



(Aug 31 2012)

To: Tony Gallagher  
NC DENR  
Fr: Dana Whitehair  
Bob Kornegay  
Foothills Connect Business & Technology Center  
Re: Level 3 Compost Demo Permit Issues  
Dt: 120703

As per Ms. Whetstone's June 28 e-mail, we are submitting the following responses:

1. Aerial photograph of site (See attached County GIS and Google Earth photos)
2. A letter of approval from Rutherford County will be forthcoming. We are providing them with support material for their review, though both Solid Waste Disposal Manager James Kilgo and County Landfill Engineer (consultant) David Garrett, P.E, have both been deeply involved in the planning of this project.
3. Leachate Control
  - a. Windrowed manure will be covered with plastic.
  - b. All manure-base compost production will take place indoors, either inside the compost center building (currently under construction) or within composting greenhouses (see attached material from New Alchemy, to which Project Manager Bob Kornegay contributed). *Please note the proposed use of a ventilation/fan system and bio-filter for control of odors (among other benefits).*
  - c. The entire project property design will be reviewed and monitored by the above-referenced County personnel. David Garrett, in particular, will be deeply involved in the final design and with any water/leachate runoff issues. We anticipate leachate "escapes" being minimal, if there are any at all.
4. Odor/Vermin Control
  - d. The site is a significant distance from any residence, particularly the areas designated to be used for composting

- e. The general area near the site is “home” to an animal shelter and landfill/transfer station with substantial solid waste disposal vehicles moving through each day. In relative terms, the Sustainable Agriculture Center will be producing significantly fewer odors than our neighboring operations.
- f. As noted above, the ventilation system being used within the composting greenhouses acts as a biofilter.
- g. Recycled food scraps delivered to the site will be processed on the same day they arrive. This will minimize “unprotected” exposure time.
- h. The building designed and being built to house composting operations is designed to deter vermin. If “critters” should become an issue, we will take corrective action consistent with the organic/sustainable living “culture” we’re attempting to maintain at the Center. We feel at least as strongly about preventing pests as DENR does.

#### 5. Placement of Worm Bins

All vermiculture operations will take place indoors, in covered areas.



# Vermicomposting Pilot Program Application

## Basis for Pilot Project

The Foothills Connect Business and Technology Center is a 501(c)(3) dedicated to rural economic development in economically devastated Rutherford County. In 2006, Foothills Connect was tasked with developing and cultivating entrepreneurs and creating jobs through the use of technology. By 2007, Foothills Connect had created the Farmers Fresh Market initiative ([www.farmersfreshmarket.org](http://www.farmersfreshmarket.org)), whereby local landholders, many with agricultural backgrounds, were encouraged to grow specialty crops in a sustainable, chemical-free, high-intensity fashion.

Since 2010, Foothills Connect has worked indirectly with Will Allen's Growing Power organization (Milwaukee, WI), exploring the viability of establishing a sustainable agriculture/permaculture/vermiculture center in Rutherford County. In addition, starting in 2011, Foothills Connect began collaborating with Bob Kornegay, a veteran of the original Mother Earth News Eco-Village and a widely-recognized authority on horticulture, organic gardening, indoor/outdoor growing systems, soil microbiology, hoop house design and construction, aquaponics, biodynamics, and permaculture science and application.

Synthesizing traditional, sustainable agriculture techniques with composting, permaculture, and vermiculture methodologies (as well as concepts and experience Kornegay's 40 years of experience with a wide variety of philosophies), Foothills Connect feels it is more prepared than ever to proceed with the establishment of a Compost/Vermicompost Pilot Program.

This program is part of a much larger effort involving three, grant-funded projects referred to as the Gas-To-Green initiative. This initiative includes:

- Capturing naturally-occurring methane from a closed County landfill to be utilized to generate electrical power for on-site purposes and to be fed back into the Duke Energy power grid. This project is being funded by the North Carolina Energy Office (with Rutherford County as the grantee, and Foothills Connect as the grant administrator)
- Designing and building a Sustainable Agriculture Center for education, training, agricultural production, compost production, and experimentation. The project involves the use of inexpensive, yet highly-functional hoop house-style greenhouses of varying designs and sizes (including the use of the Growing Power tilapia tank system); a variety of sustainable indoor and outdoor growing systems and philosophies; the on-site production and use of compost and vermicompost; establishing a center of learning for permaculture and green development activities. This project is being funded by The Rural Center.
- Developing state-of-the-art vermiculture/vermicomposting systems for on-site production, composting, greenhouse heating, education, and scientific

exploration. This project is being funded by the NC Department of Environment and Natural Resources (DENR).

- Supplemental funding for all three projects is made possible by The Stonecutter Foundation of Spindale, NC.

The basis of the methodologies being used is vermiculture and the use of worm compost and worm castings to dramatically intensify the output of plants.

