

Basis: Public Laws 25-70 and 28-56.

- E. All collection shall in no way violate any applicable rule or regulation of the Department of Public Health and Social Services (DPHSS).

Basis: DPHSS Regulations, DPW Rules and Regulations, Public Law 24-313, 29 GAR Chapter 2 Article 1.

- F. Collection contracts shall be for five years or less.

Basis: DPW regulations, Public Law 24-313, 29 GAR Section 2109.

CHAPTER SIX: DISPOSAL AND WASTE DIVERSION

Landfilling is currently the only viable and proper option for disposal of solid waste on Guam. Sending our waste off-island for disposal or ocean dumping are not considered viable or acceptable solid waste disposal methods. In contrast, recycling and composting of solid waste are waste diversion methods and should not be confused with ultimate waste disposal. Recycling and composting are two practical options available to Guam that, in suitable combinations, will divert a significant portion of and reduce the waste stream through the recovery of resources. The following briefly describes these options.

“Recycling” is the process by which materials are collected and used as raw materials for new products. There are several steps in recycling: collecting the recyclable components, separating recyclable materials by type (before or after collection), processing them into reusable goods, and purchasing and using the reprocessed materials to complete the recycling process. Recycling prevents potentially useful materials from being landfilled or incinerated, thereby preserving landfill space and conserving natural resources. Additionally, recycling removes some potentially hazardous waste from being improperly disposed or released into the environment.

A “Materials Resource Recovery Facility” (MRRF) is a centralized facility where recyclable waste streams are received in bulk from trucks, recyclables are sorted and separated, and then processed for shipping to available markets.

“Regional Transfer Stations” serve as consolidation stations for packer trucks and haulers of waste streams as well as self-haulers. At these sites, wastes streams are consolidated. The residual waste stream is transferred for disposal to larger transport vehicles to reduce traffic volume for delivery to the landfill. Recyclable materials are transferred to composting, recycling, or household hazardous waste facilities.

“Composting” is a form of recycling whereby organic waste is diverted from disposal and converted through a biological process (an accelerated form of natural decomposition) to useful soil-related products. Guam’s municipal solid waste stream, similar to other industrialized communities, contains a high percentage of recyclable or compostable material as discussed in Chapter 7.

It is essential that solid waste disposal and practical volume reduction methods be considered together as the volume of solid waste that Guam must manage over the next twenty-five to thirty years will demand that significant volume and source reduction be part of the overall solid waste management strategy. Landfilling, in combination with alternative forms of solid waste source and volume reduction methods, must be analyzed in terms of effectiveness, costs, and environmental impacts, with the results compared and measured against the projected capacity of the Layon Landfill and other future landfill sites. Broad options considered include:

- Landfill + Minimal Waste Recycling (2% - 10%)
- Landfill + Moderate to Aggressive Recycling and Composting (15% to 42%)

6.1 Landfill

For many years, Guam has been plagued with the problems associated with the operation, maintenance, and violations of the Ordot Dump. Numerous Notices of Violation/Orders of Compliance (NOV/OC) from Guam EPA and an Administrative Order issued by U.S. EPA were not able to rectify the serious violations at this half-century old dump. Residents in the surrounding area have requested the immediate closure of the dump. Public laws 22-115 and 24-272 mandated its closure. Operational violations such as the lack of leachate management, lack of compaction, lack of daily cover, lack of vector control, and lack of gas control were magnified with occasional underground fires.

The 2000 ISWMP (Guam Legislature, 2000) identified Guatali in the Apra Harbor watershed as the site for the new landfill. However, Public Law 24-06 identifies both Malaa and Guatali as potential sites for the new landfill. The preferred site was the Malaa site. There were numerous problems associated with the location and the contract to build the landfill. Based on experts from U.S. EPA wetland programs, the Guatali site has more “better quality” wetlands than the Malaa site and the mitigation for the wetlands was enormous and costly. The access road must pass through Shell’s property. There was a need to construct at least two bridges across some streams as part of the access road. On top of this problem was the contract with Guam Resource Recovery Partners (GRRP) to operate a waste-to-energy facility for the island. Additionally, the contract also gave the Government the option to have GRRP design and build a landfill for disposal of incinerator residues and waste not processed or reduced by the incinerator. While an ideal integrated solid waste management system would have recycling at the top of the waste reduction hierarchy and have incineration and landfill at the bottom, this contract provided for the opposite. As part of the contract, the Government of Guam must guarantee that waste reduction would be accomplished through waste-to-energy. As a result, the Guam Legislature passed Public Law 25-175 to make it illegal to reduce household waste by incineration and no public funds were to be used for any incineration. However, waste reduction by incineration has proven to be economical and environmentally safe in Hawaii and in many countries and can extend the life of a landfill.

As part of the Consent Decree, Guam is required to site and must design, construct, and operate a landfill that is fully compliant with Guam Solid Waste Disposal Rules and Regulations. As part of the agreement, the landfill must be in operation on September 23, 2007, or earlier. Within the constraints of the Consent Decree and in accordance with the 2000 ISWMP, the Government engaged in a site screening and site selection process. Based on the selection process, an area in Layon, Dandan, Inarajan, was selected for the future landfill site. An environmental impact statement and 40% design for the new landfill have been completed as of August 4, 2005. The following environmental considerations were incorporated in the site selection process:

Water Protection

- Aquifer
- Ground Water
- Flood Plains
- Proximity to Drinking Water
- Surface Hydrology

Wetlands
 Water Quality
Geology
 Bedrock
 Cover Soil Availability
 Fault Areas
 Hydrogeology
 Seismic Impact Zones
 Soils
 Topography
 Unstable Areas
On-Site Environment
 Air Quality and Wind Direction
 Wildlife Resources
 Archeological/Historical Resources
 Biological Resources (Habitat)
 Support Infrastructure
 Threatened and Endangered Species
Transportation
 Access
 Haul Routes
 Proximity to Waste Source
 Traffic Congestion
 Traffic Safety
Land Use
 Aesthetics
 Acreage Available
 Airport Safety
 Buffer Area Availability
 Existing Land Use
 Incompatible Adjacent Land Uses
 Mitigation Issues
 Noise Concerns
 Property Acquisition
 Property Devaluation
 Proximity to Sensitive Receptors
 Utility Availability
 Zoning

The Layon, Inarajan site will be designed, built, and operated in compliance with Guam Solid Waste Disposal Rules and Regulations and will incorporate the following:

- Access road
- Berms
- Liner system
- Leachate collection system
- Stormwater collection and disposal system
- Seismic design appropriate to site conditions
- Monitoring wells
- Security system.

- On-site soil cover source.
- Buffer zone.

More detail on the requirements for the landfill is contained in the performance standards section of this chapter.

6.2 Landfill With Minimal Waste Recycling

This solid waste disposal and waste diversion option addresses the scenario of continuing Guam's current practice consisting of the minimal recycling of two percent of generated waste, then landfilling the remainder as shown in Table 4.4. Although reliable recycling volume figures are not available at this time, the significant increase in recycling permits suggest that more than two percent of the total waste stream (municipal and others) is actually being recycled.

Relying solely on landfilling in combination with token minimal waste diversion will require a projected thirty-year landfill capacity of 14.0 million cubic yards (Chapter 4, Section 4.3.2.1). Based on a landfill and minimal recycling only scenario, the Layon Landfill site will have a capacity of approximately 18.1 million cubic yards based on the total footprint of 134.5 acres and a total site area of 330 acres, which will last for over thirty years. At this time, there are no plans to expand the Layon Landfill; however, significant additional capacity may be realized through efficient landfill operations, waste diversion, and advancements in future cell design technology. Preliminary design efforts suggest that as many as 40-50 years of landfill volume may be achieved without expanding the facility footprint. The final design is due February 6, 2006, and will have more accurate size and volume estimates.

Capital costs to construct the new MSWLF at \$60 per ton are based on initial startup costs for landfill development, equipment, and two landfill cells. Each cell has a capacity of 500,000 tons and a lifespan of three years.

The cost for operating a sanitary landfill is estimated to be \$20 per ton of waste, and must prudently include a sinking fund reserve to finance eventual closure and post-closure site improvements. Tipping fees are normally derived from sanitary landfill operating costs. In any event, landfill development and operating costs will be incurred under any combination of solid waste disposal and volume reduction schemes.

6.3 Landfill with Moderate to Aggressive Recycling and Composting

This scenario addresses the use of recycling and composting to achieve a significant diversion in solid waste volume and assumes the following:

1. The percentage and volume of recyclables and compostable material in the Guam solid waste stream is substantial and will support the use of recycling and composting programs to achieve significant MSW diversion.
2. The objective of achieving significant waste diversion through recycling and composting will require mandatory participation by commercial, institutional, and residential waste generators. Accordingly, for recycling and composting to

be the primary solid waste diversion method, source separation, as follows, is expected to be mandatory:

- Commercial solid waste generators will separate recyclables by category, non-recyclable dry waste, and wet wastes (food and green waste) for composting.
 - Residential solid waste generators will practice “curbside” separation and will separate dry recyclable and non-recyclable waste from wet waste, with the wet waste being suitable for composting.
3. A percentage of the solid waste stream will be diverted through source reduction and private recycling initiatives before waste is processed at the transfer stations.
 4. Based on recent plans by DPW for the construction of the landfill in Layon, there is no proposed MRRF at the site. The waste transfer stations will be used as sorting stations, similar to MRRF’s, as well as sites for the transfer of waste to be landfilled from collection trucks to larger transport vehicles. Tipping fees will be charged as required to fund construction, operation, and maintenance costs of the transfer stations and the landfill, as a profit-making enterprise.
 5. Recyclables from commercial and residential waste generators will be collected by private haulers and will be delivered to either the transfer stations, MRRFs, or to private recycling enterprises.
 6. The overall cost of recycling will be reduced by supporting recycling business enterprises through government-supported incentives such as GEDCA qualifying certificates, provision of land for operations, reduced tariffs, and other financial incentives.

The landfill capacity requirement for thirty years without increased recycling will be about 14 million cubic yards, with the Layon site providing for the ultimate disposal of waste. The life of this landfill will be greatly extended beyond this design period as recycling and composting are implemented island-wide.

Landfilling in tandem with significant solid waste source diversion, household hazardous waste separation and separate disposal, recycling and centralized composting programs create an ecologically ideal MSW waste diversion and disposal reduction strategy for the following reasons:

1. Waste diversion will reduce the amount and toxicity of materials before they enter the waste stream and create benefits in terms of product reuse, reduced material volume, reduced toxicity, increased product lifetime and decreased consumption (See §7.8.5 for further discussion).
2. Growing public support for increased recycling and composting efforts is evident by recent public laws (e.g., PL 25-127, 27-37, and 27-38), which support recycling and composting programs and demonstration projects, and by the increase in number and size of recycling businesses.

