

SWANA RECYCLING TECHNICAL ASSISTANCE

FINAL REPORT

**LOWER PAXTON TOWNSHIP LEAF WASTE
COLLECTION AND COMPOST SITE EVALUATION**



GANNETT FLEMING, INC.



HARRISBURG, PENNSYLVANIA

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LOWER PAXTON TOWNSHIP
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Lower Paxton Township Leaf Waste Collection and Compost Site Evaluation - Executive Summary -

Lower Paxton Township (Township), located in Dauphin County, collects leaves with a vacuum truck in the fall from November through January. The Township also provides a voluntary curbside leaf waste collection service from April to December. Mixed leaf waste, which excludes grass, is taken directly to the compost site by residents and by the Public Works Department after it is collected at the curbside.

In this study, Gannett Fleming, Inc. (GF) evaluated the Township's leaf waste collection program and the Conway Road compost site. Two primary conclusions drawn from this analysis include: 1) schedule modifications can be made to the voluntary curbside leaf collection program that can significantly improve the cost effectiveness of offering curbside leaf waste collection services with a minimum reduction or no reduction to the level of service offered to Township residents; 2) the existing compost site located on Conway Road is not preferable as a long-term permitted composting facility due to a large number of deficiencies identified in this report, the proximity of encroaching residential receptors, and due to the limited suitable area for compost site operations.

Based on GF's understanding that the Township would like to improve the overall management, processing and composting of leaf waste, GF observed that the current composting site has numerous deficiencies and limitations. It can be anticipated that these issues could negatively impact the site's functionality as a comprehensive and well-designed composting operation that, when properly designed and as it matures, will result in additional volumes/deliveries of material from residents and from other entities (e.g. local private lawn care companies) permitted to tip materials at the facility. Some of the key observations, findings and recommendations for the collection program and compost facility include:

Leaf Waste Collection Program

- The leaf vacuum service and voluntary curbside leaf waste collection program overlap for about a two-month period. Considering duplication of service, high cost of operating the voluntary curbside leaf waste collection program and the poor residential participation, it is recommended the Township reduce the service period for the voluntary curbside service so that it ends by October 31st of each year. The \$70 dollar fee for the service may be reduced to reflect the reduced level of service offered to residents.
- The Township could consider transitioning the voluntary curbside leaf waste collection program from the Public Works Department into a service that is provided by a contracted hauling company (possibly as a bundled service with a large waste collection contract). The contractual arrangement for curbside leaf waste service could include a provision that requires the hauler to deliver seasonally collected leaf waste to the Township's compost facility or to another facility approved by the Township. Outsourcing curbside leaf waste collection service may be cost effective and should improve the Township's ability to have staff available on site at the compost facility, which is recommended for the successful operation of the Township compost site.
- At least one (1) additional leaf collection vehicle is recommended to improve fall leaf collection efficiency.

Conway Road Compost Site

- Due to the numerous limitations of the existing Conway Road compost site, it is recommended the Township evaluate the development of a compost site in a more favorable location to allow

the development of a adequately sized, properly configured compost site that could support the long-term, efficient and cost effective operation of a permitted compost facility.

- If the Township elects to evaluate alternative compost sites, it is recommended that the Township limit the modifications to the existing facility until an adequately sized facility can be located, developed and permitted. In the interim, modifications to the existing site should focus on efficient site operation, improved grinding capability and improved composting methods. Refer to the conclusions and recommendations of the full Report for existing site recommendations.
- It is not recommended the existing compost site be permitted, unless other sites have been evaluated and determined unfeasible. Based on GF's understanding of compost site permitting, certain criteria required for permitting compost sites may require the Township to make modifications to the site (requiring capital), which could further reduce the available area for composting and cause numerous operational issues.
- It is recommended the compost site be staffed during hours of operation. Compost site staff should be trained on compost handling, processing, safety and general operating procedures.
- It is recommended the Township implement a method to collect/track data on operational costs, and quantities of leaf waste collected, delivered, screened, and marketed, including levels of contamination.
- It is recommended the Township compost operation improve efficiency and processing capability by adding the following equipment:
 - Windrow turner (due to the need for increasing pile size to maximize material size reduction)
 - Horizontal grinder (consider safer alternative to a tub grinder)
 - Trommel screen
 - Loader (dedicated to the facility)
- New processing equipment is needed, and the timing of procuring equipment should not be impacted by the review of alternative compost sites. Equipment can be relocated to a new site, but will benefit the current site by improving processing capacity and material quality.
- It is recommended the Township implement a number of measures to offset costs related to operating a yard waste compost facility:
 - Establish a fee structure based on volume for sale of finished compost material.
 - Charge commercial entities (e.g. landscapers) and possibly other municipalities that wish to use the facility a tipping fee for incoming loads of acceptable mixed leaf waste.
 - Consider an equipment sharing and cost sharing program with other municipalities.
- It is recommended the Township submit a request for a Section 902 Recycling Grant funds to receive up to 90 percent reimbursement of eligible costs for compost equipment. The grants may also be used toward the cost of developing a leaf waste collection and composting program. Examples of project development costs include consultant fees, advertising for equipment purchases or ordinance reviews, and conference fees.

Lower Paxton Township Leaf Waste Collection and Compost Site Evaluation

1.0 INTRODUCTION

This Report summarizes technical assistance provided by Gannett Fleming, Inc. (GF) to Lower Paxton Township (Township). This project and evaluation was completed for the Township's residential leaf waste collection program and compost site. This study was performed as part of the Recycling Technical Assistance program sponsored by the Pennsylvania Department of Environmental Protection (PADEP) and the Solid Waste Association of North America (SWANA). During this leaf waste collection program and compost site evaluation, GF provided the following assistance to the Township:

- Evaluated current leaf waste collection services provided by the Township and provided recommendations related to this collection program.
- Conducted a site visit of the Township's compost facility located on Conway Road (August 2006). The site visit included an evaluation of the existing compost site operation and equipment.
- Provided recommendations related to improving the efficiency and sustainability of the compost facility. Existing equipment was evaluated and equipment needs were identified.
- Provided guidance related to the proposed Township compost site configuration. As proposed, the existing facility will be moved approximately 150' – 200' to buffer the impact (e.g. noise, dust, etc.) to an encroaching housing development.
- Completed this project report to summarize and document our findings and recommendations.

2.0 STUDY BACKGROUND

Lower Paxton Township is located in Dauphin County, Pennsylvania. The Township has approximately 12,000 single-family households and over 44,000 residents. The Township has operated a compost site at the location of the closed Lower Paxton Township Landfill for over ten years. The compost facility is located off Conway Road in the south east corner of the Township.

The Township requested technical assistance to evaluate the existing leaf waste collection program and the operation of the compost site. The Township and compost site operators must now take into consideration the new residential development that is being constructed adjacent to the compost facility. Guidance is needed to evaluate current operations and to provide recommendations on how to rearrange and possibly consolidate the compost site to minimize the impact to these new neighbors. The project should consider economic sustainability, since there are significant operational costs associated with maintaining the leaf waste collection program and to operate the compost site.

