

July 21, 2004



Mr. Kurt Fenstermacher
Recycling Coordinator
Lehigh County
17 South Seventh Street
Allentown, PA 18101

Subject: Technical Assistance Project – Final Report

Dear Kurt:

This letter summarizes R. W. Beck's analysis of the full cost of the various composting services provided to the municipalities within the County, as well as research undertaken to identify the alternatives available in the County for yard waste processing. This effort was undertaken as part of the Recycling Technical Assistance program sponsored by the Pennsylvania Department of Environmental Protection (DEP) and the Solid Waste Association of North America (SWANA).

The report is divided into the following sections, which correspond with the Tasks provided in the scope.

- Background;
- Cost Allocation and Rate Calculations;
- Market Survey;
- Municipality Survey; and
- Conclusions and Recommendations.

Background Information

Lehigh County provides composting/mulching services for most of the municipalities located in the County. Some municipalities haul their yard waste to the Lehigh County main processing site ("Main Site"), which is centrally located and which handles the majority of the leaf and yard waste generated in the County. However, the County also maintains a network of nine smaller processing sites located in selected municipalities ("Municipal Sites"). These municipal sites are more convenient for many of the municipal users, but require the County to transport equipment (chippers, screening equipment, and a windrow turner) to process the yard waste. Table 1 summarizes the services provided at each site, as well as the municipality(ies) that use the site.

Table 1
Yard Waste Services Provided at Each Site

Facility	Process			Yard Waste Received From
	Composting	Screening	Grinding	
Schnecksville (Main Site)	X	X	X	Alburtis, Allentown, Coplay, Coopersburg, Fountain Hill, N. & S. Whitehall, Salisbury, North Whitehall, U. Macungie, Lower Macungie, U. Milford, Whitehall
Allentown		X	X	Allentown, Salisbury
Upper Macungie	X		X	Upper Macungie, Weisenberg
Washington	X	X	X	Washington, Slatington, Heidelberg, Lowhill, Lynn
Catasauqua		X	X	Catasauqua
Emmaus		X	X	Emmaus, Macungie
Lower Macungie			X	Lower Macungie
Upper Milford			X	Upper Milford
Upper Saucon	X	X	X	Upper Saucon, Coopersburg, Salisbury
Whitehall			X	Whitehall

At this time, no payments are provided to the County for basic services provided. However, the County is incurring significant cost to maintain the Main Site and to service the nine Municipal Sites, and each of these sites benefits the municipalities in the County. Because the County recognizes the importance of having a financially self-sustaining composting system, the two objectives of this project were to:

- 1) Calculate the full costs of the County's overall composting system both with and without the impact of DEP grants; and
- 2) Develop a defensible basis for establishing user fees that could be charged by the County to the municipalities to recoup the full costs of the system.

The County maintains records of cubic yards processed at the Main Site (The quantity of material processed at Municipal Sites is not tracked, however, so hours of processing equipment – grinder, screener, and windrow turner, were used instead). R. W. Beck has used the Main Site quantity processed data to estimate the annually recurring delivery quantities by municipality. This figure was calculated for each municipality as the maximum of:

- 1) Cubic yards processed in 2002;
- 2) Cubic yards processed in 2003; or

- 3) The average of the last three years' cubic yards processed, as some communities have had opportunities to land-apply leaves in the past, and such opportunities are on the decline.

The Main Site annual quantities of yard waste received from each municipality are provided in Table 2.

Table 2
Main Site Processing Quantities

Municipality	CY	Portion	Figure Used
Alburtis	1,815	2.1%	2003
Allentown	32,537	38.0%	2003
Coopersburg	784	0.9%	2002
Coplay	2,728	3.2%	2003
Fountain Hill	258	0.3%	Average
Lower Macungie	2,284	2.7%	2003
North Whitehall	7,360	8.6%	2003
Salisbury	6,132	7.2%	2003
South Whitehall	27,082	31.6%	2003
Upper Macungie	407	0.5%	Average
Upper Milford	890	1.0%	2002
Upper Saucon	461	0.5%	2002
Whitehall	2,879	3.4%	Average
Total Cubic Yards Main Site¹	85,617	100.0*%	

¹Total may not sum to exactly 100% due to rounding.

The County was also able to provide their annual costs of providing County-wide composting services. These costs are shown in Table 3.