3. Diversion of waste through recycling and composting will extend the useful life of the new MSW landfill for more than its thirty-year design.
4. Recycling promotes and supports the recovery of resources and the separation and removal of toxic and hazardous waste from the waste stream.
5. Composting transforms waste into soil conditioning products, which can be used by the community and Government of Guam agencies such as the Departments of Agriculture, Public Works, and Parks and Recreation, or be used to supplement soil cover material at the landfill.
6. Recycling and composting are environmentally friendly and treat solid waste as a renewable resource rather than a problem to be dealt with.
7. A full-fledged recycling industry will have a positive impact on the Guam economy through the creation of jobs and support services, such as trucking, storage, processing, and shipping of recycled products. Based on Guam EPA's research, there are currently 11 recycling facilities on Guam and the industry employs approximately 165 individuals. There are no materials recycling facilities on Guam, but storage and processing facilities collect, store, process, and ship recyclable materials overseas.

The biggest obstacles to establishing a recycling industry on Guam are the quality of recoverable recyclables and costs: cost for source separation, transport, waste processing, and shipping to markets in Asia and/or the U.S. mainland. The quality of recoverable recyclables will be significantly enhanced by mandatory source separation and materials recovery at transfer stations. Public Law 27-74 allows qualified companies engaging in recycling and transshipment of recyclable materials to receive qualifying certificates as per Public Law 25-127. Currently the market for all metals (ferrous and non-ferrous) is one of the highest. During the writing of the 2000 ISWMP, only two companies were actively collecting metallic waste. Now there are 11 private collection sites that are permitted by Guam EPA. The overall cost for desired levels of recycling and composting might not be cost-effective. The planned approach here will be to privatize the collection, processing (through construction and operation of appropriate transfer station facilities), packaging, and shipment of recyclables to available markets that consistently produce the highest financial returns. The recycling process, in effect, will be a pay-as-you-go system. More to the point, the civilian community of Guam will pay for reduction of the solid waste stream by residential collection and transfer station or landfill tipping fees.

6.4 Recommended Disposal, Waste Diversion, and Reduction Approach

In order to arrive at an approach to the problem of proper and cost effective disposal and waste diversion, the combination of components to be considered must be evaluated on the basis of criteria, which are relevant to the attainment of the solid waste management goals and objectives. The evaluation criteria were grouped into five broad categories: (1) legal, (2) economic, (3) environmental, (4) social, and (5) political. Detailed discussions on each broad category, with respect to the recommended approach, are contained in the following sections.

6.4.1 Legal Considerations

Overriding criteria for selection of alternatives for waste diversion, recycling, and disposal are found in the federal and Guam laws and regulations and specifically in the Guam Consent Decree. These include PL 25-175, which prevents waste reduction by incineration. The laws and regulations are subject to change.

6.4.2 Economic Considerations

The policy of privatizing the collection, separation, recycling, and disposal of solid waste, including capitalization and costs of operations and maintenance, allows basic economic evaluations, assessments, and decisions to be made by the private companies involved. Although the Government of Guam will be expected to contribute some economic resources to the implementation of the 2005 ISWMP and will regulate the costs and fees for waste management services, the private companies licensed, contracted, and approved to implement waste management must be allowed to determine costs of doing business while meeting Government requirements. Their competitive bids based on their choices of alternatives will be grounded on economic considerations. Information on the economic factors considered by private bidders for management services can be provided under confidence to the Government during bidding processes. However, there should be no obstacle to independent, competitive, private development and operation of waste management facilities that meet legal requirements. Government requirements may include legal specifications on levels and methods of waste reduction, recycling, and disposal, with related costs being considered in the assessments and proposals by private operators.

6.4.2.1 Landfilling

Landfilling is unique in this analysis because it must occur as an integral part of any integrated solid waste system. The only true form of disposal for municipal solid waste is landfilling. Given that the recommended approach for solid waste management on Guam requires disposal of wastes in a landfill, it follows then that costs for landfilling will be required regardless of the combination of waste diversion selected. As the Government proceeds with development of the Layon Landfill, its development costs will be provided for. Operational cost alternatives will be proposed by the private companies bidding to operate the facility. For this reason, landfilling, and its attendant costs, was removed from the evaluation as an alternative in itself.

6.4.2.2 Landfill With Recycling and Composting (MSWLF/Recycle/Compost)

This recommended combination employs recycling and composting as the major methods of waste diversion, retaining landfilling of residuals and non-recoverable materials as the sole disposal option. Capital costs of land, facilities, equipment, etc., for recycling and for composting, and costs for operations and maintenance, will vary with Government requirements on timing, methods and relative amounts of waste to be recycled and composted and with subsidies and support by the Government.

6.4.3 Environmental Considerations

The evaluation of the recommended approach for waste diversion and disposal was based on following environmental criteria: (1) resource recovery; (2) production of useful material; (3) volume reduction; (4) impacts to air and land resources; (5) impacts to water resources; (6) impacts to living resources; (7) impacts to historical resources; and (8) sustainability.

Note: This evaluation was not a rigorous environmental impact analysis in the form of an assessment or study (i.e., EIA or EIS). An EIA must be project specific. The approach selected is therefore subjected to all applicable statutes, rules, and regulations, both local and federal.

6.4.3.1 Landfill with Recycling and Composting

This recommended combination of waste diversion methods achieves the best performance with respect to resource recovery and production of useful materials. The capture and beneficial reuse of recyclable commodities spans the spectrum of materials comprising Guam's MSW stream. The recovered materials can either be processed and reused (paper, aluminum) or converted into some other useful form (crushed glass aggregate, compost).

Recycling and composting operations will have minimal impacts to air, land, and water resources. Recycling involves limited processing, the majority of which is packaging-related and generates no emissions. Composting has the potential to generate noxious odors if not properly performed.

6.4.3.2 Landfill with Recycling, Volume Reduction, Incineration, and Composting

As a means of volume reduction, landfill with recycling and composting performs well, significantly extending landfill capacity. They do not achieve the best level of volume reduction as that afforded by incineration. However, incineration is eliminated from consideration on Guam by Public Law 25-175. Other technologies for waste reduction, which are established in the United States, are available and are being implemented on Guam. For example, in 2005 grinding and shredding methods were under development for reduction of tires, glass, green waste, and construction waste. The market for these volume-reducing technologies is expected to grow rapidly over the next five years. Maeda Pacific has been grinding concrete waste prior to hardfilling. These and other reduction methods are expected to become practical and economical for use on Guam.

6.4.4 Social Considerations

6.4.4.1 Landfill with Recycling and Composting

In light of the tremendous controversy and public debate surrounding the Waste to Energy (WTE) facility, which was eliminated by the Guam Legislature as an alternative from the 2000 ISWMP, increasing public acceptance of the recycling and composting alternative will likely be met with greater enthusiasm. In addition, the attention placed on the Ordod Dump has primed the general population for the impending waste

diversion programs in which they will be asked to participate. However, the success of this alternative is dependent on a strong economic market for the practice. This cannot be discounted amidst the exuberance of a population which has indeed adjusted to a "recycling" mindset. If implemented, the requirement to recycle and pay attention to the disposal of MSW will result in an increased awareness of solid waste management issues.

6.4.5 Political Considerations

Political constraints bear on solid waste management facilities through political posturing, both within and between parties, regarding the proposed solutions to a variety of issues. There exists an atmosphere of general reservation between the executive and legislative branches that renders immediate, critical suspicion about any initiative for facility improvement. This often deeply contested process of checks and balances rarely yields better answers as a result of bona fide debate and critique; rather, the proposals often become so emasculated by opponents that, in the end, they fail to adequately address the very problems intended to be solved. Fortunately, the nature of these particular political constraints are subject to change without notice, and the possibility for forging successful alliances always exists. The impositions of the Consent Decree have somewhat diminished the impacts of political considerations. In any case, the political arena, from which policy and implementation strategies emanate, must be taken into account. The following analysis is done given the current political climate.

6.4.5.1 Landfill with Recycling and Composting

The implementation of this combination will achieve the best performance with respect to the satisfaction of legislative mandates for solid waste management. Any initiatives to implement this alternative should continue to be met with legislative support necessary to carry out the mandate of law. Such support makes this combination the easiest to implement.

6.5 Performance Standards

6.5.1 Ordot Dump

The Ordot Dump Closure consists of four major tasks that are identified in the Ordot Dump Permit for Conditional Use. These major tasks are as follows: (1) interim operations until closure, (2) dump closure design, (3) dump closure construction, and (4) post-closure remediation, maintenance, and monitoring. Each major task includes numerous subtasks that are detailed in the permit's compliance schedule.

Guam must undertake a new solid waste composition study (SWCS) to characterize the types and quantity of municipal solid waste generated to guide future landfill facility and recycling program design. At a minimum, a SWCS must be completed at least one year before this plan is updated in 2010, but more importantly, a SWCS should be completed over the next 2 years to guide recycling efforts and the design of future waste cells at the Layon Landfill. It is recommended that Guam EPA take the initiative to produce this study.

The functional and operational criteria for the Ordot Dump are incorporated into Guam EPA permit no. 05-060-LFL (December 2005). The legal and regulatory criteria, including the Consent Decree requirement, are also applicable to the Ordot Dump. The Consent Decree requires that the Dump cease to receive waste on the day the landfill opens or September 23, 2007, whichever is earlier.

6.5.2 Guam Municipal Solid Waste Landfill Facility

The Guam Municipal Solid Waste Landfill Facility (MSWLF) will be located in Layon, Inarajan. Modern municipal solid waste sanitary landfills are designed to protect the environment from the hazards associated with deposited waste. Primary consideration is given to the protection of subsurface resources (soil and groundwater), as well as vector control. The protection against subsurface contamination is accomplished through the use of engineering and operational controls. Vector control is accomplished through operation procedures designed to ensure adequate daily cover of filled material. The execution of design and construction efforts will be subject to the following performance criteria.

6.5.2.1 Functional Standards

- A. The Layon facility is sized to receive thirty to fifty years of municipal solid waste.

Basis: The ISWMP and the Landfill Final Site Selection Report.

- B. DPW must ensure a smooth transition for all billing and collection operations from the Ordot Dump to the Layon facility.

Basis: ISWMP

- C. Design of the Layon facility should incorporate data collection systems recommended as part of this ISWMP.

Basis: ISWMP. The regular and consistent collection of data should be performed at all solid waste management facilities that receive and dispose, recycle, compost or otherwise handle solid waste. Such data can be used to verify or confirm estimated throughput, plan for future expansion or improvements, and as a management tool for streamlining operations.

6.5.2.2 Operational Standards

- A. The Layon facility should be open for operation daily.

Basis: ISWMP

- B. The Layon facility and all MSWLFs shall accept municipal solid waste from all on-island sources.

Basis: ISWMP. The MSWLF is sized for civilian, tourist, and military waste assuming minimal source reduction of 2%, an inflated (20% greater than

the national average) waste generation rate of 5.28 pounds per capita per day (pcd), and a lifespan of at least thirty years, yielding a total capacity of 14,091,081 cubic yards, or greater. Source: DPW designs, plans, specifications, and estimates (Dec. 19, 2005).

- C. Operation of the Layon MSWLF must achieve a minimum compacted landfill density of 1,100 to 1,200 pounds per cubic yard.

Basis: The Layon facility is sized based on a compaction rate of 1,100 to 1,200 pounds per cubic yard for a 30-year lifespan.

6.5.2.3 Legal and Regulatory Standards

- A. All MSWLFs must meet siting and location requirements in terms of location, which address airports, wetlands, floodplains, seismic impact zones, fault zones, and unstable areas.

