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Novozymes North America, Inc. Application for Construction of a NCDENR Large Type 3 Solid Waste Composting Facility



Prepared By:
Frank Franciosi
Composting Department Manager
Novozymes North America, Inc.
May 2004

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book



North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director

Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary

August 6, 2004

Mr. Frank Franciosi
Novozymes North America, Inc.
77 Perry Chapel Church Road
Franklinton, North Carolina 27525

Re: Novozymes North America, Inc – SWC Permit # 35-04
Located at 445 Old Smith Farm Road in Franklinton, NC
Franklin County

Dear Mr. Franciosi:

Enclosed is your permit to construct a Large, Type III Solid Waste Compost Facility in Franklin County. Please carefully read all permit conditions.

Mr. Ben Barnes, Waste Management Specialist, Raleigh Regional Office will be responsible for facility inspections. Mr. Barnes can be contacted at 919-571-4700. If you have questions, please feel free to contact me at 919-733-0692, extension 253.

Sincerely,

Ted Lyon, Supervisor
Composting & Land Application Branch

cc: Ben Barnes
Frank Franciosi, Engineer – Novozymes North America, Inc.
Solid Waste-Central Files

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Ted Lyon
NCDENR
Division of Waste Management
Solid Waste Section
PO Box 2687
Raleigh, NC 27611-7687

6/26/2004

Dear Ted,

Enclosed you will find four engineered sealed copies of Novozymes North America, Inc. application to construct a "Large Type 3 Solid Waste Composting Permit". Please note that I am waiting on a letter from NCDENR-Water Quality-Ground Water Section regarding the use and jurisdiction of the proposed site. I will forward this letter on to you as soon as I receive it.

I look forward to working with you on this project. If you have any questions regarding this application please give me a call.

Thanks for your cooperation.

Sincerely,

A handwritten signature in black ink, appearing to read "Frank Franciosi".

Frank Franciosi
Composting Department Manager
Office - 919-494-3489 Cell - 919-612-9975



Novozymes North America, Inc.
77 Perry Chapel Church Road
P.O. Box 576
Franklinton, North Carolina 27525

Application

APPLICATION for
CONSTRUCTION of a NCDENR
LARGE TYPE 3
SOLID WASTE
COMPOSTING FACILITY

Novozymes North America, Inc.

Prepared by
Frank Franciosi
Compost Department Manager

APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
DATE 8/2/04 BY JL



SECTION .1400 - SOLID WASTE COMPOST FACILITIES

This Solid Waste Section publication of rules in Section .1400 corrects typographical errors currently found in the North Carolina Administrative Code.

.1401 REQUIREMENT FOR PERMIT

(a) All persons whose purpose is or includes the production of compost from solid waste or solid waste co-composted with other wastes shall not construct, operate, expand or modify a facility until a currently valid permit for a solid waste compost facility is issued by the Division. This provision also applies to facilities that accept, store, or produce compost or mulch from yard waste or from residues from agricultural products and processing. General Provisions, siting, design, application, operational, distribution, and reporting requirements shall be in accordance with Rules .1402, .1403, .1404, .1405, .1406, .1407, and .1408 of this Section.

(a) Novozymes North America Inc. is currently operating under a demonstration permit for solid waste composting located at highway 56 East and Old Smith Farm Road in Franklinton, North Carolina. The physical address of the facility is 445 Old Smith Farm Road. A demonstration permit was issued by the Division of Solid Waste Management in April 2001. Since that time Novozymes has filed for a "Yard Waste Notification Permit" as an interim step to process and obtain wood feedstocks. This permit was granted on March 21, 2003. Novozymes North America Inc. intends to compost feedstocks generated from internal byproducts and surrounding solid waste sources. With the guidance of the North Carolina Department of Environment and Natural Resources, Novozymes North America Inc. is applying for a permit to construct and operate a Large, Type 3 composting facility in accordance with 15A NCAC13B .1400, Rules for Municipal Solid Waste Compost Facilities.

(b) Plans for a Large Type 3 or Type 4 Solid Waste Compost Facility Permit, or a permit for any facility located over a closed out disposal area shall be submitted in accordance with Rule .0202(a)(3) of this Subchapter. A minimum of four sets of plans shall be submitted within each application.

(b) Four sets of plans are included with this application.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29; Eff. December 1, 1991; Amended Eff. May 1, 1996.

.1402 GENERAL PROVISIONS FOR SOLID WASTE COMPOST FACILITIES

(a) Applicability. The provisions of this Rule apply to compost facilities that compost solid waste or co-compost solid waste with sludges that are not classified as a solid waste, functioning as a nutrient source. Facilities that co-compost with sewage sludge shall comply with all applicable federal regulations regarding sludge management at 40 CFR 501 and 503. 40 CFR 503, subpart B is hereby incorporated by reference, including subsequent amendments or additions. Copies of the Code of Federal Regulations may be obtained from the Solid Waste Section at 401 Oberlin Road, Suite 150, Raleigh, NC 27605 at no cost.

(a) Novozymes North America Inc. will compost wood wastes, agricultural wastes and residues from agricultural products and processing, including, but not necessarily limited to, cotton gin waste and tobacco dusts. We will also use food waste, residuals from drinking water treatment plants, new dry wall gypsum board scrap and on site bio mass residuals generated from industrial enzyme production to function as a nitrogen source.

(b) The provisions of this Section do not apply to compost facilities that compost sludge with municipal solid waste functioning only as a bulking agent.

(b) Non applicable under this permit application.

(c) Solid Waste Compost Facilities that have been permitted prior to the effective date of this Rule shall meet the requirements of this Section within one year of the effective date of this Rule, or, within two years if more than one hundred thousand dollars (\$100,000) of capital investment is necessary to comply with changes.

(c) Non applicable under this permit application.

(d) Solid waste compost produced outside the State of North Carolina and imported into the state shall comply with the requirements specified in Rule .1407 of this Section.

(d) Novozymes North America Inc. will ensure that the solid waste compost products it imports from outside North Carolina comply with the requirements specified in Rule .1407 of Section .1400.

(e) Compost that is disposed shall not count toward waste reduction goals.

(e) Non applicable under this permit application.

(f) Solid waste compost facilities shall be classified based on the types and amounts of materials to be composted.

(f) Novozymes North America Inc. requests this facility to be permitted as a Large, Type 3 Facility. The facility will receive more than 1000 yards of composting material per quarter. Wastes will be limited to those listed above under Rule .1402 (a). These include wood wastes, vegetative agricultural waste, and source separated specialty wastes such as residuals from drinking water treatment, new dry wall gypsum board scrap and biomass residuals from industrial enzyme production. These are strictly controlled to prevent the introduction of physical contaminants and pathogens.

(1) Type 1 facilities may receive yard and garden waste, silvicultural waste, untreated and unpainted wood waste or any combination thereof.

(2) Type 2 facilities may receive pre-consumer meat-free food processing waste, vegetative agricultural waste, source separated paper or other source separated specialty wastes, which are low in pathogens and physical contaminants. Waste acceptable for a Type 1 facility may be composted at a Type 2 facility.

(3) Type 3 facilities may receive manures and other agricultural waste, meat, post consumer-source separated food wastes and other source separated specialty wastes or any combination thereof that are relatively low in physical contaminants, but may have high levels of pathogens. Waste acceptable for a Type 1 or 2 facility may be composted at a Type 3 facility.

(4) Type 4 facilities may receive mixed municipal solid waste post collection separated or processed waste, industrial solid waste, non solid waste sludges functioning as a nutrient source or other similar compostable organic wastes or any combination thereof. Waste acceptable for a Type 1, 2 or 3 facility may be composted at a Type 4 facility.

(5) The listed waste types in Subparagraph (f)(2) of this Rule shall be considered to be low in pathogens and physical contaminants if handled so as to prevent development of contaminants or exposure to physical contamination. The listed waste types in Subparagraph (f)(3) of this Rule are likely to have high pathogens and low physical contamination. In determining whether a specific waste stream is acceptable for composting in a Type 2 or Type 3 facility, the Division shall consider the method of handling the waste prior to delivery to the facility as well as the physical characteristics of the waste. Testing for pathogens and physical contaminants may be required where a determination cannot be made based upon prior knowledge of the waste. Test methods shall be in accord with Appendices A and B to Table 3.

(6) Small facilities are those that receive less than 1000 cubic yards of material for composting per quarter, and occupy less than two acres of land, except that a Small Type 1 facility shall process or store less than 6,000 cubic yards of material per quarter.

(7) Large facilities are those that receive 1000 cubic yards or more of material for composting per quarter or occupy two acres or more of land, except that a Large Type 1 facility shall process or store more than 6,000 cubic yards of material per quarter.

(g) A permit is not required for the following operations:

(g) Non applicable under this permit application.

.1403 GENERAL PROHIBITIONS FOR SOLID WASTE COMPOST FACILITIES

(a) Neither hazardous waste nor asbestos containing waste shall be accepted at a facility or processed into compost.

(a) Neither hazardous waste nor asbestos containing waste will be received or processed at the facility.

(b) Household hazardous waste shall not be accepted by a facility, except in an area designated by facility site plans for storage, and shall not be processed into compost.

(b) Household hazardous waste will not be accepted at the facility.

(c) Any compost made from solid waste, which cannot be used pursuant to the requirements of this Rule, shall be reprocessed or disposed of pursuant to requirements of 15A NCAC 13B.

(c) Any compost made from solid waste that cannot be used pursuant to the requirements of the Section .1400 rules, shall be reprocessed or disposed of pursuant to the requirements of 15A NCAC 13B. All unusable material that cannot be reprocessed will be transported to a local permitted landfill for final disposal.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29; Eff. December 1, 1991; Amended Eff. May 1, 1996.

.1404 SITING/DESIGN REQUIREMENTS FOR SOLID WASTE COMPOST FACILITIES

(a) A site shall meet the following requirements at the time of initial permitting and shall continue to meet these requirements throughout the life of the permit only on the property owned or controlled by the applicant or by the landowner(s) at the time of permitting:

(a) This site meets the following requirements and information are located in the sections marked ' Site Specifics' and " Site Plans":

(1) A site located in a floodplain shall not restrict the flow of the 100-year flood; reduce the temporary storage capacity of the floodplain; or result in washout of solid waste so as to pose a hazard to human life, wildlife, land or water resources;

(1) The site is not located within a 100-year flood plain and will not result in a washout of solid waste that would pose a hazard to human life, wildlife, and land or water resources.

(2) A 100-foot minimum buffer is required between all property lines and compost areas for Type 3 and 4 facilities, 50-foot for Type 1 or 2 facilities;

(2) A 100 - foot buffer will be maintained between property lines and the compost area. The closest property line is located 1500 feet from the Composting Facility.

(1) A 500-foot minimum buffer is required between compost areas and residences or dwellings not owned and occupied by the permittee, except that Type 1 and Small Type 2 and 3 facilities shall have a 200-foot minimum buffer;

(3) A 500 - foot buffer shall be maintained between compost areas and residences or dwellings not owned and occupied by Novozymes North America Inc. Actual buffer is 1800 feet from nearest dwelling.

