis for Compost	$0	$0	$50,000	$0	$0
Promote Aloha Shares	$500	$520	$540	$560	$580
Establish Electronics Collection Event [7]	$60,000	$61,800	$63,700	$65,600	$67,600
Increase Service Levels at Existing Drop Bin Sites [8]	$75,000	$77,300	$79,600	$82,000	$84,500
Add Drop-Off Site at Kapaa, Hanapepe, Lihue Transfer Stations [9]	$120,000	$123,600	$127,300	$131,100	$135,000
Begin Collecting and Processing Pre-Consumer Food Waste [10]	$0	$0	$0	$0	$330,000
Provide Residential Curbside Recycling Program with PAYT [11]	$0	$0	$0	$3,455,900	$3,510,900
Establish Program for Recycling at Special Events	$0	$5,000	$1,500	$1,550	$1,600
Implement Tourist Recycling	$0	$25,000	$25,800	$26,600	$27,400
Institute Innovative Recycling Grant	$0	$25,000	$25,800	$26,600	$27,400
Develop Permanent HHW/Electronics Facility[12]	$0	$0	$42,100	$42,100	$42,100

Table 1-2
Incremental Collection and Upstream Diversion Costs
(TPY)

Action Item	YR 1	YR 2	YR 3	YR 4	YR 5
Upgrade Puhi Metals[13]	$47,400	$47,400	$47,400	$47,400	$47,400
Additional Recycling Education[14]	$15,000	$15,500	$16,000	$16,500	$17,000
Incremental Collection and Diversion Costs	$1,494,800	$1,791,550	$2,355,840	$5,850,300	$6,353,780
Baseline Collection and Diversion Costs[15]	$4,330,500	$4,520,300	$4,720,100	$4,930,300	$5,151,800
Total Costs to County	$5,825,300	$6,311,850	$7,075,940	$10,780,600	$11,505,580
Revenue from Commercial Collection[16]	$10,800	$11,300	$11,900	$13,800	$14,500
Revenue from Residential Collection Fee[17]	$3,513,600	$3,571,200	$3,628,800	$3,686,400	$3,744,000
Households[18]	24,400	24,800	25,200	25,600	26,000
Total Cost to County Per Household Per Month	$19.90	$21.21	$23.40	$35.09	$36.88
Net Cost to County Per Household Per Month	$7.86	$9.17	$11.36	$23.05	$24.83

[1] Increased staff/benefits. Assumes two new employees.
[2] Purchase automated carts. Assumes 30,000 carts at $100 each. Financed at 5% for 10 years.
[3] The cost difference associated with replacing packer trucks with automated vehicles.
[4] Operate automated collection. Assumes decreasing crew size by one each time a route is automated.
[5] Provide curbside green waste. Assumes a 3 person crew but one crew member will be shifted from automated refuse routes. Assumes that the County will use manual packer vehicles that were displaced with automated collection vehicles.
[6] Process additional green waste. Assumes processing fee of $50 per ton and inflated 3% annually.
[7] Provide electronics collection event. Based on costs from other Hawai'i counties.
[8] Double the number of pulls at Hanalei Transfer Station, Kapaa, K-Mart Parking Lot in Lihue, Brennecke's Beach Broiler in Poipu, and Eleeele Shopping Center.
[9] Add more drop-off sites. Assumes that each additional drop-bin site costs $40,000 YR 1.
[10] Collect and process pre-consumer food waste. Assumes one collection route and a processing fee of $50 per ton and inflated at 3% annually.
[11] Provide curbside recycling. Assumes 70% of households participate and fee is $15.00 per month that is inflated at 3% annually.
[12] Develop permanent HHW/electronics facility. Assumes $300,000 financed for 10 years. Does not include land acquisition or operations costs.
[13] Upgrade Puhi Metals. Assumes purchasing land and installing monitoring wells. Annual debt costs, financing at 5% for 20 years.
[14] Additional Education Costs. Expenses associated with conducting focus groups and implementing outreach strategies to address barriers to participating in upstream diversion programs.
[15] Baseline Costs are the costs associated with current collection and upstream diversion activities with an average annual escalation rate of approximately 5%.
[16] Based on historical commercial collection fee and increasing the number of County commercial customers.
[17] Based on $12 per household per month.
[16] Includes approximately 75 County commercial customers.

14.5 Upstream Diversion Impacts on Solid Waste Management Infrastructure

Through the implementation of these upstream diversion programs, the diversion rate is projected to increase from approximately 24 percent to 35 percent by 2012 through the implementation of these programs.

However, as shown in Table 1-3, the overall quantities of solid waste that require management through a solid waste facility will continue to increase due to the level of population growth and commercial development that is projected by the 20-year General Plan for Kaua‘i (2020 General Plan), which has a direct impact on the quantity of waste that will be annually generated.

Table 1-3
Waste Management Quantities

Year	De Facto Population[1]	Generation Rate (lbs/capita/ day)[2]	Generation[3] (TPY)	Upstream Diversion Rate (lbs/capita/ day)	Upstream Diversion (TPY)[4]	Final Management (TPY)[5]	Upstream Diversion Rate[6]
YR 1	91,900	8.04	134,840	2.02	33,798	101,042	25.07%
YR 2	93,500	8.20	139,990	2.55	43,434	96,556	31.03%
YR 3	95,100	8.38	145,520	2.73	47,319	98,201	32.52%
YR 4	96,700	8.57	151,240	2.94	51,811	99,429	34.26%
YR 5	98,300	8.77	157,310	3.04	54,575	102,735	34.69%

[1] De Facto Population equals permanent residents plus daily visitors.
[2] Generation rate is projected to increase 2.27 percent annually due to commercial development.
[3] Generation is equal to De Facto Population times generation rate.
[4] Diversion is equal to De Facto Population times recycling rate.
[5] Final management is equal to generation minus recycling.
[6] Diversion rate is equal to recycling divided by generation.

To manage this waste that is not reduced or recycled through the above programs, the County will continue to use an infrastructure comprised of transfer stations, and in the short term, the Kekaha Landfill. Beginning in YR 5, additional solid waste will be diverted from disposal through the development of a Waste-to-Energy (WTE) facility. The waste that cannot be diverted through upstream diversion or WTE will be disposed at a new, subtitle D landfill. Details on transfer, energy recovery, and disposal infrastructure are provided below.

14.5.1 Transfer Stations

The four existing waste transfer stations play an important role in the County’s waste management system, serving as a link between a community’s waste collection program and a final disposal facility. One reason the County uses transfer station is to reduce the cost of directly transporting waste to disposal facilities. The transfer stations also allow residents to properly dispose of materials on days other than their scheduled collection days, and green waste may also be delivered there. Businesses may use the transfer stations for a nominal fee. Overall, the existing system offers extensive convenience to Kauai residents and businesses.

During July 2006, a comprehensive site assessment was conducted at the four existing transfer stations. Based on R. W. Beck’s observations and recommendations, the County will complete the following action items optimize the performance of the transfer stations:

- Add signs along approach routes;
- Update entrance signs;
- Consider adding video surveillance to deter illegal dumping;
- Improve traffic circulation;
- Provide drop-off recycling at the Hanapepe, Kapaa and possibly Lihue transfer stations;
- Modify green waste drop-off and processing system to provide more space for recycling drop-bins;
- Renovate compactor transfer station and upgrade to top trailer loading; and
- Repair and upgrade Transfer Station at Lihue.

The County may need to construct a new transfer station in the Koloa-Poipu-Kalaheo Planning District. The solid waste quantity projections through 2020 indicate this planning district will have the highest growth rate on the island. However, the waste delivery rate at the Hanapepe Transfer Station would likely be reduced if County develops a new transfer station in the Koloa-Poipu-Kalaheo Planning District. Thus, further evaluation is necessary.

The County may consider siting a WTE facility in Lihue or Koloa-Poipu-Kalaheo planning districts because these two planning districts are centrally located with respect to the quantities of solid waste generation on the island (i.e., centroid). If a central solid waste processing facility is located in one of these two planning districts, the County would not likely construct a new transfer station in Koloa-Poipu-Kalaheo Planning District, and may reduce or eliminate operation of the Kapaa and Lihue Transfer Stations. The new central processing facility could include a convenience center for residents to deliver solid waste, green waste, or special wastes. These changes would increase the efficiency of the County's transfer operations.

The County plans to finance the costs to upgrade the four transfer stations. The Kapaa transfer station upgrade would be initiated in 2008 and the other facility upgrades are planned for subsequent years within the five year planning period. The annual cost to the County for this debt, as well as the baseline costs associated with the transfer stations is shown in Table 1-4.

Table 1-4
Transfer Station Costs

Action Item	YR 1	YR 2	YR 3	YR 4	YR 5
Upgrade Transfer Stations[1]	$330,200	$330,200	$540,400	$756,900	$979,900
Baseline Transfer Station Costs[2]	$2,396,600	$2,167,300	$2,294,300	$2,429,600	$2,573,600
Total Costs	$2,726,800	$2,497,500	$2,834,700	$3,186,500	$3,553,500
Projected Revenues[3]	$18,400	$18,600	$18,800	$19,700	$20,400
Households[4]	24,400	24,800	25,200	25,600	26,000
Total Cost to the County Per Household Per Month	$9.31	$8.39	$9.37	$10.37	$11.39
Net Cost to the County Per Household Per Month	$9.25	$8.33	$9.31	$10.31	$11.32

[1]Transfer Station Costs reflect annual debt service based on financing for 10 years and an annual interest rate of 5% for the proposed upgrades for the four facilities.
[2] Baseline Costs are the costs associated with current transfer station operations with an average annual escalation rate of approximately 6%.
3 Based on Historical Transfer Station Tipping Fees and Commercial Collection Fees
4 Includes an average number of 75 commercial accounts.

14.5.2 Kekaha Landfill

The Kekaha Landfill (Landfill) is located on the leeward coastline of Kaua‘i near the town of Kekaha. According to the Landfill operator, Waste Management of Hawaii, Inc. (WM), and its 2006 Site Data and Report Summary, the remaining permitted airspace of the Landfill is 384,500 cubic yards as of May 19, 2006. In order to increase the Landfill’s capacity, the County is currently applying for a northwest horizontal expansion of the Phase II area.

It is estimated the northwest horizontal expansion would increase the remaining airspace of the Landfill by approximately 370,000 cubic yards. In addition to the completion of the northwest horizontal expansion, the County has also considered the possibility of expanding the Phase II landfill to the southwest over the northeast sideslope of the closed Phase I landfill (i.e., piggy-back over the unlined landfill). If the Phase I sideslope expansion is completed in conjunction with the northwest horizontal expansion, it would add approximately 350,000 cubic yards of airspace for a total Phase I and Phase II expansion volume of 720,000 cubic yards. The remaining permitted capacity options are summarized in the Table 1-5 below.

Table 1-5
Airspace Utilization

	Additional Expansion Volume (CY)	Remaining Capacity (cy)	Estimated Closure Date
Current Permit	N/A	384,500	December 2008
Northwest Horizontal Expansion[1]	370,000	754,500	February 2011
Southwest Horizontal Expansion Over Phase 12	350,000	1,104,500	January 2013

Assumptions:

Projected rated of waste increase is 4.6% per year.
Airspace Utilization Factor (AUF) = 1,300 lbs/cubic yard.
Notes:
[1] Assumes a 200-foot horizontal expansion to the northwest.
[2]Assumes a southwest horizontal expansion over the northeast sideslope of the Phase I area (i.e., piggy-back over unlined landfill), completed in conjunction with the northwest horizontal expansion.

14.5.2.1 New Subtitle D Landfill

Even if the County significantly reduces reliance on landfill disposal through upstream diversion activities such as green waste composting and a WTE facility, a new, Subtitle D landfill will still be required. The role of this landfill will be to manage the ash and by-pass waste from the WTE facility. By-pass waste includes the non-combustible County-collected solid waste, construction and demolition debris and commercially-collected solid waste that can not be processed at the WTE facility (unprocessable Waste). Unprocessable waste is typically bulky items, such as large durables and white goods, and waste that can not be combusted, such as concrete. In addition, if Kaua'i were to experience a significant man-made or natural disaster, the WTE facility (Section 1.5.3) may not be able to handle the significant increase in waste material or may not be able to operate because of energy limitations. Therefore, to assure that adequate disposal capacity is available, the County will begin siting a new, Subtitle D landfill in YR 1 of the ISWMP to facilitate it being able to receive waste before the Kekaha Landfill is closed. Since a significant portion of disaster debris could be comprised of organic materials, the County will attempt to site the facility in close proximity of a composting facility.

Initially, a 5-acre lined landfill will be constructed. The initial cell will consist of one, 2-acre cell for separate disposal of ash and one, 3-acre cell for by-pass waste. Landfill expansions occur approximately every 5 years thereafter. The lined landfill area will expand to a total of 8 cells over 20 acres during the 20-year life of the facility. The total facility size, including a 500 foot buffer, is 86 acres

During the first year of operation, 2013, it is estimated that the new landfill will receive approximately 9,000 tons of by-pass waste and 10,000 tons of ash. By 2018, the end of the life for the first cells, it is estimated that the facility will receive 11,000 tons of by-pass waste and non-combustible construction and demolition waste, and 15,000 tons of ash.

The cost associated with operating, expanding and closing the Kekaha Landfill and developing a new, Subtitle D landfill are shown in Table 1-6.

Table 1-6
Landfill Costs

Action Item	YR 1	YR 2	YR 3	YR 4	YR 5
Expand Kekaha Landfill[1]	$106,400	$764,000	$929,000	$929,000	$1,758,100
Baseline Kekaha Landfill Costs[2]	$5,145,200	$5,270,900	$5,528,700	$5,826,800	$6,159,800
Develop new Subtitle D Landfill[3]					$979,416
Operate/Maintain New Subtitle D Landfill[4]					$1,064,000
Total Costs	$5,251,600	$6,034,900	$6,457,700	$6,755,800	$7,917,900
Kekaha Landfill Revenues[5]	$2,554,400	$2,589,400	$2,617,800	$3,023,000	
New Subtitle D Landfill Revenues From Commercial Haulers[6]					$737,300
New Subtitle D Revenue From WTE Facility[7]					$1,373,616
Total Revenues	$2,554,400	$2,589,400	$2,617,800	$3,023,000	$2,110,916
Households[8]	24,400	24,800	25,200	25,600	26,000
Total Cost to the County Per Household Per Month	$17.94	$20.28	$21.35	$21.99	$25.38
Net Cost to the County Per Household Per Month	$9.21	$11.58	$12.70	$12.15	$18.61

[1] Expansion of Kekaha Landfill costs reflect annual debt based on financing for 20 years and an annual interest rate of 5%.
[2] Baseline Costs are the costs associated with current landfill operations with average annual escalation rate of approximately 5%. Includes annual contribution to County reserve fund specifically created to pay for the closure of the Kekaha Landfill.
[3] Development costs for the new, Subtitle D landfill reflect annual debt based on financing for 20 years and an annual interest rate of 5%. Development costs do not include land acquisition.
[4] Operating costs are based on $49 per ton and 19,000 tons of waste.
[5] Landfill Disposal Revenues based on estimate of annual average growth in disposal quantities of commercial and private hauler direct-haul tonnage. Assumes a 10% rate increase in all rates in YR1 and YR 4, assuming rates are increased to reflect annual inflation of approximately 3.0% per year.
[6] Revenues from new, Subtitle D landfill based on $101 per ton tipping fee and approximately 5,000 tons of construction and demolition debris and 2,300 tons of unprocessable waste collected by commercial haulers.
[7] Revenues from new, Subtitle D landfill based on $101 per ton tipping fee and approximately 13,600 tons of by-pass waste and ash from the WTE facility.
[8] Includes approximately 75 commercial accounts.

14.5.3 Waste-To-Energy Facility

To maximize landfill diversion, the County will develop a mass burn WTE Facility that will convert approximately 90 percent of incoming waste into energy. The unprocessable waste and processing residue (ash) will each be disposed at the new Subtitle D landfill, with dedicated cells for unprocessable waste and ash.