Basis: 22 GAR Article 2, Section 23201-07.

- B. All MSWLFs must be designed and constructed to ensure that contaminant levels in the uppermost aquifer at the relevant point of compliance are below those values listed in Table 1 of that section of the regulation, where the relevant point of compliance is defined as some point within one hundred fifty meters of the waste management unit boundary on land owned by the owner or operator.

Basis: 22 GAR Chapter 23, Article 4, Sections 23401 and 23403.

- C. As an option to Item B above, the MSWLF may be constructed with a composite liner, consisting of a flexible membrane liner (FML) and an underlying compacted soil layer with hydraulic conductivity of no more than 1×10^{-7} cm/sec.

Basis: 22 GAR Section 23401

- D. MSWLF units must be designed and constructed with an approved groundwater monitoring system.

Basis: 22 GAR Chapter 23, Article 5.

- E. All MSWLFs must be designed, constructed, and maintained with stormwater (run-on/run-off) control systems for discharge from a twenty-five year storm.

Basis: 22 GAR, Section 23309.

- F. Operation of all MSWLF units must include provisions for excluding the receipt of hazardous waste, cover material, disease vector control, explosive gas control, air criteria, access requirements, preventing impacts to surface water, restricting receipt of liquids, and record-keeping.

Basis: RCRA Subtitle D - 258.20.

- G. Operation of MSWLF units must include groundwater monitoring that addresses detection monitoring, assessment monitoring, and corrective action.
Basis: 22 GAR Chapter 23, Article 5.
- H. Landfill facilities and operations shall be privatized in accordance with the laws of Guam.
Basis: Public Laws 24-06 and 24-272.
- I. DPW to administer, supervise, and fulfill the responsibility of Government of Guam in any contract for the development and operation of new landfill.
Basis: Public Laws 24-06 and 24-272.
- J. Guam EPA to issue permits for the design, operation, maintenance, and modification of all solid waste management facilities.
Basis: 10 GCA, Chapter 51, Sections 51103 and 51104.
- K. Request for Proposals for new landfill facility to be finalized through the bidding process under Guam procurement law.
Basis: Public Law 24-06.

CHAPTER SEVEN: RECYCLING, COMPOSTING, AND SPECIAL WASTE

This Chapter focuses on the activities of recycling, composting, and proper disposal of special waste; it also focuses on the special considerations of waste reduction opportunities and curtailing of illegal dumping, all of which are components of integrated solid waste management. In general, waste separation and diversion allows for the activities of recycling, composting, and proper disposal of special waste. These activities lead to waste reduction prior to landfilling. Waste separation is the separation of recyclable, compostable, and special waste materials and occurs either at the source, or point, of waste generation, or at transfer stations and materials recovery facilities or at the final disposal site. Recyclable materials are then sent to processing facilities. Likewise, compostable materials are then sent to composting facilities. Special wastes such as white goods, household hazardous waste, automotive batteries, and abandoned vehicles are handled differently from recycling of other municipal solid waste. Other considerations include other waste reduction opportunities and addressing illegal dumping.

7.1 Recycling

Public Laws 24-304, 24-272, and 21-22 require the reduction of Guam's solid waste stream through various means. Recycling is the most effective and environmentally acceptable means of reducing the municipal solid waste stream. Based on a recent study, the average national recycling rate was thirty percent (U.S. EPA 2005). Guam's recycling rate is estimated to be between two and six percent.

7.1.1 Guam's Recycling Facts and Figures

Recycling practices on Guam provide for the recovery of paper and paperboard, non-ferrous metals (post-consumer aluminum, scrap copper, brass, lead), ferrous metals (vehicles and other ferrous metallic waste), waste tires, and waste oil from the municipal and non-municipal solid waste stream. The recycling efforts appear to have increased and improved since the 2000 ISWMP.

The atmosphere is right for doing recycling on Guam now. The Asian market for both metal and waste paper is bright. Thousands of junk cars have been removed and shipped to recyclers since the 2000 ISWMP. The Guam Public School System (GPSS) is creating environmental clubs to collect aluminum cans. Ambros, Inc., of Guam, in conjunction with other local businesses and in coordination with Guam EPA, is currently sponsoring a project to place aluminum recycling bins in most of the public schools, some private schools, and ultimately in all the schools on Guam. There is an increase in the recycling of paper, paperboard, nonferrous metals and ferrous metals. Based on data obtained from the companies that receive recyclable materials (see Table 7.1), both the type of recycling activities and the amount of recyclables processed and diverted from the Ordot Dump increased from 2000 to 2005.

Table 7.1 Solid Waste Recycling from Recycling Facilities

Waste Item	1999	2000	2001	2002	2003	2004	2005
C&D (yd ³)	24,577	54,169	52,968	64,846	374,485	301,061	231,222
Cardboard (tons)	600	600	960	1569	1230	1911	1615
Newsprint (lbs)							145,700
Loose Paper (lbs)							232,542
Automobiles (tons)				10	4,035	4,061	4,081
Automobiles (units)					6,025	6,127	6,335
Heavy Equipment					2,000	2,100	2,200
Scrap metals (tons)				240	2,000	2,673	7,042
White Goods (tons)					2,003	2,070	2,016
Alum. Cans (tons)					37	14	200
Other Alum (tons)					108	55	97
Copper (tons)					15	15	97
Brass (tons)					15	15	55
Automobile Batteries (units)					1016	13,904	5348

However, there is a need to increase recycling activities to address plastics, green waste, and other recyclable materials. In addition, one must anticipate the rising and falling or the buying and selling power of recyclable materials, thereby requiring the need to support recycling activities of these unmarketable materials at such times. This could be accomplished through additional funding support from importers, businesses, consumers, governments, and grants.

7.1.2 Recycling Efforts within the Community

Behavioral change by residents, businesses, and government is one aspect of improving recycling on Guam. Through public outreach programs and incentives, as well as providing the convenience of recycling, the community of Guam must share its responsibility to recycle.

Residential recycling is currently voluntary. Residential recycling includes non-ferrous metals, scrap metals (including automobiles) and white goods, cardboard, and some newsprint. One of the driving forces for most residents to recycle is the "selling power" of recyclable materials. In the past, in order to recycle or dispose of bulky waste, one had to pay for the proper disposal, such as with metallic waste. Currently, some recycling companies are offering to pay consumers a small fee for bringing in certain types of recyclable materials to their recycling facilities, such as car batteries, computers, and ferrous metals. However, illegal dumping still exists due to the inconvenience of transporting these types of waste to recycling facilities.

Commercial recycling is also currently voluntary. Many businesses recycle cardboard, newsprint, and loose paper. The major reason for the limited recycling effort by the business sector is the need to generate sufficient quantities of recyclable materials to be cost effective. In addition, there is the need to provide convenient locations and facilities for recycling of other materials.

Guam EPA commenced a pilot project in late 2005 for the purpose of implementing various recycling and waste reduction laws within Government of Guam agencies. The

program will be expanded in early 2006 to include all Government of Guam departments and agencies. Public Law 24-304 requires all Government of Guam agencies to recycle aluminum cans and paper and to assign a recycling officer within each agency. Previously, two laws were passed which also require Government of Guam agencies to recycle. Public Law 21-22 requires GSA to purchase biodegradable materials, and Public Law 21-73, known as the Government of Guam Aluminum Container Recycling Act, also requires the Government of Guam to recycle aluminum cans at all offices. Under these mandates, Governor Felix Camacho signed Executive Order 2003-17 (EO 2003-17) on May 13, 2003, for all Government of Guam agencies to implement the following:

1. Source Reduction
2. Pre-Sorting of Waste
3. Designation of a Recycling Compliance Officer (RCO) and alternate.

Each agency or department is required to designate an RCO and alternate whose charge is to educate and oversee implementation of recycling at their respective agency or department.

Guam EPA oversees the implementation of EO 2003-17, and has organized the Recycling Compliance Officer (RCO) group to implement it.

The Government of Guam can set the tone for the rest of the island by taking the lead in implementing recycling programs government-wide and can thus play a significant role in extending the lifespan of the Layon Landfill beyond the 30-year expected usage.

Guam has several groups that have been very active in promoting recycling and waste diversion within the community. There is the Recycling Association of Guam, the Friends United Through The Understanding of Recycling Efforts (FUTURE) Committee, and other groups referenced in Chapter 8 of this Plan update.

7.1.3 Future Recycling Efforts

To ensure that the life of the Layon Landfill is extended, recycling efforts on Guam must increase. Current activities such as public outreach, public support, and public programs must be encouraged to educate the community of Guam regarding the benefits of recycling. These activities may also create new jobs and minimize illegal dumping.

In addition, importers, consumers, businesses, and local and federal government must all do their part in supporting, participating in, and implementing recycling events and activities on Guam. In addition, the cost of recycling will also have to be shared by everyone in the community.

If voluntary recycling is not supported, then laws must be passed to require mandatory recycling. This will also help to ensure that recycling becomes a stable industry, which is critical to the continued implementation of the 2005 ISWMP.

The following laws are Guam's attempts to support recycling activities on Guam:

Public Law 27-37 - An Act to Create a Municipal Recycling Program. All fees collected from recycling activities from the Municipal Recycling Program within each village will be deposited into the respective Municipal Recycling Proceeds Fund. Currently, this law has not been implemented due to lack of funds and lack of trained employees at DPW.

Public Law 27-38, as amended by PL 27-148 and PL 28-05, entitled An Act to Create a Recycling Revolving Fund (also known as the Advance Disposal Fee Law) creates a Recycling Revolving Fund and imposes recycling fees at the point of sale on imported automobiles, buses, trucks, heavy equipment, white goods, and tires where applicable under the Use Tax laws. This law has not been implemented due to administrative difficulties and proposed alternatives.

Bill 232, introduced November 7, 2005, proposes to establish a Recycling Fund under Guam EPA administration, which will receive \$25 annually for each motor vehicle registered on Guam. The funds would be administered by Guam EPA for grants and contracts. The contracted work to assist in recycling would be administered by the DPW or the Solid Waste Authority.

7.1.4 Performance Standards

Recycling is integral to long-term effective reduction of waste disposal at the landfill. Recycling will be affected by such factors as social policy, market demand, commodity supply, operational costs (labor, shipping and transport, collection) and tax incentives. In addition, recycling facilities and operations should be able to accomplish the stated objectives subject to applicable local and Federal laws.

7.1.4.1 Functional Standards

- A. Recycling must reduce the MSW stream by a minimum of twenty percent (20%) by the Year 2010. (See Chapter 3)

Basis: PL 24-304 and this ISWMP.

- B. Recycling should incorporate the design and development of a Materials Resource Recovery Facility (MRRF) or similar facilities that can achieve the necessary recovery rates.

Basis: MRRFs are an integral part of the volume reduction and disposal method recommended as part of the ISWM system. The recommended collection and transport method and the integrated approach to solid waste management require the implementation of materials resource recovery.

- C. Recycling operations and facilities should allow for the convenient collection and/or drop-off of recyclable commodities in order to encourage and promote widespread participation.

