



Recommended Composting Options for Whole Foods Market Madison Wisconsin

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General Business 600
Environmental Strategy and Sustainability

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Project Introduction

This report was commissioned jointly by UW – Madison School of Business and Whole Foods Market, the world’s leading retailer of natural and organic foods. It examines a detailed list of options and recommendations for a Whole Foods Market composting solution.

Presently, Whole Foods Market in Madison does not compost their produce waste which amounts to approximately a ton each week. This goes against one of the core values of the company which is a commitment to the environment. They contacted us with the intention of developing a composting site near the store to limit their waste as well as support sustainable agriculture. In doing so, they would also implement a system that better reflected both the company’s and employees’ dedication to sustainable business practices.

In developing our proposal we kept in mind Whole Foods Market’s major concerns and requirements and sought to find successful solutions for them. These concerns included:

- **Be A Good Neighbor** - Whole Foods Market’s devotion to being a good neighbor required that we anticipate possible complications such as visual impact, aroma and pest control to limit complaints.
- **Full Compliance** – Our solution had to fully comply with city composting codes.
- **Space Constraints** – The possibility of composting on-site required finding some type of structure that worked within the limited available space. Information regarding the equipment and the maintenance necessary to produce usable compost was also requested.
- **Smooth, Workable Solution** – Our solution had to be easy to implement and easily *workable* for the produce team’s personnel, ensuring our implementation integrated with existing responsibilities and did not become a burden to existing tasks.
- **Representation** – We were asked to be sensitive to Whole Foods Market’s reputation and relationships in the community. This included properly identifying our team and noting we did not represent Whole Foods Market during our research encounters.

In addition to the core concerns there were a few other questions and considerations. One question regarded the possibility of composting non-produce waste such as meats and paper products. Another consideration was that Whole Foods Market plans to relocate to a larger store in the Madison area in about two years. Our research necessitated suggestions for a short-term solution at their current store as well as a more permanent solution at the future site taking into consideration a doubling in the volume of their produce waste. Also, while Whole Foods Market did not stress cost as a primary concern due to their core values, our team evaluated the options presented with cost in mind.

Current Whole Foods Market Processes

Before determining an optimal composting solution for Whole Foods Market, a complete overview of the status quo waste process in the Produce Department must be understood. Additionally, because the shelf-life of produce is so short and delivery vehicles are often involved in waste procedure, it is important to review the entire process from delivery to disposal.

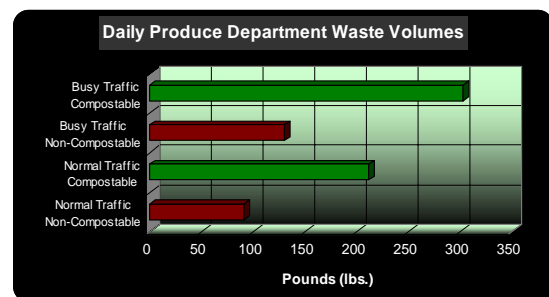
Current Delivery Process

Produce is delivered to the store either directly from local producers or from the Midwest Distribution Center based out of Munster, IN. Local producers range greatly in size and frequency

of delivery, however all use their own vehicles. Some of the larger producers also deliver orders intended for the distribution center to the Madison, WI store. When the trucks from the Munster distribution center make their daily deliveries, they then pick up this extra produce and return it to Chicago for redistribution to the 18 other stores in the region (a process called *backhaul*). The largest local producers make deliveries on average only 2-3 times per week (less yet in winter months) while the regional distribution center delivers 6 days every week.

Produce Waste Makeup and Volumes

Produce waste is known as *cull*; either the removed outer layers of vegetables to keep up appearances or items simply too old to be sold. This waste gets disposed of in one of 5 large trash cans in the produce department and then wheeled to the dumpster for emptying. However, currently non-compostable waste is also being disposed of in these same bins so additional equipment and a change in procedure will definitely be necessary in implementing any composting system. Interviews with 3 Whole Foods employees produced the following information on current waste procedure and approximate volumes. The data was then imported into Microsoft Excel where daily, weekly, monthly and yearly volumes were approximated for use in sizing appropriate composting options. The daily and annual results can be seen in the tables at the right. [See Appendix A for full details on how the volumes were calculated]