3.0 EXISTING WASTE COLLECTION AND RECYCLING PROGRAM

The Township is “mandated” by the Municipal Waste Planning, Recycling and Waste Reduction Act of 1988 (Act 101) to provide curbside recycling services. The Township currently contracts with Waste Management for curbside collection of residential municipal waste and recyclables. Residents are billed approximately \$46 per quarter by Waste Management for these curbside collection services. Waste Management collects the following recyclables under the current waste and recycling contract:

- **Glass**
- **Aluminum Cans**
- **Steel and Bi-metallic Cans**
- **Plastics**
- **Boxboard** (e.g. cereal boxes, food boxes and gift boxes, etc.)
- **Newsprint (including glossy inserts)**
- **Magazines**
- **Corrugated Boxes**

4.0 EXISTING FALL LEAF COLLECTION PROGRAM AND EVALUATION

The Public Works Department provides leaf collection using a vacuum truck in the fall (November-January). Residents rake leaves to within several feet of the curb in advance of their collection week. Service is offered to all households throughout the Township that front public roadways.

The leaf collection program takes six to eight weeks to service the entire Township. During the collection period, two separate runs are made through the Township. This is largely dependent upon the weather. The collection period requires 80 to 90 percent of the Public Works Department staff. GF believes the Township could improve the efficiency of the fall leaf collection program through the addition of at least one leaf collection vehicle. The Township is pursuing more efficient leaf collection equipment that can be operated using one person, allowing for additional staff to man the compost facility, which is a recommendation made in subsequent sections of this report.

5.0 EXISTING VOLUNTARY CURBSIDE LEAF WASTE COLLECTION PROGRAM AND EVALUATION

The Township offers a voluntary bi-weekly curbside leaf waste collection program. Leaf waste includes leaves, garden residues, shrubbery, tree trimmings and similar materials excluding grass. The voluntary program runs from April to December and the 1st and 3rd weeks in January are designated for Christmas tree pick-up. During the collection period, the Public Works Department uses the following schedule, equipment and staff to operate the voluntary program:

Monday and Friday - Five (5) Public Works staff, one (1) packer truck and (1) 3-ton dump truck
Tuesday, Wednesday, and Thursday - Three (3) Public Works staff, One (1) packer truck

The volunteer bi-weekly service includes unlimited collection of leaf waste, including leaves, garden residues and tree trimmings 6-inches or less in diameter. Grass is not accepted at the Compost Facility. Participating residents place the material in Kraft bags (provided by the residents) or in hard containers (e.g. plastic bins). After collection, the mixed leaf waste is taken directly to the compost site on Conway road.

Residents who participate in the program receive a decal to be placed on hard reusable containers so they can be recognized by the packer operators. Residents can also sign up for the curbside program at a cost of \$70 per household per year. Residents are billed once for this service at the start of the program. The Sewer Department billing software is used to assist in billing for the leaf waste program customers. This program generates approximately \$105,000 in annual revenues paid to the Township. The cost to implement this program currently exceeds the revenues. Based on the review and evaluation of the information provided to GF, there are several problems occurring with the program.

At the end of 2006 there were only 1,588 households out of 12,000 that were participating. In addition, Township data from 2006 shows that as many as 40 percent of the participating households do not regularly put materials out. This creates inefficient collection routes where collection trucks travel far distances, but collect little material. Generally, the program appears to be an inefficient use of Public Works staff and equipment.

The \$70 annual cost paid per household by participating residents for the leaf waste program appears high when compared to seasonal curbside leaf waste collection cost/fees per household in other municipalities that bundle curbside leaf waste collection services with a municipal bid and contract. The high cost of the voluntary service likely discourages some residents from participating. GF contacted Penn Waste to compare the cost of curbside collections of leaf waste offered by a contracted hauler with the fee per household paid for Lower Paxton's voluntary program. Penn Waste estimated that a once-per-month residential curbside leaf waste collection service from April through October adds \$.50 to \$.80 per month per household to the cost of typical waste collection contract. Leaf waste could be delivered to a local compost facility. Adding weekly curbside leaf waste collections from April to October adds approximately \$.90 to \$1.30 per month per household. Curbside collection in the fall for bagged leaves can also be added to a contract for a similar additional cost. Based on these cost examples, seasonal leaf waste services bundled into a typical waste collection contract will cost anywhere from \$6 to \$16 per year per household depending on the level of service offered.

The voluntary curbside collection program extends from April through December. This schedule creates an overlap of service with the leaf vacuum service that is provided in the fall. Because leaves comprise the majority of the leaf waste program beyond October 31st, the fall leaf vacuum service will meet the primary collection need.

Although the voluntary curbside collection program can be improved, the existing leaf waste site on Conway Road does not have adequate space or processing capacity in its current configuration to accept a sizeable increase in deliveries of mixed leaf waste. The timing related to expanding the level of curbside leaf waste collection services and number of households

serviced, must correspond to an enhanced leaf waste facility permitted to accept Township-generated leaf waste.

Enforcing proper participation in the voluntary curbside collection has not been a major problem. At various times throughout the season, non participating residents have put materials at the curbside of the participating residents.

The current voluntary leaf waste collection program revenues do not even come close to offsetting program costs. The Township's leaf waste collection program costs include mapping, fuel, equipment, maintenance, labor (i.e. salaries, benefits, health care, workman's compensation, etc). It appears the program is not cost effective when compared with other alternatives (e.g. bundling these services into a municipal bid for waste collection services), and thus, is not a viable and economically feasible program.

5.1 Leaf Waste Collection and Burning Requirements for Mandated Municipalities

As an Act 101 mandated municipality, Lower Paxton Township is required to meet a number of requirements and guidelines pertaining to the collection and handling of leaf waste. PADEP emphasizes the importance of establishing an anti-burning ordinance to reduce the amount of Act 101 recyclable materials that are burned, including leaf waste. The Township recently passed Ordinance 06-01 to prohibit residents from burning leaf waste.

Under Act 101, "**Leaf waste**" is defined as leaves, garden residue, shrubbery and tree trimmings, and similar material, but not including grass clippings. Collection of grass clippings is not required by the Act 101 recycling mandate; however, grass is collected at the curb along with other leaf waste by some municipalities. It is noted that the Municipal Waste Regulations and PADEP refer to the term, "Yard Waste Composting Facilities", when describing facilities that are permitted to accept leaf waste and yard waste.

Act 101 and PADEP guidelines require the following for handling leaf waste in mandated communities (as incorporated into the municipal Ordinance):

- 1. Prohibit the burning of recycled materials** collected within the municipality, **including leaf waste.**
- 2. A minimum of two curbside collections should be conducted annually for leaves, garden residue, shrubbery, tree trimmings, and similar material (i.e. brush).** To meet the minimum PADEP collection requirement:
 - PADEP recommends leaves are collected once per year (typically in the fall).
 - PADEP recommends garden residue, shrubbery, tree trimmings and similar material are collected separately at least once per year (typically in the spring).
 - If the Township does not offer a residential drop-off facility for leaf waste, Act 101 requires a minimum of one curbside leaf waste collection per month

The Township's leaf waste program meets the burn ordinance requirement and exceeds the Act 101 and PADEP minimum collection requirements for fall leaf collection. The requirement of at least one spring collection for garden residue, shrubbery, tree trimmings (or "brush"), and similar material is not currently being met by the current collection program.

5.1.1 Drop-off Sites for Recyclables or Leaf Waste

In mandated communities, drop-off recycle sites and drop-off locations for leaf waste are not an option in terms of replacing curbside collection of material from residential, commercial, institutional or municipal establishment leaf waste and yard debris disposal. Commercial establishments typically hire lawn care companies for managing and disposing of leaf waste, yard debris and grass clippings. Drop-off sites are optional for recyclables and leaf waste in the sense that they can supplement a mandated curbside recyclables collection system.

