



March 27, 2002

Mr. Mark Whitfield
Director of Public Works
State College Borough
118 W. Fraser Street
State College, PA 16801

Subject: Assessing Feasibility of Expanding State College Composting Facility

Dear Mark:

This letter is to provide State College Borough with the results of R.W. Beck's efforts to assess the feasibility of expanding the State College Composting Facility to further promote regional yard waste management for municipalities in Centre County.

Currently, this facility serves State College Borough and Patton Township. Three other municipalities, College, Ferguson and Harris Townships, have been investigating the possibility of implementing a new composting site to serve these three municipalities. College and Ferguson Townships are both mandated to recycle leaf waste under the Municipal Waste Planning, Recycling and Waste Reduction Act of 1988 (Act 101). Harris Township, with a population of under 5,000 as of the 2000 Census, is not. Given the state's new goal of 35 percent recycling by 2003, however, the PA Department of Environmental Protection (DEP) is encouraging counties and municipalities to recycle more materials. It should be noted that all three municipalities are already collecting yard waste and diverting it from disposal, but according to a 2000 survey conducted by Centre Region Council of Governments (CRCOG), the material from these three municipalities is not being composted but simply delivered to alternate sites; College Township delivers its material to a private property, Ferguson Township stockpiles it at the municipal building, and Harris Township delivers it to a private farm.

Having the ability to manage these materials through a formal composting program would enable these municipalities to ensure effective management of the material, making it possible to expand the program through heavier promotion and by possibly including more materials. A separate report addressed to Ferguson Township suggests that these municipalities might be better served by working with State College Borough to have materials composted at the existing site.

EXPANDING THE STATE COLLEGE COMPOSTING SITE

This report assumes the following:

- The State College Borough facility has sufficient land area for an expansion, and is able to manage an expanded site.
- In 1997, 1998 and 1999, municipal crews in College, Ferguson and Harris Townships collected an average of 11,557 cubic yards of residential yard waste per year. Materials collected include leaf waste and brush, but not grass. Volume has remained steady since a large spike in 1996 due to storm damage in Ferguson Township. Unless additional materials, such as grass, are included, or there are further efforts to encourage residents to set out materials, volume is expected to stay within the 11,000 to 12,000 cubic yard range.

To assist State College Borough in assessing what is required to expand its yard waste management facility to service Ferguson, College and Harris Townships, R.W. Beck is providing the following:

- Estimated composting/processing area required.
- Implementation factors and estimated costs.

CURRENT YARD WASTE VOLUMES MANAGED AT THE STATE COLLEGE FACILITY

The State College Borough site manages an average of 3,730 tons of leaves and grass at its site annually. The exact breakdown between leaves and grass is unknown, and the exact volume (in cubic yards) is also unknown. It is assumed that: (1) most of the material is leaves; (2) most of the leaves are delivered in the fall; and (3) materials are incorporated into windrows once received at the site and are turned regularly.

Table 1 provides estimates for the volume of material received at the State College facility based on annual tonnage received, assuming various ratios of leaves to grass.

TABLE 1
ESTIMATED VOLUMES DELIVERED TO STATE COLLEGE COMPOSTING FACILITY

Material	90:10 Ratio		80:20 Ratio		70:30 Ratio	
	Tonnage	Volume	Tonnage	Volume	Tonnage	Volume
Leaves	3,357	14,905	2,984	13,249	2,611	11,593
Grass	373	1,149	746	2,298	1,119	3,447
Totals	3,730	16,054	3,730	15,547	3,730	15,039

The active composting area at the State College site is approximately five acres. The **Guidelines for Yard Waste Composting Facilities** issued by the Pennsylvania Department of Environmental Protection (DEP) permit a maximum of 3,000 cubic yards per acre. Based on this allowance, the State College facility is at its limit. However, it should be noted that the composting process begins immediately once these materials are incorporated into windrows and are being turned, and the volumes are reduced significantly. What this means is that more material can be accommodated using the existing five acres, though it is difficult to estimate the exact amounts that could be incorporated, and how quickly the

material could be incorporated. However, grass is typically delivered in the spring and summer, and it may be assumed that volumes from the leaves are sufficiently reduced after processing throughout the winter months.