Recycling and Backhaul

In addition to current delivery and waste procedures, there are several other important factors which enter into the overall process. Recycling is a very important priority to Whole Foods Market. By returning their recyclable products to the Munster distribution center rather than to the local City of Madison waste facilities, they are able to recycle more types of products. In addition to picking up *backhaul*, the trucks from distribution center also take with them all the recyclable items from the store on an almost daily basis (6 trips per week). The Whole Foods Market employees also attempted to fully recycle all wax produce boxes in usable condition, giving them to local producers. However, because wax boxes are meant to break down quickly, storing these items constituted a waste code violation. So while they still allow local producers to reuse any wax boxes that happen to be on-hand when they arrive, they are forced to throw away the majority of them. This is an important lesson as any future composting solution will have to meet the same code and not store biodegradable waste within the building for extended periods of time.

Composting Basics

What is composting? Composting facilitates the natural breakdown of organic wastes and produces mature compost containing humus. The process of biological decomposition takes care of this naturally, but composting processes can hasten the breakdown of inputs and destroy

pathogens and weed seeds because of the high temperatures reached which otherwise wouldn't occur. [See Appendix B for technical details on composting]

Why compost? A composting program is a logical and beneficial extension of Whole Foods Market's core value of environmental responsibility. One of the most important benefits of composting is that it prevents the loss of biological "waste" to landfills, thereby tightening the loop on the biological waste cycle. Currently, food residuals together with yard trimmings constitute 23 percent of the U.S. waste stream which is lost to landfills and incinerators instead of being recaptured for further use in biological cycles. [Appendix B] Also, mature compost yields many benefits as a soil amendment. These include its capacity to restore and improve soil fertility, reduce the need for fertilizers, and improve soil water retention. It can also combat various forms of pollution.

How does composting work? In general, nitrogen-rich biological waste (green matter) is mixed in with carbon-rich bulking matter (brown matter) and the resulting mixture undergoes an *active* phase of rapid decomposition, where the temperature increases for a period of time, and then a *curing* phase where the temperature returns to normal and the materials stabilize and finish decomposing.

Which systems are applicable for Whole Foods Market? There are a variety of composting methods which range widely in labor, technology and space requirements; from backyard bins to industrial facilities. Though the final products differ somewhat, each method produces felicitous mature compost. By following the decision tree [Appendix B] we see the need for a technically advanced system requiring close monitoring and attention. We determined the composting solution for Whole Foods Market would need to be an in-vessel, on-site system, or an off-site large scale facility.

Regulatory Concerns

If the final composting solution is to be implemented in the City of Madison, the laws governing composting, found in Chapter 7- Public Health of the City of Madison Code of Ordinances, must be followed. Code 7.361, created by Ordinance 9747, stipulates several regulations regarding composting for both households and businesses. Most importantly, the code states that "each compost bin shall be no larger in volume than one hundred twenty-five (125) cubic feet, and shall be no taller than five (5) feet." The volume of fruit and vegetable waste produced by Whole Foods Market would necessitate several bins of this size. During an interview, George Dreckmann, Recycling and Streets Coordinator for the City of Madison confirmed the right to have multiple bins if within the size limitations previously described. Addressing Whole Foods Market's original question, the composting of meats or fish is prohibited. Additionally, Dreckmann stressed the importance of proper maintenance of the compost so as to minimize unpleasant odor and prevent the attraction of pests, both of which are outlined in the code. No permits are necessary to create a composting site on Whole Foods Market's property and no inspections would be made of the site unless a complaint was filed by a Madison resident. [See Appendix C for Code 7.361 in full]

Table of Implementation Options

The following table outlines the various options for composting systems based on the needs of the Madison Whole Foods Market and compliance with city codes.