Mandated municipalities are required to provide or offer a location for residential leaf waste drop-off (i.e. inform residents of the drop-off site through education). The leaf waste drop-off site can be a county facility, neighboring municipality, private location, landscaper, tree farm, etc. It is not required that each mandated community operate its own drop-off location.

6.0 COMPOST SITE AND OPERATION

The Township's compost site is situated on approximately 15 acres, and is located on the site of the capped and closed Lower Paxton Landfill. Several compost site photos and equipment photos are included in **Appendix A, Photos 1-5**. The site accepts leaf waste including leaves, garden residues, and tree trimmings that are 6-inch diameter or less. The Township has had problems with tree limbs and stumps accumulating on site that exceed the 6-inch maximum diameter requirement. Oversized woody material is left behind by residents who do not observe or are not aware of the woody waste requirements. **Figure 1** is a rough sketch prepared by the Township of the existing layout and a proposed layout of the compost site.

Residents are permitted to drop off the specified materials at the site on Tuesday, Thursday and Saturday between the hours of 7:30 a.m. and 5:00 p.m. Township Residents are permitted to take tanbark and finished compost from the site at no charge. The Township prohibits the delivery of grass to the compost site. The Township closes the gates to deliveries a few days a week in order to safely process accumulated leaf waste. Due to the limited available space and current compost site configuration, it is currently unsafe to operate the tub grinder when residents are on site. There is a potential for injury from ejected debris. To increase the amount or rate that material is processed, the Township would like to keep the site open throughout the week and process material safely even while residents are using the facility.

Leaf waste material is delivered to the site by residents or by the Township's Public Works Department. Material is segregated into brush piles or mixed leaf waste piles before processing. Some leaf waste comes from West Hanover Township as part of a mutual arrangement. The current pile of mixed leaf waste has accumulated since April. It is estimated by the Township that roughly 15-20 percent of the mixed leaf waste material is from the voluntary bi-weekly curbside leaf waste collection program provided by the Public Works Department. The

remaining 75-80 percent of mixed waste is dropped off by residents. The Township does not currently track the quantity of mixed waste and brush that is processed at the facility.

Mixed leaf waste is composted in windrows and processed (ground and screened) into a finished end product. The windrows are turned every 1-3 months using a loader. There is an area, segregated from the residential drop-off area, that is used for active windrow composting. The windrows are approximately 3' high, 7' wide and 250' long. The site does not have access to a water supply. Electricity is on site but would require several poles to be relocated and meter base installed. The compost site is currently not paved. There are no active measures (e.g. berms, detention ponds, etc.) in place for stormwater controls on the composting site. It is worth noting that any compost facility improvements such as fill placement, grading, paving or changes in current operational layout, which are needed for the existing site, will have a direct impact on the current landfill gas collection facilities and will require modifications to the landfill closure plan.

The Township plans to construct a road on the north side of the old landfill site. This road will redirect traffic from Conway Road, around the houses in front of the composting site. This road will reconnect with Conway Road near the current recreation area. As proposed, this planned road could reduce the available compost site area due to required setback distances.

6.1 Leaf Waste Quantity Estimates

GF reviewed information from the Township pertaining to the quantity of leaf waste material that was on-site and/or delivered to the compost site in 2006 (refer to **Appendix B**). Using the data provided, GF was able to calculate reasonable estimates of the total amount (cubic yards) of material that currently require processing over a given year at the Conway Road compost site. GF estimates that the compost site drop-off area, processing area and active compost area receive approximately 22,000 cubic yards annually of material that requires management and processing (e.g. received, processed, pre-composted, composted/windrowed, stored, cured, etc.). At the recommended maximum loading rate of 3,000 cubic yards per acre (in windrows), a minimum of seven (7) acres is needed (at current quantities) for composting. The seven (7) acres needed for composting excludes other site features such as parking areas, traffic ingress/egress, area for finished compost piles, etc.

The compost site currently has less than the seven (7) acres suitable for composting within the maximum recommended loading rate per acre.

6.2 Equipment

The Township owns and operates a tub grinder and a Wildcat pull-behind windrow turner. The windrow turner has recently been repaired and is running well. The Township is currently renting a tractor to pull the windrow turner. However, the pull-behind windrow turner can only mix piles to a height of 4-5 feet. To maximize the rate of composting (i.e. pile size reduction), the windrow height should be 6-8 feet, which cannot be accomplished using the Wildcat pull-behind turner. Ongoing subsidence, erosion and sedimentation, and existing site conditions makes it very difficult to pull and maneuver the turner effectively. A loader is driven

approximately four miles round trip to the site on days it is needed for moving piles of material or for turning windrows. Equipment issues and recommendations are included in the General Observations and Conclusions and Recommendations section of this Report. Photographs of the front-end loader (**Photo 3**) and tub grinder (**Photo 4**) are presented in **Appendix A**.

6.3 Staffing

The compost site is usually unstaffed. In the summer of 2006, the Township tested the use of one Township staff person at the site during hours of operation. The pilot was very successful, resulting in less unwanted materials because of monitoring the site and drop-off activities. Cleaner incoming material helped to reduce equipment downtime when feeding, operating and maintaining the grinder. Having someone from the Township on site to greet residents provided for good public relations. The site is not currently or regularly staffed because of the cost, time commitment, and limited available staff.

7.0 SITE VISIT - CONWAY ROAD COMPOST SITE

GF performed a site visit of the compost facility on August 8, 2006. Prior to the site visit, the Township indicated the following concerns related to the compost site operation:

- Need improved efficiency related to existing operations.
- Reorganization is needed at the site to create a buffer from the new residential development.
- Require additional space for active composting.
- Orientation and relocation of windrows considering the new residential development.
- Implementation of economically feasible measures that improve the sustainability of compost site operations.
- Ensure traffic flow is safe for residents and operators.
- Safe operation of site equipment while residents and others are on site.

During the site visit, GF:

- Conducted a site walk-through to make observations and identified operational concerns.
- Discussed site modifications that were proposed by the Township staff that would be employed to create a buffer area between the compost facility and the new and existing residential development.
- Observed, evaluated and discussed existing compost equipment versus equipment needs.

7.1 General Site Observations

- At the time of the site visit, there were approximately 0.5 acres of active windrows. There were three windrows measuring 7' wide and approximately 250' long. Each windrow is approximately 3' high with an estimated volume of approximately 100 cubic yards per windrow. This equates to approximately 600 cubic yards per acre on the existing site. This is well below PADEP's recommended maximum loading rate of 3,000 cubic yards per acre.
- At the time of the site visit, unprocessed piles of leaf waste in the receiving area were very large. Because this material is not windrowed and turned, it is not actively composting and it will not experience significant size reduction from the composting process.
- As shown in **Photo 6** in **Appendix A**, the brush pile appears to have a large quantity of material that exceeds the Township's 6" maximum diameter requirement. The existing tub grinder is not designed to handle this large material.
- Soil surface conditions are fair in terms of resistance to erosion and resistance to damage by operating equipment. However, the lack of grading, and stormwater control, is contributing to rutting and ponding of stormwater and sediment runoff.
- The compost site area grade is 2 to 6 percent, and increases rapidly to the south of the active site.
- The compost site is heavily used by Township residents. There were roughly 15 vehicles observed dropping off leaf waste in less than a 1-hour period during the time of the site visit. The Township reports that approximately 600 residential vehicles bring materials to the site each day during seasonal peak usage. The high level of use by this (or any) compost site increases the need for effective traffic controls, proper site configuration, safety measures, site monitoring, etc. Additionally, the rate of leaf waste deliveries to the site warrants timely processing and composting of leaf waste so that accumulating materials do not negatively impact compost operations and safety.
- There were very few contaminants (e.g. plastic containers, cans, etc.) observed in material that was on site. Some fine soil material (i.e. dirt and gravel) appeared to be mixed into some of the windrows, which was caused by using the loader to turn windrows.
- Windrows are undersized (~3' average height) and did not appear to be actively composting. Small windrows inhibit an environment that will maximize the natural compost process to promote pile reduction and to kill off pathogens and weed seeds. The windrows are not well mixed and are turned with a loader infrequently.
- Odors were very minimal.
- A fly problem at the site was not observed. The Township discontinued accepting grass clippings (which rot quickly) in the previous year, which may have contributed to a reduced number of flies.

