

# Appendix L

## Organics

### 1. Diversion Potential

Composting organics in lieu of disposal will not only reduce the City’s disposal costs, but will also produce a valuable soil amendment and reduce the environmental impacts of managing this material.

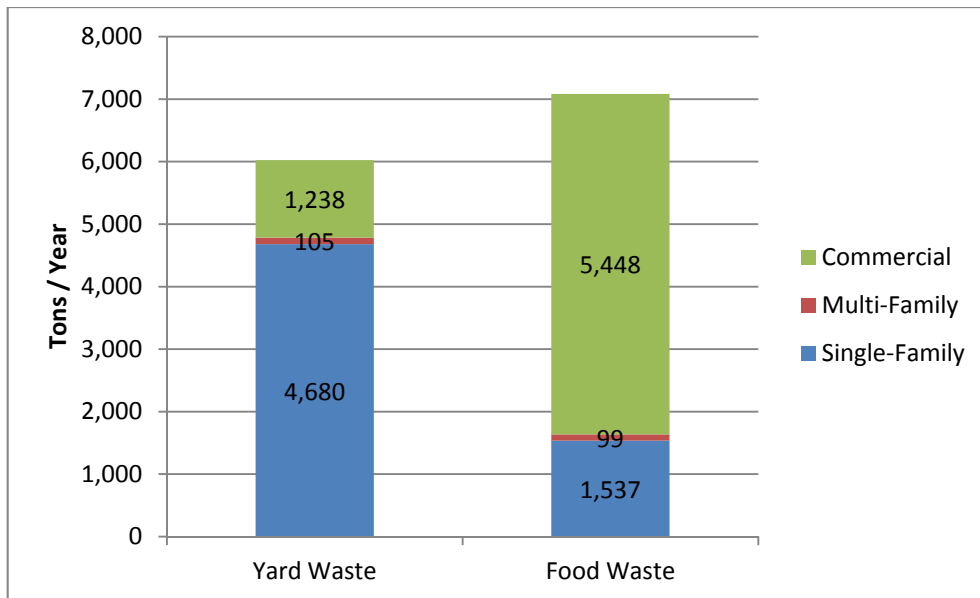
Based on the Waste Composition Study, yard waste comprises approximately 14.1% of the solid waste disposed by City residents and businesses and food waste makes up an additional 16.6%. Combined, these materials represent more than 30% of the residential and commercial waste delivered to the Transfer Station, making them prime targets for recycling. Table 1 provides the breakdown of these organic materials between residents and businesses and also estimates the tonnage disposed annually.

**Table 1: Estimated Yard Waste and Food Waste Disposed, FY 2011**

|                                 | <b>Residential &amp; Commercial Combined</b> | <b>Single-Family</b> | <b>Multi-Family</b> | <b>Commercial</b> |
|---------------------------------|--|----------------------|---------------------|-------------------|
| Waste Collected by WM (tons/yr) | 42,697                                       | 17,079               | 854                 | 24,764            |
| % of Total Waste                | 100%   | 40%                  | 2%                  | 58%               |
| Yard Waste %                    | 14.1%  | 27.4%                | 12.3%               | 5.0%              |
| Yard Waste (est. tons/yr)       | 6,020  | 4,680                | 105                 | 1,238             |
| Food Waste %                    | 16.6%  | 9.0%                 | 11.6%               | 22.0%             |
| Food Waste (est. tons/yr)       | 7,088  | 1,537                | 99                  | 5,448             |
| <b>Organics %</b>               | <b>30.7%</b>                                 | <b>36.4%</b>         | <b>23.9%</b>        | <b>27.0%</b>      |
| <b>Organics (est. tons/yr)</b>  | <b>13,108</b>                                | <b>6,217</b>         | <b>204</b>          | <b>6,686</b>      |

Based on this information and as depicted in Figure 1, single-family residents generate the overwhelming majority of yard waste and the commercial sector generates the majority of food waste. Therefore, residents should be the first target for diverting yard waste from disposal and businesses are the first target for food waste diversion. A successful organics recovery program requires the infrastructure to collect segregated organics, a processing facility, and viable end-markets for the resulting product.