Basis: By designing the collection of recyclable commodities to be convenient and easy, it encourages the recycling approach to waste reduction. The drop-off of recyclables at the transfer stations and/or other designated

locations provides options for those who may not have access to curbside collection services.

- D. Recycling collection and drop-off facilities should be provided, at a minimum, at transfer stations and village community centers (or mayor's offices).

Basis: This defines the minimum locations essential to obtain the objective of Item B above. While the transfer stations provide convenience to those who may not have access to curbside collection services, they also promote public awareness and encourage a shift in disposal practices within each village community. Public Law 27-37, Municipal Recycling Law.

- E. Design of recycling operations and facilities such as MRRFs shall be coordinated with data collection system activities to ensure that an adequate database exists for design purposes.

Basis: Data collection activities shall include the identification of recyclable commodities (wet and dry), their quantities and collection and recycling methods.

- F. The MRRFs and recycling operations shall include provisions for the regular or periodic recovery of the following materials:

- Paper and paperboard,
- Non-ferrous metals: aluminum, brass, copper, lead,
- Ferrous metals,
- White goods,
- Batteries (lead-acid, nickel-cadmium),
- Plastics,
- Glass,
- Rubber and tires,
- Used motor oil.

Basis: Through the attainment of Item E, the collection frequency and recovery of the above items can be determined based on data collected.

- G. Recycling operations should include incentives, such as qualifying certificates and waivers of transshipment fees for recycling based industries. Restrictions calling for export of recycled products to obtain incentives should be revised to encourage end use of recycled products on Guam.

Basis: PL 25-127 and 27-74. To encourage recycling, incentive programs should be initiated. Examples would include tax incentives for distributors who purchase recyclable plastics and glass containers; monetary incentives for individuals who transport recyclable commodities directly to any of the collection and/or drop-off facilities.

- H. Community, business, consumer, NGO and governmental subsidy and financial support of various recycling operations at certain times when the marketing of certain recyclable materials does not exist, or is not profitable.

Basis: To encourage, support, and maintain recycling companies to continue operations and provide services to the community.

7.1.4.2 Operational Standards

- A. The MRRFs shall have a minimum operational capacity of 20% of the MSW stream and shall be expandable to accommodate the requirements of this plan and all future updates.

Basis: 2005 ISWMP.

- B. The location determined for the MRRF sites and transfer stations must undergo a comprehensive study to ensure maximum usage and participation.

Basis: 2005 ISWMP.

- C. The MRRF facilities must be designed to accommodate drop-offs from self-haulers and commercial haulers.

Basis: 2005 ISWMP.

- D. The MRRF facilities must be designed to accept all types of recyclable materials for processing and marketing.

Basis: 2005 ISWMP.

- E. The MRRF facilities must be designed to obtain data on the volume and weight of each type of recyclable material received, processed, and transported to on-island or off-island recycling companies.

Basis: 2005 ISWMP.

- F. Recycling facility operator(s) must coordinate with Office of Recycling and Guam EPA in the promulgation and execution of a public education strategy.

Basis: Success of the public education strategy will be enhanced by the participation of actual recycling operators with valuable knowledge to pass along to target audiences.

- G. Recycling facilities shall be open for the convenience of public access.

Basis: Promotes recycling, and the operating permit requires it.

7.1.4.3 Legal/Regulatory Criteria

- A. Operation of recycling facilities must not violate applicable air, water quality, and other environmental standards or regulations, as well as safety, transport, and zoning laws.

Basis: All facilities must comply with federal and local laws and regulations.

- B. Guam EPA to issue permits for the design, operation, maintenance, and modification of all solid waste management facilities, including recycling.

Basis: 10 GCA Sections 51103 and 51104.

- C. Solid Waste Management Division of DPW to administer contract for selected recycling facilities and operations.

Basis: 10 GCA Chapter 51, Article III-IV, and other recycling laws.

- D. Guam EPA and the Solid Waste Management Division shall establish and manage a promotional program for recycling on Guam.

Basis: Public Laws 24-272 and 24-304.

- E. Department of Administration General Services Agency and other Government of Guam entities shall amend their procurement regulations and contracts to use recycled and biodegradable products. Guam EPA shall monitor and enforce purchase of biodegradable, reusable, recyclable, or recycled products by the Department of Administration General Services Agency and other Government of Guam entities.

Basis: Public Laws 21-22 and 24-304.

- F. The Department of Public Works and other Government of Guam entities shall require paving projects to use crushed glass.

Basis: 5 GCA.

- G. All Government of Guam departments, agencies, and instrumentalities shall make every effort to reduce solid waste by recycling and buying recyclable and biodegradable products.

Basis: Public Law 24-304.

- H. Each director, manager, or agency head shall insure regular collection of recyclable materials and maintain records and forward recorded data to Guam EPA, which shall post the data each year.

Basis: Public Law 24-304.

7.2 Composting

Composting is an integral part of the volume reduction strategy. Composting is the biological decomposition of the biodegradable organic fraction of MSW under controlled conditions to a state sufficiently stable for nuisance-free storage and handling and for safe use in land applications. It differs from the natural decay of materials that takes place in landfills because it occurs under controlled aerobic conditions. Composting is an accelerated version of the natural decay process, which can include many types of waste in addition to yard waste, clippings, etc. Under certain conditions (i.e., optimal levels of oxygen, nutrients, moisture and temperature, along with small particle size), composting, and the consequent creation of humus, can be accomplished in a minimum of four to six weeks. Humus is the crumbly, pleasant smelling, soil-like final product of the composting process, which can be incorporated into vegetable and flower gardens or added as a soil amendment to lawns or other areas of land to improve soil quality and prevent erosion.

Some of the benefits of composting are:

- Keeps organic wastes out of landfills,
- Provides nutrients to the soil,
- Increases beneficial soil organisms (macro-organisms such as earthworms and centipedes, and micro-organisms such as bacteria, fungi and actinomycetes),
- Suppresses certain plant diseases,
- Reduces the need for fertilizers and pesticides,
- Protects soils from erosion,
- Assists pollution remediation.

Factors to consider in choosing a composting method are speed, labor, and costs. There are four general methods of composting: passive, aerated piles, windrows, and in-vessel. The first two methods are mainly used for home or small-scale operations. Windrows and in-vessel composting are utilized in farm scale or industrial sized operations.

Passive composting is the simplest, lowest cost method, and it requires little or no management. The materials are simply stacked into piles and left to decompose over a long period of time. This method can produce objectionable odors due to anaerobic conditions and is not suitable for large quantities.

Aerated piles are a more productive form of passive composting. Perforated pipes are placed within the pile, which supply the pile with oxygen and thus promote a faster rate of decomposition. Mixing the material well also speeds up the process. Blowers and chippers may be used to provide more efficient composting. Blowers force oxygen through the piles while chippers grind the materials to produce smaller particle size and provide for easier mixing. This method produces compost faster with minimal labor and costs. Costs are increased when blowers and chippers are used.

Windrow composting involves long narrow piles, called windrows, which can vary in height and width depending on the materials and equipment available for turning. Windrows are turned or incorporate forced aeration for efficient composting. This method allows large quantities of waste to be composted. Windrows can range from

three feet high for dense materials, to as high as twelve feet for lighter, more porous materials like leaves. The process starts as the materials are mixed together, with the yard waste and paper waste having been processed through a chipper and shredder, respectively. Water is added to aid in decomposition and then the waste is formed into windrows. Windrows are turned periodically to add oxygen, mix the materials, release excess heat, and expose all materials to the high interior heat that kills pathogens. When using forced aeration, materials must initially be mixed well for windrows because they are not regularly turned. When turning windrows to provide oxygenation, it may be necessary to turn daily or even several times a day to maintain sufficient oxygen levels. If objectionable odors develop, that is a signal that turning is required to provide increased aeration and reduce moisture content. Turning can be labor intensive depending on the equipment being used. Turning equipment can include front-end loaders, an old plow and a farm tractor, or specialty machines such as windrow turners. In addition to requiring turning equipment and a large area for the windrows, the operation will also need a source of water, dial thermometers and an oxygen meter. The instruments are placed in the windrow for monitoring temperature and oxygen content and are removed for turning.

With frequent monitoring and essential turning, composting time can vary from weeks to a couple months depending on the material being composted. Once completed, the compost should be stored in large bins for further curing, screened, and either given away or sold. Larger particles that were screened are returned to the windrows. This method allows for large quantities to be composted in a relatively short period of time and produces a high quality product. However, this method requires a large land area, is labor intensive, and costs for equipment can be high.

With in-vessel composting, the materials are composted within a container such as a tank or reactor. This method provides for total control and optimization of aeration, temperature and mixing. In-vessel composting eliminates weather problems and the dissemination of odors; therefore, operators are able to process compost in highly populated areas. Types of in-vessel composting are reactors in which the air goes in at the bottom and the exhaust is captured for odor control at the top, agitated bed systems, and rotating drums.

7.2.1 Yard Waste Composting Efforts within the Community

Guam residents are beginning to realize the benefits of recycling their leaves and yard waste; not only are these materials taken out of the waste stream, but they are recycled into beneficial products such as compost or mulch that can return nutrients to the soil or be used in residential landscaping projects. However, the residents of Guam are not fully implementing backyard composting, which can be beneficial for their personal use, and can minimize waste generation from their homes.

While we are anticipating industrial type composting, we can continue with wood chipping and grinding programs for residential, landscaping, and agricultural activities. This proved to be very effective following Super typhoon Pongsona and Typhoon Chata'an, and other previous typhoons. Composting of green waste after typhoons has been successful. Residents, businesses, and government agencies have utilized the compost materials for agricultural and landscaping purposes. A ban on all green waste except those in trash bags will greatly reduce the amount of waste going to the landfill..

nearly forty percent of the waste disposed of at the Ordot Dump is green waste. Guam EPA has required the Department of Public Works to implement a waste diversion program for green waste by July 2006 as part of the Solid Waste Disposal Facility - Ordot Dump Permit.

Although there are no permitted composting facilities on Guam, the University of Guam (UOG) College of Natural and Applied Sciences, under the direction of Soil Scientist Dr. Mohammad Golabi, has been conducting research for the improvement of soil fertility using composted animal waste and green waste as part of the test variables. The Guam Legislature granted \$50,000 to UOG for the purchase of a windrow turner in furtherance of this research. The windrow turner will be used to accelerate the composting process. This research could provide the basis for island-wide composting, which could ultimately divert up to 50-60% of the waste stream from entering our landfill.

7.2.2 Future Composting Efforts

Composting must be emphasized and encouraged at the residential and community level, since these are the major sources of yard waste. In addition, backyard composting can also handle other organic and food waste generated by residents. The village mayors and other village businesses should be able to support and participate in community composting efforts.

Composting by landscapers, grounds maintenance companies, nurseries, as well as farmers should also be encouraged and supported. Support of such activity can be accomplished either through established regional composting facilities or self-composting activities by these companies.

Composting may also take place at the new Layon Landfill site or at local transfer stations. The method of composting that seems most suitable for application at these sites appears to be either windrow or in-vessel composting. Selection of the appropriate method will require a detailed analysis of the conditions at these sites and the available space. Such analysis should be conducted prior to final negotiations with a private contractor or during the design phase. More detailed information regarding specific performance requirements is included at the end of this chapter.