- Dust was fairly minimal, although a steady breeze toward the east and southeast was observed that carried some dust directly toward the new residential development. The Township used a spray dust retardant on site in the spring.
- The site is not completely enclosed by fence. Residents from the new development (or elsewhere) have easy walk-on access to the site.
- There was evidence of erosion in the area upslope of the windrow piles, and in between the windrow piles. Windrows are generally placed perpendicular to the prevailing contour, but where the land slopes through the piles, eroded sediments have collected between the piles creating “mud holes”. These rutted areas make it very difficult for staff to maneuver tractor and turner without getting stuck and compromising the equipment.

7.2 Equipment Observations

- The tub grinder is insufficient in size and design to process woody waste. Ground woody waste is very beneficial because wood chips can be added to windrows as a “bulking agent” to increase pile porosity. The tub grinder is located too close to residential drop-off areas.
- The existing windrow turner and loader are not constructing windrow piles high enough (6’ to 8’ high) to allow active composting to start inside the pile.
- The loader is driven approximately four miles round trip to the site on Township roadways, which takes time, uses fuel, adds wear and tear, and is an inefficient use of this equipment and manpower.
- There are no storage facilities at the site for the loader, other compost facility equipment, or for related maintenance supplies.

8.0 EVALUATION OF THE CONWAY ROAD SITE AND PROPOSED LAYOUT

Due to the site location and because the facility is located on an old Township landfill site, the following problems exist at the Conway Road Site. Attempting to correct some of these limitations problems could result in undue costs over the short and long-term:

- **Subsidence** – Ongoing subsidence due to landfilled municipal waste subsurface conditions impacts the ability to pave or implement effective grading/stormwater controls.
- **Grading** – The extent grading may be used could be limited by subsurface municipal waste as shallow as one to two feet below the ground surface, and by further settlement of a regraded surface. Large quantities of fill could be required to improve site grading. Even with the addition of fill, ongoing subsidence may create the need for ongoing maintenance of the pad in affected areas.

- **Landfill Gas (LFG)** – There is a risk of impacts or breakage to active LFG collection pipes (see **Photo 5, Appendix A**). This may limit the ability to configure the site, expand the site, regrade areas, and may limit flexibility of other needed improvements in the future. Impacting the LFG collection system will require changes to the landfill closure plan.
- **Dust** – Dust from the site can create a problem in the summer months for nearby residents. Site activity has exposed soil surfaces, and the prevailing winds blow from the west, in the direction of the new residential development. The dust retardant application used in the spring of 2006 was effective at the time, but cost approximately \$5,000.
- **Encroaching Properties** - The new residential development to the east may be impacted by dust, odors, noise and other nuisance caused by the operation of the compost facility. The entire compost site is not fenced; residents, including children, have open access to the site, creating a hazard and a liability for the Township. Additionally, the site is land locked by private property providing little opportunity for future expansion.
- **Slope** – A majority of the 15-acre site is not usable for composting because of the slope. The site slopes steeply to the south and to the west.
- **Operational Flow** – Operational flow should be considered in determining site arrangement. Operational flow should consider safety, entrance, exit and on-site traffic flow, stormwater management, material handling logistics. It should incorporate planned site improvements such as grading and paving. With a 150' setback from the property line, and an increased future need for active composting space, the existing site area may be marginally adequate in the short-term, but inadequate in the long-term. Higher windrow piles, and better utilization of available space will make operation of the existing facility possible. But if a better potential site, with fewer site limitations, is identified within the Township, the new potential site should be seriously considered.
- **Permitting:** If the site would become subject to PADEP permitting requirements and guidelines for yard waste composting facilities, the existing site would become subject to certain criteria that may create additional problems for the site. These requirements may impact the ability of the site to operate and could reduce the already limited available working area of the site. It is important for the Township to recognize that, simply because the Township has operated this site at the current location, it does not mean this site is favorable from the perspective of permitting or long-term operation.

There is no permit fee associated with the submittal and review of a permit-by-rule notification by the Department for yard waste facilities under five acres. The application fee for a composting general permit is \$500 if the Township applies under an established general permit for composting.

It is not known if PADEP would permit the existing site as an approved/permitted yard waste compost facility. A few of the criteria contained in PADEP Document Number 254-5403-100, GUIDELINES FOR YARD WASTE COMPOSTING FACILITIES, that may impact the site include:

Siting Restrictions

Yard waste composting facilities, including storage, composting, and curing, shall not occur in the following areas or the following distances, unless the operator takes special precautions and receives written authorization from the Department:

- e. at least 300 feet from an occupied dwelling, unless a written consent waiver is obtained to be closer.

Access Control

2. Access to the site shall be limited to those times when an attendant is on duty.

Nuisance Control

2. The operator shall not cause or allow conditions that are harmful to the environment or public health, or which create safety hazards, odors, noise, or other public nuisances.

GF notes that a primary reason that compost facilities are shut down is due to public nuisances and corresponding public complaints, which are usually in response to odors but can include other nuisances that impact residential receptors (e.g. dust, noise, etc.).

Water Quality Protection

1. The operator shall manage surface water and control erosion and sedimentation in accordance with the requirements of 25 Pa. Code Chapter 102, Erosion Control.
- **Conway Road Relocation** - The planned construction of the new road on the north side of the old landfill site will reduce the suitable area available for a reorganized and reconfigured yard waste composting facility. The proposed road will likely impinge on the existing facility. The road will place the composting area in clear view of passing traffic, and could increase the need for managing insecure access to the site and/or contribute to other residential complaints about the compost site. At minimum, a fence that can provide access control and visual screening will be required. An eight foot high chain link fence will cost approximately \$40 – \$60 per linear foot. The significant expense of installing a fence will have no direct operational benefit, but will be required due to the construction of the new road. With a fence separating the facility from the new road, operations at the leaf waste facility may be conducted in close proximity to the road, but control of noise, dust and odors will become very important. If the site requires a permit from PADEP, there may be setback requirements from the road that will further reduce the area of the leaf waste facility.

