



8.0 Collection and Transfer

8.1 Introduction

The County of Hawai`i currently operates a network of twenty one recycling and transfer stations at which residents can drop off recyclables and waste. The County contracts with private firms to transport recyclables from the stations to privately operated processing facilities. Municipal waste is transported by the County's Solid Waste Division (SWD) staff to either the South Hilo Landfill or the West Hawai`i Landfill. The recycling and transfer stations provide geographically distributed collection points that are conveniently located for public users. A map of the stations that describes the relative size of each station by denoting FY 07-08 garbage received is included in Exhibit 8-1.

Currently, there is no residential curbside pickup of recyclables or garbage provided by the County, so most residents use the recycling and recycling and transfer stations as their primary means of recycling or disposing of materials. There are private collection companies in the county that offer fee-based curbside garbage collection services. These services are used by a relatively small percentage of residents on the island.

Commercial businesses are served by private firms in a competitive market. There is evidence that some non-residential customers use the recycling and transfer stations.

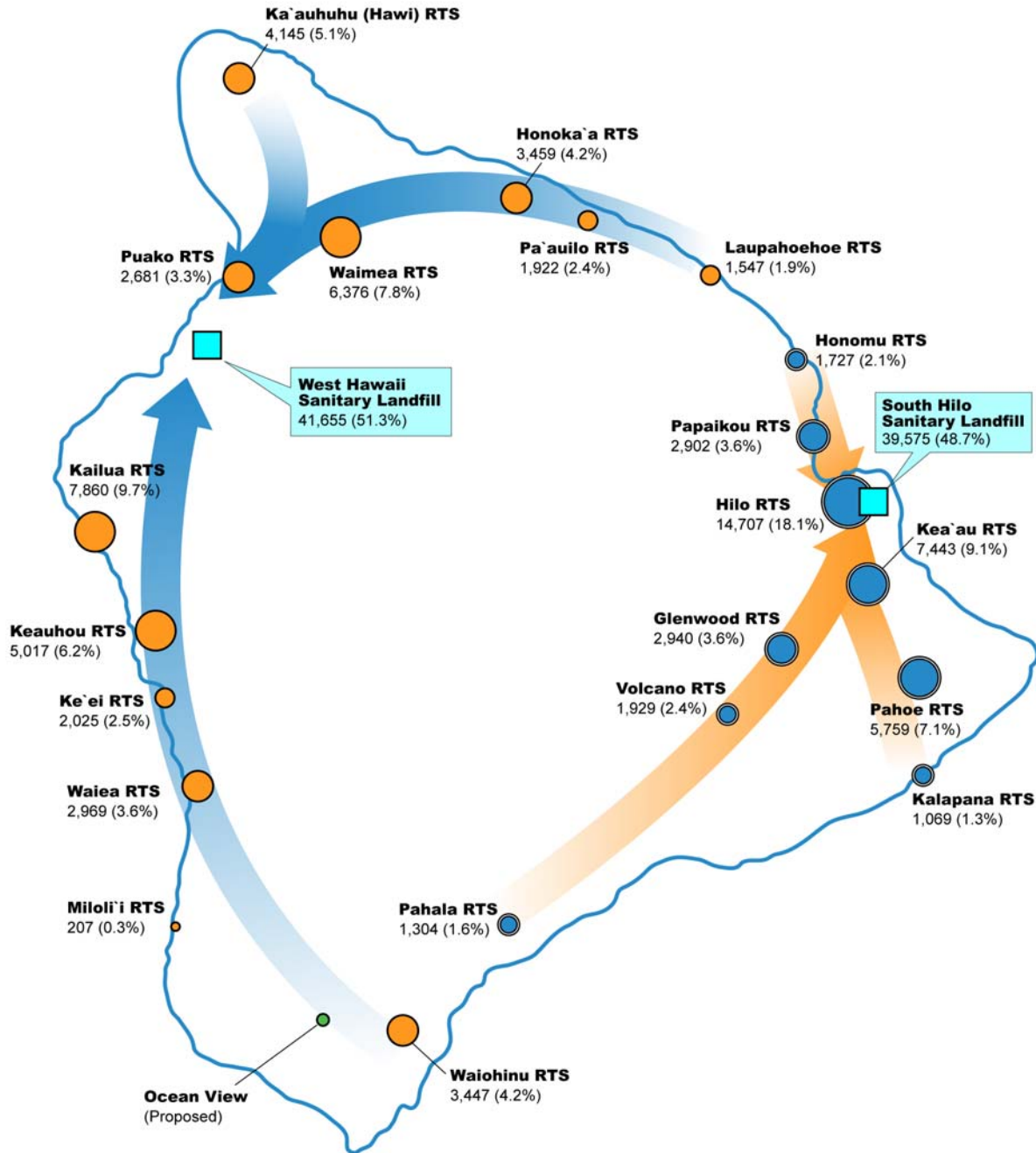
This section describes current conditions of the existing solid waste collection and transfer system within Hawai`i County, identifies current issues and concerns, and presents options for achieving the County's solid waste collection and transfer goals.

8.2 Background

The County of Hawai`i developed a recycling and transfer station system in the 1970s to provide a transition from operating local dump sites to instituting a more centralized landfill system. The recycling and transfer stations were initially constructed as inexpensive, temporary facilities to fulfill the immediate needs of residential users. The rationale behind a recycling and transfer station system is to create efficiency by consolidating many smaller residential loads into combined larger loads for transfer to landfills.

The County's Solid Waste Division, Department of Environmental Management operates and maintains the recycling and transfer stations. Twenty of the twenty-one recycling and transfer stations operate under Solid Waste Management Permits issued by the Hawai`i Department of Health¹.

¹ The Miloli`i transfer station is currently not under permit.



Note: Numbers under transfer station = tons of trash hauled in FY 07-08 and percent of total for County.

Exhibit 8-1
**Disposal at Hawai'i County
 Recycling and Transfer Stations
 FY 07-08**



374128.10.01_ES092008003SEA Ex 8-1_Disposal at Hawaii County at 5/22/09

8.3 Review of 2002 Plan Update

The following is a summary of the recommendations presented in the 2002 Plan update relative to solid waste collection and transfer, and a description of the actions taken to date to achieve each recommendation.

2002 Plan Update Recommendation	Status
Design and Construct a Sort Station in Hilo	The sort station is currently under construction and is scheduled for completion in May 2009.
Establish recycling dropoff centers at all transfer stations	All but three recycling and transfer stations now have recycling dropoff centers.
Operate the West Hawai'i Landfill for west Hawai'i waste stream and residual from east Hawai'i waste stream that cannot be managed otherwise	Currently, the South Hilo Landfill is still operational and the proposed transfer of waste to the West Hawai'i Landfill is not taking place.
Close South Hilo Landfill	South Hilo Landfill has not been closed. Its capacity has been extended using various engineered approaches.
Design and Construct Waste Reduction Facility	The County issued an RFP for construction of a waste reduction facility. The City Council rejected all proposals submitted to construct a waste reduction facility primarily because the costs of construction looked to be significantly higher than initially estimated.

8.4 Existing Conditions

Currently there is no municipal curbside recycling or garbage pickup provided by the County. Most island residents use the County recycling and transfer stations to dispose of their refuse. Private companies currently provide curbside pickup within limited geographic regions of the island for a fee. Based on residential credit information from the County², it is estimated that about 6,600 households currently subscribe to curbside service. This represents approximately 10.5 percent of the 63,300 estimated occupied households in Hawai'i County in 2008. Fees for curbside collection quoted by private collection firms appear to range between \$20 to \$30 per household per month.



There are a number of companies that collect garbage from businesses and institutions in the County. An analysis of August 2008 County scale records suggests that there are two private collection firms that deliver more than five percent of the waste delivered to County landfills: Pacific Waste (22 percent) and Business Services Hawai'i (6 percent). Companies that delivered between one and five percent of the waste to County landfills include: Atlas

² The County provides credit against tipping fees to collection firms that document waste that is collected from residences.

Recycling (2 percent), PFI (2 percent), CTS Earthmoving (1 percent), Superior Sanitation (1 percent), Hawai`i Dredging and Construction (1 percent), and Leo's Rubbish Service (1 percent). Collection rates charged vary by company, the type of service provided, and the distance from the collection point to the landfill. Representative rates are \$180 for collection of a 3-cubic-yard bin once per week or \$228 for collection of a 4-cubic-yard bin once per week.