Table of Implementation Options

| Composting System | Short Term – Current Store (2 years) | Long Term – New Store (beyond) |
|---|---|---|
| <p>Compost with Local Producers Utilize the existing composting facilities of local producers to give them the raw ingredients to make new healthy soil.</p> | <p>Large local producers who make deliveries often would be chosen to participate. The waste transportation would be assumed by the farmers as they currently leave with empty trucks.</p> | <p>Large local producers who make deliveries often would be chosen to participate. The waste transportation would be assumed by the farmers as they currently leave with empty trucks.</p> |
| <p>Recommendations</p> | <p>NO - Code stipulates waste cannot be stored onsite and Local Producers do not deliver often enough. This problem would be even worse in the winter when fewer deliveries are made.</p> | <p>NO – With waste expected to double in the new store, this option would be even less likely to handle the increased volume.</p> |
| <p>Compost Onsite Create an onsite composting system using an enclosed composter located behind the store near the loading dock.</p> | <p>This option would require considerable upfront cost and an ongoing time commitment to manage it properly. By fencing in all the equipment and using a sealed composter, odors, pests and visual impact can be kept to a minimum.</p> | <p>By beginning early and designing the system from the ground up for the new store, all of the major concerns could be kept to an absolute minimum while working with the produce department and its employees as smoothly as possible.</p> |
| <p>Recommendations</p> | <p>MAYBE - While an onsite system can be implemented within code, the space constraints, the high cost, time commitments and neighbor concerns make this a less than ideal option.</p> | <p>MAYBE - Again, high costs and the ongoing management and time commitment keep this from being the best option, but it is possible and should be considered as a backup.</p> |
| <p>Compost at City-run Facility Many city governments operate large scale, industrial composting facilities.</p> | <p>Large industrial composting operations can be very cost effective through scale and can keep complaints to a minimum by being sited in non-residential areas. The only concerns would be the tipping fees and how to transport the compostable material to the site.</p> | <p>Large industrial composting operations can be very cost effective through scale and can keep complaints to a minimum by being sited in non-residential areas. The only concerns would be the tipping fees and how to transport the compostable material to the site.</p> |
| <p>Recommendations</p> | <p>NO - Unfortunately, the City of Madison does not yet have an industrial composting facility so this is not an option to be considered.</p> | <p>MAYBE - While there is no current City of Madison-run, industrial composting facility, they are currently discussing the implementation of one. If they move forward with the plan, it should be completed around the same time as the new store.</p> |
| <p>Compost at Whole Foods Regional Distribution Center The NW and SE regional centers already operate large scale composting facilities.</p> | <p>A large-scale industrial composting facility run out of Munster, IN (reg. distribution center) could take advantage of scale and siting benefits. Very few changes would be necessary in transportation as distribution trucks already bring the recycling from all the stores back to this facility and there is extra room for compostables.</p> | <p>A large-scale industrial composting facility run out of Munster, IN (reg. distribution center) could take advantage of scale and siting benefits. Very few changes would be necessary in transportation as distribution trucks already bring the recycling from all the stores back to this facility and there is extra room for compostables.</p> |
| <p>Recommendations</p> | <p>YES – There is already a tentative commitment to implement such a system, though the rollout will be slow across the 18 stores. Because of the close proximity of the Madison store and the willingness of the employees, we recommend the Madison store volunteer to be a trial store so they can begin composting quickly.</p> | <p>YES - Even if the Whole Foods Market store in Madison cannot volunteer early to be included in the regional composting system, it is expected that it will be fully operational by the time the new store is completed. This is by far the best long term option as cost, time, transportation and possible complaints will all be addressed.</p> |

Analysis of Implementation Options

Possible Options (Maybes)

Of the different implementation options that we have brought up, three of them are viewed as *maybes* in our analysis. These three options, on-site for a short term plan, on-site for a long term plan, and composting at a city run facility for a long term plan, are all viable options for the Madison store, however, each present complications or excessive costs. [See Appendix D for details on Viable, but Not Recommended Options]

Recommended Solution: Regional Composting

The option that our group recommends for the Madison Whole Foods Market is composting at the Whole Foods Regional Distribution Center for both short and long term solutions. Currently, the plan for the regional composting facility would be located in Munster, Indiana at their existing regional recycling center.

Currently, stores in the Southwest and Northeast U.S. already have composting programs intact. In the November 2004 issue of *BioCycle*, Molly Farrell detailed these existing Whole Foods Markets operations, highlighting their success. The compostable material is sent out and processed, then returned to the stores to be sold.

Implementation

First, our group recommends that the Madison Whole Foods Market contact the regional distribution center and become a 'proof of concept' store for the regional composting plan.

Changes and Employee Education

Along with applying to be a composting store, the Madison Whole Foods Market must make changes in order to adapt the new system. At present, employees put all waste, both produce and non-compostable materials, in a general garbage bin to be thrown away. As composting is a delicate science, certain materials cannot be included and would have to be separated from the produce. Specifically labeled bins should be placed in the produce back room designating which one is for materials to be sent to the composting plant, and which will be thrown away.