It is assumed that the finished material will be reduced to less than half its original volume, or approximately 40 percent. Table 2 provides estimates for a range of reduction that might take place within the two to three month period when leaves are being delivered to the site and the composting process is started during the fall season.

TABLE 2
ESTIMATED VOLUME ON SITE AT END OF FALL LEAF COLLECTION SEASON

Leaf Volumes	90:10 Ratio	80:20 Ratio	70:30 Ratio
Original Volume	14,905	13,249	11,593
Reduced Volume--10%	13,415	11,924	10,434
Reduced Volume--20%	11,924	10,599	9,274
Reduced Volume--30%	10,434	9,274	8,115

Assuming the estimated rates of reduction presented in Table 2, Table 3 provides estimates for the amount of additional material that might be accommodated within the existing active composting area during the fall collection season.

TABLE 3
ESTIMATED ADDITIONAL VOLUME AVAILABLE DURING FALL LEAF COLLECTION SEASON

Leaf Volumes	90:10 Ratio		80:20 Ratio		70:30 Ratio	
	Initial Volume	Additional Volume	Initial Volume	Additional Volume	Initial Volume	Additional Volume
Original Volume	14,905	95	13,249	1,751	11,593	3,407
Reduced Volume--10%	13,415	1,585	11,924	3,076	10,434	4,566
Reduced Volume--20%	11,924	3,076	10,599	4,401	9,274	5,726
Reduced Volume--30%	10,434	4,566	9,274	5,726	8,115	6,885

ESTIMATED VOLUME GENERATION AND SITE SIZE REQUIREMENTS FOR COLLEGE, FERGUSON AND HARRIS TOWNSHIPS

The volume of yard waste collected from College, Ferguson and Harris Townships has been holding steady since 1997. Materials in the three Townships are collected by municipal crews, and composted informally at locations established in each municipality. Most of the material is collected in the fall, though some materials are also collected in the spring.

Table 4 presents the total acres required for an active composting area based on a maximum of 3,000 cubic yards per acre. This table indicates that approximately four acres is required for active composting, based on the volumes of material received over the period since 1997. However, as noted above, reduction in volume means that this material could be managed in less than four acres, depending on the rate of reduction and the timing of deliveries of materials.

TABLE 4
ACREAGE REQUIRED FOR ACTIVE COMPOSTING
REGIONAL COMPOSTING SITE

Municipality	Total Volume	Acreage Required*
1999	11,625	3.88
1998	11,793	3.93
1997	11,253	3.75
1996	16,385	5.46
1995	6,492	2.16

*Assumes 3,000 cubic yards per acre

As indicated in Table 3, the Borough should be able to manage at least some portion of the materials generated by College, Ferguson and Harris Townships within the existing active composting area, depending on the current ratio of leaves to grass, and rate of reduction in currently received materials. Table 5 provides estimates for the volume of material that may need to be accommodated based on the scenarios provided in Table 3.

TABLE 5
ESTIMATED VOLUME THAT WILL REQUIRE ADDITIONAL ACTIVE COMPOSTING AREA

Leaf Volumes	90:10 Ratio		80:20 Ratio		70:30 Ratio	
	Volume Accommodated in Existing Area	Remaining Volume	Volume Accommodated in Existing Area	Remaining Volume	Volume Accommodated in Existing Area	Remaining Volume
Original Volume	95	11,905	1,751	10,249	3,407	8,593
Reduced Volume--10%	1,585	10,415	3,076	8,924	4,566	7,434
Reduced Volume--20%	3,076	8,924	4,401	7,599	5,726	6,274
Reduced Volume--30%	4,566	7,434	5,726	6,274	6,885	5,115

Based on the remaining volume figures cited in Table 5, the Borough would need to develop an additional two to four acres of active composting area to accommodate the additional material estimated to be received from College, Ferguson and Harris Townships. To be certain that there is sufficient active composting area, it may be best to plan for the maximum of four additional acres.