**Figure 1: Primary Generators of Yard Waste and Food Waste**



Backyard composting is commendable and should be encouraged. During a Green Living Expo at the Botanical Gardens in November 2010, City staff distributed more than 100 backyard composting bins to City residents and Extension Service staff provided training on backyard composting. However, a backyard composting program will not achieve the level of waste diversion needed to achieve even a 25% recycling rate.

Prior to November 2010, Florida law banned the placement of yard waste in a lined (Class I) landfill and currently bans such placement unless the landfill has an active gas-collection system and the landfill gas is put to beneficial use.<sup>1</sup> Because of this law, Florida communities that utilize landfills have been successfully collecting residential yard waste separate from other residential garbage for many years. Yard waste diversion rates in these communities have typically exceeded 90% because of the landfill ban.

Food waste diversion programs are gaining momentum as communities strive to achieve higher recycling rates. More than 180 communities nationwide have food waste collection programs, the vast majority implemented since 2004.<sup>2</sup>

The potential also exists to co-compost organics from the municipal solid waste (MSW) stream with biosolids, which are wastewater treatment residuals. Biosolids are rich in nutrients and contain a significant amount of water, making them an ideal feedstock for blending with yard waste. South Florida's characteristically woody and dry yard waste contains a substantial amount of palm fronds, which have a high lignin content and are resistant to degradation. Biosolids, however, contain nitrogen, which balances the carbon to nitrogen (C:N) ratio, allowing the microorganisms responsible for composting to work much more efficiently in breaking down resistant compounds.

<sup>1</sup> Section 403.708(12)(c)1, F.S., which was amended in November 2010. Because the City's solid waste is disposed in a waste-to-energy facility, the City has not had to separate its yard waste from other solid waste.

<sup>2</sup> US EPA Region 5, *Best Management Practices in Food Scraps Programs*, 2011.

Biosolids composting has become a widely accepted practice across the United States, with over 265 operating programs nationally, including at least six in Florida (private facilities in Ocala, Okahumpka, and Reedy Creek, as well as public facilities in Lee County, Sarasota, and Miami-Dade. The closest is operated by Miami-Dade, which only processes biosolids from its own system. Biosolids composting is a proven method for pathogen reduction, provides considerable volume reduction, and produces a valuable end-product.

The City's wastewater treatment facility generates approximately 6,800 tons (8,500 cubic yards) of biosolids annually and currently pays about \$70 per ton to transport and dispose of these biosolids. Although not considered part of the MSW stream, including biosolids in the composting program should provide additional cost savings to the City. It would also enhance the soil structure and nutrient value of the resulting compost, thereby creating a more valuable end-product.

## 2. Organics Collection

An increasing trend in Florida is to convert to once per week, separate collection of residential garbage, yard waste, and recyclables. Approximately 27% of Florida residents currently have weekly collection of solid waste. Communities that have made this conversion typically realize cost savings and increase recycling tonnages. The City should be able to convert one of its weekly garbage collections to yard waste collection and implement this program with little or no additional cost. Residents would need to be educated about the program, its potential impacts, and how to separate yard waste for collection.

Food waste diversion and composting is common in some parts of the country, and is of increasing interest to Florida communities as they strive to achieve the State's 75% recycling goal. To divert commercial food waste for processing, the City should first target those businesses that generate the most food waste, such as grocery stores and restaurants. Separate collection containers would need to be provided for food waste, which would need to be collected separate from other solid waste. While there is a cost associated with this, the processing cost should be less than for solid waste disposal. Many communities choose to first conduct a pilot program to demonstrate the viability of the program and to work out any logistical or operational issues.

## 3. Regulatory Requirements for Organics Processing

The rules governing organics processing and recycling facilities are found in Chapter 62-709, FAC. Whether or not a composting facility requires a State solid waste permit depends on the location of the operation and the types and quantities of materials being processed. Backyard composting, composting as part of normal farming operations, or composting of less than 100 cubic yards of material onsite at any time are exempt from regulation.