Use of the recycling and transfer stations for the dropoff of recyclables or garbage is currently free for residents. The County recently instituted a two-bin system for recycling at transfer stations. This consists of one roll-off container for glass and another for mixed recyclables. Currently, most stations have stairs and platforms to allow reasonably convenient customer access to the recycling bins. Selected stations offer a HI-5 redemption center, reuse opportunities and/or facilities for the recycling of green waste and metals. The recycling services provided at each station are shown in Exhibit 8-2.

Several of the recycling and transfer stations are used by private recyclers or community groups for collection of recyclable materials. The County facilitates the use of the recycling and transfer stations as collection points for recyclables to the extent practical, and intends to eventually upgrade all of the recycling and transfer stations to enhance recyclable collection capabilities.

At the stations, residents deposit garbage into chutes that lead to truck-mounted, compacting containers, which are then hauled by SWD staff to the two landfills. The County operates and maintains stationary compacting units, truck mounted compacting units, and a fleet of trucks and compacting containers utilized in the operation of the recycling and transfer station system, and also provides part-time security monitoring at the busiest recycling and transfer stations.

8.4.1 Recycling and Transfer Station Characteristics

The stations vary in size, population served, tonnage of waste collected per day, types of waste accepted, and hours of operation. Site characteristics for each recycling and transfer station are presented in Exhibit 8-3.

With the exception of one station (Miloli`i) refuse is compacted at each of the recycling and transfer stations three to four times per day by roving SWD recycling and transfer station attendants. The Miloli`i recycling and transfer station has a roll-off container that is hauled twice per week to the West Hawai`i Landfill by a private contractor. Recycling and transfer station attendants clean and maintain the stations, operate the compactors, periodically monitor refuse haulers for prohibited materials, and report any unusual activity at the stations.

The recycling and transfer stations are permitted to accept only residential refuse; commercial and hazardous wastes are prohibited at all stations. However, commercial businesses frequently use the stations because of a lack of enforcement and lack of suitable alternatives for solid waste disposal. Without adequate security measures and enforcement (for example, fences and security guards or SWD personnel to document the origin and type of waste being disposed of at the recycling and transfer stations), it is virtually impossible for the County to ensure that all permit requirements are being met. Currently, 18 of the 21 stations are gated and have part-time security guards.

EXHIBIT 8-2
Recycling Services at Recycling and Transfer Stations

Recycling and Transfer Station	Glass	Mixed Recyclables	Scrap Metal	Green Waste	Reuse Center	HI-5 Redemption Center
East Hawai`i						
Kea`au (KRRC)	X	X	X	X	X	X
Hilo	X	X	X	X		X
Pahoa	X	X				X
Laupahoehoe	X	X			X	
Honoka`a	X	X				X
Kalapana	X	X				
Volcano	X	X				
Glenwood	X	X				
Honomu	X	X				
Papaikou	X	X				
Pa`auilo						
Pahala	X					
West Hawai`i						
Kealakehe (Kailua)	X	X	X	X		X
Keauhou	X	X			X	X
Ka`auhuhu (Hawi)	X	X				X
Puako	X	X				X
Waimea	X	X				X
Ke`ei	X	X				
Waiea	X	X				
Miloli`i						
Waiohinu	X	X				X

EXHIBIT 8-3
Site Characteristics for Existing Recycling and Transfer Stations

Recycling and Transfer Station	District	Approx. Population Served	Parcel Size (Acres)	Number of Chutes	FY 07-08 Tonnage (Tons/Day)	Gated Hours of Operation (Summer)
East Hawai'i						
Kea'au	Puna	11,700	19.54	2	20.39	6:30 a.m. - 6:30 p.m.
Pahoa	Puna	9,400	3.77	2	15.78	6:30 a.m. - 6:30 p.m.
Kalapana	Puna	1,200	13.2	1	2.93	6:30 a.m. - 6:30 p.m.
Volcano	Puna	2,000	2.19	1	5.29	Not gated
Glenwood	Puna	4,300	1.97	1	8.06	6:30 a.m. - 6:30 p.m.
Hilo	S. Hilo	42,000	72.7	4	40.29	6:30 a.m. - 5:00 p.m.
Honomu	S. Hilo	3,400	0.84	1	4.73	6:30 a.m. - 6:30 p.m.
Papaikou	S. Hilo	5,800	0.57	1	7.02	6:30 a.m. - 6:30 p.m.
Laupahoehoe	N. Hilo	1,700	1.02	1	4.24	6:30 a.m. - 6:30 p.m.
Pa'auilo	Hamakua	1,800	0.85	1	5.27	6:30 a.m. - 6:30 p.m.
Honokaa	Hamakua	5,100	0.73	1	9.48	6:30 a.m. - 6:30 p.m.
Pahala	Ka'u	1,700	0.75	1	3.57	Not gated
West Hawai'i						
Ka'auhuhu (Hawi)	N. Kohala	6,000	17.28	1	11.36	6:30 a.m. - 6:30 p.m.
Puako	S. Kohala	5,600	8.9	1	7.34	6:30 a.m. - 6:30 p.m.
Waimea	S. Kohala	11,700	0.31	2	17.47	6:30 a.m. - 6:30 p.m.
Kailua (Kealakehe)	N. Kona	21,000	30.32	3	21.54	6:30 a.m. - 6:30 p.m.
Keauhou	N. Kona	8,500	5.47	2	13.75	6:30 a.m. - 6:30 p.m.
Ke'ei	S. Kona	5,600	11.6	1	5.55	6:30 a.m. - 6:30 p.m.
Waiea	S. Kona	3,300	2.28	1	8.13	6:30 a.m. - 6:30 p.m.
Miloli'i	S. Kona	700	0.17	1	0.57	Not gated
Waiohinu	Ka'u	3,000	31.65	1	9.44	6:30 a.m. - 6:30 p.m.

8.4.2 Recycling and Transfer Station Repair and Enhancement

Since the initial construction of the County's current recycling and transfer stations, there have been relatively few major repair or improvement projects conducted to maintain or upgrade the stations. Repairs and maintenance on equipment and infrastructure is currently provided by the County Department of Public Works on an emergency or time available basis. Many of the recycling and transfer stations have deteriorated and have existing engineering or structural deficiencies that require repair or complete renovation. The majority of the recycling and transfer stations have not been upgraded to accommodate population growth within nearby communities, or to effectively accommodate recycling or reuse.

In 2006, the County conducted detailed inspections of all of the recycling and transfer stations in an effort to inventory and assess the conditions of each station. Infrastructure and equipment needing repair was identified and documented, and the layout and capacity of each station were evaluated based on the needs and current population of the surrounding communities. The County then drafted the *Island Wide Transfer Stations Repair and Enhancement Plan*, which detailed the results of the inspections conducted at each recycling and transfer station and rated the condition of each facility. The condition of the recycling and transfer stations documented in the Plan is shown in Exhibit 8-4.

Major deficiencies were identified at many of the recycling and transfer stations. In order to prioritize the stations with the most pressing needs for repair and enhancement, the County rated each station in four areas: structural adequacy, functionality, safety, and regulatory compliance. Based on these ratings, the County developed a five year repair and upgrade plan, in which major construction projects were planned for the Volcano, Glenwood, Pahoa, and Waiohinu recycling and transfer stations between 2006 and 2011. At this time, funding has been authorized only for reconstruction of the Pahoa station.

The Solid Waste Division's planned future enhancements and upgrades at the stations include a standardized layout plan that combines the most effective layout components identified during the inspections. Uniformity at the stations will help to ensure safety and regulatory compliance, and to reduce long-term maintenance and repair costs. Repairs and upgrades to the existing stations are being planned with the intent to minimize or eliminate closure of each station during the project in order to mitigate disruption of service to residents.

Additional components that will be included in the plans for upgrades to existing recycling and transfer stations are specific recycling goals for each station, and identification of specific stations that will serve as collection points for additional waste streams including green waste, household hazardous waste, and white/bulky goods.