Current employees will need to be educated on the new system. An issue to be addressed with the current employees is a change in job descriptions, responsibilities, and hours. Some employees will have extra responsibilities dealing with the disposal and/or shipment of the materials to be composted. While minimal, this additional time commitment will require modification to certain positions and could require additional help.

In an interview with Brad Austin, the produce team-leader, he made clear that most employees working at Whole Foods Market do so because they are in agreement with the core values. Therefore, the employees should be very cooperative and receptive to the changes that would have to take place if the composting program were to be added. He also told us that education would probably take less than a week before the current employees would be up to date with the new practices. This is based off of past experience with the implementation of their comprehensive recycling program.

Further Waste Reduction

The Madison store has the opportunity to further reduce the amount of compostable waste that would have to be transported to Indiana through cooperation with local producers. The compostable waste is a valuable source of nutrients that can be used as animal feed for swine and poultry. Building off their existing relationships with local producers to recycle wax boxes which would normally be disposed of, they can also take this compostable material in their empty vehicles.

Final Thoughts

We would like to thank Whole Foods Market of Madison for their cooperation and hope that the information we have provided will be of service in their implementation.

Academic Integrity Policy

I understand this paper must be entirely my own work and that the University of Wisconsin's Code of Academic Integrity applies. By signing below, I affirm that the paper is my own work and that I did not plagiarize any parts of the paper or receive any unauthorized aid in completing the paper.

Signatures:

John Wesley Ostlund 12/2/05

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Ryan McMahon 12/2/05

Appendix A – Whole Foods Market – Biodegradable Waste Calculations

Interviews with Brad Bohlen (Marketing Director), Brad Austin (Produce Team Manager) and Jessica Barman (Green Team Leader) produced the following data regarding volumes of waste and current disposal processes:

- (5) Total trash bins (w/built-in wheels) made up of (4) 55 gal. and (1) 32 gal.
- The large cans weigh approximately 65 lbs. each (giving density of ~1.2 lbs./gal)
- March to June approximately 5-6 cans/day
- July to February approximately 7-8 cans/day
- Less waste on weekends by 1-2 cans (more sales equate to less waste)
- (15) Total employees working in Produce Department (Max 5, Min 1)
- Approximately 25-35% of current waste is non-compostable
- Produce floor space is expected to double in new store, waste should as well

This information was assembled into Microsoft Excel to generate daily, weekly and yearly volumes in the relevant units for sizing comparisons to industrial composting systems. Tables from the Excel file are included below.

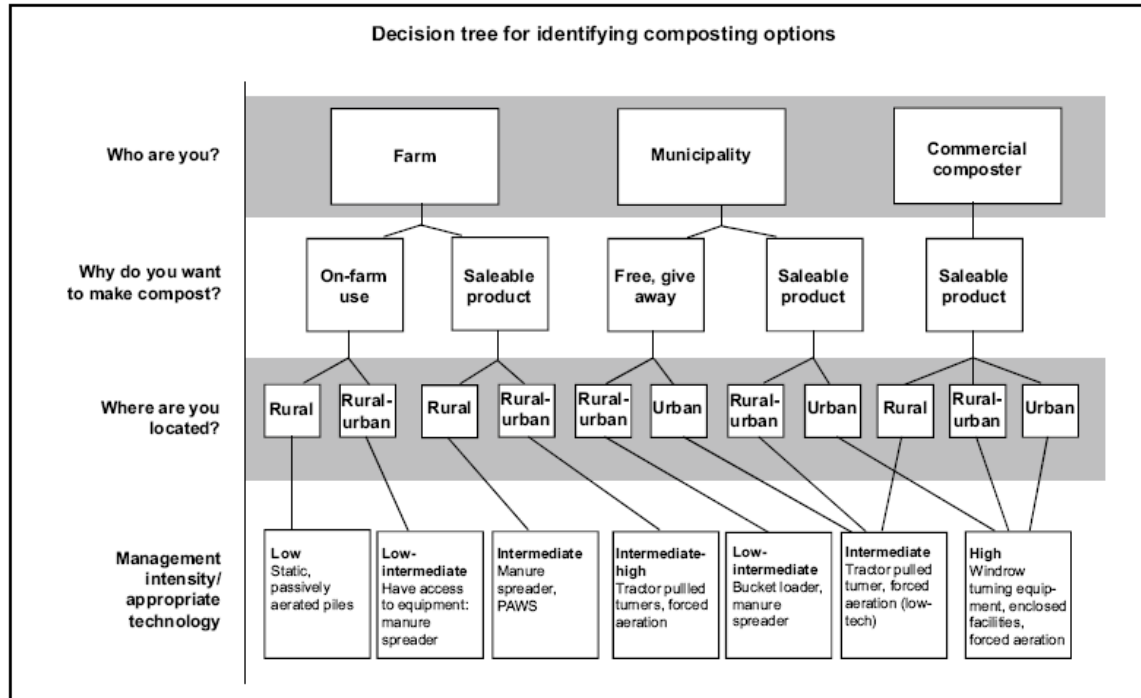
| Trash Can Information | | |
|----------------------------|--------|-------------|
| Description | Total | Unit |
| Total Large Cans | 4 | # of cans |
| Total Small Cans | 1 | # of cans |
| Size of Large Can | 55 | gallons |
| Size of Small Can | 32 | gallons |
| Average Weight (large) | 65 | pounds |
| Percentage Non-Compostable | 30 | percent |
| Density | 1.1818 | lbs./gallon |