The Borough currently has one area of approximately one to one and one half acres that could fairly readily be developed into active composting area. Additional area that would meet all of DEP's requirements in the *Guidelines for Yard Waste Composting Facilities* would need to be determined. Given the area of the land that is available for consideration—approximate 88 acres—finding additional area should not present a problem. The main consideration is that it meet the requirements, but a secondary consideration should be the amount of work required to prepare the area for active composting and to provide access for incoming vehicles delivering materials. The main factors for consideration are:

- The amount of clearing to be done (trees and brush)
- The amount of grading required
- Distance from existing composting area and access road

The cost for additional site development would depend on the amount of work required to prepare the area. Without knowing the area to be developed, the Borough might consider using the cost per acre to develop the existing composting area to estimate the cost to develop a new area.

Table 6 provides an estimate for the effort and cost required to add the estimated volume of materials from College, Ferguson and Harris Townships.

TABLE 6
ESTIMATED LABOR COST TO ADD MATERIALS TO CURRENT SITE

Category	Current Effort	Estimated Effort*
Labor--Total Hours	1,150	2,040
Labor Cost--Total	\$27,095.00	\$48,071.77
Labor Cost--Rate/Hour	\$23.56	\$23.56
Volume Processed--cu.yd.**	15,500	7,500
Volume Processed--per hr. worked	13.48	13.48

*With addition of College, Ferguson, and Harris Townships

**Estimated--converted from weight, assuming 80:20 mix of leaves to grass

According to Table 6, it would take the equivalent of approximately one full-time person to manage the effort required at the site, and the total cost is estimated to be just over \$48,000.

Other costs would increase as well, but the increase would not necessarily be directly equivalent to the additional operation time required on site. Table 7 provides the estimated cost to operate the site that includes the additional materials, including an estimated cost per ton that could be used to determine what should be charged to College, Ferguson and Harris Townships to manage their leaves. Because the greatest portion of the cost is in labor, the overall cost is reduced by only around \$4.00. The projected costs are estimated using factors provided in the footnotes below the table. The Borough will need to use whatever factors it feels most appropriate, however, to make a more accurate determination of what these numbers might be.

In a report to Ferguson Township on behalf of Ferguson, College and Harris Townships, Beck suggested that the cost per ton for processing their materials at the State College site would be around \$23.00 per ton, the cost estimated by the Borough for current operations. The Borough would need to determine an appropriate rate per ton based on its own needs to ensure that it covers the additional cost to manage the additional materials.

TABLE 7
ESTIMATED COST PER TON TO ADD MATERIALS TO CURRENT SITE

Cost Category	Current	Projected
Equipment Depreciation	20,909.41	20,909.41
Equipment Maintenance (1)	10,618.00	15,927.00
Land Improvement Depreciation (1)	15,967.00	23,950.50
Labor	27,095.00	48,071.77
Administration Overhead (2)	11,188.00	13,985.00
Total Cost	\$85,777.41	\$122,843.68
Volume Processed--cu.yd.	15,500	27,500
Tonnage (3)	3,730	6,433
Cost per Ton	\$23.00	\$19.10

(1) Assumes 50% increase

(2) Assumes 25% increase

(3) Estimated on the 12,000 cu.yd. additional, using 4.44 cu.yd./ton (leaves only)

MARKETING OF COMPOST

The Borough has suggested that there is an interest in marketing finished compost. How this is accomplished depends on how the Borough wants to market it.

If the Borough wishes to market the material as a fertilizer, soil conditioner or plant growth substance, it must obtain an annual license from the PA Department of Agriculture, Bureau of Plant Industry, Division of Agronomic Services, which administers the Pennsylvania Fertilizer, Soil Conditioner and Plant Growth Substance Law. The application for marketing as one of these materials must include the following:

- the net weight or other measure prescribed by regulation
- the brand
- an accurate statement of composition and purpose; and
- the name and address of the person guaranteeing the soil conditioner

Different brand and grades of product, including different blends require separate registration. A current copy of label must be submitted with the registration.