EXHIBIT 8-4

Island Wide Recycling and Transfer Station Condition

Recycling and Transfer Station	Minor Engineering Deficiencies – Can be Corrected While Station is in Operation	Serious Engineering Deficiencies – Correctable Without Reconstruction	Major Engineering Deficiencies – Reconstruction Required
Kea`au		X	
Pahoa			X
Kalapana		X	
Volcano			X
Glenwood			X
Hilo		X	
Honomu			X
Papaikou			X
Laupahoehoe			X
Pa`auilo			X
Honokaa			X
Pahala			X
Ka`auhuhu (Hawi)		X	
Puako			X
Waimea		X	
Kealakehe (Kailua)	X		
Keauhou	X		
Ke`ei		X	
Waiea			X
Miloli`i			X
Waiohinu			X

Source: County of Hawai`i Department of Environmental Management. *Island Wide Transfer Stations Repair and Enhancement Plan*. February 2006.

8.5 Issues and Concerns

The County's network of recycling and transfer stations provides convenient locations for most County residents to drop off recyclables and garbage. Residents who prefer to have curbside collection must make arrangements with a local business willing to provide the service. This type of system is still in effect in some rural counties in the United States, but it is uncommon, particularly for a county the size of Hawai`i with over 170,000 people. This IRSWMP update includes an evaluation of potential effects on costs or service levels if curbside service is implemented by the County.

When evaluating a curbside service program, the County should assess the need to continue operating all 21 recycling and transfer stations. Curbside service would require significant additional capital start-up and yearly operations costs, and the net cost increase could potentially be reduced by closing some of the County's existing recycling and transfer stations.

As discussed above, the County's existing transfer system was established in the 1970s and most of the stations require significant upgrades to address structural and functional deficiencies. As discussed in the recycling, bioconversion, and markets section, it would also be desirable to provide additional opportunities to divert waste from landfills. Many such opportunities would require significant and potentially expensive changes to the existing infrastructure and operations at County recycling and transfer stations.

8.6 Curbside Collection Implementation Considerations

This section provides a discussion of a variety of issues that should be considered when evaluating the merits of the County implementing a residential curbside collection service, including:

- Institutional approaches to service delivery
- Funding options
- Service levels
- Collection technologies
- Services and service frequency

It should be noted that many of these issues were also discussed in the Recycling, Bioconversion, and Markets section. References to that section will be made as appropriate.

8.6.1 Institutional Approaches to Service Delivery

In the United States today, residential waste collection services are provided by both the private and public sectors. Although there are numerous ways to group or categorize different ways of delivering waste collection services, the four most common types of service delivery arrangements currently used in the United States are:

1. No government-organized collection service
2. Local government owned and operated collection service
3. Noncompetitive franchise collection service with rate regulation
4. Competitive contract collection service

This section provides a brief discussion that highlights the features of each service delivery arrangement.

8.6.1.1 No Government-Organized Collection Service

This is the method of collection currently in effect in Hawai'i County, where customers either deliver their own waste to a processing or disposal facility, or select a private business to pick up recyclables and/or waste at the curb. In many communities, "going to the dump" has long been part of a routine for some local residents. Many of these individuals would

prefer to make the time to deliver waste materials on their own rather than pay for collection services.

Historically, many communities have given residents the option to either sign up for curbside collection services or to self-haul their materials. The main advantage to self-haul collection is that the (typically smaller) percentage of residents who prefer to self-haul their waste may do so without being charged for a service they do not want or need.

In most industries, having many firms compete with each other for business tends to result in efficiencies and lower costs for consumers. However, this is usually not the case for residential collection of garbage because the benefits of competition are usually overcome by the inefficiencies of having multiple haulers driving down the same street each day. Trucks must drive greater distances between stops resulting in fewer stops per collection day resulting in increased costs. In other words, residential collection service is a good example of an industry in which costs can be reduced by regulatory structures that ensure that a product or service is delivered by a single entity.

Another disadvantage of this arrangement is that billing and other overhead costs will also be higher than in service arrangements in which billing is combined with billing for other municipal services and handled by a single entity. Finally, as communities grow and housing density increases, public health and social considerations become more important: garbage should usually be removed at least once every seven days to control flies and odors.

8.6.1.2 Local Government Owned and Operated

Local government collection is most typically performed by city governments although collection is sometimes provided by counties. Advantages typically associated with local government collection include:

- Local governments have some inherent cost advantages over private firms, such as not having to pay income or other taxes, the ability to combine overhead costs for collection programs with other existing programs (such as water, power, or sewer), not earning profits, and lower costs of borrowing.
- Local governments may place a higher value on service to customers than private firms.
- When local government collection is provided as part of a utility structure, rate increase proposals are discussed in an open, public forum.
- Local government collection typically includes all households in a city or county allowing for increased efficiency through the economics of contiguity (the contiguous alignment of customers along a service route), and for larger jurisdictions, potential economies of scale.



While local government has some inherent cost advantages, the cost of local government collection is often higher than when collection is provided by the private sector. A comprehensive national survey of collection practices found that local government and

privately-provided service were of equal cost, on average, for smaller local governments (with a population of less than 20,000), but that privately-provided service (with exclusive collection territories) was significantly (up to 37 percent) less costly for larger jurisdictions with populations of more than 50,000³. Another study reported the results of a national survey of 60 communities which indicated that the average cost per household for local government collection was 32 percent greater than that of private contract collection⁴.

Some of the factors that can lead to inefficiency and higher costs for local government collection include:

- Civil service requirements can hamper the ability of supervisors to motivate employees and, if necessary, fire underperforming employees.
- The lack of the profit incentive removes a powerful motivator toward efficiency.
- Work rule requirements can make it much more difficult for public sector managers to affect a flexible response to changed conditions.

While local government collection can be cost competitive with the private sector, there are many documented cases where local government has cut collection costs significantly by contracting out collection services⁵. In summary, it is likely but not certain that local government collection would be somewhat more costly than collection provided by the private sector in Hawai'i County. If the County were to establish a collection service, it would be critical to ensure good, experienced, proactive management, and the use of appropriate incentives to motivate the behavior of collection personnel.

8.6.1.3 Noncompetitive Franchise with Rate Regulation

In this type of service arrangement, collection is provided by private firms holding franchises that give them an exclusive right to collect waste from all residences within a specified geographic area. The noncompetitive aspect of the franchise means that rates are negotiated between the hauler and the state or local government. This is a common arrangement in many communities in the United States. As an example, in Washington State hauler rates are regulated by the Washington Utilities and Transportation Commission for jurisdictions that opt for this collection arrangement.

This method of providing collection service can foster a sense of partnership between the private and public sectors. It is one of the most flexible institutional arrangements, because there is usually an ongoing mechanism for negotiation between the public and private sectors. If conditions change it is often easier to make adjustments to service levels, or add additional services such as curbside recycling programs than other types of service arrangements. For example, local government collection programs are often difficult to change because of civil service agreements. Contract collection is inherently less flexible because a good contract specifies numerous details that are part of a legally binding

³ Stevens, Barbara J. 1980. *Handbook of Municipal Waste Management Systems Planning and Practice*. Van Nostrand Reinhold Company.

⁴ CH2M HILL in association with Ecodata. 1995. *City of Tacoma, Refuse Utility Performance Analysis*.

⁵ Hilke, John. *Cost Savings from Privatization: A Compilation of Study Findings*. Reason Foundation Privatization Center. March 1993.

agreement that can be complex to alter. With an exclusive franchise, the jurisdiction retains flexibility to negotiate change, and the efficiency advantage of contiguous routes.

One disadvantage associated with noncompetitive franchises is the lack of competition to establish a true, baseline cost of service. Without competition, local governments must rely on various regulatory measures, rate comparisons with similar-sized operations, auditing methods, and negotiating techniques to try and mandate that collection service providers establish reasonable pricing for services. Often, these efforts result in only modest success: thus, competitive contracting for collection services often is cheaper than a non-competitive franchise collection service. Finally, it is often difficult and costly for governments to secure the expertise to effectively regulate the rates charged by haulers.

8.6.1.4 Competitive Contract Collection Service

The competitive contract arrangement refers to a system in which a city or county goes through a competitive selection process and awards a single contract to the successful firm for the exclusive right to provide collection services in a designated area for a specified period of time. Assuming there are multiple firms competing for the business, contract collection for exclusive collection zones usually result in lower prices for residential collection services than the other institutional arrangements. This occurs because firms must keep their prices low to be competitive.