7.2.3 Performance Standards – Composting Operations

7.2.3.1 Functional Standards

- A. A minimum of 5% of the green waste stream must be composted by July 1, 2007, and a minimum of 15% must be composted by July 1, 2010.

Basis: 2005 ISWMP

- B. Design of composting operations and facilities shall be coordinated with data collection system activities as support for design purposes.

Basis: Data collected can confirm or verify the estimated throughput for a given period, the moisture content of the waste stream to be processed, and can

be used to determine the most appropriate composting method for the site.

- C. Composting operations shall provide and encourage the use of their product in home gardening and farming to promote reuse of organic waste in the community.

Basis: Encouraging the use of finished compost material by consumers creates demand for the finished material and contributes to the continued success of the program.

- D. Composting facilities shall include contingency provisions for the effects and after-effects of typhoons and earthquakes, which occur frequently on Guam.

Basis: Green waste, such as yard landscaping debris and roadway maintenance debris, is generated at elevated quantities immediately after typhoons and earthquakes. Composting facilities should be designed and operated to manage these peaks in volume.

7.2.3.2 Operational Standards

- A. The composting facilities shall accept green waste from all on-island sources.

Basis: To accommodate 15% of the island-wide green waste stream.

- B. Operation of composting facilities must not violate applicable air and water quality standards or regulations.

Basis: All facilities must comply with federal and local laws and regulations.

7.2.3.3 Legal and Regulatory Standards

- A. Composting, in combination with recycling, must account for a minimum 20% reduction in volume of MSW on Guam.

Basis: 2005 ISWMP

- B. The composting facilities must meet siting requirements in terms of location, with respect to flood plains and wetlands, etc.

Basis: Local and federal land use and wetland laws and ISWMP. Composting facilities and landfills share functional concerns, such as odor and vector control.

- C. Composting rules and regulations shall be in place prior to the development of the facility.

Basis: In order to effectively manage the design, construction, permitting and operation of the facilities, there will need to be, at the very least, interim

operating rules and regulations against which to evaluate performance of the system.

7.3 Special Waste

7.3.1 White Goods

“White goods” are defined as household appliances such as washers, dryers, refrigerators, air conditioners, etc. Although the disposal of white goods has been historically problematic, currently Asian markets for metallic wastes have made it more convenient and profitable for customers to recycle their white goods. The biggest problem with the redemption of white goods is the requirement to have freon in the units removed prior to delivery to the metal processing facilities. In the past years local processing companies have charged \$25 for each unit. A pick-up truck full could cost nearly \$200. Currently, in 2005, companies are buying air conditioners at nine cents a pound. A unit now has a value of about \$6. Two metal recycling companies are now buying both ferrous and non-ferrous metal. The general public should take advantage of the current market situation in Asia. Guam EPA has recently updated its Guam Recycling Guide, which identifies recycling companies and what recyclables they accept from the public.

In 2003, Public Law 27-38 and its amendments (PL 27-148 and PL 28-07) were passed to establish a recycling revolving fund to provide for proper disposal of white goods and other recyclable materials. In addition, this law required Guam EPA to establish regulations for the administration of the fund, for collection of recycling fees by the Guam Customs and Quarantine Agency, for creation of standards for recycling centers and recycling facilities, and at the same time provide for refunds for the recycling of recyclable materials to consumers. Guam EPA did create and submit regulations based on this law; however, due to concerns regarding the increased administrative responsibilities placed on those affected, the regulations were disapproved and new revisions to the law have been proposed in bill form by the Guam Legislature.

Proper disposal of white goods by residents has been inconsistent, just like the disposal of any recyclable material. The availability and convenience of disposal sites for white goods have always been a challenge. This leads to the illegal dumping of white goods, which are visible around our island. Unless curbside collection of white goods and other bulky materials is in place, illegal dumping will still occur.

Therefore, as required by Article 3 of 10 GCA Chapter 51, the Department of Public Works must also include the collection of white goods as part of its collection of abandoned vehicles.

7.3.2 Household Hazardous Waste and Automotive Batteries

Household hazardous waste, to include automotive batteries, is special waste generated by individual homes. This waste is excluded from sanitary landfills. Improper storage and disposal of household hazardous waste (HHW) is associated with accidental poisonings, worker health and safety, equipment damage, and environmental contamination of surface and groundwater. Heavy metals such as lead, zinc, copper, nickel, mercury and cadmium enter the waste stream via residential sewage and urban

run-off. Because of its impact to the island's surface and groundwater, diversion of household hazardous waste must be implemented. Since the implementation of *Hasso Guam!* in 1993, Guam EPA has provided to the community a proper method for household hazardous waste disposal. Through this program of education and outreach, community awareness and participation has increased dramatically over the years.

The collection of household hazardous waste was implemented in 1993 and has continued on an annual or semi-annual basis since then. Table 7.2 provides a summary of some types of household hazardous waste collected in the *Hasso Guam!* events in 2004 and 2005. Combining the quantities collected each year, approximately 8,325 gallons of used oil, 9,745 gallons of used paint, and 6,776 lead acid batteries were diverted from the dump and recycled. Consolidated grant funds from U.S. EPA have played a crucial role in funding this collection program. However, as part of the Consent Decree settlement, Government of Guam must perform a one million dollar supplemental environmental project (SEP) for the diversion of household waste. Guam must develop an interim collection system, establish a permanent collection facility for all household hazardous wastes, and prepare a *Household Hazardous Waste Diversion for Island Communities Guide*. The funding for this SEP program must be local.

Table 7.2 Household Hazardous Waste Collection

Description of HHW	2004	2005
Used Oil (gallons)	4200	4125
Flammable Paints (gallons)	2365	1480
Latex Paints (gallons)	2475	3425
Lead Acid Batteries (Automobile) (pieces)	3681	3095
Fluorescent Light Bulbs (pieces)	1151	2100

In addition to the Guam EPA's *Hasso Guam!* collection events, there is ongoing collection and acceptance by other local environmental companies on these waste items, but a fee is assessed.

7.3.3 Abandoned Vehicles

Recent experience on Guam has shown that the abandoned vehicle problem is quite significant. There have been major attempts by Guam EPA, DPW, and the Attorney General's Office to resolve this problem of abandoned vehicles. Within the last two years, the battle over the streetlight fund and recycling fees created much interest, as well as awareness for the need for a permanent funding program for the collection of special wastes. The so-called "Abandoned Vehicle Fund" (AVF) was for many years a misnomer. The name suggests that it is for the collection of all vehicles that are abandoned. Every automobile owner pays a fee every year for this program. However, only ten percent of the funds collected were to be used for the collection of abandoned vehicles. Unfortunately, the collection of abandoned vehicles under the program was a failure as evidenced by the staging of junk cars at the Malojloj, Agat, and Dededo transfer stations. Hundreds of cars were staged in these locations but were never processed and removed from the island. Based on statements from DPW, towing companies were charging DPW up to \$200 for each vehicle that they removed

under the AVF program. The program stopped but the collection of the funds continued. The spending of the AVF was never resolved.

In 2005, DPW implemented a pilot project for the collection, transport, recycling, and disposal of abandoned and junk vehicles. In the 2005 pilot project, DPW's contractor removed 1,189 vehicles just from the villages of Yona and Dededo. In addition to processing these individual vehicles, a total of 180 automobile batteries, 726 engine components, 706 transmissions, 68 auto air conditioners, and 1,417 tires were collected and properly disposed of. In late 2005, DPW was expanding this program to serve the entire island and to include the collection of white goods.

Public Law 23-64 requires the Director of Public Works to advertise and contract for the collection of abandoned metal implements over which DPW has jurisdiction and the right to dispose. DPW cannot charge the owner a fee for the scrap metal. However, abandonment of vehicles and other metallic waste on government land or rights of way is illegal. It can result in litter citations or prosecution for misdemeanor crimes for failure to abate a public nuisance under 10 GCA Chapter 20.

In 2005, in order to address the abandoned vehicle problems, amendments to Public Law 27-38 (as amended by PL 27-148 and PL 28-07) were being considered by the Guam Legislature. Bill 232 would require annual recycling fees paid at vehicle registration to be administered by the Guam EPA and used to subsidize the collection, processing, recycling, and disposal of all recyclable materials in the priority of junk vehicles, tires, batteries, and white goods.

In late 2005, eleven recycling companies were actively collecting or accepting all types of metallic wastes. But because there is a requirement for the removal of engine oil, differential oil, freon and fuel from junk vehicles, recycling companies have been reluctant to deal with junk cars. Only one permitted recycling company was accepting junk cars in 2005. A continuous collection system will depend on a government subsidy program.

7.3.4 Waste Reduction Opportunities

It is unquestionable that reduction of the amount of waste generated at the source is one of the keys to effective solid waste management. Waste reduction can be achieved through the elimination of excess packaging, production of more durable goods, reuse of product packaging, and promotion of responsible consumer packaging. Potential source reduction options that involve regulating the production of packaging cannot be effectively implemented on Guam. However, with regards to the use of packaging, it is important that, to the extent practical, the "Three Rs" be followed as part of Guam's overall waste management strategy as follows:

1. Reduce use of containers
2. Reuse containers
3. Recycle containers.

Successful implementation of programs which address container and packaging use reduction and reuse could result in a significant reduction in Guam's (per capita) solid waste generation rate and, in turn, a significant reduction in recycling processing and

required landfill capacity. The study of the feasibility and subsequent implementation where applicable of the following source reduction policies must be seriously considered by the government in cooperation and consultation with applicable private sector industries as public awareness of solid waste management issues increases:

Policy	Description
• Taxation	A tax on one-way containers that is high enough to make refillable or reusable beverage containers an attractive alternative to consumers.
• Ban	Ban the sale of one-way containers.
• Quotas	Require beverage manufacturers to package a certain percentage of their products in refillable containers.
• Deposit	Require a deposit on one-way containers to create an environment in which refillable containers can effectively compete.
• Differential Deposits	Require deposits on one-way and refillable containers, but only a fraction of the deposit is refunded on one-ways to increase the competitive advantage for refillables.
• Deposit/Refund	Consumers pay a deposit (say, 10 cents) on each beverage container purchased. A refund (say, 5 cents) is given for each container returned. The remainder of the deposit is used to fund collection, recycling, and education programs. This can only be effective in conjunction with a one-way container ban, taxation, or quota system.
• Mandatory Recycling Rates	Set mandatory recycling goals for one-way container types (beer, soft drink, wine, liquor, etc.) or for material types (glass, steel, plastic, aluminum). Require deposits if goals are not met.

Unfortunately, in a free market society such as ours, to reduce material consumption is viewed as economic meddling. To implement source reduction policies requires a radical change in current consumer attitudes, strong political will, and, in the final analysis, cooperation with the private sector.

We emphasize that the feasibility of implementing any or a combination of the above policies must be preceded by a thorough feasibility study and analysis that takes into consideration the impacts on consumer practices and acceptance, Guam beverage manufacturing and distribution industries, and achievable waste reduction gains.