Facilities that process only the following materials may operate without a permit under an annual registration issued by the Florida Department of Environmental Protection (FDEP):

- Source-separated vegetative materials, including vegetables, fruits, or breads from commercial and institutional generators;
- Source-separated animal by-products, including meat, fats, dairy, or eggs from commercial and institutional generators but excluding butchers and abattoirs;

- Manure; and
- Yard trash.

Such registered facilities must meet all other design, operating, and product quality criteria required of permitted facilities.

Certain projects that do not qualify to operate under registration rules may apply for a special pilot permit. To be eligible to operate under a special pilot permit, the project must accept less than 10,000 cubic yards of feedstock in total and plan to operate initially for no more than 18 months, with an option to extend for an additional 18 months. The design, operating, and product quality criteria are modified from those of facilities operating under a full permit. The project must submit a progress report within nine months of permitting and a final report within 60 days of permit expiration.

All other composting facilities require a permit issued by the FDEP.

If biosolids are included in the composting system, the process and end-product are subject to additional Federal and State regulation. Federal regulations (40 CFR Part 503) divide biosolids into two classes – Class A and Class B – based on pathogen levels. Class A biosolids must undergo treatment that reduces pathogens below detectable levels. Biosolids compost that meets pollutant concentration and pathogen limits corresponding to Class A specifications can be bagged and marketed for public consumption and applied without restriction. Class B biosolids ensure that pathogens have been reduced to levels that protect public health and the environment, but application must comply with site restrictions that minimize potential for human and animal contact until environmental factors have reduced pathogens to very low levels. Class B biosolids can be used in bulk at appropriate types of land application sites including agricultural lands, forests, and reclamation sites.<sup>3</sup>

Florida regulations (Chapter 62-640, FAC) stipulate management criteria, use, and land application site requirements. Pollutant and pathogen levels, reporting, monitoring, and minimum staffing requirements set forth in Chapter 62-640 are in accordance with Federal levels. Biosolids treatment facility permits are submitted on FDEP Department Form 62-620.910(2) Application Form 2A, Permit for Domestic Wastewater Treatment & Reuse or Disposal Facility. Additionally, a current Florida DEP NPDES Permit is required as a part of the FDEP Department Form 62-620.910(2) Application Form 2A.

## 4. Organics Processing Options

Various methods of organics processing are in use today, ranging from no or low technology options to comprehensive and technologically advanced systems.

**Windrow composting** involves piling feedstock materials into elongated rows either outside or in a building, and turning them periodically based on time and temperature factors. This is by far the most common method of composting in the United States and Canada for yard waste and source-separated food waste. Windrow composting is fairly flexible and can be accomplished with turning equipment ranging from a front-end loader to specialized windrow turning machines.

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<sup>3</sup> US EPA, *Biosolids Generation, Use & Disposal in the United States* (US EPA530-R-99-009), 1999.

**Aerated static pile composting** involves placing air blowers and/or ducts under a pile of organic materials in order to maintain aerobic conditions. The pile is capped with an insulating blanket of wood chips or other material and not disturbed until the active composting process is complete.

**The Modified Static Aerobic Pile (MSAP) method** combines both static pile and windrow composting methods, which minimizes the need for mechanical turning while still maintaining aerobic conditions and excellent pathogen kill. This method accelerates the process with the use of an organic catalyst and creates a high quality compost product. The MSAP method was developed by Harvest Quest International, Inc. and is currently being applied in a yard and food waste composting operating in numerous locations throughout the U.S., including Florida. This method has received EPA approval for meeting the 503 requirements for biosolids.

**In-vessel composting** refers to enclosed systems such as large rotating tubes or elongated bays with mechanical turning machines and forced aeration systems. Such systems are typically used to compost manures, food waste, and biosolids; with very large systems also used to process municipal solid waste. They are not conducive to composting solely yard waste. Benefits of in-vessel composting include the ability to contain feedstocks, such as food waste and biosolids, that might attract birds or generate odors. In-vessel systems tend to be more technologically advanced and therefore have higher capital and operational costs.