Table 3
Lehigh County Composting Operations 2004 Operating Budget

Line Item	Description	Budget Amount (\$)
	Personnel:	
	Compost operation	
1a	Full-time employees	160,961
1b	Part-time employees	25,000
1c	Fringe benefits	54,559
	Solid waste office (Portion dedicated to compost operations)	
2a	Full time employees	23,962.00
2b	Part time employees	15,750.00
2c	Fringe benefits	9,524.50
	Total Personnel	289,756.50
	Direct Operating and Maintenance Costs:	
3a	Travel and transport (escort and municipals)	7,250.00
3b	Fuel	12,000.00
4a	Maintenance and operating supplies	50,900.00
4b	Maintenance and repair services	52,000.00
4c	Other operating expenses	11,451.00
	Total Direct O&M Costs	133,601.00
5	Indirect Expenses:	29,176.00
	Total Composting Operation Budget	452,533.50

As shown, the County estimates that the total cost of their composting system is \$452,533. However, these figures omit the annualized capital costs of the County's composting equipment. R. W. Beck calculated the annualized cost of capital equipment, to more truly reflect the cost of the system. The County has purchased much of their processing equipment with the help of DEP grant funds, so R. W. Beck calculated costs both including and excluding DEP grants. Specifically, we have added back in the annualized cost of capital:

- 1) Solely including the portion of equipment capital costs borne by the County (i.e., approximately 10 percent of the full cost); and
- 2) At full cost (i.e., assuming the County would have to pay for the entire cost of the equipment).

This second method is intended to reflect the true cost of the system. We believe this is an important concept for the County to consider for long-term planning purposes. Although composting equipment grants are available at the current time, the County believes there may come a time when such grant dollars are not available. In any case, these grants are competitive and there is no guarantee that the County will be awarded a particular grant. By analyzing full costs and developing rates and user fees assuming that no grant dollars will be available in the future, the County will have successfully established rates to sustain the composting program.

The annualized equipment costs were calculated by dividing the total purchase price of the equipment (in current-year dollars) by the equipment's useful life. This was done for both the subsidized and non-subsidized equipment costs.

Budgeted fuel costs were also adjusted for the purposes of this report. Currently Municipal Sites provide their own fuel for the equipment operated. It is assumed that if they paid the County an annual rate for processing, that they would prefer for fuel costs to be included in that rate. County-provided information regarding gallons-per-hour consumed by the processing equipment was therefore utilized to estimate fuel costs for the Municipal Sites. These costs were then included in the rate structure. Utilizing the same methodology for estimated Main Site annual fuel costs resulted in a higher estimated annual cost than budgeted by the County, therefore these costs were increased by \$5,000 per year, from \$12,000 to \$17,000.

The impact these calculations would have on the annual budget is presented in Table 4.

Table 4
Lehigh County Composting Operations Annual Operating Budget¹

Description	Budget Amount (\$)
Total Composting Operation Budget	452,533.50
Annual Equipment Cost – Including DEP Grants	32,131.70
Municipal Site Fuel Costs	19,780.65
Increase in Main Site Fuel Costs	5,000.00
Total Annual Composting Budget Including Impact of DEP Grants	509,445.85
Increase in Annual Equipment Cost – Excluding DEP Grants ²	149,830.85
Full-Cost Composting	659,276.70

¹ Calculated sums are rounded to the nearest \$0.05

² Equals \$181,962.55 - \$32,131.70

As the data in Table 4 show, the County's full costs should be increased by a minimum of 7 percent to reflect the annualized equipment costs borne by the County. If the County had not received DEP grants to aid in the purchase of equipment (most equipment was purchased with a 90 percent contribution by DEP grants), the full cost would need to be increased by 40 percent.

In other words, in the absence of DEP grants, the annual full cost of the County's composting system is \$659,276.70. The addition of the Municipal Sites' fuel costs, along with the adjustment to the Main Site fuel costs, increase the annual budget by another 5 percent.

The following section describes how these full costs are allocated to the different composting processes provided by the County at the Main Site and at the Municipal Sites to develop defensible and equitable rates.

Cost Allocation and Rate Analysis

Methodology

Although the County's composting system encompasses multiple types of equipment, at its core it is essentially providing three services to its municipalities:

- Grinding,
- Screening, and
- Windrowing.

The County has estimated the number of operating hours for each of these processes at each site, and we have used these operating hours as the basis for all of the cost allocation analysis below. By calculating the operating cost per hour for each type of process at both the Main Site and at the Municipal Sites, the County will have a basis for estimating the cost to serve each municipality. Main Site processing also includes the costs of material movement via front-end loaders, etc. Municipal Site costs include the costs associated with transporting the processing equipment to the municipal sites.

Table 5 shows the number of hours each piece of processing equipment is expected to be used at the Main Site and at the Municipal Sites in 2004.

Table 5
Projected Processing Equipment Usage for 2004

Equipment	Main Site Hours	Municipal Site Hours	Total Hours
Grinder	197	615	812
Screeener	580	588	1,168
Windrow Turner (Scarab)	100	80	180
Total Processing Hours	877	1,283	2,160

As Table 5 shows, grinders are used more than three times as much at Municipal Sites than at the Main Site. Although not shown, the Allentown site accounts for nearly 40 percent of the Municipal Site hours for grinding, and Upper Macungie accounts for approximately 15 percent of these hours. The rest of the sites use the grinders less than 15 percent of the time allocated to

Municipal Site hours. Screening hours are slightly higher for Municipal Sites, relative to Main Site usage, and the windrow turner is used at the Main Site 25 percent more hours than it is used at all Municipal Sites. Only Upper Macungie, Upper Saucon, and the Washington site have windrow turner hours allocated to them in 2004.