Initial sizing of the WTE facility is for receipt of only County-collected solid waste. Sizing the WTE facility for this capacity is because there is no existing agreement between the private waste haulers and the County to deliver commercially-collected waste to a WTE Facility. However, if the private waste haulers enter into a public/private partnership with the County before the facility is designed, capacity may be expanded to accommodate the overall waste stream. If both private- and public-collected solid waste is delivered to a WTE facility, the County may consider adding a mixed waste stream processing facility. In addition, the receipt of additional quantities of materials offers greater economies of scale and would reduce the per tons costs at the WTE.

In April 2007, the U.S. Supreme Court rendered an opinion in the case of the United Haulers vs. Oneida-Herkimer Solid Waste Management Authority that addresses the issue of local government authority to direct the flow of waste to solid waste facilities. The outcome has been characterized as including the following:

- Flow control to publicly owned facilities where all private entities are treated similarly is constitutional.
- Waste Management is a public function and local government plays a vital role in providing this function.
- Justifications for implementing local ordinances to provide waste assurance may include environmental health and safety, fostering recycling, revenue generation, and enforcement of local laws. We recommend the County consult with its legal counsel if it chooses to consider this option to direct private waste haulers to a proposed WTE.

If the private sector does not enter into a public/private partnership with the County or are not required via ordinance to transport solid waste to a proposed WTE, it will be the responsibility of the private waste haulers to identify adequate long-term disposal options.

Based on projected 2013 County-collected solid waste quantities of approximately 45,000 tons, operating and financial conditions associated with the WTE are shown in Table 1-7.

Table 1-7
WTE Facility for
Only County-Collected Disposed Waste

2013 Processed Waste Receipts	40,500 tons
Development Costs for WTE	$46 to $52 million
2013 Annual Operating Expenses (including annual debt service)	$8 to $9 million
2013 Energy Produced	18,200 – 20,200 MWh
2013 Energy Revenue from WTE facility	$2.4 to $2.7 million[10]
2013 Tipping ($/ton) (includes offset from sale of energy)	$121 to $139
Average Total Cost to the County Per Household Per Month	$28
Average Net Cost to the County Per Household Per Month	$19
Land Requirements	6 - 8 acres for the WTE facility.

14.5.3.1 WTE Assumptions

- WTE Processing Capacity:
  - Approximately 90 percent by weight of the waste is received and recovered;
  - 85 percent annual facility availability factor;[11]
  - At the 200-tpd rated capacity, the WTE facility will combust a maximum of 62,050 tons per year with the assumed availability factor; and
  - In 2013, the WTE facility will combust approximately 40,500 tons.
- Capital "Hard" Cost – $197,000 to $220,000 per tpd of installed capacity for 200-tpd, which is equivalent to approximately $39 to $44 million.
- WTE Project Development "Soft" Cost – 15 percent of the capital cost includes engineering, permitting, financing, air emission offsets, spare parts, start-up, and contingency, which is equivalent to $6 to $7 million.
- Operating & Maintenance (O&M) Expenses:
  - The O&M expenses include provision for labor, parts and supplies, extraordinary renewals and replacements, general and administration, operator profit, electricity, fuel, and "normal" pass-throughs such as chemicals, insurance, and utilities. This does not include property taxes, host fees, or residue disposal; and

[10] Please note that since the initial analysis was completed the dramatic increase in costs of oil (fuel oil pricing is linked to oil prices) to more than $100 per barrel would impact total potential energy revenues from the sale of power. The energy revenues are likely to be greater because the avoided costs for KIUC have likely increased. A more detailed analysis is recommended as part of the development process for a WTE facility.

[11] The availability factor is less than a WTE facility for all waste because this facility would only have one boiler. For a WTE facility for all waste, the facility would have two boilers. Therefore, if one boiler is not operating, the second boiler could be used.

  - WTE Facility O&M Expenses – $77 to $89 per ton of solid waste processed and combusted at 200 tpd. This is based on industry standards that have been adjusted for facility size and location.
- Unprocessable Waste and Combustion Residue Disposal:
  - For planning purposes, R. W. Beck estimates that all of the "non-processables" and ash will require disposal, which is equivalent to approximately 5,000 tons of "non-processable" waste and approximately 10,000 tons of ash. This will be disposed at a New Subtitle D landfill with estimated costs of $101 per ton to develop and operate.
- Electricity Production Capability and Revenues:
  - Net electrical generation will range from 450-500 kWh per ton of waste processed, assuming solid waste with a higher heating value ("HHV") of 5,000 - 5,200 Btu per pound;
  - In 2013, the facility will deliver the excess power to Kaua'i Island Utility Cooperative (KIUC) at the energy charge of about $0.131 per kWh. This value was estimated using the Renewable Energy Technology Assessments report issued by KIUC in 2005[11]. In 2014, KIUC will likely begin paying a capacity charge, which has the potential to reduce the tipping fee by $9 - 10 per ton;
  - Revenue from the sale of energy is estimated to be $2.5 to $2.8 million in 2013. Revenue is estimated to increase throughout the life of the WTE; and
  - In 2013, the WTE facility will sell sufficient electricity to power 1,260 to 1,400 homes per year on the island (assumes 1,200 kWh monthly usage per home).

14.6 Financial Impacts

Table 1-8 shows the estimated cost for implementing the new solid waste system for the County on a cost/household/month basis. The components of the new system include upstream diversion programs, transfer stations upgrades, new by-pass/ash landfill, and waste-to-energy facility. The total costs represent a sum of the baseline and incremental costs that are shown in Tables 1-2, 1-4 and 1-6. The total revenues include commercial collection fee and transfer station fee revenues, landfill tip fees from commercial haulers of non-combustible waste, recovered metals sales from the WTE, WTE energy sales revenue, and the proposed residential solid waste management fee revenues.

Table 1-8
Total System Costs

Line Item	YR 1	YR 2	YR 3	YR 4	YR 5
Total Cost To The County	$13,803,700	$14,844,250	$17,337,561	$22,661,342	$31,609,548
Total Revenue To The County	$6,097,200	$6,190,500	$6,277,300	$6,742,900	$8,579,279
Net Cost To The County	$7,706,500	$8,653,750	$11,060,261	$15,918,442	$23,030,269
Households	24,400	24,800	25,200	25,600	26,000
Total Cost To The County Per Household Per Month	$47.14	$49.88	$57.33	$73.77	$101.31
Net Cost To The County Per Month	$26.32	$29.08	$36.57	$51.82	$73.81

As mentioned earlier, to offset these costs to the County's general fund, the Plan recommends the implementation of a residential solid waste management fee of $12/household/month in 2009. The revenue from this fee (approximately $3.5 to $3.7 million dollars per year) is shown in Table 1-2. While the proposed fee is a fraction of the actual costs as shown in the table above, the implementation of a solid waste fee will provide a strong price signal to residents that rubbish collection and management are significant costs to the County. The implementation of this fee will also support the County's goal of establishing a solid waste enterprise fund in the long term. In 2011, after all of the County's residential customers have access to automated collection, as well as green waste and curbside recycling services, a hybrid PAYT system will be instituted.

14.7 Conclusion

By YR 5, the implementation of this Plan is projected to divert approximately 85,000 tons or more than 50 percent of the solid waste that will be generated by Kauai residents and business in 2013 (approximately 157,000 tons) from landfill disposal.

The reduction will be the result of an aggressive and comprehensive upstream diversion system that includes programs such as curbside green waste and recyclable collection and disposal bans on specified materials. For materials that cannot be recovered through upstream diversion, the County will develop a WTE facility that will convert 90 percent (approximately 40,000 tons) of incoming solid waste into energy. The County will develop a new, Subtitle D landfill to manage the approximate 19,000 tons of non-combustible waste and ash that will require landfill disposal, and debris from natural or man-made disasters. It should be noted that the County does not plan to develop new landfill capacity to manage combustible solid waste from private waste haulers after the Kekaha Landfill closes. The County will actively work

with the private waste haulers to become partners in the development of the WTE facility. If this were to occur, the potential to further reduce reliance on landfills would increase significantly and the tipping fee at the WTE facility will most likely decrease.

Beyond decreasing the quantity of solid waste that requires landfill disposal, implementation of this Plan will minimize the toxicity of the solid waste stream by expanding opportunities to recycle HHW and electronics. The Plan recommends the continued opportunity for residents to dispose of solid waste at the transfer stations without a user fee, which will deter illegal dumping of solid waste when the PAYT system is instituted.

Appendix A

FINANCIAL PLANNING ANALYSIS

- FINAL -
County of Kaua‘i
Department of Public Works
Solid Waste Program Financial Model
Financial Planning Analysis
Fiscal Years
2007 - 2011

Model prepared by R. W. Beck, Inc.

for internal use by Solid Waste Division Staff

R. W. Beck run date: May 09, 2008

TABLE 1
County of Kaua'i
Department of Public Works
Solid Waste Program Financial Model
Assumptions and General Parameters

Operating Expenses/Income	**'06 - '13**
General Salary Escalator (1)	3.00%
General Expense Escalator (1)	3.00%
Additional Expense Escalator (2)	4.00%
Fringe Benefit (3)	68.23%
Estimated Inflation Rate (Basis for Kekaha Landfill Operation Rate Increase) (4)	
FY 2008	2.90%
FY 2009 and Beyond	3.00%
Total Tonnage (5)	
Estimated Commercial	56.00%
Estimated Residential	44.00%
Transfer Station Tonnage (6)	
Estimated Commercial	10.00%
Estimated Residential	90.00%
Recycling (7)	
Households Participating in Recycling	70%
Capital Expenditures	
Inflation (1)	3.00%
Financing Assumptions	
Long-Term Debt (Facilities)	
Interest Rate	5.00%
Repayment Period (Years)	20
Bond Financing Expense	1.50%
Short-Term Debt	
Interest Rate	5.00%
Repayment Period (Years)	10
Bond Financing Expense	1.50%

	'06 - '13
Annual Growth Rates (8)	
Residential	1.72%
Commercial (Square Footage)	4.84%
Visitors	1.64%
Financial Assurance Targets (9)	
Operating Reserves (Min. Days of O&M)	0
Target Debt Service Coverage	1.00
Budget Year	2007
Round	-2

Notes:

(1) Based on the historical trend of inflation in Hawai'i being higher than the US national average.
(2) Based on County Staff expectations of a 7% percent median growth rate (general inflation of 3.0% plus 4.0% Additional Expense Escalator = 7.0%).
(3) Based on input from County Staff.
(4) FY 2008 increases based on the increase in the Honolulu CPI from the second half of 2005 to the first half of 2006. FY 2009 and beyond, based on the historical trend of inflation in Hawai'i being higher than the US national average.
(5) Based on FY 2005 tonnage.
(6) Based on a study completed by the Division in 1997.
(7) See Section 4 of the ISWMP for details.
(8) Based on the average annual growth rate from FY 2005 - FY 2020, from the Kaua'i Long Range Land Transportation Plan. See Section 2 of the ISWMP.
(9) Based on R.W. Beck assumptions.

Table 2
County of Kaua`i
Department of Public Works
Solid Waste Program
Projected Number of Accounts
Fiscal Years Ending June 30

		Historical (1)			'03 - '05 Average Annual	(2) Estimate	(2) Budget	Projected (2)						'06 - '13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
1	**Customer Accounts**													
2	Residential Households (3)	17,439	17,700	17,863	1.21%	18,170	23,480	23,880	24,290	24,710	25,140	25,570	26,010	5.26%
3	Commercial	n/a	n/a	60	n/a	63	66	69	72	75	79	83	87	4.72%
4	**Total Customer Accounts**	17,439	17,700	17,923	1.38%	18,233	23,546	23,949	24,362	24,785	25,219	25,653	26,097	5.26%
5	**Total Customer Accounts (rounded)**					18,200	23,500	23,900	24,400	24,800	25,200	25,700	26,100	5.29%
6														
7														
8	Resident Population	60,706	61,836	63,883	2.58%	65,000	66,100	67,200	68,400	69,600	70,800	72,000	73,200	1.71%
9	Daily Visitors (4)	17,828	18,921	21,923	10.89%	22,300	22,700	23,100	23,500	23,900	24,300	24,700	25,100	1.70%
10	**Total De Facto Population**	78,534	80,757	85,806	4.53%	87,300	88,800	90,300	91,900	93,500	95,100	96,700	98,300	1.71%

Notes:

(1) Customer Account Data from Solid Waste Division.
Population Data from State of Hawai'i Department of Business, Economic Development & Tourism.

(2) Estimate, Budget and Projected growth rates based on the Kaua'i Long-Range Transportation Plan's average annual growth rates for Residential Population and Commercial Square Footage. See Section 2 of the ISWMP.

(3) Per the Division, FY 2007 includes an additional 5,000 households which had not been accounted for in previous years.

(4) Average annual growth rates for the Daily Visitors may not equal 1.64 percent due to rounding.

Table 3
County of Kauai`i
Department of Public Works
Solid Waste Program
Projected Waste Quantities - Tons
Fiscal Years Ending June 30

		Historical (1)			'03-'05 Average Annual	(2) Estimate	(2) Budget	Projected (2)						'06-'13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
1	**SOLID WASTE DISPOSED BY FUNCTION**													
2														
3	**Solid Waste Disposed**	**81,062**	**86,465**	**89,156**	4.87%	**92,910**	**96,870**	**101,050**	**100,855**	**96,144**	**97,795**	**98,884**	**102,200**	1.37%
4	Solid Waste Recycled	20,294	55,587	27,233	3.00%	27,710	28,180	28,660	33,815	43,716	47,565	52,176	54,930	10.27%
5	Total Solid Waste Generated	101,356	142,052	116,389	7.16%	120,620	125,050	129,710	134,670	139,860	145,360	151,060	157,130	3.85%
6														
7	**Solid Waste Transferred (3)**													
8	Hanapepe Transfer Station													
9	Commercial (4)	739	802	846	6.99%	860	900	940	940	890	910	920	950	1.43%
10	Residential Self-Haulers	6,652	7,220	7,612	6.97%	7,770	8,100	8,450	8,440	8,040	8,180	8,270	8,550	1.38%
11	Total Hanapepe Transfer Station	7,391	8,022	8,458	6.98%	8,630	9,000	9,390	9,380	8,930	9,090	9,190	9,500	1.38%
12														
13	Lihue Transfer Station													
14	Commercial (4)	973	1,150	1,194	10.78%	1,200	1,250	1,300	1,300	1,240	1,260	1,280	1,320	1.37%
15	Residential Self-Haulers	8,757	10,347	10,743	10.76%	10,780	11,240	11,730	11,710	11,160	11,350	11,480	11,860	1.37%
16	Total Lihue Transfer Station	9,730	11,497	11,937	10.76%	11,980	12,490	13,030	13,010	12,400	12,610	12,760	13,180	1.37%
17														
18	Kapaa Transfer Station													
19	Commercial (4)	1,015	1,052	1,108	4.48%	1,150	1,200	1,250	1,250	1,190	1,210	1,220	1,260	1.31%
20	Residential Self-Haulers	9,135	9,469	9,975	4.50%	10,350	10,790	11,250	11,230	10,710	10,890	11,010	11,380	1.36%
21	Total Kapaa Transfer Station	10,150	10,521	11,083	4.49%	11,500	11,990	12,500	12,480	11,900	12,100	12,230	12,640	1.36%
22														
23	Hanalei Transfer Station													
24	Commercial (4)	690	774	742	3.70%	800	830	870	870	830	840	850	880	1.37%
25	Residential Self-Haulers	6,207	6,962	6,681	3.75%	7,190	7,490	7,820	7,800	7,440	7,560	7,650	7,900	1.35%
26	Total Hanalei Transfer Station	6,897	7,736	7,423	3.75%	7,990	8,320	8,690	8,670	8,270	8,400	8,500	8,780	1.36%
27														
28	**Total Waste Transferred**	**34,169**	**37,775**	**38,902**	6.70%	**40,100**	**41,800**	**43,610**	**43,540**	**41,500**	**42,200**	**42,680**	**44,100**	1.37%
29														
30	**Solid Waste Direct-Haul**													
31	Landfill - Residential	4,915	4,048	4,217	-7.37%	4,790	5,000	5,210	5,200	4,950	5,050	5,100	5,280	1.40%
32	Landfill - Commercial & Private Hauler	41,978	44,642	46,037	4.72%	48,020	50,070	52,230	52,115	49,694	50,545	51,104	52,820	1.37%
33	**Total Waste Direct-Haul**	**46,893**	**48,690**	**50,254**	3.52%	**52,810**	**55,070**	**57,440**	**57,315**	**54,644**	**55,595**	**56,204**	**58,100**	1.37%
34														
35	**Total Solid Waste Disposed by Function**	**81,062**	**86,465**	**89,156**	4.87%	**92,910**	**96,870**	**101,050**	**100,855**	**96,144**	**97,795**	**98,884**	**102,200**	1.37%
36														
37	**SOLID WASTE DISPOSED BY GENERATOR**													
38	**Residential and Commercial &**													
39	**Private Hauler Waste Disposed (5)**													
40	Total Residential (6)	35,326	37,770	39,229	5.38%	40,880	42,620	44,460	44,380	42,300	43,030	43,510	44,970	1.37%
41	Total Commercial & Private Hauler (7)	45,737	48,695	49,927	4.48%	52,030	54,250	56,590	56,475	53,844	54,765	55,374	57,230	1.37%
42	**Total Residential and**	**81,062**	**86,465**	**89,156**	4.87%	**92,910**	**96,870**	**101,050**	**100,855**	**96,144**	**97,795**	**98,884**	**102,200**	1.37%
43	**Commercial Waste Disposed**													