**Anaerobic digestion (AD)** is a biological process that takes place in the absence of oxygen. AD produces methane, which can be recovered for use as a biogas fuel. The solid digestate typically undergoes subsequent aerobic composting. Numerous different AD technologies are available. Historically, AD has been used primarily for wastewater treatment and manure. With regard to source-separated organics from solid waste, dozens of AD facilities operate in Europe and several are currently under development in the United States.

The costs and complexity of organics management systems increase substantially as the move is made from windrows to in-vessel composting, to anaerobic digestion. In general, aerobic in-vessel systems generally cost twice as much to implement, operate and maintain compared to windrows. Anaerobic systems can cost upwards of three times as much.<sup>4</sup>

As mentioned previously, including biosolids in the composting operation can be advantageous operationally. Biosolids provide moisture and nitrogen, while yard waste provides carbon and serves as a bulking agent to increase porosity. Composting options that are appropriate for biosolids include windrow composting, MSAP, aerated static pile composting, and in-vessel composting. Aerated static pile and windrow are the most commonly utilized methods, representing 72% of the programs in the United States, and all six Florida programs.<sup>5</sup> Depending on the method utilized, biosolids compost can be ready for use with 3 to 4 weeks of active composting followed by one month curing.<sup>6</sup>

## 5. Feasibility of Organics Composting

Numerous successful composting operations exist throughout the country. The challenge in Key West is to develop an organics collection and processing operation that is cost-effective. To

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<sup>4</sup> Per conversation with Darren Midlane, Technical Director at Harvest Quest International.

<sup>5</sup> *Biocycle*, "Biosolids Composting in the United States – 2010 Update."

<sup>6</sup> US EPA, *Biosolids Generation, Use & Disposal in the United States* (US EPA530-R-99-009), 1999.

achieve this, the processing facility would ideally be located in the Lower Keys, with the primary use of the end-product also in the Keys.

The Monroe County Board of County Commissioners recently directed the County's Climate Change Action Committee to develop a plan for mulching, composting or otherwise recycling yard waste instead of disposing of it. The County has received a draft proposal from the South Dade Soil and Water Conservation District (SDSWCD) and expects to also receive a proposal from Waste Management, which currently operates the County's three transfer stations.

SDSWCD proposes using two 96-cubic yard in-vessel composters at each of the County's three transfer stations. The estimated cost for purchase, delivery and installation is \$763,000 per transfer station, or a total of \$2.3 million. This does not include operating and maintenance costs.

As demonstrated by these cost estimates, in-vessel composting requires substantial capital investment and limits the tonnage that can be processed. Bulking agents, such as yard waste, often need to be considerably reduced in size to avoid blocking the vessel or tunnels.

Windrow composting and the MSAP method are less expensive, easier to implement, and more flexible than other composting processes. If managed correctly, odors and vectors are not an issue. In addition, land acreage requirements are similar for in-vessel and windrow composting. A vessel provides initial treatment, but does not produce a finished compost product; additional windrowing and curing is required.



Given the potential cost difference to the City and nature of yard waste in the Florida Keys, this discussion regarding the feasibility of processing organics focuses on windrow composting or the MSAP method.

## Site Criteria and Space Requirements

Criteria to be considered for a composting site include location, size, accessibility, soil drainage, topography, and buffers. The site must be adequately sized to receive, mix, and compost all of the current and future material that will be received at the facility. The facility land requirement is dependent upon the volume of organics collected for processing.

Investing in a suitable all-weather surface is important, ensuring access and operation of heavy equipment during periods of wet weather. For yard waste and food waste composting, a crushed aggregate base-layer is sufficient. Limerock or recycled crushed concrete is generally utilized (12 to 18 inches in depth). The site design must also include adequate plans for storm water management.

If biosolids are included, additional site design requirements must be met, including an impervious surface and storm water and leachate collection controls. With Florida's inclement weather, the simplest method to avoid dealing with large volumes of runoff or leachate is to erect a canopy roof structure over the compost pad.

