

Recycling Spoiled Produce From Foodshare's Facility at the Regional Produce Terminal and Market



FOODSHARE 
"When hunger stops, so will we."

Final Report

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Abstract

[Foodshare](http://www.foodshare.org), a member of America's Second Harvest the Nations Food bank Network, is the regional food bank for Hartford and Tolland Counties. Foodshare provides food to food pantries, community kitchens, shelters, and other social service organizations in every town in greater Hartford. Approximately 1/3 of the food Foodshare distributes each year is donated fresh produce. A grinding mill, holding tank, blower, and peripheral equipment were installed to recycle the produce that is too spoiled to distribute. The vegetable "slurry" was brought to local farms for composting.

After three years of operation, a decision was made to replace the grinder with a chopper pump. Over the course of the three-year project, 377 tons of spoiled produce was recycled and saved Foodshare \$32,497 through avoided disposal costs. The organics recycling program continues today at a comparable rate.



History

Anyone dealing with perishable food has waste. This is true at all levels: farmers, wholesalers, retailers, truckers, and consumers. Food banks, being near the end of the usable food spectrum, are no exception. As the produce program at Foodshare grew, so did its trash bill.

In 2002 over 2 million pounds of fresh produce was donated to Foodshare. As volunteers repacked the fruit and vegetables, the unusable portion was being put in a dumpster along with the trash. The dumpster leaked, smelled, and attracted animals. It was also very expensive to send wet, heavy trash to the disposal facility. A better solution was needed.

Description of Processing Equipment

With a grant from the Connecticut Department of Environmental Protection ([DEP](http://www.depr.state.ct.us)), Foodshare purchased a forklift with a built-in scale and installed an organics recycling system based on those marketed by [Organic Resource Management, Inc.](http://www.organicresource.com) of Toronto, Canada. The Organic Resource Recovery System, also known as an ORRS is comprised of:



- A grinding mill produced by Red Goat in Tennessee. (Organic Resource Management, Inc. is the sole distributor of the Red Goat Mill for North America)
- An underground fiberglass holding tank.
- A small blower for maintaining a negative pressure in the tank.

Foodshare bought only the grinder and blower from Organic Resource Management, Inc. Since both were designed to run on Canadian current, Foodshare purchased a transformer from a local supplier to convert the US current to Canadian.

Holding Tank

A six-thousand gallon rectangular concrete holding tank was substituted for the four-thousand gallon fiberglass one used in the ORRS system. The tank was purchased from [Arrow Concrete Products](#) in Granby, CT. Arrow cast the tank to Foodshare's specification, including openings in the top for loading, access and aeration (See Diagram #1).



The larger tank was chosen to allow for continued use of the system during the time interval between when a vacuum truck was called to empty the tank and when the actual emptying took place. To work with the oversized tank, Organic Resource Management, Inc. recommended a larger blower that Foodshare purchased from them.

Blower

The ORRS system is used in many Canadian in supermarkets. Each store has its own mill and tank. All the organic food waste from the store is brought to a room where the mill is housed. The food is separated from the packaging and run through the grinder. Fish, meat, dairy, etc. are included with the produce. The ORRS system was designed using a small blower to draw the odor out of the tank and maintain a negative pressure to keep the odor from coming into the building. Foodshare bought the blower expecting to run it continually as is done in Canada. As it turned out, the blower is not needed in Foodshare's system. It is believed that this is the case since only spoiled produce is run through the mill. No fish, meat or dairy is included.



Evacuation Pipe

Another distinction between the Canadian ORRS system and that used by Foodshare is the evacuation pipes. The Canadian ORRS system uses an evacuation pipe running from the top of the tank, down to the bottom of the tank. The vacuum truck used to remove the slurry produced by the mill

connects its hose to the evacuation pipe to draw out the slurry. Foodshare installed pipes in its concrete tank expecting to use the same removal method. However, the hauler hired by Foodshare prefers to open the manhole cover on the top of the tank and remove the slurry from there.