| Daily Volumes | Pounds |
|--------------------------------|--------|
| Normal Traffic Non-Compostable | 91 |
| Normal Traffic Compostable | 212 |
| Busy Traffic Non-Compostable | 130 |
| Busy Traffic Compostable | 303 |

| Store Traffic Description | July - February Total | March - June Total | Unit |
|---------------------------|-----------------------|--------------------|-----------------|
| Small Can | 1 | 1 | Per day average |
| Min/Day | 4 | 6 | Weekday Min |
| Max/Day | 5 | 7 | Weekday Max |
| Less on Weekend | -1 | -1 | Higher sales |
| Average Trips/Week Large | 28.5 | 42.5 | trips |
| Average Trips/Week Small | 7 | 7 | trips |
| Weekly Trips | 35.5 | 49.5 | trips |
| Non-Compostable/Week | 2.66 | 3.80 | cubic yards |
| Non-Compostable/Week | 635.17 | 908.17 | pounds |
| Compostable/Week | 6.21 | 8.88 | cubic yards |
| Compostable/Week | 1,482.06 | 2,119.06 | pounds |
| Total Cubic Yards/Week | 8.87 | 12.68 | cubic yards |
| Total Weight/Week | 2,117.23 | 3,027.23 | pounds |

Appendix B – Composting Technical Details

- 23% figure came from <http://www.epa.gov/epaoswer/non-hw/composting/index.htm>



Source: <http://www.cias.wisc.edu/pdf/artofcompost.pdf>

Benefits Beyond the Bin

Compost can:

- Suppress plant diseases and pests.
- Reduce or eliminate the need for chemical fertilizers.
- Promote higher yields of agricultural crops.
- Facilitate reforestation, wetlands restoration, and habitat revitalization efforts by amending contaminated, compacted, and marginal soils.

Pollution Solution

Compost can:

- Cost-effectively remediate soils contaminated by hazardous waste.
- Remove solids, oil, grease, and heavy metals from storm water runoff.
- Capture and destroy 99.6 percent of industrial volatile organic chemicals (VOCs) in contaminated air.

- Provide cost savings of at least 50 percent over conventional soil, water, and air pollution remediation technologies, where applicable.

Source: <http://www.epa.gov/epaoswer/non-hw/composting/index.htm>

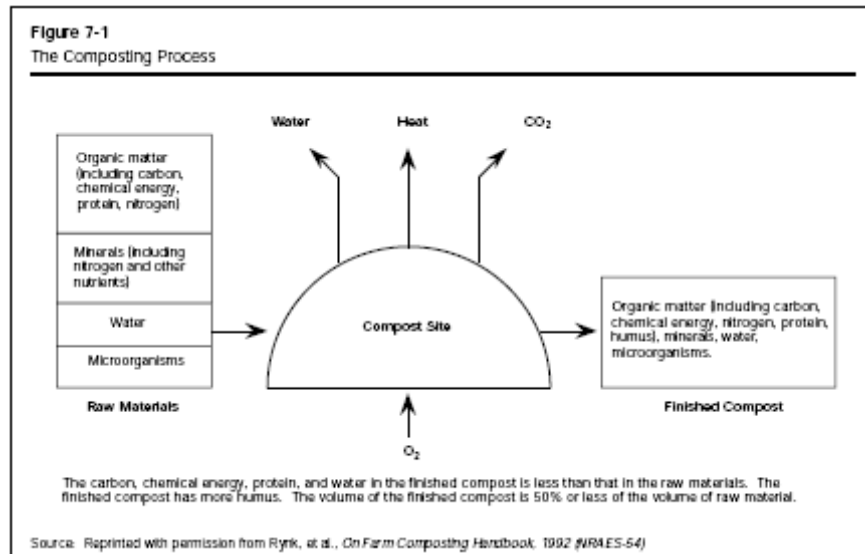
| What to compost - The IN List | | |
|---------------------------------|-------------------------|----------------------|
| • Animal manure | • Fireplace ashes | • Nut shells |
| • Cardboard rolls | • Fruits and vegetables | • Sawdust |
| • Clean paper | • Grass clippings | • Shredded newspaper |
| • Coffee grounds and filters | • Hair and fur | • Tea bags |
| • Cotton rags | • Hay and straw | • Wood chips |
| • Dryer and vacuum cleaner lint | • Houseplants | • Wool rags |
| • Eggshells | • Leaves | • Yard trimmings |