Based primarily on these operating hours, but also including the transport costs and main site costs (front-end loader and skidsteer operation, for example), we have further allocated the County's total composting costs attributable to each process at the Main and Municipal Sites. Additional details of these line item allocation methodologies are described below.

Vehicle Repair and O&M Costs

The County does not track repair costs by piece of equipment, which means there was no way to directly allocate the \$114,000 of equipment O&M and repair related costs (sum of line items 4a through 4c in Table 3). R. W. Beck relied on industry knowledge and experience, and considered the age and level of use of each piece of equipment, to estimate the portion of repair costs that could be attributed to each piece of equipment. These costs were allocated to processing at the Main Site and at the Municipal Sites based on equipment usage. The portion of O&M costs allocated to the Main Site and the Municipal Sites is provided in Table 7 below.

Fuel Costs

Fuel consumption per hour (or mile) of operation usage was provided by the County for each piece of equipment. R. W. Beck therefore estimated fuel consumption based on estimated hours to be used in 2004, and allocated the fuel costs accordingly. Table 7 summarizes the allocation of fuel costs. The portion of fuel costs allocated to the Main Site and the Municipal Sites is shown in Table 7 below.

Labor and Benefits

Labor costs including fringe benefits (line items 1 and 2 in Table 3) were allocated based on processing equipment usage hours, including transportation equipment and operation, which was attributed to Municipal Sites. Similarly, labor hours used to move materials at the Main Site were allocated to the Main Site. Remaining direct labor costs were allocated to the Main Site and Municipal Site based upon processing and transport hours to be utilized in 2004. Tables 8 and 9 summarize the results of direct labor allocation for Main-Site and Municipal-Site specific labor. The portion of labor and benefits costs allocated to the Main Site and the Municipal Sites is shown in Table 7 below.

Indirect Expenses

Indirect expenses, line item 5 in Table 3, were allocated in proportion to the sum of the direct costs. The portion of indirect expenses allocated to the Main Site and the Municipal Sites is shown in Table 7 below.

Capital Costs

The capital cost of each piece of equipment, as well as the subsidized portion, is shown in Table 6. This table also shows the subsidized and unsubsidized annual cost of capital, based on dividing the capital cost by the useful life of the equipment.

Table 6
Capital Costs of Composting Equipment¹

Manufacturer and Model	Purchase Price (\$)	Current Price (\$)	Annual Cost No DEP Grants (\$)	Annual Cost With DEP Grants (\$)
Case Bull Dozer	64,990	77,988	3,899	390
Ford Dump Truck	65,090	82,990	5,533	553
Cat 926 Front End Loader	109,000	149,875	12,490	12,490
John Deere 624 FEL	127,040	155,624	12,969	1,297
John Deere 644 FEL	147,592	162,351	13,529	1,353
Eager Beaver Trailer	28,282	31,110	1,556	156
Bush Hog Lawn Mower	1,850	1,943	194	194
John Deere Skidsteer	40,120	44,132	2,207	221
Erin Screen	202,461	222,707	22,271	2,227
Deutz Allis Tractor	32,000	41,600	2,080	208
Rawson Screen	103,271	129,089	12,909	1,291
Autocar Truck Tractor	77,000	84,700	5,647	565
Morbark 1400 Grinder	420,000	493,500	41,125	4,113
Morbark 1100 Grinder	205,586	267,262	22,272	2,227
Scarab Windrow Turner	267,177	307,254	20,484	2,048
Ford F350 Utility Body Pickup Truck	28,000	28,000	2,800	2,800
Total Equipment Cost	1,919,459	2,280,124	181,963	32,132

¹ Rounded to the nearest dollar.

As shown, the Morbark 1400 grinder is the most costly piece of equipment, followed by the Scarab windrow turner and the Morbark 1100 grinder. When DEP grants are considered, the total cost to the County drops significantly, by an average of 90 percent.

The sum total of all capital costs were allocated based on the capital costs of the grinding, screening, and windrowing equipment. The portion of these costs allocated to the Main Site and to the Municipal Sites is shown in Table 7.

Table 7
Portion of Costs Allocated to Main Site and Municipal Sites

	Portion Main Site	Portion Municipal Sites	Total
Equipment O&M	60%	40%	100%
Fuel	39%	61%	100%
Capital	68%	32%	100%
Direct Labor	64%	36%	100%
Indirect Labor	64%	36%	100%
Indirect Expenses	64%	36%	100%
Total Annual Costs	\$310,099.72	\$199,346.15	\$509,445.87

Municipal Site Transportation Costs

The cost of operating the Municipal Sites also includes the costs associated with transporting equipment to and from these sites. This includes labor, fuel, and operations and maintenance costs.