Description of Operations



Handling of Produce

Foodshare receives donated produce from the wholesalers in the [Regional Market](#), national donors through [America's Second Harvest](#), local growers, and trucking companies. We accept all produce donations that contain at least 75% solid viable product. Volunteers sort the usable from the unusable. What is deemed fit for distribution is repacked and sent to our main warehouse in Bloomfield. The remainder is batch fed by the volunteers into the hopper on top of the ORRS grinder. As it is ground, it drops directly into the tank.

Equipment Operation

The hopper on top of the ORRS grinder holds about 1/3 cubic yard. It has a top which locks once the unit is turned on to prevent insertion of hands or arms. The grinder will process almost any produce item. Once the top is closed, and the start button is pushed, the auger and mill start rotating. It takes about 2 ½ minutes to process one load which drops directly into the tank as it is ground. Once the load is completely processed, the top will unlock and the unit is ready to be reloaded.



The grinder will not process corn husks, or pineapple tops, which are too stringy and will only process hard vegetables such as winter squash or rutabagas, if they are included in a mixed load with softer vegetables. If corn husks or pineapple tops are added to the mix, they may stall out the auger that is located directly under the hopper. If they are able to get past the auger into the mill, they may get caught in the hammers of the mill. In the first case the grinder must be shut off, the top opened, and the unacceptable items removed. In the second case the side panel on the grinder must be unbolted and the fibrous material removed.

Slurry Evacuation

When the 4000 gallon level is reached (measured with a dipstick), the vacuum truck is called and a time for emptying the tank is set. Since the truck holds 4000 gallons and the tank holds 6000 gallons, ground spoiled produce can continue to be added. When the truck arrives it draws off 4000 gallons and transports it to one of two farms for composting. Foodshare pays the hauler \$400 per load to pump out the 4000 gallons and haul the slurry to the farm.



Composting

Farms accepting slurry from Foodshare must have an Agricultural Waste Management plan. By spreading the word in the farm community, Foodshare was able to locate two farms that were interested in accepting the slurry and obtaining the appropriate DEP approval of the plan. Foodshare is presently rotating deliveries between [Old Maids Farm](#) in South Glastonbury and Park Farm in Melrose. Each farm is paid a \$20 per ton (\$330 per load) tipping fee.



Once at the farm, the truck offloads the slurry into a receiving area. The receiving area provides containment for the slurry and consists of a windrow (a long berm) made of wood chips, saw dust, leaves, spent manure, or other similar bulking material with a trench down the length of the windrow. The bulking material helps absorb the slurry and provides carbon for the composting process. Once the slurry has been unloaded into the trench, equipment is used to cover the slurry with more bulking material and the composting process is carried out by the farmer.

Diversion Tonnages

The system was initiated on October 28, 2002. Over a 36 month period, more than three quarters of a million pounds of spoiled produce have been removed from the waste stream and trucked to local farms to be mixed with bulking agents (leaves, saw dust, manure, wood chips, etc.) and recycled into compost. This represents 80% of Foodshare's produce waste. The other 20 % is not being recycled since it is too dense or fibrous to go through the mill. These include such vegetables as winter squash, pineapple tops, and corn husks.

Cost/Benefits

During most of the time that Foodshare has been using this recycling system, the only other option for disposing of spoiled produce was to put it in a rented six yard dumpster. In the same dumpster went all the other trash. It was emptied "on call" when full. Foodshare was charged per pickup regardless of how much weight was in the container. This made it impossible to figure what percent of the cost was associated with the produce waste.

Recently Foodshare installed a trash compactor. Fees for the compactor are as follows: \$350 per month, \$195 per pick up, and \$75 per ton. Based on a once per month, 10 ton pick-up, Foodshare is spending \$130 per ton for waste put in the compactor compared to \$44 per ton with the grinder/slurry system. Table #1 shows that 377.87 tons were processed with this system during the three-year grant period. This represents a savings of \$86 per ton or \$32,497 for the three-year period.