| What not to compost - The OUT List | |
|--|--|
| Leave Out... | Reason Why... |
| Black walnut tree leaves or twigs | Releases substances that might be harmful to plants |
| Citrus rinds (e.g., grapefruit, lemons, limes, oranges) | Might contain fruit flies and eggs |
| Coal or charcoal ash | Might contain substances harmful to plants |
| Dairy products (e.g., butter, egg yolks, milk, sour cream, yogurt) | Create odor problems and attract pests such as rodents and flies |
| Diseased or insect-ridden plants | Diseases or insects might survive and be transferred back to other plants |
| Fats, grease, lard, or oils | Create odor problems and attract pests such as rodents and flies |
| Meat or fish bones and scraps | Create odor problems and attract pests such as rodents and flies |
| Pet wastes (e.g., dog or cat feces, soiled cat litter) | Might contain parasites, bacteria, germs, pathogens, and viruses harmful to humans |
| Yard trimmings treated with chemical | Might kill beneficial composting organisms |

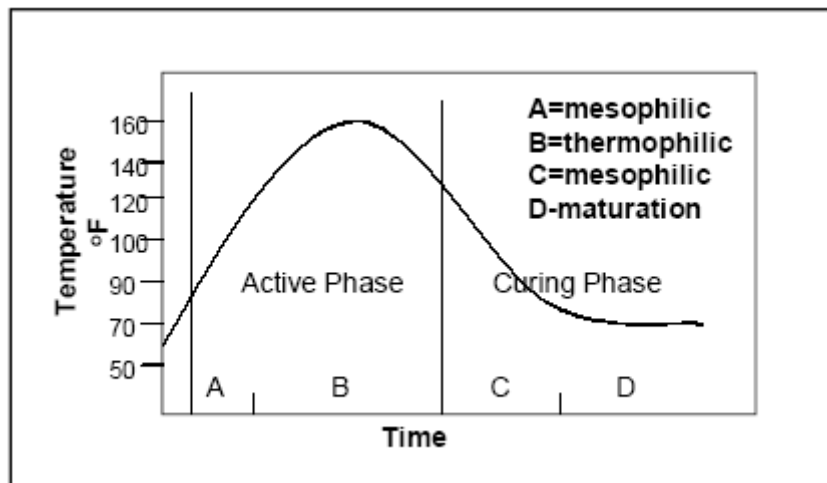
pesticides

*some inputs more/less suitable depending on method used.