Based on the estimated volumes of yard waste, commercial food waste, and biosolids that are potentially available and utilization of windrow composting techniques, Table 2 estimates the land requirements depending on the types and percentages of materials diverted for composting. Of note, the inclusion of food waste and/or biosolids into yard trash does not increase the volume and space requirements as much as additional yard waste. Yard waste is coarsely ground and bulky with countless voids that would be filled in with food waste or biosolids. The table is based only on yard waste, food waste, and biosolids generated in the City. Economies of scale potentially could be realized if the City partnered with Monroe County.

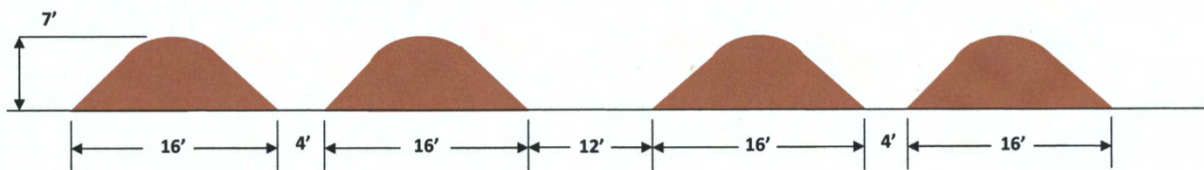
**Table 2: Land Requirements for Organics Composting**

| Organic Waste Capture Rate          |      | Volume<br>(cubic yds/yr) | Space Required |       |
|-------------------------------------|------|--------------------------|----------------|-------|
|                                     |      |                          | Square Feet    | Acres |
| Yard Waste Only                     | 100% | 24,081                   | 78,760         | 1.81  |
|                                     | 75%  | 18,061                   | 59,070         | 1.36  |
|                                     | 50%  | 12,041                   | 39,380         | 0.90  |
| Yard Waste + Comm. Food             | 100% | 25,285                   | 82,698         | 1.90  |
|                                     | 75%  | 18,964                   | 62,024         | 1.43  |
|                                     | 50%  | 12,643                   | 41,349         | 0.95  |
| Yard Waste + Comm. Food + Biosolids | 100% | 26,549                   | 86,833         | 2.00  |
|                                     | 75%  | 19,912                   | 65,125         | 1.50  |
|                                     | 50%  | 13,275                   | 43,416         | 0.99  |

Note: Based on the waste composition results and converted to cubic yards.  
 Assumptions: Yard waste density of 500 lbs/cy; food waste and biosolids density of 1,600 lbs/cy; 5% volume increase with the addition of food waste, 10% with subsequent addition of biosolids, assuming a 3:1 mix of yard waste to food waste or biosolids; reprocessing of bulk material provides up to an additional 7,225 yards of carbon-based materials.

The calculations in Table 2 assume four composting cycles per year (three months per cycle) and windrows 7 feet in height and 16 feet wide at the base. Windrows would be constructed in pairs 4 feet apart with 12 feet wide aisles between each pair, as depicted in Figure 2.

**Figure 2: Windrow Construction Diagram**



Concerns have been raised regarding attraction of vectors and birds. The composting facility design can include parameters to eliminate vector attraction. In particular, the receiving and mixing area of the facility could be enclosed to eliminate any potential exposure to food waste.

Fabric structures, which are rapidly gaining popularity, are both inexpensive and exceptionally strong. A framework of galvanized steel tubing covered with UVI treated and weather resistant fabric provides an ideal structure that can withstand hurricane force winds.

To further reduce attraction of animals, as well as to speed up the degradation process, food waste can be macerated or ground. Initial composting can be performed within the enclosed structure and the material relocated outside after approximately 5 to 7 days.



## Potential Composting Sites

Based on discussions with City and County staff, finding a location to compost organics could be challenging because of the density of development and existing land uses. Discussions with City staff resulting in identification of the following sites for further exploration.