(2) A 100-foot minimum buffer is required between all wells and compost areas, except monitoring wells;

(4) No drinking water wells are currently located or are planned within 100 feet of the proposed compost area. The nearest existing well is located 1800 feet from the Compost Facility.

(3) A 50-foot minimum buffer is required between perennial streams/ivers and compost areas;

(5) No perennial streams / rivers are located within 50 feet of the composting area. The nearest stream is an unnamed tributary to Cedar Creek located 600 feet from the Composting Facility.

(4) A compost facility shall be located in accordance with 15A NCAC 2B .0200, Classification and Water Quality Standards Applicable to Surface Waters in North Carolina;

(6) The location and operation of the facility shall not contravene the water quality standards of 15A NCAC 2B .0200. Water quality standards are protected by facility design. In order to satisfy the requirements of the regulations a series of Best Management Practice's (BMP's) was developed and designed for the site. The first stage of treatment consists of a dry storm water detention pond whose primary purpose is to restrict the peak discharge of the 1-yr 24 hr storm to levels predicted for pre-development conditions. In addition the storm water detention system reduces Total Suspended Solids (TSS) loading and nitrogen loading from the stormwater as well as providing a system to remove any floatable material from the compost which might find its way into the stormwater system. The detention pond satisfies the requirements of State Stormwater Regulations for water supply water sheds, peak discharge from 1 year -24 hour from pre-development to post construction. The second stage of treatment within the system is a Level Spreader designed to provide diffuse flow of all storms up to and including the 10yr-24-hr storm. The conveyance channel on the upstream side of the level spreader provides for a portion of the peak discharge reduction. The level Spreader is 300 feet in length and discharges into a 50' wide grassed buffer with a maximum slope of 8% then into a forested area and finally into an existing ephemeral stream. The level spreader system satisfies the requirements of diffuse flow of Stormwater through buffers, Stormwater BMP's reduce TSS load by 85%, peak discharge form 1 year – 24 hour storm events, and net export of Nitrogen is limited to 10 lbs/acre/year with a buy-down of an additional 4 lbs/acre/year. A monitoring plan for this drainage system is addressed in the section marked "Site Specifics" of this application.

Specifics of stormwater treatment and leachate collection and storage systems:

Dry Storm Water Detention pond:

<u>Volume of sedimentation pond</u>	<u>9537 Cu ft</u>
<u>Total Volume of Detention components</u>	<u>12087 Cu Ft</u>
<u>(detention pond and conveyances)</u>	
<u>Max outflow to Level Spreader</u>	<u>19.9 cfs</u>
<u>Bottom Elevation</u>	<u>298 ft</u>
<u>Liner</u>	<u>none</u>

Level Spreader:

<u>Storage Volume of Conveyance system</u>	<u>2550 Cu ft</u>
<u>Length</u>	<u>300 ft</u>
<u>Material</u>	<u>Concrete</u>
<u>Elevation</u>	<u>297</u>
<u>Down-slope cover</u>	<u>Grass</u>
<u>Discharge slope</u>	<u>8% (max)</u>

Leachate Retention Pond:

<u>Volume of Retention Pond</u>	<u>15664 Cu ft</u>
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(5) All portions of any compost facility located over a closed-out disposal area shall be designed with a pad adequate to protect the disposal area cap from being disturbed, as defined in Part (a)(10)(E) of this Rule, and there shall be no runoff from the pad onto the cap or side slopes of the closed out area;

(5) Non applicable. The compost facility is not located over a closed-out disposal area.

(6) A 25-foot minimum distance is required between compost areas and swales or berms to allow for adequate access of fire fighting equipment;

(6) In order to allow fire fighting equipment access, a minimum of 25 feet shall be maintained between compost areas and all drainage ditches and berms.

(9) A site shall meet the following surface water requirements:

(9) The site meets the following surface water requirements:

(A) A site shall not cause a discharge of materials or fill materials into waters or wetlands of the state that is in violation of Section 404 of the Clean Water Act;

(A) Non applicable. There are no wetland areas present within the construction envelope of the compost facility. The Erosion Control Plan addresses the control of sediment during the construction phase of the site and shall not cause a discharge of materials or fill materials into waters or wetlands that would be in violation of Section 404 of the Clean Water Act.

(A) A site shall not cause a discharge of pollutants into waters of the state that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), under Section 402 of the Clean Water Act; and

(A) The site shall not cause a release of pollutants in violation of the NPDES requirements of Section 402 of the Clean Water Act. As described above in section (6).

(B) A site shall not cause non-point source pollution of waters of the state that violates assigned water quality standards;

(B) The site is designed and maintained to contain storm water and minimize the risk of any non-point source of pollution leaving the facility that could violate area water quality standards. As described above in section (6).

(10) A site shall meet the following groundwater requirements:

(10) The site meets the following groundwater requirements:

(A) A site shall not contravene groundwater standards as established under 15A NCAC 2L;

(A) Based on previous investigations a ground water contamination issue exists under certain areas of the field where the compost facility is located. This investigation is an ongoing process under the jurisdiction of NC Department of Environment and Natural Resource's-Division Water Quality-Ground Water Section. See enclosed letter from DWQ Ground

Water Section regarding this issue and the future use of this field as a composting facility.

The composting facility as designed shall not contravene the 15A NCAC 2L groundwater standards. Across the site, the depth to the seasonal high groundwater table ranges from 12 - 20 feet below original grade. Groundwater is protected from contamination by control of feedstock materials and separation of wastes from groundwater with a compost pad and leachate collection system consisting of 4 inches of compacted ABC stone, filter fabric, 6 inches of number 67 stone, filter fabric, 40 mil HDPE liner installed on a compacted clay surface. The clay surface is derived from native clays with low permeability. The details of the pad and leachate collection system are enclosed in the section marked "Site Plans" of this application". Feedstocks are limited to those previously identified in Section .1402 (a). Leachate will be collected from the leachate collection system in the stone layer above the HDPE membrane. This leachate will be monitored for water quality. The volume of water will be periodically pumped to be use as moisture addition to new compost batch mixes or transferred to Novozymes existing waste water treatment system.

(B) Portions of a site used for waste receipt and storage, active composting, and curing shall have a soil texture finer than loamy sand and the depth to the seasonal high water table shall be maintained at least 12 inches for a Type 1 or 2 facility and 24 inches for a Type 3 facility, unless a pad is provided;

(B) The site has been investigated by a licensed soil scientist. The soil evaluation was conducted down to a depth of four feet. This report can be found in this application under the section marked "Soil Data".

(C) A pad shall be provided for portions of a Type 4 facility used for waste receiving and storage, active composting, and curing;

(C) Non applicable under this permit application.

(D) A pad is not required for storage of finished product that is dried so as to pass the Paint Filter Liquids Test (EPA Method 9095), and for which the storage area is prepared

in such a manner that water does not collect around the base of the stored material, and where the depth to the seasonal high water table is maintained at least 12 inches; and

(D) Not applicable. The finished compost product will pass the EPA Paint Filter Liquids Test. Finished product will be stored on a compacted stone pad. This storage area will be maintained to prevent the collection of water. The Compost Storage Area will slope to the retention pond for collection of surface runoff.

(E) The linear coefficient of permeability of pads required in accordance with this Rule shall not be greater than 1×10^{-7} centimeters per second. If natural soils are used, the liner must be at least 18 inches thick.

(E) Not applicable for a Type 3 Facility. However a pad will be constructed as described above. The purpose of this pad is to maintain an all weather surface for operating composting equipment.

(b) For Subparagraphs (a)(2) through (a)(4) and Part (a)(10)(B) of this Rule, (dependent upon waste type, facility design, and regional topography) alternative minimum buffers or requirements may be increased if deemed necessary by the Division in order to protect public health and the environment or to prevent the creation of a nuisance.

(b) Not applicable. No alternative buffers or other requirements are requested.

(c) A site shall meet the following design requirements:

(c) The site meets the following design requirements:

(1) A site shall not allow uncontrolled public access;

(1) The site does not allow uncontrolled public access. Vehicle access is prevented by the use of natural buffers, berms surrounding the site and chain linked fenced with locked gates placed at the entrance.

(2) A site shall meet the requirements of the Sedimentation Pollution Control Law (15A NCAC 4);

(2) The site has been designed in accordance with 15A NCAC 4, the requirements of the Sedimentation Pollution Control Law. A Sedimentation and Erosion Control Plan has been submitted to NCDENR Division of Land Resources.

(3) A site shall meet the requirements of the Air Pollution Control Requirements (15A NCAC 2D) to minimize fugitive emissions and odors; and

(3) The site complies with the Air Pollution Control Requirements at 15A NCAC 2D. Fugitive dust is controlled by the use of overhead water sprinklers and or by water wagon. Dust and odors will be monitored and controlled by maintaining good management practices.

(4) A site shall be designed to minimize odors at the property boundary.

(4) The site is designed to minimize odors at the facility boundary by using setbacks, natural buffers, berms and existing vegetation. Under our demonstration permit we did not generate any objectionable odors and under normal operating conditions, odors are detectable only within a few feet of the composting windrows.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29; Eff. December 1, 1991; Amended Eff. May 1, 1996.

.1405 APPLICATION REQUIREMENTS FOR SOLID WASTE COMPOST FACILITIES

(a) The following information is required for an application for a permit to construct and operate a proposed Type 1, or a Small Type 2 or 3 solid waste compost facility; unless the permitting requirements are exempted by Paragraph (g) of Rule .1402 of this Section:

(a) Not applicable for a Large, Type 3 Facility. Go to section (b).

(b) The following information is required for an application for a permit to construct a proposed Large Type 2 or 3 or a Type 4 solid waste compost facility:

(b) The following information is submitted for this proposed Large, Type 3 facility:

(1) An aerial photograph or scaled drawing, where one inch is less than or equal to 400 feet, accurately showing the area within one-fourth of the mile of the proposed site's boundaries with the following specifically identified:

(1) Enclosed under the section marked "Site Plans", is an aerial photograph scaled at one inch equals 300 feet showing the area within one-fourth mile of the site boundaries and identifying the following requirements:

(A) Entire property owned or leased by the person proposing the site;

(A) Novozymes, North America Inc. owns the composting facility land and surrounding land.

(B) Location of all homes, wells, industrial buildings, public or private utilities and roads, watercourses, dry runs, and other applicable information regarding the general topography within one-fourth mile; and

(B) Location of all homes, wells, industrial buildings, public or private utilities and roads, watercourses, dry runs, and the general topography.

(C) Land use and zoning of the proposed site.

(C) The site is zoned as HI "Heavy Industrial"

(2) A letter from the unit of government having zoning jurisdiction over the site which states that the proposed use is allowed within the existing zoning, if any, and that any necessary zoning approval or permit has been obtained.

(2) Under the section marked "Site Specifics" the enclosed zoning permit issued by the Franklin County Planning Department, stating that the proposed project complies with local zoning ordinances.

(3) An explanation of how the site complies with siting and design standards in Rule .1404 of this Section.

(3) The siting and design standards are shown on the enclosed "Site Plan" section and are described in the discussion under Section .1404 above.