Considerations for Replicating This Project

The USDA has a recommended hierarchy for what should happen to food that, for one reason or another, leaves the normal marketing system.

1. Donated to food banks (if it is still fit for human consumption).
2. Fed to animals.
3. Composted.
4. Disposed of with other trash.

Anyone considering a project such as this should first see if the food they are disposing of is acceptable to their local food bank. If not they should seek out pig, goat, or worm farmers. If none of these is a viable option, turning the food into a slurry and then composting it has many advantages. When dealing with food waste one obvious consideration is odor from dumpsters. Collecting the slurry in an underground tank eliminates that problem. Also flies or vermin are not an issue. The obvious other consideration is cost. Depending on where this is taking place the savings can be substantial. Another important point to consider is that all of the people involved in the project must understand and "buy into" the process. Managers, employees, farmers,

haulers, etc all need to support the changes that will be necessary to sustain the operation. Foodshare has been successful with this endeavor because of a commitment from the top and a vision of “greening” the organization, cost savings and sustainability. Another reason for success is that Foodshare is providing the farmers with a feedstock that is pure vegetable waste. If the slurry were contaminated with glass, plastic, or other foreign matter, it would not be acceptable for composting, and we would therefore have no place to take it.

A new piece of equipment has replaced the ORRS grinder (see “Improvements” below). Anyone interested in replicating a version of this system is encouraged to contact the project manager, Stephen Slipchinsky at Foodshare 860-286-9999 ext. 134 for his reasoning on that decision, and with any questions about the project. More information and photos can also be found on the [DEP website](#).

Lessons Learned

- The ORRS machine will work fine within its limitations. It did not function as advertised since it could not handle fibrous or dense produce and jammed frequently. It also required a lot of maintenance and replacement parts.
- Maintaining negative pressure in the tank to suppress odors is only possible in a sealed system such as that used in Canada, but may not be required if only produce is being recycled. In Foodshare’s system configuration, some odors were present, but only when the loading hatch was opened. Odor was all but eliminated when citrus fruit was added to the tank. More aeration/agitation resulted in less odors.
- Evacuating the tank takes longer than anticipated because the slurry gets denser toward the bottom of the tank. Backwashing is required to homogenize the slurry to a consistency that the vacuum truck can handle adding more time to the process.
- The evacuation pipes in the original design of the tank were unnecessary. Using the manhole worked better.
- Given the equipment changes anticipated (see “Improvements” below), a round holding tank would be better than the square/rectangular tank.
- For generators of large volumes of produce waste, a system such as the one described can save significant money if they are willing to take the time to separate the produce from the packaging.

Improvements



Since the completion of the 3-year pilot, several improvements have been made. A different, more powerful, piece of equipment called a chopper pump manufactured by [Vaughn](#), has replaced the ORRS grinder. Chopper pumps such as these are used most often in the agricultural, municipal, and industrial sectors for waste management applications. This machine can process Foodshare's produce waste faster since the spoiled produce is added to the tank whole and ground-up inside the tank, thereby reducing handling time. It also homogenizes the slurry. Recirculation plumbing was installed to help with homogenization and to re-chop larger pieces that may have evaded the blade of the chopper pump in previous days. A Vortex blower manufactured and donated by [The Spencer Turbine Company](#) in Windsor, CT was installed to blow air into the tank through one fixed PVC pipe, and one flexible hose to help dislodge and circulate the slurry. If a round tank had been installed instead of the rectangular tank, the flow of the slurry would have been facilitated by the circular shape of the tank, as in a blender, resulting in more efficient chopping. A stainless steel table was installed as a work surface and a place to stage produce before going into the tank, giving the operator one last chance to pull-out plastic and other non-biodegradable contaminants.

