

PREPARED FOR:
HOUSTON-GALVESTON AREA COUNCIL

Organic Waste Best Management Practices

FINAL | AUGUST 2009



An SAIC Company

This study was funded through a solid waste management grant provided by the Texas Commission on Environmental Quality through the Houston-Galveston Area Council. This funding does not necessarily indicate endorsement of the study's findings and recommendations.

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Organic Waste Best Management Practices

Houston – Galveston Area Council

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This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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1.1 Project Purpose

The Houston-Galveston Area Council (H-GAC) retained R. W. Beck, Inc. (R. W. Beck) in April 2009 to develop an Organics Best Management Practices Manual (Manual). This Manual is designed to assist large public institutions in the Houston-Galveston area with evaluating and implementing best practices for organics management and enhance organics diversion efforts. In addition to this Manual, R. W. Beck will conduct a workshop for the targeted institutions in August 2009.

Organics, such as food scraps and yard trimmings, represent a large portion of the waste disposed of in the H-GAC region. However, diversion efforts for organics have historically been limited due to the different collection strategies and processing needs for this material stream. H-GAC staff recognized the need for training and education on organics diversion and management strategies for entities in the region. Large public institutions were selected to be the focus of this study. Although this Manual is specifically targeted toward the institutional sector, much of the information could potentially be applied to other commercial generators of organic material.

1.2 Targeted Institutions

As previously mentioned, this Manual is primarily intended for use by large public institutions in the H-GAC region. Key reasons supporting the focus of this study on institutions include:

- The quantity of organics generated by large institutions (e.g., schools, hospitals, prisons, etc.) may enhance the economic benefits of diverting the material.
- Public entities are a natural audience for H-GAC training efforts.
- Institutions in the region have demonstrated an interest in exploring best management practices for organic materials.

1.2.1 List of Institution Sub-Types

The institutions studied in this Manual (and for the workshop) include the following sub-types:

- Universities and colleges with large student dining facilities
- Medical facilities with large on-site kitchens
- Sports arenas and stadiums
- Convention centers
- Hotels

- Prisons
- School districts with large on-site kitchens

1.3 Report Organization

This Manual is organized into seven chapters plus two appendices:

- Section 1: Introduction
- Section 2: Framing the Environmental Issues
- Section 3: Existing Conditions in the H-GAC Region
- Section 4: Setting Incentives for Generators, Haulers, and Processors
- Section 5: Developing an Organics Management System
- Section 6: Bio-Plastics – Opportunities and Issues
- Section 7: Recommendations for Regional Implementation
- Appendix A: Case Studies
- Appendix B: Resources and Contacts
- Appendix C: Sample Organics Ordinance

1.4 Acknowledgements

The Project Team for this engagement consisted of staff from R. W. Beck, Cascadia Consulting Group, and Overgaard and Associates.

R. W. Beck would like to acknowledge the critical contributions from key staff at institutions that were utilized as case studies for this Manual. These individuals are listed below:

- Ken Steblein, University of Texas Medical Branch
- Christopher Day and Andrea Allston, City of Plano
- Bruce Willette, Texas Instruments
- Courtney Lindberg, Environmental Resources Technology
- John Ferguson and Linda Robbins, Nature's Way Resources

Section 2

FRAMING THE ENVIRONMENTAL ISSUES

This chapter addresses environmental benefits associated with optimizing organic materials management. It is organized into four sections, as follows:

- Solid waste management
- Greenhouse gases
- Need for organic soil amendments
- Need for highest and best use of food waste

2.1 Solid Waste Management

According to U.S. Environmental Protection Agency (EPA) estimates, organic materials such as landscape trimmings and food scraps make up approximately 25 percent of waste disposed in the United States. Several viable management options exist for these discarded resources. These options offer institutions in the region the opportunity to:

- Reduce costs
- Provide food for the economically disadvantaged
- Achieve environmental benefits

There are four broad organic material categories addressed in this manual.

- **Landscape Trimmings** – Biodegradable material generated by gardening and landscaping activities, including but not limited to:
 - Grass clippings
 - Flower cuttings
 - Hedge trimmings
 - Leaves
 - Brush
 - Branches
 - Stumps
 - Uncontaminated wood products
- **Food Scraps** – Raw, cooked, and processed foods from vegetative- and animal-based sources. Examples of vegetative sources include:
 - Breads and bakery products
 - Coffee grounds

- Produce trimmings
- Fruits
- Oils and condiments (in small quantities)

Examples of animal-based sources include:

- Meat
- Cheese
- Fish
- Egg

For the purposes of this project, the focus is on pre- and post-consumer food scraps generated as a result of food service within targeted institutions.

- **Soiled Paper**¹ – For the purposes of this manual, soiled paper is defined as compostable but non-recyclable paper, including wet, waxed and food-soiled paper. Types include, but are not limited to:
 - Waxed corrugated cardboard
 - Pizza boxes
 - Wooden fruit packaging crates
 - Paper napkins
 - Paper towels
 - Wooden stir sticks
 - Paper straws
 - Paper coffee cups
 - Paper to-go containers
- **Bioplastics** – Form of plastics derived from renewable biomass sources, most commonly corn starch or sugar cane, rather than plastics derived from petroleum.

Animal and human wastes are not addressed in this manual, but offer their own unique set of management opportunities.

In addition to providing social and environmental benefit, institutions can reap financial savings by effective management of organic materials, including:²

- Avoided purchase costs through less wasteful food preparation and other waste-prevention strategies
- Tax write-offs through surplus food donation

¹ Non-soiled paper, such as clean office paper, newspaper and unwaxed cardboard, is not included in the organics stream. Clean, recyclable paper should be reused or recycled rather than composted to take advantage of its higher and best use.

² Source: California Integrated Waste Management Board, <http://www.ciwmb.ca.gov/FoodWaste/FAQ.htm>

- Reduction in custodial costs through more efficient collection systems
- Reduction in refuse collection fees through reduced level of service
- Potentially discounted service associated with food waste or yard trimmings collection
- Reduced soil amendment purchases for landscaping through onsite composting.

2.2 Greenhouse Gases

Reducing the disposal of organic materials can reduce the generation of greenhouse gases (GHGs). This occurs due to the following:

- **Removing organics from the landfill reduces methane production.** When disposed in landfills, organic materials generate methane which is released to the atmosphere. Methane is 21 times more potent a GHG than carbon dioxide (CO₂).³

While landfill gas collection and management systems can help to reduce this problem, the best way to eliminate the problem for future streams of discarded materials is to divert organic materials from disposal. Over 20 states have restricted the disposal of organic materials. For example, the State of Arkansas prohibits the disposal of leaves, grass clippings, shrub trimmings, and brush.⁴ Regional governments and authorities have begun to pass and enforce such restrictions in states without such laws; as an example, the City of Arlington, Texas, through a contract with its residential refuse hauler, does not accept bagged grass clippings as part of its refuse collection.

- **Using organic soil amendments reduces the need for conventional pesticides and fertilizers and helps to retain and clean water.** The use of compost improves soil quality, increases crop yield, and reduces the need for fertilizers and pesticides, which are extremely energy intensive to make and transport. Compost and mulch help soils to retain water, which reduces the energy required to supply water for agricultural or municipal use. Organic soil amendments, such as compost and mulch, can be produced from organic materials generated by the targeted institutions.

The Houston-Galveston area is projected to dispose approximately 630,000 tons of combined food scraps and yard trimmings in 2010.⁵ If these tons of organic material were composted rather than disposed, an estimated 418,000 metric tons of CO₂ equivalents could be avoided each year.⁶ When analyzed in terms of the amount greenhouse gases emitted from the average car in the United States, this estimate translates into 77,000 cars per year.

³ Source: Environmental Protection Agency, <http://epa.gov/methane/scientific.html>

⁴ Source: Arkansas Code, 8-6-220 Yard Waste

⁵ See Section 4 for a more detailed explanation of this estimate.

⁶ This value is estimated using the U.S. EPA's WARM model, a calculator used to convert the disposal of solid waste into GHG equivalents, and assuming the national average for landfill gas capture. http://epa.gov/climatechange/wyacd/waste/calculators/Warm_home.html

2.3 Need for Organic Soil Amendments

Soil health has been in decline in recent decades, both in urban centers and in agricultural areas. Intensive cultivation, topsoil removal, and the application of synthetic fertilizers and pesticides have contributed to this soil degradation.

Soil improvement is a slow and continual process. It can take several years to build healthy, productive soil. If soil has too much sand or clay, the solution to both is the same - add organic material. Among other attributes, compost has the following benefits for soil:

- Breaks apart tight clays and holds water and nutrients in loose sands
- Can reduce soil compaction and allow soil to absorb more water, thus decreasing flash flooding
- Balance nutrient content in soil

2.3.1 Compost

Composting is the microbial decomposition of discarded organic materials under controlled conditions. The end product, compost, is used as an organic soil amendment. It promotes microbiological activity in soils necessary for plant growth, disease resistance, water retention and filtration, and erosion prevention.

Compost can be used in various ways. As a soil amendment, compost enhances the physical, chemical, and biological properties of soil. The macro-nutrient value of compost is typically not high relative to fertilizers.⁷ Compost enriches the soil by increasing organic matter.

Additionally, compost increases soil's capacity to hold water. By amending soil with compost, soil is better able to hold nutrients. Nutrients do not leach as easily; rather, they are released more slowly to plants, which can reduce the need for fertilizers. Compost can also suppress fungal diseases in soil, which can be particularly important to the golf and nursery industries.

The list of benefits of compost use includes⁸:

- Increased organic content of soil
- Improved soil structure and texture
- Increased aeration capacity of soil
- Increased soil fertility
- Increased water- and nutrient-holding capacity
- Increased resistance to erosion from wind and water

⁷ The nutrients in compost are not in a form that is soluble in water such as in chemical fertilizers. The nutrients in compost are tied up in the bodies of the microbes and are released more slowly.

⁸ Source: *Compost Marketing: A Planning Guide for Local Governments*, A Project of The United States Conference of Mayors, October 1994

- Reduced pollutant load to surface and ground waters
- Enhanced plant disease and weed growth suppression
- Increased temperature insulation
- Ability to balance the pH level in acidic or alkaline soils

2.3.2 Mulch

Mulch is a soil amendment that can be derived from the volume reduction (e.g., grinding, shredding) of the woody fraction of organic materials, such as Christmas trees, clean scrap wood, and tree branches and/or stumps. Using mulch can be extremely beneficial for soil and plants.

The list of benefits of mulch use includes⁹:

- Reduced need for weeding
- Reduced labor time for weeding, mowing, and watering
- Prevention of germination of many weed seeds, thus reducing the need for the use of herbicides
- Moderation of soil temperature
- Retention of water in the soil, thus reducing the need for watering
- Protection from the impact of raindrops (i.e., less crusting of soil, which can prevent the germination of seedlings and erosion from channels being cut through the surface)
- Enhanced growing media for beneficial soil organisms, which can improve soil structure and the availability of nutrients for plants
- Improved landscape or garden aesthetics

The demand for organic soil amendments is growing nationally. Several well-established market niches exist for organic soil amendments, such as the landscaping industry. Emerging uses and markets for organic soil amendments, such as erosion control socks at construction sites, can present opportunities for increasing overall product demand.

Product specifications for organic soil amendments vary by user and use. There is no single standard of quality for a generic category of organic soil amendment products. In general, users want products that are rich in organic matter, meet federal and state health and safety standards for the intended use, and have the following compost quality characteristics¹⁰:

⁹ Source: Natural Resources Conservation Service,
<http://www.nrcs.usda.gov/FEATURE/backyard/benmulch.html>

¹⁰ Source: *Compost Marketing: A Planning Guide for Local Governments*, A Project of The United States Conference of Mayors, October 1994.

- Physical
 - Dark color
 - Uniform particle size
 - Pleasant, earthy scent
 - Absence of inert materials, such as rocks
 - Moisture content close to 50%
 - Near-neutral pH
- Chemical
 - Available macro-nutrients
 - Minimal or undetectable level of heavy metals and various pollutants
- Biological
 - Sufficiently mature and stable
 - High concentration of organic matter
 - Absence of pathogenic organisms
 - Absence of weed seeds

Potential compost market sectors in the Houston-Galveston area include:

- Landscaping
- Horticulture
- Agriculture
- Silviculture, or forest management
- Land reclamation
- Erosion control

Composting and volume reduction—and the effective use of compost and mulch—are important parts of an overall organics management strategy. Although not discussed in this Manual, the use of organic materials for the production of energy, such as wood chips for biomass energy facilities or captured methane from anaerobic digestion operations, are additional components of some organics management strategies.

2.4 Need for Highest and Best Use of Food Scraps

The focus of this section is on making the best use of food scraps, which can include reducing waste in purchasing and preparation processes, donating surplus food to local food banks, and sending food scraps to a composting or grinding facility.

The EPA developed the concept of the food management hierarchy to encourage directing food to the highest and best use. Figure 2-1 is a visual depiction of this hierarchy. In short, the concept of “Highest and Best Use” refers to maximizing

source reduction activities and minimizing the disposal of food. Each of the strategies contained in the food management hierarchy is explained in more detail below.

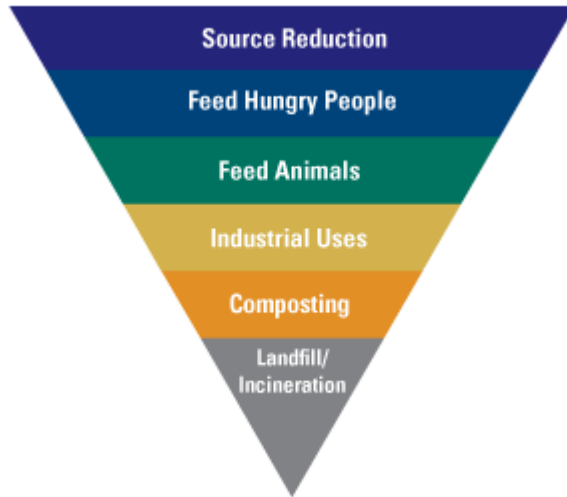


Figure 2-1: Food Waste Hierarchy (Source: U.S. EPA)

2.4.1 Source Reduction

This strategy includes a variety of ways to reduce the disposal of food, such as properly purchasing, storing, preparing, serving and repurposing food items. Examples of source reduction practices that H-GAC area public institutions may be able to implement include, but are not limited to, the following:¹¹

■ Purchasing

- Consider buying precut food items, such as lettuce and potatoes.
- Serve beverages from a beverage hose or dispenser.
- Buy milk in bulk dispenser boxes rather than in individual serving sizes.
- Use health department-approved, refillable condiment dispensers instead of individual packets.
- Buy food supplies in bulk when sales volume and storage space allow.

■ Produce Handling and Storage

- Check produce deliveries carefully for rotten or damaged product, and return any sub-standard product.
- Rotate perishable stock at every delivery to minimize waste due to spoilage.
- Clean coolers and freezers regularly to ensure that food has not fallen behind the shelving and spoiled.

¹¹ Source: California Integrated Waste Management Board,
<http://www.ciwmb.ca.gov/BizWaste/FactSheets/FoodSrvc.htm>

- Store raw vegetables and other perishables in reusable airtight containers to prevent unnecessary dehydration and spoilage.
- **Food Preparation and Storage**
 - Adjust inventory levels of perishables to reduce waste due to spoilage or dehydration.
 - Use hourly or daily production charts to minimize over-prepping and unnecessary waste.
 - Whenever possible, prepare foods to order.
 - When prepping food, only trim off what is not needed.
 - Use vegetable and meat trimmings for soup stock.
 - Adjust the size of meal portions downward (minimize supersizing), especially if portions are consistently being returned unfinished.
 - Reuse leftover foods that have been stored at proper temperature within two days of preparation to prevent waste due to spoilage.
 - Wrap freezer products tightly, label, and date them. Make sure they are used in a timely fashion, to minimize waste due to freezer burn.

2.4.2 Feed Hungry People

This strategy means donating appropriate surplus food items to either of the following:

- **Food banks** are community-based, professional organizations that collect food from various sources, store the food in a warehouse, and then distribute it to hungry families and individuals, mostly through local human service agencies. Most food banks tend to collect less perishable foods, such as canned goods, because they can be stored for a longer time.
- **Food rescue programs** take excess perishable and prepared food and distribute it to agencies that serve the hungry.

Organizations in the H-GAC region, such as the Houston Food Bank, may be of assistance to public institutions that wish to donate food for human consumption.

Legal liability is likely the most common concern related to surplus food donation. The Federal Good Samaritan Food Donation Act, originally passed in 1996, protects donors from civil and criminal liability when donating food believed to be safe and edible. This law was specifically designed to encourage the donation of needed foods and to protect donors.¹²

Companies can usually take a tax deduction for donated food, although the amount of the deductions can vary based upon a number of factors, including legal organizational structure and accounting methods.

¹² Source: Bill Emerson Good Samaritan Food Donation Act of 1996, 42 U.S.C. § 1791 (2006)

2.4.3 Feed Animals

This strategy refers to diverting food not appropriate for human consumption to animal feed. While a potentially useful outlet for food scraps that otherwise would be disposed, this avenue tends to be limited primarily to food processors and breweries and may not be feasible for urban institutions. In some cases, rural corrections facilities and land-grant colleges have the appropriate combination of circumstances that allows for the collection and feeding of certain food scraps to on-site animals.

2.4.4 Industrial Uses

This strategy refers to sending food not suitable for human or animal consumption to industrial facilities that can re-purpose those materials for use in their products. Examples include:

- Rendering plants that utilize meat and oil wastes to produce feedstocks for soap and cosmetic manufacturing.
- Biodiesel refineries that turn “brown grease” or waste oil into biodiesel products suitable for vehicle or equipment use.

2.4.5 Composting

This strategy means either:

- Composting organic materials on site through an enclosed, windrow, or other system; or
- Sending materials to an off-site facility for composting.

On-site processing may be preferred by institutions because it reduces trash collection costs. Plus, there is an added benefit of generating soil amendments that can be used on site, or donated or sold to other facilities. However, on-site processing of food scraps may not be feasible for institutions due to space limitations, equipment cost considerations, feedstock requirements, and personnel limitations and expertise.

2.4.6 Landfill Disposal or Incineration

This strategy refers sending organic materials to a disposal facility to be landfilled or incinerated. This is considered the least desirable strategy from a social, environmental, and sometimes economic perspective.

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Section 3

EXISTING CONDITIONS IN THE H-GAC REGION

This section provides an understanding of the potential impact of organics diversion on regional disposal capacity in the region. Existing infrastructure for organics processing is also presented and discussed. Last, existing governmental policies, regulations, and goals pursuant to organics diversion are discussed.

3.1 Potential Impact of Organics Diversion

Organics diversion is one option to alleviate the burden on landfill capacity in the H-GAC region. Diverting organics to separate processing facilities, such as mulching and/or composting operations is a strategy to minimize waste entering MSW landfills. However, organics have traditionally been one of the more difficult material streams to manage in the region due to the different markets and collection methods inherent with this type of material.

There is no waste characterization data available for the H-GAC region that indicates the quantity of organics disposed by public institutions. However, according to studies developed by the U.S. EPA, approximately 25 percent of the MSW disposed is composed of organics such as yard trimmings and food scraps.¹ Based on this estimate, approximately 631,172 tons of food scraps and yard trimmings will be disposed in 2010 by commercial entities in the region.

By diverting organics from the identified facilities in the H-GAC region, a significant portion of the capacity in the region's landfills can be preserved for future use. For this study, R. W. Beck estimated the impact on regional disposal capacity if the commercial sector diverted organics, specifically food scraps and yard trimmings.

It is unknown at this time how much of the commercial organics stream can feasibly be diverted. Because of this, R. W. Beck conducted a sensitivity analysis to determine the impact on regional disposal capacity given organics diversion of 25 percent, 50 percent, or 75 percent from the commercial waste stream. Table 3-3 shows the results of this analysis.