However, contract collection is not always the lowest cost institutional arrangement for collection. Higher costs can occur if local governments do not use adequate care in the development, implementation, and administration of the contractual relationship with its contractor. Three key factors that must be present for a community to ensure low cost, high quality service from a competitive contract include:

- The procurement process must be structured to ensure that multiple firms bid on the collection zones, and that multiple firms will be willing to bid once the initial contract ends and must be rebid.
- The procurement documents, and in particular the contract, must precisely specify the services required.
- The contracting jurisdiction must devote significant resources to craft a good contract. Once the contract is in place, additional resources are needed to actively monitor and manage contractor performance.

Some disadvantages of contract collection include the following:

- There is added risk associated with contracting because it is difficult to foresee the future and to devise a contractual relationship that protects the interests of the contracting jurisdiction yet leaves the private sector the flexibility to profitably and creatively provide the requested services.
- Customer service can suffer if the contract does not clearly specify service requirements and/or if the contracting jurisdiction does not enforce contractual requirements.
- In some cases, intense competition or intra-firm marketing pressures result in firms bidding prices below the true cost of service. In such cases the local government benefits

from low prices, but there can be protracted difficulties in getting the contractor to perform in accordance with the contract.

If Hawai'i County were to implement curbside collection using competitive contracts, it would need to address many issues including the following:

- Deciding how many collection zones and contracts are appropriate to establish. In order to ensure long-term competition and economies of scale, the County would need a minimum of two zones awarded to two different contractors and probably a maximum of three or four zones.
- Developing a complex request for bids or proposals including a good contract that spells out clearly the services to be performed and penalties for non-performance.
- Communicating daily with haulers about ongoing billing, customer service, and equipment or logistical issues.
- Monitoring hauler performance.

In Hawai'i County, a recent Supreme Court decision⁶ affirmed the right of public sector unions to provide services traditionally performed by the public sector. The Hawai'i State legislature has made provisions to allow for managed competition, in which both the public and private sectors could compete for the provision of public services, such as collection. However, there is no process yet established for such a competition, and it is highly likely that an attempt to enact such a process would result in litigation with an uncertain outcome.

8.6.2 Collection Technology

Curbside collection can be provided using various levels of automation. The traditional approach to refuse collection relies on crews of 2 to 3 people to manually toss refuse into collection trucks. To reduce crew sizes, some communities have implemented semi-automated or fully automated collection systems. This requires providing each household with a wheeled container that is rolled to the curb on collection day. Automated collection trucks have lifting mechanisms that empty the refuse into the truck. This section discusses the relative merits of manual, semi-automated and fully automated collection systems, and their applicability to Hawai'i County.

8.6.2.1 Manual Collection

Manual collection is the traditional method of collecting materials at curbside. Waste is typically collected by two- or three-person collection crews in rear-loaded and side-loaded collection vehicles. This arrangement is a common method of collection in the United States, although in some rural areas where the distance between stops is great, one-person crews are sometimes used. Side-loaded vehicles use compartment openings on the driver side of the vehicle rather than at the back, and therefore the driver or crew member does not have to walk as far to unload waste into the truck. For this reason, side-



⁶ Supreme Court of the State of Hawaii. 2004. No. 22022. Konno et. al., vs. County of Hawaii.

loaded vehicles can be operated somewhat more efficiently than rear-load vehicles when smaller (one- or two-person) crews are used.

In an effort to reduce labor costs, many communities are modifying their solid waste collection program to add some level of automation. In one survey, most solid waste managers contacted who operate with manual collection equipment plan to transition to semi-automated or fully automated systems as soon as is practical⁷. In Hawai'i, the Counties of Honolulu, Kauai, and Maui are all currently transitioning from manual collection to fully automated collection.

Automated collection vehicles reduce labor costs by allowing for smaller crews, but at the expense of higher capital investment in trucks. Therefore, automated collection is best suited to areas with relatively high labor costs, and manual collection is best suited to areas with relatively low labor costs. Insurance premiums are also higher with manual collection because many refuse workers suffer injuries to backs and shoulders by repetitively lifting waste into the truck. Thus, the appropriateness of manual versus automated collection will depend on the relative cost of labor plus associated costs versus capital costs, and the characteristics of local collection routes.

8.6.2.2 Semi-Automated Collection

In semi-automated systems, the collector wheels the container from the curb to the rear or side of the truck and attaches the container to an automated hydraulic dumping unit (tipper). These systems require special containers that are designed to be compatible with the lifting units. Virtually all of the heavy lifting associated with refuse collection is eliminated; thus worker fatigue and injury is reduced, and the vehicles can be operated by crews as small as one person. Considering that solid waste collectors have the highest injury rate of any industry nationally, the benefits associated with eliminating lifting can be significant. The reduction in lifting also makes the profession more accessible to women and older workers.



Although semi-automatic systems require more time per pickup than manual loading, service time *per crew member* can decrease because semi-automated systems usually allow for a sizable reduction in crew size. The wheeled containers used with semi-automated and fully automated systems are often perceived by the customer as a more convenient, cleaner collection system, with a resulting decrease in litter.

For rural customers with long dirt driveways, larger, wheeled containers may be a drawback as they are difficult to load into a personal vehicle to take to the set out location. In rural areas, customers could be allowed to set out smaller, 30-gallon cans to make it more convenient.

Semi-automated collection has been successful in some communities but unsuccessful and ultimately canceled in others. This type of collection service typically failed due to slower route times, overly stringent container set-out requirements, higher vehicle and container

⁷ Merrill, Lynn. *Improving the Bottom Line on Curbside Collection*. MSW Management. January/ February 1996.

costs, or a perceived reduction in the incentive to recycle because of the larger can sizes. Municipalities with successful semi-automated collection programs devised ways to work around these problems. In some cases, it has been determined that despite the challenges, overall collection costs were less than manual collection because of the reduction in crew sizes, decrease in insurance premiums, and reduced injury rates.

Compared with existing manually loaded vehicles with two- or three-person crews, semi-automated collection results in longer route times and higher capital costs. Manually loading refuse into trucks from cans is faster than using automated loading systems. Labor costs can be reduced by reducing the size of the crew per truck, but capital costs are increased because more trucks may be required to pick up the same quantity of waste.

Semi-automated (and fully automated) collection would be challenging to implement in rural areas of Hawai'i County because of factors not conducive to automation, including:

- Unimproved roads
- Lack of curbs or sidewalks for set outs
- Steep slopes
- Dense vegetation

More study would be needed to evaluate if semi-automated or fully automated collection could be implemented effectively in Hawai'i County.

8.6.2.3 Fully Automated Collection

Although fully automated systems are not as common as semi-automated systems, the number of communities throughout the country that use fully automated collection vehicles is growing. Fully automated systems use one-person side-loading vehicles equipped with a lifting mechanism (collection arm) on the side of the vehicle. The operator pulls up to the container at the curb and controls the entire loading operation from the right-hand driver's seat. The collection arm allows the operator to grasp, empty, and return the container without leaving the truck cab. In certain cases, such as improperly positioned or obstructed containers, the operator may have to leave the cab to respond to a problem.



Fully automated systems have similar advantages to the semi-automated systems discussed in the previous section. Because virtually all lifting is eliminated, the costs associated with worker injury and fatigue are greatly reduced. In addition, there is usually an improvement in collection labor efficiency because fully automated systems use a single person on each truck and the driver does not have to get out of the truck as frequently. Benchmark fully automated collection systems can collect from over 800 households per day per truck with a single driver. Since commercial containers compatible with fully automated systems are available up to 300 gallons, some communities have lowered collection costs by incorporating commercial accounts on residential routes.

Fully automated systems require cooperation by residents to set out containers in a prescribed way. Implementing fully automated systems presents additional physical constraints as well. Single side of the street routing is required (which will increase miles driven and drive time between accounts). Parking restrictions may need to be instituted, and obstructions (for example, trees, and utility wires) may present problems in certain areas.