In 2004, it is expected that 241 truck tractor autocar hours will be used transporting equipment and/or materials to/from Municipal Sites, as well as 187 escort hours. Table 8 provides details regarding the identifiable direct costs associated with transportation of equipment and materials to and from the Municipal Sites.

Table 8
Direct Transportation Costs To/From Municipal Sites

Item	Annual Cost \$)
Fuel (From Budget)	7,250
Annualized Capital Costs (Including Grant contributions):	
Autocar	564.67
Pickup Truck	2,800.00
Trailer	155.55
Total Annual Capital Costs	3,520.22
Operations/Maintenance:	
Trailer	1,143.51
Pickup Truck	1,143.51
Truck Tractor	3,430.53
Total O&M (Excluding Fuel)	5,717.55
Autocar	6,861.27
Escort	5,323.89
Total Annual Labor Costs	12,185.67
Total Direct Transportation Costs	28,673.44

As Table 8 illustrates, approximately 6 percent of the total annual budget is spent on direct costs associated with transport of equipment and/or materials. In calculating the total cost and the unit processing costs for the Main Site and the Municipal Sites, we have allocated the entire \$28,673 above to the Municipal Sites.

Main Site Processing Costs

The costs of moving incoming materials and processed materials at the Main Site are apportioned to Main-Site processing. Presumably Municipal Sites bear these costs independently of the County, and are therefore not included in this analysis. These identifiable direct costs are described in Table 9.

Table 9
Direct Main Site Material-Moving Costs

Item	Annual Cost (\$)
Fuel (Estimated)	9,475.48
Annualized Capital Costs (Including Grant contributions):	
Bull Dozer	389.84
Dump Truck	553.27
Cat 926 (Front End Loader)	12,489.58
JD 624 (Front End Loader)	1,296.87
JD 644 (Front End Loader)	1,352.93
Mower	194.25
Skidsteer	220.66
Tractor	208.00
Total Annual Capital Costs	16,705.49
Operations/Maintenance:	
Bull Dozer ¹	0.00
Dump Truck	2,287.02
Cat 926 (Front End Loader)	9,148.08
JD 624 (Front End Loader)	13,722.12
JD 644 (Front End Loader)	11,435.10
Mower	2,287.02
Skidsteer	3,430.55
Tractor	0.00
Total O&M (Excluding Fuel)	42,309.87
Total Annual Labor Costs	59,708.71
Total Annual Direct Costs Incurred by Main Site Material Movement	28,199.55

¹ County staff indicate that operations and maintenance costs for this vehicle are negligible, as it is not used frequently.

Costs by Processing Activity

R. W. Beck calculated annual costs by processing activity (grinding, screening, composting), allocating various costs as described above. Table 10 shows total projected processing costs at the Main Site, at the Municipal Sites (combined), and system wide for 2004.

Table 10
Total Annual Processing Costs by Yard Waste Processing Activity

	System Wide Costs (\$)	Municipal Sites' Costs (\$)	Main Site Costs (\$)
Including DEP Grants			
Grinding	215,219.43	108,099.61	96,738.81
Screening	240,423.48	73,594.76	175,103.86
Compost Turning	53,802.96	17,651.78	38,257.05
All Processing	509,445.87	199,346.15	310,099.72
Excluding DEP Grants			
Grinding	288,319.92	148,588.32	124,544.78
Screening	295,162.23	92,370.39	214,897.89
Compost Turning	75,794.58	26,249.38	52,625.97
All Processing	659,276.73	267,208.09	392,068.64

Table 11 shows hourly processing costs by activity at the Main Site, at the Municipal Sites (combined) and system wide for 2004.

Table 11
Hourly Processing Costs by Activity

	System Wide Costs (\$)	Municipal Sites' Costs (\$)	Main Site Costs (\$)
Including DEP Grants			
Grinding	265.05	175.77	491.06
Screening	205.84	125.16	301.90
Compost Turning	298.91	220.65	382.57
Overall Processing	235.85	155.38	353.59
Excluding DEP Grants			
Grinding	355.07	241.61	632.21
Screening	252.71	157.09	370.51
Compost Turning	421.08	328.12	526.26
Overall Processing	305.22	208.27	447.06

As shown, screening is the least costly service performed by the County, followed by grinding and finally by windrow turning. The hourly cost is driven to a large extent by the amount of downtime for each piece of equipment, and also by the direct operating costs. Given that the

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windrow turner is quite expensive and is also the least frequently used piece of equipment, it is not surprising that the costs per operating hour are the highest.

Costs by Site

Main Site overall processing costs can be estimated by the cubic yard, as total cubic yard counts are available. On average, the Main Site processes 85,617 cubic yards per year. This is approximately \$3.62 per cubic yard including DEP equipment grant contributions, and \$4.58 per cubic yard excluding DEP grant contributions. These costs includes all costs incurred, such as allocated annual equipment costs, fuel, labor, equipment maintenance costs, and labor and benefits. Costs can not be calculated for the municipal sites on a per-cubic yard basis, as the number of cubic yards processed at each site is not currently tracked.