Table 3-3
Organic Diversion Analysis for 2010

	25% Diversion	50% Diversion	75% Diversion
Commercial Waste Stream (tons)	2,524,687	2,524,687	2,524,687
Organic Material (tons)	631,172	631,172	631,172
Organic Material Diverted (tons)	157,753	315,586	473,379

¹ Source: *Municipal Solid Waste in America, 2007 Facts and Figures*, U.S. EPA

As can be seen from this table, the diversion of any portion of organic waste from the MSW stream has an effect on the disposal capacity for the region. However, as discussed in the following section, the capacity in the H-GAC area for processing this diverted organic waste may prove to be a limiting factor for organics diversion.

3.2 Organics Processing Infrastructure

Management of organics in the region is generally handled in one of two ways: landfill disposal or processing at a mulch and/or composting facility. Figure 3-1 is a map of the identified composting and/or mulching and grinding facilities in the H-GAC planning region. The names of the facilities are shown in Table 3-4. More detailed information concerning these facilities can be found in Appendix B.

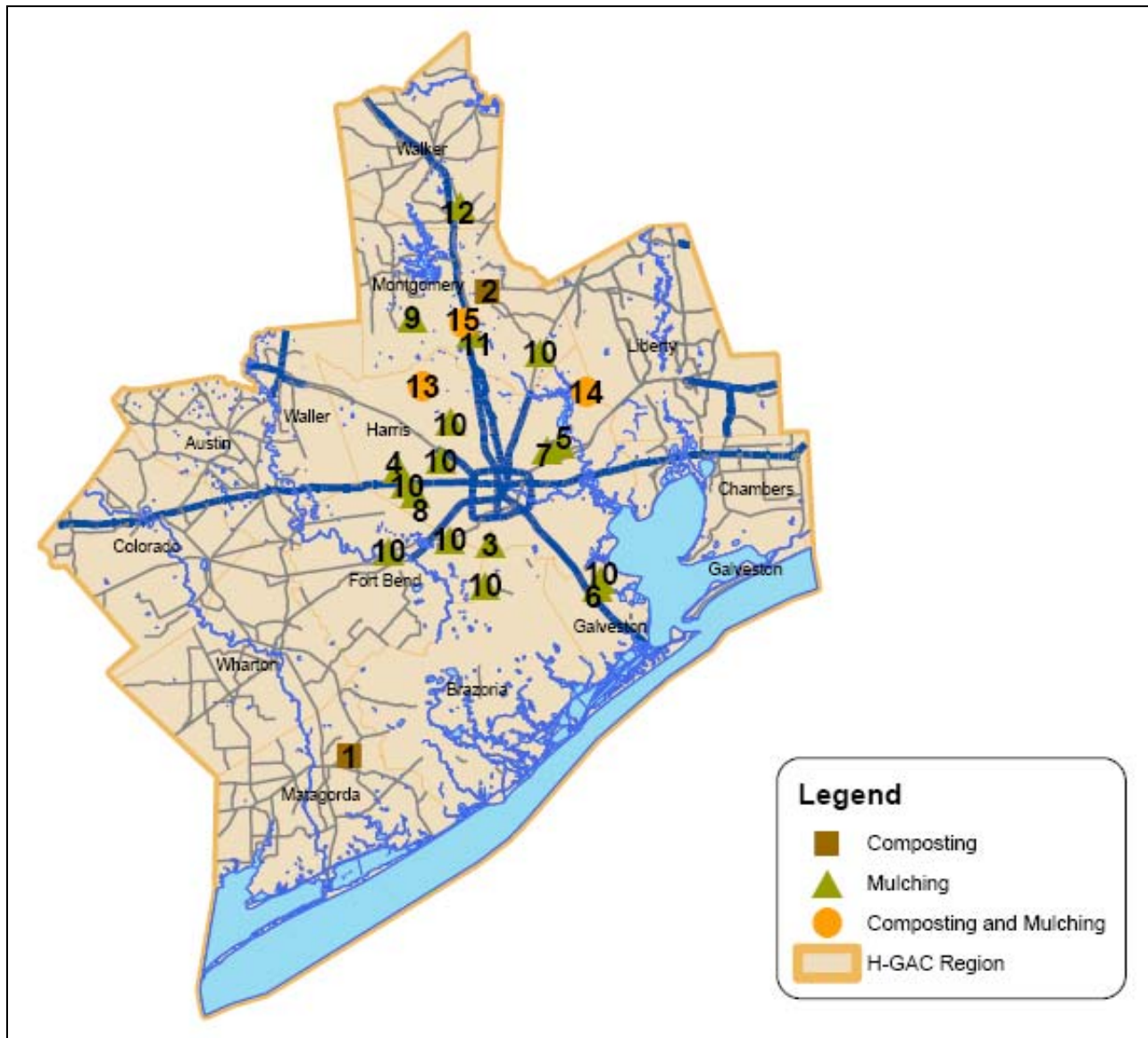


Figure 3-1: Map of Composting and Mulching Facilities in H-GAC region.

Table 3-4
Figure Legend

#	Facility	#	Facility
1	Don Tol Compost Facility	9	Texas Landscape Products
2	New Earth Compost	10	Living Earth Technology Co.
3	CASCO Hauling and Excavation Landfill	11	Timber Solutions, Inc.
4	Greenhouse Road Landfill	12	Landscapers Pride
5	Just Wood and Mulch	13	Mulch King
6	Novus Wood Group	14	JMJ Organics Materials
7	Mulch Matters	15	Natures Way Resources
8	Champion Landscape Supplies		

As seen in this figure, most of the processing facilities in the region are for mulching only, and not composting. Mulch facilities are limited to accepting landscaping trimmings and other green waste and generally cannot process food waste.

There are many barriers that have been identified that help to explain the limited capacity for composting in the region, as described below.

3.2.1 Regulatory

The Texas Commission on Environmental Quality (TCEQ) regulations in TAC Chapter 30 § 332 outline the requirements for composting facilities. These regulations can be somewhat confusing and it can be a difficult task to discern what level of regulation is needed for a facility. In addition, further coordination with entities beyond TCEQ, such as local governments and fire departments, is recommended.

TCEQ requirements indicate that for facilities which only process source-separated yard trimmings, clean wood material, vegetative material, paper and manure, there is no need to provide a permit, registration or notification for the facility under composting requirements. However, these facilities must follow the requirements of an exempt recycling facility which denote the limitations on storage as well as the reporting and recordkeeping requirements.

Other operations, such as those accepting food waste, have a more in-depth regulatory requirements with the TCEQ, depending on the specific material being processed and the location of the facility. Specific regulatory requirements related to composting facilities are as follows.

- **Operations requiring notification:** Facilities that compost any source-separated meat, fish, dead animal carcasses, oils, greases or dairy materials must register a Notice of Intent to Operate a Compost Facility with the TCEQ 30 days prior to construction of the facility.
- **Operations requiring registration:** Facilities that compost additional materials including, but not limited to, municipal sewage sludge must apply for a registration with TCEQ. These facilities are also subject to more detailed location, operating, and reporting requirements than facilities requiring notification.

- **Operations requiring a permit:** Facilities that compost mixed municipal solid waste (MSW) or grease trap waste must apply for a TCEQ permit for the composting facility. In addition, facilities requiring a permit must comply with end-product standards and submit monthly and annual reports which detail the sampling and analysis of final product characteristics.

3.2.2 Economic

There are various economic barriers to expanded mulching and composting in the region. The primary barrier is the relatively inexpensive cost of disposal in the region. R. W. Beck provided the reported landfill tipping fees for regional disposal facilities in Table 3-5. The tipping fees shown in this table are based on reports provided by the facilities to TCEQ.

Table 3-5
Disposal Costs within the H-GAC Region

Facility	Disposal Fee ¹ (Per ton)	Facility	Disposal Fee ¹ (Per ton)
Coastal Plains Landfill	\$16.58	Greenhouse Road Landfill	\$8.00 per CY
Security Landfill	\$19.42	North County Landfill	\$7.19 per CY
Sprint Fort Bend County Landfill	\$7.50 per CY	Cougar Landfill	\$15.00
Ralston Road Landfill	\$5.00 per CY	Fort Bend Regional Landfill	\$15.00
Altair Landfill	\$13.63 per CY	Addicks-Fairbanks Landfill	\$22.00
Galveston County Landfill	\$32.00	McCarty Road Landfill	\$32.00
Whispering Pines Landfill	\$25.00	Baytown Landfill	\$21.17
Atascocita Landfill	\$15.03	Seabreeze Environmental Landfill	\$22.75
Chambers County Landfill	\$60.00	Greenshadow Landfill	\$21.00
Blue Ridge Landfill	\$38.41	Hawthorn Park Landfill	\$26.52
Fairbanks Landfill	\$16.08	Tall Pines Landfill	\$5.00 per CY
WCT/Greenbelt Landfill	\$5.00 per CY		

As shown in the table, the average cost of disposal in the region is about \$25.00 per ton or \$7.00 per cubic yard. However, disposal costs in the region can be as low as \$15.00 per ton or \$5.00 per cubic yard. This is relatively low compared to other areas of the United States. The relatively low cost of disposal creates an economic disincentive for recycling and organics diversion activities.

3.2.3 Educational

Another significant barrier to expanded mulching and composting operations in the region is lack of awareness about these methods as viable disposal alternatives for organic materials. Based on conversations with area institutions and processors, there is a need for greater education and awareness regarding the following:

- The uses and benefits of mulch and compost

- Identification of true mulch and compost vs. products that may be mislabeled as mulch and compost
- Availability of mulching and composting operations as a way to divert organic materials

3.3 Governmental Regulations, Policies, and Goals

The limited amount of organics diversion in the H-GAC region and across the State of Texas can be partially attributed to a general lack of regulation related to recycling and waste diversion. However, although diversion is not mandated, both H-GAC and the State of Texas have adopted diversion goals.

The Omnibus Recycling Act of 1991, helped establish the first statewide recycling goal for MSW in the State of Texas. The statewide diversion goal, as stated in this Act, was 40 percent by January 1, 1994. This legislation mandated that the General Land Office (GLO), the Railroad Commission of Texas, the Texas Department of Commerce and the TCEQ conduct a study to develop a market-stimulating strategy for the sale of recycled goods. Furthermore, the legislation mandated state agencies to preferentially purchase recycled materials over non-recycled materials among other provisions.

As an addendum to this Act, further legislation was passed in 1993 which altered the 40 percent recycling goal established in 1991 to instead embody a 40 percent waste reduction goal. This legislation specifically encourages source reduction and recycling throughout the State.

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Section 4

SETTING INCENTIVES FOR GENERATORS, HAULERS, AND PROCESSORS

Organics diversion requires cooperative participation from generators (e.g., institutions), haulers, and processors of organic material. This section summarizes existing and potential incentives for each group of stakeholders that can encourage or mandate participation in organics diversion efforts.

4.1 Incentives for Public Institutions

4.1.1 Regulatory

Although uncommon in Texas, local governments have the option to mandate organics diversion by ordinance.

Mandatory Program Development

Mandatory program development ordinances generally require that the management of public facilities develop programs for organics diversion. For example, the City of San Francisco mandates that all managers of public facilities develop organics diversion systems, including provision of labeled containers, for use by employees or occupants of public facilities.¹ Managers must also continually educate the employees or occupants of public facilities on how to properly source separate materials for composting. A copy of this ordinance can be found in Appendix C.

Mandatory Recycling Rate

Some communities choose to require public institutions and other commercial entities to demonstrate that they have achieved a specific recycling rate. These ordinances incent organics diversion if they are set at such a level that it is difficult to achieve the mandated rate without diverting organics. Mandatory recycling rates are more common on the West Coast, particularly in California.

Disposal Bans

Disposal ban ordinances prohibit public institutions and other commercial establishments from disposing designated materials. In addition, these ordinances can prohibit disposal facilities in the community, such as landfills and transfer stations, to accept prohibited materials for disposal. Disposal ban ordinances are commonly enacted in conjunction with a mandatory recycling ordinance.

¹ This ordinance extends beyond public facilities and applies to all residents and businesses in the city.

Communities also have the option to enact disposal bans via a contract with a solid waste service provider. For example, the City of Arlington, Texas requires that its residential solid waste hauler not collect grass clippings from residential customers. This “Don’t Bag It” program is not included in the City’s code of ordinances.

4.1.2 Economic

Waste Disposal Cost Reductions

Many generators are motivated to participate in organics collection programs by the potential for cost savings on solid waste disposal. Understandably, institutions need incentives to be motivated to change their material handling procedures.

Most institutions tend to understand that organics collection is a valuable service for which there will likely be a fee. Still, they generally seek to pay less for this service than they pay for an equivalent level of waste service. Typically, the difference in rates between organics collection service and waste collection service is called a discount, as in “organics collection service is charged at a 50 percent discount to the waste collection rate.” Examples of this type of incentive structure include:

- In the City of Seattle, Washington, rates for commercial composting bins are 30 percent less than commercial refuse bins.
- The City of McAllen, Texas provides commercial collection of organics to grocery stores for a discount of approximately 50 percent. Collection is conducted using four cubic yard containers and customers are charged for collection of two cubic yard containers.
- The City of San Francisco’s rate structure includes a discount that can be up to 75 percent less than the waste collection rate.
- The City of Plano, Texas incentivizes its food scrap collection program by providing the service at no charge. The City is able to recover the cost to provide service through revenue from the sale of mulch and compost.

Some Texas businesses are experiencing cost savings as a result of diverting materials to organics programs. For example, Plano's Krispy Kreme Doughnuts, which earned the City's 2006 Environmental Star of Excellence Award for Outstanding Recycling Newcomer, experienced annual waste disposal savings of about \$7,500 by participating in organics diversion. Instead of having two, eight cubic yard trash dumpsters serviced six days per week, the restaurant now has a single eight cubic yard trash dumpster serviced six days per week and recycles an average of 15 tons of organics per month.²

Grant Funding

For institutions that seek to process yard trimmings and/or food scraps on site, there can be opportunities to leverage funding from national, state or local sources to help

² Source: *Organics Recycling Program Shows Continued Growth*, Andrea Allston, Biocycle August 2007, http://www.jgpress.com/archives/_free/001407.html

with capital investments. For example, many state, regional, and local governments offer grants to assist organizations in purchasing on-site composting and grinding equipment.

H-GAC administers the Solid Waste Grants Program in which it distributes grant funds made available through the TCEQ. However, these grant funds are only distributed to local governments or to public or private entities that partner with local governments for a particular program. Also, according to state law (Section 361.014 (b) TX Health & Safety Code), a project or service funded under this program must promote cooperation between public and private entities, and the grant funded project or service may not be otherwise readily available or create a competitive advantage over a private industry that provides recycling or solid waste services.

Tax Deductions

Lastly, there is an opportunity to take advantage of existing tax deductions for donating edible food and other items to non-profit organizations. Some institutions, for example, might consider donating usable plants, such as still-fresh floral arrangements, after major events.

4.1.3 Other

Organics management programs have non-monetary benefits for public institutions, including the following.

Awards and Recognition Programs

Local governments can incentivize organics diversion by creating an awards and recognition program for public facilities. Awards and recognition programs are directed towards the generators of the organic material. These programs typically provide public recognition for public facilities that have developed exceptional or innovative programs. Publicly commending organics diversion initiatives provides positive publicity, which encourages continued efforts.

Employee Benefits

Organics diversion programs can provide many benefits to employees of public institutions, including the following:

- **Job satisfaction:** Employees generally want to participate and to be recognized for meaningful work that provides some larger benefit to the community. Job satisfaction can also be linked to greater employee productivity.
- **Skill development:** Most employees want to improve their job skills. Initiating an organics collection program provides a venue for employees to have leadership opportunities, from informing program development to setting up program logistics to training their peers. Employee support and involvement is critical to the success of organics diversion programs.
- **Worker Safety:** Initiating new programs often highlights existing practices or equipment that can be improved to foster better conditions for employees at all

levels. For example, keeping wet organics out of a leaky trash dumpster and putting it instead in a well-sealed, regularly emptied organics container can help reduce or eliminate employee slips and falls.

Reduced Nuisance

Organics collection programs can offer an opportunity to increase the frequency of collection service for putrescible materials. Not only does the increased frequency reduce the chance for objectionable odors and vectors, so does having new, smaller, well-sealed, lockable organics containers to use instead of older and larger refuse collection containers.

4.2 Incentives for Haulers

Local governments and their customers are the key actors who set incentives for participation for waste haulers in organics collection programs. Below are some incentives and regulations that can be put into place by local governments and public institutions to incent haulers to provide organics collection service.

4.2.1 Regulatory

In addition to ordinances pertaining to generators of organics, local governments have the option to mandate that haulers participate in organics diversion efforts. This typically occurs via an ordinance requiring that haulers offer organics collection service to commercial customers.

Mandatory Hauler-Provided Recycling Service

Local governments can require haulers to provide recycling services to public institutions and other commercial customers. This type of ordinance places the burden of compliance on the hauler rather than the generator of organic material. This type of ordinance typically requires haulers to do the following:

- Provide organics collection containers
- Collect organic material with a specific frequency
- Notify the participating customer of the program and its requirements
- Provide reports to local governments regarding the quantities of material collected

It is important to note that this type of ordinance should only be enacted in a local government that has the infrastructure in place (e.g., processing facility) to divert organic material. The City of San Francisco's mandatory composting ordinance also includes requirements for solid waste collection service providers. A copy of this ordinance can be found in Appendix C.

4.2.2 Economic

Public institutions and local governments can provide economic incentives for haulers to provide organics collection service. Franchise fees are one option for local

governments to provide incentive for haulers to collect organic materials. Resource Management Contracting represents an approach that public institutions can take to incent waste management contractors to minimize waste disposed.

Franchise Fees

In order to incent haulers to recycle, local governments can charge lower franchise fees to haulers that offer organics collection service to customers. The difference in franchise fees should be large enough to provide sufficient incentive to participate.

Disposal Surcharges and Fees

A community can provide incentive to recycle organics by enacting an ordinance that requires collection service providers to pay a surcharge or fee for the disposal of organics at facilities under the community's jurisdiction. This type of ordinance is most appropriate if the community owns the landfill or transfer station where most of the waste in the jurisdiction is disposed. Implementing a surcharge or fee for organics collection service providers establishes a clear incentive to recycle.

Resource Management Contracting

Resource Management (RM) is an innovative contracting strategy that aims to compensate solid waste contractors based on efficient management of resources rather than on the volume of solid waste disposed. The concept was originally pioneered by General Motors Corporation (GM) in working with contractors for chemical purchasing, use, and management. The U.S. EPA, through its WasteWise program, has partnered with GM to produce resources to help organizations utilize RM contracting strategies.

The primary principle of RM contracting is to structure the financial terms of contracts with waste haulers such that the cost savings and financial benefits associated with recycling flow back to the contractor if diversion goals are met. The financial benefits of recycling include:

- Disposal cost avoidance; and
- Recycling revenue.

Further resources on RM can be found through the U.S. EPA.³

4.3 Incentives for Processors

4.3.1 Regulatory

Funding opportunities also exist for organics processors. For example, as provided by the Texas Health and Safety Code,⁴ the operator of a public or privately owned MSW facility may be eligible for a rebate of up to 20 percent of the solid waste fees

³ <http://www.epa.gov/osw/partnerships/wastewise/wrr/rm.htm>

⁴ Chapter 361, Section 361.0135 and Title 30 Texas Administrative Code, Chapter 330, Section 330.677

collected by the facility. To be eligible for the rebate, the operator of the facility must submit a composting plan to the TCEQ and receive written approval of the plan.⁵ It is important to note that this rebate only applies to composting facilities owned by entities that have permitted MSW facilities (e.g., landfills, transfer stations) and not to independent compost companies. However, MSW facilities may choose to partner with independent compost companies in order to receive the rebate.

4.3.2 Economic

The primary economic incentive for processors to participate in organics diversion in the region is demand for service from institutional customers and local governments. Demand for processing service, and adequate compensation for service provided, is the best way for local governments, institutions, and haulers to ensure participation from processors.

When entering into service agreements with processors, it is critical for institutions, haulers, and local governments to consider the following.

Enter into Long-Term Contracts with Processors

R. W. Beck recommends that contracts with processors of organic materials be from five to seven years in length. If the processor has assurance of receiving material over a period of time, they can continue to make investments in the facility and program and have greater financial viability. The primary reason for longer contract terms is to allow contractors to recover the capital cost of equipment (e.g., vehicles, carts) purchased to provide the collection service. Since renewal terms are not guaranteed, contractors will likely depreciate these capital costs exclusively over the initial contract term. Therefore, longer contract terms can result in lower cost to the customer.