The Future

At Foodshare's Main Distribution Center in Bloomfield

In anticipation of expanding the organics recycling effort, Foodshare's new distribution center in Bloomfield has another 6000 tank that was installed below the floor slab, straddling the rear outer wall, half in the building and half out. Plans call for the transfer of the original grinder from its present location at Foodshare's facility in the Regional Market to the new distribution center in Bloomfield. The distribution center does not handle as much produce as the Market location, but does have stale bakery items and damaged/outdated canned and jarred goods that could be opened and emptied into the tank if volunteer labor is available. This would also result in increased recycling of metal and glass containers.

In the Community

The 4-H garden in Bloomfield grows vegetables for Foodshare with the help of UCONN's Master Gardeners. Plans are being formulated to "close the recycling loop" by having one 4000-gallon truckload of vegetable slurry trucked to the site where it will be used in the production of compost for the garden, and in turn, to grow vegetables for Foodshare.

Award



As a result of his dedication and hard work to implement this innovative organics recycling program at Foodshare, project manager Steve Slipchinsky was presented with an [EPA Environmental Merit Award](#). The awards, given out since 1970, honor individuals and groups who have shown particular ingenuity and commitment in their efforts to preserve the region's environment. Steve was [one of four](#) 2003 recipients from CT and was chosen from a field of over 100 nominees from throughout New England.

Special Thanks / Acknowledgements

Foodshare would like to thank the following agencies and businesses for their assistance in helping to make this project possible and successful.

- The Connecticut Department of Environmental Protection Recycling Program for their technical assistance, guidance, publicity and initial funding for the project.
- Old Maids Farm and Park Farm for providing composting locations for the vegetable slurry.
- [S.G. Marino Crane Service Corp.](#) for installing the tank at a reduced cost.
- Arrow Concrete Products Inc. for their help with the design and construction of the tank.
- The Spencer Turbine Company for donating the vortex blower.
- Walker Wellington for their help in getting the chopper pump properly installed.