A rough sketch of the Township's current concept of a proposed compost site reconfiguration is presented in **Figure 1** along with the existing layout. The proposed layout provided by the Township improves the operational and traffic flow of the facility. The proposed layout also improves the safety of visitors by increasing the distance between drop-off areas and the tub grinding operation. These changes should allow leaf waste processing operations to continue throughout the week, even when this site is open to the public. Operators will still have to

closely monitor the tub grinder and ensure that it stays relatively full so there is less chance that it will eject debris. Although the proposed site layout does offer some benefits, these benefits are marginal when considering that the proposed buffer distance (300') will do almost nothing to minimize existing nuisances that will continue to impact the adjacent residential development. GF has provided a sketch of a site configuration option in **Figure 2** that could be considered by the Township as an alternative layout that could improve some aspects of the compost site operation.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The Township's compost site located on Conway Road is the current processing location for leaf waste generated by Township residents. Mixed leaf waste, excluding grass, is taken to the site by residents or by the Public Works Department after providing collection service. The Township collects leaves with a vacuum truck in the fall from November through January. The Township also provides a voluntary curbside leaf waste collection service from April to December. Only about 1,500 of 12,000 single-family households participate in the voluntary curbside leaf waste program and as many as 40 percent of these households do not set out leaf waste regularly on collection days. These two services overlap for about a two month period. Without modifications, the ongoing implementation of the current voluntary leaf waste program appears impractical and cost-prohibitive when considering: the distance traveled by collection vehicles; ineffective use of equipment; total staff time to operate the program; overlap with the leaf vacuum service; household participation; revenues generated versus program costs; and the total number of households serviced compared to the total availability of leaf waste collected by the program. Notably, even if these leaf waste services were improved, the existing Conway Road compost facility does not currently have the space (as configured now) or processing capacity to accept truckloads of mixed leaf waste from an enhanced curbside leaf waste collection program. Reconfiguring the existing compost site can improve the facility's ability to accept and process additional leaf waste volumes in the short term, but alternative composting sites for leaf waste should be identified and evaluated by the Township for use as a feasible, long-term outlet for leaf waste.

The Conway Road compost site is used heavily by Township residents who drop-off mixed leaf waste and brush. In the spring, participation peaks and the compost facility receives deliveries by up to 600 vehicles per day. Generally, the operation of the compost site is safe and promotes adequate flow of vehicles. The volume of material received at the site warrants requires frequent processing of material to minimize accumulation of unprocessed leaf waste on the site. The site currently receives approximately 22,000 cubic yards of materials each season, which requires seven (7) acres of composting area at the minimum recommended loading rate of 3,000 cubic yards per acre. The current site does not have seven (7) acres that are suitable for active composting. If the Township would improve its leaf waste collection program, the existing compost site design, operation, and equipment is not suitable to accommodate additional leaf wastes deliveries. Therefore, it may not be practical to invest a significant amount of time or excessive financial resources to modify the existing site before looking at other potential compost sites.

The equipment used to process material delivered to the site is inadequate. The existing leaf waste processing equipment does not have capability and/or processing capacity to efficiently process the quantity and types of leaf waste material, including brush and other woody material that is received. The site does not produce a high-value finished compost product, primarily because of ineffective windrow construction from an undersized windrow turner and because of limited access to a screener. The Township should evaluate the feasibility of developing a well-planned public leaf waste processing facility in another location.

- The existing site has a number of limitations and problems. The site limitations and operational problems are primarily due to existing site location and conditions: the compost site is located on top of a capped landfill; most of the 15-acre site is unusable for active composting due to slope steepness; there are LFG pipelines and subsurface municipal waste; there is encroaching residential development; insufficient useable area to effectively windrow and compost the quantity of leaf waste currently being received; and there is limited ability for site expansion. With the recent PADEP correspondence to the Township indicating the compost site will need to become a permitted yard waste compost facility, there are certain regulatory requirements and siting criteria that may further limit the useable area and effective operation of the compost site. All of these issues raise serious questions about the viability of the Conway Road compost site as a long-term public leaf waste outlet and processing facility. *It is important for the Township to recognize that, simply because the Township has operated this site at the current location, it does not mean this site is favorable/feasible from the perspective of permitting this site or for its long-term operation.*

Offsetting capital and operational costs of a large public yard waste composting facility is critical to the economic sustainability and successful operation of the site. Act 101, Section 902 Grants, revenues from sale of finished compost, tip fees for incoming material deliveries, and equipment sharing are some of the ways Pennsylvania municipalities partially offset costs for public yard waste composting facilities. In response to a question posed by the Township concerning the ability of the Township to charge fees at the compost site, PADEP indicated they are not aware of any legal restrictions that prohibit municipalities from charging tip fees for incoming leaf waste material or that prohibit the sale of finished compost.

9.2 Recommendations

From the review of existing Township programs, compost site visit observations, and from the preliminary review of processing needs and equipment, GF formulated the following recommendations:

Leaf Waste Collection and Voluntary Curbside Leaf Waste Collection Program

- In the near-term, it is recommended the Township continue the voluntary curbside collection program. However, due to the high cost, the schedule overlap, and redundancy with the vacuum service, it is recommended the Township reduce the number of months that this collection service is provided. It is suggested the voluntary curbside service

ends by October 31st of each year. Because households will receive less service, the \$70 annual fee could be reduced accordingly.

Reducing the service period will reduce total program costs and could make several Public Works Department staff available to assist with compost site operations (e.g. windrow turning, compost site monitoring and management, serving as a compost site attendant, compost site equipment maintenance, etc.) or other tasks.

- When the timing is appropriate, the Township could consider transitioning the voluntary curbside leaf waste collection program from the Public Works Department into a service that is provided by a contracted waste hauling company (possibly as a bundled service with a large waste collection contract like the current contract with Waste Management). Bundled along with waste collection service, curbside collection of leaf waste can be done cost effectively, which can create a relatively low cost per household for this service. The cost of this additional service can be spread across all the households in the Township so there would only be a small increase in residential collection costs. Likely, the service would require households to place leaf waste in containers or kraft bags which could be provided by the contracted hauler. Securing a contractor to complete this work instead of the Public Works Department may create opportunities for some Public Works Department staff to complete other functions (e.g. compost site management and operation).
- It is recommended that a contractual agreement with the selected hauler include a provision that requires the hauler to deliver seasonally collected leaf waste to the Township's compost facility or to another facility approved by the Township. Outsourcing curbside leaf waste service should improve the Township's ability to staff the compost site.
- It is recommended the Township bundle seasonal curbside waste collection services into a subsequent municipal bid that includes curbside waste and recycling services. The cost for this leaf waste collection service could be incorporated into this monthly or quarterly waste bill. A competitive bid for these services should present an opportunity to provide curbside waste collection services to more households at a lower cost per household than the current \$70 per year for the voluntary program.
- It is not recommended the Township implement an enhanced residential curbside leaf waste collection program until the Township has secured a site with adequate capacity to compost the additional material. Only about 1,500 of 12,000 households participate in the voluntary curbside leaf waste program and as many as 40 percent of these households do not set out leaf waste regularly on collection days. Even with the low participation rate, the bi-weekly volunteer program accounts for 15-20 percent of the total leaf waste brought to the compost site for processing. An enhanced municipal-wide curbside collection program that offers a similar collection service as the voluntary program, could substantially increase the quantity of leaf waste recovered and result in an unmanageable volume of leaf waste at the current compost facility, even if the site is reconfigured. Other comments include:

- The current volume of leaf waste material received annually exceeds site capacity for proper handling and composting.
- An enhanced curbside leaf waste collection program that would increase the volume of leaf waste material requiring handling and processing would magnify current site, equipment, and operational issues.
- Additional volumes of leaf waste material may begin to accumulate on site because the windrow turner is undersized and does not promote proper sizing, mixing, and size reduction of windrowed leaf waste. Accumulated leaf waste can hinder the effective and safe operation of the site.
- Additional volumes of leaf waste may require that the active compost site footprint be expanded. However, due to the numerous problems that have been identified, it may not be feasible to expand the existing compost site.
- Additional deliveries of leaf waste will increase the impacts to residential receptors. More dust, noise, and odor are expected with additional deliveries to the compost site.