### **Persons Involved**

Project Director: Dana E. Whitehair, Exec. Director, Foothills Connect Business & Technology Center

Site Manager: Bob Kornegay, Project Manager

Organization Location:

Foothills Connect Business and Technology Center  
146 N. Main St.  
Rutherfordton, NC 28139  
828-288-1650

Project Location:

514 Laurel Hill Dr.  
Rutherfordton, NC 28139

### **Waste Stream**

Foothills Connect is targeting waste streams of the pre- and post-consumer waste derived from restaurants, catering operations, and coffee shops. Various restaurants that are the customers of the Farmers Fresh Market Initiative. In addition, leaves from the City of Rutherfordton (and other sources) and sawdust from local lumber mills, will be used.

The composting operation will also be utilizing livestock manure (including, but not limited to, cattle, horse, chicken, goat, and alpaca) for use in producing heat and CO<sub>2</sub> in *at least* three composting greenhouses. Some of the manure compost will be used to feed a vermiculture bed in at least one separate greenhouse. The manure will **not** be used in the main vermiculture production center (to be described later in this narrative).

### **Methodology - Composting**

- These materials will be layered in containers made from six, used 4' x 4' wooden pallets lined with hardware cloth to prevent the intrusion of vermin, in a minimum mixture of two parts high carbon (i.e., leaves, branches, sawdust, woodchips, etc.) to one part high nitrogen (i.e., waste vegetables, grass clippings, spoiled fruit, alfalfa meal, cover crop residue, kudzu, etc.).

- Each receptacle will contain approximately 1500 pounds of compostable material and will be stacked two-high in a rain-proof building (see attached design) to prevent the infiltration of rainwater and the elimination of storm water issues. All waste food brought to the site will be composted immediately.
- It is estimated that over the course of the first year, 50 receptacles will be filled representing 75,000 pounds of waste, 50,000 of which will be from high carbon wood chip or saw dust material and 25,000 of which will be high nitrogen, vegetable waste material. Of this, it is estimated that at least 25,000 pounds of worm castings will be produced, for use in growing mini greens and sprouts, as well as part of the potting mix for veggie starts, rooted cutting of herbs, flowers, hanging baskets, and large vegetable containers.
- All exposed soil will be covered with a thick layer of wood chips, which will serve to prevent runoff from the site to adjacent properties. Sawdust used in the composting bin will come from a 35' covered trailer on site.
- The wood chips will be brought to the site from local sawmills as needed.
- The food waste will be picked up at regularly-schedule times in cooperation with SWEEP (the County's recycling organization) and local restaurants using multiple, securely-lidded containers. These full containers will be replaced on-the-spot by similarly-sized, clean containers. The food waste will be immediately layered with high carbon material in the 4' X 4' compost bins appropriately stored for six (6) weeks to three (3) months. The soiled containers will be cleaned at the vermicomposting site using soap and hot water.
- Once the food waste is on-site, it will be immediately layered and mixed with the high-carbon material within the pallet bins previously described. The bins will be stacked on-site where they will compost over the period(s) cited above, in a rain-proof shed.
- It is anticipated that at some point, there will be no more than sixty (60) active bins – plus two (2) 5' X 27' wedge-style beds – on-site. This will ultimately result in 99,000 lbs. of total waste...66,000 of which will be high carbon and 33,000 lbs. would be vegetable and other, previously-referenced high nitrogen waste. Of this, it is estimated that at least 33,000 pounds of worm castings will be produced.

### **Methodology - Vermicomposting**

- The worm depository will be built within a greenhouse *attached to the compost barn* for mutual benefit. Hot air from the top of the greenhouse will be blown through the static forced air 4X4 compost bins. The compost bins will supply heat for the entire structure and increase CO<sub>2</sub> levels for the greenhouse.
- Vermicompost will be processed illustrating four (4) methods.
  - o Two (2) 5' X 21' wedge beds
  - o Two (2) 4' X 20' stacked bins
  - o Four (4) 4' X 20' continuous feed examples

- Two (2) mechanical scrape & two (2) slat-style beds
- Each bed will have a growing bed built above, as well as hanging baskets overhead. The worms will be fed semi-composted material from pallet bins. All feed stock, in-process material, and end-product will be contained within the bins.
- Each bin will be processed with worms for approximately three to four months before harvesting the finished worm castings. The worms will be fed only semi-composted material in the worm bins. During the cool, winter months the worms – along with the 4' X 4' compost bins - will provide additional heat within the solar greenhouse. Conversely, in the heat of the summer months, the sides of greenhouse will be rolled up to provide air flow-through, in addition a shade cloth will be pulled over the greenhouse to keep temperatures in their ideal range that is suitable for worms.
- The finished worm castings will be harvested, screened, and separated from the undigested material. The undigested materials, worms, and bedding will be separated out and placed in a new bin. Castings will be used for the above-mentioned purposes (see “Methodology – Composting”).