Pay Processors an Adequate Service Fee

Processors provide a valuable service in providing a disposal alternative for organic materials, and there are significant capital and operating costs in order to process organic material. Processing fees are intended to provide a mechanism for the contractor to recover the costs of providing this service to its customers.

Processing fees are typically administered on a per-ton or per-cubic yard basis, depending on whether the processing facility has a scale. There are many factors that determine the processing fee charged to a customer, including the following:

- Volume of material
- Level of competition in the marketplace
- Materials processed
- Term of contract
- Inclusion of contaminants (e.g., plastic bags)

⁵ Source: Title 30 Texas Administrative Code, Chapter 330, Section 330.677

Section 5

DEVELOPING AN ORGANICS MANAGEMENT SYSTEM

This section provides information for implementing a successful institutional organics program for on-or off-site processing. There are many steps in the implementation process, and some steps may vary in scope and sequence, depending on the individual institution.

This section provides explanation of the following aspects of an organics management system:

- Development of a collection system for organic materials to be diverted;
- Development of employee educational tools;
- Available methods of organic material source reduction; and
- Program “keys to success”.

5.1 Developing the Collection System

Taking the time to design a proper collection infrastructure is critical to the success of any recycling program. The steps described below are intended to guide institutions of all types through the process of creating an efficient and effective source-separated organics collection system.

Step 1: Conduct a Waste Audit

The goal of the audit is to determine the amount of organic material generated to ensure an adequate number and size of interior and exterior containers for collecting material. This information is also used as a baseline to measure the program’s success and future improvements. Simple instructions for conducting your own visual waste audit follow.

- **Set aside waste.** Work with your custodial staff or contractor to set aside waste from at least one day of regular business operations. Place the waste materials open on a tarp or tarps.
- **Measure the volume of waste.** Record the length, width and height of the pile.
- **Note number of hours or days over which waste was collected.** This information allows you to extrapolate waste amounts for a longer time period.
- **Open the bags of waste.** Use a box cutter to split open the bags of waste. You can choose to either empty the bags onto the tarp or if you are able to observe all the contents of the bag, leave the waste bagged for easier clean-up.
- **Photograph waste.** Take multiple photographs of the waste, including, if any, materials of particular note (e.g., significant quantities of food scraps and other organic materials).

- **Note all materials present.** In the left hand column of your list, make a note of every material you see in the waste. Next, note what broad material category each belongs to (i.e. paper, plastic, metal, organic)
- **Estimate composition by volume for each material present.** Beginning with the most commonly present material, estimate visually its percentage by volume. [*Tip: Imagine you are filling empty garbage bags with the different materials you have found present in the waste. Each material gets its own bag. Next imagine how many bags you might fill with one of these materials (such as plastic packaging which is voluminous) compared to the number you would fill with another material (such as newspaper, which is denser and therefore, occupies less space). This simple visualization exercise will allow you to estimate the percentage by volume of each material of the total waste sample*].
- **Repeat this process for each noted material.** The total of these percentage estimates should sum to 100%.

Step 2: Appoint a Program Manager

This person will oversee the new organics recycling program. The program manager will be responsible for monitoring organics collection activities, ensuring that employees and volunteers are well trained regarding program details, and tracking and reporting the results of the program to company leadership and staff.

Step 3: Determine Whether to Process Materials On-site or Off-Site

Several institutions with substantial landscaping and grounds maintenance operations may decide to collect and process landscape trimmings separately from the rest of the organics stream. Landscape trimmings are much more easily managed on-site than is the broader category of compostable organics.

If processing of some or all of the organics will occur off-site, then see Step 4.

For example, an institution could use the following on-site processing techniques for landscape trimmings:

- **Grasscycling** – Leaving the grass on the lawn, using mulching mowers.
- **Passive Composting** – Creating modest size (approximately one to five cubic yard) piles of leaves, and letting the material degrade slowly over time without human intervention.
- **Chipping or Grinding** – Using a mobile chipper or grinder to reduce the size of woody landscape trimmings, such as branches, to create mulch or wood chips.
- **Passive Aeration Composting** – Using perforated pipes placed in windrows to provide passive aeration.
- **Hand Turning of Compost Piles** – Having people turn small compost piles (less than three cubic yards) by hand.
- **Simple Mechanical Turning of Compost Windrows** – Typically using various attachments to tractors and related equipment that mechanically aerates windrows.

- **Other Techniques** – Other techniques blend yard trimmings with other organics, such as small in-vessel composting units that can handle a broad range of organics and rudimentary vermicomposting systems that can handle vegetative food scraps and landscape trimmings.

Considerations that institutions must address prior to processing organic materials on site typically include, but are not limited to:

- Feedstock type, quantity, and quality
- Seasonality of materials generation
- Seasonality of labor
- Available space
- Nearby land uses
- Various processing site considerations, including available utilities, site surface, access and egress, and traffic flow
- Equipment needs and ability to re-purpose existing equipment
- Operating and capital costs
- End product quality and possible uses
- Site security
- Local regulations and requirements

Step 4: Select a Collection Company

For off-site processing, determine which companies are available to provide collection services. If multiple collection companies provide these services, consider developing a Request for Proposals (RFP) to take advantage of the most competitive pricing for collection and processing services. If unable to secure adequate service at a reasonable price, consider self-hauling organic materials to an organic materials collection or transfer location or directly to a processing site.

Step 5: Identify Outdoor/Back Area Collection System

Assuming that food scraps are to be collected, identify and select the outside, loading dock, or back area organics collection system that is appropriate for the location. The determination of what system to put in place is based on various factors, which typically include:

- **Waste generation data** – How much material is generated? Is it primarily heavy, wet food scraps or lighter food mixed with compostable paper or yard trimmings?
- **Facility layout** – The layout should be designed to minimize employee labor and injuries, which may mean installing automated lifts or a ramp for employees to easily dump the contents of containers into dumpsters.
- **Storage considerations** – Storage is important both in terms of capacity and avoiding nuisances. If the organics stream is mostly food scraps, then storage

capacity might need to be less given more frequent collection service (to minimize odors and other issues).

- **Timing of receiving operations** – Receiving operations should be timed to minimize disruptions from organics collection. In addition, perishable food should be quickly transported to refrigerators or freezers to ensure a longer shelf life and improved food safety.
- **Aesthetics** – Keep in mind areas that organics collection containers may create a visual nuisance or an odor, similar to a refuse container. For example, staging an organics dumpster near a guest room on the first floor of a hotel is likely not an optimal location.
- **Other factors**, as determined by the general or operations manager.

Step 6: Determine Number and Type of Outdoor Containers

Depending on the hauler of organic materials including food scraps, institutions may have a choice of outdoor container types and sizes, such as:

- Carts: typically in 32-, 64-, or 96-gallon size; wheeled; lidded; lockable;
- Rear- or front-load dumpsters: one, two, three, and four cubic yard size; lidded; lockable
- Loose roll-offs: often 10 to 20 cubic yards in storage capacity
- Compacted roll-offs: of various sizes, ranging from a few cubic yards to 20 cubic yards or more

Some institutions may choose a certain configuration of outdoor organics containers based on logistical and space considerations while others may choose solely based on cost of service. Sometimes, the type of exterior storage containers will be initially determined by the hauler's trucking capability and compatibility with the institution's receiving area.

Carts are regularly used to collect and store food scraps and an incidental amount of food-soiled paper, particularly in restaurants and food service facilities that do not generate a large weekly volume of organics. Carts are not normally used for the collection of large quantities of brush or landscape trimmings, waxed or wet cardboard, wood, or other bulky compostable materials. Carts are advantageous when space, capital expenditure limits, or operational limitations preclude self-contained compactors, roll-offs, or dumpsters. Sometimes, carts can be placed directly in food prep areas or workstations, filled directly with compostables, and rolled to the back of the food preparation area or facility for emptying.

Carts can be stored on back loading docks, in back room service areas, or even in unused refrigerated space until the day of collection. They can be lined with bags, a broken down cardboard box, or left unlined, depending on the logistics of cleaning the carts after use. Typically, haulers dump the contents of carts into collection vehicles and transport the compostables to the receiving facility more than once per week and often more than twice per week.

Dumpsters may be used for collection if there is easy access to the collection area by the hauler and if space allows. Waxed cardboard, scrap wood, and other bulky organic materials (such as discarded large indoor plants) can be added more easily to bins and dumpsters than to carts. Dumpsters may be emptied one or more times per week, depending on volume and other considerations.

Dedicated organics roll-offs or compactors can be used to capture compostable materials from high-volume operations. This option can be particularly attractive to institutions that experience pulses of materials flow, such as sports stadiums or convention centers. In some cases, space exists for the placement of a new dedicated organics compactor. Alternatively, this option may require the conversion of an existing compactor used for trash to one dedicated exclusively to organics, at which point alternative trash or cardboard collection options are developed. It is important to weigh the capital costs for the installation of an organics compactor against the potentially offsetting cost savings resulting from the efficient collection, transport, and diversion from a disposal site of a high volume of organics.

Step 7: Determine Number and Type of Indoor Containers

It is important to focus on those areas where organic materials are generated, such as kitchens, banquet rooms, and landscaping areas. For some institutions, individual employee workstations may be cumulatively the largest generator of organics. Engage staff responsible for using and emptying waste containers in those areas to determine what types of containers will best meet their ergonomic and work space needs. For example, it may work better to have a central organics container in a break room or at kitchenettes in close range of a cluster of individual employee workstations.

Other important bin considerations and options include:

- Placing organic collection bins next to waste and recycling bins, whenever possible. This minimizes cross-contamination in all bins and if designed correctly, minimizes waste disposal.
- Consider re-purposing existing waste bins as organics bins. One can use paint, signage or lids to distinguish them from waste bins.
- Smaller buckets or countertop bins can be used to capture food scraps from kitchen prep, coffee or bussing stations.
- Bins designed for indoor use are often not effective in outdoor environments. For instance, they are often not durable enough to withstand outdoor conditions, precipitation, or other problems.
- Consider purchasing smaller bins for organics collection as these materials are much heavier than garbage or dry recyclables.

Step 8: To Bag or Not to Bag?

When it comes to bag liners for organic materials collection, there are more options than the typical plastic bag.

- **Some facilities choose to go bagless** and clean their bins regularly to minimize odor and insect problems. This is the least expensive option from a liner purchasing standpoint but requires labor to maintain the bins.
- **Others continue to use a plastic liner**, emptying the contents of the liner in the organics dumpster and dispose of the bag in the waste dumpster. This option keeps containers clean, does not require purchasing changes, but can pose ergonomic challenges at the dumpster and may add labor (i.e. if dumpsters are located in separate areas, staff spend time taking liners from the organics to the waste dumpster.)
- **Still others prefer using compostable liners**, which involves some up-front work on purchasing decisions, but minimizes labor as the liner keeps the container clean and gets tossed into the organics dumpster along with its contents. Performance is improving with these liners; however, they typically cannot hold the same weight as a conventional plastic liner.
- **Kraft bags present a viable alternative to bioplastics.** These bags are typically used for collection of yard trimmings but can also be used to line food scrap collection containers. However, if Kraft bags are used, R. W. Beck recommends that the material holding time not exceed two to four days.

Step 9: Determine Any Additional Equipment Needs and Costs

In addition to collection bins and dumpsters, a facility may also require equipment for the loading dock, such as mechanical lifts or tippers to transport and transfer organic wastes from interior collection containers to the materials transport containers efficiently and safely. Additionally, for very large institutions, mechanized systems (e.g., freight elevators, conveyors) or vehicles (e.g., forklifts, pick-up trucks, etc.) may be needed to transport organics long distances to a centralized location on the premises. It is important to factor in any other costs and avoided costs associated with organics collection at individual institutions.

Step 10: Conduct Staff Training

Staff training which results in a sustainable change in organizational behavior with respect to materials handling is critical to program success. Thorough training should be completed before the program commences and should continue as new staff are hired. An annual re-fresher training, similar to other annual compliance training sessions, can be very helpful. Adding language about waste and recyclable and organic materials management to written job descriptions can help to reinforce the training.

Step 11: Place Collection Equipment and Educational Materials in Appropriate Locations

Once the staff is prepared for the new program, and the collection and transportation system is ready, place labeled organics containers and signage in appropriate locations. Interior organics containers should be as visible and accessible, if not more so, than trash bins. They should be placed at workstations in all areas where organics are handled, such as salad preparation areas, general food preparation, baking, and

dishwashing areas. Ideally, equipment would be positioned during or immediately after staff training.

Step 12: Start the Organics Collection Program

Staff tend to respond better to the new program when managers demonstrate that the program is important to the institution. It can be useful to post information about the program for customers and others, such as vendors, to see. It is important to make sure that all staff—from purchasing to food service to housekeeping to custodial to security—are aware of the new program and the cultural change expected.

Step 13: Monitor and Provide Quality Control for the Program

Continue to monitor and provide quality control of the organics collection program. Continual and sustained attention is required to create a waste reduction-oriented, recycling-positive organizational culture. Once the program is well established, monitoring, quality control, and periodic re-fresher or spot trainings as necessary, become the key aspects to maintaining program effectiveness. New habits take time to become second nature, so a long-term commitment will be necessary to ensure that the cultural change at the facility has occurred.

Step 14: Report Results to Stakeholders

Periodically, report results about the program—especially materials recovery, cost savings, and anecdotes about program acceptance—to leadership groups within the institution, to staff who are directly involved with the program, and to customers. As needed, discuss changes that should be implemented to improve the program.

Step 15: Re-Invigorate and Expand the Recycling Program

Assuming that the institution already has a recycling program, the implementation of an organics collection program usually brings with it opportunities for an institution's recycling program to achieve greater success. When food scraps and soiled paper are placed in organics containers, it becomes more readily apparent to observers the relative amount and type of recyclables that continue to be discarded in the trash. Re-fresher training about waste reduction and recycling can accompany initial and re-fresher training about organics collection.

5.2 Educational Tools

5.2.1 Posters

If designed and placed properly, posters and other signage can dramatically increase participation and minimize cross-contamination in organics collection programs. Effective posters and signs are:

- **Employee endorsed.** Posters should be used as part of the educational and engagement process with employees. This is important because they will know

best where to hang the posters. Employees may also have ideas about how to customize the poster design and content.

- **Suitable for all audiences.** Design posters to educate people of various ethnic and linguistic backgrounds. This is typically accomplished by using images, colors, and universal symbols. For example, a green background could indicate acceptable items to place in the green organics bin, and images of common types of acceptable food and other could replace the use of text.
- **Not to be missed.** Posters should be hung in places the user is likely to notice when placing discarded items in containers. For example, posters can be hung at eye level in front of the organics container and placed on the lid and all sides of the container. This way, even if the container is moved or is placed in a different position, the user is still likely to notice the posters. Posters could also be placed in high visibility areas such as in employee break rooms.
- **Rotate posters.** Moving or changing posters periodically will capture employee attention and refocus on the content of the posters.

5.2.2 Stickers

Much like the posters described in the previous section, stickers can serve to enhance participation and minimize contamination. Stickers are typically used in the following applications:

- **Container decals.** These stickers are most commonly placed directly on the sides, on top of, or inside the lid of an organics container to indicate to the user the materials that should be placed within it.
- **Window clings.** These stickers are typically used for recognizing organizations that are effectively participating in an organics, recycling or green program.

The same best practices in the previous section for posters apply to stickers (e.g., employee engagement, design, and placement).

5.3 Utilize Available Methods of Source Reduction

5.3.1 Food Scrap Source Reduction Methods

R. W. Beck provides discussion of available food scrap source reduction methods in Section 2.4.1 of this Manual.

5.3.2 Source Reduction of Organic Residuals from Landscape Management

There are many landscape strategies available to reduce the amount of waste generated from on-site landscaping activities. In addition to waste reduction, these strategies can have other environmental benefits, such as reduced irrigation needs. Some of these strategies are listed below.

Select Appropriate Turf Varieties

Choosing turf varieties that are best suited to the growing conditions of the area will reduce the need for extra water and fertilizers and will have the effect of slower growth rates and reduced need for mowing. For instance, if institutions in the region were to move away from St. Augustine toward different turf varieties, the need for water and fertilizer could be reduced. Some turf varieties available for the region include:

- St. Augustine, which requires the most water and fertilizer;
- Zoysia and Bermuda, which require less water and fertilizer; and
- Buffalo grass, which requires the least amount of water and fertilizer.

Grasscycling

Leaving the clippings in place after mowing not only reduces the amount of trimmings to be managed, but also recycles the nutrients back to the soil. The techniques mentioned below can also reduce residuals. Some particular techniques which can reduce residuals are:

- Raising the height of the mower blade;
- Sharpening the mower blade often;
- Mowing only when the turf is dry to eliminate clumping; and
- Using a mulching blade which cuts trimmings into smaller pieces.

Selection of Ornamental Plants

As with turf grasses, choosing plants that are well adapted to the area can have a big impact on the amount of material generated during maintenance. Strategies include:

- Choosing plants that require less trimming;
- Zoning ornamental plants by water requirements; and
- Selecting perennials instead of annuals whenever possible.

Leaf Management

Up to 80 percent of the nutrients taken from the soil by a plant are stored in the leaves. Recycling this valuable resource not only reduces the need for fertilizers, but also reduces the volume of material to be managed in an alternate manner. Strategies for leaf management include:

- Mowing over leaves on the turf which promotes the direct recycling of nutrients;
- Raking or blowing leaves into nearby beds or mulched areas; and
- Collecting for composting.

Mulching

The importance of mulching cannot be overstated. The benefits are outlined in section 2.3.2. Mulching also uses up a large amount of the residuals from landscape management. Strategies to enhance mulch practices include:

- Using organic mulches;
- Using mulch produced from local vegetation;
- Underlying the mulch with newspaper to suppress weeds; and
- Applying properly sized material in appropriate rates according to the particular plant's need.

Extend Mulched Areas

All plants will benefit from being surrounded with mulch. Increasing the area of mulched beds will not only use more material but will also create better definition. Benefits of extending mulched areas include:

- A decrease in the skill required to properly edge long sweeping curves as opposed to short abrupt corners;
- The creation of a larger palette upon which to place color plants;
- The utilization of more of the organic material created during routine maintenance;
- Improved protection of tree roots;
- An increased ability to hold water;
- The addition of nutrients; and
- A reduction of the area requiring mowing.

5.4 Keys to Success

Other key elements of a successful organics collection program are presented below.

5.4.1 Gaining Management Support

Approach management early on to solicit their buy-in and ideas for program success. Demonstrate the financial, environmental, and social benefits of the program. Connect it to the institution's mission, increasing customer service, and other important organizational or strategic values. Encourage them to participate in a kick-off or launch event with employees. Demonstrate the applicability of this activity if the institution is engaging in any Leadership in Energy and Environmental Design (LEED) programs.

5.4.2 Engaging and Educating Employees

Employee support and participation are essential to the success of any organics collection program. Identify the "spark plug" employees at the outset of the program,

and leverage their interest and energy to help shape the program and inspire their peers. Employee-led efforts can take many forms, such as competitions between departments or parties that reward the highest levels of participation. Find ways for employees to have fun, to gain a sense of ownership over the organics program details, and recognize them for the program's success.

5.4.3 Evaluating the Program Over Time

Here are a few suggested strategies for optimizing performance after an institution's organics program is initiated:

- **Conduct facility walk-throughs.** Walk through the institution's facilities regularly to examine the program in action. Take note of activities that seem to be working well and those that need improvement. Ask customers or guests what they think of the program.
- **Audit containers.** Look at containers inside and out. Are there odor or insect problems? Spillage? Leakage? How are posters and stickers holding up? Are the correct materials going into each bin – organics, trash, and recyclables? What are the common contaminants and where are they coming from?
- **Solicit employee feedback.** Inquire with employees - during walk-throughs, use a traveling "in-box" for comments, complaints, or suggestions. Where are employees seeing success? What areas need attention? What are key challenges or obstacles to participating in the program? Employees see the program from the inside out, and often have a strong sense of seemingly minor ergonomic and logistical changes with respect to the handling of discarded materials that could improve worker productivity and sense of control. Leverage their experience, what they are observing about their peers and customers, and then use that information to constructively and responsively improve the program.