7.3.5 Illegal Dumping

Illegal dumping activities are still an ongoing problem on Guam. According to Guam EPA data, there appears to be an increase in the illegal dumping activities around the island. The dumping appears mostly on isolated government properties, especially in the northern part of the island where the population is denser and more government (local and federal) properties are located. Illegal dumping is difficult to detect. The most that can be done is to minimize the conditions that contribute to the public's participation in this illegal act. These conditions are likely to be the following:

- Mistaken belief that dumping is legal and harmless: Illegal dumping is a crime punishable under both the Solid Waste and Litter Control Act, 10 GCA Chapter 51, Articles I and II, and the Public Health and Sanitation Law, 10 GCA Chapter 20, for failure to remove the material which creates a public nuisance.
- Dissatisfaction with MSW collection service: This can only be addressed by providing consistent collection service. Implementation of privatized residential collection may go a long way in achieving this end.
- Ignorance of the negative impacts associated with illegal dumping: Public education efforts to relay the negative impacts, as well as to encourage reporting of illegal dumping activities, should be undertaken as part of the SWM Plan's public education strategy.
- Perceived inconvenience of hauling waste to a transfer or disposal facility: For those who dump illegally because it is easier than proper disposal, only a fundamental shift in disposal attitudes will adequately address this problem. Public education and increased enforcement may be two solutions applicable to this problem. In order to facilitate enforcement and ensure reasonable penalties that can actually be assessed and collected, implementing a system of penalties that vary based on the severity of the violation may be appropriate. When combined with public education efforts, such a measure can effectively reduce illegal dumping.
- Resistance to pay costs of disposal: Charges from private operators for white goods and metallic waste disposal in the past have discouraged the public from properly disposing these wastes.

CHAPTER EIGHT: PUBLIC EDUCATION STRATEGY

The development of a comprehensive public awareness and involvement program is central to the success of integrated solid waste management (ISWM). While incorporating elements from successful programs elsewhere, considerable effort has been made in this Plan to examine Guam's unique population and environment in order to meet the needs of the entire community.

8.1 Purpose and Objectives of this Strategy

8.1.1 Purpose of this Strategy

Five target audiences on Guam have been identified, and each will benefit from specific public education and information programs tailored to its situation. They are:

- Schools,
- Commercial and tourist businesses,
- Government of Guam agencies and institutions,
- General public,
- Military installations.

The purpose of this public education and information strategy is to outline the needs of these groups with regard to their public awareness and understanding of SWM, to suggest ways in which their participation in an ISWM public information and education program can be encouraged and secured, and to recommend some general activities to be promoted for, by, and among these groups.

8.1.2 Objectives of the Public Information and Education Strategy

Public information and education programs are expensive but essential for public acceptance of and participation in Guam's ISWM. Because the various target audiences require different approaches, a professional, consistent, and well-funded effort should be established with the following objectives:

- The Guam Environmental Protection Agency (Guam EPA), through its Solid Waste Management Program and Information Services Branch (Guam EPA), will oversee the development and distribution of ISWM information to the general public, consistent with the Solid Waste Reduction Act, PL 24-304.
- Upon full staffing and operation of its public information program, the Solid Waste Management Division of DPW (Solid Waste Management Division) will take on a more active role in public education activities under this Plan, and Guam EPA will propose to transfer some of its public education responsibilities under current law.
- Guam EPA will coordinate with the Solid Waste Management Division to enlist the participation of solid waste collectors to assist in disseminating SWM information and education materials, noting the different needs of small and

large businesses. Guam EPA will provide educational materials to solid waste collectors as necessary.

- The Solid Waste Management Division of DPW and Guam EPA will encourage and coordinate with the federal agencies on Guam to implement SWM information and education programs and will assist federal agencies, wherever possible, to carry out those programs.

8.2 Public Education Activities

Public education activities will focus on "the big picture" of the solid waste challenges facing Guam, an understanding of each facet of ISWM, and how the various facets work together. The Guam EPA and the Solid Waste Management Division will be the community's primary resources for information on solid waste reduction and recycling issues. While a large part of these responsibilities will be to develop and implement "Reduce, Reuse, Recycle" educational programs throughout the Guam community, public presentations, the development of print materials, and producing media articles will necessitate a broad knowledge of ISWM practices. To facilitate the development of a comprehensive and effective educational program, Guam EPA is developing a "Waste Reduction Education Strategy" to cover, in detail, the activities included in this chapter.

8.2.1 Coordination with Commercial Haulers, Educators, Federal Agencies, and Utilities

Guam EPA will work closely with the Government of Guam Recycling Compliance Officers (RCOs) as designated in Executive Order 2003-17, commercial haulers, and educators, as well as other civilian and military entities in collaboration and coordination to ensure that each target audience receives the information it needs. One avenue for disseminating such information is through monthly billings by the Government of Guam utilities. Bills for power and water are currently distributed to more than thirty thousand residences and businesses every month. Guam EPA can capitalize on this distribution by including "Reduce, Reuse, Recycle" messages and other relevant public information, as well as encouraging the use of recycled paper for these bills.

8.2.2 Source of Reference Materials

Guam EPA will also serve as a repository and resource library on solid waste references, with an emphasis on recycling and source reduction. Current SWM industry periodicals, ISWM plans from other jurisdictions, sample brochures and flyers, and educational curriculum will be compiled.

8.2.3 Recycling Web Site

Guam EPA will also oversee a community recycling section on the Guam EPA Web site. As ISWM programs become operational, many questions from the public are likely to arise. New SWM procedures are more difficult to understand for some individuals and entities than for others, and problems occur in any newly established public program. A comprehensive Web site will serve to enhance public knowledge and confidence in the educational programs run by Guam EPA and the operational programs of the Solid

Waste Management Division by providing answers from an informed source. Information should also be available in hard copy format and by telephone from the Guam EPA front office staff.

8.2.4 Arrange Community Events

Guam already has been actively participating in Earth Week in April of each year with displays and other events. Further, several business groups, clubs, and organizations presently provide litter pick-up several times a year. Guam EPA can build on this awareness and enthusiasm to include similar activities throughout the year, such as recycling and composting fairs, as well as other events that will be instructional, educational, and fun.

8.3 School Community

The most effective strategy for achieving long-term change to Guam-wide apathy about recycling is through education of Guam's school children. Consequently, school curriculum development and implementation at the elementary, middle, and secondary levels is one of the most important objectives in ISWM public education. It is through these school children that families can become informed and encouraged to participate in "Reduce, Reuse, Recycle" programs. Additionally, through such school programs, the children are inculcated with an environmental ethic that will become a habit for the rest of their lives, and this represents a long-range benefit.

8.3.1 Curriculum Development, Pre-K through 12

Attitudinal and behavioral changes to recycling will only occur through early intervention in the educational process. To that end, the Guam Public School System (GPSS), which currently teaches approximately thirty-two thousand school children, becomes a major role player in achieving Guam's SWM objectives.

GPSS already addresses SWM and recycling issues collaterally through its science curriculum, which includes a component on ecology. The summary of Content and Performance Standards for Ecology now establishes the following standards for student learning:

- Know that changes in ecosystems can be caused by natural and human activities, which may affect all members of the system.
- Understand how organisms are linked to one another and their surroundings by the exchange of energy and matter.
- Describe the responsibilities human beings have as the stewards of the environment.

Guam EPA shall coordinate assistance to GPSS in expanding its curriculum content and performance standards so as to address Guam SWM and recycling issues. While the majority of subject content will be addressed within the department's "Content Standards for Science," recycling issues can also surface in other subject areas, such as mathematics (e.g., exercises for converting tons of solid waste collected into volumes of

compacted solid waste being disposed) and language arts (e.g., writing letters to elected officials and articles about SWM issues). Model curricula are already available through the U.S. EPA as well as several states, including Hawaii. This expanded content about recycling within the GPSS curriculum content and performance standards should meet the department's current standard of compliance with the National Science Teachers Association. Additionally, inasmuch as thirty percent of GPSS students speak English as a second language, course work must be prepared in the five secondary languages being used by GPSS. The costs for curriculum development and teaching materials can be funded in part through the budgets for public information and education of the Solid Waste Management Division of DPW and Guam EPA.

Guam EPA shall also coordinate assistance to Guam's private, parochial, and Department of Defense school systems in a manner similar to that employed with GPSS in order to reach all non-government of Guam school children with the same educational information about Guam's SWM and recycling issues.

Until such time as SWM and recycling become a permanent part of the GPSS curriculum, it is recommended that Guam EPA and GPSS organize a peer mentoring initiative to introduce recycling concepts at each Government of Guam public school.

8.3.2 Teacher Training

In order to introduce SWM and recycling issues at all levels of the Guam educational system, teacher training must be conducted. This can be accomplished through a new series of methodology courses within both the Pre-Service and In-Service programs at the College of Education, University of Guam. Within the Pre-Service program at the College of Education, new courses that specifically address environmental and recycling issues on Guam can be added to the current series of teaching methodology courses. This material can range from such topics as the need for and benefits of recycling to programs and strategies for achieving Guam's MSW recycling objectives. The UOG Media Lab could assist in developing support materials for this course work. At the In-Service level, a fifteen-credit methodology course, similar in subject matter to that developed about recycling in the College's Pre-Service Program, can be developed for GPSS's Continuing Education Program. This would bring teaching methodology about recycling to current GPSS teaching staff.

The estimated budget for undertaking a new recycling methodology course within the College of Education's Pre-Service program can likely be limited to only the cost of teaching materials. At the In-Service level, however, the budget would be approximately \$100.00 per credit hour per teacher, or about \$1,500.00 per teacher.

8.3.3 Assembly Presentations

Presentations by the Guam EPA and other government and solid waste management specialists, business leaders, and organizations at various schools is another important way to gain participation in source reduction and recycling and to influence public opinion. Most children take note when government and business representatives take time to meet them at their level. Promotional items (made from recycled materials) can be distributed at such presentations. Colorful displays and drama skits will also gain the attention of students. A reasonable objective is for every school on Guam to be

visited within the calendar year. Planning, coordination, and collaboration are the keys to success for school assembly presentations.

8.3.4 School Recycling Centers

Each elementary school could function as a local collection point for certain recyclable materials. Newspaper, mixed paper, and aluminum cans are particularly suitable for campus collection programs. The students should be encouraged to be involved in the design and maintenance of their school recycling center. This involvement will teach the importance of recycling, source reduction, and litter control. It will give the students another reason to take pride in their school and their stewardship of the environment. Schools could also receive money for the materials collected for recycling, and such funds could be applied to field trips, school supplies, etc. Since 2005, Guam EPA has been spearheading a public/private partnership to establish aluminum can collection sites at all Guam public schools, and this effort could be expanded to private schools and to cover additional materials.

8.3.5 Environmental Clubs

Every school should be encouraged to form an environmental club. Such clubs will engender groups of informed student leaders who will be instrumental in making their school recycling center a success. The clubs will also serve to build pride and awareness in the respective schools, thereby helping to reduce litter and graffiti. These clubs could be modeled after the 'WAVE' clubs in public high schools. The Environmental Education Committee and the Island Pride Campaign are forming 'Island Pride' clubs in public middle schools.