### **Leachates**

- **Compost** - An alternative system will provide for leachate to be contained and absorbed with wood chips or sawdust (in pathways) and reintroduced into the system. Leachate will also be minimized through proper mixing of feedstocks and bulking material.
- **Vermicompost** - Leachate from worm bins will collect in a system under the bins similar to the tray under the composting bins (40 mil liner in a 4 foot wide wooden tray at 1” per 4’ pitch. This excess leachate will be captured in plastic containers located at the end of each bin row. This leachate will also be returned to the pallet composting bins (similar to above).

### **Schedule**

The project will last for a minimum of three years, however Foothills Connect and the property owner (Rutherford County) have executed a lease that covers four (4) years with an option for two, four (4) year renewals. The expected time frame to get usable castings from the project is approximately nine (9) months to a year. The project (in terms of being a pilot project) will last one (1) year.

### **Record Keeping**

Records will be kept of all data, including weight of food waste introduced each day; moisture content; and temperature of the compost beds. These will be logged in a database five days per week.

### **Testing**

(NOTE: Alison Davidson has stated that DENR will assist Foothills Connect with this process)

A waste analysis will be conducted by the North Carolina Department of Agriculture and Consumer Services. This analysis will be used to detect nutrients and heavy metals. A man-made inerts test will be performed by staff for contaminants. Samples will be taken and submitted to a private lab for pathogenic testing.

### **Product Use**

The final products will be used as growing mediums in hoop houses that will be erected over a three-year period at the Foothills Connect Sustainable Agriculture Center. The Center will serve as a education, training, commercial production, and experimentation resource for those interested in sustainable agriculture, gardening, permaculture, composting/vermicomposting, biodynamics, and agriculture-based entrepreneurship. High-value vegetable crops, culinary herbs, annual & perennial flowers, hanging baskets, and propagation of all the above, plus nursery and ornamental/edible landscaping crops will be the primary products. Eventually, it is hoped that excess compost will be offered for sale to the public.

### **End of Project**

A report will be completed and presented to the Department of Waste Management on the results of the project. Included in the report will be amount of waste added during the project in tons (nitrogen, carbon), amount of vermicompost produced, amount of vermicompost used, all vermicompost analysis data, and a comprehensive report on the success of the project.

# Rutherford Co, NC

Layers Apply Changes

Layers Legend

## Layers

- On Label Name
- Census Tracts
- City Limits
- Contours 20'
- County Boundary
- Draft Protected Mountain Ridges
- Firm Panels
- Flood Zone
- Hydrology
- Monuments
- Parcels
- Roads
- Sheet Index
- Soils
- Townships
- Watersheds
- Zoning



Buffer:  ft

## Parcels

**Tax PIN:** 1621020  
**GPIN:** 1529091626240000  
**Account No.:** 15008637  
**Owners Name1:** RUTHERFORD COUNTY  
**Owners Name2:**  
**Address1:** 289 N MAIN ST  
**Address2:**  
**City:** RUTHERFORDTON  
**State:** NC  
**Zip:** 28139  
**Property Address:** 578 LAUREL HILL DR  
**Acres:** 25.82  
**No. of Bldgs:** 0  
**Deed BK/Pg:** 642/273  
**Deed Date:** 12/4/1994  
**Land Value:** \$107,700  
**Bldg. Value:** \$0  
**Defr. Value:** \$0  
**Total Value:** \$107,700  
**Sale Price:** \$103,500  
**Neighborhood Code:** A31L  
**Neighborhood Desc.:** AVERAGE RURAL  
**Property Desc.:** LANDFIELD LAUREL HILL RD  
**Zoning:**  
**Map/Bk/Lot:** 97 1 4 M  
**Nbr Land Seg.:** 2  
**Stamps:** 207.00  
**Land Use:**