Source: <http://www.epa.gov/epaoswer/non-hw/composting/basic.htm>



Source: <http://www.epa.gov/epaoswer/non-hw/muncpl/dmg2/chapter7.pdf>



Source: <http://www.cias.wisc.edu/pdf/artofcompost.pdf>

Appendix C - City of Madison - Codes of Ordinances

7.361 COMPOSTING.

- (1) Purpose and Intent. The purpose of this section is to promote the recycling of yard wastes through composting, and to establish minimum standards for proper compost maintenance.
- (2) Definitions. Composting shall mean a controlled biological reduction of organic wastes to humus. Yard waste shall mean leaves, grass clippings, garden debris and brush.
- (3) Maintenance. All compost piles shall be maintained using approved composting procedures to comply with the following requirements:
 - (a) All compost piles other than compost piles consisting solely of yard waste, excluding fruit, shall be enclosed in a free standing compost bin. Each compost bin shall be no larger in volume than one hundred twenty-five (125) cubic feet, and shall be no taller than five (5) feet.
 - (b) All compost piles and bins shall be so maintained as to prevent the attraction or harborage of rodents and pests. The presence of rodents in or near a compost pile or bin shall be cause for the Health Department to proceed under Section 7.05(4).
 - (c) All compost piles and bins shall be so maintained as to prevent unpleasant odors. Compost bins containing horse manure or fruits shall be kept covered, except when turning. All compost piles or bins shall be located not less than three feet from a property line or building.
 - (d) No compost pile or bin shall be located in any yard except a rear yard. All piles or bins shall be placed between the rear building wall, excluding all portions of a building which are occupied seasonally, and the rear lot line extended to the side lot line.
 - (e) On a reverse corner lot, no compost pile or bin shall be located less than ten (10) feet from the rear property line.
 - (f) Subdivisions (d) and (e) shall not apply to a compost pile or bin located in a side yard substantially screened from view from the street and from the ground level of the adjacent residences by shrubs and other plantings or by fencing, provided that such plantings or fencing shall at all times exceed the height of the compost bin or pile by no less than one foot.
- (4) Ingredients.
 - (a) No compost bin shall contain any of the following:
 1. Lakeweeds;
 2. Cooked food scraps, except coffee grounds and tea leaves;
 3. Fish, meat or other animal products;
 4. Manures other than horse manure;
 5. Large items that will impede the composting process.
 - (b) Permitted ingredients in a compost bin shall include:
 1. Yard waste;
 2. Raw vegetables and fruit scraps that are suitable for composting;
 3. Horse manure;
 4. Commercial compost additives.
- (5) Owner Responsibility. Every owner or operator shall be responsible for maintaining all property under his or her control in accordance with the requirements of this subsection.
- (6) Penalty. Any person violating Section 7.361 shall be subject to a forfeiture of not less than ten dollars (\$10) or more than two hundred dollars (\$200). Each day such violation continues shall be considered a separate offense. (Cr. by Ord. 9747, Adopted 4-4-89)

Appendix D - Viable, But Not Recommended Options

Maybes

On-site composting as a short term plan can be a viable option if the store can absorb the costs and devote the necessary time to an on-site composting system. An on-site composting system would eliminate having to deal with transportation, but would also be overly expensive and time consuming. After investigating in-vessel, on-site composting units, we approximated the cost of two earth bins (as required for their amount of waste) as well as their housing at \$28,440 [Two Earth Bin tubs - \$18,440; Construction of four curing bins - \$2,000; Conversion of four parking spaces to fenced-in, concrete floored, housing shed for the Earth Bins and curing bins - \$8,000]. However, we would expect the intensive management requirements of an on-site composting system to be a larger impediment than capital cost.

On-site composting as a long term plan can be a viable option for a serious backup plan. While being able to design the composting system into the new store plan would make it easier to implement the system. The expenses and time needed prevent this option from being our best recommendation for the Madison store.

Composting at a city-run facility is also another good option for a long term plan. At the present time, the city of Madison does not have a city-run composting system, but there are talks underway of starting one, according to John Reindl, the Recycling Manager for Dane County. If the city does decide on implementing a city-run composting system, it would be completed in around two years. So, while this option is not viable now, in the near future it would be a strong option.

Green Mountain Technologies, Inc.
The Organic Recycling Company

Earth Tub Price Quote

Attn: Ryan McMahon
233 W. Lakelawn Place
Madison, Madison 53703
630-606-0553

Date: 11/14/2005
Quote#: 51114-0955

Prepared by: Penny Bernard
Location: East Coast Office

| GMT Rep | Terms | F.O.B. | P.O.# |
|----------------|----------------------------|---------------|--------------|
| | 50% on PO N 30 Delivery | Factory | |

| Quantity | Description | Cost | Total |
|-----------------|--|---------------|--------------------|
| 2 | Earth Tub Biofilter Aeration Piping 30" Temperature probe | \$8,495.00 | \$16,990.00 |
| | | Freight: | \$1,450.00 |
| | | Total: | \$18,440.00 |

Upon acceptance of quotation please sign and date _____
Signature & Date

Quotes are Valid for 90 days. If the project is expected to proceed more than 90 days a non-refundable deposit of 5% can be made to hold the amount quoted. Shipping is not included unless listed on the quotation. All products are FOB Factory.

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