Diagram #1. Holding Tank Specification and Drawing

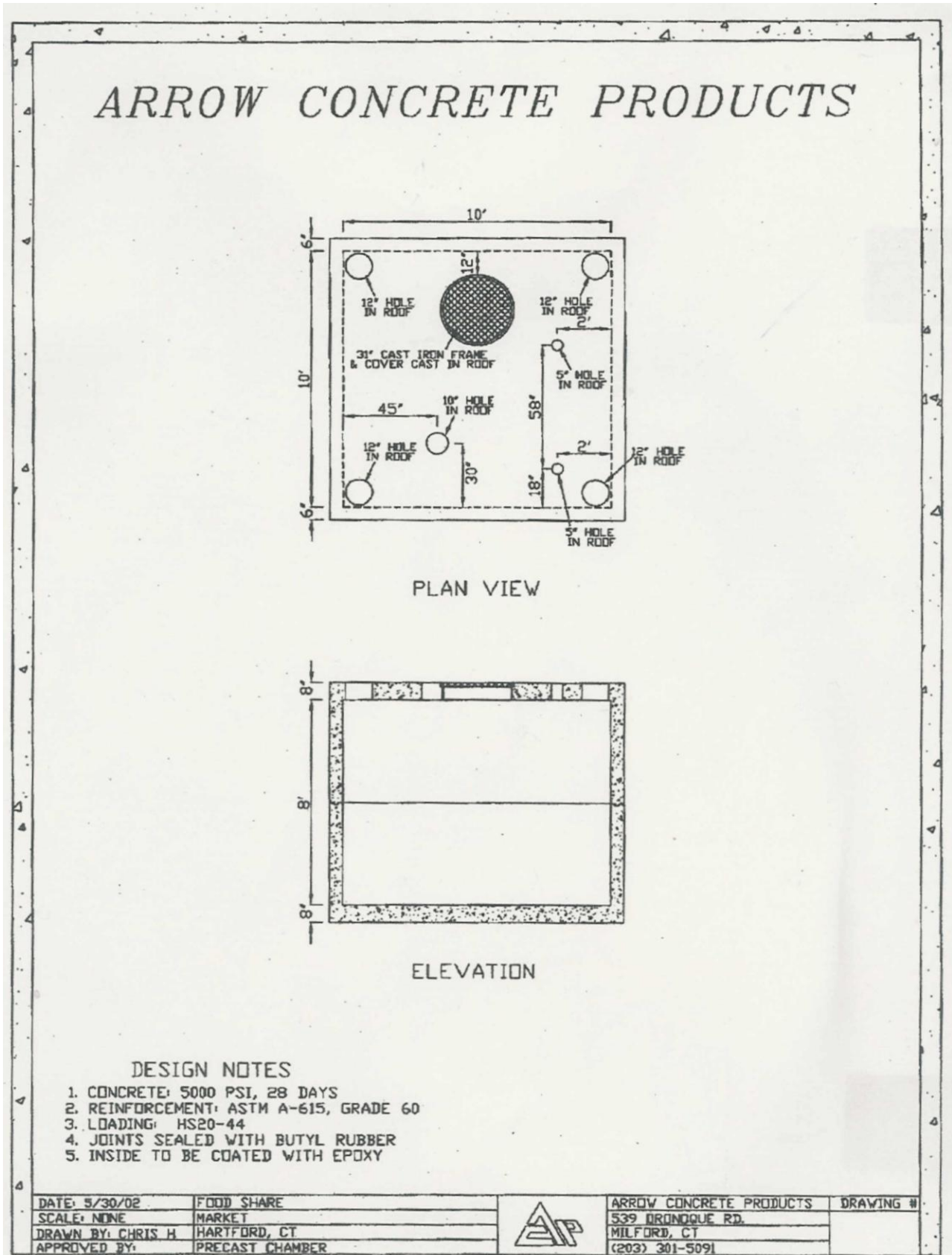


Table #1. Vegetable Slurry Recycling Costs and Tonnages

Vegetable Slurry Recycling Costs and Tonnage									
Load	Date	To	Hauling \$	Tipping \$	\$ Total	Gallons	Pounds	Tons	\$/ton
1	2002-12-17	Old Maid's Farm	240.00	247.50	487.50	3,000	24,750	12.38	39
2	2003-02-06	Park Farm	160.00	247.50	407.50	3,000	24,750	12.38	33
3	2003-05-02	Old Maid's Farm	160.00	247.50	407.50	3,000	24,750	12.38	33
4	2003-07-02	Old Maid's Farm	160.00	288.75	448.75	3,500	28,875	14.44	31
5	2003-09-03	Park Farm	160.00	247.50	407.50	3,000	24,750	12.38	33
6	2003-10-18	Old Maid's Farm	160.00	330.00	490.00	4,000	33,000	16.50	30
7	2004-01-06	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
8	2004-02-18	Old Maid's Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
9	2004-03-29	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
10	2004-05-10	Old Maid's Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
11	2004-07-05	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
12	2004-08-10	Old Maid's Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
13	2004-09-08	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
14	2005-01-11	Old Maid's Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
15	2005-02-02	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
16	2005-03-03	Old Maid's Farm	350.00	330.00	680.00	4,000	33,000	16.50	41
17	2005-03-21	Park Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
18	2005-05-10	Old Maid's Farm	200.00	330.00	530.00	4,000	33,000	16.50	32
19	2005-05-23	Park Farm	460.00	330.00	790.00	4,000	33,000	16.50	48
20	2005-06-28	Old Maid's Farm	320.00	330.00	650.00	4,000	33,000	16.50	39
21	2005-07-07	Park Farm	320.00	330.00	650.00	4,000	33,000	16.50	39
22	2005-08-17	Old Maid's Farm	300.00	330.00	630.00	2,500	20,625	10.31	49
23	2005-09-02	Park Farm	400.00	330.00	730.00	4,000	33,000	16.50	44
24	2005-10-03	Old Maid's Farm	300.00	330.00	630.00	2,800	23,100	11.55	46
25	2005-10-19	Park Farm	300.00	330.00	630.00	2,800	23,100	11.55	46
			5,990.00	7,878.75	13,868.75	91,600	755,700	377.87	36.12