General Compost Site and Operations

- Due to the numerous limitations of the existing Conway Road compost site, it is recommended the Township evaluate the development of a more efficient, sustainable compost site in another location.
- It is recommended the Township limit the modifications to the existing facility until an adequately sized facility can be located, permitted and/or constructed. In the interim, modifications should focus on efficient operation and proper equipment utilization and effective composting methods.
- It is not recommended the existing compost site be permitted as a yard waste composting site. Preferably, other land parcels can be evaluated so that a new compost site can be appropriately located, designed and permitted as a PADEP-approved yard waste compost facility.
- Without substantial investment in a large dust fence or mature tree dust break, there is little that can be done to lessen the dust effects of the facility on the neighbors to the east. During dry, dusty periods, the Township could use a water truck or wagon to mist travel lanes to minimize dust migration, but this would require at least one equipment operator/attendant at the site during operational hours, and the purchase of a water wagon capable of watering to suppress dust. Paving the site and utilizing emulsifying ground treatments are other solutions, but both involve significant investment, as pavement will likely subside over time due to subsurface waste settlement, and ground treatments have a limited effective duration.
- As the site currently has no access control and is surrounded by residential areas, a security fence is recommended to prevent unauthorized access, vandalism, and reduce potential risk of injury to children and others who might venture onto the site during non business hours. An eight foot high chain link fence will cost approximately \$40 – \$60

per linear foot (depending on options), and will be a necessary, but considerable expense. “No trespassing” signage should be installed on the fence.

- The operation of the tub grinder presents the most likely source of noise complaints from the facility, and greatest safety risk. It is recommended that the tub grinder be moved as far away as possible from the northern and eastern site property line boundaries to minimize noise migration and potential projectile risk. While separation distance will aid in reducing noise complaints, it is likely that without a sound break, noise complaints will persist when the neighboring development is fully built. Additionally, a fence is needed if unauthorized individuals are to be denied access to the facility.
- The site could be arranged so that public traffic is kept to the north and northeast portions of the site, and the compost processing, active composting area and the tub grinder operations are placed in the southwest quadrant of the site. The preprocessing leaf waste drop-off area could separate these two areas or could be to one side of both to allow for shorter transport of woody waste for processing, and wood chips ready for pickup. The tub grinder should be placed a minimum of 200’ from areas open to the general public if it is to be operated while customers are on-site.
- The existing site along Conway Road has limited area that is acceptable for yard waste facility operations due to numerous issues that have been identified in this report. The required 200’ setback from the tub grinder, and a minimum 300’ buffer from an occupied dwelling, greatly reduces this available area to a level that may not be operationally feasible. The grinder could be moved to areas on the old landfill site that are not currently level, however, operating loading equipment in between the gas collection wells increases the risk of damage to the gas collection system. While the required setback distances do not entirely preclude operations at the existing site, implementing efficient and safe operations at the existing site is difficult, and not ideal. These site limitations will be magnified if the facility accepts additional volumes of material in the future.
- Regrading the active composting windrow area is necessary to redirect stormwater, minimize erosion, and prevent sedimentation and stormwater ponding between the windrows that prevents proper utilization of turning equipment. Proper storm drainage will help prevent wet spots and will prevent equipment from getting stuck.
- Leaf waste and woody waste on the existing receiving piles should be transferred to active windrow piles as soon as feasible so that the composting process can be started. While biological activity may be taking place within the piles, large static piles of this type can create fire hazards if not managed correctly. The waste received in the receiving area should be transported to the active composting area and placed into properly sized (6’-8’ high) windrows on a regular basis. A functional, and properly sized, windrow turner is critical to an effective composting operation.
- Create a method to collect/track data on operational costs, and quantities of leaf waste (collected, delivered, screened, marketed, and contamination). Tracking this information is necessary for identifying problem areas and optimizing the operation. Tracking

material quantities may also be useful if the Township begins charging for the material at some point in the future. It may be difficult to record compost site data without having someone on site regularly while the facility is operating.

- PADEP currently allows the operation of yard waste composting facilities of five (5) acres or less through a “permit-by-rule”; sites 5 - 15 acres require a General Permit. Based on the current population and leaf and yard waste generation of the Township, there is a need for additional space beyond the 5-acre limit established for a Permit-by-Rule compost facilities. Therefore, it is recommended the Township consider permitting another, more suitable leaf waste compost site with PADEP.

Compost Site Staffing

- It is recommended the compost site be staffed during hours of operation.
- It is recommended that compost site staff are trained on compost handling, processing, safety and general operating procedures. This may include site visits to other compost facilities in the Commonwealth. GF has developed compost training manuals and provided compost training and guidance to site operators. The Professional Recyclers of Pennsylvania (PROP) offers a Professional Certification that includes composting courses. Operating the site with staff that have been trained in composting should improve the overall performance and operation of the site.

Compost Site Equipment

- It is recommended the Township compost operation improve efficiency and processing capability by adding or otherwise obtaining the following equipment:
 - **New tub grinder** (capable of processing woody material at least 6”s in diameter)
 - **Leaf Waste Collection Vehicle** (increase leaf collection efficiency and improve staff utilization)
 - **Tractor/farm implement** (for pulling windrow turner to eliminate rental fees)
 - **Loader** (dedicated to the facility)
- Highest priority should be given to the grinder. The current grinder is undersized for the volume of material that is to be processed annually and it is not designed to process woody waste. The larger grinder would provide for increased efficiency, provide for volume reduction, and create wood chips needed for “bulking” compost piles to maximize active composting. The volume reduction is required due to the limited space for active composting.
- Second priority should be given to tractor/farm implement capable of pulling the windrow turner to replace the rental tractor.
- To increase the operation efficiency of the fall leaf collection, it is recommended the Township procure a leaf collection truck. There are leaf collection trucks available that

can be operated using one person, which can reduce the number of staff needed for this task and reduce labor costs. The savings in manpower could benefit the operation of the compost facility.

- A loader that is dedicated to the facility is recommended since it is inefficient to drive the loader routinely back and forth between the Public Works facility and compost site.
- It is recommended that vendor/equipment demonstrations are done on-site to confirm capabilities of any equipment that the Township may procure.
- It is recommended the Township submit a request for a Section 902 Recycling Grant funds to receive up to 90 percent reimbursement of eligible costs for compost equipment. The grants may also be used toward the cost of developing a leaf waste collection and composting program. Examples of project development costs include consultant fees, advertising for equipment purchases or ordinance reviews, and conference fees.
- New processing equipment is needed and the timing of procuring equipment should not be impacted by the review of alternative compost sites. Equipment can be relocated to a new site, but will benefit the current site by improving processing capacity and material quality.
- A pole-barn or similar structure is recommended to house on-site equipment, however, due to site limitations noted in this report this should be considered only for a more suitable compost site at another location. Compost site equipment storage structures are not Act 101 Section 902 grant eligible. They could, however, be funded through 904 Recycling Performance Grant funds.