(4) A detailed report indicating the following:

(4) Waste type, soils and seasonable high water table information is as follows:

(A) Waste type(s), source and quantity of the solid waste to be composted, including the source and expected quantity of any bulking agent or amendment (if applicable), any expected recycle of bulking agent or compost, and any seasonal variations in the solid waste type or quantity;

(A) Composted feedstock materials include the following:

<i>Waste Type</i>	<i>Specific</i>	<i>Source</i>	<i>Processed Tons/Year</i>
<i>Wood Waste</i>	<i>Sawdust, pallets, non-treated non-painted wood waste, green waste, and or yard waste</i>	<i>Various manufacturers</i>	<i>30,000 – 35,000</i>
<i>Bio Mass Residuals</i>	<i>Enzyme production residuals</i>	<i>Novozymes NA</i>	<i>5,000 -25,000</i>
<i>Agricultural Residuals</i>	<i>Cotton mote, tobacco dusts, and field crop residuals.</i>	<i>Various local farms</i>	<i>5,000 – 10,000</i>
<i>Drinking Water Residuals</i>	<i>Iron and alum residuals</i>	<i>Various municipalities</i>	<i>5,000 –20,000</i>
<i>Drywall gypsum</i>	<i>New construction waste</i>	<i>Homebuilders</i>	<i>10,000 – 10,000</i>
<i>Food Waste</i>	<i>Pre and post consumer</i>	<i>Produce and super markets, and cafeterias</i>	<i>10,000 –10,000</i>
<i>Totals</i>			<i>65,000 – 110,000</i>

(B) For facilities which utilize natural soils as a pad, a soil evaluation of the site conducted by a soil scientist down to a depth of four feet or to bedrock or evidence of a seasonal high water table, to evaluate all chemical and physical soil properties and depth of the seasonal high water table.

(B) A detailed evaluation of the sites soil is provided under the section marked "Soil Data".

(5) Site plans at a scale where one inch is less than or equal to 100 feet to the inch that delineates the following:

(5) Under the section marked "Site Plans" the following information is provided:

(A) Existing and proposed contours, at intervals appropriate to the topography;

(A) Existing and proposed contours,

(B) Location and elevations of dikes, trenches, and other water control devices and structures for the diversion and controlled removal of surface water;

(B) Location of dikes, trenches, and other water control devices for surface water control,

(C) Designated setbacks, buffer zones and property lines;

(C) Designated setbacks, buffer zones and property lines,

(D) Proposed utilities and structures;

(D) Proposed utilities and structures,

(E) Access roads, details on traffic patterns;

(E) Access roads, and details on traffic flow and patterns;

(F) Areas for unloading, processing, active composting, curing, and storage of material;

(F) Areas for unloading, processing, active composting, curing, and storage,

(G) Areas for unloading, processing, and storing recyclables, household hazardous waste, and other materials, where applicable;

(G) Recycling containers and a dumpster will be provided for the recycling or disposal of all solid waste other than the compostable materials identified in this application and noted so on the site plan. Household hazardous waste will not be accepted at this facility.

(H) Proposed surface and groundwater monitoring locations;

(H) Surface water monitoring is explained in the "Storm Water & Leachate Monitoring Plan" located in the section marked "Site Specifics". Ground water monitoring locations are marked on the aerial photograph located the section marked "Site Plans".

(I) Flood plains and wetlands; and

(I) The site does not fall within a 100 - year flood plain.

(J) Benchmarks.

(J) A survey benchmark is identified on the Site Plans.

(6) A description of the operation of the facility, which must include at a minimum:

(6) Facility operation:

(A) Name, address and phone number for the person responsible for the operation of the facility;

(A) The persons responsible for facility operation are:

Frank Franciosi

Steve Stadelman

Randy Green

Clayton Norton

Novozymes North America Inc.

PO Box 576

77 Perry Chapel Church Road

Franklinton, North Carolina 27525

(919) 494-3000

(B) Operation plan for the facility;

(B) The enclosed "Operations and Maintenance Manual" serves as the operational plan for this facility and is located in the "Appendix" of this application.

(C) List of personnel required and the responsibilities of each position;

(C) The facility is to be operated by three persons until additional volume dictates the need for additional labor. The operators will be responsible for monitoring and recording temperatures, supervising unloading operations, recording all material entering and leaving the facility, operating the equipment to aerate the compost windrows and recording those events. The Manager will provide oversight and are responsible for regulatory compliance. Job descriptions are provided in the O&M Manual of this application. If the need arises additional staffing can be supported by NZNA Environmental Operations Department.

(D) A schedule for operation, including days and hours that the facility will be open, preparations before opening, and procedures to be followed after closing for the day;

(D) The site will be open for operation from 8:00 AM to 5:00 PM Monday through Friday. At times hours will be extended for the purpose of receiving wastes only. All putrescible wastes will be turned into the compost windrows by the end of the workday or will be stored in under cover, and or in sealed and covered roll-off containers. Precautions will be taken to minimize any problems with odors and vectors. All other carbon wastes such as wood wastes will be stored un-covered, on site and managed to minimize the generation of dusts. All equipment and entrance gate shall be secured at the end of each operating day.

(E) For mixed waste processing facilities, a plan for removing and disposal of household hazardous waste from the waste stream;

(E) No mixed wastes are to be received at the facility. The facility will not accept household hazardous waste. Dumpsters or waste bins shall be provided for disposal of any solid wastes that are not identified in this permit application as a material to be composted.

(F) Special precautions or procedures for operating during wind, heavy rain, snow, freezing or other adverse conditions;

(F) Heavy equipment operations will not be conducted during periods of heavy wind, rain, snow, or ice. Other operations will be conducted during these periods if the tasks can be performed safely. The improved pad surface provides the advantage of safe movement of equipment since this well compacted material does not become as slick or muddy as earthen materials. Novozymes NA is prepared to halt all operations if inclement weather conditions persist. Any damage to the

pad area caused by these weather conditions will be repaired before returning the facility to operation.

(G) A description of actions to be taken to minimize noise, vectors, air borne particulates, and odors; and

(G) The berm siting and native landscape are to be the primary noise abatement methods. Berms and trees will also control air movement across the site to contain odors and minimize airborne pollutants. Under normal operating conditions, odors are detectable only within a few feet of the active compost windrows. Vectors and odors will be managed by careful monitoring of feedstocks, monitoring temperatures and maintaining an appropriate turning schedule and good management practices.

(H) A description of the ultimate use for the finished compost, method for removal from the site, and a contingency plan for disposal or alternative usage of residues or finished compost that cannot be used in the expected manner due to poor quality or change in market conditions.

(H) The end product will be blended with other organic and inorganic materials, as appropriate to make horticultural substrates. Mixed substrates may include Sand, Pine Bark, Vermiculite, Perlite, or Peat Moss. The materials will leave the site via truck to be delivered bulk to the end users. All compost produced will be marketed or beneficially used on Novozymes NA projects. By carefully controlling the input feedstocks, the compost process, and final product quality we will eliminate production waste requiring disposal. All off spec compost will be remixed with new feedstock windrows. In the unlikely event that composted material cannot be sold, used, or remixed, the excess material will be disposed of in a permitted landfill.

(7) A report on the design of the facility, including:

(7) This information is located under the sections marked "Process Flow" and "Site Plans":

(A) Design capacity of the facility;

(A) The information is located under the section marked "Process Flow".

(B) A process flow diagram of the entire facility, including the type, size, and location of all major equipment, and feed stock flow streams. The flow streams shall indicate the quantity of material on a wet weight and volumetric basis;

(B) The information is located under the section marked "Process Flow".

(C) A description and sizing of the storage facilities for amendment, bulking agent, solid waste, recyclables, household hazardous waste and finished compost;

(C) The information is located under the section marked "Process Flow".

(D) The means for measuring, shredding, mixing, and proportioning input materials;

(D) The information is located under the section marked "Process Flow".

(E) Anticipated process duration, including receiving, preparation, composting, curing, and distribution;

(E) Process duration of receiving preparation, composting, and curing will take approximately 60 to 120 days. Distribution is market driven and highly dependent on market conditions, with spring and fall being high demand times of the year. Distribution may occur immediately after curing is complete or the finished product will be stored after completion of the production cycle.

(F) The separation, processing, storage, and ultimate disposal of non-compostable materials, if applicable;

(F) A dumpster is provided for non-compostable non-recyclable materials. These are so noted on site plan. A contract hauler for ultimate disposal in a local permitted landfill handles these materials.

(G) A description of the location of all temperature, air and any other type of monitoring points, and the frequency of monitoring;

(G) Compost pile temperatures will be monitored three times per week and recorded on Monday, Wednesday and Friday. Each windrow will be monitored every sixty feet along the length of the windrow. Oxygen

levels will be monitored with an oxygen analyzer weekly. Moisture will also be monitored weekly as well as Windrow Turning Frequency.

(H) A description of how the temperature control and monitoring equipment will demonstrate that the facility meets the requirements in Rule .1406 Items (10), (11), or (12) of this Section, as appropriate for the feedstock;

(H) Windrow temperatures will be monitored and recorded three times each week by using a thermometer with a 3 ft. shank. The composting process shall qualify as a Process to Further Reduce Pathogens by the windrow composting method as specified in Rule .1406 (12) (A). A temperature of at least 131 degrees F shall be maintained in the windrow for a minimum of 15 days. During this high temperature period, the windrow shall be turned at least five times.

(I) The method of aeration, including turning frequency or mechanical aeration equipment and aeration capacity;

(I) Windrows shall be turned to provide aeration at least five times during the high temperature period. A compost turner and/or a front-end loaders will turn windrows mechanically. Our goal is to maintain aerobic conditions within the windrow pile. Turning frequency may increase as the need arises to control temperature, odor, or vectors.

(J) A description of the air emission and control technologies;

(J) Non applicable under this type of composting method.