Table 3
County of Kauai`i
Department of Public Works
Solid Waste Program
Projected Waste Quantities - Tons
Fiscal Years Ending June 30

Notes:

(1) Per County Staff.
(2) Estimate, Budget and Projections reflect the historical proportion of recycled materials, waste transferred and waste landfilled to total waste generated. Projected Solid Waste Generated, Solid Waste Disposed and Recyclable Materials per RW Beck. (See Section 2 of the ISWMP for details.)
(3) Total Transfer Station tonnage based on MSW Intake @ Kekaha Phase II by Origin, dated FY 2003, FY 2004 and FY 2005.
(4) Assumes 10% of the tonnage collected at the Transfer Station is from Commercial Customers, per the County.
(5) Based on MSW Intake @ Kekaha Phase II by Origin, dated FY 2003, FY 2004 and FY 2005. Includes mixed rubbish, mixed C&D, sewage sludge, asbestos, dead animals, contaminated soils, solidified grease and aggregates. Beginning in FY 2014, the County does not plan to receive any Commercial & Private Hauler waste.
(6) Assumes Residential Mixed Rubbish of 44% and total Commercial Mixed Rubbish of 56%, based on tons disposed at landfill by residential and commercial customers in FY 2005.
(7) Source: County of Kaua'i - Solid Waste, Materials Summary for FYs 2003 - 2005.

Table 4
County of Kaua`i
Department of Public Works
Solid Waste Program
Projected Tipping Revenues at Existing Rates
Fiscal Years Ending June 30

		Historical (1)			'03 - '05 Average Annual	(2) Estimate	(2) Budget	Projected (3)						'06-'13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
1	**Revenues**													
2														
3	**Transfer Station Tipping Revenues**													
4	Automobiles	$0	$0	$0	n/a	$0	$0	$0	$0	$0	$0	$0	$0	n/a
5	1/2 ton Truck/Trailer	8,500	7,490	8,860	2.1%	7,500	7,500	7,800	8,600	8,200	8,300	9,200	9,500	3.43%
6	3/4 ton Truck/Trailer	11,160	11,660	5,660	-28.8%	10,000	10,000	10,400	11,400	10,900	11,100	12,300	12,700	3.47%
7	Total Transfer Station Tipping Revenues (4)	$19,660	$19,150	$14,520	-14.1%	$17,500	$17,500	$18,200	$20,000	$19,100	$19,400	$21,500	$22,200	3.46%
8														
9	Commercial Collection Fee Revenues (4)	$10,660	$10,338	$10,455	-1.0%	$9,000	$9,000	$9,400	$10,300	$9,800	$10,000	$11,100	$11,500	3.56%
10														
11	**Kekaha Landfill Disposal Revenues (5)**	$2,417,015	$2,675,748	$2,313,756	-2.2%	$2,450,000	$2,450,000	$3,450,200	$3,442,600	$3,282,700	$3,338,900	$3,713,400	$0	-100.00%
12														
13	**New Subtitle D Landfill Revenues**													
14	Commercial Haulers (6)	$0	$0	$0	n/a	$0	$0	$0	$0	$0	$0	$0	$737,300	n/a
15	WTE Facility (7)	0	0	0	n/a	0	0	0	0	0	0	0	1,717,000	n/a
16	Total New Subtitle D Landfill Revenues	$0	$0	$0	n/a	$0	$0	$0	$0	$0	$0	$0	$2,454,300	n/a
17														
18	**WTE Energy Revenues (8)**	$0	$0	$0	n/a	$0	$0	$0	$0	$0	$0	$0	$2,550,000	n/a
19														
20	**Total Revenues**	$2,447,335	$2,705,236	$2,338,731	-2.2%	$2,476,500	$2,476,500	$3,477,800	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000	10.68%

	FY 2007 Transfer Station Tipping Fees	**Coupon Rate**
25	Automobiles	$6.00
26	1/2 ton Truck/Trailer	10.00
27	3/4 ton Truck/Trailer	20.00

	FY 2007 Commercial Collection Fee	**Rate ($/month)**
30	1 Can	$11.00
31	2 Cans	17.00
32	3 Cans	23.00
33	For each can over 3	6.00

	FY 2008 Kekaha Landfill Rates & Fees	**Rate ($/ton)**
36	Commercial Haulers - Municipal Solid Waste	$80.00
37	Asbestos	70.00
38	Special Waste (9)	80.00
39	Residential Self Haul - Municipal Solid Waste	no charge

Notes:

(1) Historical data per Schedule of Revenues, Expenditures and Changes in Fund Balance.

(2) Estimate and Budget data per County Staff.

(3) FY 2008 and beyond Tipping Revenues based on the average annual growth in waste transferred (See Table 3, Line 28) and Commercial Collection Fee Revenues based on the average annual growth in commercial customer accounts (See Table 2, Line 3).
Landfill Disposal Revenues based on estimate of annual average growth in disposal quantities of commercial and private hauler direct-haul tonnage (See Table 3, Line 32).
Assumes a 10% rate increase in Transfer Station Tipping Fees in 2009 and a 10% rate increase in Transfer Station Tipping Fees and Landill Tipping Fees in 2012, these rate increase assume rates are increased to

(4) Historical Transfer Station Tipping Fees & Commercial Collection Fee per County Staff. 2005 revenues for 3/4 ton Truck/Trailer are unusually low for unknown reasons, per County Staff.

(5) Assumes that Landfill Disposal Revenues cease at the end of FY 2012 and the WTE Facility is fully operational in FY 2013.
FY 2008 revenues include an adjustment for the increase in the Landfill MSW Tipping Fee from $56 to $80.

(6) Based on a tip fee of $101/ton and approximately 5,000 tons of construction and demolition debris and 2,300 tons of unprocessable waste collected by commercial haulers.

(7) Based on a tip fee of $101/ton and approximately 17,000 tons of by-pass waste and ash from the WTE facility.

(8) See Section 10 in the ISWMP for details, assumes mid-range of projected revenues based on disposal of Residential Mixed Rubbish at the WTE Facility (See Table 3, Line 40).

(9) Commercial haulers, treated medical waste, PC soils, offals, etc.

Table 5
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Expenses
Fiscal Years Ending June 30

		Actual (1)			'03 - '05 Average Annual	Estimate (1)	Budget (1)	Projected (2)						'06 - '13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
1	**RESIDENTIAL COLLECTION**													
2	Administrative (3,4)	$500	$900	$500	0.00%	$34,700	$37,000	$39,600	$42,400	$45,400	$48,600	$52,000	$55,600	6.97%
3	Salaries & Benefits (4,5)	597,800	596,900	648,000	4.11%	695,200	784,000	838,900	897,600	960,400	1,027,600	1,099,500	1,176,500	7.81%
4	Central Services Cost (4)	69,800	94,000	86,200	11.13%	86,200	90,100	96,400	103,100	110,300	118,000	126,300	135,100	6.63%
5	Heavy Equipment (6)	107,200	146,800	357,700	82.67%	315,700	54,300	203,900	210,000	216,300	222,800	229,500	236,400	-4.05%
6	Puhi Metals Recycling Center - Bulky Items (7)	0	0	0	n/a	0	900,000	0	0	0	0	0	0	n/a
7	Supplies & Expenses	0	100	0	n/a	200	400	400	400	400	400	400	400	10.41%
8	Highway Division Support Services (8)	0	0	210,800	n/a	217,100	223,700	230,400	237,300	244,400	251,700	259,300	267,100	3.01%
9	Other Solid Waste Related Costs (8)	0	0	42,800	n/a	44,100	45,400	46,800	48,200	49,600	51,100	52,600	54,200	2.99%
10	Other (4)	1,300	1,200	1,100	-8.01%	1,900	1,800	1,900	2,000	2,100	2,200	2,400	2,600	4.58%
11	**TOTAL RESIDENTIAL COLLECTION**	$776,600	$839,900	$1,347,100	31.70%	$1,395,100	$2,136,700	$1,458,300	$1,541,000	$1,628,900	$1,722,400	$1,822,000	$1,927,900	4.73%
12	Percent Increase						53%	-32%	6%	6%	6%	6%	6%	
13														
14	**COMMERCIAL COLLECTION**													
15	Administrative (3,4)	$500	$900	$500	0.00%	$4,800	$4,600	$4,900	$5,200	$5,600	$6,000	$6,400	$6,800	5.10%
16	Salaries & Benefits (4,5)	5,900	6,100	6,400	4.15%	3,200	3,300	3,500	3,700	4,000	4,300	4,600	4,900	6.28%
17	Central Services Cost (4)	7,800	10,400	9,600	10.94%	9,600	10,000	10,700	11,400	12,200	13,100	14,000	15,000	6.58%
18	Heavy Equipment (6)	2,800	7,100	10,300	91.80%	7,200	6,000	6,700	6,900	7,100	7,300	7,500	7,700	0.96%
19	Public Education	0	0	100	n/a	3,300	3,300	3,400	3,500	3,600	3,700	3,800	3,900	2.42%
20	Supplies & Expenses	0	100	0	n/a	100	300	300	300	300	300	300	300	16.99%
21	Highway Division Support Services (8)	0	0	700	n/a	800	600	600	600	600	600	600	600	-4.03%
22	Other Solid Waste Related Costs (8)	0	0	4,800	n/a	4,900	5,000	5,200	5,400	5,600	5,800	6,000	6,200	3.42%
23	Other (4)	1,200	1,200	1,100	-4.26%	1,800	1,700	1,800	1,900	2,000	2,100	2,200	2,400	4.20%
24	**TOTAL COMMERCIAL COLLECTION**	$18,200	$25,800	$33,500	35.67%	$35,700	$34,800	$37,100	$38,900	$41,000	$43,200	$45,400	$47,800	4.26%
25	Percent Increase						-3%	7%	5%	5%	5%	5%	5%	
26														
27	**TRANSFER STATION**													
28	Administrative (3,4)	$500	$900	$500	0.00%	$38,400	$41,000	$43,900	$47,000	$50,300	$53,800	$57,600	$61,600	6.98%
29	Salaries & Benefits (4,5)	909,800	908,300	984,600	4.03%	1,081,200	1,186,600	1,269,700	1,358,600	1,453,700	1,555,500	1,664,400	1,780,900	7.39%
30	Central Services Cost (4)	77,600	104,400	95,800	11.11%	95,800	100,100	107,100	114,600	122,600	131,200	140,400	150,200	6.64%
31	Heavy Equipment (6)	93,700	115,200	309,100	81.63%	294,700	693,500	640,000	300,000	309,000	318,300	327,800	337,600	1.96%
32	Other (4,9)	1,600	1,700	1,500	-3.18%	3,000	2,300	2,500	2,700	2,900	3,100	3,300	3,500	2.23%
33	Equipment Repairs	0	0	0	n/a	0	40,000	41,200	42,400	43,700	45,000	46,400	47,800	n/a
34	NPDES Permit/Monitoring (10)	0	0	0	n/a	124,600	46,900	48,300	49,700	51,200	52,700	54,300	55,900	-10.82%
35	Public Education	0	0	100	n/a	3,300	3,300	3,400	3,500	3,600	3,700	3,800	3,900	2.42%
36	Propane Tank Disposal	0	0	23,500	n/a	26,400	26,400	27,200	28,000	28,800	29,700	30,600	31,500	2.56%
37	Replacement Parts - Kapaa (6)	4,600	3,000	25,300	134.52%	25,000	0	11,000	11,300	11,600	11,900	12,300	12,700	-9.22%
38	Supplies & Equipment (11)	3,500	4,300	3,500	0.00%	5,400	6,200	6,400	6,600	6,800	7,000	7,200	7,400	4.60%
39	Utilities (4,13)	16,900	15,800	21,100	11.74%	24,100	24,100	25,800	27,600	29,500	31,600	33,800	36,200	5.98%
40	Highway Division Support Services (8)	0	0	97,300	n/a	100,300	103,300	106,400	109,600	112,900	116,300	119,800	123,400	3.01%
41	Hanapepe Baseyard Electricity Billing (8)	0	0	10,900	n/a	11,200	11,500	11,800	12,200	12,600	13,000	13,400	13,800	3.03%
42	Other Solid Waste Related Costs (8)	0	0	47,500	n/a	49,000	50,400	51,900	53,500	55,100	56,800	58,500	60,300	3.01%
43	**TOTAL TRANSFER STATION**	$1,108,200	$1,153,600	$1,620,700	20.93%	$1,882,400	$2,335,600	$2,396,600	$2,167,300	$2,294,300	$2,429,600	$2,573,600	$2,726,700	5.44%
44	Percent Increase						24%	3%	-10%	6%	6%	6%	6%	
45														

Table 5
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Expenses
Fiscal Years Ending June 30