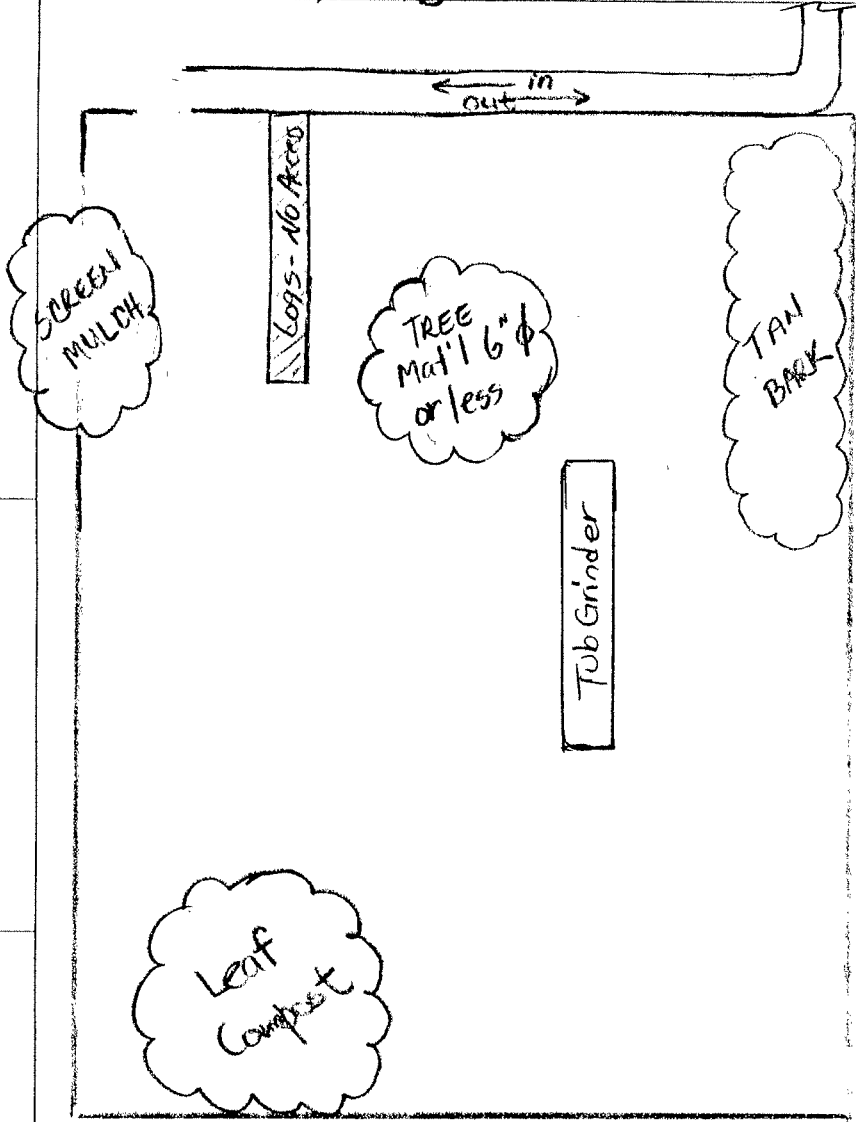
Offsetting Compost Site Costs

- In addition to submitting for Act 101, Section 902 Recycling Grants to partially fund equipment and other costs for leaf or yard waste compost program development, it is recommended the Township implement a number of measures to offset costs related to operating a yard waste compost facility. In the future, as the quality of finished compost product is improved, it is recommended the Township:
 - Establish a fee structure based on volume (i.e. cubic yards or vehicle type/size) for finished material. GF has observed prices for leaf waste compost ranging from \$2 to \$12 per cubic yard and even higher depending on final processing. Charging a fee for finished compost is justified because the Township is allocating resources in the production of an improved and valuable finished compost product that will be available to the public. Some publicly operated composting facilities will allow residents who hand load material take it for free, but charge for finished compost that requires mechanical equipment for loading. Ironically, processed leaf waste that is sold often has a higher demand than the same material given away at no cost.
 - Charge commercial entities (e.g. landscapers), and possibly other municipalities that wish to use the facility, a tipping fee for incoming loads of acceptable leaf waste.
 - Consider an equipment sharing and cost sharing program with other municipalities to minimize costs of maintaining and operating yard waste processing equipment.