(K) A description of the method to control surface water run-off; and the method to control, collect, treat, and dispose of leachate generated; and

(K). The location and operation of the facility shall not contravene the water quality standards of 15A NCAC 2B .0200. Water quality standards are protected by facility design. In order to satisfy the requirements of the regulations a series of BMP's was developed and designed for the site. The first stage of treatment consists of a dry storm water detention pond whose primary purpose is to restrict the peak discharge of the 1-yr 24 hr storm to levels predicted for pre-development conditions. In addition the detention system reduces TSS loading and nitrogen loading from the stormwater as well as providing a system to remove any floatable material from the compost which

might find its way into the stormwater system. The storm water detention pond satisfies the requirements of State Stormwater regulations for water supply water sheds, peak discharge from 1 year – 24 hour from pre-development to post construction. The second stage of treatment within the system is a Level Spreader designed to provide diffuse flow of all storms up to and including the 10yr-24-hr storm. The conveyance channel on the upstream side of the level spreader provides for a portion of the peak discharge reduction. The level Spreader is 300 feet in length and discharges into a 50' wide grassed buffer with a maximum slope of 8% then into a forested area and finally into an existing ephemeral stream. The level spreader system satisfies the requirements of diffuse flow of Stormwater through buffers, Stormwater BMP's reduce TSS load by 85%, peak discharge form 1 year – 24 hour storm events, and net export of Nitrogen is limited to 10 lbs/acre/year with a buy-down of an additional 4 lbs/acre/year. Due to concerns over long term effects of infiltration of leachate water into groundwater a leachate collection system has been designed to intercept any rainfall infiltrating the surface layer. The compost pad area consists of 4 inches of compacted ABC stone, filter fabric, 6 inches of number 67 stone, filter fabric, 40 mil HDPE liner and compacted clay. Lateral PVC collection pipes intercept leachate at the 40 mil liner and leachate gravity flows to a lined collection pond. The details of the pad and leachate collection system are enclosed in the section marked "Site Plans". Current stormwater regulations do not place any additional restrictions on the water draining into this system. However, Novozymes will temporarily store all leachate water and monitor it. This water will be periodically pumped to the existing waste water treatment lagoon. A monitoring plan for this drainage system is addressed in the section marked "Site Specifics" of this application. A 40 mil HDPE liner will also be placed in the retention pond to prevent infiltration. The volume of water will be periodically pumped to be use as moisture addition to new compost batch mixes or transferred to Novozymes existing waste water treatment system. (See enclosed letter from NCDENR DWQ Storm Water Section in the section marked "Site Specifics of this application)

Specifics of stormwater treatment and drainage collection and storage systems:

Dry Stormwater Detention pond:

<u>Volume of sedimentation pond</u>	<u>9537 Cu ft</u>
<u>Total Volume of Detention components</u>	<u>12087 Cu Ft</u>

(detention pond and conveyances)

<u>Max outflow to Level Spreader</u>	<u>19.9 cfs</u>
<u>Bottom Elevation</u>	<u>298 ft</u>
<u>Liner</u>	<u>none</u>

Level Spreader:

<u>Storage Volume of Conveyance system</u>	<u>2550 Cu ft</u>
<u>Length</u>	<u>300 ft</u>
<u>Material</u>	<u>Concrete</u>
<u>Elevation</u>	<u>297</u>
<u>Down-slope cover</u>	<u>Grass</u>
<u>Discharge slope</u>	<u>8% (max)</u>

Leachate Retention Pond:

<u>Volume of Retention Pond</u>	<u>15664 Cu ft</u>
<u>Liner</u>	<u>40 mil HDPE</u>

(L) A description of any recycling or other material handling processes used at the facility.

(L) Recycling bins for metal, glass, paper, and plastic will be provided.

(8) A description of the label or other information source that meets the requirements of Rule .1407(k) of this Section.

(8) Since this Section does not include a rule listed as .1407(k), we believe that the correct reference should be Rule .1407 (g). In accordance with Rule .1407 (g), finished compost products will be labeled. An information sheet will be provided to new customers on product use. This will contain information on classification grade, recommended uses, application rates, restrictions on usage, and total nitrogen. Copies of product labels and information sheets are enclosed in the "Appendix" section of this application.

(9) Engineering plans and specifications for the facility, including manufacturer's performance data for all equipment selected.

(9) Engineering plans and manufacturers equipment specifications for all selected equipment are enclosed in the "Process Flow" section of this application.

(c) The following information is required for reviewing an application for a

permit to operate a Type 4 or Large Type 2 or 3 solid waste composting facility:

(c) As a Large, Type 3 facility, the following information is submitted:

(1) Contingency plans detailing corrective or remedial action to be taken in the event of equipment breakdown; air pollution; non-conforming waste delivered to the facility; spills, and undesirable conditions such as fires, particulates, noise, vectors, odors, and unusual traffic conditions;

(1) Contingency plans are contained in the enclosed Operation and Maintenance Manual.

(2) A detailed operation and maintenance manual. The manual must contain general design information, a discussion of compliance with operational requirements as outlined in Rule .1406 of this Section, detailed operational information and instruction, equipment maintenance, list of personnel, required personnel training, outline of reports to be submitted in compliance with this Section, and safety instructions;

(2) The Operation and Maintenance Manual is enclosed in the Appendix.

(3) A quality assurance plan for the process and final product which lists the procedures used in inspecting incoming materials; monitoring, sampling and analyzing the compost process and final product, testing schedule, and record keeping requirements;

(3) Quality of the product starts with the monitoring of feedstocks. Temperature monitoring supported with laboratory analyses will determine the end point of the composting process and assure product consistency. Daily, weekly, monthly, quarterly, and annual monitoring is detailed in the Operation and Maintenance Manual. An annual report will be completed and filed with the NCDENR by August 1 of each year.

(4) A fact sheet and process flow diagram that summarizes actual equipment sizing, aeration capacity, detention times, storage capacity, and flow rates (wet weight and volumetric) for the system and equipment chosen;

(4) This is included in the section marked "Process Flow".

(5) As-built drawings;

(5) Certified "as-built" drawings will be provided at the end of construction.

(6) A copy of all applicable local, state, and federal permits and approvals

necessary for the proper operation of the facility; and

(6) The local letter of approval is enclosed under the section marked "Site Specifics", all other applicable letters have been included in the appendix.

(7) Product marketing and distribution plan.

(7) Novozymes plans to produce a "Grade A" compost product. Targeted clients for bulk sales include Soil and Mulch Brokers, Landscaping Contractors, Nurseries, Golf Courses, and grading Contractors. A detailed plan for marketing and distribution is provided in the Appendix.

(d) An application for a permit modification shall be required for changes in facility ownership, an increase in facility capacity, or the addition of new feedstock materials.

(d) Non applicable under this application at this time. Any changes in ownership, capacity and or feedstock materials will follow the procedures for permit modification.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29; Eff. December 1, 1991; Amended Eff. May 1, 1996.

.1406 OPERATIONAL REQUIREMENTS FOR SOLID WASTE COMPOST FACILITIES

Any person who maintains or operates a solid waste compost facility shall maintain and operate the site to conform with the following practices:

(1) Plan and Permit Requirements:

(1) Plan and permit requirements:

(A) Construction plans and conditions of permit shall be followed; and

(A) Novozymes North America Inc. shall follow the construction plans as approved with the permit and all conditions of the permit.

(B) A copy of the permit, plans, and operational reports shall be maintained on site at all times.

(B) Novozymes North America Inc. shall maintain a copy of the permit, plans, and operational reports on-site at all times.

(2) Adequate erosion control measures shall be practiced to prevent on-site erosion and to control the movement of soil or contaminants from the site.

(2) The site will be constructed and operated in accordance with the approved Sedimentation and Erosion Control Plan (copy enclosed).

(3) Surface water shall be diverted from the operational, compost curing, and storage areas.

(3) All surface water from runoff and facility operations is routed away from the operational, composting, curing, and storage areas to the storm water retention pond. The site grading will be maintained so as to prevent ponding of any excess water prior to reaching the storm water retention pond.

(4) Leachate shall be contained on site treated to meet the standards of the off-site disposal method.

(4) Leachate collected from the leachate collection system will be monitored for volume and water quality. The volume of water will be periodically pumped to be use as moisture addition to new compost batch mixes or transferred to Novozymes existing waste water treatment system.

(5) Access and Security Requirements:

(5) Access and Security Requirements:

(A) Large sites shall be secured by means of gates, chains, berms, fences, or other security measures demonstrated to provide equivalent protection approved by the Division, to prevent unauthorized entry.

(A) As a Large site, it is secured by the addition of berms and fencing surrounding the facility to prevent vehicular access other than at the designated entrance roads. All entrance roads are supplied with a gate, which is closed and locked during non-operational hours.

(B) An operator shall be on duty at the site at all times while the facility is open for public use to ensure compliance with operational requirements and access to such facilities shall be controlled.

(B) The facility is not open for public use. Novozymes North America Inc. personnel are on-site during normal business hours.

(C) The access road to the site shall be of all-weather construction and maintained in good condition.

(C) All access roads to and within the site are constructed of compacted stone. All roads meet or exceed the performance standards of roads covered with a six-inch layer of ABC stone. Novozymes North America Inc. is responsible for maintaining all roads in good operating condition.

(6) A site shall only accept those solid wastes that it is permitted to receive.

(6) The site shall receive only those waste materials identified in this application and approved by the permit. The site shall not receive hazardous waste, household hazardous waste, asbestos containing waste, medical waste, or painted/treated wood.

(7) Safety Requirements:

(7) Safety Requirements:

(A) Open burning of solid waste is prohibited.

(A) There shall be no burning of solid wastes at the site.

(B) Equipment shall be provided to control accidental fires and arrangements made with the local fire protection agency to immediately provide fire-fighting services when needed.

(B) Fire hoses and fire extinguishers are provided on-site for initial control of accidental fires. The local fire department has been notified of our operation and is available for response if needed. See enclosed letter in the section marked "Site Specifics".

(C) Personnel training shall be provided to insure that all employees are trained in site-specific safety, remedial, and corrective action procedures.

(C) Site specific safety, remedial, and corrective action training is provided by in-house expertise to all Novozymes personnel.

(8) Sign Requirements:

(B) A sample copy of the facility's signage is enclosed under the section marked "Site Specifics".

(A) Signs providing information on waste that can be received, dumping procedures, the hours during which the site is open for public use, the permit number and other pertinent information shall be posted at the site entrance.

(A) Signage providing information on hours of operation, permit number, waste which can be received, procedures, and the permit number. The location of this sign is noted on the site plan.

(B) Traffic signs/markers shall be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.

(B) A traffic sign shall be posted the entrance to the composting area.

(C) Signs shall be posted stating that no hazardous waste, asbestos containing waste, or medical waste can be received at the site.

(C) At the entrance area, signage shall include a statement to the effect that this facility does not accept hazardous waste, asbestos containing waste, or medical waste.

(9) Monitoring Requirements:

(9) Monitoring Requirements:

(A) Specified monitoring and reporting requirements shall be met.

(A) The monitoring and reporting requirements specified in the permit and the Section .1400 Rules shall be met.

(B) The temperature of all compost produced shall be monitored sufficiently to ensure that the pathogen reduction criteria is met.

(B) The temperature of windrowed compost shall be monitored and recorded three times per week and every sixty feet of windrow length. Temperature monitoring and recording will ensure the PFRP of feedstocks.

(10) Compost process at Type 1 facilities shall be maintained at or above 55 degrees Celsius (131 degrees F) 3 days and aerated to maintain elevated temperatures.

(10) Not applicable under this method of composting.

(11) Types 2, 3 and 4 facilities shall maintain the compost process at a temperature above 40 degrees Celsius (104 degrees F) for 14 days or longer and the average temperature for that time shall be higher than 45 degrees Celsius (113 degrees F) or, Types 2, 3 and 4 facilities shall meet the vector attraction reduction requirements in 40 CFR 503.33(b)(4) or (7). Requirements of 40 CFR 503.33(b)(4) and (7) are hereby incorporated by reference, including any subsequent amendments or additions.

(11) By complying with the windrow composting method requirements of Rule .1406 (12) (A), the operation of this facility will exceed the requirements of this Rule .1406 (11).

(12) The composting process shall qualify as a process to further reduce pathogens for all Type 3 and Type 4 facilities. The following are acceptable methods:

(12) The composting process qualifies as Process to Further Reduce Pathogens by incorporating the windrow composting method.