Compared with manually loaded vehicles with two- or three-person crews, route times will be longer and capital costs will be greater with either semi- or fully-automated collection. However, labor costs would decline by reducing crew sizes to one (plus extra replacement drivers for sick days, vacation, and holidays). The total operational collection cost will depend on a community's labor costs and route structure. Because capital costs will be higher and route times slightly longer, the main source of savings compared to manual collection is in labor. Communities that have shifted to automated collection typically have relatively high labor costs. It should be noted that this is an important factor in case studies of automated collection that show an overall reduction in collection costs.

Compared to semi-automated collection, fully automated collection requires trucks that are more costly with higher maintenance requirements. Those costs are typically overshadowed by the cost savings that results from the reduced time per stop. Thus, in most cases, fully automated collection appears to be more advantageous than semi-automated collection.

8.6.3 Service Levels

Curbside service is generally provided in one of two ways:

- Subscription basis – where residents have the option to either subscribe to the service or not.
- Universal collection – where all residents in a jurisdiction or a sub-area of a jurisdiction are charged for curbside service regardless of whether or not they use the service.

The advantages of a subscription service are that residents are given a choice of whether or not to pay for the service. The disadvantage is that it makes collection more costly on a per-household basis by lengthening the distance between stops on a route. Universal collection has just the opposite set of advantages and disadvantages: residents no longer have a choice and are required to pay for a service, yet per-household costs are lower.

This issue was discussed in the recycling, bioconversion, and markets section. Hawai'i County is predominantly rural in character with relatively small urban and suburban areas in Hilo, Kailua-Kona, Waimea, and a few other locations. Many of the rural areas within the County have steep, unimproved roads not suitable for collection vehicles. Thus, mandatory curbside collection for all County residents is likely to be impractical. Further, longer distances between collection stops will occur in many of the geographically dispersed small communities in the County. A voluntary subscription service, for which not all residents would sign up, would potentially make the distance between collection stops even longer. While there's no binding constraint against implementing a subscription service, the fact that the County has many geographically dispersed rural communities suggests that designating specific geographic zones where curbside service would be mandatory would make more sense than mandating island-wide collection.

8.6.4 Services and Service Frequency

Most collection systems now include both garbage and recycling and many offer green waste services. Some communities are taking the next step toward zero waste and are diverting food and other organics from the garbage at curbside. Considering the County's commitment to zero waste, should the County elect to make the substantial commitment to begin offering curbside collection services, it would make sense to offer curbside collection of recyclables.

Some communities in hot and humid climates offer garbage collection service twice weekly. This is significantly more expensive than weekly collection and this practice seems to be less and less common; weekly collection of garbage is the norm in most communities.

Recyclables are typically collected either weekly or bi-weekly. Weekly collection generally is more costly, but may result in higher diversion from landfill. However, as discussed in the recycling, bioconversion, and markets section, the evidence of increased diversion from weekly collection versus bi-weekly collection is weak and is not consistent in all jurisdictions. Green waste services are offered in a wide variety of service frequencies including weekly, bi-weekly, monthly, and seasonally.



PHOTO: REHRIG

The most aggressive approach to diversion at curbside is a three-stream system in which food and other organics (which could include green waste) is collected weekly and garbage and recyclables are collected either weekly or on alternate weeks.

8.6.5 Funding Options

There are a number of ways that the County could pay for a curbside collection service, including:

- Property taxes
- Line item on property tax bill
- Direct billing
- PAYT

8.6.5.1 Property Taxes

This is how solid waste management expenditures are currently funded. Thus, it would be relatively simple for the County to continue with this method and would potentially streamline implementation of a new service.

The main disadvantage of this funding method is that it would provide no information to customers about the cost of the program. The lack of information for consumers about program costs would indirectly eliminate one way of providing incentive to program managers to keep service costs low.

8.6.5.2 Line Item on Property Tax Bill

Many jurisdictions separate the costs of waste management services on property tax bills. This would be relatively simple for the County to implement and would provide some information to customers about the cost of curbside collection, and potentially other waste management services.

8.6.5.3 Direct Billing

The County could provide curbside collection and other waste management services in a similar fashion to utility services like water or electricity, and send bills directly to customers. This is a very common arrangement in the United States. The main advantages of this type of system are to provide better information to customers about the cost of the collection service, and to indirectly provide incentives to provide services more efficiently.

To implement this type of system, the County would need to hire personnel, establish computer-based systems for the program, and conduct considerable public education. Ongoing customer service would need to be provided to address disputes about services and billing, and for collection of unpaid bills.

8.6.5.4 Pay-As-You-Throw

As discussed in the source reduction section, PAYT can take many forms including using a variable can, metered bag, or metered tag system. The key aspect of this system is to charge a progressive rate for each additional garbage unit collected above the basic service level (for example, one can per week). In other municipalities, PAYT has proven to be a highly effective method of reducing waste and increasing the use of recycling and organics diversion programs.

The variable can system is becoming increasingly popular in the United States and integrates well with automated collection. In this approach, residents are charged more for larger can sizes. Some communities charge progressively increasing rates for a wide menu of can sizes ranging from a 12-gallon micro-can to one or more 96-gallon carts. This system requires the collector to keep a substantial inventory of different cart sizes and spare parts, and requires billing and account systems to keep track of changes in can sizes.

A metered bag program consists of charging customers on a per-bag basis. This requires the collector to keep track of how many bags are set out by each customer. It can be prone to disputes about how many bags are set out by each customer during each billing cycle.

A metered tag program requires each bag of garbage to be accompanied by a county-sanctioned tag. Tags can be sold at County offices and/or at local supermarkets. This system has the advantage of minimizing disputes about how much waste is set out each month, but places a burden on customers to remember to purchase tags.

Implementing a PAYT system would require implementation of an aggressive public education and information campaign to ensure that residents understand the rationale for implementing the PAYT program. Significant up-front planning would be required to assess a wide range of implementation details. The County would need to establish billing systems, a customer service organization, and modify its financial systems to accommodate

this new service. The County could elect to assess the potential for reducing property taxes as an offset to the new revenue source.

8.7 Options for Improvement

The County's system of recycling and transfer stations is a unique system that has served the County well for over 30 years. Options for improving that system follow.

8.7.1 Add Curbside Collection

The challenges associated with implementing curbside collection of recyclables (as discussed in the Recycling, Bioconversion, and Markets section) would also apply to collecting garbage. Mandatory curbside collection of garbage for all County residents is impractical because of Hawai'i County's predominantly rural character and the many areas with steep, unimproved roads not suitable for collection vehicles. Further, longer distances between collection stops will occur due to the large number of geographically dispersed small communities in the County. A voluntary subscription service, for which not all residents would sign up, would potentially make the distance between collection stops even longer. For program cost efficiency, it is recommended that this option should include designated zones where curbside service would be mandatory.

For the purpose of developing diversion and cost estimates, a rough analysis of housing units in Census Designated Places was conducted. The result was an estimate of 37,000 households that would be served by the program, which is about 73 percent of the estimated 51,300 occupied single family households in Hawai'i County⁸. Under this assumption, there would be approximately 14,000 single family households for which curbside collection would not be available. Those residents and the approximately 12,000 multi-family households would need to transport recyclables and garbage to recycling and transfer stations.

Estimated Cost. The cost of curbside collection of garbage would depend on many factors including the type of collection vehicles used (manual vs. semi-automated vs. fully automated), the number of rural households included in the program (increased distance between collection stops), and the institutional arrangement (for example, public versus private). Curbside garbage collection is likely to cost between \$20 and \$30 per household per month (excluding the cost of disposal), or \$8.8 million to \$13.3 million per year in total. Combining garbage collection with recyclables and organics would potentially cost between \$40 and \$60 per household per month.

The cost of curbside collection would be offset somewhat by reducing the amount of waste that would be transported from recycling and transfer stations to landfills. In FY 07-08, the County's variable costs of transporting waste from recycling and transfer stations to landfills was approximately \$4 million. It would be reasonable to expect annual transportation cost savings of \$1.5 million to \$2.5 million per year if curbside collection were implemented. The County's full complement of transfer stations would be somewhat less necessary if curbside collection were implemented. However, it should be recognized that

⁸ Based on data from U.S. Census 2006 *Selected Housing Characteristics* (single-family was counted as dwellings with 1-4 units), and 2000-2006 annual growth rate used to project 2008 total occupied housing units (63,347).

the rural residents not easily served by curbside service are dispersed geographically throughout the island and still need convenient locations to dispose of recyclables and garbage. As shown in Option 5 above, closing 10 stations might result in \$700,000 to \$1.5 million per year savings in station operation costs.