		Actual (1)			'03 - '05 Average Annual	Estimate (1)	Budget (1)	Projected (2)						'06 - '13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
46	**LANDFILL**													
47	Administrative (3,4)	$500	$900	$500	0.00%	$68,700	$76,600	$82,000	$87,700	$93,800	$100,400	$107,400	$114,900	7.62%
48	Salaries & Benefits (4,5)	1,091,600	1,101,600	1,218,600	5.66%	1,392,900	1,577,400	1,687,800	1,805,900	1,932,300	2,067,600	2,212,300	2,367,200	7.87%
49	Central Services Cost (4)	77,600	104,400	95,800	11.11%	95,800	100,100	107,100	114,600	122,600	131,200	140,400	150,200	6.64%
50	Halehaka Lease	9,100	9,100	9,100	0.00%	9,100	9,100	9,400	9,700	10,000	10,300	10,600	10,900	2.61%
51	Heavy/Light Equipment & Vehicles (6)	55,600	54,100	169,100	74.40%	218,500	0	92,900	95,700	98,600	101,600	104,600	107,700	-9.61%
52	Electric	8,200	8,900	7,600	-3.73%	19,500	16,000	16,500	17,000	17,500	18,000	18,500	19,100	-0.30%
53	Equipment Repairs	20,600	16,100	6,900	-42.13%	15,000	15,000	15,500	16,000	16,500	17,000	17,500	18,000	2.64%
54	Financial Assurance (14)	295,700	321,100	360,200	10.37%	367,500	367,500	378,500	389,900	401,600	413,600	426,000	438,800	2.57%
55	Kekaha Landfill Operation (15)	1,591,000	1,607,000	1,777,300	5.69%	1,868,000	1,900,000	2,039,500	2,096,600	2,058,600	2,156,800	2,246,200	2,391,200	3.59%
56	NPDES Permit/Monitoring (10)	0	0	0	n/a	30,700	11,600	17,900	18,400	19,000	49,900	19,000	19,600	-6.21%
57	Other (4,11)	3,400	105,300	5,800	30.61%	5,800	9,500	10,000	12,200	16,200	18,200	20,600	22,300	21.21%
58	Other Contractual Services (4,16)	11,800	8,400	20,400	31.48%	14,100	15,100	16,100	17,200	18,400	19,700	21,100	22,600	6.97%
59	Post Closure (14)	1,600	258,100	289,100	1244.20%	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	0.00%
60	Propane Tank Disposal	0	0	5,900	n/a	6,600	6,600	6,800	7,000	7,200	7,400	7,600	7,800	2.42%
61	Public Education	0	0	100	n/a	3,300	3,300	3,400	3,500	3,600	3,700	3,800	3,900	2.42%
62	Solid Waste Surcharge (12)	28,400	22,700	31,300	4.98%	34,000	34,000	35,400	35,300	33,700	34,200	34,600	35,800	0.74%
63	Supplies & Equipment (17)	4,000	4,000	4,100	1.24%	5,600	18,300	18,800	19,400	20,000	20,600	21,200	21,800	21.43%
64	Top Soil & Cover Material (6)	2,300	500	0	-100.00%	10,000	0	900	900	900	900	900	900	-29.11%
65	Uncollectible Receivables	0	0	0	n/a	25,000	25,000	25,800	26,600	27,400	28,200	29,000	29,900	2.59%
66	Highway Division Support Services (8)	0	0	97,300	n/a	100,300	103,300	106,400	109,600	112,900	116,300	119,800	123,400	3.01%
67	Other Solid Waste Related Costs (8)	0	0	244,500	n/a	251,900	259,400	267,200	275,200	283,500	292,000	300,800	309,800	3.00%
68	**TOTAL LANDFILL**	$3,201,400	$3,622,200	$4,343,600	16.48%	$4,842,300	$4,847,800	$5,237,900	$5,458,400	$5,594,300	$5,907,600	$6,161,900	$6,515,800	4.33%
69	Percent Increase						0%	8%	4%	2%	6%	4%	6%	
70														
71	**RECYCLING**													
72	Administrative (3,4)	$500	$900	$500	0.00%	$59,400	$64,400	$68,900	$73,700	$78,900	84,400	90,300	96,600	7.19%
73	Salaries & Benefits (4,5)	153,700	151,200	156,700	0.97%	132,800	135,100	144,600	8,800	9,400	10,100	10,800	11,600	-29.41%
74	Auto Recycling Site Lease (18)	20,800	20,800	20,800	0.00%	20,800	20,800	20,800	21,000	21,000	21,000	21,000	21,000	0.14%
75	Central Services Cost (4)	58,200	78,300	71,800	11.07%	71,800	75,100	80,400	86,000	92,000	98,400	105,300	112,700	6.65%
76	Kaua'i Household Hazardous Waste	76,000	36,600	58,800	-12.04%	77,000	77,000	79,300	81,700	84,200	86,700	89,300	92,000	2.58%
77	Kaua'i Recycles Program	297,200	18,500	239,500	-10.23%	300,000	200,000	206,000	212,200	218,600	225,200	232,000	239,000	-3.20%
78	NPDES Permit/Monitoring (10)	0	0	0	n/a	30,700	11,600	11,900	12,300	12,700	13,100	13,500	13,900	-10.70%
79	White Goods Hauling (19)	0	0	0	n/a	0	376,000	250,000	257,500	265,200	273,200	281,400	289,800	n/a
80	Puhi Metals Recycling Center	286,000	484,500	319,400	5.68%	488,000	341,000	341,000	341,000	351,200	361,700	372,600	383,800	-3.37%
81	Other (4,20)	900	700	1,300	20.19%	1,400	1,600	1,700	1,800	1,900	2,000	2,100	2,200	6.67%
82	Recycling Programs (21)	120,900	98,500	26,800	-52.92%	149,000	42,000	43,300	44,600	45,900	47,300	48,700	50,200	-14.39%
83	Supplies & Equipment (22)	1,300	1,300	1,300	0.00%	1,400	1,700	1,800	1,900	2,000	2,100	2,200	2,300	7.35%
84	Used Tire Processing	0	0	52,800	n/a	65,000	75,000	77,300	100,000	103,000	106,100	109,300	112,600	8.17%
85	Utilities (4,13)	4,300	3,900	5,100	8.91%	6,100	6,100	6,500	7,000	7,500	8,000	8,600	9,200	6.05%
86	Highway Division Support Services (8)	0	0	20,100	n/a	20,700	21,300	21,900	22,600	23,300	24,000	24,700	25,400	2.97%
87	Hanapepe Baseyard Electricity Billing (8)	0	0	0	n/a	0	0	0	0	0	0	0	0	n/a
88	Other Solid Waste Related Costs (8)	0	0	0	n/a	0	0	0	0	0	0	0	0	n/a
89	**TOTAL RECYCLING**	$1,019,800	$895,200	$974,900	-2.23%	$1,424,100	$1,448,700	$1,355,400	$1,272,100	$1,316,800	$1,363,300	$1,411,800	$1,462,300	0.38%
90	Percent Increase						2%	-6%	-6%	4%	4%	4%	4%	
91														

Table 5
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Expenses
Fiscal Years Ending June 30

		Actual (1)			'03 - '05 Average Annual	Estimate (1)	Budget (1)	Projected (2)						'06 - '13 Average Annual
		2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth
92	**GREENWASTE**													
93	Administrative (3,4)	$500	$900	$500	0.00%	$10,400	$10,600	$11,300	$12,100	$12,900	$13,800	$14,800	$15,800	6.16%
94	Salaries & Benefits (4,5)	117,200	119,300	139,600	9.14%	174,900	164,000	175,500	187,800	200,900	215,000	230,100	246,200	5.01%
95	Central Services Cost (4)	19,400	26,100	23,900	10.99%	23,900	25,000	26,800	28,700	30,700	32,800	35,100	37,600	6.69%
96	Other	300	300	400	15.47%	300	400	400	400	400	400	400	400	4.20%
97	Supplies & Equipment (22)	0	0	0	n/a	0	200	200	200	200	200	200	200	n/a
98	Greenwaste Processing	0	429,300	528,500	n/a	368,200	600,000	618,000	636,500	655,600	675,300	695,600	716,500	9.98%
99	**TOTAL GREENWASTE**	$137,400	$575,900	$692,900	124.56%	$577,700	$800,200	$832,200	$865,700	$900,700	$937,500	$976,200	$1,016,700	8.41%
100	Percent Increase						38.5%	4.0%	4.0%	4.0%	4.1%	4.1%	4.1%	
101														
102	**TOTAL BUDGETED OPERATIONS**	$6,261,600	$7,112,600	$9,012,700	19.97%	$10,157,300	$11,603,800	$11,317,500	$11,343,400	$11,776,000	$12,403,600	$12,990,900	$13,697,200	4.36%
103	Percent Increase						14.2%	-2.5%	0.2%	3.8%	5.3%	4.7%	5.4%	
104														
105	**RECOMMENDED ISWMP**													
106	Residential Automated Collection (23)	n/a	n/a	n/a	n/a	n/a	n/a	$0	$695,000	$1,652,400	$1,394,900	$0	$0	n/a
107	Additional Recycling Services (23)	n/a	n/a	n/a	n/a	n/a	n/a	0	536,500	574,500	4,082,100	1,787,900	1,889,400	n/a
108	Additional Greenwaste Services (23)	n/a	n/a	n/a	n/a	n/a	n/a	0	770,000	2,166,200	2,045,500	487,900	841,100	n/a
109	WTE Facility O&M Costs (24)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,172,600	n/a
110	WTE Facility Residual Disposal Costs (25)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,549,900	n/a
111	Subtitle D Landfill O&M Costs (26)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2,454,300	n/a
112	Customer Service Related Expenses (27)	n/a	n/a	n/a	n/a	n/a	n/a	0	0	56,900	60,900	65,200	69,800	n/a
113	**TOTAL RECOMMENDED ISWMP**	n/a	n/a	n/a	n/a	n/a	n/a	$0	$2,001,500	$4,450,000	$7,583,400	$2,341,000	$9,977,100	n/a
114														
115														
116	**TOTAL COST OF OPERATIONS**	$6,261,600	$7,112,600	$9,012,700	19.97%	$10,157,300	$11,603,800	$11,317,500	$13,344,900	$16,226,000	$19,987,000	$15,331,900	$23,674,300	14.50%
							14.2%	-2.5%	17.9%	21.6%	23.2%	-23.3%	54.4%	

Table 5
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Expenses
Fiscal Years Ending June 30

	Actual (1)			'03 - '05 Average Annual	Estimate (1)	Budget (1)	Projected (2)						'06 - '13 Average Annual
	2003	2004	2005	Growth	2006	2007	2008	2009	2010	2011	2012	2013	Growth

Notes:

(1) FY 2003 - FY 2005 per Budget Preparation worksheet. FY 2006 and FY 2007 per approved Budget.
(2) Based on previous year's expense times 3.0 percent general inflation, unless otherwise noted. Recommended ISWMP Programs and Strategies begin on Line 105. Both the landfill and the WTE facility will be open for operations in FY 2013.
(3) Some Administrative expenses have been allocated to Salaries & Benefits for FYs 2003 - FY 2005. FY 2006 and beyond includes salaries for Program Administrative Officer, Departmental Contracts Specialist, Solid Waste Programs Assistant, Abandoned/Derelict Vehicle Coordinator, and Office Manager, airfare, per diem, car rental and parking, and other travel expenditures.
(4) Based on previous year's expense times 3.0 percent general inflation plus 4.0 percent additional expense escalator, for certain accounts per County Staff.
(5) Includes salaries, overtime, vacation pay, temporary assignment, meals, shift work, collective bargaining raises, training, FICA, Public Employee's Health Fund, worker's compensation, unemployment compensation, employer contribution.
(6) Projections in FY 2008 are based on the average of FY 2003 - FY 2005 actual expenditures. Projections in FY 2009 and beyond are based on previous year's expenses times 3.0 general inflation. This assumes an average annual expense, when in reality purchases may be made every few years. Heavy Equipment for the Transfer Station assumed to be $640,000 in FY 2008 and $300,000 in FY 2009 and beyond, per County Staff.
(7) This program was discontinued in FY 2007.
(8) FY 2005 Additional Expenses per Public Works
(9) Includes safety gear, physical and medical
(10) Large increase in FY 2006 due to NPDES permit requirements for Hanalei Transfer Station, Kapaa Transfer Station, Lihue Transfer Station. FY 2007 expenses and beyond are for NPDES monitoring expenses, assumes monitoring expense will increase by 50% in FY 2008, per County Staff. Assumes NPDES permit renewal activities
(11) Includes office supplies, janitorial supplies, computer supplies, herbicides/fertilizer/insect repellants, disinfectants/portable toilet rentals, and small tools. FY 2004 Landfill expenses includes $98,870 of landfill maintenance.
(12) FY 2008 and beyond based on tonnage disposed and State surcharge of $0.35 per ton.
(13) Includes electric, water or delivery of potable water, and telephone services.
(14) The County has been building a reserve fund to pay for Closure and Post Closure Activities.
(15) Payments to Waste Management based on average annual growth in disposal quantities (See Table 3, Line 3) and the estimates of future inflation (See Table 1).
(16) Includes maintenance, misc. emergency repairs, and site tune up of scales.
(17) Includes office supplies, janitorial supplies, computer supplies, herbicides/fertilizer/insect repellants, and small tools.
(18) Lease expense for FY 2007 - FY 2011 per Grove Farm License Agreement for Puhi Metals Recycling Center.
(19) Budgeted FY 2007 includes an increase of approximately $376,000, due primarily to increases in white goods hauling expenses; however this program ceased operation after 2007. New contract began in FY 2008 at a lower cost of $250,000 pe
(20) Includes mileage and dues/subscriptions.
(21) FY 2006 based on budgeted County Beach Park Recycling Program and anticipated Curbside Recycling Program. FY 2007 budget recognize delay in implementing Curbside Recycling Program. See Table 6 for further details regarding the Curbside Recycling Program.
(22) Copier rental, office supplies, and computer supplies.
(23) See Table 6 and Section 4 in the ISWMP for details.
(24) See Section 10 of the ISWMP for details. Based on an average O&M cost of $77/ton - $89/ton processed. Assumes disposal of 85 percent of the Residential Waste Disposed at the WTE Facility (See Table 3, Line 40).
(25) Based on a disposal fee of $101 per ton for the Residential Waste not Processed and for Combustion Residue Quantity, which is based on an average of 20% - 25% of the Residential Waste after back-end ferrous metal recovery.
(26) Based on 7,000 tons of residue or bypass, 10,000 tons of ash, 5,000 tons of C&D and 2.300 tons of non-combustible commercial waste at $101/ton per Section 8 of ISWMP.
(27) Based on hiring of one SR-13 staff person to handle customer service responsibilities associated with new solid waste fee.

Table 6
County of Kaua`i
Department of Public Works
Solid Waste Program
Recommended ISWMP Programs and Strategies
Fiscal Years Ending June 30

		Projected					'09 - '13 Average Annual
		2009	2010	2011	2012	2013	Growth
1	**Residential Automated Collection**						
2	**Operating Expenses**						
3	Purchase 5,000 Carts for Automated Refuse Collection Program Lihue households (1)	$550,000	$0	$0	$0	$0	-100.00%
4	Purchase One Automated Refuse Collection Vehicle for Lihue (2)	40,000	0	0	0	0	-100.00%
5	Educate Pilot Program Lihue Residents on Automated Collection	5,000	0	0	0	0	-100.00%
6	Purchase 13,000 Carts for Automated Refuse Collection Program for 13,000 Kapaa and North Shore households (1)	0	1,560,000	0	0	0	n/a
7	Purchase Two Automated Refuse Collection Vehicles for Kapaa and North Shore (2)	0	82,400	0	0	0	n/a
8	Educate Kapaa and North Shore Residents on Automated Collection	0	10,000	0	0	0	n/a
9	Purchase 10,000 Carts for Automated Refuse for Poipu & Westside Households (1)	0	0	1,300,000	0	0	n/a
10	Purchase Two Automated Refuse Collection Vehicles for Poipu	0	0	84,900	0	0	n/a
11	Educate Poipu & Westside Residents on Automated Collection	0	0	10,000	0	0	n/a
12	Conduct Operational Efficiency review	100,000	0	0	0	0	-100.00%
13	**Total Residential Automated Collection O&M Expenses**	$695,000	$1,652,400	$1,394,900	$0	$0	-100.00%
14							
15	**Recycling Services**						
16	Additional Staff Salary (3)	$190,600	$196,300	$202,200	$208,300	$214,500	3.00%
17	Additional Staff Fringe Benefits (3)	130,000	133,900	138,000	142,100	146,400	3.01%
18	**Total Additional Salary and Benefits**	$320,600	$330,200	$340,200	$350,400	$360,900	3.00%
19							
20	Promote Aloha Shares	$500	$500	$500	$500	$500	0.00%
21	Establish Electronics Collection Event	61,800	63,700	65,600	67,600	69,600	3.02%
22	Establish Innovative Recycling Grant Program	0	25,000	25,800	26,600	27,400	n/a
23	Disseminate Information on The Proper Handling of Medical Wastes	0	500	500	500	500	n/a
24	Establish Program for Recycling at Special Events	5,000	1,500	1,500	1,500	1,500	-25.99%
25	Implement Tourist Recycling	25,000	25,800	26,600	27,400	28,200	3.06%
26	Add Drop Off site at Kapaa, Hanapepe and Lihue Transfer Stations (4)	123,600	127,300	131,100	135,000	139,100	3.00%
27	Additional routes for curbside recycling (salaries & benefits) (5)	0	0	0	552,100	590,700	
28	Recycling Carts (6)	0	0	3,490,300	0	0	
29	MRF operating costs (7)	0	0	0	626,300	671,000	
30	**Subtotal Additional Recycling Collection Expenses**	$215,900	$244,300	$3,741,900	$1,437,500	$1,528,500	63.12%
31							
32	**Total Recycling Services Expenses**	$536,500	$574,500	$4,082,100	$1,787,900	$1,889,400	36.99%
33							