Cost for doing this would depend on the following:

- costs incurred in testing the material to determine the percentages of the following nutrients: total nitrogen; ammoniacal nitrogen; nitrate nitrogen; water insoluble nitrogen; phosphoric acid; soluble potash; additional plant nutrients as prescribed by regulation; and
- costs for packaging.

It would be difficult to assign a specific cost to this for purposes of this report as it depends on who is doing the testing, what type of packaging is used, and how much material is to be marketed in this way. If the Borough wishes to market material as one of the products

specified above, it would need to determine what its costs would be, and should establish a selling price that would ensure that all costs are covered.

If the Borough wishes to pursue marketing the material in this way, it should contact the following:

Pennsylvania Department of Agriculture
Bureau of Plant Industry
Division of Agronomic Services
2301 N. Cameron Street
Harrisburg, PA 17110-9408
717-787-4843

The Borough can offer the material as a soil amendment without any suggestion of its efficacy for plant growth as it has been doing, and would be able to recover distribution costs—i.e., whatever cost it incurs in delivering the material to a site, or cost in loading material on site.

A decision concerning marketing efforts should take into account the amount of time and internal cost involved in getting the material tested, investigating packaging options and setting up for processing, advertising, and any other activities the Borough might incur in doing this.

CONCLUSIONS

- State College Borough is able to manage current volumes of yard waste received, and has the ability to expand to process more yard waste from other municipalities in the region.
- College, Ferguson and Harris Townships are looking to manage approximately 12,000 cubic yards of leaf waste, and currently are looking into establishing a new site for the materials.
- The State College Borough site appears to present a viable and reasonable alternative to building and operating a new site.
- An area of approximately four acres should provide more than sufficient space for composting additional materials that might be received from College, Ferguson and Harris Townships.
- The cost per ton to manage current levels of material is \$23.00. Considering economies of scale, the cost should be lower per ton if additional materials are added because not all costs will rise in proportion to the amount of material received. The reduction is not expected to be too dramatic, however, because labor, the greatest of the cost categories, is expected to rise in proportion to the material to be processed.
- The cost to develop additional area will probably be similar to previous site development costs on a per acre basis unless there are significant differences in the area to be developed that would increase or decrease the effort required to develop it.

- Marketing finished compost as a fertilizer, soil conditioner or plant growth substance requires that the Borough adhere to requirements established by the PA Department of Agriculture. Material can be supplied as a soil amendment (as it is now) at the cost to manage the materials.

RECOMMENDATIONS

- State College Borough should refine the cost estimates included in this report to determine an estimated cost by weight or volume for processing additional materials.
- The Borough should also speak with the DEP Northcentral Office to determine what the potential is for funding a site expansion.
- The Borough should discuss with College, Ferguson and Harris Townships the possibility of an agreement for these municipalities to use the site before making a decision to expand the site for this purpose alone.
- If an agreement can be reached, the Borough should prepare for site expansion, including:
 - Selection of an appropriate area
 - Determination of costs based on specific preparation requirements
 - Development of a grant application
- The Borough should decide whether or not to begin expansion prior to receipt of grant funding.
- Assuming all above factors fall in place, site expansion should proceed.
- The Borough may wish to contact laboratories, explore packaging options, and consider advertising options in order to determine cost and decide whether or not it wishes to market its finished compost as a fertilizer, soil conditioner or plant growth substance.

Expansion of this site appears to be a win-win opportunity for the Borough and for College, Ferguson and Harris Townships in that income for managing the additional materials might help to offset some of the costs to operate the site, and should result in less expense for the three municipalities.

Sincerely,

Sandra L. Strauss
Environmental Analyst

cc: Kathleen Kilbane, SWANA
Carl Hursh, DEP
Joanne Shafer, Centre County
Cathy Prosek, Centre Region COG