8.7.1.1 Collection Sub-options

During the October 20, 2008 SWAC meeting, an in-depth discussion was held about curbside collection for single-family households, and various implementation ideas were put forth. In response, the following suboptions have been developed to further explore possible ways to implement residential curbside collection. While there are many possible methods of implementing collection service, the following suboptions are intended to reflect a number of current opportunities and constraints that exist in Hawai'i County, including:

- The County transfer system provides reasonably convenient service for all households, and there is no County-sponsored curbside service.
- About 10 percent of County households receive service from private companies that compete for customers with little County involvement.
- No companies currently provide curbside recycling for residences (in part because there are very few locations they could take the materials collected).
- Universal curbside collection of garbage for all County residents is impractical because of Hawai'i County's predominantly rural character and the many areas with steep, unimproved roads not suitable for collection vehicles.
- State law may preclude the County from engaging in franchises or contracts with private sector collection firms.

In response, the following suboptions were developed for SWAC consideration. As the options move from a to e, they provide an increasing level of change, potential benefits and costs, and implementation difficulty:

- A. Retain existing system
- B. License all existing collection companies
- C. License existing collection companies and require every-other-week recycling
- D. County offer collection services using County crews
- E. Exclusive franchises for private sector collection

Note that in all of these options, collection service would be optional for residents. A universal collection service would be more efficient than an optional service because it would result in more stops per hour of collection. However, in most areas of the County the total cost for universal collection would probably be quite high when combined with a means of providing service to the many rural residents that are spread out widely throughout the County. To serve these residents, the County would need to retain many of its existing stations (perhaps 10-15 of the existing 21 stations) or provide an additional collection service (such as bins located on main roads where residents could dispose of their waste). It is possible that universal collection could be implemented in Hilo or in select areas on the eastern side of the County at the same time recycling and transfer stations that serve those areas could be closed. This could be evaluated at a later date, but in most areas of the

County, the sum total of universal curbside collection and maintaining recycling and transfer stations for more rural areas is likely to be cost-prohibitive compared to any advantages it might provide.

A. Retain Existing System

In this option, the existing system would be retained. Residents who would like curbside collection would make arrangements with a collection company.

This system would have the advantage of simplicity by just continuing existing practices at no cost to the County: those living in more urbanized areas of the County have the service available to them. Some disadvantages of this option include:

- Many areas of the County are currently unserved because of the difficulty of profitably serving customers outside of more densely populated areas.
- The current collection system is relatively inefficient with both low route densities and the potential for multiple companies collecting from homes on the same street.
- This system is somewhat less compatible with recycling because persons receiving garbage collection still would have to go to a recycling and transfer station to drop off recyclables.
- There is currently no standardization of services and no control over the type and condition of vehicles used by haulers.

B. License all Existing Collection Companies

In this option, the County would pass an ordinance requiring all companies collecting garbage or recyclables from residents to obtain a “material collection license”. The County would place certain conditions for obtaining a license such as: paying a small annual fee, obtaining a “license sticker” to be displayed on each vehicle used for collection purposes, and requiring annual safety inspections of each vehicle.

The County could then assist in the promotion of collection service by licensed haulers by listing haulers name and phone numbers on its website and in promotional material. This may help inform the public about the services available and provide some measure of sanction by the County of those providing the service.

Other than requirements associated with licensure, collection companies would be free to engage in operations as they see fit including where and when to offer service, the method of set-out, and the price of the service.

There would be a small initial cost to prepare the ordinance and develop the licensing program, then a small annual cost to license each vehicle. Part or all of the annual cost of the program could be paid for through licensing fees.

C. License all Existing Collection Companies and Require bi-Weekly Recycling

This option is like Option B., with an additional requirement that licensed haulers also offer a bi-weekly recycling service, and submit documentation about the method of collection for County approval. Materials collected should match the list of materials accepted in the County’s 2-bin recycling system at its recycling and transfer stations.

To implement this option, the County would need to ensure that there are places for haulers to deliver recyclables: at a minimum, facilities would be needed on the west and east sides of the island. This could be accomplished at the South Hilo sort station, at a new facility developed by the County on the east side of the island, and or at a private facility or facilities.

This option would have the advantage of helping to increase recycling. It would, however, increase the cost of curbside service and probably result in some customers discontinuing collection service.

D. County Offer Collection Services using County Crews

In this option, the County would establish a new department of collections, and implement weekly curbside collection of garbage and every-other-week collection of recyclables County-wide. Private sector collection from single-family residents would no longer be allowed. It is assumed that this would be an optional service available in areas of the County that could be reasonably served by a collection vehicle (initial estimates are that this would be about 70 percent of all single family households). The County would need to ensure that processing facilities are available for the west and east sides of the island.

Customers who do not sign up for collection service would continue to use the recycling and transfer stations.

This option would have significant implementation challenges, some of which include:

- Hiring a collection supervisor to oversee the operation, and hire additional staff and procure vehicles, carts, and equipment.
- Hiring consulting expertise with an individual or firm that has expertise in establishing a collection operation.
- Establishing a billing mechanism to charge customers for the service.
- Establishing base yards with basic maintenance services for vehicles and carts in two or three locations on the island.

The County would need to estimate the cost of collection service and then decide if it would be provided at cost or at a subsidized rate. Estimating the cost of serving each household at this time is difficult: it is likely to be somewhere between \$30 and \$50 per month.

E. Exclusive Franchises for Private Sector Collection

In this option, the County would establish 2-4 franchises in which a collection company would have the exclusive right to collect waste and recyclables from residential customers. Currently, it is estimated that there are only about 6,600 customers that currently subscribe to collection service. Considering that a single truck in a somewhat rural system can collect from 200-600 customers each day on a route (depending on route density), the franchises would be small initially. Thus, more than a few territories would be very inefficient to implement.

The service would be optional for residents, but presumably with an exclusive territory, costs would fall compared to today and the number of customers served would probably grow through time. All companies would be required to offer a similar service, ideally using

the same type of cart, with weekly collection of garbage and every-other-week collection of recyclables. The County would need to ensure that processing facilities are available for the west and east sides of the island.

It is uncertain if this could be implemented under current state law. If the County were to implement this option, the County would probably face a legal challenge from the union that serves County workers. Thus, the County would need to test the legality of this approach. It might be able to proceed by engaging in a managed competition process in which the County could also vie for franchises in competition with private collection firms. But the County would need to receive approval from the state to engage in such a process. Thus, there is some legal work to be done prior to determining if this option could be implemented.

Assuming implementing this option is legal, there are many ways that franchises could be awarded. It would be challenging to develop a method of assigning franchises that is perceived as “fair” by all existing collection companies: many (or all) of them are likely to oppose any particular franchise award method. One approach would be to have firms bid a price per month for collection service in each zone (i.e., bids would differ in each zone). The lowest price offered in a zone would be the winning bid. The County could then set a County-wide rate that all residents would pay for collection services (say \$30 or \$40 per month). The County would then pay (or receive a payment from) the collection firm for the difference between the bid price and the County-wide rate paid by residents for service in each franchise territory. The collection firm would bill and collect the County-wide rate from residents who elect to sign up for the service.

The County would need to establish rate review capabilities and establish a process for firms to adjust bid prices as costs change in the future. This would include reviewing the justification for any proposed rate increases. The County would continue to set the actual rate paid by residents. That rate could be set so that the County breaks even or it could subsidize the collection service as it prefers.

In this option, County recycling and transfer stations would remain open for those that prefer to not pay for curbside collection.

The main advantages of this option are providing a way of improving the efficiency of service provision (only one firm passing down a residential street), standardized services County-wide, increased recycling, and flexibility and choice for residents.

Some disadvantages of this approach include: existing collection firms would lose the ability to provide services as they see fit, and significant administration and legal expertise would be required for implementation and to regulate rates. Implementing this approach would require project management and specific expertise. It would probably take the County a year or more to put into place and would probably require hiring a project manager and/or using consultants to provide specific expertise.

The cost of this option would depend on many factors, but would probably range between \$30 and \$50 per month per household.