The County's hourly costs for grinding (including grants) are \$175.77 at Municipal Sites and \$491.06 at the Main Site. Without grants, the hourly costs are \$241.61 at the Municipal Sites, and \$632.21 at the Main Site. By comparison, a private composter contacted by R. W. Beck (details below) will perform grinding operations off site for \$3,500 per day for the first day, and \$3,000 per day for the second day. Assuming an eight-hour day, this is \$437.50 per hour for the first day, and \$375 per hour for the second day. The County's costs are therefore higher at the Main Site, and less costly at the Municipal Sites. It should be noted, however, that at the municipal sites the municipalities are incurring additional costs (administering the program and moving materials and product) that are not captured by this analysis.

R. W. Beck then estimated annual costs for each site, based upon the projected processing hours at each site. Table 12 shows these results, including and excluding DEP grant contributions.

Table 12
 Estimated 2004 Costs Incurred At Each Site

	Grinding Costs (\$)	Screening Costs (\$)	Composting Costs (\$)	Total Costs (\$)
Including Grants				
Allentown	40,779.04	8,010.31	0.00	48,789.35
Catasauqua	1,406.17	2,503.22	0.00	3,909.40
Emmaus	9,843.22	17,021.92	0.00	26,865.13
L. Macungie	12,655.56	28,536.75	0.00	41,192.31
Lynn	2,812.35	0.00	0.00	2,812.35
U. Macungie	16,171.00	0.00	7,060.71	23,231.71
U. Milford	8,437.04	0.00	0.00	8,437.04
U. Saucon	7,030.87	8,010.31	7,060.71	22,101.90
Washington	4,218.52	2,503.22	3,530.36	10,252.10
Whitehall	10,252.10	7,009.03	0.00	11,754.86
Total Municipal Sites	108,099.61	73,594.76	17,651.78	199,346.15
Main Site	96,738.81	175,103.86	38,257.05	310,099.72
Total All Sites	204,838.42	248,698.63	55,908.83	509,445.87
Excluding Grants				
Allentown	6,052.83	10,053.92	0.00	66,106.75
Catasauqua	1,932.86	3,141.85	0.00	5,074.71
Emmaus	13,529.99	21,364.58	0.00	34,894.57
L. Macungie	17,395.71	35,817.09	0.00	53,212.79
Lynn	3,865.71	0.00	0.00	3,865.71
U. Macungie	22,227.85	0.00	10,499.75	32,727.60
U. Milford	11,597.14	0.00	0.00	11,597.14
U. Saucon	9,664.28	10,053.92	10,499.75	30,217.95
Washington	5,798.57	3,141.85	5,249.88	14,190.30
Whitehall	6,523.39	8,797.18	0.00	15,320.57
Total Municipal Sites	148,588.32	92,370.39	26,249.38	267,208.09
Main Site	124,544.78	214,897.89	52,625.97	392,068.64
Total All Sites	273,133.10	307,268.28	78,875.35	659,276.73

Costs by Municipality

R. W. Beck calculated costs by municipality for each of the municipalities that deliver their yard waste to the main site for processing, as quantities are available for these communities. Some jurisdictions deliver some of their yard waste to the Main Site, and have some processed at another site. The costs described below only pertain to materials processed at the main site. Some municipalities deliver only materials to be screened and composted (not ground) to the main site, therefore costs are allocated by process, as well as quantity delivered. All materials delivered to the main site are screened and composted, but not all are ground. Only yard waste (which has not yet been ground) is ground at the main site – leaf waste and grass waste are not. The portion of material delivered to the site that is to be ground is based upon 2003 portions of yard waste vs. leaf waste and grass waste, except in the case of Allentown, in which the yard waste is treated like leaf waste, as it is delivered to the site pre-ground. Estimated annual costs per household were also calculated. The number of households per municipality was estimated based on the average number of people per household in the County, except in the cases of Allentown and South Whitehall, where actual household numbers were provided. The results (both with and without DEP grants) are shown in Table 13.

Table 13
Estimated 2004 Main Site Processing Costs by Municipality and Processing Activity