(A) The windrow composting method, in which the following requirements apply: Aerobic conditions shall be maintained during the compost process. A temperature of 131 degrees F (55 degrees Celsius) or greater shall be maintained in the windrow for at least 15 days. During the high temperature period, the windrow shall be turned at least five times.

(A) Temperatures shall be monitored and recorded three times per week to ensure a minimum temperature of 131 degrees F is maintained for at least 15 days during the high temperature period, the windrow shall be turned at least five times.

(B) The static aerated pile composting method, in which the following requirements apply: Aerobic conditions shall be maintained during the compost process. The temperature of the compost pile shall be maintained at 131 degrees F (55 degrees Celsius) or greater for at least three days.

(B) Non applicable under this method of composting.

(C) The within-vessel composting method, in which the temperature in the compost piles shall be maintained at a minimal temperature of 131 degrees F (55 degrees Celsius) for at least three days.

(C) Non applicable under this method of composting.

(13) Nitrogen bearing wastes shall be incorporated as necessary to minimize odor and the migration of nutrients.

(13) Nitrogen bearing wastes shall be incorporated to the windrows as necessary to control odor and the migration of nutrients. In cases of poor weather conditions this type of waste will be store on covered concrete pad area or in sealed covered roll-off containers.

(14) Miscellaneous Requirements:

(14) Miscellaneous Requirements:

(A) The finished compost shall meet the classification and distribution requirements outlined in Rule .1407 of this Section.

(A) Finished compost shall be subjected to laboratory analyses to ensure compliance with the classification and distribution requirements of Rule .1407.

(B) The quality of the final product shall determine the allowable uses as outlined in Rule .1407 of this Section.

(B) The final product shall be used per the quality requirements of Rule .1407.

(C) The final product shall be approved by the Solid Waste Section as outlined in Rule .1407 Subparagraph (6)(b) of this Section.

(C) Lab results of the feedstocks and final product from the demonstration permit are enclosed. These are located under the section marked "Laboratory Data". We believe this submittal satisfies the requirements of this rule. Note that the Solid Waste Section for approval under Rule .1407 (6) (b) of the Section as it appeared prior to the June 1, 1996 amendments. The language for this requirement now appears at Rule .1407 (e) instead of .1407 (6) (b) as referenced in this rule.

(i) Non-compostable solid waste and unacceptable compost shall be disposed in a solid waste management facility

permitted to receive the particular type of waste under 15A NCAC 13B.

(i) A dumpster and / or trash bins are supplied for non-compostable solid wastes. A contract hauler for disposal at a permitted landfill shall transport these wastes.

(ii) The amount of compost stored at the facility shall not exceed the designed storage capacity.

(ii) As discussed in the Operation and Maintenance Manual, the amount of compost stored at the facility shall not exceed the designed storage capacity. If storage capacity exceeds the site design additional storage will be constructed to meet permit requirements.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29.

Eff. December 1, 1991; Amended Eff. June 1, 1996.

.1407 CLASSIFICATION/DISTRIBUTION OF SOLID WASTE COMPOST PRODUCTS

(a) Compost shall not be applied to the land or sold or given away if the concentration of any metal exceeds the concentration in 40 CFR 503.13(b)(3) [See Table 1 below], unless the concentration of all metals are less than the values in 40 CFR 503.13(b)(1) and records are maintained to show compliance with the cumulative and annual metal levels in 40 CFR 503.13(b)(2) and (4).

(a) It is the intention of Novozymes North America Inc. to produce a compost material, which qualifies for unlimited and unrestricted distribution. All compost produced shall qualify as Grade A by meeting the metals limitations listed in Table 1 of Rule .1407 (a), with less than 6% by dry weight of man made inerts in Table 2, and meeting the PFRP standards for pathogen reduction.

Table 1

Metals	Concentration (mg per kg)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	36
Zinc	2800

(b) Solid waste compost shall be classified based on Table 2:

Table 2

Grade	Manmade inerts % dry wt.of inerts	Pathogen Reduction	Metal Concentration
A	#6	PFRP	Table 1
B	>6	NA	40CFR 503.13(b) (1)

(c) Man made inerts shall not exceed 1 inch in size.

(a) Distribution of the defined grades shall be as follows:

(1) Grade A compost shall have unlimited, unrestricted distribution. This product may be distributed directly to the public;

(2) Grade B compost shall be restricted to distribution for land and mine reclamation, silviculture, and agriculture (on non-food chain crops) projects; and

(3) Compost or mulch that is produced at a Type 1 facility and that contains minimal pathogenic organisms, is free from offensive odor, and contains no sharp particles that would cause injury to persons handling the compost, shall have unrestricted applications and distributions if directions are provided with the compost product.

(e) Solid waste compost products may not be distributed or marketed until the permittee has provided adequate test data to the Division as outlined in Rule .1408 of this Section. Within 30 days of receipt of the test data, the Division

shall approve or deny the distribution and marketing of the product based upon the compost classification and distribution scheme. As long as the test data required in Rule .1408 of this Section continues to verify that compost is produced to the specifications of this Rule, the Division's approval to distribute the compost shall be ongoing.

(e) Test data is provided on the demonstration project in this application. Additional test data will be provided to comply with this rule as soon as finished product is available for testing.

(f) The applicant is responsible for meeting any applicable requirements of the North Carolina Department of Agriculture, Fertilizer Section concerning the distribution of this product.

(f) Novozymes will meet all applicable requirements of the NCDA Fertilizer Section prior to distribution of the finished product.

(g) If the owner intends to distribute the product, the owner shall provide instructions to the user on any restrictions on use and recommended safe uses and application rates. The following information shall be provided on a label or an information sheet and a copy of the label or information sheet shall be submitted to the Solid Waste Section:

- (1) Classification grade as outlined in Paragraph (d) of this Rule;
- (2) Recommended uses;
- (3) Application rates;
- (4) Restrictions on usage; and
- (5) Total N (for products containing sludge).

(g) The label or information sheet is enclosed under the section marked "Laboratory Data".

History Note: Authority G.S. 130A-309.11; Eff. December 1, 1991; Amended Eff. June 1, 1996.

.1408 METHODS FOR TESTING AND REPORTING REQUIREMENTS

(a) The compost product from Type 2, 3, and 4 facilities shall be sampled and analyzed as follows:

(a) As a Type 3 facility, the compost shall be sampled and analyzed as follows:

(1) A composite sample of the compost produced at each compost facility shall be analyzed at intervals of every 20,000 tons of compost produced or every six months, whichever comes first, for test parameters for each Type of facility as designated in Table 3 of this Rule. Standard methods equivalent to those in Table 3 may be approved by the Division.

(1) A composite sample of the compost shall be analyzed a minimum of every six months or every 20,000 tons of processed material, whichever comes first. We will use the US Composting Council's Standard Testing of Assurance Programs method of sampling. This sampling protocol is outlined in the Appendix. The compost product shall be analyzed per the parameters outlined in Table 3 of this Rule .1408 (a) (1) as amended to date.

Table 3

Parameter	Unit	Facility	Test Method
Foreign Matter	%	All	See Subparagraph (d) of this Rule
Arsenic	mg/kg dry wt.	Type 4	
Cadmium	mg/kg dry wt.	All	
Chromium	mg/kg dry wt.	Type 4	
Copper	mg/kg dry wt.	All	
Lead	mg/kg dry wt.	All	
Mercury	mg/kg dry wt.	Type 4	
Nickel	mg/kg dry wt.	All	
Selenium	mg/kg dry wt.	Type 4	
Zinc	mg/kg dry wt.	All	
Pathogens	See Appendix B	All	See Appendix B
Total N	%	See*	Kjeldahl

* Total N required for products containing sludge subject to 40 CFR 503.

The parameters listed in Table 3 of this Rule may also be determined by methods accepted by the North Carolina Department of Agriculture.

(2) Sample collection, preservation, and analysis shall assure valid and representative results pursuant to a Division-approved quality

assurance plan. At least three individual samples (of equal volume) shall be taken from each batch produced in separate areas along the side of the batch. Each sampling point shall be at a depth of two to six feet into the pile from the outside surface of the pile. Samples that have been analyzed for metals shall be composited and accumulated over a six month period or at intervals of every 20,000 tons of product produced, whichever comes first. Any sample collected for testing for pathogens and nutrients shall be a representative composite sample of the compost and shall be processed within a period of time required by the testing procedure.

(2) Sample collection, preservation and analysis shall assure valid and representative results pursuant to a Division approved quality assurance plan. Individual samples (of equal volume) shall be taken from each windrow produced in separate areas along the side of each windrow every sixty feet. Each sampling point shall be at a depth of two to four feet into the windrow from the outside surface of the windrow. These samples will be mixed and one composite sample will be submitted for testing. Samples tested for metals shall be accumulated over a minimum six-month period or every 20,000 tons whichever comes first. Samples collected for pathogens and nutrients shall be representative and composite samples and shall be processed within the time limit required by the testing procedure.

(3) Compost containing sewage sludge shall be tested in accordance with 40 CFR 503, Subpart B.

(3) Not applicable for this facility.

(4) The Division may decrease or increase the parameters to be analyzed or the frequency of analysis based upon monitoring data, changes in the waste stream or processing, or information regarding the potential for presence of toxic substances that are not on the list of monitoring parameters.

(4) This program of sampling and analysis is subject to review and amendment by the Division.

(5) Foreign matter content shall be determined by passing a dried, weighed sample of the compost product through a one-quarter inch screen. EPA Method 160.3 shall be used to dry the sample. The material remaining on the screen shall be visually inspected, and the foreign matter that can be clearly identified shall be separated and weighed. The weight of the separated foreign matter divided by

the weight of the total sample shall be determined and multiplied by 100. This shall be the percent dry weight of the foreign matter content.

(5) Foreign matter content shall be determined by the method detailed in Rule .1408 (a) (5).

(b) Record Keeping: All facility owners or operators shall record and maintain records for a minimum of five years. Records shall be available for inspection by Division personnel during normal business hours and shall be sent to the Division upon request:

(b) Record Keeping: Novozymes North America Inc. shall record and maintain all records listed below for a minimum of five years. Records shall be available for inspection by Division personnel during normal business hours and shall be sent to the Division upon request. The following records shall be maintained:

(1) Daily operational records must be maintained, which include, at a minimum, temperature data (length of the composting period) and quantity of material processed;

(1) Daily operational records including temperature data, date, and quantity of material processed,

(2) Analytical results on compost testing;

(2) Analytical results on compost testing,

(3) The quantity, type and source of waste received;

(3) The quantity, type, and source of waste received,

(4) The quantity and type of waste processed into compost;

(4) The quantity and type of waste processed into compost,

(5) The quantity and type of compost produced by product classification; and

(5) The quantity and type of compost produced by product classification, and

(6) The quantity and type of compost removed for use or disposal, by product classification, and the market or permitted disposal facility.

(6) The quantity and type of compost removed for use or disposal, by product classification, and the market or permitted disposal facility.