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Section 6

BIOPLASTICS: OPPORTUNITIES AND ISSUES

The use of bioplastics in the manufacture of food service products and container liners has become more prevalent in recent years. Institutional organics collection programs, to varying degrees, are experimenting with both types of products, as a way to increase convenience and to reduce contamination of the compostable stream with non-compostable materials.

6.1 Food Serviceware

The three primary types of bio-plastic food serviceware are shown in Table 6-1 and include:

- **Corn-based Polylactide (PLA):** PLA is produced from the polymerization of lactic acid. It is a very common biodegradable polymer that has high clarity for packaging applications.
- **Sugar Cane Bagasse:** Bagasse is the biomass remaining after sugarcane stalks are crushed to extract their juice.
- **Plant Starch Material (PSM):** The use of plant starches, such as from potatoes, is less common than corn-based PLA or bagasse. PSM is a material synthesized from several different vegetable starches.

Table 6-1
Types of Compostable Serviceware

	Corn-based Polylactide (PLA)	Sugar Cane Bagasse	Plant Starch Material (PSM)
Typical Products	PLA plastic and PLA-lined paper cups, containers, clamshells, and cutlery	Containers, clamshells, plates, and bowls	Cutlery
Heat Tolerance	Most products up to 110 degrees, select cutlery up to 135 degrees	Similar to tree based paper products, microwavable	Select cutlery lines up to 220 degrees
Benefit	Look and feel of traditional plastic and petroleum-based poly-coated paper products	Sturdy, grease and cut resistant, and microwave / freezer safe	Optimal for hot foods

Photos of the three different types of food service ware are shown in Figure 6-1.



Figure 6-1: Compostable Food Serviceware including PLA cups (left), sugar cane bagasse (middle), and PSM cutlery (right)

6.2 Cost Differences

Compostable plastic products are more expensive than conventional plastic products due in part to low production volumes. Increasing demand has been and is expected to continue to result in lower prices.

Currently, biodegradable plastic products range from being two to 10 times more expensive than their conventional plastic product counterparts. The cost for biodegradable PLA varies from \$1.50 to \$2.00 per pound. The high cost of the compostable plastic is a disadvantage when compared to paper, and other common plastic resins such as low-density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), and polyethylene terephthalate (PET).¹

The following more specific pricing information is based on information provided via the Costco Business Delivery online service, using common Houston-Galveston area zip codes.²

¹ Source: California Integrated Waste Management Board, <http://www.ciwmb.ca.gov/Publications/Plastics/43208001.pdf>

² Genpak plates and Eco-products clamshell are not available in Houston at this time.

Table 6-2
Cost Comparison of Compostable Serviceware

	Cups	Utensils	Plates	Clamshell
<u>Compostable</u>				
Brand	Eco-Products	Eco-Products	Genpak Harvest	Eco-Products
Product	Corn-Based Cold Cup	Vegetable Plant Starch Fork	9" Biodegradable Plate	8" Compostable Hinged Clamshell (PLA)
Quantity	16 oz 1,000 ct	1000 ct	125 ct	1 Compartment, 160 ct.
Item #	285694	285752	369910	262723
Price (Case)	\$128.05	\$69.17	\$19.09	\$72.14
Price (Per Unit)	\$0.13	\$0.07	\$0.15	\$0.72
<u>Recyclable</u>				
Brand	Solo	Dixie	Dixie	Reynolds
Product	Plastic Cold Drink Cups	Heavyweight Plastic Forks	8 1/2" Paper Plate	Easy-Lock
Quantity	16 oz/50 ct	White, 100 ct	Cherry Blossom, 276 ct	10" Hinged Container, 200 ct
Item #	Item # 117513	Item # 117095	Item # 994311	Item # 374080
Price (Case)	\$5.64	\$5.39	\$17.00	\$49.43
Price (Per Unit)	\$0.11	\$0.05	\$0.06	\$0.25
<u>Styrofoam</u>				
Brand	Dart		Hefty	Hefty
Product	Insulated Cups		9" Foam Plate	Foam Container
Quantity	16 oz/1000 ct		White 200 ct	9"/100 ct
Item #	Item # 121251		Item # 265999	Item # 39415
Price (Case)	\$38.99		\$9.76	\$11.11
Price (Per Unit)	\$0.04		\$0.05	\$0.11

6.3 Compostable Plastic Liners for Collection Containers

From the standpoint of a processor of organic material, traditional petroleum-based plastics often constitute a significant contaminant, both in terms of processing and for the final product. In many cases, compost facility operators do not accept such material, including plastic bags.

Consequently, the use of compostable plastic bags ("liners") for interior food scraps collection containers is favored by some institutions. In some cases, the ability to use these liners can help some wavering potential participating institutions join an organics collection program. Additionally, by using compostable plastic bags, institutions can reduce the overall contamination of the compostable stream by non-compostable plastics.

An institution starting to receive organics collection service faces several challenges. After setting up bins and educating staff to keep organics and trash separate, the most noticeable operational shift relates to bagging practices. There are several ways to eliminate non-compostable plastic bags from the compostable stream. The most common methods are:

- Use no liner for interior or exterior organics bins, and rinse interior and exterior bins after emptying them (“going bagless”).
- Continue to use traditional plastic liners for interior organics bins, emptying only the contents into the exterior organics bin for collection and disposing of the liner in the trash, or leaving it in the interior organics for re-use with additional loads.
- Use compostable liners in all interior organics bins.

Some institutions with space and facilities to rinse bins go bagless for their organics collection program. This method can be a significant change internally from bag-based materials management. In addition to reduced usage of bags, this method offers staff a clear visual cue to place only food scraps in unlined containers. However, this method requires more labor for cleaning and can cause more odor and insect issues in warmer climates.

Institutions that are concerned with the price of compostable liners, but which are unable to rinse interior bins after emptying them, often keep traditional plastic liners in the organics bins as in the second method described above. This method reduces the need for rinsing the interior bins, and may reduce liner usage if the bags are replaced only when necessary. It does not eliminate the need to rinse bins periodically.

The third method—substituting compostable liners in all interior compost bins—allows employees to continue the practice of bagging materials as they have in the past. Odors, pest problems, and the need to rinse bins are reduced because the food scraps are contained in a compostable bag. This method has the potential to attract institutions that otherwise would hesitate to participate, due to lack of rinsing facilities and concern about potential odor and vectors. This method, however, means that institutions pay more for a product that does not perform as well as traditional plastic bags.

Typically, compostable plastic bags are not as strong as most non-compostable bags. Insufficient strength of compostable or biodegradable but not necessarily compostable bags has been experienced by several San Francisco restaurants, for instance. Double-bagging may be one solution, which increases cost.

Compostable liner bags can cost several times more than standard polyethylene-based bags. From the perspective of food service managers, the price difference can affect substantially the economics of participation in an organics collection program. The following table provides more specific pricing information and comparisons for compostable and conventional container liners.

Table 6-3
Compostable vs. Conventional Plastic Container Liners: Pricing and Product Specifications³

	30 Gallon Bags	45 Gallon Bags
<u>Compostable</u>		
Brand	BioBags	BioBags
Product	32.3" X 41.3"	34.3" X 52.0"
Quantity	240 ct	192 ct
Item #	187626	187628
Price (Case)	\$203.60	\$208.44
Price (Per Unit)	\$0.85	\$1.09
<u>Conventional Plastic</u>		
Brand	Jaguar Plastics	Jaguar Plastics
Product	30" x 36" - Extra Heavy	40" x 46" - Extra Heavy
Quantity	100 ct	100 ct
Item #	JAGW3036X	JAGW4046X
Price (Case)	\$13.58	\$22.34
Price (Per Unit)	\$0.14	\$0.22

The equation of convenience, logistics, and economy is shifting in favor of compostable bags, as product demand, performance, and availability increase. Still, the need is substantial for higher-performing, reasonably priced, and readily available compostable plastics liner bags.⁴

6.4 Opportunities

The key opportunities bioplastics present to institutions include the following.

- **Streamline collection and education:** By utilizing bioplastics suitable for composting, institutions are able to simplify the collection of organics that is free from contaminants. By eliminating non-compostable plastics altogether, institutions can not only signal environmental awareness to its clientele, but it can make it easier for organics collection at both the back end (behind the scenes, pre-consumer) and the front end (post-consumer) of the food service area. In addition, eliminating contaminants such as traditional plastics can minimize employee labor required for such sorting at bussing and dishwashing stations.
- **Reduce demand for petroleum-based feedstock:** There is a larger environmental benefit associated with substituting petroleum with renewable and less toxic plant-based feedstocks in the production of bioplastic products.

³ Source: BioBag pricing: <http://www.ecoproducts.com>; Plastic bag pricing, <http://www.instawares.com>

⁴ R. W. Beck would note that paper Kraft bags can represent a viable alternative to compostable plastic bags for exterior bin lining purposes.

6.5 Other Environmental and Operational Issues

There are additional issues that must be considered before an institution decides whether to transition to bioplastics. These issues can be divided into two primary areas: environmental and operational.

6.5.1 Environmental

Important environmental considerations include:

- **Moving food crops into packaging feedstock:** One of the most commonly cited environmental concerns with bioplastics is diverting traditional food crops such as sugar cane, corn and potatoes into packaging and products.
- **Fueling unsustainable industrial agricultural practices:** Another common argument against the use of bioplastics is that its basic ingredients, in particular corn and potatoes, tend to be propagated by large-scale farming operations with unsustainable practices, such as applying large amounts of conventional pesticides and fertilizers and using genetically modified organisms (GMOs).
- **Cross-contaminating recyclable streams with bioplastics streams:** Packaging such as HDPE milk bottles and PET water and soft drinks bottles are easily identified and have established recycling markets in most of the country. However, PLA and PET products cannot be recycled with the same technology, and yet are not easily distinguishable from each other. In cities like Seattle and San Francisco where restaurants are being mandated to shift to compostable or recyclable packaging, this cross-contamination problem has already materialized. Efforts are being made for adding visible designations to bioplastic products to differentiate them from conventional plastics.
- **If not composted, contributing a net increase of landfill-related GHG emissions:** If bioplastics are ultimately disposed as waste and sent to a landfill, they degrade more quickly and produce more methane than conventional plastics. Conventional plastics eventually degrade, but it can take hundreds of thousands of years for this process.
- **Some bioplastics do not compost well:** To ensure that bioplastic products compost well in municipal composting programs or industrial aerobic digesters, the Biodegradable Products Institute⁵ (BPI) and American Society for Testing and Materials (now known as ASTM International) have developed specifications. The specific ASTM standards that apply are:
 - **ASTM D6400** - 04 Standard Specification for Compostable Plastics⁶
 - **ASTM D6868** - 03 Standard Specification for Biodegradable Plastics Used as Coatings on Paper and Other Compostable Substrates⁷

⁵ Source: <http://www.bpiworld.org/BPI-Public/About.html>

⁶ Source: BPI, <http://www.bpiworld.org/BPI-Public/About.html>

⁷ Source: ASTM International, <http://www.astm.org/Standards/D6400.htm>

In general, the recommended serviceware items are those that are certified as being compostable, as identified by the joint BPI/U.S. Compost Council Compostable (USCC) logo. BPI/USCC certified compostable serviceware products are designed to disintegrate and biodegrade quickly and safely, when composted in a professionally managed facility. All certified products meet scientifically-based specifications for compostability and comply with the ASTM D6400 or D6868 standards.

The advantages of using BPI/USCC certified compostable serviceware includes:

- Higher organics recovery rates
- Ease of source separation
- Reduced institutional labor associated with sorting
- Customer acceptance
- Tested compostability at the receiving facility
- Public education and awareness around sustainability issues
- Potential competitive advantage for institutions perceived as promoting, practicing, and achieving environmental sustainability

6.5.2 Operations

Operational issues associated with bioplastics include:

- **Sourcing options can be limited:** Because bioplastic products are not yet mainstream, not all food service or supply distributors stock them. However, the Houston-Galveston area institutions could create enough demand together to bring a suite of basic bioplastic products to the market. The area's public institutions could release an RFP or develop a purchasing cooperative to leverage the combined market influence for better pricing and availability for key products. In addition, H-GAC could add vendors of bioplastics and other compostable items to its H-GAC Buy Cooperative Purchasing agreement.
- **Pricing for some items can exceed those for conventional products:** Pricing for bioplastics can be higher than conventional plastic or even paper products. In markets where bioplastics are commonly used in the food service sector, such as Seattle and San Francisco, pricing for some products can be 15 to 30 percent greater than conventional products.
- **There are still some key performance issues:** These issues include bioplastics having a shorter shelf life, and particularly so when they are stored in warm, humid environments like kitchens. In addition, they have leakage issues, particularly when acidic or hot liquids are left in cups or bowls for extended periods of time. Similarly, utensils are not as resistant to heat as conventional plastic ware, so cannot be left in hot beverages or soups for extended periods of time. Lastly, bioplastic container liners are typically not as durable as their plastic counterparts with regard to heat resistance and weight. A tension exists in making products that perform in food service environments, but also break down in a composting system. Manufacturers are continuing their research to find this balance.

The number of manufacturers and distributors of bio-plastics is growing across the county. A partial list of suppliers is found in Appendix B, Useful Resources and Contacts. In addition, the variety of product lines and the quality of compostable serviceware has improved recently. Durability, appearance, and resistance to high temperatures continue to improve.

Section 7

RECOMMENDATIONS FOR REGIONAL IMPLEMENTATION

There are many public and private entities that need to participate in order to implement institutional organics diversion in the H-GAC region. Below are recommendations for regional government (e.g., H-GAC), local governments, and public institutions in the region.

7.1 Regional Government

The primary means for H-GAC to influence organics diversion is to distribute TCEQ grant funding to projects and studies through the Solid Waste Grants Program. In light of this, R. W. Beck has identified recommended priority areas for grant funding based on the findings of this report. R. W. Beck would recommend that H-GAC place grant funding priority on studies that address the following issues:

- Public-private partnerships for organics diversion programs. For instance, an institution could partner with a local government for the purpose of increasing organics diversion (e.g., University of Texas Medical Branch and City of Galveston, see case studies in Appendix A).
- Equipment and materials to develop municipal organics processing programs. Local governments that have a lack of processing facilities in their area may develop their own facilities to meet the needs of municipal programs.
- Provide public education. H-GAC can prioritize grants that provide education regarding home composting, benefits of organics diversion, uses and benefits of mulch and compost, and other organics-related issues.

In addition to distributing grant funds, H-GAC, as the regional association of local governments, has an opportunity to take a lead role in supporting organics diversion on behalf of the region. More specifically, H-GAC could undertake the following:

- Organize stakeholder discussion forums, roundtables, and other networking events that enhance communication between generators, haulers, processors, and end users of organics. These programs help foster understanding of the needs and concerns of all stakeholders in the marketplace and develop cooperative efforts to increase diversion.
- Further investigate and promote enhanced regional infrastructure for organics processing.
- Explore opportunities to work with state, regional, and national industry and trade associations in sponsoring activities of mutual benefit. Such activities can include educational workshops or conferences.
- Continue to provide outreach and technical assistance activities for local governments in the region on organics diversion.

- Include vendors of compostable food service items within the H-GAC Buy cooperative purchasing program. If these products are offered, it will be important to communicate the need for these materials to be composted.
- Consider providing relevant education on organic waste reduction, such as education regarding resource efficient landscaping for commercial buildings.

7.2 Local Government

Local governments that have an interest in expanding organics diversion within their jurisdiction can participate in regional efforts in cooperation with H-GAC as well as establish programs of their own. Potential roles for local government include:

- Set local goals, policies, and regulations regarding organics diversion. Local goals and policies will drive diversion efforts.
- Reach out to institutions within the local government's jurisdictional area to provide education and awareness about the benefits of organics diversion. Institutions will need education as to how to start a program as well as information about available providers of hauling and processing service.
- Identify area needs for hauling and processing service. Communicate with service providers about the need for these services within the local government service area.
- For municipal organics diversion programs, consider entering into medium to long term contracts with processors of organics (e.g., three to seven years). Extended contract terms will enable processors to invest in their facilities and ensure long-term financial viability.

7.3 Public Institutions

This Manual is intended to provide a comprehensive guide for public institutions that wish to develop organics diversion programs. However, R. W. Beck recognizes that there are significant challenges associated with organics diversion in the region. Below are recommendations for public institutions to overcome some of these challenges.

- Evaluate waste reduction opportunities such as reducing food packaging, evaluating food preparation practices and purchases, grasscycling, resource efficient landscaping, and other opportunities. Organics waste reduction can make a significant impact when barriers prohibit the development of organics collection and diversion programs.
- Talk to waste haulers and other service providers about the feasibility of providing organics collection service and the costs associated with those services. When there are hesitations about providing service, consider a pilot program to evaluate the feasibility of a large-scale system.
- Engage with local governments in the region for opportunities to partner to develop organics diversion programs.

- Assess the potential cost reductions associated with organics diversion, including reduced waste hauling fees, food purchases, and soil amendment costs. Communicate with stakeholders about the cost saving opportunities associated with organics diversion.
- Engage all stakeholders (e.g., management, staff, custodians, kitchen staff) from the planning stages of a project to solicit their feedback on program development. It is important to maintain stakeholder engagement on an ongoing basis to get feedback on program performance.
- Communicate with local processing facilities about the interest in organics diversion. Processing facilities may consider expanding service (e.g., accepting food scraps) if they knew there was demand for service.
- In situations where landscape volumes do not justify purchasing grinding equipment, evaluate the use of contracted service providers for on-site grinding of material.

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Appendix A – Case Studies

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Case Study Johnson Space Center

Overview

The National Aeronautics and Space Administration (NASA) Lyndon B. Johnson Space Center (JSC), located in Houston, Texas, has a goal to divert 45 percent of the waste generated from the complex. Pursuant to this goal, the JSC has developed a brush and wood grinding operation in order to process wood waste and landscaping trimmings generated from the complex. In addition, JSC operates a small-scale food waste diversion program.

Institution Description

The JSC complex includes office buildings, two cafeterias, shipping and receiving operations, as well as other general purpose facilities for a total of approximately 6.9 million square feet on 1,620 acres of land. The two cafeterias serve approximately 1,500 meals per day.

As of Summer 2009, there were 3,500 civil servants and 6,500 contractors on site.

Contracted Services

JSC relies on contracted service providers to perform many of the functions related to solid waste management and diversion. Following is a list of the contractors that participate in solid waste and recycling for the JSC complex.

- **Earth Resources Technology (ERT):** Provides environmental technical support and reporting of all material that is reused or recycled.
- **Prodyn EPES (Prodyn):** Landscape contractor; responsible for landscaping activities and operation of the brush grinding program.
- **Sodexo:** Manages the two on-site cafeterias as well as the on-site vending machines.
- **Integrity National Corporation (INC):** Custodial contractor; responsible for transporting refuse and recyclable materials to the appropriate collection containers on-site.
- **Waste Management (WM):** Refuse hauler; empties refuse dumpsters according to the collection schedule.
- **Gulf Coast Recycling (GCR):** Recycling hauler; hauls roll-off containers and compactors for mixed paper, cardboard, plastic bottles, and aluminum cans.

Annual Waste Survey

In order to evaluate opportunities to increase recycling, ERT staff develop the Annual Municipal Solid Waste Survey Report for the JSC. Within this report, ERT staff records the frequency of waste collection service and conducts a visual waste characterization of on-site refuse containers. The following data regarding waste generation was included in the 2008 waste survey:¹

- There are 52 dumpsters of varying sizes on the property. Most containers are collected three times per week with limited number being collected six days per week.
- JSC has separate compactors for mixed paper and cardboard that are collected on an as-needed basis.
- JSC has one roll-off for the collection of plastic bottles and aluminum cans that is collected on an as-needed basis.
- Approximately 6,500 tons of material was diverted from disposal in 2008.

On-Site Collection System

The following describes the on-site collection system developed by JSC in order to divert organic material, including landscape trimmings and food scraps.

Landscape Trimmings

Materials

Prodyn staff divert landscape trimmings generated from on-site landscaping activities to the brush grinding program. Landscape trimmings collected include leaves and brush. Grass clippings from lawns are left on the grass after mowing. Scrap wood and other raw lumber is also diverted as part of this program.