Table 6
County of Kaua`i
Department of Public Works
Solid Waste Program
Recommended ISWMP Programs and Strategies
Fiscal Years Ending June 30

		Projected					'09 - '13 Average Annual
		2009	2010	2011	2012	2013	Growth
34	**Green Waste Services**						
35	Promote Backyard Composting	$1,000	$1,000	$1,000	$1,000	$1,000	0.00%
36							
37	Collection of Pre-Consumer Food Waste (8)	0	0	0	0	227,400	n/a
38	Compost Pre-Consumer Food Waste (9)	0	0	0	0	102,600	n/a
39	Total Pre-Consumer Food Waste Costs	$0	$0	$0	$0	$330,000	n/a
40							
41	Carts to Collect Green Waste Every Other Week in Lihue (10)	660,000	0	0	0	0	-100.00%
42	Automated Vehicles to Collect Green Waste in Every Other Lihue (11)	40,000	0	0	0	0	-100.00%
43	Carts to Collect Green Waste Every Other Week in Kapaa and North Shore (10)	0	1,800,000	0	0	0	n/a
44	Automated Vehicles to Collect Green Waste every other week in Kapaa and North Shore (11)	0	82,400	0	0	0	n/a
45	Carts to Collect Green Waste Every Other Week in Poipu and West Side (10)	0	0	1,495,000	0	0	n/a
46	Automated Vehicles to Collect Green Waste Every Other Week in Poipu and West Side (11)	0	0	84,900	0	0	n/a
47	Additional green waste processing (12)	69,000	282,800	464,600	486,900	510,100	64.89%
48	Develop Site Plan for Centralized Composting Facility		0	0	0	0	n/a
49	**Subtotal Green Waste Services Expenses**	$769,000	$2,165,200	$2,044,500	$486,900	$510,100	-9.75%
50							
51	**Total Green Waste Services Expenses**	$770,000	$2,166,200	$2,045,500	$487,900	$841,100	2.23%
52							
53	**Customer Service Related Expenses**						
54	Training Staff	$0	$56,900	$60,900	$65,200	$69,800	n/a
56	**Total Customer Service Related Expenses**	$0	$56,900	$60,900	$65,200	$69,800	n/a
55	Additional FTEs		1	1	1	1	n/a
57							
58	**Total Additional Costs**	$2,001,500	$4,450,000	$7,583,400	$2,341,000	$2,800,300	8.76%

Notes:
(1) Based on purchasing 5,000 carts at $110 a piece in 2009; 13,000 carts at $120 a piece in 2010; 10,000 carts $130 in 2011.
(2) Based on purchasing one vehicle in 2009, two vehicles in 2010 and 2 vehicles in 2011, with a purchase price $40,000 (2009$), plus 3% inflation per year.
(3) Based on adding a Deputy Assistant, Business Waste Diversion Specialist and Collection Specialist.
(4) Based on each drop off site costing $40,000 per year in operating expenses (2008 dollars).
(5) Based on 50% of automated residential and commercial collection salaries and benefits.
(6) Assumes all carts will be purchased one year before curbside recycling begins. Based on costs of carts purchased for automated collection.
(7) Assumes 10.8% of total tonnage processed at MRF at $35/ton (2009 dollars), escalated.
(8) Based on a portion of existing collection costs.
(9) Based on collecting approximatley 1,718 tons, at a processing cost of $50 a ton (2007 dollars), escalated.
(10) Based on purchasing 6,000 carts at $110 a piece in 2009; 15,000 carts at $120 a piece in 2010; 11,500 carts at $130 a piece in 2011.
(11) Based on purchasing one vehicle in 2009, two vehicles in 2010 and 2 vehicles in 2011, with a purchase price $40,000 (2009$), plus 3% inflation per year.
(12) Assumes 90% of Residential green waste that is currently disposed will be processed at $50 a ton (2007 dollars).

Table 7
County of Kaua`i
Department of Public Works
Solid Waste Program
Projected CIP and Sources of Funds
Fiscal Years Ending June 30

		2009	2010	2011	2012	2013
1	**Projected Capital Expenditures (1)**					
2	Puhi Metals Recycling Center Site	$0	$0	$615,300	$0	$0
3	Materials Recovery Facility (MRF)	650,000	1,030,000	4,774,100	0	0
4	Central Composting Site	0	669,500	4,758,100	437,100	5,953,900
5	Kekaha Landfill Lateral Expansion	7,000,000	0	0	0	0
6	Development of New Subtitle D Landfill (2)	0	0	636,500	9,834,500	0
7	Construction of Waste-To-Energy Facility (3)	0	0	17,080,500	17,592,900	18,120,700
8	Construction of a HHW & Electronics Recycling Center	0	0	708,900	0	0
9	Upgrade Kapaa Refuse Transfer Station	0	2,482,300	0	0	0
10	Upgrade Hanalei Transfer Station	0	0	1,591,400	0	0
11	Upgrade Hanapepe Transfer Station	0	0	1,591,400	0	0
12	Upgrade Lihue Transfer Station	0	0	1,591,400	0	0
13	Total Capital Expenditures	$7,650,000	$4,181,800	$33,347,600	$27,864,500	$24,074,600
14						
15	**Sources of Funds for Capital Expenditures (4)**					
16	**Long-Term Bonds (20 Years)**					
17	Long-Term Bonds - Existing Landfill	$7,000,000	$0	$0	$0	$0
18	Long-Term Bonds - MRF	650,000	1,030,000	4,774,100	0	0
19	Long-Term Bonds - Central Composting Site	0	669,500	4,758,100	437,100	5,953,900
20	Long-Term Bonds - New Subtitle D Landfill	0	0	636,500	9,834,500	0
21	Long-Term Bonds - Puhi Metals	0	0	615,300	0	0
22	Long-Term Bonds - Recycling (HHW)	0	0	708,900	0	0
23	Long-Term Bonds - WTE Facility	0	0	17,080,500	17,592,900	18,120,700
24	**Total Long-Term Bonds**	$7,650,000	$1,699,500	$28,573,400	$27,864,500	$24,074,600
25						
26	**Short-Term Bonds (10 Years)**					
27	Short-Term Bonds - Kapaa Transfer Station	$0	$2,482,300	$0	$0	$0
28	Short-Term Bonds - Other Transfer Stations	0	0	4,774,200	0	0
29	**Total Short-Term Bonds**	$0	$2,482,300	$4,774,200	$0	$0
30						
31	**Total County Funds**	$7,650,000	$4,181,800	$33,347,600	$27,864,500	$24,074,600
32	**Landfill Closure Reserve Fund (5)**	0	0	0	0	0
33	**State General/Bond Funds (6)**	0	0	0	0	0
34	**Total Funded Capital Expenditures**	$7,650,000	$4,181,800	$33,347,600	$27,864,500	$24,074,600

Table 7
County of Kaua`i
Department of Public Works
Solid Waste Program
Projected CIP and Sources of Funds
Fiscal Years Ending June 30

	2009	2010	2011	2012	2013

Notes:

(1) Projected Capital Expenditures for Puhi Metals Recycling Center Site, MRF, Composting Site and Kekaha Landfill Lateral Expansion per County Staff. Projected capital expenditures for Development of New Subtitle D Landfill, Construction of WTE Facility, Construction of a HHW & Electronics Recycling Center and Upgrades to the Transfer Station, per RW Beck (See Sections 6, 8 and 10 in the ISWMP for details). All capital expenditures include 3.0% annual inflation, beginning in FY 2010.

(2) An additional $4,000,000 is budgeted to be spent in FY 2014.

(3) Assumes a construction cost of $52,800,000, spread over three years. See Section 10 in the ISWMP for details.

(4) See Table 1 for financing assumptions. Assumes Long-Term Financing for the Puhi Metals Recycling Center Site, MRF, Central Composting Site, Kekaha Landfill Lateral Expansion, Development of New Subtitle D Landfill, and Construction of the WTE Facility. Assumes short-term funding for the Construction of the HHW & Electronics Recycling Center and Upgrades to the Transfer Stations.

(5) The County has created a reserve fund for landfill closure costs and does not anticipate needing additional funding for landfill closure costs.

(6) Assumes 100% of the CIP will be funded by the County.

Table 8
County of Kaua`i
Department of Public Works
Solid Waste Program
Refuse Division
Actual and Projected Debt Service
Fiscal Years Ending June 30

		2009	2010	2011	2012	2013
1	**Proposed Bond Issuances**					
2	**Long-Term Bonds - Existing Landfill**					
3	Proposed Bond Issue (1)	$7,000,000	$0	$0	$0	$0
4	Bond Financing Fee (2)	105,000	0	0	0	0
5	Total Proposed Long-Term Bond Issuances	$7,105,000	$0	$0	$0	$0
6						
7	**Long-Term Bonds - New Subtitle D Landfill**					
8	Proposed Bond Issue (1)	$0	$0	$636,500	$9,834,500	$0
9	Bond Financing Fee (2)	0	0	9,500	147,500	0
10	Total Proposed Long-Term Bond Issuances	$0	$0	$646,000	$9,982,000	$0
11						
12	**Long-Term Bonds - MRF**					
13	Proposed Bond Issue (1)	$650,000	$1,030,000	$4,774,100	$0	$0
14	Bond Financing Fee (2)	9,800	15,500	71,600	0	0
15	Total Proposed Long-Term Bond Issuances	$659,800	$1,045,500	$4,845,700	$0	$0
16						
17	**Long-Term Bonds - Composting Facility**					
18	Proposed Bond Issue (1)	$0	$669,500	$4,758,100	$437,100	$5,953,900
19	Bond Financing Fee (2)	0	10,000	71,400	6,600	89,300
20	Total Proposed Short-Term Bond Issuances	$0	$679,500	$4,829,500	$443,700	$6,043,200
21						
22	**Long-Term Bonds - Puhi Metals**					
23	Proposed Bond Issue (1)	$0	$0	$615,300	$0	$0
24	Bond Financing Fee (2)	0	0	9,200	0	0
25	Total Proposed Long-Term Bond Issuances	$0	$0	$624,500	$0	$0
26						
27	**Long-Term Bonds - Recycling (HHW)**					
28	Proposed Bond Issue (1)	$0	$0	$708,900	$0	$0
29	Bond Financing Fee (2)	0	0	10,600	0	0
30	Total Proposed Short-Term Bond Issuances	$0	$0	$719,500	$0	$0
31						
32	**Long-Term Bonds - WTE Facility**					
33	Proposed Bond Issue (1)	$0	$0	$17,080,500	$17,592,900	$18,120,700
34	Bond Financing Fee (2)	0	0	256,200	263,900	271,800
35	Total Proposed Long-Term Bond Issuances	$0	$0	$17,336,700	$17,856,800	$18,392,500
36						
37	**Total Long-Term Bonds**	$7,764,800	$1,725,000	$29,001,900	$28,282,500	$24,435,700
38						
39	**Short-Term Bonds - Kapaa Transfer Station**					
40	Proposed Bond Issue (1)	$0	$2,482,300	$0	$0	$0
41	Bond Financing Fee (2)	0	37,200	0	0	0
42	Total Proposed Short-Term Bond Issuances	$0	$2,519,500	$0	$0	$0

Table 8
County of Kaua`i
Department of Public Works
Solid Waste Program
Refuse Division
Actual and Projected Debt Service
Fiscal Years Ending June 30

		2009	2010	2011	2012	2013
43	**Short-Term Bonds - Add'l Transfer Stations**					
44	Proposed Bond Issue (1)	$0	$0	$4,774,200	$0	$0
45	Bond Financing Fee (2)	0	0	71,600	0	0
46	Total Proposed Short-Term Bond Issuances	$0	$0	$4,845,800	$0	$0
47						
48	**Total Short-Term Bonds**	$0	$2,519,500	$4,845,800	$0	$0
49						
50	**Total Proposed Bond Issuances**	$7,764,800	$4,244,500	$33,847,700	$28,282,500	$24,435,700
51	**Total Debt Service**					
52	Total Existing Annual Debt Service (3)	$0	$0	$0	$0	$0
53						
54	Total Proposed Annual Debt Service (2)					
55	Long-Term Debt - Existing Landfill	$570,100	$570,100	$570,100	$570,100	$570,100
56	Long-Term Debt - New Subtitle D Landfill	0	0	51,800	852,800	852,800
57	Long-Term Debt - MRF	52,900	136,800	525,600	525,600	525,600
58	Long-Term Debt - Composting Facility	0	54,500	442,000	477,600	962,500
59	Long-Term Debt - Puhi Metals	0	0	50,100	50,100	50,100
60	Long-Term Debt - Recycling (HHW)	0	0	57,700	57,700	57,700
61	Long-Term Debt - WTE Facility	0	0	1,391,100	2,824,000	4,299,900
62	Short-Term Debt - Kapaa Transfer Station	0	326,300	326,300	326,300	326,300
63	Short-Term Debt - Add'l Transfer Stations	0	0	627,600	627,600	627,600
64	**Total Debt Service**	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600

Notes:

(1) See Table 7 for details of bond funded capital expenditures. Assumes the Division will be responsible for debt-service payments on County bond funded capital expenditures.

(2) See Table 1 for assumptions.

(3) The Division has no existing debt service obligations.