8.4 The Commercial and Tourism Business Community

Guam's commercial, tourism, and business communities continue to grow, contributing significantly to Guam's SWM challenges. Because commercial haulers are currently responsible for the collection of Guam's commercial waste and their role is likely to expand with more privatization of the island's SWM operations, it is important that they take a major role in assisting with the public information and education responsibilities. This will contribute to their business advantage, as well as to the advantage of the overall ISWM program. The haulers' involvement in the education of their customers will, first of all, improve their image and good will. Secondly, it may make the haulers' job easier, since new SWM programs will introduce more modern and efficient collection methods. Thirdly, active involvement will help to empower commercial haulers to shape the success of their respective commercial accounts.

8.4.1 Educational Materials and Events for the Commercial Sector

Guam EPA will work closely with the Guam Solid Waste Authority and the private haulers to provide the most up-to-date, successful educational materials and ideas available to meet the needs of the business community. Collaboration and/or review of applicable informational materials will also be provided, and Guam EPA may offer presentations and workshops for commercial haulers.

Meeting the needs of the various language groups related to our tourist businesses should be viewed as a responsibility of the individual businesses, the Guam Hotel and Restaurant Association, and the Guam Visitors Bureau. Presently, hotels on Guam are communicating in different "tourist" languages about Guam's need for water conservation; recycling and source reduction can use the same approach. Information about recycling and source reduction can also be added to the language-specific packets distributed by the Guam Visitors Bureau. However, because many visitors to Guam are already familiar with and participate in recycling activities in their home countries, the need to educate this group will be limited. Instead, providing opportunities to recycle (recycling bins in hotel common areas and public places, for example) may be a more effective way of engaging the visitor community.

8.4.2 Awards Program

Acknowledgment of efforts to make a significant impact on the environment through wise solid waste practices is important to encourage greater participation and creativity. An expansion of Guam EPA's annual awards ceremony during Earth Week will help spur the commercial sector to greater participation.

8.4.3 Recycling Bins for Public Events and Places

For special events such as fiestas, conferences, and other large gatherings, specialized containers for recyclable materials should be provided with the recycling logo and business name of sponsors and designed to accommodate a thirty-gallon (or larger) trash bag liner. Such containers are inexpensive and appropriate for use in areas that remain sheltered from rain. Recycling containers should also be permanently placed (and maintained by the Department of Parks, Recreation, and Historic Preservation) at public parks.

8.5 The Government of Guam Agency and Institutional Community

8.5.1 Setting the Example

Guam EPA and the Solid Waste Management Division can continue to assist all the agencies of the Government of Guam, Guam's largest employer, to meet the requirements of Executive Order (EO) 2003-17 on government-wide recycling by encouraging agencies to participate in environmentally-friendly purchasing procedures, source reduction, office paper recycling, and solid waste collection. Guam EPA will be the primary entity responsible for the dissemination of information to various Government of Guam agencies and the implementation of responsible practices government-wide. These duties and responsibilities are generally described in the "The Solid Waste Reduction Act" (PL 24-304). The general public will be encouraged to participate in new activities and develop an improved environmental ethic when it sees the example set by the Government of Guam agencies and institutions. Guam EPA has been leading the government recycling initiative under EO 2003-17 with a 'pilot' group of ten agencies. The program is set to expand to the entire executive branch in early 2006.

8.5.2 In-house Communication

Flyers, newsletters, in-house presentations, and incentives for participation are some of the ways to communicate the problem and the solutions to Government of Guam employees. Guam EPA will be responsible for the development and production of these items.

Guam EPA can assist in designing, developing, and/or utilizing present communication methods to assure that every employee, student, and client is informed about government recycling initiatives. Guam EPA can also make presentations and hold workshops for the various agencies as needed and/or requested.

8.5.3 Training Government of Guam RCOs in the "Reduce, Reuse, Recycle" Philosophy

Guam EPA will have to rely on assistance from other agency RCOs in assuring that the Government is successful in setting the example for the private sector on Guam for reducing, reusing, and recycling wastes. Those RCOs (and other select agency staff) must be both trained and then periodically retrained in undertaking MSW public information and education programs within their respective agencies. Guam EPA should organize such training at regular intervals.

8.6 The General Public

Guam EPA and the Solid Waste Management Division will serve as the primary source of "Reduce, Reuse, Recycle" and related programs for the residents and visitors on Guam. As such, it will be responsible for designing, developing, and implementing, among other activities, an advertising campaign to enhance existing knowledge and influence prevailing attitudes regarding solid waste management for the general public. A successful campaign will necessitate the help of an advertising agency, billboards, public service announcements, paid advertising in print and electronic media, printed materials, and promotional items. Guam EPA, working with the Chamorro Language Commission, will also identify and communicate the values of the Chamorro culture and show how source reduction, recycling, and new SWM projects are consistent with the traditional values and practices. Guam EPA should also seek to address the specific cultural needs of other ethnic groups on Guam, including the Filipino community and former residents of Palau and the Federated States of Micronesia.

Each and every hands-on activity in which the public can participate in aspects of a "Reduce, Reuse, Recycle" program becomes an educational opportunity. Variety in the activities, especially those that touch every part of the residents' lives (school, business and home), will instill in the public mind the importance and far-reaching impact of their behavior in dealing with waste. Recycling, source reduction, composting, new collection methods, and material recovery facilities all have the potential for influencing public opinion and behavior.

8.6.1 Logo and Theme

A logo and theme or slogans must be developed in the earliest stages of implementing a public information and education program. By employing a local professional

advertising agency, these promotional items will be of high artistic quality, easily reproducible, and attentive to Guam's unique culture. Slogans expressing the "Reduce, Reuse, Recycle" ethic must be communicated over a prolonged period of time, to be diminished only after significant reduction in solid waste is realized. Guam EPA will be responsible for directing the development and implementation of this Guam-wide campaign, which can build upon the "Don't waste Guam's future" campaign launched in 2005.

8.6.2 Coordination and Collaboration

A task force made up of representatives from various sectors of the community who have a sincere interest in the environment and public education can prove to be very helpful to Guam EPA and the Solid Waste Management Division in moving a program along. The existing "Friends United through the Understanding of Recycling Efforts" (FUTURE) committee should develop a public outreach and education subcommittee to advise Guam EPA on ISWM education issues. Representatives on the committee come from Government, the tourist industry, commercial haulers, the environmental community, the school community, and residents-at-large. Bringing these diverse groups together serves to build understanding of their respective SWM problems and provides an idea pool for greater program success.

The Environmental Education Committee, an inter-agency group made up of representatives from several local and federal agencies, NGOs, and the community, must also continue to be actively involved in planning public education campaigns and events. The Government's coordinated environmental education activities, through events such as Earth Week and the Island Pride Campaign events, attest to the value of an integrated, coordinated approach, and Guam EPA should continue to actively involve the Committee in recycling and waste reduction education activities and plans.

8.6.3 Community Events

The general public can also be accessed through community events, such as the Earth Week Island Pride Festival, village fiestas, the annual Liberation Day Carnival, GVB summer and winter festivals, and similar public gatherings.

8.6.4 Media

The media on Guam represents a major player in achieving public awareness about Guam's SWM issues. Specifically, the media can provide opportunities for feature articles, advertisements and public service announcements, as well as encourage general access by the public to discuss ISWM concerns. Guam EPA and the Solid Waste Management Division should aggressively engage the media through their Public Information Officers by regularly preparing press releases and fact sheets on ISWM-related topics, communicating with and educating journalists and media personalities on ISWM issues, appearing on radio and television talk shows, and actively responding to current ISWM issues in the media.

8.7 Federal Agencies on Guam

Although the Air Force and Navy installations and other federal agencies on Guam are undertaking their own public information and education programs with regard to reducing, reusing, and recycling military-generated solid waste, it is important that Guam EPA and the Solid Waste Management Division stay abreast of such work and participate wherever possible. The opportunities for jointly-sponsored events and sharing public information and education resources are beneficial to achieving objectives for both the military and the civilian side of Guam's SWM programs.

8.8 Funding

Currently there is no dedicated funding source to support the Solid Waste Management Program, including public education responsibilities within Guam EPA. In addition, Government of Guam agencies must rely on General Fund monies to support their solid waste management and their recycling responsibilities under Executive Order 2003-17. The funding strategy is outlined below.

8.8.1 Fees

A portion of the tipping fee shall be deposited in the Solid Waste Management Fund for use by Guam EPA for public information and education programs. In order to accomplish this, legislation must be introduced to restructure the fee. Any recycling fees created by legislation or otherwise should also include a percentage earmarked for public information and education programs.

8.8.2 Grants

Grants, especially for start-up programs, are offered by federal agencies and certain foundations.

8.8.3 Initial Government Subsidy

The Government of Guam should commit to bearing the expense of the start-up program's information and education efforts. A minimum of two dollars (\$2.00) per resident has been the standard budget in stateside communities. Guam needs additional money for an effective start-up program. The start-up funding should be \$3.00 per resident, or \$480,000, for 160,000 people for fiscal year 2007. This initial subsidy start-up money shall be deposited into the Solid Waste Management Fund.

8.9 Future Planning and Development

The overall public information and education program will benefit from an annual critique by various stakeholders, including the FUTURE Committee, the Environmental Education Committee, and the management of Guam EPA and the Solid Waste Management Division. Such an assessment may suggest that a phased approach to educating the public about SWM issues may be more cost effective and compatible with Guam's transition into a society which fully accepts a "Reduce, Reuse, Recycle" philosophy.

8.10 Recommended Actions

This Section will set out essential public information and education activities, already mentioned in the above text, which need to be implemented if Guam is to meet its MSW reduction goals. The effort demands participation by every resident, visitor, and business. It is not enough that only a few individuals, agencies, or businesses participate; everyone must also do whatever possible to educate and inform others, through both word and example.

1. Develop activities, curricula, and incentives to reach the audiences in the educational community.
2. Develop activities, incentives, and print and electronic materials to reach the commercial and tourist industry.
3. Implement government-wide source reduction, procurement, and recycling policies throughout Government of Guam agencies and institutions in accordance with Executive Order 2003-17.
4. Develop a long-range publicity and awareness campaign to meet the needs of the general public, including logo and slogans.
5. Develop, implement, and encourage source reduction activities in all sectors.
6. Commit to the need for funding of the program through earmarking a portion of the Solid Waste Management Division revenues.
7. Establish an education and outreach subcommittee of the FUTURE Committee to assist Guam EPA and the Solid Waste Management Division with ideas and meeting the community's information and education needs.
8. Commit to enforcement of all laws and regulations regarding Integrated Solid Waste Management.