- **Rockland Key** – Property owned by Toppino, Kemp, or Monroe County. Siting of a facility on Rockland Key would require coordination with the U.S. Naval Air Station on Boca Chica Key to ensure that operations would not create a bird hazard for aircraft using the air station.<sup>7</sup>
- **Fleming Key** – U.S. Navy property. The City currently operates a wastewater treatment facility on Fleming Key, which would make it a convenient location for co-composting with biosolids. The U.S. Naval Air Station’s Business Manager expressed concern regarding increased traffic to this site because of the burden on security forces and additional wear and tear on the access bridge.
- **Old Boca Chica Road** – County property located south of the Naval Air Station on Boca Chica Key. As with Rockland Key, siting of a facility on Rockland Key would require coordination with the U.S. Naval Air Station on Boca Chica Key to ensure that operations would not create a bird hazard for aircraft using the air station.<sup>8</sup> Access to this site is provided via Boca Chica Road (County Road 941) at mile marker 11 on Big Coppitt Key.
- **Closed Stock Island Landfill site** – The footprint of the landfill itself is not conducive to a composting operation and the other areas of the property are slated to be used as a transportation facility for the City.

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<sup>7,8</sup> FAA Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports, Section 3-4 Composting Operations on Airports provides guidance regarding locating composting facilities on or near airports. This section recommends against locating composting operations within 1,200 feet from an aircraft movement area, loading ramp, or parking space. Section 3-4.a specifies that the components of the compost should never include any municipal solid waste; however, non-food waste such as leaves, lawn clippings, branches, and twigs generally are not considered a wildlife attractant. Further, sewage sludge, wood chips, and similar material are not considered municipal solid waste and may be used as bulking agents. Section 3-4.b provides for an airport operator to reserve the right to stop any operation that creates unsafe, undesirable, or incompatible conditions at the airport.

- **Monroe County property** – possibly on Long Key or Cudjoe Key. As mentioned previously, the Board of County Commissioners recently tasked the Climate Change Action Committee with developing a yard waste diversion plan. Based on discussions with County staff, the primary sites under consideration are the three County transfer stations, one of which is located on Cudjoe Key.

## Equipment Requirements

Regardless of the composting method selected, equipment is needed to process incoming material (size reduction) and handle pile construction, turning, watering, screening, and monitoring of the material. Provided below is a summary of the types of equipment needed and the uses of each.

A composting facility could be owned and/or operated by the City or a private contractor. If the City contracts for service, the contractor would likely provide some or all of the equipment.

### Grinder



Size-reducing yard waste to a suitable particle size for composting is a crucial initial step. The characteristics of the City's yard waste, predominantly palms, will make it difficult to grind, requiring a high horsepower unit to handle the tough fibrous material. Therefore, the most likely option will be to utilize a private grinding contractor on a periodic basis.

### Front-End Loader



The loader is the all purpose workhorse responsible for all forms of material movement:

- Windrow construction,
- Windrow turning,
- Feeding grinders, screeners, etc., and
- Loading out finished compost.

### Screener



The use of a screener provides uniform fine-grade compost suitable for numerous horticultural applications. Screened compost also has a value and can be sold or traded to residents, landscapers, nurseries, and golf courses. A small trommel screen (14 foot drum) would be adequate, or alternatively a rental unit could be utilized periodically.

### Water Truck or Hose Setup



During the drier periods of the year, composting yard waste can be a water intensive process. Ground yard waste can have very low moisture content and requires the addition of water to raise the moisture level to a minimum of 50% to facilitate optimum composting. Therefore, having an adequate water source is an

important consideration when determining a suitable facility location. Biosolids, if co-composted with yard waste, can provide substantial moisture.