Personnel

Prodyn staff are responsible for the transport of material to the brush grinding location.

Containers and Storage

There are no specific collection containers for landscape trimmings. Prodyn staff transport material directly from the point of generation to the grinding location where it is stored in piles on a concrete pad.

¹ Source: *Annual Municipal Solid Waste Survey Report*, prepared for the NASA Lyndon B. Johnson Space Center by Environmental Resources Technology, Inc., December 2008

Food Scraps

Following describes the current food scrap collection efforts at JSC. Food scraps are currently collected from one of the on-site cafeterias. It is estimated that this cafeteria serves approximately 500 meals per day.

Materials

JSC staff currently focuses food scrap collection efforts of pre-consumer produce scraps. Based on information provided by the manufacturer of JSC's food waste processing equipment, oils, fats, and meats are not recommended to be included in the program due to the potential for odor and pest issues.

The kitchen staff utilizes prepackaged, pre-cut food in meal preparation. Therefore, pre-consumer food scrap potential is limited. However, the current program has generated enough material to develop a small-scale processing operation.

Personnel

Two Prodyn staff transport the food scrap material from the kitchen to the processing location.

Kitchen staff are responsible for putting the food scraps into the appropriate collection containers during meal preparation. ERT has encountered some challenges with the kitchen staff because food scrap diversion is not currently included in the service contract for the kitchen management contractor. However, ERT has been successful in gaining buy-in from the kitchen manager to participate in the program.

Containers

One-gallon, open buckets are utilized to collect food scraps in the kitchen area. Prodyn staff estimate that between three and eight full buckets are collected from the kitchen each day. ERT selected the smaller bucket size for easy use by kitchen staff and to minimize space consumed by full containers.

Processing System

The following describes the processing system developed for landscape trimmings and food scraps generated at JSC.

Landscape Trimmings

Following is a description of the brush grinding program operated by Prodyn for the JSC.

Location

The brush grinding site is located on the JSC grounds in an area that is isolated from buildings and other facilities. The area consists of a concrete pad, bunkers for material storage, and a shed that provides access to water.

Feedstock

Materials processed as part of the brush grinding operation include yard trimmings, scrap lumber, and other clean wood that is generated from the JSC complex. At the time of the site visit, there was a small stockpile of residual debris from Hurricane Ike that was waiting to be processed.

Personnel

Two, full-time Prodyn staff manage and operate the grinding operation.

Equipment

Prodyn utilizes a Vermeer BC 1230 chipper to grind wood and brush material. According to information provided by the manufacturer, the typical sales price for this piece of equipment is \$9,900.

A skid steer loader and John Deere gator are also utilized for the operation, primarily for material handling and transport.

End Product

Prodyn has experienced some challenges with the quality of the ground brush material due to equipment limitations. In some cases, material has been able to be utilized as mulch. Other material has been used to construct a berm. There would be a need for additional material (e.g., a screener) in order to consistently be able to produce material of sufficient quality to be used as mulch.

Food Scraps

Food scraps collected from the JSC cafeteria kitchen are currently processed separately from yard trimmings. Prodyn utilizes an anaerobic processing method to compost food scrap materials. Following describes the food scrap composting system developed for the JSC.

Location

ERT and Prodyn staff have established a processing area near the kitchen building in order to minimize transportation associated with food scraps.

Feedstock

As previously mentioned, only pre-consumer, produce scraps are accepted as part of the processing operation. Prodyn staff utilize 80 percent food scraps and 20 percent carbon material (e.g., paper, yard trimmings) to develop the compost product.²

² Typically anaerobic composting utilizes minimal carbon-rich material, as this feedstock can slow the decomposition process.

Personnel

Two Prodyn staff are responsible for the food scrap processing system. These staff are the same staff that manage the brush grinding operation.

Equipment

Prodyn staff utilize three, hand-turned barrels for the food scrap composting system. These barrels cost approximately \$500 each. These barrels were selected for the following reasons,

- They keep the process off of the ground, thus minimizing potential for pest issues.
- The material decomposition happens relatively quickly, in about two weeks.
- The in-vessel system helps manage odor.

R. W. Beck would note that the barrels are not recommended for a large-scale composting system.

Compost Process

Prodyn staff load material into the barrels one time per day and turn each barrel five times per day.³

End Product

After approximately two weeks of decomposition within the barrels, the resulting compost product is applied directly into JSC flower beds. In some cases, the compost product is deemed to be too moist for land application and is incorporated with ground brush before being land applied.

Future Opportunities

This section summarizes future opportunities for expanded organics diversion programs at JSC.

Compostable Paper Goods

ERT is in the process of working with kitchen management to transition away from polystyrene (e.g., Styrofoam) containers to compostable to-go containers. This compostable material will be collected separately from refuse within the dining areas, and the goal is to incorporate it into the anaerobic composting operation.

Aerobic Composting

The current, anaerobic composting operation has met the needs of a small-scale, produce-only food scrap diversion program. However, in order to process a larger quantity of materials, as well as to expand the types of materials collected, R. W. Beck

³ In anaerobic composting systems, it is atypical to open the containers with this frequency, since opening the barrels introduces oxygen into the container.

recommends that Prodyn and ERT consider establishing an aerobic composting operation. This would eliminate the need to have separate processing operations for landscape trimmings and food scraps.

An aerobic composting system could be developed using the current storage bunkers at the brush grinding location. Food scraps could be added to landscape trimmings in layers and processed into compost.

Key Findings for the Region

Listed below are key items from this case study that are applicable to the H-GAC region. These key findings were used in the development of Recommendations for Implementation in the Region, listed in Section 7.

- It is important to include specific responsibilities for organics diversion programs within contracts with service providers, including custodial services, landscapers, and kitchen staff.
- In cases where institutions do not have the staff or equipment necessary to have a grinding operation, outside contractors may be utilized to grind stockpiles of material as needed.
- The anaerobic composting system has met the needs of the current, small-scale food scrap diversion program; however, R. W. Beck does not recommend that this type of processing system be utilized on a large-scale basis.

Photos

Below are photos of the landscape trimmings and food scrap collection and processing programs at the JSC.



Figure 1: Compost Barrels



Figure 2: Grinder



Figure 3: Ground Brush in Storage Bunker



Figure 4: Interior Food Scrap Collection Container

Case Study Nature's Way Resources

Overview

Nature's Way Resources operates a mulch and compost facility in Conroe, Texas off of Interstate 45. The facility is located on approximately 42 acres of land and accepts approximately 80,000 cubic yards of feedstock per year.

Nature's Way grinds material into various grades of mulch and composts material utilizing static compost piles. The facility actively accepts and composts food scraps from public institutions and other large generators.

Facility Operations

Feedstock

Table 1 shows the volume and types of material accepted at Nature's Way in 2008.

**Table 1
Material Accepted at Nature's Way Resources**

Solid Feedstock	Volume (CY)	Liquid Feedstock	Volume (gal)
Tree trimmings	34,631	Liquid waste	4,102,000
Food	8,207		
Grass and leaves	31,689		
Manure and bedding	3,101		
Total	77,628	Total	4,102,000

Materials Accepted

Nature's Way accepts the following materials to be composted at the facility:

- Yard trimmings
- Clean wood
- Vegetative material
- Paper
- Manure
- Meats and Fish
- Animal carcasses

- Oil
- Grease
- Dairy materials

Although these materials are generally accepted at the facility, each feedstock is evaluated on a case-by-case basis. A more detailed list of materials that are accepted at Nature's Way can be found on their website.¹

Yard Trimmings

The majority of the feedstock accepted at the facility consists of brush and yard trimmings. Nature's Way currently has two municipal contracts, with the Cities of Oak Ridge and the Woodlands, to accept residentially generated yard trimmings.

Food Scraps

Nature's Way has accepted food scraps for composting for approximately five years. The facility currently accepts food scrap material for composting from a variety of customers, including the following:

- **Institutional:** Hilton in downtown Houston²
- **Commercial:** HEB grocery stores, Wal-Mart, and Sams Club
- **Industrial:** Borden's Dairy, Riviana (Rice), Imperial Sugar

Contamination

Plastic bags represent the most significant source of contamination for material entering the facility. Nature's Way charges customers \$55.00 per man hour to remove contaminants from material.

Mulch and Compost Process

After being tipped at the facility, raw wood trimmings and yard debris must be ground into wood chips before composting. After all large material is ground, then Nature's Way staff construct the compost piles. The piles are turned approximately once every six months using a wheel loader. After approximately two years of processing, the compost product is screened to a uniform particle size and then made available for sale. Mulch is developed using a similar process, except material only processes for one year and is turned approximately three times.

Tipping Fees

Nature's Way charges tipping fees for material entering the facility. The posted tipping fees are shown below.³

¹ <http://www.natureswayresources.com/fdaccepted22.html>

² The Hilton is considered a public institution for the purposes of this project, as defined in Section 1.

³ Contracted rates may differ from posted tipping fees shown in this list.

- Grass and leaves (debagged) – \$2.50 per cubic yard
- Grass and leaves (bagged) – \$10.00 per cubic yard
- Brush and tree trimmings (less than 6” diameter) – \$5.50 per cubic yard
- Brush and tree trimmings (more than 6” diameter) – \$6.50 per cubic yard
- Food scraps – \$4.50 per cubic yard

End Products

Nature's Way develops a variety of mulch products that vary based on many factors, as described below. Mulch is sold for \$15.00 to \$45.00 per cubic yard.

- Feedstock: The feedstock can be adjusted to create varying textures of mulch.
- Age (fresh ground or aged): Aged mulch is composted before sold, which enriches the nutrient content of the product.
- Size: Mulch can be screened to 3/8 inch or one inch in size

Nature's Way also develops a variety of compost products that vary based on the following factors. Compost is sold for \$35.00 to \$90.00 per cubic yard.

- Feedstock: The feedstock can be adjusted to create varying textures of compost.
- Size: Compost can be screened to 1/4, 3/8 inch or one inch in size

Barriers to Composting in the Region

Based on discussions with Nature's Way staff, there are several barriers to composting in the H-GAC region, as described below.

- There is a lack of state regulations regarding the labeling of product as “mulch” or “compost”. This has the potential to lead to customer dissatisfaction with and reduced demand for mulch and compost due to mislabeling of low quality product.
- There is a lack of technical studies on the environmental benefits of mulch and compost for the H-GAC region. Technical studies may be used for marketing by local mulch and composting companies.
- Some in the region perceive that mulch and composting facilities create environmental health and safety issues for the surrounding community.
- There is a general lack of awareness of composting and mulching as a viable disposal alternative for organic material.
- Relatively inexpensive landfill disposal creates an incentive to dispose of material rather than process at a composting facility.
- Contaminants present a significant financial and operational challenge.
- Service contracts for organics processing tend to be short term (e.g., one year) and not sufficient for long term planning.

As discussed with Nature's Way staff, there are also several barriers to enhanced organics diversion among public institutions in the region, as described below.

- There is a lack of service providers for food scrap collection, especially for smaller generators.
- Some customers do not have space for a separate food scrap collection container.
- Institutions in the region are generally unfamiliar with collection procedures and program requirements for food scrap collection.

Key Findings for the Region

Based on discussions during the Nature's Way site visit, R. W. Beck identified the following recommendations for organics diversion implementation in the region.

- Food waste composting is feasible in the H-GAC region, and the service is available through Nature's Way Resources.
- Local governments should consider longer-term contracts (five to seven years) for organics processing contracts. Long-term contracts allow processors to invest in their facility and ensures the long-term financial viability of the facility.
- Plastic bags represent a significant financial and operational challenge for composting programs. Future organics programs should be designed to avoid disposing of plastic bags with organic material.

Photos

Below are photos of the Nature's Way mulch and composting facility.



Figure 5: Tub Grinder



Figure 6: Compost Pile



Figure 7: Screener

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Case Study

City of Plano Organics Collection Program

Overview

The City of Plano operates a food scrap collection and processing program for its commercial customers. The program has approximately 130 customers, which include the following types of businesses: schools (47 Plano Independent School District campuses, grocery stores, nurseries, corporate facilities, bakeries, hospital, and other food stores. The City provides collection of 96-gallon carts five days per week. Approximately 4,000 tons of material were collected and diverted through this program in Fiscal Year 2007-2008.

Collection Service

The City of Plano offers organics collection service to commercial refuse customers in the City. The City has an exclusive franchise agreement with a private company for commercial refuse collection; however, the hauler has been very cooperative with the City in developing the organics collection program.

Collection Example: Texas Instruments

This case study includes a description of the collection system in place at one of the City's customer's campuses. Texas Instruments (TI) was selected for this description based on their success in the program as well as their similarity to a public institution (e.g., large campus, on-site cafeteria and kitchen).¹

The TI campus in Plano is approximately 937,00 square feet with between 800 and 900 employees on-site. The cafeteria serves breakfast and lunch to employees. Based on extensive diversion efforts for multiple material streams, the campus has achieved a diversion rate of 78 percent. TI as a corporation has a goal for its facilities to be "zero waste".

Processing Facility

Food scraps are transported by collection vehicles to the Custer Road Transfer Station, located in the City of Plano and owned and operated by the North Texas Municipal Water District (NTMWD).² Food scraps are transferred to the NTMWD composting facility in Melissa, Texas for processing.

¹ Since case study site visits were conducted during summer break, R. W. Beck was unable to visit any of the participating PISD campuses.

² The NTMWD is a regional entity that provides solid waste disposal service to five member cities, as follows: Cities of Plano, Frisco, Allen, Richardson, and McKinney.

On-Site Collection System

Below describes the on-site collection system for food scraps at TI. The food scraps are collected by the City of Plano to be integrated into its composting operation.

Materials

Food Scraps

TI focuses food scrap collection efforts on pre-consumer food scraps generated by meal preparation activities. All food scrap items, including produce, meats, fish, oils, and dairy, are collected as part of the program.

TI is moving toward integrating post-consumer food scraps into the collection system. In anticipation of this transition, TI has converted all serveware in the kitchen area to compostable paper and bioplastic products.

Compostable Containers

In making the transition to compostable food serveware and to-go containers, TI staff first evaluated the foods served in the cafeteria. Evaluating foods served will ensure that the appropriate types and quantities of to-go containers are purchased. In addition, TI staff were able to make simple changes for little cost to reduce non-compostable waste in the dining area. For instance, they transitioned from plastic to wooden coffee stir sticks for little additional cost.

TI staff have provided educational signage regarding the compostable items in the dining area in order to inform employees ahead of time that they are developing a post-consumer food scrap collection program.

Personnel

TI has appointed one individual, the Building Service Manager, to be the manager and champion of the food scrap collection program. The kitchen staff, who are employees of TI, are responsible for placing food scraps into the collection containers as well as taking the containers to the outdoor loading area to be tipped by collection vehicles.

Containers

TI utilizes 96-gallon carts provided by the City of Plano for interior and exterior collection of food scraps. Empty carts are wheeled into the food prep area at locations convenient for kitchen staff. When full, kitchen staff wheel the carts down a ramp adjacent to the kitchen to the outdoor collection area. The City collects carts from this location five days per week.

After the carts are emptied, the empty carts are stored in a staging area until needed in the kitchen for collection. Oftentimes, the carts must be taken out of the kitchen before they are completely full to prevent them from being too heavy for staff to roll. TI has approximately 12 to 15 carts on-site.

TI utilizes biodegradable plastic bags to line collection containers. These bags represent a significant expense for the program, costing between \$0.85 and \$1.30 per bag, depending on the vendor and the quantity purchased.

Waste Generation and Diversion

TI fills an average of two carts per day of food scraps. At the beginning of the program, they filled an average of six carts per day. However, participation in the program enabled them to identify ways to reduce food waste generated and become more efficient in food preparation activities. TI staff estimate that this program results in about five percent waste diversion for the campus.

The TI campus generates one, 42 CY compactor of refuse per month and one 42 CY compactor of recyclable paper per quarter. In addition to the paper compactor, TI source separates and recycles cardboard, scrap metal, and plastics.

Processing System

The City of Plano operates a compost facility that is utilized as the contracted processing facility for the NTMWD regional composting program. Plano accepts material from Allen, Frisco, and Richardson residential collections and wood from Green Builder programs operating in Frisco and Plano.

Location

Food scraps are composted at the City's composting facility in Melissa, Texas. The composting facility is located near the landfill that is operated by NTMWD.

End Product

The City of Plano sells its compost and mulch products under the brand Texas Pure. Products are available bagged or in bulk and are sold at the NTMWD Custer Road Transfer Station in the City of Plano. Compost is sold for \$26.00 to \$28.00 per cubic yard and mulch is sold for \$12.00 to \$27.00 per cubic yard.³

Future Opportunities

Below are future opportunities for TI identified by staff and R.W. Beck during the case study site visit.

Compostable Paper Goods

As previously mentioned, TI has transitioned to using all compostable items in the dining areas. The intent of this transition is to begin to collect post-consumer food scraps in the dining area. In addition, TI staff are exploring ways to collect post-

³ Colored mulch is priced higher than regular mulch.

consumer food scraps throughout the campus by setting up recycling centers in break rooms and other common areas. TI staff would like to be able to capture food scraps that are generated when employees take meals to their desks.

Single-Stream

TI is also exploring single-stream recycling for the campus. Currently all recyclables are collected source separated. TI has a baler that it utilizes to bale cardboard.

Key Findings for the H-GAC Region

Based on discussions during the City of Plano and TI site visit, R. W. Beck identified the following recommendations for organics diversion implementation in the H-GAC region.

- It is feasible for local governments to successfully operate organics collection programs for commercial customers, even in situations where they are not the commercial refuse collection service provider.
- It is important for public institutions to appoint a program manager for organics collection efforts that can champion and manage all aspects of the program.
- Exterior collection carts can be used effectively as interior collection containers, provided that there is ramp access to the outdoor collection area.
- Organics collection programs can highlight areas of inefficiency in food preparation and identify opportunities for waste reduction.
- Public institutions should only transition to utilizing compostable food service items if they plan to implement a program for collecting and composting these items.

Photos

Below are photos of the City of Plano program and the TI collection system.



Figure 8: Compostable Food Service Items with Signage



Figure 9: 96 Gallon Cart in Food Prep Area



Figure 10: Cart Staging Area (shown with City of Plano and TI staff)



Figure 11: Texas Pure Bulk Product for Purchase at Custer Road Transfer Station

Case Study University of Texas Medical Branch

Overview

The University of Texas Medical Branch (UTMB) in Galveston, Texas has developed a partnership with the City of Galveston (City) to grind landscape trimmings into mulch. Moody Gardens, a multi-use complex that includes a convention center, hotel, aquarium, museum, and Imax theater, also participates in the program by contributing material generated from the complex.

UTMB has diverted landscape trimmings generated from the campus for the past 15 years. In 2003, UTMB purchased a tub grinder for approximately \$260,000 in order to process material generated on-site. In 2008, due to organizational changes within UTMB, ownership of the grinder was transferred to the City and the program continued as a partnership between the two entities.

In spite of the significant challenges caused by Hurricane Ike in September 2008, UTMB and the City have continued to operate the landscape diversion program.

Institution Description

The UTMB campus includes hospital and clinical facilities, academic facilities, student residences, dining facilities, and other general purpose facilities for a total of approximately 6.9 million square feet. The hospital has approximately 200 to 300 beds. The three dining facilities serve approximately 2,000 meals per day.

As of Spring 2009, there are 2,233 students enrolled at UTMB, including students with full-and part-time status.¹ As of Fall 2008, there were 7,392 faculty members and staff.

The campus currently generates approximately 300 tons per month of MSW for disposal and 100 tons per month of material that is recycled, resulting in a campus recycling rate of approximately 25 percent.

Interlocal Agreement

The City of Galveston and UTMB have an interlocal agreement that details the arrangement for the brush grinding program. When the interlocal agreement is updated, R. W. Beck recommends that it include specifications for end product delivery (product quantity, delivery location, delivery frequency, product characteristics) from the City of Galveston to UTMB.

¹ Source: UTMB Facts, maintained by the Office of Institutional Effectiveness, <http://www.utmb.edu/facts/default.asp>

On-Site Collection System

The following describes the collection system that UTMB put in place to divert landscape trimmings generated from the campus.