(c) Annual Reporting: An annual report for the period July 1 to June 30 shall be submitted by all facility owners or operators to the Division by August 1, 1996 and every August 1 thereafter and shall contain:

(c) Annual Reporting: An annual report for the period of July 1 to June 30 shall be submitted to the Division by August 1 of each year containing:

(1) The facility name, address and permit number;

(1) The facility name, address, and permit number,

(2) The total quantity in tons, with sludge values expressed in dry weight, and type of waste received at the facility during the year covered by the report, including tons of waste received from local governments of origin;

(2) The total quantity in tons, with sludge values expressed in dry weight, and type of waste received at the facility during the year covered by the report, including tons of waste received from local governments of origin,

(3) The total quantity in tons, with sludge values expressed in dry weight, and type of waste processed into compost during the year covered by the report;

(3) The total quantity in tons, with residual values expressed in dry weight and type of waste processed into compost during the year covered by the report,

(4) The total quantity in tons and type of compost produced at the facility, by product classification, during the year covered by the report;

(4) The total quantity in tons and type of compost produced at the facility by product classification during the year covered by the report,

(5) The total quantity in tons and type of compost removed for use or disposal from the facility, by product classification,

along with a general description of the market if for use during the year covered by the report;

(5) The total quantity in tons and type of compost removed for use or disposal from the facility, by product classification, along with a general description of the market if for use during the year covered by the report,

(6) Monthly temperature monitoring to support Rule .1406 of this Section; and

(6) Condensed monthly temperature monitoring to support Rule .1406 (12) (A),

(7) Results of tests required in Table 3 of this Rule.

(7) Results of tests required in Table 3 of Rule .1408 (a) (1).

(d) Yearly totals of solid waste received and composted shall be reported back to the local government of origin for annual recycling reporting.

(d) Condensed yearly totals of received and composted materials shall be reported back to the local government of origin for annual recycling reporting.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29;

Eff. December 1, 1991; Amended Eff. June 1, 1996.

.1409 APPROVAL OF ALTERNATIVE PROCEDURES AND REQUIREMENTS

(a) An owner or operator of a composting facility, subject to the provisions of this Rule, may request in writing the approval of an alternative procedure for the facility or the compost that is produced. The following information shall be submitted to the Solid Waste Section:

(a) Novozymes North America Inc. is not at this time requesting approval for any alternative procedures or requirements.

(1) The specific facility for which the exception is requested;

(2) The specific provisions of this Section for which the exception is requested;

(3) The basis for the exception;

(4) The alternate procedure or requirement for which the approval is sought and a demonstration that the alternate procedure or requirement provides equivalent protection of the public health and the environment; and

(5) A demonstration of the effectiveness of the proposed alternate procedure.

(b) An individual may request in writing the approval of a solid waste composting pilot or demonstration project for the purpose of evaluating the feasibility of such a project. The following information shall be submitted to the Solid Waste Section:

(1) The owner, operator, location, and contact numbers for the project;

(2) The specific primary waste stream for which the project is to be evaluated;

(3) The specific time frame for the project;

(4) The estimated amount of each type of waste or bulking material to be composted;

(5) The basis for running the pilot or demonstration project;

(6) A description of all testing procedures to be used;

(7) A description of the process to be used, including the method of composting and details of the method of aeration;

(8) The expected final usage or disposal of the final product; and

(9) An outline of the final report to be submitted to the Solid Waste Section upon completion of the project.

(c) For Paragraph (a) of this Rule, the Division will review alternative procedures only to the extent that adequate staffing is available.

(d) Permits shall not be required for primary and secondary school educational projects that take place on the school grounds and that receive less than one cubic yard of material per week.

History Note: Authority G.S. 130A-294; 130A-309.03; 130A-309.11; 130A-309.29; Eff. December 1, 1991; Eff. April 18, 1996; Amended Eff. June 1, 1996.

Site Specifics





Novozymes Composting Facility



Legend

- floodplain
- parcels
- creeks
- roads

DATE: 11/23/2002



Franklin County Zoning Permit



FRANKLIN COUNTY

Franklin County, North Carolina

Planning Department

215 E Nash Street, Louisburg, North Carolina 27549

496-2909

Zoning Permit Number: 5922

ADDRESS: 445 OLD SMITH FARM ROAD

PARCEL NO.: 1874-88-9840

ZONING: H I

SUBDIVISION:

ISSUED TO: **NOVO NORDISK BIOCHEM INC**
P O BOX 576
FRANKLINTON NC 27525

SETBACK: FRONT: 75 RIGHT: 25 LEFT: 25 REAR: 75

COUNTY WATER: N/A FLOODPLAIN: N/A

PERMIT TYPE: **ZONING PERMIT**

DETAILS: **RESEARCH FACILITY (COMPOST & MULCH)**

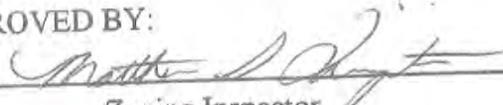
PERMIT DATE: 11/22/2002 WATERSHED IV

FEE: \$0.00 TOWNSHIP EXPIRE DATE: 05/22/2003

It is hereby certified that the above use as shown on the plats and plans submitted with the application conforms with all applicable provisions of the Franklin County Zoning Ordinance. The issuance of this Permit does not allow the violation of Franklin County Zoning Ordinances or other governing Regulations.

The applicant is responsible for obtaining a building permit (if required) prior to commencing work on the proposed improvement. A final zoning inspection must be scheduled by the applicant.

APPROVED BY:



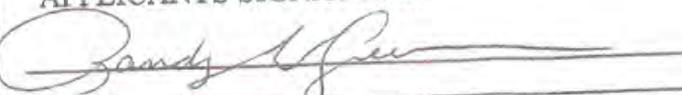
Zoning Inspector

DATE:

11/22/2002

I hereby certify that all information I have provided to the Planning Department is true and accurate.

APPLICANTS SIGNATURE:



COUNTY OF FRANKLIN
ENVIRONMENT HEALTH APPLICATION (496-8100)

Permit #: 5524

Permit Type: SEPTIC PERMIT

Date Issued: 10/19/2001

Project Address: , FRANKLINTON, NC

Location:

Lot #:

Subdivision:

Size #: 587.830

Applicant: NOVO NORDISK BIOCHEM INC
P O BOX 576
FRANKLINTON NC 27525

Phone:

Contractor:

Phone:

Proposed Use: MODULAR OFFICE

Work:

Desc: 1874-88.9840

Bldg Cost: \$0	Fees Due: \$175.00	Date Paid: 10/19/2001
Zoned: H I	Setbacks Front: 75	Rear 75 Side 25
Tax record: 6976	Pin #: 1874-88-9840	Parcel #: F06 04 020
Township: FRANKLINTO	Public Water/Sewer: PRIVATE	ST Road #:
Special Conditions/Property Owner: NOVO NORDISK		
# of bedrooms:	# of people:	Approved for Issuance by:
I certify that all the statements made in this application and any attached documents are true, complete and correct to the best of my knowledge and belief and are made in good faith. I understand that false information may be grounds for rejection of this application. Authorized county representatives are granted right of entry to make evaluations or inspections and to release information upon public request.		

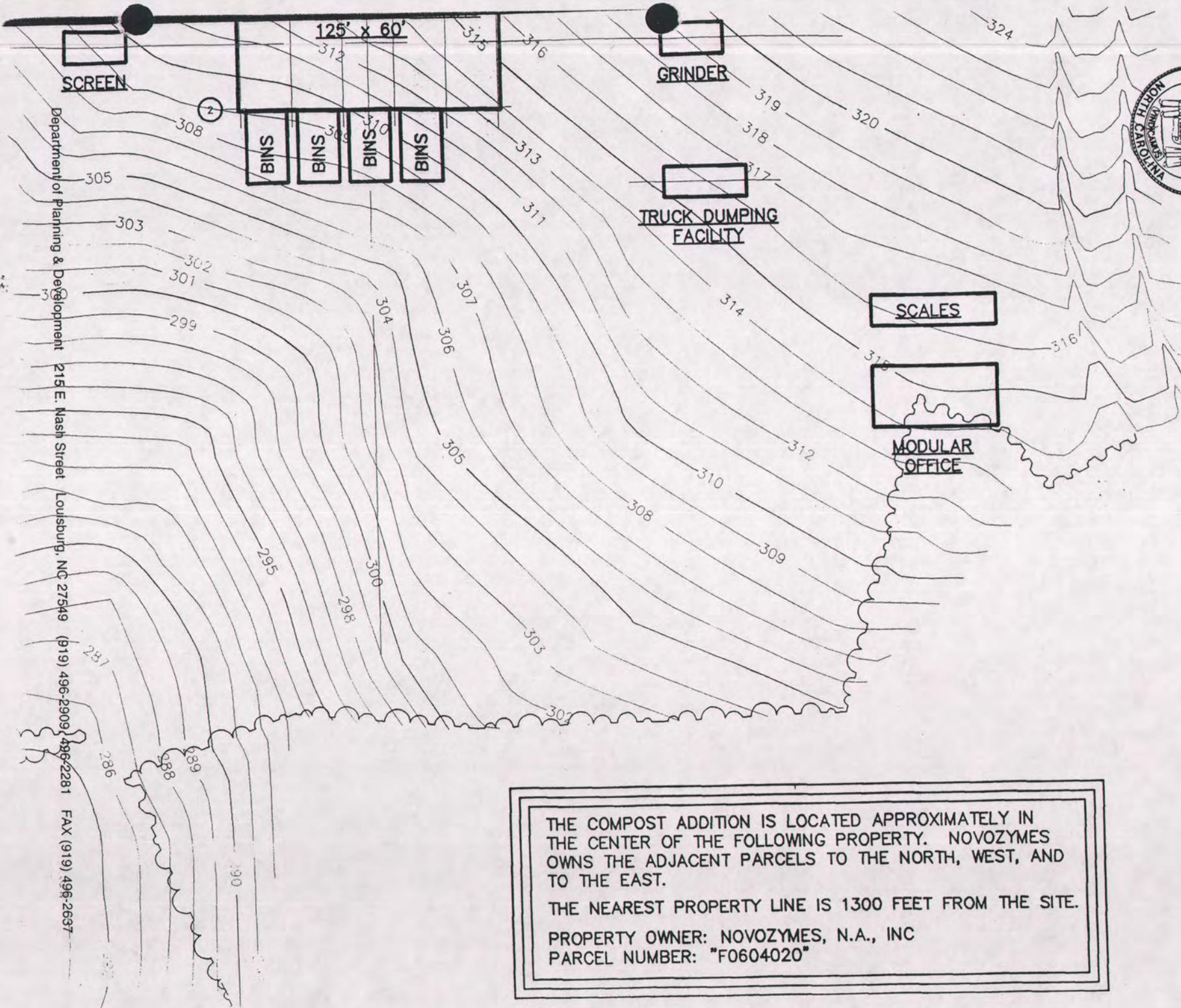
Call Environment Health (496-8100) between 8:00 AM and 9:00 AM Monday thru Friday to schedule an appointment with the environment health specialist to evaluate your lot. He/She will show you where to locate the well and septic system, in relation to the desired dwelling location and any property lines. If approved, an improvements permit will be issued. After the septic tank has been installed and approved, the Sanitarian will issue a certification of completion.