### Monitoring Equipment

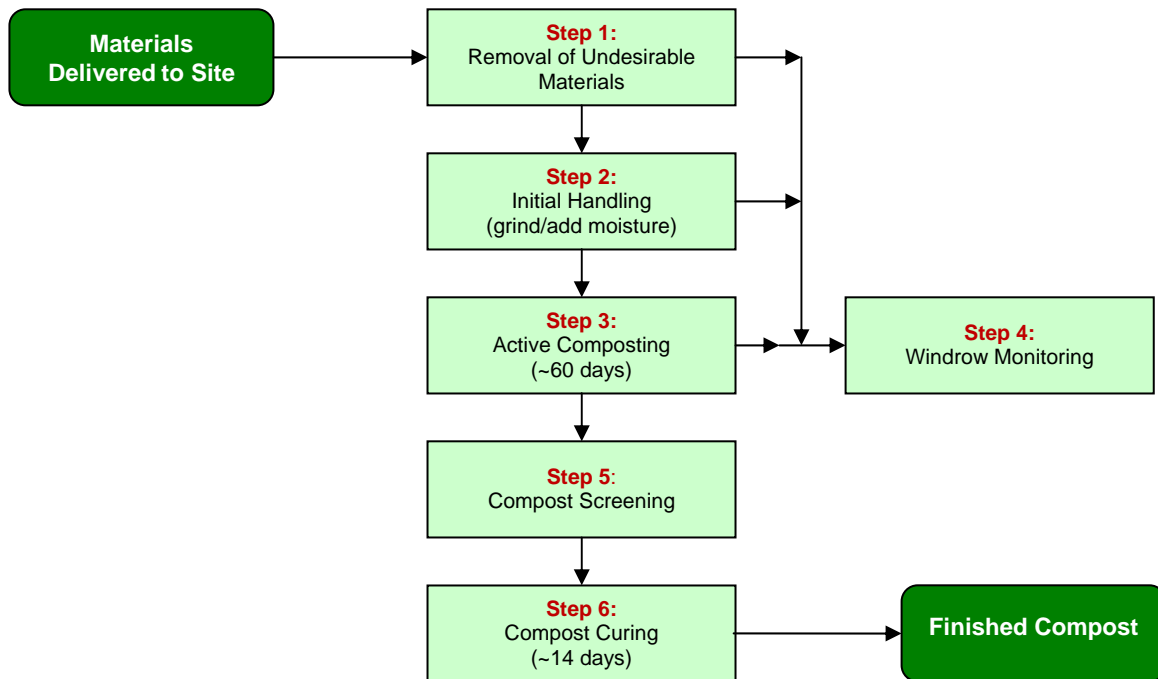


Thermometers are necessary to monitor temperature and to keep a temperature log to meet regulations. The temperature of a compost pile is a good indicator of how well the microbes are working. Heat produced through the composting process is an indicator of microbial activity.

## Six-Step Operational Process Flow

A composting process entails six basic steps, which are summarized below and depicted in Figure 3.

Figure 3: Six-Step Composting Process



**Step 1: Removal of Undesirable Materials** – At the receiving point of the facility, a protocol is needed to reject loads containing excessive contamination. Once accepted, compostable material is separated from non-compostable material and other contaminants. For example, removing non-compostable materials from yard waste (e.g., leaves, brush and yard trimmings) might involve removing contaminants such as pieces of metal, garden hoses, used vehicle oil and air filters, aerosol cans, concrete and rocks, and plastic bags. Eliminating non-compostable material can occur at various stages of the process. For example, if bags are to be used for collection, it is advantageous to debug at the curb or require the use of paper bags. This type of bag can be

shredded and mixed into the compost, while non-biodegradable plastic bags must be removed prior to composting.

**Step 2: Initial Handling** – Incoming materials are then physically processing (ground) and other materials that improve composting efficiency are added. Materials preparation also includes the following:

- (a) Blending of carbon and nitrogen sources by mixing two or more materials to establish a desired ratio of carbon to nitrogen to promote efficient composting.
- (b) Adjusting initial porosity to satisfy requirements for airspace and mitigate odor generation.
- (c) Adding water to the materials to adjust the moisture levels to a desirable range.
- (d) Mixing to homogenize the starter materials, to distribute water uniformly, and to break down clumps or oversized particles.
- (e) Constructing windrows.

**Step 3: Active Composting** – The natural biological degradation process (composting) is controlled and accelerated at a composting facility. Composting is the transformation of biologically decomposable material through a controlled process that results in production of stabilized organic matter (compost).

**Step 4: Windrow Monitoring** – Monitoring is necessary to ensure optimum conditions, such as porosity, ample oxygen, and moisture level, which are highly favorable to active composting microbes. Windrows are monitored for temperature, moisture content, odors, and evidence of leachate. Samples are sent for laboratory analysis to ensure a quality product. All monitoring data is recorded for process management and evaluation.