8.7.2 Change Permits to Allow Commercial Recycling at Recycling and Transfer Stations

The County is currently in the process of changing the operating permits at each station from a convenience center to a transfer station. This change eliminates a 40 cubic yard per day delivery maximum and allows non-residential customers to access the stations. The County anticipates submitting the permit changes to the State Department of Health for approval by the end of 2008.

Once the permits are changed, this option would include allowing non-residential customers to use the recycling services at each recycling and transfer station. Non-residential customers would not be allowed to deliver garbage at the stations.

This policy would provide more convenient recycling opportunities for small businesses throughout the county.

Estimated Cost. Under this option, the amount of added recyclables that would be delivered to recycling and transfer stations is uncertain. If 20 to 40 percent of current recyclables could be added by this option, the result would be approximately 1,100 to 2,200 tons per year. At 2008 prices for transportation and diversion incentive payments, this would cost the County about \$200,000 to \$400,000 annually. The County would also need to spend a small amount for additional signage, education, and promotion of this new policy.

8.7.3 Timely Reconstruction of Stations in Need of Major Repair

As shown in Exhibit 8-4, 13 of the County's 21 recycling and transfer stations have major engineering deficiencies requiring reconstruction, and another six have serious engineering deficiencies that can be addressed while the station is operational. The County has conducted conceptual engineering design for the replacement of the Waiohinu, Pahoa, Glenwood, and Volcano recycling and transfer stations and is currently designing the reconstruction of the Pahoa station which is scheduled to be completed in FY 09-10, most likely followed by Waiohinu. The County is also planning to develop a new recycling and transfer station in South Kona - Ocean View.

Conceptual drawings of the proposed reconstruction of those four facilities are presented in Appendix C. It is recommended that the County commit to a schedule to reconstruct one station per year. At that rate, all of the station reconstructions could be completed within the next 13 years. After that, the deficiencies not requiring reconstruction could be addressed.

Estimated Cost. The County estimates that station reconstructions will cost between \$3 million and \$5 million each. Assuming the County continues its current practice of funding such reconstructions with general obligation bonds, each station would add annual costs of approximately \$250,000 to \$400,000 assuming a 5.5 percent rate of interest and a 20-year term.

8.7.4 Add Full-Time Attendants and Reduce Operating Hours at Recycling and Transfer Stations

The County could increase recycling by having full time attendants at each station. These attendants could encourage customers to separate recyclables and provide information

about different ways residents could reduce the amount of waste going to landfills. The stations are already partially staffed, but adding full-time staff to all stations would be a significant added cost. Thus, in this option it is proposed to reduce the number of hours that stations are open to the public. The County stations are open 12 hours per day in the summer and 11.5 hours per day in the winter (excepting Hilo, which is open 10.5 hours per day throughout the year). All stations are open 7 days per week, 362 days per year. It is common in many rural areas of the United States to have stations that are open just a few days per week and/or fewer hours per day than the County stations.

In this option, operating hours would be reduced (for example 8 a.m. to 5 p.m.) for three to seven days per week depending on the size of the station – with the more heavily used stations open more frequently. One approach would be to have the six stations that accept more than 5,000 tons per year open seven days per week (Kailua, Keauhou, Waimea, Hilo, Kea`au, Pahoa) and have all other stations open only three days per week. The three-day-per-week schedule should be structured so that adjacent stations are open on different days and all stations are open at least one weekend day. For example, the County could have Laupahoehoe open Tuesday, Thursday, and Sunday, and Honomu open Monday, Wednesday, and Saturday. This schedule would reduce the operating hours of County stations by approximately 50 percent.

Estimated Cost. With a 50 percent reduction in operating hours, it is estimated that the County could provide full-time attendants at each station with existing staff, and there would be excess station attendant staff that could perform functions currently done by private security guards. It is estimated that this would allow the County to significantly reduce or eliminate the \$800,000 it spent on private security guards in FY 07-08.

8.7.5 Add Full-Time Attendants, Reduce Operating Hours, and Implement PAYT at Recycling and Transfer Stations

This option is similar to the option discussed above in Chapter 8.6.4 with the addition of implementing a PAYT system at the recycling and transfer stations. As discussed in the source reduction section, PAYT systems provide a powerful incentive to reduce waste and increase reuse and recycling.

While there are many ways this system could be implemented, one approach would be a “bag/tag” system in which regular household garbage would be accepted only in approved pre-purchased bags, and bulky waste that doesn’t fit in a bag would need to be accompanied by an approved pre-purchased tag. The bags and tags would be sold at various retail establishments throughout the county. The County would need to work with local retail establishments to ensure the availability of bags and tags. A key advantage of this system is to eliminate the need to exchange money at stations. Accepting money at stations would add substantial extra costs for security, record keeping, and potentially could result in longer wait times at stations because of the time needed to assess the fee, accept money, and make change.

The County would need to devote considerable upfront resources to educate residents about the reasons for the new program and to explain how the new program works. Further, it is recommended that this type of program be phased in with a 3- to 6-month

grace period during which bags and tags would be collected, but no one would be turned away for not using the appropriate bag or tag.

Illegal dumping is always a concern, although results from around the country have shown that long-term increases in illegal dumping from PAYT programs are rare⁹. The County may need to consider increasing enforcement authority for the Department of Environmental Management or other County agencies to allow them to levy fines against those caught engaging in illegal dumping practices.

Estimated Cost. At startup, a small attendant shed would need to be added to each station. With reduced operating hours at stations, this program should not cost extra money and should result in substantial increased revenues from sales of bags and tags. It is estimated that a charge of \$2 per bag would result in approximately \$11 million in additional revenue less the cost of program administration and purchasing and distributing bags and tags.

8.7.6 Reduce System Costs by Closing Select Stations and Reducing Operating Hours

In this option, the County would close some stations and reduce the operating hours of some stations that remain open. The money saved could be used to increase waste reduction, reuse, and recycling or used to lower the amount of money collected from property taxes for solid waste management purposes.

This option would include closing the following ten stations:

Closed Stations	Closest Remaining Station(s)
Papaikou	Hilo
Honomu	Laupahoehoe, Hilo
Pa`auilo	Honoka`a, Laupahoehoe
Puako	New facilities would be opened at the Pu`uanahulu Landfill site, Waimea
Ke`ei	Keauhou
Waiea	Keauhou, Waiohinu
Miloli`i	Keauhou, Waiohinu
Pahala	Waiohinu
Kalapana	Pahoa
Glenwood	Volcano

This option would require an aggressive public education program that stresses the reasons for closing some stations. As discussed above in the PAYT option, the County would need to educate residents and increase enforcement to prevent illegal dumping. It is likely that some residents would continue trying to drop off waste at closed transfer stations for some time until residents become comfortable with the new arrangement. The County would need to plan for this and increase its budget for enforcement and cleanup crews.

⁹ A good guide to preventing illegal dumping can be found in EPA, 1998. *Illegal Dumping Prevention Guidebook*. Accessed at http://www.epa.gov/reg5rcra/wptdiv/illegal_dumping/downloads/il-dmpng.pdf

Estimated Cost. An analysis of the County operating budget indicates that the variable cost of operating the County transfer stations in FY 07-08 (that is, excluding certain “fixed” costs and the cost of transportation) was about \$2.7 million. With 10 fewer stations, some reduction in operating hours, allowing for the added cost of full-time attendants, and providing some budget for increased enforcement, it is estimated that this option could save \$700,000 to \$1.5 million per year.

8.7.7 Lower Transportation Costs by Compacting Recyclables

In FY 07-08, the County spent about \$720,000 transporting recyclables from recycling and transfer stations to processors. About \$430,000 of that amount was for transporting mixed recyclables, which are transported loose in 40 cubic yard drop boxes. The transportation costs could be lessened by compacting these recyclables prior to transportation from stations. Two possible methods of compaction include:

- Converting one garbage chute to handle recyclables at larger stations with multiple garbage chutes (Kea`au, Pahoa, Hilo, Waimea, Kailua, Keauhou).
- Use compacted drop boxes at stations for mixed recyclables.