	% Grind	Annual Grinding Costs (\$)	% Screen/Windrow	Annual Screening Costs (\$)	Annual Compost Costs (\$)	Annual Total Cost (\$)	Annual Cost/HH (\$)
Including DEP Grants							
Alburtis	5.39	5,212.76	2.12	3,712.04	811.01	9,735.81	12.58
Allentown ¹	0.00	0.00	38.00	66,544.66	14,538.81	81,083.48	2.22
Coopersburg	2.20	2,125.99	0.92	1,603.44	350.32	4,079.75	4.15
Coplay	5.35	5,173.43	3.19	5,579.30	1,218.98	11,971.71	8.37
Fountain Hill	0.68	653.19	0.30	527.66	115.28	1,296.13	0.68
Lower Macungie	9.14	8,844.41	2.67	4,671.24	1,020.58	14,536.23	2.03
North Whitehall	20.48	19,816.32	8.60	15,052.67	3,288.74	38,157.73	7.27
Salisbury	4.08	3,950.63	7.16	12,541.16	2,740.02	19,231.81	3.74
South Whitehall	50.18	48,539.27	31.63	55,388.10	12,101.31	116,028.68	17.85
Upper Macungie ²	0.00	0.00	0.48	832.40	181.86	1,014.26	0.20
Upper Milford	0.22	211.71	1.04	1,820.23	397.69	2,429.62	0.97
Upper Saucon	1.93	1,870.31	0.54	942.84	205.99	3,019.14	0.76
Whitehall	0.35	340.79	3.36	5,888.13	1,286.45	7,515.37	0.72
Total/Average	100.00	96,738.81	100.00	175,103.86	38,257.05	310,099.72	3.54
Excluding DEP Grants							
Alburtis	5.39	6,711.08	2.12	4,555.63	1,115.62	12,382.33	16.00
Allentown ¹	0.00	0.00	38.00	81,667.57	19,999.43	101,667.00	2.79
Coopersburg	2.20	2,737.07	0.92	1,967.83	481.90	5,186.80	5.28
Coplay	5.35	6,660.45	3.19	6,847.26	1,676.81	15,184.51	10.61
Fountain Hill	0.68	840.94	0.30	647.58	158.58	1,647.10	0.86
Lower Macungie	9.14	11,386.59	2.67	5,732.82	1,403.90	18,523.31	2.59
North Whitehall	20.48	25,512.19	8.60	18,473.53	4,523.95	48,509.68	9.24
Salisbury	4.08	5,086.17	7.16	15,391.26	3,769.14	24,246.58	4.72
South Whitehall	50.18	62,491.08	31.63	67,975.57	16,646.42	147,113.08	22.63
Upper Macungie ²	0.00	0.00	0.48	1,021.57	250.17	1,271.74	0.25
Upper Milford	0.22	272.56	1.04	2,233.89	547.05	3,053.51	1.21
Upper Saucon	1.93	2,407.90	0.54	1,157.11	283.36	3,848.37	0.97
Whitehall	0.35	438.75	3.36	7,226.26	1,769.63	9,434.64	0.91
Total/Average	100.00	124,544.78	100.00	214,897.89	52,625.97	392,068.64	4.33

¹Allentown has no Main Site grinding costs, as all materials are ground at the Allentown site, then delivered to the Main Site

²Upper Macungie has no grinding costs at the Main Site because all of their material delivered to the Main Site is leaf waste, which is not ground.

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The maximum annual cost per household including grants is \$17.85 per year including grants, and \$22.63 excluding grants, which is equivalent to \$1.49 and \$1.88 per household per month, respectively. In most cases, the cost of yard waste processing is expected to be a relatively small component of each municipality's solid waste system, and it is believed that this cost could be reasonably recouped via a user fee or tip fee to be negotiated by the County and each municipality.

It was beyond the scope of this analysis to estimate the costs for all municipalities using the Municipal Sites, as no incoming quantity data was available. We understand that the County will utilize the hourly rates provided by this analysis to develop defensible charges for individual municipalities using the Municipal Sites.

Market Survey

R. W. Beck contacted three private composters located in the area to assess whether they would be willing and/or able to process additional materials from municipalities if the municipalities chose to seek alternative yard waste processing options. R. W. Beck also asked the facilities the following:

- 1) How much additional material they could process?
- 2) What they would charge?
- 3) Would they be willing to process at municipal sites?
- 4) What would that charge be?
- 5) What are end markets? –Do they have ample markets?
- 6) Would they offer a lower price in exchange for long-term commitment?

There is no private composting/yard waste processing facilities in Lehigh County, but the following facilities are relatively close, and therefore were contacted as potential alternative processors:

American Soil & Mulch (Northampton County)
1600 Freemansberg Road
Bethlehem, PA 18020 (in Freemansburg, technically – good rapport with them)
Phone: (610)-882-1555
Gary Diaz

Scott Farms (Monroe County – Two miles from Northampton County)
HC # 1 Box 72, Mt, Eaton Road
Saylorsburg, PA 18353
Phone: (570)-992-8500
Martin Gerardo

Zwicky Specialty Products, Inc. (Berks County)
R.D. #1, Box 285

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Robesonia, PA 19551
Contact: David Zwicky
Phone: (610)-693-5606
David Zwicky

Table 14 summarizes the market survey results.