Table 9
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - No Solid Waste Residential Solid Waste Fee
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	**REVENUES**											
2	Transfer Station Tipping Fees	$19,660	$19,150	$14,520	$17,500	$17,500	$18,200	$20,000	$19,100	$19,400	$21,500	$22,200
3	Commercial Collection Fee	10,660	10,338	10,455	9,000	9,000	9,400	10,300	9,800	10,000	11,100	11,500
4	Existing Landfill Disposal Fees	2,417,015	2,675,748	2,313,756	2,450,000	2,450,000	3,450,200	3,442,600	3,282,700	3,338,900	3,713,400	0
5	New Subtitle D Landfill Disposal Fees	0	0	0	0	0	0	0	0	0	0	2,454,300
6	WTE Energy Revenues	0	0	0	0	0	0	0	0	0	0	2,550,000
7	Total Tipping & Disposal Revenues	$2,447,335	$2,705,236	$2,338,731	$2,476,500	$2,476,500	$3,477,800	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000
8												
9	**RESIDENTIAL SOLID WASTE FEE REVENUES (3)**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
10												
11	**OTHER REVENUES**											
12	Rents and Concessions (4)	$9,600	$9,600	$8,800	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
13	Interest (5)	164,678	8,224	226	0	0	0	0	0	0	0	0
14	Total Other Revenues	$174,278	$17,824	$9,026	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
15	**TOTAL REVENUES**	$2,621,613	$2,723,060	$2,347,757	$2,485,300	$2,482,500	$3,489,800	$3,484,900	$3,323,600	$3,380,300	$3,758,000	$5,050,000
16	**OPERATING EXPENSES (6)**											
17	Residential Collection	776,600	839,900	1,347,100	1,395,100	2,136,700	1,458,300	1,541,000	1,628,900	1,722,400	1,822,000	1,927,900
18	Commercial Collection	18,200	25,800	33,500	35,700	34,800	37,100	38,900	41,000	43,200	45,400	47,800
19	Transfer Station	1,108,200	1,153,600	1,620,700	1,882,400	2,335,600	2,396,600	2,167,300	2,294,300	2,429,600	2,573,600	2,726,700
20	Landfill	3,201,400	3,622,200	4,343,600	4,842,300	4,847,800	5,237,900	5,458,400	5,594,300	5,907,600	6,161,900	6,515,800
21	Recycling	1,019,800	895,200	974,900	1,424,100	1,448,700	1,355,400	1,272,100	1,316,800	1,363,300	1,411,800	1,462,300
22	Greenwaste	137,400	575,900	692,900	577,700	800,200	832,200	865,700	900,700	937,500	976,200	1,016,700
23	Recommended ISWMP Programs And Strategies	n/a	n/a	n/a	n/a	n/a	0	2,001,500	4,450,000	7,583,400	2,341,000	9,977,100
23	**TOTAL EXPENDITURES**	$6,261,600	$7,112,600	$9,012,700	$10,157,300	$11,603,800	$11,317,500	$13,344,900	$16,226,000	$19,987,000	$15,331,900	$23,674,300
24	**NET OPERATING REVENUES**	($3,639,987)	($4,389,540)	($6,664,943)	($7,672,000)	($9,121,300)	($7,827,700)	($9,860,000)	($12,902,400)	($16,606,700)	($11,573,900)	($18,624,300)
25												
26	**GENERAL FUND ASSISTANCE (8)**	$3,583,349	$4,421,000	$5,821,000	$7,672,000	$9,121,300	$7,827,700	$10,483,000	$13,990,100	$20,649,000	$17,885,700	$26,896,900
27												
28	**FUNDS AVAILABLE FOR CAPITAL EXPENDITURES**	($56,638)	$31,460	($843,943)	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
29												
30	**DEBT SERVICE (7)**	$0	$0	$0	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
31	**CASH FINANCED CAPITAL**	0	0	0	0	0	0	0	0	0	0	0
32	**TOTAL CAPITAL EXPENDITURES**	$0	$0	$0	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
33												
34	**NET INCOME (9)**	($56,638)	$31,460	($843,943)	$0	$0	$0	$0	$0	$0	$0	$0

Table 9
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - No Solid Waste Residential Solid Waste Fee
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
35	**Target Operating Reserves (10)**	n/a	n/a	n/a	n/a	$0	$0	$0	$0	$0	$0	$0
36												
37	**Operating Reserve Fund Balance**				$0	$0	$0	$0	$0	$0	$0	$0
38	**Addition to Operating Reserve**				n/a	0	0	0	0	0	0	0
39	**Actual Operating Reserves**	n/a	n/a	n/a	$0	$0	$0	$0	$0	$0	$0	$0
40	**Days of O&M Available**	n/a	n/a	n/a	0	0	0	0	0	0	0	0
41	Residential Households (11)	17,439	17,700	17,863	18,200	23,500	23,900	24,400	24,800	25,200	25,700	26,100
42												
43	**AVERAGE COST per RESIDENTIAL/**					$32.30	$27.30	$35.80	$47.00	$68.30	$58.00	$85.90
44	**MULTI-FAMILY UNIT ($/Month) (12)**											
45												
46	**ANNUAL DEBT SERVICE (7)**				$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
47	**DEBT SERVICE COVERAGE**				n/a	n/a	n/a	1.00	1.00	1.00	1.00	1.00
48	**TARGET**				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Notes:

(1) Historical data per Schedule of Revenues, Expenditures and Changes in Fund Balance and Budget Preparation Worksheet for FY 2006.
(2) See Tables 4, 5 and 6 for details.
(3) Residential Solid Waste Fee Revenues based on implementation of a Residential Solid Waste Fee.
(4) Assumes 1/2 a year of rent in FY 2007, and full year of rent in FY 2008 and beyond of approximately $1,000 per month for GID to operate Kaua'i Recycling Center (KRC) for the County.
(5) Assumes future interest income for the landfill post-closure fund will be accounted for in the post-closure fund (Landfill Liability).
(6) See Table 5 for details.
(7) See Table 8 for details.
(8) Based on Total Revenues less Total Expenditures plus Total Capital Expenditures and maintaining a Net Income equal to zero.
(9) Net Income in FY 2003 - FY 2005 equals the Deficiency of Revenues Under Expenditures and Other Financing Sources per the Solid Waste Disposal Fund, Statement of Revenues, Expenditures and Changes in Fund except for the Commercial Collection Fee. For FY 2006 and beyond, the Net Income is equal to Total Revenues less Total Expenditures plus the General Fund Assistance less Total Capital Expenditures.
(10) See Table 1 for details. Target Operating Reserves set at $0 for this scenario.
(11) See Table 2 for details.
(12) Equals General Fund Assistance divided by the annual count of Residential Households divided by 12 months. Provides an estimate of a full-cost recovery user fee. (Line 26 divided by Line 37 divided by 12).

Table 10
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - Recommended Residential Solid Waste Fee
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	**REVENUES**											
2	Transfer Station Tipping Fees	$19,660	$19,150	$14,520	$17,500	$17,500	$18,200	$20,000	$19,100	$19,400	$21,500	$22,200
3	Commercial Collection Fee	10,660	10,338	10,455	9,000	9,000	9,400	10,300	9,800	10,000	11,100	11,500
4	Existing Landfill Disposal Fees	2,417,015	2,675,748	2,313,756	2,450,000	2,450,000	3,450,200	3,442,600	3,282,700	3,338,900	3,713,400	0
5	New Subtitle D Landfill Disposal Fees	0	0	0	0	0	0	0	0	0	0	2,454,300
6	WTE Energy Revenues	0	0	0	0	0	0	0	0	0	0	2,550,000
7	Total Tipping & Disposal Revenues	$2,447,335	$2,705,236	$2,338,731	$2,476,500	$2,476,500	$3,477,800	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000
8												
9	**RESIDENTIAL SOLID WASTE FEE REVENUES (3)**	$0	$0	$0	$0	$0	$0	$0	$3,571,200	$3,737,700	$3,926,200	$4,733,300
10												
11	**OTHER REVENUES**											
12	Rents and Concessions (4)	$9,600	$9,600	$8,800	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
13	Interest (5)	164,678	8,224	226	0	0	0	0	0	0	0	0
14	Total Other Revenues	$174,278	$17,824	$9,026	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
15	**TOTAL REVENUES**	$2,621,613	$2,723,060	$2,347,757	$2,485,300	$2,482,500	$3,489,800	$3,484,900	$6,894,800	$7,118,000	$7,684,200	$9,783,300
16	**OPERATING EXPENSES (6)**											
17	Residential Collection	776,600	839,900	1,347,100	1,395,100	2,136,700	1,458,300	1,541,000	1,628,900	1,722,400	1,822,000	1,927,900
18	Commercial Collection	18,200	25,800	33,500	35,700	34,800	37,100	38,900	41,000	43,200	45,400	47,800
19	Transfer Station	1,108,200	1,153,600	1,620,700	1,882,400	2,335,600	2,396,600	2,167,300	2,294,300	2,429,600	2,573,600	2,726,700
20	Landfill	3,201,400	3,622,200	4,343,600	4,842,300	4,847,800	5,237,900	5,458,400	5,594,300	5,907,600	6,161,900	6,515,800
21	Recycling	1,019,800	895,200	974,900	1,424,100	1,448,700	1,355,400	1,272,100	1,316,800	1,363,300	1,411,800	1,462,300
22	Greenwaste	137,400	575,900	692,900	577,700	800,200	832,200	865,700	900,700	937,500	976,200	1,016,700
23	Recommended ISWMP Programs And Strategies	n/a	n/a	n/a	n/a	n/a	0	2,001,500	4,450,000	7,583,400	2,341,000	9,977,100
24	**TOTAL EXPENDITURES**	$6,261,600	$7,112,600	$9,012,700	$10,157,300	$11,603,800	$11,317,500	$13,344,900	$16,226,000	$19,987,000	$15,331,900	$23,674,300
25	**NET OP. REVENUES**	($3,639,987)	($4,389,540)	($6,664,943)	($7,672,000)	($9,121,300)	($7,827,700)	($9,860,000)	($9,331,200)	($12,869,000)	($7,647,700)	($13,891,000)
26												
27	**GENERAL FUND ASSISTANCE (8)**	$3,583,349	$4,421,000	$5,821,000	$7,672,000	$9,121,300	$7,827,700	$10,483,000	$10,418,900	$16,911,300	$13,959,500	$22,163,600
28												
29	**FUNDS AVAILABLE FOR CAPITAL EXPENDITURES**	($56,638)	$31,460	($843,943)	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
30												
31	**DEBT SERVICE (7)**	$0	$0	$0	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
32	**CASH FINANCED CAPITAL**	0	0	0	0	0	0	0	0	0	0	0
33	**TOTAL CAPITAL EXPENDITURES**	$0	$0	$0	$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
34												
35	**NET INCOME (9)**	($56,638)	$31,460	($843,943)	$0	$0	$0	$0	$0	$0	$0	$0

Table 10
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - Recommended Residential Solid Waste Fee
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
36	**Target Operating Reserves (10)**	n/a	n/a	n/a	n/a	$0	$0	$0	$0	$0	$0	$0
37	**Days of O&M Available**	n/a	n/a	n/a	0	0	0	0	0	0	0	0
38	Residential Households (11)	17,439	17,700	17,863	18,170	23,480	23,900	24,400	24,800	25,200	25,700	26,100
	AVERAGE COST PER RESIDENTIAL/MULTI-FAMILY UNIT ($/Month)							35.80	35.01	55.92	45.26	70.77
39												
40	**RECOMMENDED RESIDENTIAL SOLID WASTE FEE per**					$0.00	$0.00	$0.00	$12.00	$12.36	$12.73	$13.11
41	**RESIDENTIAL/MULTI-FAMILY UNIT ($/Month) (12)**											
42	**PAYT Fee ($/Month) (13)**					0.00	0.00	0.00	0.00	0.00	0.00	2.00
43	**TOTAL RESIDENTIAL SOLID WASTE FEE for Households not**					$0.00	$0.00	$0.00	$12.00	$12.36	$12.73	$15.11
44	**Participating in Recycling ($/Month) (14)**											
45	**ANNUAL DEBT SERVICE (7)**				$0	$0	$0	$623,000	$1,087,700	$4,042,300	$6,311,800	$8,272,600
46	**DEBT SERVICE COVERAGE**				n/a	n/a	n/a	1.00	1.00	1.00	1.00	1.00
47	**TARGET**				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Notes:

(1) Historical data per Schedule of Revenues, Expenditures and Changes in Fund Balance and Budget Preparation Worksheet for FY 2006.
(2) See Tables 4, 5 and 6 for details.
(3) Residential Solid Waste Fee Revenues based on implementation of a Monthly Solid Waste Fee of $12, beginning in FY 2009. Starting in 2013, an additional PAYT Fee is recommended to encourage residents to recycle. (See Section 4 of the ISWMP for more details).
(4) Assumes 1/2 a year of rent in FY 2007, and full year of rent in FY 2008 and beyond of approximately $1,000 per month for GID to operate Kaua'i Recycling Center (KRC) for the County.
(5) Assumes future interest income for the landfill post-closure fund will be accounted for in the post-closure fund (Landfill Liability).
(6) See Table 5 for details.
(7) See Table 8 for details.
(8) Based on Total Revenues less Total Expenditures plus Total Capital Expenditures and maintaining a Net Income equal to zero.
(9) Net Income in FY 2003 - FY 2005 equals the Deficiency of Revenues Under Expenditures and Other Financing Sources per the Solid Waste Disposal Fund, Statement of Revenues, Expenditures and Changes in Fund except for the Commercial Collection Fee. For FY 2006 and beyond, the Net Income is equal to Total Revenues less Total Expenditures plus the General Fund Assistance less Total Capital Expenditures.
(10) See Table 1 for details. Target Operating Reserves set at $0 for this scenario.
(11) See Table 2 for details.
(12) Based on implementing a Residential Solid Waste Fee in FY 2009. FY 2010 and beyond increase by annual inflation of 3 percent per year.
(13) Based on WTE Tipping Fee of $101 in FY 2013, annual inflation of 3 percent per year and 70% of households participating in recycling, each recycling 400 lbs. per year.
(14) Total Residential Solid Waste Fee assessed to Residential Households who do not subscribe to recycling.

Table 11
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - Base Case
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	**REVENUES**											
2	Transfer Station Tipping Fees	$19,660	$19,150	$14,520	$17,500	$17,500	$18,200	$20,000	$19,100	$19,400	$21,500	$22,200
3	Commercial Collection Fee	10,660	10,338	10,455	9,000	9,000	9,400	10,300	9,800	10,000	11,100	11,500
4	Existing Landfill Disposal Fees	2,417,015	2,675,748	2,313,756	2,450,000	2,450,000	3,450,200	3,442,600	3,282,700	3,338,900	3,713,400	0
5	New Subtitle D Landfill Disposal Fees	0	0	0	0	0	0	0	0	0	0	2,454,300
6	WTE Energy Revenues	0	0	0	0	0	0	0	0	0	0	2,550,000
7	Total Tipping & Disposal Revenues	$2,447,335	$2,705,236	$2,338,731	$2,476,500	$2,476,500	$3,477,800	$3,472,900	$3,311,600	$3,368,300	$3,746,000	$5,038,000
8												
9	**RESIDENTIAL SOLID WASTE FEE REVENUES (3)**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
10												
11	**OTHER REVENUES**											
12	Rents and Concessions (4)	$9,600	$9,600	$8,800	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
13	Interest (5)	164,678	8,224	226	0	0	0	0	0	0	0	0
14	Total Other Revenues	$174,278	$17,824	$9,026	$8,800	$6,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
15	**TOTAL REVENUES**	$2,621,613	$2,723,060	$2,347,757	$2,485,300	$2,482,500	$3,489,800	$3,484,900	$3,323,600	$3,380,300	$3,758,000	$5,050,000
16	**OPERATING EXPENSES (6)**											
17	Residential Collection	776,600	839,900	1,347,100	1,395,100	2,136,700	1,458,300	1,541,000	1,628,900	1,722,400	1,822,000	1,927,900
18	Commercial Collection	18,200	25,800	33,500	35,700	34,800	37,100	38,900	41,000	43,200	45,400	47,800
19	Transfer Station	1,108,200	1,153,600	1,620,700	1,882,400	2,335,600	2,396,600	2,167,300	2,294,300	2,429,600	2,573,600	2,726,700
20	Landfill	3,201,400	3,622,200	4,343,600	4,842,300	4,847,800	5,237,900	5,458,400	5,594,300	5,907,600	6,161,900	6,515,800
21	Recycling	1,019,800	895,200	974,900	1,424,100	1,448,700	1,355,400	1,272,100	1,316,800	1,363,300	1,411,800	1,462,300
22	Greenwaste	137,400	575,900	692,900	577,700	800,200	832,200	865,700	900,700	937,500	976,200	1,016,700
23	Recommended ISWMP Programs And Strategies	n/a										
23	**TOTAL EXPENDITURES**	$6,261,600	$7,112,600	$9,012,700	$10,157,300	$11,603,800	$11,317,500	$11,343,400	$11,776,000	$12,403,600	$12,990,900	$13,697,200
24	**NET OPERATING REVENUES**	($3,639,987)	($4,389,540)	($6,664,943)	($7,672,000)	($9,121,300)	($7,827,700)	($7,858,500)	($8,452,400)	($9,023,300)	($9,232,900)	($8,647,200)
25												
26	**GENERAL FUND ASSISTANCE (8)**	$3,583,349	$4,421,000	$5,821,000	$7,672,000	$9,121,300	$8,187,700	$8,598,500	$13,457,400	$14,028,300	$14,602,900	$14,017,200
27												
28	**FUNDS AVAILABLE FOR CAPITAL EXPENDITURES**	($56,638)	$31,460	($843,943)	$0	$0	$360,000	$740,000	$5,005,000	$5,005,000	$5,370,000	$5,370,000
29												
30	**DEBT SERVICE (7)**	$0	$0	$0	$0	$0	$360,000	$740,000	$5,005,000	$5,005,000	$5,370,000	$5,370,000
31	**CASH FINANCED CAPITAL**	0	0	0	0	0	0	0	0	0	0	0
32	**TOTAL CAPITAL EXPENDITURES**	$0	$0	$0	$0	$0	$360,000	$740,000	$5,005,000	$5,005,000	$5,370,000	$5,370,000
33												
34	**NET INCOME (9)**	($56,638)	$31,460	($843,943)	$0	$0	$0	$0	$0	$0	$0	$0