Bandy W. Greer
(Signature of Contractor, Authorized Agent or Owner)

10/19/01
Date



County of Franklin



THE COMPOST ADDITION IS LOCATED APPROXIMATELY IN THE CENTER OF THE FOLLOWING PROPERTY. NOVOZYMES OWNS THE ADJACENT PARCELS TO THE NORTH, WEST, AND TO THE EAST.

THE NEAREST PROPERTY LINE IS 1300 FEET FROM THE SITE.

PROPERTY OWNER: NOVOZYMES, N.A., INC
PARCEL NUMBER: "F0604020"

Department of Planning & Development 215 E. Nash Street Louisburg, NC 27549 (919) 496-2909 / 496-2281 FAX (919) 496-2637

Mitchiners Crossroads Fire Department
2964 West River Road
Franklinton, North Carolina 27525

5-21-2002

Mr. Randy W. Green
Environmental Operations
Novozymes

Dear Randy,

Thank you for advising us of the composting facility coming to Old Smith Farm Road –
Novo farm # 3. We will be glad to work with you for any fire protection issue you may
have.

If I can be of any assistance please call me at 919-664-5603.

Sincerely,



Al Pruitt
Fire Chief

SAMPLE SIGNAGE



Manufactured by **novozymes** 

Composting & Mulch Facility

Permit #SWC-XX-XX

Hours of Operation
Monday- Friday
8:00AM-5:00PM

Compost Mulch Special Blends

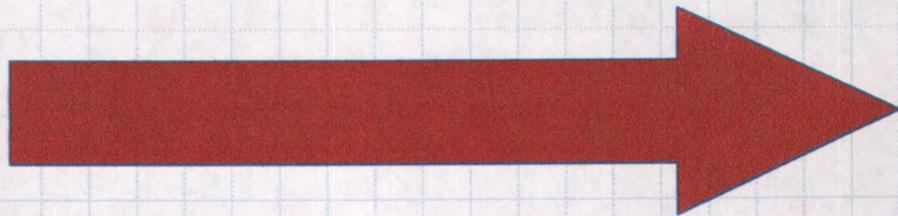
All visitors must check in
at the office. Please follow
the signs

This facility does not accept the following wastes:
hazardous waste
asbestos containing waste
medical waste
treated or painted wood

SAMPLE SIGNAGE



Composting & Mulch
Facility
Office & Scales



Stormwater
&
Leachate Monitoring Plan

State of North Carolina
Department of Environment
and Natural Resources
Division of Water Quality

Michael F. Easley, Governor
William G. Ross Jr., Secretary
Alan W. Klimek, P.E., Director



September 19, 2003

Mr. Frank Franciosi
Novozymes North America, Inc.
77 Perry Chapel Church Road
P.O. Box 576
Franklinton, NC 2752

Subject: Composting Facility's Stormwater Permitting
Franklin County

Dear Mr. Franciosi:

This letter is in response to your letter requesting direction for your proposed composting facility's stormwater permitting. A review of the provided materials shows that the drainage from the compost facilities and detention pond will be diffused through a level spreader. Since this type of discharge is designed to produce sheet flow rather than a point source discharge it is not subject to stormwater permitting at this time.

If after the system is installed the level spreader does not work properly and does indeed produce a channelized, point source, flow it will become subject to stormwater permitting regulations.

Not requiring a stormwater permit does not preclude the site from requiring any other water permits. Leachate that will be draining from the windrows is considered a wastewater which may require permitting under the nondischarge permit since there will be no point source discharge. For more information about obtaining a nondischarge permit contact Mr. Kim Colson at (919) 733-5083, ext. 540.

If you have any questions concerning this matter please contact me at
(919) 733-5083, ext. 578.

Sincerely,

Aisha H. Lau
Environmental Engineer

cc: Raleigh Regional Office
Stormwater and General Permits Unit
Central Files

SEP 29 2003

STORMWATER & LEACHATE MONITORING PLAN FOR
 NOVOZYMES NORTH AMERICA, INC. COMPOSTING FACILITY
 FRANKLINTON, NC

The monitoring plan described below is based on the monitoring requirements of an individual permit to discharge stormwater. Novozymes chooses to monitor stormwater discharge and leachate as part of our in house environmental monitoring program. A stormwater discharge outfall (SDO) is a location downstream of the stormwater treatment system. Since the stormwater treatment system "discharges" into a grassed filter it may be difficult to collect a sample at a location of concentrated flow. By design a level spreader and filter system provides diffuse flow not concentrated flow. Whenever possible, grab samples shall be collected downstream of the filter strip a distance of at least 50 distance from the level spreader. In addition to the sample collection at the downstream of the filter system a grab sample should be collected at the outlet of the stormwater detention pond and the leachate retention pond.

ANALYTICAL MONITORING REQUIREMENTS

Analytical monitoring of stormwater discharges shall be performed as specified below in Table 1.

All analytical monitoring shall be performed during a representative storm event. The required monitoring will result in a minimum of 4 analytical samplings being conducted over the term of the term of one year at each stormwater discharge outfall (SDO). Novozymes Inc. shall complete the minimum 4 analytical samplings per year in accordance with the schedule specified below in Table 2.

Table 1. Analytical Monitoring Requirements

Discharge Characteristics	Units	Measurement Frequency ¹	Sample Type ²	Sample Location ³
Total Nitrogen (TN)	mg/l	Quarterly	Grab	SDO
Total Phosphorous (TP)	mg/l	Quarterly	Grab	SDO
Total Rainfall ⁴	inches	Quarterly	-	-
Event Duration ⁴	minutes	Quarterly	-	-
Total Flow ⁴	MG	Quarterly	-	SDO

Footnotes:

- 1 Measurement Frequency: Once per quarter during each year. A year is defined as the 12 month period beginning on the month and day of completion of the Composting facility. See Table 2 for schedule of monitoring periods.
- 2 If the stormwater runoff is controlled by a stormwater detention pond, a grab sample of the discharge from the pond shall be collected within the first 30 minutes of discharge. If the detention pond discharges only in response to a storm event exceeding a ten year design storm, then no analytical monitoring is required and only qualitative monitoring shall be performed.
- 3 Sample Location: Samples shall be collected at each stormwater discharge outfall (SDO) unless representative outfall status has been granted. Sample will also be collected at the leachate retention pond.
- 4 For each sampled representative storm event the total precipitation, storm duration, and total flow must be monitored. Total flow shall be either; (a) measured continuously, (b) calculated based on the amount of area draining to the outfall, the amount of built-upon (impervious) area, and the total amount of rainfall, or (c) estimated by the measurement of flow at 20 minute intervals during the rainfall event.

Table 2 Monitoring schedule

Monitoring period	Sample Number	Start	End
1 st quarter	1	June 1, 2004	August 31, 2004
2 nd quarter	2	September 1, 2004	November 30, 2004
3 rd quarter	3	December 1, 2004	February 28, 2005
4 th quarter	4	March 1, 2005	May 31, 2005

QUALITATIVE MONITORING REQUIREMENTS

Qualitative monitoring requires a visual inspection of each stormwater outfall regardless of representative outfall status and shall be performed as specified below in Table 3. Qualitative monitoring is for the purpose of evaluating the effectiveness of the Stormwater Pollution Prevention Plan (SPPP) and assessing new sources of stormwater pollution. No analytical tests are required. Qualitative monitoring of stormwater outfalls does not need to be performed during a representative storm event.

In the event an atypical condition is noted at a stormwater discharge outfall, Novozymes Inc. shall document the suspected cause of the condition and any actions taken in response to the discovery. This documentation will be maintained with the Stormwater Pollution Prevention Plan.

All qualitative monitoring will be performed twice per year, once in the spring (April - June) and once in the fall (September - November).

Table 3. Qualitative Monitoring Requirements

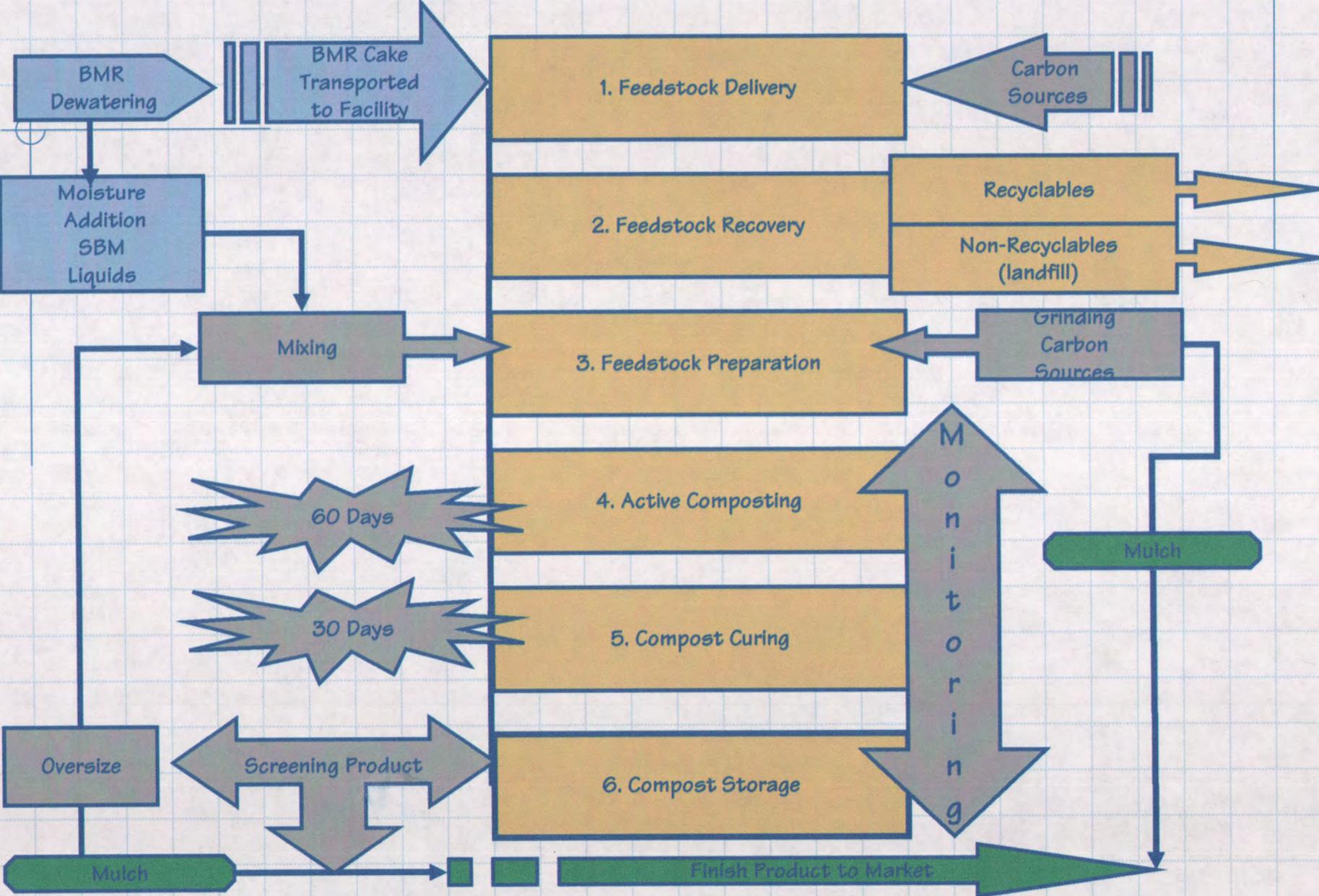
Discharge Characteristics	Frequency	Monitoring Location¹
Color	Semi-Annual	SDO
Odor	Semi-Annual	SDO
Clarity	Semi-Annual	SDO
Floating Solids	Semi-Annual	SDO
Suspended Solids	Semi-Annual	SDO
Foam	Semi-Annual	SDO
Oil Sheen	Semi-Annual	SDO
Other obvious indicators of stormwater pollution	Semi-Annual	SDO