**Table 14
 Market Survey Results**

	American Soil and Mulch	Scott Farms	Zwicky Specialty Products, Inc.
Contact (s)	Gary Diaz	Martin Gerardo Brock Scott	Dave Zwicky
Additional Capacity?	Could take in more materials. Might have to stop taking some materials from out-of-state, but would consider doing that. Would welcome the opportunity to work with local markets.	Probably have room for 5,000 cy of finished product.	Have capacity for yard waste materials, leaves, grass, and land clearing debris.
Charge for Tipping	Regular price - up to 50% more than municipal prices. Municipal prices --Mixed materials, small branches brush wood leaves, \$3 cy; Leaves and grass \$2 per yard; \$4 branches up to 8" in diameter. Take in chips through tree chippers for no fee. Tipping fee will be tremendously higher if have to take it in plastic bags. Would be more like \$20 per ton.	\$5 per pickup truck is what he charges residents. \$5 per yard – If bring a lot, will charge a better price.	\$4 cy tip fee for bulk materials. \$6 cy per bagged materials. No size max or minimums if delivered to site.
Willing to Process at Municipal Sites?	They could, but gets difficult to figure out costs. Northampton was trying to figure out municipal sites, but it gets expensive. The only way a municipal site worked would be to have a roll off or trailer there to bring things to other site.	No. Limited with help. Three employees plus part timers in the summer. Building it up.	Yes, currently do some off-site grinding. Allow paper bags, but increase charge for materials that come in any kind of bag. Try to stay away from plastic bags.

	American Soil and Mulch	Scott Farms	Zwicky Specialty Products, Inc.
Charge for Municipal Site Processing?	Would have to be calculated. Depends on distance, amount of material, etc.	NA	For on-site processing, have a minimum day charge – usually they need to have 1,000 yards, then haul the material away at no cost. Processing cost is \$3,500 for first day, \$3,000 per day after that. Will pro-rate second day. Turns out to be \$3.50 to \$4.00 per yard.
Type of Processing	Grind, compost, screen, dye.	Grind, dye, compost, screen. No windrow turner currently – use front end loaders to turn.	Grind, chip, screen, color.
What are End Markets? – Are they Ample?	Wholesale markets in a 60-70 mile radius. Always trying to expand markets. Trying to change perception of “compost” in particular. Often it has a negative connotation linked to it. All finished products will be sold out at end of year, except for regular soil.	Have some material left over. Working on developing markets for compost.	Can increase markets. Have been doing this for 15 years, have a good market. Whole operation is set up on flow-through, so they know what's coming in. Have good contracts in place. 600 customers – wholesale only, no retail.
Would They Offer a Lower Price for Long-Term Commitment?	Possibly, but not a lot lower. Would depend on factors such as how easy to deal with, type of material, etc.	Yes – open to that possibility.	Would have to look at that. Depends on location, quantities, etc. Everything is negotiable. They want to benefit. In process of developing a market that will let them utilize another 1,000 tons 4,000 cy. Based on outgoing material. Four yards to the ton.

	American Soil and Mulch	Scott Farms	Zwicky Specialty Products, Inc.
End Products	Compost, mulch, colorized mulch, soil. Not bagged.	Double-ground mulch, natural and dyed, compost. Sells wholesale and retail – bulk only.	Sold 700,000 cy last year, including 18 different types of product. Goal is to hit 1 million cy per year. Mulch, natural and dyed, compost, and more.
Notes:	Site is located three miles from route 33 interchange.	Processing site is 15 acres.	Would consider joint ventures on site for some municipalities that have the ability to collect and sort, and don't want to get into processing. Also do container services, roll off, etc. Able to help where they want. Work with some municipalities in Berks County. Processing site is 200 acres.

In sum, all three sites indicate that they are willing and able to accept additional yard waste materials.

Municipality Survey

As part of this project, R. W. Beck agreed to contact four municipalities serviced by the County's yard waste program, to discern their willingness to pay the costs associated with yard waste processing. Because there are multiple Municipal Sites, and many of these sites serve several communities, R. W. Beck recommended contacting two Municipal Sites that only process their own municipality's materials. In addition, it was recommended that two communities be selected that are served entirely by the main site (e.g., do not have any materials processed at municipal sites). The selected communities' estimated annual yard waste processing costs were then calculated on a per-household basis, to make the rate more meaningful to the municipal contact. The following municipalities were selected: Allentown, South Whitehall, Lower Macungie, and Upper Macungie. Table 15 reviews the costs per municipality excluding grant contributions. Allentown's costs include both Main Site and Municipal Site processing services. The survey results are also provided in Table 15.

Table 15
Survey Municipalities
Estimated 2005 Costs Excluding Grant Contributions**

	Total Cost (\$)	Estimated Annual Cost/HH (\$)	Estimated Monthly Cost/HH (\$)	Comments
Main Site Processing				
Allentown*	172,806.96	4.73	0.39	My first reaction is we're definitely getting a service, but we have no control of the decisions being made or the administration of the facility. I think it's a hard sell for them to expect us to pay fees without having any control. A service is being provided – but it's to their citizens too, not just our (the municipality's) citizens.
South Whitehall	147,113.08	22.63	1.88	Nancy Tonkin's reaction: -- "That's a good chunk of change." – We aren't raising the rates for trash collection and recycling every year. They're in the first year of their contract. Would have to give some thought as to how they would pay for this. They get \$100,000 in performance grants, which go into the general funds, so maybe they could somehow designate that. There are few alternatives. We don't have a large area, and I don't think we'd want to get into tub grinders, etc.
Municipal Site Processing				
Lower Macungie	54,809.18	7.56	0.63	It sounds expensive. It may be realistic. It's another State mandate that ran out of funding, as far as we're concerned. It probably would mean our actual per-household cost would be 5 to 6 times that cost, because of the amount of material we're doing on site. Probably 20 – 25 percent is coming in from other municipalities.
Upper Milford	11,945.05	4.59	0.38	Dan DeLong, Township Manager: "Cost is a bargain for the Township. "I certainly think it's a fair cost." .. I know due to economies of scale we can't do it any cheaper.