Table 11
County of Kaua`i
Department of Public Works
Solid Waste Program
Actual and Projected Operating Statement - Base Case
Fiscal Years Ending June 30

		Actual (1)			(2) Estimate	(2) Budget	Projected (2)					
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
35	**Target Operating Reserves (10)**	n/a	n/a	n/a	n/a	$0	$0	$0	$0	$0	$0	$0
36												
37	**Operating Reserve Fund Balance**				$0	$0	$0	$0	$0	$0	$0	$0
38	**Addition to Operating Reserve**				n/a	0	0	0	0	0	0	0
39	**Actual Operating Reserves**	n/a	n/a	n/a	$0	$0	$0	$0	$0	$0	$0	$0
40	**Days of O&M Available**	n/a	n/a	n/a	0	0	0	0	0	0	0	0
41	Residential Households (11)	17,439	17,700	17,863	18,200	23,500	23,900	24,400	24,800	25,200	25,700	26,100
42												
43	**AVERAGE COST per RESIDENTIAL/**					$32.30	$28.50	$29.40	$45.20	$46.40	$47.40	$44.80
44	**MULTI-FAMILY UNIT ($/Month) (12)**											
45												
46	**ANNUAL DEBT SERVICE (7)**				$0	$0	$360,000	$740,000	$5,005,000	$5,005,000	$5,370,000	$5,370,000
47	**DEBT SERVICE COVERAGE**				n/a	n/a	1.00	1.00	1.00	1.00	1.00	1.00
48	**TARGET**				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Notes:

(1) Historical data per Schedule of Revenues, Expenditures and Changes in Fund Balance and Budget Preparation Worksheet for FY 2006.
(2) See Tables 4, 5 and 6 for details.
(3) Residential Solid Waste Fee Revenues based on implementation of a Residential Solid Waste Fee.
(4) Assumes 1/2 a year of rent in FY 2007, and full year of rent in FY 2008 and beyond of approximately $1,000 per month for GID to operate Kaua'i Recycling Center (KRC) for the County.
(5) Assumes future interest income for the landfill post-closure fund will be accounted for in the post-closure fund (Landfill Liability).
(6) See Table 5 for details.
(7) Per SW SUMMARY SHEET-2007 FINAL.xls assumes 50% of projects funded through State/Bond Fund, and the remaining 50% through County Funds.
(8) Based on Total Revenues less Total Expenditures plus Total Capital Expenditures and maintaining a Net Income equal to zero.
(9) Net Income in FY 2003 - FY 2005 equals the Deficiency of Revenues Under Expenditures and Other Financing Sources per the Solid Waste Disposal Fund, Statement of Revenues, Expenditures and Changes in Fund except for the Commercial Collection Fee. For FY 2
(10) See Table 1 for details. Target Operating Reserves set at $0 for this scenario.
(11) See Table 2 for details.
(12) Equals General Fund Assistance divided by the annual count of Residential Households divided by 12 months. Provides an estimate of a full-cost recovery user fee. (Line 26 divided by Line 37 divided by 12).

Appendix B

2007 COST OF SERVICE STUDY

R·W·BECK

County of Kaua'i
Department of Public Works
Solid Waste Program

FY 2007 Operating Cost of Service Analysis

Line No	Account Number	Text	CODE		Account Description	Council's Review	Residential Collection	Commercial Collection	Transfer Station	Landfill	Greenwaste	Recycling	RC	CC	TS	LF	GW	RCYCL	Notes
			CODE		AD	CR	RC	CC	TS	L	GW	R							
1	**208-2031-641.01-01**				**Salaries**														
2		1919	Ad		Program Administrative Officer	67,318	15,147	1,683	16,830	16,830	4,207	12,622	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
3		1940	Ad		Departmental Contracts Specialist	52,902	11,903	1,323	13,226	13,226	3,306	9,919	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
4		1890	Ad		Solid Waste Programs Assistant	35,615	0	0	0	35,615	0	0				100.00%			2
5		1947	Ad		Abandoned/Derelict Vehicle Coordinator	33,471	0	0	0	0	0	33,471						100.00%	2
6		1949	Ad		Office Manager	41,787	9,402	1,045	10,447	10,447	2,612	7,835	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
7		1948	S&B	S	Solid Waste Superintendent	44,049	0	0	21,804	11,232	5,506	5,506			49.50%	25.50%	12.50%	12.50%	2
8		1055	S&B	S	Solid Waste Worksite Supervisor	46,308	0	0	0	46,308	0	0				100.00%			2
9		1054	S&B	S	Clerk	26,439	0	0	0	26,439	0	0				100.00%			2
10		938	S&B	S	Clerk	26,028	0	0	0	26,028	0	0				100.00%			2
11		1076	S&B	S	Clerk	28,617	0	0	0	28,617	0	0				100.00%			2
12		1917	S&B	S	Solid Waste Working Supervisor	43,215	0	0	43,215	0	0	0			100.00%				2
13		1927	S&B	S	Equipment Operator IV	42,294	0	0	0	42,294	0	0				100.00%			2
14		1928	S&B	S	Equipment Operator III	40,799	0	0	0	40,799	0	0				100.00%			2
15		1929	S&B	S	Equipment Operator III	40,799	0	0	0	40,799	0	0				100.00%			2
16		1930	S&B	S	Equipment Operator III	40,799	0	0	0	40,799	0	0				100.00%			2
17		1931	S&B	S	Equipment Operator III	40,799	0	0	0	40,799	0	0				100.00%			2
18		1887	S&B	S	Solid Waste Worksite Attendant (HPE) BC	32,941	0	0	32,941	0	0	0			100.00%				2
19		1882	S&B	S	Solid Waste Worksite Attendant (KAPAA)	32,941	0	0	32,941	0	0	0			100.00%				2
20		1881	S&B	S	Solid Waste Worksite Attendant (KAPAA)	32,941	0	0	32,941	0	0	0			100.00%				2
21		1888	S&B	S	Solid Waste Worksite Attendant (HPE)	32,941	0	0	32,941	0	0	0			100.00%				2
22		1921	S&B	S	Solid Waste Worksite Attendant (KEKAHA)	32,941	0	0	0	32,941	0	0				100.00%			2
23		1922	S&B	S	Solid Waste Worksite Attendant (KEKAHA)	32,941	0	0	0	32,941	0	0				100.00%			2
24		1923	S&B	S	Solid Waste Worksite Attendant (KEKAHA)	32,941	0	0	0	32,941	0	0				100.00%			2
25		1932	S&B	S	Utility Worker	32,941	0	0	0	32,941	0	0				100.00%			2
26		1924	S&B	S	Laborer II	30,453	0	0	0	30,453	0	0				100.00%			2
27		1925	S&B	S	Laborer II	30,453	0	0	0	30,453	0	0				100.00%			2
28		1926	S&B	S	Laborer II	30,453	0	0	0	30,453	0	0				100.00%			2
29		NEW	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	0	32,941	0	0				100.00%			2
30		NEW	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	0	32,941	0	0				100.00%			2
31																			
32	**208-2031-641.01-04**		S&B	S	**Salaries/Adjustments**	0	0	0	0	0	0	0							
33																			
34	**208-2031-641.01-05**				**Vacation Credit Payout**														
35			S&B	S	Anticipated Retirements for FY 06-07	59,524	2,226	22	6,514	39,337	7,879	3,545	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
36																			
37	**208-2031-641.02-01**		S&B	S	**Overtime**	150,000	0	0	0	150,000	0	0				100.00%			2
38																			
39	**208-2031-641.03-01**				**Premium Pay**														
40			S&B	S	Temporary Assignment	28,000	6,300	700	7,000	7,000	1,750	5,250	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
41			S&B	S	Meals	1,000	225	25	250	250	63	188	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
42																			
43	**208-2031-641.05-01**		S&B	B	**Social Security Contribution**	218,600	8,176	83	23,923	144,465	28,934	13,020	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
44																			
45	**208-2031-641.05-02**		S&B	B	**Pub. Empl. Health Fund Contributior**	382,500	14,307	145	41,860	252,780	50,627	22,781	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
46																			
47	**208-2031-641.05-03**		S&B	B	**Retirement Contribution**	392,000	14,662	148	42,900	259,059	51,885	23,347	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
48																			
49	**208-2031-641.05-04**		S&B	B	**Workers' Compensation PPD**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
50																			
51	**208-2031-641.05-05**		S&B	B	**Workers' Compensation MEDI**	120,000	4,488	45	13,133	79,304	15,883	7,147	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
52																			
53	**208-2031-641.05-06**		S&B	B	**Unemployment Compensatior**	10,000	374	4	1,094	6,609	1,324	596	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
54																			
55	**208-2031-641.05-09**		O		**Mileage** (Call out mileage requirement for Landfill personnel.)	3,000	0	0	0	3,000	0	0				100.00%			2
56																			
57	**208-2031-641.05-10**		S&B	B	**Other Employee Benefits**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
58																			
59	**208-2031-641.10-01**		U		**Electricity** (Represents 12mth est. for the Kekaha Pump Sta. for non-potable water and Halehaka landfill requirement.)	10,000	0	0	0	10,000	0	0				100.00%			2
60																			
61	**208-2031-641.10-02**		U		**Water** (12mth requirement for delivery of potable drinking water for the Kekaha scale house incl. container rental	1,000	0	0	0	1,000	0	0				100.00%			2
62																			
63	**208-2031-641.10-03**		U		**Telephone** (Telephone usage and data transmissions via modem for the Kekaha scale house and solid waste planning office. Includes pager rental cost.	5,000	0	0	0	5,000	0	0				100.00%			2
64																			
65	**208-2031-641.24-00**		S&B	B	**Training** (for FY 07)	10,000	952	33	2,904	5,456	121	534	9.52%	0.33%	29.04%	54.56%	1.21%	5.34%	3
66																			

Line No	Account Number	Text	CODE	Account Description	Council's Review	Cost Center: Residential Collection	Commercial Collection	Transfer Station	Landfill	Greenwaste	Recycling	RC	CC	TS	LF	GW	RCYCL	Notes
67	**208-2031-641.30-00**			**Other Services**														
68			OCS	Annual Support Plan "Weigh master" System	7,600	0	0	0	7,600	0	0				100.00%			2
69			OCS	Maintenance of Landfill Scales (2X Calibrations)	7,500	0	0	0	7,500	0	0				100.00%			2
70			GWP	Greenwaste Processing	600,000	0	0	0	0	600,000	0					100.00%		2
71				Puhi Metals Recycling Center:														
72			MRC	Abandoned/Derelict Vehicles & Whitegoods Incl.	341,000	0	0	0	0	0	341,000						100.00%	2
73			MRC	Ground Water Monitoring		0	0	0	0	0	0						100.00%	2
74			WG	Whitegoods Hauling (Kekaha LF, & Hanalei, Kappa & Hanapepe Rts's to Puhi)	376,000	0	0	0	0	0	376,000						100.00%	2
75			PC	Postclosure: Mntnce of Kapaa, Halehaka, Kekaha Ph I Landfills	300,000	0	0	0	300,000	0	0				100.00%			2
76			SUR	Solid Waste Surcharge	34,000	0	0	0	34,000	0	0				100.00%			2
77				NPDES Facility Monitoring for:		0	0	0	0	0	0							
78			NPDES	Hanaalei, Kapaa, Lihue & Hanapepe Rts's; Kauai Resource Center; and Kekaha LF	70,000	0	0	46,900	11,550	0	11,550			67.00%	16.50%		16.50%	2
79			KLO	Kekaha Landfill Operation	1,900,000	0	0	0	1,900,000	0	0				100.00%			2
80			FA	Financial Assurance (Closure)	367,500	0	0	0	367,500	0	0				100.00%			2
81				Future Landfill Site	0	0	0	0	0	0	0				100.00%			2
82				Management of Disaster Debris	0	0	0	0	0	0	0				100.00%			2
83			PTD	Propane Tank Disposal	33,000	0	0	26,400	6,600	0	0			80.00%	20.00%			2
84			GWP	Public Education	10,000	0	3,333	3,333	3,334	0	0		33.33%	33.33%	33.34%			2
85			BI	Bulky Items Pick-up (Evaluation of initial program and plan for new program to be provided; Council approves required prior to expenditure.)	900,000	900,000	0	0	0	0	0	100.00%						2
86			UTP	Used Tire Processing	75,000	0	0	0	0	0	75,000						100.00%	2
87																		
88	**208-2031-641.32-00**			**Consultant Services**	0	0	0	0	0	0	0							
89																		
90	**208-2031-641.41-01**		ARSL	**Building Rental** (Auto recycling site lease. Annual lease - CR944 - 15yr adj. agreement includes lease rental, excise tax, & real property taxes. Current rate GT 06/30/08.	20,834	0	0	0	0	0	20,834						100.00%	2
91																		
92	**208-2031-641.41-02**		S&E	**Copier Rental** (for Kekaha Scale house)	500	0	0	0	500	0	0				100.00%			2
93																		
94	**208-2031-641.41-03**		HL	**Other Rentals** (Halehaka Lease - C4330 (30yr agreement, includes lease rental, excise tax & real property taxes	9,075	0	0	0	9,075	0	0				100.00%			2
95																		
96	**208-2031-641.42-00**		CS	**Indirect Costs / Central SE**	400,500	90,113	10,013	100,125	100,125	25,031	75,094	22.50%	2.50%	25.00%	25.00%	6.25%	18.75%	1
97																		
98	**208-2031-641.43-01**		O	**Repair & Maint. Building** (Represents an est. for R&M cost to County facilities at Kekaha Landfill.	3,000	0	0	0	3,000	0	0				100.00%			2
99																		
100	**208-2031-641.43-02**		ER	**Repair & Maint. Equipment** (Non-potable water pump at Kekaha Landfill.)	15,000	0	0	0	15,000	0	0				100.00%			2
101																		
102	**208-2031-641.43-04**			**Repair & Maint. Roads & Bridges** (Airfare, General)	0	0	0	0	0	0	0							
103																		
104	**208-2031-641.56.01**		Ad	**Airfare, General** (Intrastate Airfare - trips for meeting with Dept. of Health & to attend workshops.)	1,200	200	200	200	200	200	200	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
105																		
106	**208-2031-641.56.02**		Ad	**Per Diem, General** (Intrastate per diem - allowance for the requested trips based on an average of 1-3/4 trips @ $140/trip)	945	157	157	158	158	158	157	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
107																		
108	**208-2031-641.56.03**		Ad	**Car Rental & Parking, General** (Auto/Parking costs for travel)	300	50	50	50	50	50	50	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
109																		
110	**208-2031-641.56.04**		Ad	**Other Travel, General** (Registration fees for (2) anticipated workshops.)	600	100	100	100	100	100	100	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
111																		
112	**208-2031-641.61.01**		S&E	**Office Supplies** (Printed forms & misc. office supplies Kekaha scale house and solid waste planning office.	2,000	0	0	0	2,000	0	0				100.00%			2
113																		
114	**208-2031-641.61.02**			**Other Supplies:**														
115			S&E	Office Supplies	2,000	0	0	0	2,000	0	0				100.00%			2
116			S&E	Janitorial supplies (paper towers, bathrm tissue, handsoap, cleaning supplies for scale house & landfill.)	600	0	0	0	600	0	0				100.00%			2
117			S&E	Herb., Fert., Insect.	200	0	0	0	200	0	0				100.00%			2
118			S&E	Top soil, & cover material for Kekaha LF	10,000	0	0	0	10,000	0	0				100.00%			2
119			S&E	Computer Supplies	2,000	0	0	0	2,000	0	0	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	2
120																		
121	**208-2031-641.62.01**		S&E	**Other Small Equipment** (Small tools: items used in normal operations at the landfill.	100	0	0	0	100	0	0				100.00%			2
122																		