**Step 5: Compost Screening** – Screening is required to remove contaminants such as oversized materials, stones, plastic film, and hard plastic. Screening also enables size classification to suit customer needs. Some customers may require that essentially all man-made inert material is removed from compost to enhance its aesthetic acceptability.

**Step 6: Compost Curing** – Customers that require a very mature product may specify a greater degree of product stability. Curing is the last stage of composting that occurs after much of the readily metabolized material has been decomposed. Following the active composting phase, when temperatures within the windrows have declined to around 100°F and screening (if required) has been carried out, the resultant compost should be allowed to cure before final use. Curing has no defined time; however, common practices in commercial composting operations usually allow a period of two to four weeks.



## Marketing: End-Use Options

Numerous uses exist for compost. As a soil amendment, it improves the texture, porosity, water holding capacity, and organic content of the soil. Compost is often distributed in bulk with pickup at the composting facility by the end-use market. The product can also be bagged and sold.

While some facilities give end-product compost to the public at no cost, other facilities enjoy revenue from both public and professional markets. The market value of mature yard waste compost in Florida currently ranges from \$10.00 to \$26.00 per cubic yard.<sup>9</sup>

The volume and quality of the compost produced will impact which end-users will be targeted and their acceptance of the product. Potential users of compost include the following:

- **City facilities, parks, and recreation areas** – Use of compost on City property not only closes the loop, but can offset costs by reducing or eliminating the need to purchase comparable landscaping material.
- **Golf courses** (see photo) – Over 75 golf courses are located within 130 miles of the City, including the Key West Golf Club located on College Road.
- **Local landscapers and gardeners** – Sale of compost to commercial landscapers offsets costs and provides revenue. Compost can be offered for bulk pickup or distributed in bags.
- **Nearby military base and related properties**
- **Resorts** – Over 100 resorts and lodges are located in the Keys, many of which have landscaped property.
- **Farmers** – Farmers might not present a significant end-market for Key West compost, as evidenced by the relatively small value of agricultural products sold in Monroe County.<sup>10</sup>
- **Residents** – Compost can be offered free or sold to residents for use in home gardens and landscaping.



A market research study would identify the realistic geographic boundary of the market for Key West compost and assess the potential demand for it by end-users within that boundary. In addition, a marketing strategy would be necessary to target the most promising end-users. A program to market the compost to the local public might include branding and a logo, a demonstration garden at the facility pickup site, and promotion on the City website and at events.

## Financial Implications

As noted above, the cost of producing compost will vary greatly depending on the methodology used. In Key West, local composting will provide a cost effective alternative to disposal if production costs remain lower than transport and disposal costs, which should be attainable. The

<sup>9</sup> *Composting News*, April 2012, page 6.

<sup>10</sup> In 2007, farmers in Monroe County sold only \$2 million worth of products. Of those published, all but four other counties sold more (Florida Department of Agriculture and Consumer Services, Division of Marketing and Development).

sale and use of locally produced compost may also provide additional benefits to the City in the form of increased waste diversion and revenue.

Preliminary conversations with industry specialists have indicated that the windrow or MSAP methods best suit Key West's unique environmental parameters. Production costs for windrow composting ranges from \$16-25 per ton of inbound material, and for the MSAP process the range is \$28-44 per ton. Either would be far less than current transport and disposal fees (currently \$71.55/ton). Revenue for finished compost is generally in the range of \$8-15 per cubic yard.<sup>11</sup>

One potential consumer for locally produced compost could be Key West Golf Course. Compost is used by golf courses for both construction and maintenance purposes. A standard 18-hole golf course can typically consume 250 to 300 cubic yards of compost, or 500 to 600 cubic yards of 50/50 compost-sand blend per year for maintenance purposes. Use at the Key West Golf Course will also increase product exposure. The City could also sell finished compost to local businesses and make it available to residents at no charge. A more detailed analysis of financial implications will be needed once a composting site is found.

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<sup>11</sup> Per conversation with Darren Midlane, Technical Director at Harvest Quest International.