*Includes Municipal site grinding costs.
 **2004 Costs inflated by 3 percent.

Observations and Recommendations

In summary, we can conclude:

- Lehigh County currently expends nearly \$453k each year to provide composting services to the municipalities in the County. At the current time, there is no mechanism by which the County is reimbursed for these services.
- If fuel consumed by the Municipal Sites, increased fuel consumption at the Main Site, and full capital costs are included, the annual costs are \$659k.
- In order to develop defensible, equitable rates, the County must allocate the full cost of their composting system to the main services provided—grinding, screening and windrowing.
- Based on operating and cost data provided by the County, and based on R. W. Beck's industry knowledge of equipment O&M and fuel costs and other operational parameters, it is possible to calculate an hourly charge for each equipment type. These hourly charges — which are higher for the main site due to the incremental cost of main site-specific equipment and labor (generally for moving incoming and outgoing material) — should serve as the basis for setting rates for the County's composting system.
- Across the nation, it is customary for municipalities to recoup their costs of providing solid waste, recycling and composting services via user fees, assessments, and tipping/processing fees. Given that Lehigh County now has a defensible basis for rate setting, we believe it is reasonable for the County to impose cost-based rates on its municipalities for providing yard waste processing services. This exercise will also encourage the County to remain efficient, as municipalities will generally exert pressure to keep rates low.
- When setting rates, the County should rely on the true full cost of the system (i.e., ignoring grant subsidies for equipment capital purchases). This will allow the County to accrue equipment replacement funds for use in the future when the current equipment reaches the end of its useful life. Rates that are based on the full cost, rather than the subsidized costs, significantly reduce the risk that the County's composting system will need to be significantly reduced or even eliminated if such DEP grants are not available in the future, and to the extent grant monies are available, the accrued equipment replacement funds could be used to subsidize on a go-forward basis, rather than in arrears. The County might consider issuing a rebate to municipalities if the replacement fund became excessive.

We also make the following observations for consideration by the County:

- The County's hourly costs for providing composting services at the Main Site appear to be on the high side based on equivalent private-sector benchmarks. This suggests that the County's composting system could handle more material (and/or could utilize less equipment), which would reduce the hourly processing costs.

- The potential exists for municipalities to bring materials contaminated with plastic bags and trash to the main site, or to have County workers process contaminated materials on the municipal site. The County may consider refusing to accept such material, or charging an additional fee to the municipality, due to the fact that contaminated materials result in more wear and tear on processing equipment (increasing operating and maintenance costs, as well as capital costs in the long run), and decreases the ability to sell the materials. If a formal agreement is developed, language indicating the potential contamination surcharge should be specified, as well as what constitutes contamination.
- There are additional inefficiencies borne by the County to operate the Main Site — i.e., costs associated with moving incoming and processed materials. As shown in this analysis, the County should charge a proportionately higher fee at the Main Site when compared to the Municipal Sites. Presumably the Municipal Sites are providing this service at their respective sites.
- Despite the fact that Main-Site processing is currently relatively more costly than Municipal-Site processing, there are extra costs associated with processing yard waste at Municipal Sites as well – the cost of transporting equipment. The County appears to process at Municipal Sites only when necessary, to maximize efficiency. The County should continue to ensure that Municipal Sites being serviced have adequate material to process (e.g., the County should eliminate Municipal Sites if they have inadequate quantities of material to process). By implementing a fee structure, the municipalities managing the sites have an incentive to ensure that this is the case
- DEP regulations do not permit leasing out processing equipment purchased with DEP grant funds, however in the future, the County might consider increasing the usage of equipment purchased without DEP grant funds by leasing equipment out. One local private composter, for example, has no windrow turner, and might be interested in leasing equipment at a reasonable rate.
- The County and surrounding municipalities may wish to form an authority or devise an inter-local agreement in order to formalize and more clearly define the services the County will offer. If an authority is formed, the jurisdictions might consider collectively bidding out yard waste collection services, such that economies of scale could be gained, and such that a consistent quality of yard waste material would be collected.

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We appreciate the opportunity to work with the County on this project, and support the County's implementing cost-based service fees. Please do not hesitate to contact me at (401) 782-6710 if you have any questions.

Very truly yours,

R. W. BECK, INC.

Susan Bush
Project Manager

SB:ls