Line No	Account Number	Text	CODE		Account Description	Council's Review	Cost Center: Residential Collection	Commercial Collection	Transfer Station	Landfill	Greenwaste	Recycling	RC	CC	TS	LF	GW	RCYCL	Notes
123	**208-2031-641.65.00**				**Collective Bargaining:**														
124			O		Shoes, Gloves, Raingear, Protective Eyewear, etc. required for personal safety per collective bargaining contracts.	2,500	0	0	0	1,250	313	938				50.00%	12.50%	37.50%	2
125			O		Physical & Med. Related (PUC 2 @ $70, Drug 3 @ $45, Alcoho 2 @$45, CDL 2 @ $45; 1 @ $140	555	0	0	0	555	0	0	0.00%	0.00%	0.00%	100.00%			2
126																			
127	**208-2031-641.66.01**		S&E		**Gasoline**	500	150	17	167	167	0	0	30.00%	3.33%	33.33%	33.33%			2
128																			
129	**208-2031-641.66.04**		S&E		**Propane** (Fuel for the Halehaka flare facility to incinerate methane gas.)	500	0	0	0	500	0	0				100.00%			2
130																			
131	**208-2031-641.67.00**		UR		**Other Commodities** (Allowance for uncollectible receivables)	25,000	0	0	0	25,000	0	0				100.00%			2
132																			
133	**208-2031-641.88.01**		E		**Automobiles**	0	0	0	0	0	0	0				100.00%			2
134																			
135	**208-2031-641.88.02**				**Leased**	0	0	0	0	0	0	0							
136																			
137	**208-2031-641.89.01**				**Office Equipment:**														
138			S&E		Printer for solid waste admin office	500	83	83	83	83	83	83	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
139			S&E		Replacement weed eaters - 2 @ $400 ea	800	133	133	133	133	133	133	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
140																			
141	**208-2031-641.89.02**				**Tractors and Other Heavy (Replacement):**		0	0	0	0	0	0							
142			E		EQ #185 - 1999 Transfer Trailer	80,000	0	0	80,000	0	0	0			100.00%				2
143			E		EQ #021 - 1998 Roll Off	170,000	0	0	170,000	0	0	0			100.00%				2
144			E		EQ #184 - 2001 Transfer Trailer	80,000	0	0	80,000	0	0	0			100.00%				2
145			E		EQ #243 - 1999 Refuse Truck	160,000	0	0	160,000	0	0	0			100.00%				2
146			E		EQ #230 - 2000 Refuse Truck	160,000	0	0	160,000	0	0	0			100.00%				2
147																			
148	**208-2031-641.89.05**				**Leased:**														
149			E		5th year of 5yr lease - C6563-Refuse Truck/Transfer Trailer	43,376	26,351	2,928	14,097	0	0	0	60.75%	6.75%	32.50%	0.00%			2
150			E		4th year of 5yr lease - C6747-Refuse Truck/Transfer Trailer (2ea)	60,410	27,946	3,105	29,359	0	0	0	46.26%	5.14%	48.60%	0.00%	0.00%	0.00%	6
151																			
152	**208-2032-641.01.01**				**Regular Salaries:**														
153		864	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
154		1013	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
155		1032	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
156		1039	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
157		1040	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
158		876	S&B	S	Equipment Operator II	39,322	0	0	39,322	0	0	0			100.00%				2
159		1033	S&B	S	Equipment Operator II	39,322	0	0	39,322	0	0	0			100.00%				2
160		866	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
161		867	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
162		868	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
163		869	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
164		1010	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
165		1064	S&B	S	Refuse Collection Crew Leader	39,322	39,212	110	0	0	0	0	99.72%	0.28%					5
166		841	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
167		958	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
168		959	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
169		960	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
170		961	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
171		962	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
172		964	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
173		965	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
174		966	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
175		1011	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
176		1012	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
177		1855	S&B	S	Refuse Collector	34,256	34,160	96	0	0	0	0	99.72%	0.28%					5
178		1062	S&B	S	Truck Driver	34,256	0	0	34,256	0	0	0			100.00%				2
179		933	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
180		944	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
181		954	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
182		1005	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
183		1034	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
184		1035	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
185		1037	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
186		1042	S&B	S	Solid Waste Worksite Attendant	32,941	0	0	32,941	0	0	0			100.00%				2
187		921	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
188		852	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
189		1879	S&B	S	Equipment Operator III	40,799	0	0	40,799	0	0	0			100.00%				2
190		1975	S&B	S	Solid Waste Worksite Attendant	46,308	0	0	46,308	0	0	0			100.00%				2
191																			
192	**208-2032-641.02.01**				**Regular Overtime:**														
193			S&B	S	Solid Waste Collections & Transfer Station	138,000	63,774	179	74,047	0	0	0	46%	0%	54%				6
194			S&B	S	Additional Cost for Units Over the Max	35,000	16,174	45	18,780	0	0	0	46%	0%	54%				6
195																			
196	**208-2032-641.03.01**				**Premium Pay:**														
197			S&B	S	Temporary Assignment	11,700	5,407	15	6,278	0	0	0	46%	0%	54%				6
198			S&B	S	Meals	800	370	1	429	0	0	0	46%	0%	54%				6
199			S&B	S	Shift	3,000	1,386	4	1,610	0	0	0	46%	0%	54%				6
200																			
201	**208-2032-641.05.01**		S&B	B	**Social Security Contribution**	0	0	0	0	0	0	0	99.72%	0.28%					5
202																			

Line No	Account Number	Text	CODE		Account Description	Council's Review	Cost Center: Residential Collection	Commercial Collection	Transfer Station	Landfill	Greenwaste	Recycling	RC	CC	TS	LF	GW	RCYCL	Notes
203	**208-2032-641.05.02**		S&B	B	**Health Fund Contribution**	0	0	0	0	0	0	0	99.72%	0.28%					5
204																			
205	**208-2032-641.05.03**		S&B	B	**Retirement Contribution**	0	0	0	0	0	0	0	99.72%	0.28%					5
206																			
207	**208-2032-641.05.04**		S&B	B	**Workers Compensation PPD**	0	0	0	0	0	0	0	99.72%	0.28%					5
208																			
209	**208-2032-641.05.05**		S&B	B	**Workers Compensation Medi**	0	0	0	0	0	0	0	99.72%	0.28%					5
210																			
211	**208-2032-641.05.06**		S&B	B	**Unemployment Compensation**	0	0	0	0	0	0	0	99.72%	0.28%					5
212																			
213	**208-2032-641.05.9**		O		**Mileage**	100	100	0	0	0	0	0	99.72%	0.28%					5
214																			
215	**208-2032-641.05.10**		S&B	B	**Other Employee Benefits**	0	0	0	0	0	0	0	46%	0%	54%				6
216																			
217	**208-2032-641.10.01**				**Electricity**														
218			U		Electricity Charges for Kapaa, Hanalei, And Lihue Refuse Transfer Station	17,000	0	0	17,000	0	0	0			100.00%				2
219																			
220	**208-2032-641.10.02**		U		**Water** (Charges for the various transfer stations	4,800	0	0	4,800	0	0	0			100.00%				2
221																			
222	**208-2032-641.10.03**		U		**Telephone**	2,300	0	0	2,300	0	0	0			100.00%				2
223																			
224	**208-2032-641.30.00**		UTP		**Other Services** (Used tire processing)		0	0	0	0	0	0						100.00%	2
225																			
226	**208-2032-641.31.00**		O		**Dues and Subscriptions**(Renewal of membership in the Solid Waste Assoc. of North America for the Solid Waste Coordinator. Subscription to Waste News and Resource Recycling Magazines and Other Solid Waste Publications.)	350	58	58	58	58	58	58	16.67%	16.67%	16.67%	16.67%	16.67%	16.67%	4
227																			
228	**208-2032-641.43.03**				**Vehicles:**														
229			ER		Normal Repairs due to constant wear to hydraulics and motorized equipment.	15,000	0	0	15,000	0	0	0			100.00%				2
230			ER		Repair Lihue Rts.	25,000	0	0	25,000	0	0	0			100.00%				2
231																			
232	**208-2032-641.61.01**		S&E		**Office Supplies** (Current Annual Requirement	500	0	0	500	0	0	0			100.00%				2
233																			
234	**208-2032-641.61.02**				**Other Supplies:**														
235			S&E		Disinfectants & Detergents	4,700	0	0	4,700	0	0	0			100.00%				2
236			O		Herbicides & Fertilizers	600	0	0	600	0	0	0			100.00%				2
237			S&E		Computer Supplies	200	50	50	50	50	0	0	25.00%	25.00%	25.00%	25.00%			2
238																			
239	**208-2032-641.62.01**		S&E		**Other Small Equipment** (Small tools - items used in normal operations for transfer stations.	600	0	0	600	0	0	0			100.00%				2
240																			
241	**208-2032-641.65.00**				**Collective Bargaining**														
242			O		Gear	3,200	800	800	800	800	0	0	25.00%	25.00%	25.00%	25.00%			2
243			O		Physicals & Med. Related: PUC 5 @ $70, Drug 20 @ $45, Alcohol 5 @ $100, CDL 12 @ $45, 3 @ $140)	3,535	884	884	884	884	0	0	25.00%	25.00%	25.00%	25.00%			2
244																			
245	**208-2032-641.67.00**				**Other Commodities**	0	0	0	0	0	0	0							
246																			
247	**208-2032-641.88.01**		E		**Automobiles**	0	0	0	0	0	0	0			100.00%				2
248																			
249	**208-2032-641.89.01**		S&E		**Office Equipment**	0	0	0	0	0	0	0			100.00%				2
250																			
251	**208-2033-641.01.01**		S&B	B	**Regular Salaries** (Recycled Program Coordinator)	50,877	0	0	0	0	0	50,877					0.00%	100.00%	2
252																			
253	**208-2033-641.02.01**		S&B	B	**Regular Overtime** (Recycled Program Coordinator)	2,000	0	0	0	0	0	2,000					0.00%	100.00%	2
254																			
255	**208-2033-641.03.01**				**Premium Pay:**														
256			S&B	B	Meals	50	0	0	0	0	0	50					0.00%	100.00%	2

Line No	Account Number	Text	CODE		Account Description	Council's Review	Cost Center: Residential Collection	Commercial Collection	Transfer Station	Landfill	Greenwaste	Recycling	RC	CC	TS	LF	GW	RCYCL	Notes
257			S&B	B	Temporary Assignment	300	0	0	0	0	0	300					0.00%	100.00%	2
258																			
259	**208-2033-641.05.01**		S&B	B	**Social Security Contribution**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
260																			
261	**208-2033-641.05.02**		S&B	B	**Health Fund Contributior**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
262																			
263	**208-2033-641.05.03**		S&B	B	**Retirement Contribution**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
264																			
265	**208-2033-641.05.04**		S&B	B	**Workers Compensation PPD**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
266																			
267	**208-2033-641.05.05**		S&B	B	**Workers Compensation MEDI**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
268																			
269	**208-2033-641.05.06**		S&B	B	**Unemployment Compensatior**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
270																			
271	**208-2033-641.05.09**		O		**Mileage**	462	0	0	0	0	0	462					0.00%	100.00%	2
272																			
273	**208-2033-641.05.10**		S&B	B	**Other Employee Benefits**	0	0	0	0	0	0	0	3.74%	0.04%	10.94%	66.09%	13.24%	5.96%	3
274																			
275	**208-2033-641.10.01**		U		**Electricity**	4,200	0	0	0	0	0	4,200					0.00%	100.00%	2
276																			
277	**208-2033-641.10.02**		U		**Water**	200	0	0	0	0	0	200					0.00%	100.00%	2
278																			
279	**208-2033-641.10.03**		U		**Telephone**	1,680	0	0	0	0	0	1,680					0.00%	100.00%	2
280																			
281	**208-2033-641.30.00**				**Other Services (Recycling Programs):**														
282			RP		Recycling Promotions	25,000	0	0	0	0	0	25,000						100.00%	2
283			RP		Computer Recycling	15,000	0	0	0	0	0	15,000						100.00%	2
284			RP		KCC Internship	2,000	0	0	0	0	0	2,000						100.00%	2
285			HHW		Household Hazardous Waste	77,000	0	0	0	0	0	77,000						100.00%	2
286			KRP		Kauai Recycles Program	200,000	0	0	0	0	0	200,000						100.00%	2
287																			
288	**208-2033-641.31.00**		O		**Dues and Subscriptions**	150	0	0	0	0	0	150					0.00%	100.00%	2
289																			
290	**208-2033-641.41.03**		S&E		**Other Rentals** (Copier Lease)	864	0	0	0	0	0	864					0.00%	100.00%	2
291																			
292	**208-2033-641.61.01**		S&E		**Office Supplies** (Special events materials: laminating sheet, brochure holders @$100; misc. office @$200; janitorial supplies @$100)	400	0	0	0	0	0	400					0.00%	100.00%	2
293																			
294	**208-2033-641.61.02**		S&E		**Other Supplies** (Computer Supplies)	200	0	0	0	0	0	200					0.00%	100.00%	2
295																			
296	**208-2033-641.67.00**				**Other Commodities**	0	0	0	0	0	0	0						100.00%	2
297					**SUBTOTAL - Council Approved Budge**	10,780,127	1,867,640	29,223	2,170,533	4,485,169	800,223	1,427,341							
298																			
299																			
300					**ADDITIONAL EXPENSES**														
301			HBE		Hanapepe Baseyard Electricity Billing	11,540	0	0	11,540	0	0	0			100%				2
302																			
303					Highway Division Support Services														
304			HDSS		Refuse Collection	224,350	223,721	629	0	0	0	0	99.72%	0.28%					5
305			HDSS		Kekaha Landfill/Transfer Station	206,550	0	0	103,275	103,275	0	0			50%	50%			2
306			HDSS		GW/White Goods Hauling	21,270	0	0	0	0	0	21,270						100%	2
307						$452,170	$223,721	$629	$103,275	$103,275	$0	$21,270							
308					Other Solid Waste Related Costs														
309			Flt		Fleet Repair & Maintenance	208,980	0	0	0	208,980	0	0				100%			2
310			Flt		Fuel & Other Fluid Cost	151,300	45,390	5,043	50,433	50,433	0	0	30%	3%	33%	33%	0%	0%	2
311						$360,280	45,390	5,043	50,433	259,413	0	0							
312																			
313					**Subtotal Additional Expenses from other Division**	$823,990	$269,111	$5,672	$165,248	$362,688	$0	$21,270							
314																			
315					**TOTAL**	$11,604,117	$2,136,751	$34,895	$2,335,781	$4,847,857	$800,223	$1,448,611							
316					check Op Exp. - ok	$11,603,800													
317					**CUSTOMERS/TONNAGE**		23,480	66	41,800	96,870	28,180								
318							customers	customers	tons	tons	tons								
319																			
320					**UNIT COSTS**		$7.58	$44.06	$55.88	$50.04	$79.80								
321							per customer	per month	per ton	per ton	per ton								
							$7.69												

Notes:

(1) Based on initial 25% allocation for collection, TS, landfill and GW/Recycling. Collection and GW/Recycling further allocated based on tonnage to Residential/Commercial and GW/Recycling.
(2) Value reflects prorated share based on the area of responsibility and program demands.
(3) Based on the total percent of salaries allocated to each Cost Center.
(4) Allocated evenly to all cost centers.
(5) Based on the percent of Residential and Commercial Accounts.
(6) Based on the total percent of salaries allocated to Residential Collection, Commercial Collection and the Transfer Stations.