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APPENDIX A

GUAM SOLID WASTE LAWS
(SUBJECT TO REVISION)

December 2005

APPENDIX A
GUAM SOLID WASTE LAWS
December 2005

Public Law No.	Date Passed	Short Title	Brief Description	Status
28-92	12/12/05	Recycling Enterprise Zone	Directs Port Commission to establish size and location at JD Leon Guerrero at Cabras Island for recycling enterprise zone and only lease to companies that satisfy Qualifying Certificates under PL 25-127.	Port Decision due 2/10/06
28-70	10/14/05	No ADF Regulations	Disapproves Advance Disposal Fee regulations and the renumbering of SW regulations.	Bill 232 would replace ADF with recycling fee.
28-58	6/30/05	ADF Rule Making Authority	Amended §51505 to make Guam EPA promulgate rules. Guam EPA to request economic impact assessment from GEDCA. Authorized again DPW to enter into contracts with recycling companies	Rule authority Article I of Ch. 51. Bill 232 would delete economic impact and specific rule authority
28-56	6/30/05	PUC Tipping Fee Law	Amended Tipping fee §51118(e) and (f) to allow for PUC rate making charges to part of fees and paid from the Solid Waste Operations Fund.	PUC made rate in October 2005, effective Nov 1, 2005.
28-11	3/9/05	No Combustibles in Hardfills	Defined combustible materials per federal hazardous transportation regulation at 49 CFR and deleted “undecayed wooden materials attached to construction debris” from SW regulations as permissible in hardfills.	Guam EPA to incorporate in hardfill permits.
28-07	3/3/05	Advanced Disposal Fees Amendments	Postpone the effective date of Advanced Disposal Fees (ADF) until the regulations become effective.	PL 28-70 disapproved regulations. Bill 232 would replace ADF with recycling fee.
27-148	12/30/04	Guam’s Recycling Act Amendments	Revises the ADF for vehicles imported for resale to be collected at the point of sale.	PL 28-07

Public Law No.	Date Passed	Short Title	Brief Description	Status
27-74	2/10/04	Regulations for Recycler Qualifying Certificate	Approves GEDCA rules for qualified companies engaging in recycling and transshipment.	One company has certificate
27-38	11/13/03	Guam's Recycling Law (Advanced Disposal Fees)	Assess fees on items imported for resale, collected by Customs, established revolving funds for Guam EPA to administer for recycling projects. Repealed abandoned vehicle fee portion of 16 GCA §7161 Abandoned Vehicle and Street Light Fund.	Revision made with PL 27-148.
27-37	11/14/03	Municipal Recycling Law	Municipal Recycling Program; DPW to set up recycling programs at the village level.	Mayor's Council of Guam to implement
27-07	2/28/03	Feb 2003 Appropriation Act	Sections V.3 and V.4 made the Abandoned Vehicle and Street Light fee \$25; and after April 1, 2004, \$45.	Abandoned vehicle provision repealed by PL 27-38
26-153	10/31/02	Ordot Fire Appropriation	\$250,000 for Office of Civil Defense to respond to fire of October 25, 2002.	Done
26-132	9/17/02	DPW SW Hazardous Pay	Hazardous pay for DPW Dump workers if emergency (e.g. fire, typhoon)	Ongoing
26-99	6/3/02	DPW Privatize Collections	DPW to Contract out collections for 2/3 island within 90 days.	No action
26-76	3/12/02	CCU Act	Created the CCU to oversee GWA and GPA– disbanded the boards of each.	DPW's solid waste duties should be moved to Solid Waste Authority
26-35	9/30/01	Mayor Tipping Fee Exemption and Ordot Fire Appropriation	Add subsection (m) to §51118 exempts Mayors from paying tipping fee for solid waste from village streets, public buildings, parks or facilities. \$214,681 to Civil Defense for its response to Ordot Dump fire on May 14, 2001.	Some Mayors are inappropriately providing trucks as dumpsters and so residential customers are avoiding tipping fee.
25-175	12/12/00	ISWMP Amendment	Approves the ISWMP submitted by Guam EPA, eliminated the Solid Waste Management Authority, and eliminated waste reduction by incineration.	Updated January 2006 by Guam EPA

Public Law No.	Date Passed	Short Title	Brief Description	Status
25-173	10/20/00	Administrative Adjudication Law Amendments	Any rule or regulation that has a cost to public of over \$500,000 requires an economic impact statement	Ongoing
25-170	10/19/00	Litter Fines on Guam	Litter fine reduced from \$500 to \$100 to encourage officers to encourage officers to issue more fines by Guam EPA, Mayors Council, GPD, certain peace officials in Superior Court.	Lt Gov. Litter Task Force to encourage litter citation issuance by Mayors, GPD, etc.
25-127	5/22/00	Tax Benefits For Recycling and Shipping Companies	Tax benefits for recycling companies; 100% corp. income tax rebate for 40,000 lbs. The earned interest from rebate goes to Guam EPA. Gives 10 yr waiver of docking and stevedoring fees if shipping company has permit from Guam EPA and CPA certifies type and volume of recyclable materials.	PL 27-74, ongoing
25-119	3/24/00	Litter Fines for Village Beautification	Creates litter fine under Mayors power to issue. Deputizing powers to GEPA and other agencies if people are trained at GCC. Creates Municipal Litter and Defacement Fund.	Most Mayors do not get trained or levy fines
25-93	12/29/99	SW Tipping Fee Amendments	Mandates DPW to develop lifeline rates. Creates exemptions for Mayors (1 yr), force majeure, good citizen if permitted, and terminate service if 60 days in arrears.	DPW did not develop rates, so PUC will do so under PL 28-56.
25-70	7/15/99	Tipping Fee Amendment	Changed commercial rate to volume from \$45/ton and PUC to set rate in 3 years.	PUC 3 years late set rate in Oct. 2005.
24-313	12/24/98	DPW Solid Waste Collection Rules and Regulations	Approved DPW regulations. Residents shall segregate waste and recyclables, but no provision for "disposal" of recyclables. Standards for cans and placement. Commercial and govt. construction must design space for collecting and loading recyclable materials and solid waste. Collection contracts 5 yrs or less.	No enforcement by DPW. No collection contracts.
24-309	12/18/98	Solid and Hazardous Waste Federal Approval Law	Added financial assurance, performance bonds, inspection authority and warrant authority to 10 GCA Chapter 51	SW Program published on 10/5/99 approved 6/6/00

Public Law No.	Date Passed	Short Title	Brief Description	Status
24-304	12/18/98	An Act Mandating the Government of Guam to Reduce Waste	Requires Guam EPA SW program to: monitor and enforce PL 21-22, implement recycling efforts and coordinate with DPW Recycling Office. Mandates GovGuam and schools to make every effort to decrease waste purchase recycled and biodegradable goods, and compost. Also created Guam EPA SW Management and Hazardous Waste Programs and positions.	Similar EO 2003-17 signed by Gov. Camacho. Ongoing
24-272	10/8/98	The Revised Ordot Dump Closure and SW Management Alternative Act	Same law as 24-139 except it deleted: privatization of SW collection and transportation, DPW employee transfer, GEDCA bonding, mandated Ordot closure and open MSWLF for April 1999, and <u>added</u> to definition of hazardous waste, and that DPW, in cooperation with Parks and Recreation to convert Ordot to Park, and that Guam EPA shall monitor Ordot for compliance with Act and “take proper measures to mitigate environmental damage to protect health and welfare of residents and people of Guam.”	DPW did not privatize and did not create recycling office. Law invalidated by Supreme court in <u>Pangelinan and Wesley v. Gutierrez</u> (2004 Guam 16).
24-246	8/18/98	Recycled Paper Collection Contract Law	DPW, after advertising for proposals, to enter into 2-year contract with company to collect recyclable paper from the public and implement a plan to prevent paper from entering into the waste stream. Award to highest bidder per pound to pay public for recyclable paper. The contract to be granted \$150,000 per year from the SW Operations Fund. Article 4 of Chapter 51.	DPW has not implemented.
24-181	4/17/98	SW Health Monitoring and Compensation Act	Requires 1% of all tipping fees deposited into the solid waste management facility medical monitoring fund. The Director of DPHSS shall distribute the funds quarterly - 25% to village(s) with landfill for community health care needs and programs; 25% to village(s) with other solid waste management facilities; and 50% for DPHSS for health monitoring of people and animals around landfills and other designated solid waste facilities as specified by Guam EPA Administrator or DPHSS Director.	Unknown

Public Law No.	Date Passed	Short Title	Brief Description	Status
24-166	4/11/98	Priorities for Private Activity Bonds	Places restriction on private bonding section of PL 24-139 and requires legislative approval of any contracts related to bonding. Prevents Governor's transfer of the \$4 million for Ordot.	Partially repealed with PL 24-272.
24-139	3/11/98	The Ordot Dump Closure and Solid Waste Management Alternatives Act	Changed DPW role from doing SW operations to contracting SW operations and promoting recycling; established tipping fees; requires dump to close by July 1998 and open new landfill in 6 months, \$4 million for Ordot, authority to GEDCA private bonds, 180 days to execute privatization of operations, ISWMP and sets details, Governor transfers DPW SW employees, Land Management Report on Ordot on private land, and notify DOI of law so to release funds for Ordot.	Repealed by 24-242:1
24-57	6/30/97	Prohibited Government Funds for GRRP Agreement	Section 6 prohibited the commitment of any funds, resources, assets or debt by any government entity for payment of the GRRP Agreement, including the waste to energy facility and the landfill design and construction.	Invalidated by court decision.
24-06	3/20/97	Privatization of the MSWMF	Requires funding, design, construction, and operation of the new landfill. Required qualifications and insurance from bidders.	Not implemented, and then partially eclipsed by Consent Decree
23-95	5/8/96	Landfill Site Law	Stated Guatali as the preferred site and Malaa as the secondary site. Required budget within 90 days and annual reports for 3 years.	Nullified in <u>San Miguel et al. v. DPW, et al.</u> Sup. Ct No.CV0892- 04, (April 22, 2005)
23-64	12/5/95	Solid Waste Management and Litter Control Act	Repealed and reenacted 10 GCA Chapter 51. Requires the ISWMP, required financial assurance for SW facilities and public notices for recycling, disposal and incineration, specified permit fees, inspection rights, prohibit activities, citizen suits, yearly scrap metal removals, littering fines between \$500-\$1000.	The comprehensive solid waste law with the voidance of PL 24-272. By Supreme Ct.

Public Law No.	Date Passed	Short Title	Brief Description	Status
22-115	4/25/94	Close Ordot Dump Act	Mandated closure of Ordot Dump by April 25, 1997. Directed Governor to identify new site and submit budget for moving disposal to new site. Required DPW and Guam EPA to assess environmental impacts of Ordot Dump and estimate clean up costs. Directed Guam EPA to develop an integrated solid waste management program including recycling of glass, metals, composting, and submit in 90 days. Directed DPW within 180 days to develop commercial fees by regulation and created solid waste processing fund.	Major components not implemented.
21-73	1/24/92	Aluminum Can Recycling Act	Mandated Agency directors to have monthly collection of aluminum beverage cans, to sell the cans and to maintain records.	Repealed/replaced by 24-304 12/18/98
21-22	5/17/91	Buy Recyclable and Biodegradable	An Act mandating GSA to purchase biodegradable products.	Partially implemented, ongoing
17-87	1/18/85	Solid Waste Management and Litter Control Act	Specifies Guam EPA and DPW powers and duties. Includes DPW authority to contract out collection and disposal, provided employees adversely affected are given first preference for other GovGuam jobs for which they qualify.	Repealed and reenacted by PL 23-64
17-26:46	10/11/83	Supplemental Appropriations Act for FY84	Section 46 repealed and reenacted the street light fund law to make the fund the Abandoned Vehicle and Street Light Fund. It mandated that 90% of funds to GPA to be used for streetlights and 10% for removal of abandoned vehicles.	Abandoned Vehicle provision repealed by PL 27-38.