Materials

UTMB diverts landscape trimmings as part of its program. Landscape trimmings collected include leaves and brush. Grass clippings from campus lawns are left on the grass after mowing.

UTMB also recycles pallets and other raw lumber as part of the program. However, before diverting through the mulching program, facility staff attempts to return pallets that are in good condition to manufacturers for reuse.

Approximately 30 CY of material is diverted per week as part of the program, which represents one to two percent of the campus waste stream based on staff estimates.

Personnel

The primary UTMB staff person that is responsible for the collection program is the Conservation Initiatives manager within the Facilities Operations and Management Department. This individual oversees two staff that assist with management and oversight of the program.

Staff from UTMB's contracted landscape service collects all landscape trimmings and transports the material to the 30 CY roll-off container that is used for collection. They are required to participate in recycling efforts by contract, but UTMB staff occasionally must remind contracted staff of the program procedures.

Containers

One 30 CY roll-off container is utilized for this operation. No other on-site containers are utilized for the collection operation.

Hauling

UTMB contracts with a private hauling company to transport the 30 CY container to the processing location one time per week.

Storage

UTMB receives mulch product as it becomes available from the City's grinding operation. Mulch material is stored until applied on property leased from a yacht club adjacent to the campus.

Processing System

The following describes the processing system that is operated by the City of Galveston to process landscape trimmings.

Location

The permanent location for the grinding operation is the City's recycling center located on 61st street. However, at the time of R. W. Beck's site visit, the grinder was located at Moody Gardens in order to process a stockpile of debris that was located on the property.

Feedstock

The processing operation accepts clean landscape trimmings (excluding grass), pallets, and untreated lumber. The City sources material from UTMB, Moody Gardens, and City operations. The City also continues to process debris that was generated from Hurricane Ike.

Personnel

The grinding program is operated by two City staff that allocate approximately 10 percent of their time to the program.

Equipment

The City utilizes a Morbark Woodhog 4600 tub grinder for the program that was originally purchased by UTMB in 2003. Ownership of the grinder transferred to the City in 2008.

End Product

Due to equipment limitations – specifically, lack of ability to screen the end product – material must generally be ground twice before suitable to be used as mulch. However, due to operational challenges and the influx of material received after Hurricane Ike, City staff have been unable to double-grind material. As a result, the end mulch product contains many large pieces and is generally too coarse to be used for landscape application. Moody Gardens has utilized the material for fill material on its campus. Staff from the City and UTMB are currently exploring potential solutions to this issue.

Future Opportunities

This section summarizes future opportunities for organics diversion identified by UTMB staff and R. W. Beck.

Food Scrap Collection

UTMB staff has an interest in developing a food scrap collection and composting program to divert organics generated from the on-site cafeterias. However, there are some significant barriers to developing this type of program, including the following.

- **Facility damage from Hurricane Ike:** The on-site kitchen and dining areas were severely damaged from Hurricane Ike such that UTMB was required to develop interim outdoor (tented) facilities. New kitchen and dining facilities are not expected to be completed for five years. However, UTMB staff expect that food waste collection infrastructure will be a consideration in the design of the new facilities.
- **Lack of processing facility:** As discussed in Section 2, the nearest composting facility that accepts food scraps is located in Conroe, which is approximately 90 miles from Galveston. In order to make a program economically viable, there would need to be a processing facility within a more typical hauling distance.

Tree Grinding

Due to salt water exposure from Hurricane Ike, approximately 50 percent of the trees on the UTMB campus are dead and must be disposed of. This equates to approximately 800 to 1,000 trees. UTMB Staff has expressed interest in grinding these trees for mulch material.

In addition to trees on UTMB campus, there is a significant inventory of trees throughout Galveston that must be disposed due to salt water damage. Significant opportunity exists to divert this material from the landfill by processing it into mulch.

Key Findings for the Region

Listed below are key items from this case study that are applicable to the H-GAC region. These key findings were used in the development of Recommendations for Implementation in the Region, listed in Section 7.

- A strong manager and/or champion is critical for the successful operation of a landscape diversion program.
- There is a need for education and training opportunities for local governments that wish to operate a wood and brush grinding operation
- Distance from the region's composting facility prohibits the development of a food scrap collection program at this time.
- It is vital that written interlocal agreements be created, checked, and updated as necessary, so that both or all sides have clarity regarding roles, responsibilities, specific assignments, and financial terms.

Photos

The figures below are photos of the UTMB program as well as the City's temporary processing location at the Moody Gardens complex.



Figure 12: Roll-Off Collection Container at UTMB Campus



Figure 13: Temporary (Tented) Kitchen at UTMB Campus



Figure 14: Morbark Grinder



Figure 15: Unprocessed Feedstock at Moody Gardens

Appendix B – Useful Resources and Contacts

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APPENDIX B Useful Resources and Contacts

Area Food Banks and Food Rescue Organizations

A partial listing of food bank and food rescue resources in the Houston-Galveston area includes the following.

**Table B-1
Food Bank and Food Rescue Resources**

Company Name	Address	Phone	Website
Houston Food Bank	The Herzstein Center 3811 Eastex Freeway Houston, TX 77026	713-223-3700	http://www.houstonfoodbank.org
Fair Haven Food Pantry	United Methodist Church 1330 Gessner Drive Houston, TX 77055	713-468-3276	http://www.fairhavenumc.org/foodpantry
Anderson Food Pantry	1508 Gregg Street Houston, TX 77020	713-222-0373	
Great Ward Chapel Food Pantry	6823 Arabella Street Houston, TX 77091	713-695-8228	
Cypress Assistance Ministries	11202 Huffmeister Houston, TX 77065	281-955-7684	http://www.cypressassistanceministries.com
Alvin Community Food Pantry	1212 S Durant St Alvin, TX 77511	281-824-8871	
South Texas Pantry, Inc.	1832 Texas Ave. Texas City, TX 77590	409-941-9500	
Warm Pantry	31315 Fm 2920 Rd Waller, TX 77484	936-372-3025	
Operation Refuge Pantry	1625 N. Blair Avenue Cleveland, TX 77327	281-592-6701	http://www.operationrefuge.com/pantry.htm
TLC Food Pantry	110 W Montgomery St Willis, TX 77378	936-856-8317	
Gleanings From The Harvest	903 53rd Street Galveston, TX 77551	409-744-4384	http://www.gfthgalveston.org
Community Food Pantry	216 W. Murray Angleton, TX 77515	979-848-1285	http://www.communityfoodpantry.com
South Union Food Pantry	3601 Lydia Street Houston, TX 77021	713-747-7002	http://www.southunioncdc.org/pantry.html
Manna House Third Ward Food Pantry	3118 ½ Blodgett Street Houston, TX 77004	281-358-8108	

Katy Christian Ministries (KCM)	5011 E. 5 th Street Katy, TX 77493	281-391-3730	http://www.ktcm.org/Food_Pantry.htm
Montgomery County Food Bank	111 S. 2 nd Street Conroe, TX 77301	936-539-6686	http://www.montgomerycountyfoodbank.com
St Vincent De Paul Food Pantry	2730 Nelwood Drive Houston, TX 77038	281-405-0432	

Compostable Product Suppliers: Food Serviceware and Bags

A partial list of manufacturers and suppliers of BPI/USCC certified ASTM D6400 or ASTM D6868 compostable serviceware includes the following.¹

Table B-2
Food Serviceware

Company Name	Phone	Website
Asean	503-295-4977	www.stalkmarketproducts.com/
Biosphere Industries, LLC	805-566-6563 x101	www.biosphereindustries.com
Bridae-Gate Alliance Group	925-475-2240	www.bridae-gate.com
Cereblast	310-676-5000	www.cereblast.com
CKF Inc.	416-249-2272	www.rovalchinet.ca
Dvne-A-Pak, Inc.	N/A	www.dvneapak.com
Eco-Products, Inc.	303-962-4240	www.ecoproducts.com
Fabri-Kal Corp	269-385-8004	www.f-k.com
Genpak LLC	518-798-9511 x250	www.harvestcollection.com
Greenood Eco-tech	N/A	www.hanafundint.com
Huhtamaki	913-583-8254	www.us.huhtamaki.com
International Paper	N/A	www.ecotainercup.com/
Sealed Air	N/A	www.sealedair.com
Solo Cup	N/A	www.solocup.com
Trans-World International	718-499-3371	www.greenwave.us.com
VerTerra Ltd	718-383-3333	www.verterra.com

¹ These lists are drawn from: <http://www.bpiworld.org/BPI-Public/Approved.html>.

**Table B-3
Compostable Bags**

Company Name	Phone, Email and Website	Company Name	Phone, Email and Website
AL-PACK	506-852-4262 vernona@al-pack.com www.mycompost.com	Indaco Manufacturing Ltd.	763-323-7634 SteveRfriese@aol.com www.indaco.ca
Alte-Rego Corporation	416-740-3397 x226 dsidhu@alte-rego.com www.mycompost.com	Inteplast Group	800-896-3222 rchang@inteplast.com www.inteplast.com
Berry Plastics	781-372-2273 timglowik@berryplastics.com www.berryplastics.com	Mid-America Bag LLC	905-795-0999 x21 bobr@cpiplastics.com www.midamericabag.com
BioBag Canada, Inc.	604-876-5100 gregb@biobag.ca www.biobag.ca	Northern Technologies	763-225-6600 vdalal@ntic.com www.ntic.com
BioBag International	47-69-88-8591 jorn@biobag.no www.biobag.no	Plastics Solutions	604-597-7063 dfreeman@ecosafeplastics.com www.ecosafeplastics.com
BioBagUSA	800-959-2247 dave.williams@biobagusa.com www.biobagusa.com	Poly-America L.P.	972-337-7061 shannar@poly-america.com www.poly-america.com
Coretec	bboyle@coretecvci.com	Republic Bag Inc.	sns@republicbag.com www.republicbag.com
El-En Packaging Company Limited	905-761-5975 ext 153 cbabcock@elenpac.com www.elenpac.com	Roplast Industries Incorporated	530-532-9500 dcostello@roplast.com www.roplast.com
Farnell Packaging	902-468-9378 billmora@farnell.ns.ca www.farnell.ns.ca/	S&Q Plastic	905-678-1720 Usha@sqplastic.com www.sqplastic.com
Fortune Plastics	800-243-0306 x119 weddy@fortuneplastics.com www.fortuneplastics.com	Sharp Packaging Systems	262-246-8815 jimk@sharppackaging.com www.sharppackaging.com
Glad Manufacturing Co.	905-595-8232 josie.denicola@clorox.com www.clorox.com	US Compo Solutions	760-891-0332 plastechplus@yahoo.com
Heritage Plastics	214-432-3684 frank.ruiz@plastimin.com www.heritage-plastics.com	W. Ralston (Canada)	800-784-1474 x227 wriviere@cttgroup.com www.ralston.ca
Hybrid Packaging Ltd	1.888.326.2247 Richardl@hybrid-packaging.com www.i-compost.com/	Webster Industries	978-532-2000 ceveleigh@websterindustries.com

In-Vessel Compost Equipment Manufacturers

Below is a partial list of vendors who distribute in-vessel composting technologies.²

Table B-4
In-Vessel Composting Technologies

Company Name	Phone	Email
Augsburger Engineering	480-483-5966	engineering@aeincaz.com
Biosystem Solutions	203-557-0644	info@biosystemsolutions.com
BW Organics, Inc.	888-293-0033	BWOrganics@neto.com
Engineered Compost Systems	206-634-2625	steve@compostsystems.com
EPM Inc.	800-779-1709	
Environmental Products & Technologies Corporation	805- 492-6865	chieftec@eptcorp.com
Green Mountain Technologies	802-368-7291	sales@gmt-organic.com
Hot Rot Composting Systems	805-884-6118	cwhan@outspoken.com
Nature's Soil	603-598-6815	ceo@naturessoil.com
NaturTech Composting System	320-253-5076	naturtech@composter.com
Tri Form Poly, Inc.	204-746-6401	byronirwin@shaw.ca
Vermigold Ecotech Pvt Ltd	91-22-26463589	info@vermigold.com
Vermitech Systems, Ltd.	416-693-1027	vermitech@vermitechsystems.com
Willcam, Inc.	530-549-5788	willisc@frontiernet.net
Wright Environmental Management Inc.	905-881-3950	Stephen.Wright@wrightenvironmental.com

Recycling Container Manufacturers and Distributors

The list below shows the variety of bin manufacturers and distributors available to service institutional collection needs. Some of these companies offer bin customization, such as adding customer artwork, colors, and other features.³ (This list is not exhaustive.)

² List drawn from: <http://www.ciwmb.ca.gov/FoodWaste/Compost/InVessel.htm>

³ <http://www.ciwmb.ca.gov/Recycle/Tools/Containers.htm>

Table B-5
Recycling Container Manufacturers and Distributors

Company Name	Phone	Website
Busch Systems	800-565-9931	http://www.buschsystems.com
Chevy Lane	905-295-7224	http://www.chevylane.com
Consolidated Fabricators	800-339-8335	http://www.con-fab.com
Eco-Pop Designs	650-728-9220	http://ecopopdesigns.com
The Fibrex Group	800-444-83380	http://www.fibrexgroup.com
Jedstock, Inc.	877-533-7862	http://www.jedstock.com
McClure Industries	800-752-2821	http://www.mclureindustries.com
Midpoint International	888-646-4246	http://www.midpoint-int.com
Recy-CAL Supply Company	800-927-3873	http://www.recy-cal.com
Recycling Products, Inc.	800-875-1735	http://www.recyclingproducts.com
Rehrig Pacific Company	800-421-6244	http://www.rehrigpacific.com
Rubbermaid Commercial Products	800-347-9800	http://www.rcpworksmarter.com
Techstar Plastic	800-263-7943	http://www.techstarplastics.com
Toter Incorporated	800-772-0071	http://www.toter.com
Tulip Corporation	626-968-0573	http://www.tulipcorp.com
Windsor Barrel Works	800-527-7848	http://www.windsorbarrel.com

Chipping and Grinding Equipment Manufacturers

Below is a partial list of manufacturers and distributors of heavy equipment for chipping and grinding organic materials, particularly woody debris.

Table B-6
Manufacturers and Distributors of Heavy Equipment for Chipping and Grinding

Company Name	Phone	Website
Bandit Industries, Inc.	800-952-0178	http://www.banditchippers.com
Continental Biomass Industries, Inc.	603-382-0556	http://www.cbi-inc.com
CW Mill Equipment Company, Inc.	785-284-3454	http://www.hogzilla.com
Doppstadt US, LLC	440-937-3225	http://www.doppstadtus.com
Franklin Miller	937-535-9200	http://www.franklinmiller.com
Global Recycling Equipment	815-674-5802	http://www.globalrecyclingequipment.com
Komptech USA, Inc.	720-890-9090	http://www.komptechusa.com
Morbark, Inc.	800-831-0042	http://www.morbark.com
Peterson	541-689-6520	http://www.petersonpacific.com
Vecoplan, LLC	336-861-6070	http://www.vecoplan.com/us/index
Vermeer Corporation	641-628-3141	http://www.vermeer.com
WEIMA America, Inc.	803-802-7170	http://www.weimaamerica.com
West Salem Machinery Company	800-722-3530	http://westsalem.com

Area Compost Facilities

The table below shows mulch and compost facilities in the region based on information from the TCEQ and verified by R. W. Beck in July 2009.

**Table B-7
Mulch and Compost Facilities**

Facility Name	City	County	Facility Type	Materials Processed	Processing Fee
CASCO Hauling and Excavation Landfill	Houston	Harris	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	\$8.50 per CY
Champion Landscape Supplies	Houston	Harris	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	Unavailable ¹
Don Tol Compost Facility	Van Vleck	Wharton	Composting	Grease trap waste, sewage sludge, tree trimmings, yard waste, brush, lumber	\$0.30 per gallon
Greenhouse Road Landfill	Houston	Harris	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	\$8.00 per CY
JMJ Organic Materials	Huffman	Harris	Mulching/Grinding, Composting	Tree trimmings, yard waste, brush, lumber	No charge.
Just Wood and Mulch	Houston	Harris	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	\$5.00 per CY
Landscapers Pride	New Waverly	Walker	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	Unavailable ²
Living Earth Resources	Various	Various	Mulching/Grinding, Composting	Tree trimmings, yard waste, brush, lumber	\$10.00 truck load, \$20.00 trailer
Mulch King	Tomball	Harris	Mulching/Grinding, Composting	Tree trimmings, yard waste, brush, lumber	\$4.00 per CY, \$20.00 minimum
Mulch Matters	Houston	Harris	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	\$35.00 trailer, \$75.00-\$150.00 commercial truck
Natures Way Resources	Conroe	Montgomery	Mulching/Grinding, Composting	Tree trimmings, yard waste, brush, lumber, food waste	Unavailable ²
New Earth Compost	Conroe	Montgomery	Composting	Tree trimmings, yard waste, brush, lumber	\$10.00 truck load, \$60.00 roll-off
Novus Wood Group	Dickinson	Galveston	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	Unavailable ¹
Texas Landscape Products	Magnolia	Montgomery	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	Unavailable ¹
Timber Solutions, Inc.	Conroe	Montgomery	Mulching/Grinding	Tree trimmings, yard waste, brush, lumber	\$5.00 per CY

1. Price dependent on time required to process material.
2. Price dependent on type and quantity of material.
3. R. W. Beck was unable to contact

Appendix C – Ordinance

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1 [Mandatory Recycling and Composting.]
2

3 Ordinance amending the San Francisco Environment Code by adding Chapter 19,
4 Sections 1901 through 1912, entitled "Mandatory Recycling and Composting
5 Ordinance," amending the San Francisco Public Works Code by amending Section 173,
6 and amending the San Francisco Health Code by amending Sections 291, 291.1, 291.2,
7 291.4, 291.7, 291.11, 291.12, 291.15, 291.17, and 293.1, and by repealing current
8 Sections 291.9 and 291.16 and adding a new Section 291.16, all to: (1) require all
9 persons located in San Francisco to separate recyclables, compostables and landfilled
10 trash and participate in recycling and composting programs; (2) provide enforcement
11 mechanisms and penalties for violations; (3) ensure that all properties subscribe to
12 refuse collection service; and (4) authorize a Department of Public Health inspection
13 fee of \$167 per hour; and making environmental findings and setting an operative date.

14 Note: Additions are *single-underline italics Times New Roman*;
15 deletions are ~~*strikethrough italics Times New Roman*~~.
16 Board amendment additions are double underlined.
Board amendment deletions are ~~strikethrough normal~~.

17 Be it ordained by the People of the City and County of San Francisco:
18

19 Section 1. **Findings.** The Board of Supervisors finds and declares:

20 1. The City and County of San Francisco has a duty to protect the natural
21 environment, the economy, and the health of its citizens.

22 2. The California Integrated Waste Management Act of 1989 requires cities and
23 counties to reduce, reuse and recycle (including composting) solid waste generated in the
24 state to the maximum extent feasible before any incineration or landfill disposal of waste, to
25 conserve water, energy and other natural resources, and to protect the environment.

1 3. The California Integrated Waste Management Act of 1989 mandates that each local
2 jurisdiction in the state divert 50% of discarded materials from landfill. Every city and county
3 in California could face fines up to \$10,000 a day for not meeting the 50% diversion goal. In
4 2001, the California Integrated Waste Management Board adopted a Strategic Directive
5 statewide zero waste goal.

6 4. The State of California regulates hazardous waste (e.g., paint, batteries, electronics)
7 and sets management standards, including banning landfill disposal of hazardous waste, to
8 protect public health and the environment, and conserve natural resources. As a result,
9 services to collect and recycle hazardous waste materials include more than 100
10 neighborhood drop-off sites throughout the city for various materials, a year-round facility that
11 accepts all materials, and an appointment-based home pick-up service.

12 5. For each ton of municipal waste landfilled, about 71 tons of waste have been
13 created "upstream" from the mining, manufacturing and distribution of materials in the product
14 lifecycle, resulting in significant resource depletion, pollution and climate-changing impacts.

15 6. Organic or compostable waste that is buried in the anaerobic conditions of landfills
16 creates methane gas along with the leaching of toxins. Methane gas is at least 21 times as
17 potent as carbon dioxide in changing the planet's climate. Twenty percent of San Francisco's
18 planned reductions in climate-changing emissions come from diverting additional solid waste
19 from landfill.