Imagery Date: 4/2/2011 1993

35°21'10.77" N 81°56'57.16" W elev 1022 ft

© 2012 Google

Google earth

Eye alt 6146 ft

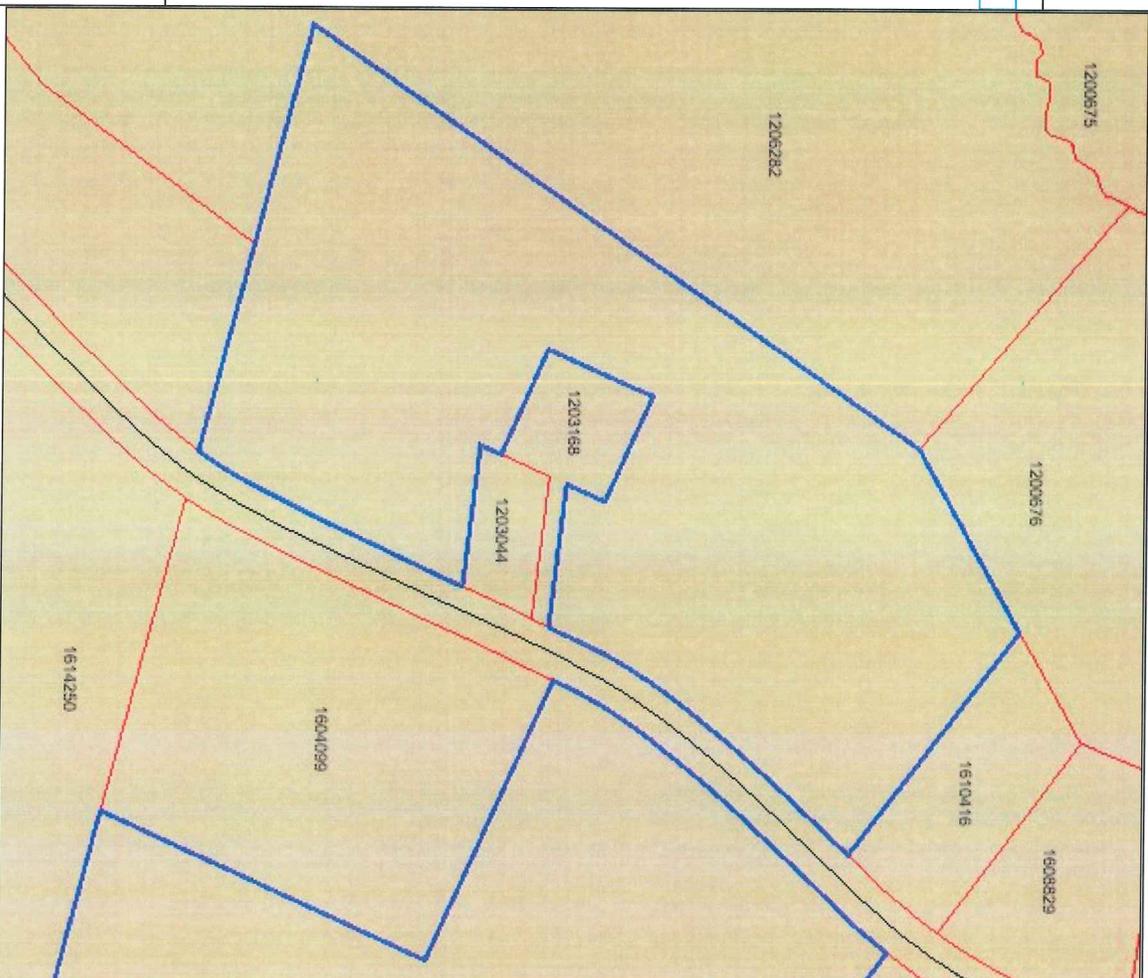
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### Identify Adjoining Parcels

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County Commissioners

Julius Owens, *Chairman*  
William Eckler, *Vice Chairman*  
Susan G. Crowe  
Eddie Holland  
Roger Richard



Carl Classen, *County Manager*  
Hazel S. Haynes, *Clerk to the Board*  
Richard Williams, *County Attorney*

# Rutherford County

July 20, 2012

Mr. Booker T. Pullen, Permit Engineer  
NCDENR, Division of Air Quality  
Air Permits Section  
1641 Mail Service Center  
Raleigh, NC 27699-1641



Re: Foothills Connect (Rutherford County) Level 3 Compost Demo Permit Request

Mr. Pullen,

Please accept this letter as an acknowledgment that Rutherford County has reviewed the material submitted by Foothills Connect to DENR regarding its request for a Level 3 Compost Demo permit and supports the application.

Foothills Connect has worked very closely with my office, the Rutherford County Solid Waste Department, and the County's Contract Landfill Engineer. Since County land and/or facilities are affected by the Sustainable Agriculture Center project (for which the Level 3 Permit is being sought), there is a firm commitment by both the County and Foothills Connect to continue our close collaboration.

If the County can provide any further information or answer any further questions, please don't hesitate to contact James Kilgo, Solid Waste Director at 828-287-6125.

Sincerely,

Carl Classen  
County Manager

Cc: James Kilgo, Solid Waste Director  
David Garrett, PE

State of North Carolina

County of Rutherford

I, Debra Lynn Conner, a Notary of the County and State aforesaid, do hereby certify that Carl Classen came before me this day and acknowledged that he is the County Manager of Rutherford County, and that he being authorized to do so, executed the foregoing letter on behalf of Rutherford County.

Witness my hand and official seal this the 20 day of July, 2012.

Debra Lynn Conner  
Notary Public

My commission expires August 24, 2015