8.7.7.1 Converting One Garbage Chute to Accept Recyclables

In this option, one garbage chute at certain stations would be designated for accepting recyclables only (as shown in the adjacent example). Once dropped into the chute, materials would be compacted in the County’s 75-yard compaction trailers, using the same operational methods currently used for garbage.

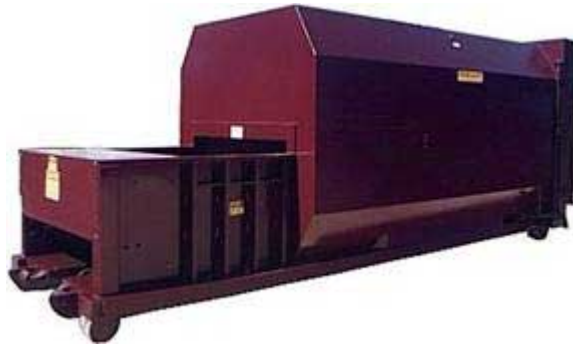


The Kea`au, Pahoa, Waimea, and Keauhou stations each have two chutes for garbage, the Kailua station has three, and the Hilo station has four. Where only two chutes are available, it may be difficult to devote one chute entirely to recyclables; long lines may form during peak conditions for disposal. Signage would need to be changed, public education would be needed, and a full-time attendant would need to be present on-site to ensure that only recyclables went into the chute designated for recycling. This concept might work better at the Kailua or Hilo stations where converting one chute would leave two (Kailua) or three (Hilo) chutes for garbage. Transportation cost savings from compacting at the Hilo recycling and transfer station may be small because currently mixed recyclables are processed in Hilo and the distance transported is small.

In summary, this concept appears to be feasible at the Kailua station, and might be feasible at the Kea`au, Pahoa, and Waimea stations. If the County is interested in this option, it should conduct a pilot program to test its effectiveness.

8.7.7.2 Use Compacted Drop Boxes at Stations for Mixed Recyclables

The County could increase truck payloads and lower transportation costs by installing stationary compactors at each station for recyclables. This system would include a compaction unit and a charging hopper (two cubic yards is a typical size) that residents would place their recyclables into. When the charging hopper is full, an operator would activate the compaction stroke and material would be pushed into an enclosed drop box. For safety, the hydraulic ram should be key- or code-operated so that only trained operators would be able to engage the compaction unit.



Enclosed drop boxes come in many sizes, but a 40-cubic-yard box is recommended to allow containers to stay at stations for longer periods of time before they needed to be hauled. The installation would require pouring a concrete pad to support each compactor, and building a safe and convenient platform around the charging hoppers for customers. County equipment operators (or a station attendant) would have to routinely operate the compaction units to compact recyclables as they currently do for the County's garbage trailers. In FY 07-08, the uncompacted mixed recyclables hauled from recycling and transfer stations averaged about 1.4 tons per 40 cubic yard bin. This type of unit at County stations could probably achieve an average compaction ratio somewhere between 3:1 and 5:1 for mixed recyclables.

Estimated Cost. Converting garbage chutes to accept recyclables would probably require one additional site attendant at each station (to ensure that materials are placed in the proper chute) for an annual cost of about \$100,000. There would be a small initial cost for extra signage, education, and promotion.

Compacting recyclables would cost about \$30,000 for each compaction unit and about \$15,000 for each enclosed 40 cubic yard drop box. If the County were to install one compaction unit at each station and purchase 30 containers, the total initial capital cost would be about \$1.1 million. Adding an additional \$10,000 per station for site improvements would result in a total cost of about \$1.3 million. Amortized at 5.5 percent over 5 years, this would result in an annual cost of about \$300,000. When considering the added annual maintenance cost of about 5 percent of capital (\$55,000), and labor costs for staff, it is uncertain if installation of compactors at all stations would be cost-effective given the current recycling rates at County recycling and transfer stations.

However, it is important to note that many options considered in the plan (such as mandatory recycling, PAYT, allowing non-residential recycling) would increase the quantities of mixed recyclables accepted at stations. The larger the volume of recyclable materials that is transported, the more likely compaction will be cost-effective. Another option to consider is installing the units only at selected stations. The County could adopt a "satellite" system at which compactors would be installed at selected stations that would accept uncompacted recyclables from stations more distant from processors. It would be

appropriate to revisit this option after recycling options for this IRSWMP update are more clearly defined.

8.7.8 New Baseyard and Equipment Maintenance Facilities

The County has identified a need for two new facilities to enhance ongoing operations. The first is new baseyard facilities in Hilo to provide shelter and improved working conditions for solid waste workers.

The second is a new equipment maintenance facility. The County's existing facilities are too small to allow for prompt servicing of trailers and other heavy equipment operated by the Solid Waste Division. This results in a very high percentage of out-of-service equipment and higher equipment leasing costs.

Estimated Cost. The County's current CIP budget includes \$2 million for the new baseyard facilities, and \$9 million for the new equipment maintenance facility.

8.8 Recommendations

On the basis of the analysis presented above and discussions with stakeholders, this plan recommends the improvements discussed below. The Plan update also recommends a new pay-as-you-throw system and additional education and recycling activities at the County's recycling and transfer station. Implementation issues related to these activities are discussed in Sections 3.0, 4.0, and 5.0.

1. **Retain the County's system of recycling and transfer stations.** Currently, there is no government-organized residential waste collection service in Hawai'i County. Thus, an analysis of curbside collection options was presented above in Section 8.7.1 and in Section 4. Based on the outcome of SWAC and DEM staff deliberations about the cost and other advantages and disadvantages of curbside collection, it is recommended that the County maintain its existing system of recycling and transfer stations. To continue operating the stations, which are more than 30 years old, the County will need to complete upgrades to address structural deficiencies and provide expanded services to help support zero waste initiatives.
2. **Reconstruct one or more recycling and transfer stations annually.** The decision discussed above to maintain the County's transfer system will require repair and/or reconstruction of the recycling and transfer stations. After considering other County funding needs, it is recommended that the County fund at least one reconstruction each year, and develop a new South Kona recycling and transfer station at Ocean View. The County should also consider installing compaction units for recyclables at selected stations. This would include consideration of adopting a "satellite" system where compactors would be installed at selected stations, and those stations would accept uncompacted recyclables from nearby stations with no compactor.
3. **Implement full-time staffing and reduced operating hours at recycling and transfer stations, and consider closing one or more stations.** In Sections 3, 4 and 6, a number of proposed new zero waste programs are recommended for implementation at County recycling and transfer systems, including PAYT. It will be imperative that County staff

are present during station operating hours to enforce the PAYT program and to inform users of the various recycling, reuse, organics, and other programs available. As more services are provided, it will become prohibitively expensive to keep stations open 10 to 11 hours per day, 362 days per year. Thus, it is recommended that the County reduce operating hours as needed to keep its overall staffing costs similar to what they are today. The County may want to consider closing select stations if the benefits of increased services in some areas are deemed to be less than the cost of providing that service.

4. **Develop a system to license private collection firms.** As the County invests more into its recycling and transfer system and aggressively pursues zero waste programs, it is recommended that the County develop a simple licensing program for waste collection firms. In this program, all firms that collect garbage from residents or businesses would be required to register vehicles, document that the vehicles meet safety requirements, and pay a nominal licensing fee (to cover the cost of licensing). As discussed in Section 4, an added requirement of the license would be that all licensed firms must offer a recycling service along with its garbage service. This would help ensure that residents and businesses that do not use the recycling and transfer stations stay in compliance with mandatory recycling requirements.
5. **Change permits to allow small commercial businesses to drop off recyclables at County recycling and transfer stations.** The County is already in the process of converting its State permits to allow commercial businesses to recycle at the recycling and transfer stations. This would make it much more convenient for small businesses in rural areas to recycle. To ensure efficient and safe operations, only trucks below a certain size threshold (for example, less than one ton) would be allowed to use the stations.
6. **Conduct an operational efficiency analysis.** It is recommended that the County continue to monitor the cost of its recycling and transfer network including contracting with a third party to conduct an efficiency analysis and identify potential opportunities to lower costs.
7. **Develop a baseyard facility and equipment maintenance facility for transfer vehicles at the South Hilo landfill.** Development of these facilities would help ensure adequate working conditions for County employees and provide infrastructure that would enable the County to proactively maintain its vehicles in a more cost-effective manner.

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