20 7. The Board of Supervisors has adopted goals of 75% diversion from landfill by 2010
21 and zero waste to landfill or incineration by 2020. This policy includes urging greater
22 consumer responsibility, including mandatory participation in diversion programs.

23 8. People who live in, work in, or visit San Francisco generate over 2 million tons of
24 solid waste annually. While the city has an overall landfill diversion rate of 70% (as reported
25

1 to the State), most residents and businesses divert closer to 50% through recycling and
2 composting, resulting in over 660,000 tons per year of material from San Francisco being
3 landfilled in 2006.

4 9. Growth in the rate of landfill diversion in San Francisco has leveled off in recent
5 years, with an increase of less than 1% from 2005 to 2006, and continued voluntary diversion
6 participation alone will not likely enable the City to meet its 75% diversion goal by 2010.

7 10. San Francisco's agreement with the Altamont Landfill in Alameda County provides
8 for waste disposal of up to 15 million tons. At the end of 2007, nearly 12 million tons of this
9 contract capacity had been used, leaving about 3 million tons of capacity remaining. At the
10 current disposal rate at the Altamont Landfill there are about 5 years left (until 2013) on the
11 City's landfill contract. Increased diversion will extend the life of this landfill contract with its
12 favorable low disposal costs, while any new landfill contract will likely increase disposal costs
13 and subsequently trash collection rates in San Francisco.

14 11. After years of voluntary, convenient, nation-leading, award-winning programs and
15 outreach and financial incentives, a comprehensive study found that 36% of what San
16 Francisco sends to landfills is compostable (primarily food scraps) and 31% is recyclable
17 (mostly paper), and this breakdown essentially applies to all sectors (residential, commercial
18 and City government).

19 12. There are facilities in the City and surrounding areas that can effectively reuse,
20 recycle, compost or otherwise process and market most materials discarded in San Francisco
21 and thereby divert such materials from landfill while creating jobs.

22 13. Many state and local governments have mandated recycling of various materials
23 and composting of yard trimmings, or conversely banned them from landfill, resulting in
24 significant increases in waste diversion.

1 14. State legislation that would have mandated owners or managers of multifamily
2 buildings to provide recycling collection for their tenants was vetoed by the Governor because,
3 as he stated, local jurisdictions already have the authority to mandate this participation locally.

4 15. The Board of Supervisors passed a mandatory Construction and Demolition Debris
5 Recovery Ordinance (No. 27-06), effective July 1, 2006, which helped divert more than 26,000
6 additional tons from landfill in its first year of implementation.

7 16. In keeping with the Precautionary Principle, codified in Chapter 1 of the
8 Environment Code, this Chapter requires diversion of recyclable or compostable materials
9 from landfill for beneficial use as a deterrent to unsafe and wasteful practices. In this way, the
10 City will create and maintain a healthy, viable environment for current and future generations,
11 and will become a model of sustainability.

12
13 Section 2. The San Francisco Environment Code is hereby amended by adding
14 Chapter 1948, Sections 19014804 through 19124812, to read as follows:

15 **SEC. 19014804. TITLE.**

16 *This Chapter shall be entitled "Mandatory Recycling and Composting".*

17
18 **SEC. 19024802. DEFINITIONS.**

19 *For the purposes of this Chapter, the following words have the following meanings:*

20 *(a) "Adequate Refuse Collection Service" means that a dwelling or commercial property is*
21 *serviced by a Collector for recyclables, compostables, and trash, and that the level of service is*
22 *sufficient to contain the refuse generated at that dwelling or commercial property.*

23 *(b) "City" means the City and County of San Francisco.*

1 (c) "Collection" means taking physical possession of and removing discarded material from
2 the place of generation for subsequent off-site management of that material.

3 (d) "Collection Container" means the receptacle that is provided, designated and serviced by
4 the collector for the collection of recyclables, compostables or trash.

5 (e) "Collector" means a person, firm or corporation licensed and permitted to collect refuse by
6 the Director of Public Health pursuant to the provisions of the Refuse Collection and Disposal
7 Ordinance adopted November 8, 1932, as amended, and any other collectors of discarded material not
8 excluded under that ordinance.

9 (f) "Commercial Property" means a parcel or any portion of real property where refuse is
10 generated that is not a dwelling, including schools, institutions, and City properties.

11 (g) "Compostable" means any material that can be broken down into, or otherwise become
12 part of, usable compost (e.g., soil-conditioning material) in a safe and timely manner as accepted in
13 San Francisco's compostables collection program, such as food scraps, soiled paper and plant
14 trimmings. Compostable materials can also include disposable plastic food service ware and bags if
15 labeled "Compostable", in accordance with the Food Service Waste Reduction Ordinance (No.
16 295-06) and Department of the Environment regulations for easy identification, meeting the ASTM
17 Standard Specification (D6400) for compostable plastics, and consistent with State labeling law
18 (California Public Resources Code Section 42359) that any plastic bag or food container labeled
19 "Compostable" must meet the ASTM Standard Specification for compostable plastics.

20 (h) "Construction and Demolition Debris" means building materials generated from
21 construction and demolition activities including, but not limited to, fully-cured asphalt, concrete, brick,
22 rock, soil, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material,
23 ceramic tile, carpeting, fixtures, plastic pipe, metals, tree stumps, and other vegetative matter resulting
24 from land clearing and landscaping for construction, deconstruction, demolition or land developments.

1 Hazardous waste, as defined in California Health and Safety Code Sections 25100 et seq., is not
2 construction and demolition debris for purposes of this Chapter.

3 (i) "Customer" means any person being served food from a food vendor or event.

4 (j) "Department" means the San Francisco Department of the Environment.

5 (k) "Designated" means clearly labeled and color-coded for a material type, such as labeled
6 blue receptacles for recyclables, green for compostables and black for trash.

7 (l) "Director" means the Director of the Department of the Environment or his or her designee.

8 (m) "Disposable Food Service Ware" means all containers, bowls, plates, trays, carton, cups,
9 lids, straws, forks, spoons, knives, napkins and other items that are designed for one-time use for
10 servicing food.

11 (n) "Dwelling" means a residence, flat, apartment, or other facility, used for housing one or
12 more persons.

13 (o) "Event" means any function that serves food and is permitted through any agency,
14 including, but not limited to, the Department of Parking and Traffic, the Recreation and Park
15 Department, the Port of San Francisco or, to the extent permitted by law, the National Park Service.

16 (p) "Food Vendor" means any and all sales outlets, stores, shops, vehicles or other places of
17 business located or operating in the city that operate primarily to sell or convey foods or beverages to
18 consumers, and stores that sell food or beverages in combination with a gasoline station.

19 (q) "Janitor" means the person who is hired by owners and managers of commercial
20 properties and their contractors to process refuse on-site before it leaves the premises.

21 (r) "Manager" means the authorized agent for the owner of a building, structure or property,
22 who is responsible for the day-to-day operation of said building, structure or property.

23 (s) "Multifamily Property" means a property that includes multiple residential households
24 and has a single account with collector(s) for recyclables, compostables and trash.

1 (ts) "Person" means a natural person (including a resident, employee, or visitor), a firm,
2 business concern, association, partnership, corporation or governmental entity, including the City and
3 County of San Francisco and its departments, boards and commissions, and successors or assigns.

4 (ut) "Public Trash Container" means any receptacle installed by a public agency at a
5 sidewalk, park or other public area and that is not under the control, unless otherwise required by this
6 Chapter, of a multifamily or commercial property, food vendor or event manager.

7 (vU) "Recyclable" means any material that can be sorted and reconstituted, for the purpose of
8 using the altered form in the manufacture of a new product, as accepted in San Francisco's recycling
9 collection program, such as paper, bottles and cans. Recycling does not include burning, incinerating,
10 converting, or otherwise thermally destroying solid waste.

11 (wv) "Refuse" has the meaning set forth in the Refuse Collection and Disposal Ordinance
12 adopted November 8, 1932, as amended, and includes recyclables, compostables, and trash, but not
13 construction and demolition debris or hazardous waste, all as defined in this Chapter.

14 (xw) "Source Separate" means to divide refuse at the place of discard generation, prior to
15 collection, into separate containers that are designated for recyclables, compostables or trash.

16 (yX) "Transfer Station" means a facility that is permitted under Health Code Section 294 to
17 receive discarded materials and transport them to a landfill for disposal.

18 (zY) "Trash" means material that is designated for landfill disposal by the collector and does
19 not include either recyclable or compostable materials. The term "trash" does not include hazardous
20 waste, as defined in California Health and Safety Code Sections 25100 et seq., or construction and
21 demolition debris as defined in this Chapter.

22
23 **SEC. 19034803. SOURCE SEPARATION OF REFUSE REQUIRED.**

1 All persons in San Francisco must source separate their refuse into recyclables, compostables
2 and trash, and place each type of refuse in a separate container designated for disposal of that type of
3 refuse. No person may mix recyclables, compostables or trash, or deposit refuse of one type in a
4 collection container designated for another type of refuse, except as otherwise provided in this
5 Chapter.

6
7 **SEC. 19044804. REQUIREMENTS FOR OWNERS OR MANAGERS OF MULTIFAMILY AND**
8 **COMMERCIAL PROPERTIES.**

9 (a) Owners or managers of multifamily or commercial properties must provide Adequate
10 Refuse Collection Service to the tenants, employees, contractors, and customers of the properties.

11 (b) Owners or managers of multifamily or commercial properties must supply appropriate
12 containers, placed in an appropriate location, to make source separation of refuse convenient for the
13 tenants, employees, contractors, and customers of the properties. The containers must:

14 (1) Be of appropriate number and size in light of the recyclable, compostable, and trash
15 quantities reasonably anticipated to be generated at the location;

16 (2) Bear appropriate signage and be color coded to identify the type of refuse to be
17 contained—blue for recyclables, green for compostables, and black for trash—and meet any additional
18 design criteria established by the Department by regulation; and,

19 (3) Be placed as close together as possible, to provide equally convenient access to
20 users.

21 (c) Owners or managers of multifamily or commercial properties must provide information
22 and/or training for new tenants, employees and contractors, including janitorseustodians, on how to
23 source separate recyclables, compostables and trash, and must re-educate existing tenants, employees
24 and contractors at least once a year.

1 (d) Owners and managers of commercial properties or their contractors will work with
2 on-site janitors to create effective source separation programs as a means of achieving
3 compliance, meeting citywide diversion goals, and achieving the diversion or disposal rate
4 reported annually to the State of California.

5 (ed) New construction or expansion of multifamily or commercial properties may be subject to
6 Department of Building Inspection requirements, such as Administrative Bulletin 088 and Building
7 Code Chapter 13, Section 1304C, to provide adequate space for recyclables and compostables, which
8 includes requiring any chute systems to keep compostables, recyclables and trash separate.

9
10 **SEC. 19054805. REQUIREMENTS FOR OWNERS OR MANAGERS OF FOOD VENDORS**
11 **AND EVENTS.**

12 (a) Owners or managers of food vendors and events must provide Adequate Refuse Collection
13 Service to their employees, contractors and customers.

14 (b) Owners or managers of food vendors and events must supply appropriate containers,
15 placed in appropriate locations, to make source separation of recyclables, compostables, and trash
16 convenient for the employees, contractors, and customers of the food vendors and events. The
17 containers must:

18 (1) Be of appropriate number and size in light of the recyclable, compostable, and trash
19 quantities reasonably anticipated to be generated at the location;

20 (2) Bear appropriate signage and be color coded to identify the type of refuse to be
21 deposited—blue for recyclables, green for compostables, and black for trash—and meet any additional
22 design criteria established by the Department by regulation; and,

23 (3) Be placed as close together as possible to provide equally convenient access to
24 users.

1 (c) Owners or managers of food vendors and events must provide information and/or training
2 for new tenants, employees, and contractors, including janitors/custodians, on how to source separate
3 recyclables, compostables, and trash, and must re-educate existing tenants, employees, and contractors
4 at least once a year.

5 (d) Food vendors that provide disposable food ware must have at least one container each for
6 recyclables, compostables and trash for use by customers and visitors, placed inside near a main exit,
7 unless that food vendor does not use disposable food ware for on-site consumption and
8 serves minimal to go orders per day, but not including any to go orders delivered to residents
9 by a delivery service. Food vendors meeting the requirements of this Section are exempt from the
10 requirement of Public Works Code Section 173 to place "a litter receptacle outside each exit."
11 Multiple food vendors that provide disposable food service ware and share a common eating area may
12 share an appropriate number, size, and placement of containers for recyclables, compostables and
13 trash for convenient use by customers or visitors.

14 (e) Food vendors and events must not put any fats, oils or grease in trash collection containers.

15
16 **SEC. 19064806. REQUIREMENTS FOR REFUSE COLLECTORS, TRANSFER STATIONS,**
17 **AND PROCESSING FACILITIES.**

18 (a) All collectors must appropriately designate the collection containers they provide to
19 customers for source separation of recyclables, compostables and trash. The containers must:

20 (1) Bear appropriate signage that allows users to clearly and easily identify which
21 containers to use for recyclables, compostables or trash;

22 (2) Be color-coded—blue for recyclables, green for compostables and black for trash;

23 and,

24 (3) Bear the name of the collector to whom the container belongs.
25

1 (b) (1) If a collector finds materials that are not the correct type as designated for that
2 container, such as recyclables or compostables in a trash container, or trash in a compostables or
3 recyclables container, the collector then must leave a tag on the container identifying the incorrect
4 materials.

5 (2) If the collector continues to find incorrect materials in a collection container after
6 the collector has left a previous tag for that customer and that type of container, the collector must
7 leave another tag on the container identifying the incorrect materials and send a written notice to the
8 person who subscribes for that collection service.

9 (3) If the collector continues to find incorrect materials in a collection container after
10 the collector has already left two or more tags for that customer and that type of container, the
11 collector may refuse to empty the container, subject to California Code of Regulations Title 14,
12 Section 17331, or as determined by the Director of Public Health or his or her designee. If the
13 container is not emptied, the collector must leave a tag and send a written notice to the person who
14 subscribes for the collection service, identifying the incorrect materials and describing what action
15 must be taken for the materials to be collected; provided, however, that a collector may not refuse on
16 this basis to empty containers from multifamily or commercial properties with multiple tenants and
17 joint account collection service.

18 (4) The collector shall, upon request, provide to the Director a list of the names and
19 addresses of those persons who have received tags or notices or whose containers have not been
20 emptied due to non-compliance with this Chapter, or copies of the tags or notices issued by the
21 collector. The collector shall also provide to the Director, upon request, a list of the names, addresses,
22 and service levels of the collector's customers and any additional information required by the Director.

1 (c) Within 90 days of the end of each calendar year, each collector must submit to the
2 Department, on a form specified by the Director, an annual report of all tons collected by material type
3 and to whom the material was sent.

4 (d) No person may deliver recyclables or compostables, including those mixed with trash, to a
5 landfill or transfer station for the purpose of having those materials landfilled, except as follows:

6 (1) A collector may drop off recyclables or compostables at the San Francisco transfer
7 station for landfill if the transfer station has agreed to provide to the Director, upon request, audits of
8 collection vehicles for a specified period going forward in time. The transfer station's audit shall
9 report the quantity of recyclables or compostables, stated as estimated tons per load or as a percentage
10 of the loads, deposited at the transfer station by collection vehicles specifically identified in the request
11 over a reasonable period of time occurring after the request.

12 (2) A processing facility that sorts and reconstitutes recyclables for the purpose of using
13 the altered form in the manufacture of a new product or turns compostables into usable and marketable
14 compost (e.g., soil-conditioning) material may send to a landfill a minor portion of those materials that
15 constitutes unmarketable processing residuals, if the processing facility provides to the Director, upon
16 request, audits of specific collection vehicles for a specific period going forward in time, of the
17 quantities of recyclables or compostables sent to the landfill from the processing facility.

18 (e) No person may deliver trash from the city, including trash mixed with recyclables or
19 compostables, to a processing facility, unless the processing facility has agreed to provide to the
20 Director, upon request, audits of collection vehicles for a specified period going forward in time. The
21 processing facility's audit shall report the quantity of trash, stated as estimated tons per load or as a
22 percentage of the loads, deposited at the processing facility by collection vehicles specifically identified
23 in the request over a reasonable period of time occurring after the request.

1 **SEC. 19074807. REQUIREMENT TO SUBSCRIBE TO REFUSE COLLECTION SERVICE.**

2 Owners of residential, multifamily or commercial properties, events or other facilities that
3 generate refuse must subscribe to and pay for Adequate Refuse Collection Service, and provide an
4 accessible location for sufficient levels of service with collector(s) for source separated recyclables,
5 compostables and trash, except as otherwise provided in this Chapter. Owners of such properties are
6 responsible for any failure to subscribe to or pay for sufficient levels of refuse collection service. The
7 Director of Public Health, pursuant to Health Code Article 6, as amended, shall enforce requirements
8 for adequate and continuous refuse collections services.

9
10 **SEC. 19084808. ENFORCEMENT.**

11 (a) The Director and his or her designee may administer all provisions of this Chapter and
12 enforce those provisions by any lawful means available for such purpose, except as otherwise provided
13 in this Chapter.

14 (b) To the extent permitted by law, the Director may inspect any collection container, collection
15 vehicle load, or receiving facility for collected trash, recyclables or compostables.

16 (c) Except as otherwise provided in this Chapter, the Director of the Department of Public
17 Health or his or her designee may impose administrative fines for violations of those provisions of this
18 Chapter, or of rules and regulations adopted pursuant to this Chapter, that pertain to the jurisdiction of
19 the Department of Public Health.

20 (d) Except as otherwise provided in this Chapter, the Director of Public Works or his or her
21 designee may impose administrative fines for violations of those provisions of this Chapter, or of any
22 rule or regulation adopted pursuant to this Chapter, that pertain to the jurisdiction of the Department
23 of Public Works.

1 (e) San Francisco Administrative Code Chapter 100, "Procedures Governing the Imposition of
2 Administrative Fines," as amended, is hereby incorporated in its entirety and shall govern the
3 imposition, enforcement, collection, and review of administrative citations issued to enforce this
4 Chapter and any rule or regulation adopted pursuant to this Chapter; provided, however, that:

5 (1) The Director of Public Works or the Director of Public Health may adopt
6 regulations providing for lesser penalty amounts than those provided in Administrative Code
7 Section 100.5;

8 (2) The fine for any violation at a dwelling or commercial property that generates less
9 than one cubic yard of refuse per week may not initially exceed \$100; and,

10 (3) No person who is the owner, tenant, manager, employee, contractor, or visitor of a
11 multifamily or of a multi-tenant commercial property shall be subject to fines or penalties for violation
12 of Section 19034803 (but will remain subject to such enforcement for violations of section 1904
13 and other sections of the Ordinance), unless and until the Director of the Department of the
14 Environment has adopted specific regulations setting out the liability of such persons. The Director
15 shall not adopt such regulations prior to July 1, 2011.

16 (f) The City shall use administrative penalties collected under this Chapter, including recovery
17 of enforcement costs, to fund implementation and enforcement of this Chapter. Remedies under this
18 Chapter are in addition to and do not supersede or limit any and all other remedies, civil or criminal.

19
20 **SEC. 19094809. FORMS, REGULATIONS AND GUIDELINES.**

21 (a) After public notice and a public hearing, the Director may adopt necessary forms,
22 regulations, and guidelines to implement this Chapter.

23 (b) The Department shall provide assistance regarding compliance with this Chapter.

1 (c) The Department shall provide information on its website regarding what materials are
2 accepted as recyclables, compostables, and trash under this Chapter.

3
4 **SEC. 19104810. EXCEPTIONS**

5 (a) A property owner or manager may seek a waiver from the Director of all or portions of this
6 Chapter, if the applicant submits documentation, using a form specified by the Director and including a
7 signed affidavit under penalty of perjury, that shows that the property does not have adequate storage
8 space for containers for recyclables, compostables or trash. In cases where after on-site verification
9 space limitations are determined to exist, the Director shall evaluate the feasibility of sharing
10 containers for recyclables, compostables or trash with contiguous properties, and, where feasible,
11 requiring container sharing in lieu of providing a waiver.