FIGURE 1

Existing and Proposed Conway Road Compost Site Layout

Existing



Proposed

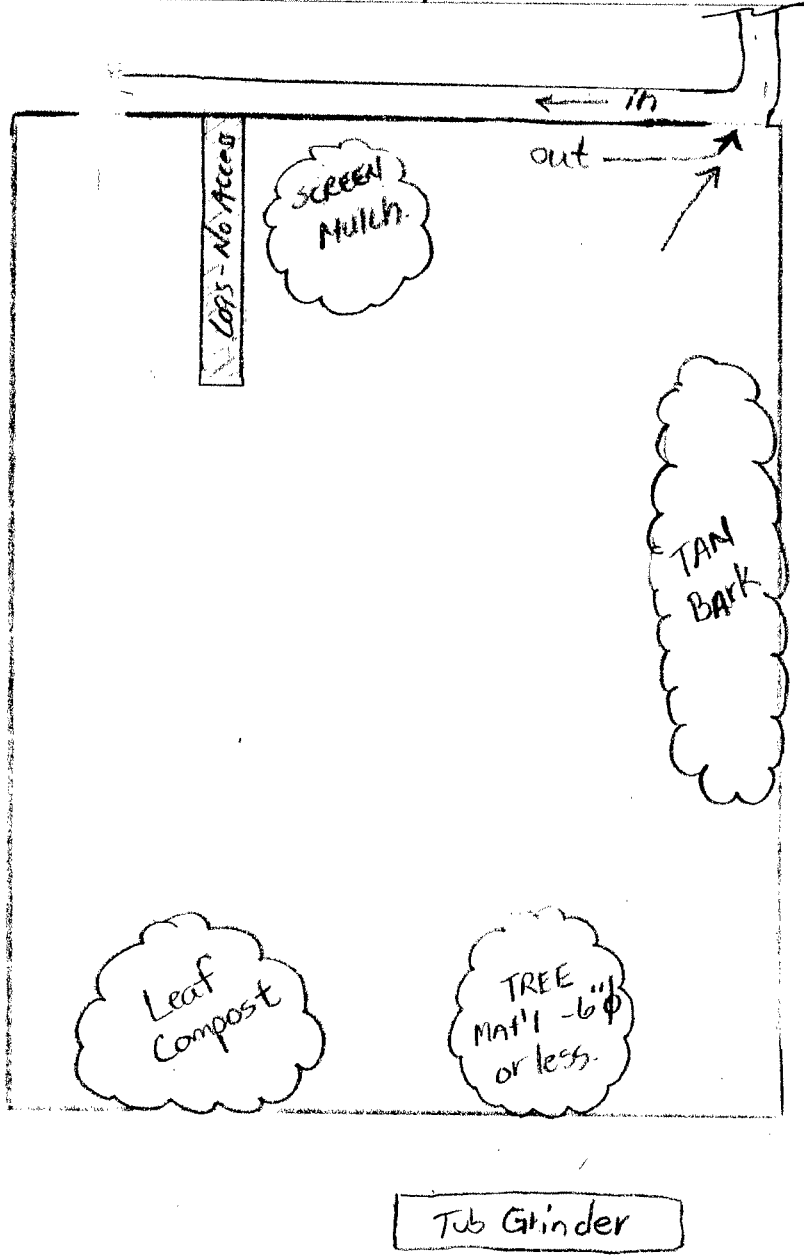
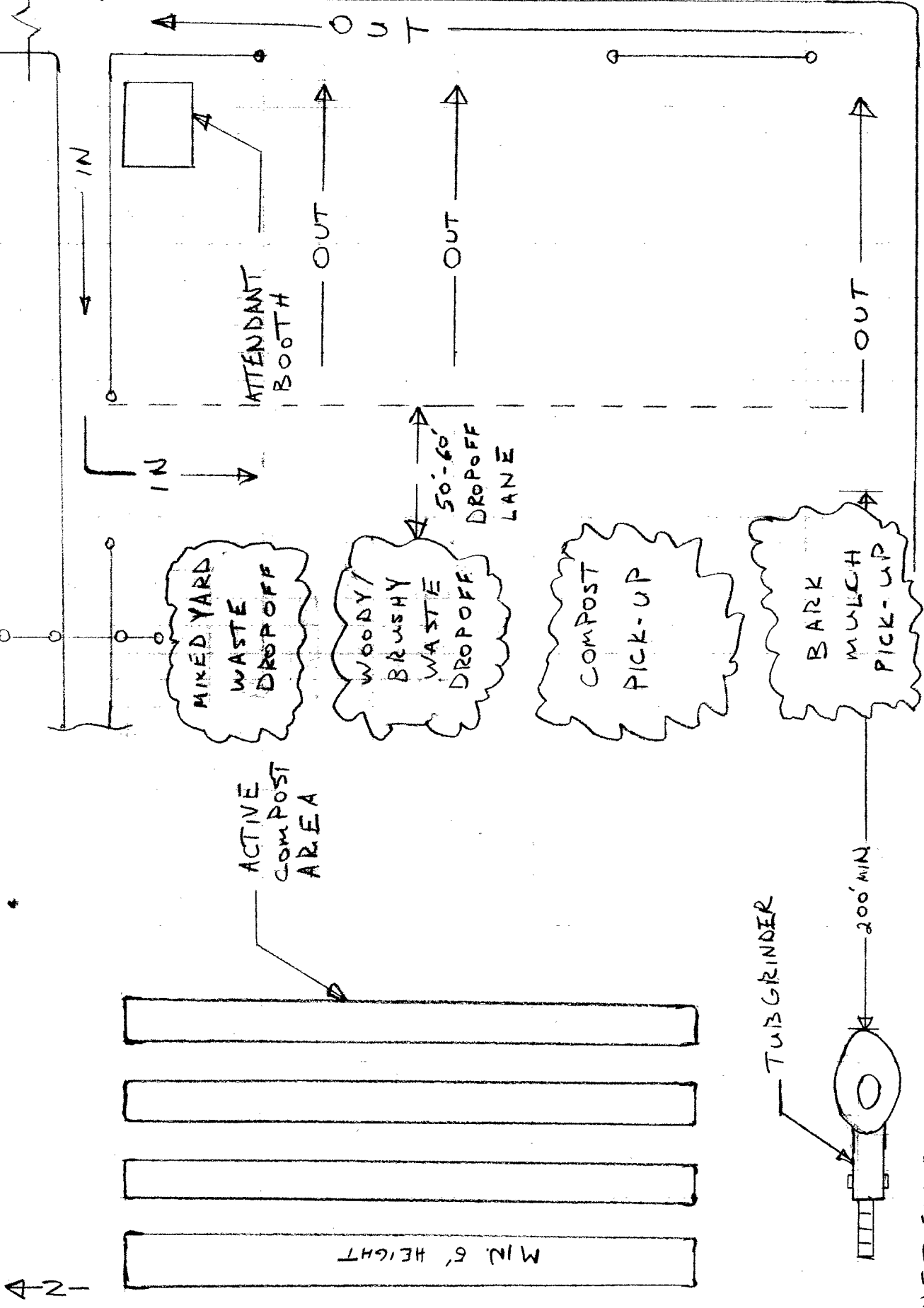


FIGURE 2

Configuration Option (by GF) For the Conway Road Compost Site

CONFIGURATION OPTION FOR THE CONWAY ROAD COMPOSTING SITE



NOT TO SCALE

APPENDIX

Appendix A – Site Photos (1-6)

APPENDIX

Appendix A - Site Photos



Photo 1: Mixed Yard Waste (prior to screening)



Photo 2: Windrowed Compost Piles (primarily leaves)



Photo 3: Front-end Loader



Photo 4: Tub Grinder



Photo 5: Landfill Gas Well Head



Photo 6: Brush pile and oversized wood waste

APPENDIX

Appendix B – Leaf Waste Quantity Estimate Back-up

Lower Paxton – Annual Leaf Waste Quantity Back-up (2006)

Fall Leaves (estimated at 8,620 CY)

21 rows (fresh leaves)

220 feet long

6 feet high

12 feet wide

$$A = 0.7 \times H \times W$$

$$V = A \times L$$

$$A = 0.7 \times 6 \times 12 = 50.4$$

$$V = 50.4 \times 220 = 11,088$$

$$11,088 \times 21 = 232,848/27 = 8,620$$

8,620 CY (material on-site from prior season/year)

Voluntary Curb Side Collection (estimate of 2,200 CY)

Assume 20 CY packer

Remember collection takes 2 weeks per month (no Saturdays)

April to June

$$M \ \& \ F \dots 2 \text{ loads/day} \times 12 \text{ days} = 24 \text{ loads} = 480 \text{ CY}$$

$$T, \ W \ \& \ Th \dots 1 \text{ load/day} \times 18 \text{ days} = 18 \text{ loads} = 360 \text{ CY}$$

July to September

$$M \ \& \ F \dots 3/4 \text{ load/day} \times 12 \text{ days} = 9 \text{ loads} = 180 \text{ CY}$$

$$T, \ W \ \& \ Th \dots 1/2 \text{ load/day} \times 18 \text{ days} = 9 \text{ loads} = 360 \text{ CY}$$

October to December

Same as April to June

Compost Site Drop Off (4,870 CY)

Woody Waste

Remember we are only open Tue, Thurs, and Sat.

$$\text{April to June} \dots 20'L \times 20'W \times 4'H /27 = 60 \text{ CY} \times 36 \text{ days} = 2160 \text{ CY}$$

$$\text{July to September} \dots 10'L \times 10'W \times 4'H /27 = 15 \text{ CY} \times 36 \text{ days} = 550 \text{ CY}$$

$$\text{October to December} \dots \text{same as April to June}$$

Leaf Waste (6,320 CY)

$$\text{April to June} \dots 30'L \times 20'W \times 2'H /27 = 111 \text{ CY} \times 36 \text{ days} = 1600 \text{ CY}$$

$$\text{July to September} \dots 15'L \times 15'W \times 2'H /27 = 20 \text{ CY} \times 36 \text{ days} = 720 \text{ CY}$$

$$\text{October to December} \dots 50'L \times 30'L \times 2' /27 = 111 \text{ CY} \times 36 \text{ days} = 4000 \text{ CY}$$

13,390 CY (incoming material during season)

ESTIMATED CURRENT ANNUAL TOTAL MATERIAL MANAGED ON SITE = 22,000 CY.

PADEP RECOMMENDED MAX LOADING RATE = 3,000 CY PER ACRE

MINIMUM SITE AREA TO CONTINUALLY MANAGE AND WINDROW MATERIAL = 7 acres

***the 7 acres does not account for parking area, traffic routes, finished material piles, equipment storage facilities, and other space requirements that may be necessary for safe and efficient compost site operations. A ten acre site could be a good baseline to consider for a site to manage and compost leaf and yard waste from the Township.**