12 (b) Except as otherwise required by the Director, a collector may drop-off compostables or
13 recyclables at the San Francisco transfer station that have been collected from public trash containers.
14 The Director may require public trash containers to have a recyclables receptacle attached.

15
16 **SEC. 19114844. DISCLAIMER OF LIABILITY.**

17 The degree of protection required by this Chapter is considered to be reasonable for regulatory
18 purposes. The standards set forth in this Chapter are minimal standards and do not imply that
19 compliance will ensure safe handling of recyclables, compostables or trash. This Chapter shall not
20 create liability on the part of the City, or any of its officers or employees for any damages that result
21 from reliance on this Chapter or any administrative decision lawfully made in accordance with this
22 Chapter. All persons handling discarded materials within the city should be and are advised to
23 conduct their own inquiry as to the handling of such materials. In undertaking the implementation of
24 this Chapter, the City is assuming an undertaking only to promote the general welfare. It is not
25

1 assuming, nor is it imposing on its officer and employees, an obligation for breach of which it is liable
2 in money damages to any person who claims that such breach proximately caused injury.

3
4 **SEC. 19124812. DUTIES ARE DISCRETIONARY.**

5 Subject to the limitations of due process and applicable requirements of State or federal laws,
6 and notwithstanding any other provisions of this Code, whenever the words "shall" or "must" are used
7 in establishing a responsibility or duty of the City, its elected or appointed officers, employees or
8 agents, it is the legislative intent that such words establish a discretionary responsibility or duty
9 requiring the exercise of judgment and discretion.

10
11 Section 3. The San Francisco Public Works Code is hereby amended by amending
12 Section 173, to read as follows:

13 **SEC. 173. PLACEMENT AND MAINTENANCE OF LITTER RECEPTACLES.**

14 (a) It is the intent of this Section to ensure that public areas are kept clean and free
15 from litter.

16 (b) Any person, firm or corporation operating a grocery store, a liquor store or an
17 establishment selling food or beverages for consumption off the premises shall place and
18 maintain a litter receptacle outside of each exit from said premises for the use of the patrons
19 thereof during business hours; provided, however, that a person, firm, or corporation is not
20 required under this Section to place and maintain a litter receptacle outside each exit if that person,
21 firm, or corporation places and maintains a set of three containers for recyclables, compostables and
22 trash for use by customers and visitors as specified in Chapter ~~19~~ 48 of the Environment Code.

23 (c) Any person, firm, corporation, or property owner operating a place of employment
24 shall provide and maintain adjacent to the place of employment sufficient ashtrays or other
25

1 receptacles for the disposal of cigarettes, cigars, and other similar combustible products used
2 by employees and patrons who smoke. The Director of Public Works shall authorize the
3 placement of such ashtrays or other receptacles in the public right-of-way where necessary.

4 (d) The design, capacity, location, and number of ashtrays and receptacles shall be
5 prescribed by the Director of Public Works. Decals may be placed upon said receptacles
6 subject to the limitations set forth in Section 171 of this Article.

7 (e) The receptacle shall be emptied when full and at the close of business each day
8 and the contents thereof shall be stored or set out for collection in the same manner as other
9 refuse generated in the operation of the business. Each receptacle shall be maintained in a
10 clean and sanitary condition.

11 (f) Violation of this Section shall constitute an infraction and shall be punishable by a
12 fine of not less than \$80 nor more than \$100; for a second offense by a fine not less than
13 \$150 nor more than \$200; and for each additional offense by a fine not less than \$250 nor
14 more than \$500. In the alternative, an administrative penalty not to exceed \$250 may be
15 assessed for each violation. Such penalty shall be assessed, enforced and collected in
16 accordance with Section 39-1 of the Police Code.

17
18 Section 4. The San Francisco Health Code is hereby amended, by amending Sections
19 291, 291.1, 291.2, 291.4, 291.7, 291.11, 291.12, 291.15, and 291.17, and by repealing the
20 current Section 291.16 and adding a new Section 291.16, to read as follows:

21 **SEC. 291. OWNER RESPONSIBILITY FOR MAINTENANCE OF REFUSE COLLECTION**
22 **SERVICE TO DWELLINGS AND COMMERCIAL PROPERTIES; DEFINITIONS.**

23 Unless the context otherwise specifies or requires, the terms defined in this Section
24 shall, for all purposes of this Article, have the meanings herein specified, the following
25

1 definitions to be equally applicable to both the singular and plural forms of any of the terms
2 herein defined:

3 (a) The term "City" means the City and County of San Francisco;

4 (b) The term "Collector" means a refuse collector duly licensed pursuant to the
5 provisions of the Initiative Ordinance;

6 (c) The term "Commercial Property" means a parcel or any portion of real property where
7 Refuse is generated that is not a Dwelling, including schools, institutions, and City properties.

8 (d) (e) The term "Director" means the Director of Health of the City, or his authorized
9 agents;

10 (e) (f) The term "dwelling" means a residence, flat, apartment, or other facility, used for
11 housing one or more persons in the City and County of San Francisco;

12 (f) (e) The term "Initiative Ordinance" means the Initiative Refuse Collection and
13 Disposal Ordinance adopted November 8, 1932, as amended; and

14 (g) (f) The term "Owner" when used with reference to a dwelling shall mean, and shall
15 conclusively be deemed to be, the legal Owner of the dwelling and when used in reference to a
16 commercial property shall mean, and shall conclusively be deemed to be, the legal Owner of the
17 commercial property.

18
19 **SEC. 291.1. OWNER RESPONSIBLE FOR REFUSE COLLECTION SERVICE.**

20 The owner of any dwelling or commercial property shall subscribe to and pay for adequate
21 refuse collection service rendered to such dwelling or commercial property by a collector and
22 shall provide at a location accessible to the collector for an adequate container or containers
23 for deposit of refuse of such capacity as the Director of Public Works may prescribe. The
24 necessity for and type of refuse collection service required and the rates charged therefor
25

1 shall be governed by the Initiative Ordinance, Chapter 1948 of the Environment Code, and any
2 applicable rules and regulations adopted by the Director of Public Health.

3 Nothing in this Section is intended to prevent an arrangement or the continuance of an
4 existing arrangement, under which payments for refuse collection service are made by a
5 tenant or tenants, or any agent, in behalf of the Owner. However, any such arrangement will
6 not affect the Owner's obligation to the City.

7
8 **SEC. 291.2. FAILURE TO INITIATE SERVICE, MAINTAIN ADEQUATE SERVICE, OR TO**
9 **PROVIDE SUFFICIENT REFUSE CONTAINERS.**

10 When an owner fails to initiate adequate refuse collection service within 15 days of
11 occupancy of a Dwelling or commercial property by any person, including a business entity, or
12 fails to maintain adequate refuse collection service, the Director will evaluate the need for service and
13 what would constitute adequate service in this context, and, where appropriate, give the Owner an
14 order from the Director ~~notification~~ that such service or additional service is required. In
15 determining the need for service or additional service, the Director may make use of any relevant
16 information or evidence, including information provided by the Collector regarding the existing level of
17 service. A copy of the Director's order ~~said notice~~ will be sent to the Collector. If the Owner
18 does not arrange with the Collector for service within 15 days from the date of mailing of the
19 order, or request within that time a hearing before the Director to dispute a service or change of
20 service requirement ~~notice~~, then the Collector shall, consistent with the Director's order, initiate,
21 maintain, or increase ~~and continue~~ refuse collection service for said dwelling or commercial
22 property.

23 When in the judgment of the Director additional refuse containers are required, they
24 shall be provided by the Owner upon written notification from the Director.

1 The Director, in consultation with the Department of the Environment and after a public notice
2 and hearing, may adopt forms, regulations, and guidelines to ensure the payment and collection of
3 refuse services from any commercial property managers who fail to initiate or maintain sufficient
4 refuse service, including standards and criteria for determining whether a Commercial property has
5 provided for sufficient refuse service, or to otherwise implement and enforce Sections 291 et seq.

6 The Director of Public Health, or his or her designee, may impose administrative fines for
7 violations of Sections 291.1 and 291.2, or any rules or regulations adopted by the Director to
8 implement and enforce Sections 291 et seq. San Francisco Administrative Code Chapter 100,
9 "Procedures Governing the Imposition of Administrative Fines," as amended, is hereby incorporated in
10 its entirety and shall govern the imposition, enforcement, collection, and review of administrative
11 citations issued to enforce this Chapter and any rule or regulation adopted pursuant to this Chapter;
12 provided, however, that the Director may adopt regulations providing for lesser penalties than those
13 provided in Administrative Code Section 100.5.

14 No person who is the owner, tenant, manager, employee, contractor, or visitor of a multifamily
15 dwelling or of a multi-tenant commercial property shall be subject to fines or penalties for failure to
16 provide adequate refuse collection service, unless and until the Director has adopted specific
17 regulations establishing the responsibilities of such persons under this Article.

18 The fine for any violation at a dwelling or commercial property which generates less than one
19 cubic yard of refuse per week may not initially exceed \$100.

20 In addition to any administrative penalty assessed pursuant to this Article, the Director may
21 assess the responsible Owner the reasonable enforcement costs incurred by the City, including
22 reasonable attorneys' fees. The imposition of enforcement costs is within the discretion of the Director.

23
24 **SEC. 291.4. COLLECTOR ENTITLED TO PAYMENT FOR SERVICES RENDERED.**
25

1 Pursuant to the provisions of the Initiative Ordinance, the Collector shall be entitled to
2 payment from the owner for services rendered. When the Owner has been directed to
3 initiate service but fails to provide an adequate container or containers at an accessible
4 location and the Collector attempts to collect refuse from the dwelling or commercial property,
5 then such attempt shall be deemed the rendering of collection service for which Collector is
6 entitled to compensation in the same manner and amount as if refuse had actually been
7 collected. Should there be failure to make payment for any service rendered to any dwelling
8 by the Collector, or rendered to a commercial property pursuant to an order of the Director of
9 Public Health under Section 291.2, the means for effecting payment shall be in accordance
10 with the procedure set forth hereunder.

11
12 **SEC. 291.7. PAYMENT BY DEPARTMENT OF PUBLIC HEALTH LIEN.**

13 Following Within 45 days following the receipt of the complaint filed in accordance with
14 Section 291.5, the Director shall, regardless of any sale or other transfer of property following
15 the date of receipt of such complaint, process the complaint for payment to the Collector from
16 a continuing appropriation account so provided herein under Section 291.14, and the Owner
17 shall be liable to the City for fees paid. The payment by the City will, upon the recording
18 thereof in the manner herein provided, create a lien on the real property to which the service
19 was rendered. The lien will be officially recorded in the County Recorder's files, the lien to
20 carry and will include additional charges for administrative expenses of \$50 or 10 percent of
21 the amount owned, whichever is higher, plus any applicable recording fees, and interest at a rate
22 of 1 1/2 percent per full month compounded monthly from the date of the recordation of the
23 lien on all fees and charges due. The Owner shall be notified by the Director that the fees and
24 charges are due to the City. In addition, the Owner shall be notified that if the fees and
25

1 charges remain unpaid, subsequent proceedings may be taken to make said fees and
2 charges a special assessment on the real property to which said refuse collection service was
3 rendered.

4
5 ~~SEC. 291.9. DIRECTOR'S HEARING.~~

6 ~~Prior to the report of delinquent collection services fees being submitted to the Board of~~
7 ~~Supervisors, the Director shall cause a hearing to be held as to each owner of the real~~
8 ~~property to which service was rendered. At such hearing, the Owner may make any protest or~~
9 ~~objection regarding inclusion on the list.~~

10 ~~The Director shall fix a date, time and place of hearing and shall cause a notice, at least 10~~
11 ~~days prior to said hearing, to be mailed to the Owners.~~

12 ~~At the conclusion of the hearing, the Director shall issue a report of delinquent charges~~
13 ~~together with his recommendation as to any charge.~~

14
15 **SEC. 291.11. REPORTS OF DELINQUENCIES TRANSMITTED TO THE DIRECTOR**
16 **BOARD OF SUPERVISORS.**

17 Any charges that remain unpaid by a residential property owner or a commercial
18 property owner pursuant to an order of the Director under Section 291.2 for a period of 60 or
19 more days after the date upon which they were billed are delinquent and may be collected in
20 the manner set forth in this Article. A report of delinquent charges shall be transmitted to *the*
21 *Board of Supervisors* by the Director. Upon receipt by the *Director Board of Supervisors* of the
22 report, *he or she* ~~it~~ shall fix a time, date and place for hearing the report and any protests or
23 objections thereto.

1 **SEC. 291.12. HEARING.**

2 The Director Board of Supervisors shall cause notice of the hearing to be mailed to the
3 Owner of the real property to which the service was rendered not less than 10 days prior to
4 the date of hearing. At the time fixed for the report, the Director Board of Supervisors shall hear
5 it with any objections of the Owner liable to be assessed for delinquent accounts. The
6 Director Board of Supervisors may make such revisions, corrections or modifications of the
7 report as it may deem just and in the event that the Director Board of Supervisors is satisfied
8 with correctness of the report (as submitted or as revised, corrected or modified), the Director
9 shall confirm the report it shall be confirmed or rejected by resolution. The decision of the Director
10 Board of Supervisors on the report and on all protests or objections thereto shall be final and
11 conclusive.

12
13 **SEC. 291.15. MANNER OF GIVING NOTICES.**

14 Any notice required to be given hereunder by the City, the Director or any Collector to
15 an Owner shall be sufficiently given or served upon the Owner for all purposes hereunder if
16 personally served upon the Owner or if deposited, postage prepaid, in a post office letter box
17 addressed to the "Owner" at the official address of the Owner maintained by the Tax Collector
18 of the City for the mailing of tax bills or, if no such address is available, to the Owner at the
19 address of the dwelling or commercial property.

20
21 **SEC. 291.16. INSPECTION FEE.**

22 If the Director of Public Health causes a Dwelling or a Commercial Property to be inspected to
23 determine whether the Owner has complied with Section 291.1, the Owner of the Dwelling or

1 Commercial Property shall pay an inspection fee equal to \$167 per hour of Department of Public
2 Health staff time spent during the inspection.

3
4 **~~SEC. 291.16. PENALTY.~~**

5 ~~Notwithstanding the provisions of Section 291.3 of this Article, any person who shall violate any~~
6 ~~of the provisions of Sections 291.1 or 291.2 of this Article shall be guilty of an infraction or a~~
7 ~~misdemeanor. If charged as an infraction, upon conviction thereof, said person shall be punished for~~
8 ~~the first offense by a fine of not less than \$10 nor more than \$50; and for a second and each additional~~
9 ~~offense by a fine of not less than \$20 nor more than \$100.~~

10 ~~If charged as a misdemeanor, upon conviction thereof, said person shall be punished by~~
11 ~~imprisonment in the County Jail not exceeding one year or a fine not exceeding \$1,000. The complaint~~
12 ~~charging such violation shall specify whether the violation is a misdemeanor or infraction, which~~
13 ~~decision shall be solely that of the District Attorney.~~

14
15 **SEC. 291.17. SEVERABILITY.**

16 If any part or provisions of Sections 291 through ~~291.16~~ 291.16 or application thereof, to
17 any person or circumstance is held invalid, the remainder of the Section, including the
18 application of such part or provision to other persons or circumstances shall not be affected
19 thereby and shall continue in full force and effect. To this end the provisions of the Sections
20 are severable.

21
22 Section 5. The San Francisco Health Code is hereby amended by amending
23 Section 293.1, to read as follows:

24 **SEC. 293.1. VIOLATIONS.**

1 It shall be unlawful for any person other than the Collector, an authorized City employee
2 for enforcement purposes, or the generator of recyclable materials ~~City's authorized curbside~~
3 ~~recycling program collectors~~ to take, remove, move or otherwise appropriate recyclable materials
4 that have been placed in a container designated by a Collector for recyclables or to take, remove,
5 move, or otherwise appropriate the container that is placed for collection ~~the container in which~~
6 ~~recyclable materials are placed for collection and the matters contained therein~~. The City and its
7 duly authorized collectors shall have the exclusive right to collect recyclable materials placed
8 for collection in public sidewalk and street areas.

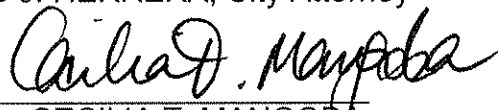
9 Section 6. **Environmental Findings.** On December 9, 2008, the Planning
10 Department determined that the actions contemplated in this Ordinance are categorically
11 exempt under the California Environmental Quality Act (California Public Resources Code
12 sections 121000 et seq.). Said determination is on file with the Clerk of the Board of
13 Supervisors in File No. 081404 and is incorporated herein by reference.

14 Section 7. **Severability.** If any part or provision of this ordinance, or the application
15 thereof to any person or circumstance, is held invalid, the remainder of the ordinance,
16 including the application of such part or provision to other persons or circumstances shall not
17 be affected thereby and shall continue in full force and effect. To this end the provisions of the
18 ordinance are severable.

19 Section 8. **Operative Date.** The operative date of this ordinance shall be 90 days
20 after its effective date.

21 APPROVED AS TO FORM:
22 DENNIS J. HERRERA, City Attorney

23 By:


24 CECILIA T. MANGOBA
25 Deputy City Attorney



City and County of San Francisco

City Hall
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102-4689

Tails Ordinance

File Number: 081404

Date Passed:

Ordinance amending the San Francisco Environment Code by adding Chapter 18, Sections 1801 through 1812; entitled "Mandatory Recycling and Composting Ordinance," amending the San Francisco Public Works Code by amending Section 173, and amending the San Francisco Health Code by amending Sections 291, 291.1, 291.2, 291.4, 291.7, 291.11, 291.12, 291.15, 291.17, and 293.1, and by repealing the current Section 291.16 and adding a new Section 291.16, all to: (1) require all persons located in San Francisco to separate recyclables, compostables and landfilled trash and participate in recycling and composting programs; (2) provide enforcement mechanisms and penalties for violations; (3) ensure that all properties subscribe to refuse collection service; and (4) authorize a Department of Public Health inspection fee of \$167 per hour; and making environmental findings and setting an operative date.

April 7, 2009 Board of Supervisors — SUBSTITUTED

June 9, 2009 Board of Supervisors — AMENDED, AN AMENDMENT OF THE WHOLE BEARING NEW TITLE

Ayes: 11 - Alioto-Pier, Avalos, Campos, Chiu, Chu, Daly, Dufty, Elsbernd, Mar, Maxwell, Mirkarimi

June 9, 2009 Board of Supervisors — PASSED ON FIRST READING AS AMENDED

Ayes: 9 - Alioto-Pier, Avalos, Campos, Chiu, Daly, Dufty, Mar, Maxwell, Mirkarimi

Noes: 2 - Chu, Elsbernd

June 16, 2009 Board of Supervisors — FINALLY PASSED

Ayes: 9 - Alioto-Pier, Avalos, Campos, Chiu, Daly, Dufty, Mar, Maxwell, Mirkarimi

Noes: 1 - Chu

Excused: 1 - Elsbernd

File No. 081404

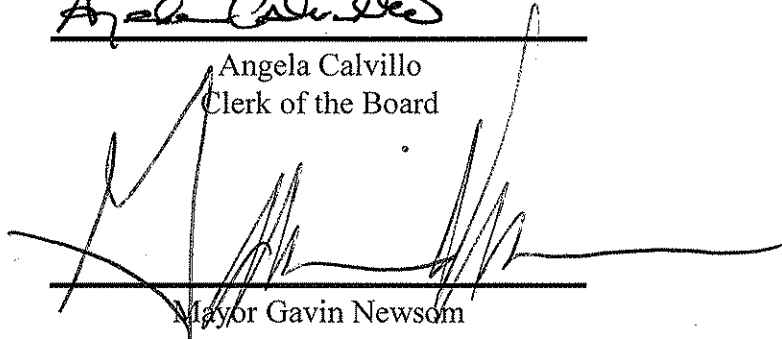
I hereby certify that the foregoing Ordinance
was **FINALLY PASSED** on June 16, 2009 by
the Board of Supervisors of the City and
County of San Francisco.

6/23/2009

Date Approved



Angela Calvillo
Clerk of the Board



Mayor Gavin Newsom