Footnotes:

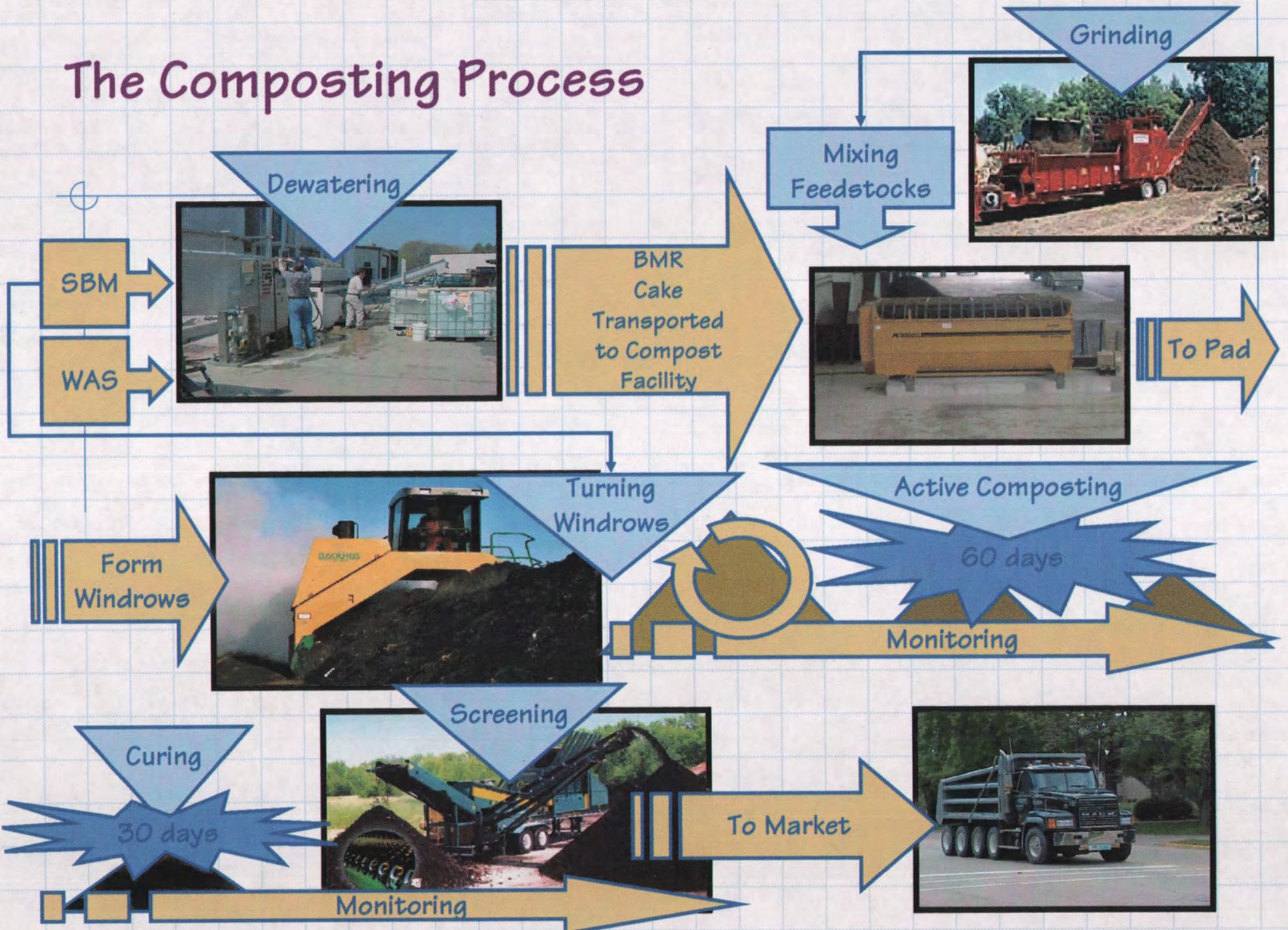
- ¹ Monitoring Location: Qualitative monitoring shall be performed at each stormwater discharge outfall (SDO) regardless of representative outfall status.

Process Flow

Composting Process Flow



The Composting Process



PROCESS FLOW

1. Feedstock Delivery - Feedstocks will enter off of highway 56 and turn down Old Smith Farm Road. Signs will direct traffic flow to the office and the Truck Scale. All incoming feedstocks will be weighed prior to unloading. All trucks will be operated by onsite personnel or unloaded under the direct supervision of site personnel. This will assure the homogeneity of materials being delivered. Feedstock materials will then be unloaded at the Feedstock Storage Area. The Feedstock Storage Area is approximately 8,000 square feet in size. The area is made of improved gravel surface and a concrete portion for sludge handling and storage. Pre-ground carbon based materials such as saw dust, sander dust and source separated leaves will be stored in bulk bins and separated by type. The setting and stacking of large concrete blocks 6 feet long by 2 feet high by 2 feet wide, on three sides creates these bin structures.

Large un-ground wood waste materials will be ground to size for mulch or will be used as a bulking agent in the composting process depending on quality and makeup. Oversized wood waste feedstock will be unloaded at the Grinding Area. Nitrogen-based feedstocks such as biomass residuals will be mixed by recipe with carbon-based feedstocks at the Mixing Area. The mixed feedstock is then incorporated into windrows. All unmixed Nitrogen-based feedstocks will be stored in sealed and covered roll-off containers. Precautions will be taken to minimize potential problems with odors and vectors.

2. Feedstock Recovery - At the Feedstock Storage Area, feedstocks that contain non-biodegradable but recoverable materials will be sorted and recycled. All non-recoverable materials will be collected and disposed in a permitted landfill. All recyclables will be stored in small fifty-gallon containers and pickup for recycling on an as needed basis.

3. Feedstock Preparation – The Grinding Area is approximately 11,500 square feet of improved gravel surface. At the Grinding Area feedstocks are reduced to appropriate size for composting by utilizing a Roto-Chopper diesel powered horizontal grinder. Ground wood for composting is stockpiled in close proximity to the Mixing Area. A select amount of the higher-grade wood waste material may be ground and sold as a mulch product. This product is separated and stored near the Grinding Area.

The Mixing Area is approximately 2,500 square feet in size and will provide concrete surface to mix the various components of the compost recipe. A front-end loader will use a four-five cubic yard bucket volume to mix the feedstock components by batching them into a 35 cubic yard, Knight Reel Auggie, electric powered mixer. Liquid Novozymes BMR will be added at this time to increase moisture content if necessary. The mixer will un-load the batched mix via conveyor into a sealed roll-off container for transport to the Compost Production Pad. The Compost Production Pad is approximately 122,000 square feet in size.

Feedstocks will be mixed base on recipe design to maintain the following mix parameters.

- ❖ A Carbon to Nitrogen Ratio of 20:1
- ❖ A moisture rating at 50 - 65%
- ❖ An oxygen rating at 5 - 15%
- ❖ A pH rating at 5.5-8.0
- ❖ A porosity rating of 1.5 – 2.0

Each feedstock material is tested prior to acceptance in the facility and to determine base levels of the above. Initial testing of feedstocks will include the following:

Parameter (mg/kg/dry wt.)	Code 1
Mercury	10
Cadmium	10
Nickel	200
Copper	800
Lead	250
Chromium	1,000
Zinc	1,000

Windrows will be constructed at eight feet in height and fourteen feet in width. Length will be varied depending on location within the site. An average length would be 490 feet. Windrows will be turned, inverted and mixed by using a Backhus 16.43 compost windrow turner. In the event that the compost windrow turner becomes non-functional, the front-end loader will then be used to turn windrows. A two-foot access row will be left between each windrow for tire track space for the compost windrow turner. A twenty-five foot access way will be maintained surrounding the Compost Production Pad for vehicular traffic and fire control.

4. Active Composting - Mixed feedstocks will be actively composted using the "Turned Windrow Method of Composting". Windrows will be turned 5 times during the 15-day high temperature period (131°F) by using the compost turner or front-end loader. This will maintain homogeneity and porosity during aerobic decomposition and control any pathogens present in the feedstock materials. Turning frequency there after will be based on moisture and oxygen levels. The monitoring biological activity is accomplished by tracking both pile temperatures and oxygen levels. Pile temperatures will be monitored three times per week, by using a three-foot probe thermometer. Temperatures will be taken at different points every sixty feet along the windrow by

inserting the temperature probe half way up the slope of the windrow, and into the windrow the length of the shaft. All readings will be recorded as well as the mean temperature. Readings will be recorded to achieve the Process to Further Reduce Pathogens (PFRP) specification of for 131°F over 15-day period with a minimum of 5 turnings.

Percent oxygen present with in a windrow will be monitored weekly using an Oxygen Analyzer to maintain aerobic decomposition of organic matter. If oxygen levels decline, more bulking materials such as wood chips will be added to increase the porosity of the pile. This will increase the oxygen levels by increasing convection currents of oxygen being pulled into the pile. Increasing the frequency windrow turning will also achieve this same result by increasing the porosity of the windrow.

Moisture is checked weekly by grabbing a handful of composting material and balling it up with both hands. If the ball is compacted with no moisture running out, but can be easily broken apart, it will be at approximately 50% moisture. This is verified at the end of each month in the lab by using an oven to determine the dry weight and wet weight of the composting materials. Windrows will be watered to maintain the minimum 50% moisture and the maximum of 65%, by using the following method. Spring fed water stored in storage tank and pumped through a main PVC line running perpendicular to the windrows. Upright hydrants will come off this mainline for compost moisture addition. An irrigation reel is attached to the hydrant to access water and the compost turner to deliver the water to the windrows. As the turner move down the windrow it will be able to provide moisture addition directly to the compost with minimal run off.

The pH of the active compost will be tested monthly. Sampling will occur every seventy-five feet along each windrow. This will be accomplished by sampling at a depth

of four feet. A composite sample will be tested using an electronic pH meter. Composting materials will be monitored to maintain a pH rating of 5.5-8.0. If levels change beyond this range corrective measures will take place by increasing the amount of acidic or alkaline.

5. Compost Curing - After a period of 60 days of active composting the compost product will be moved via front-end loader and roll-off container truck, off of the Compost Production Pad area to the Compost Curing Area. There it will cure for an additional 30 days or until testing indicates a mature product. Normally this is indicated by lower temperatures, a neutral pH of 7.0, and a lowered carbon to nitrogen ratio. The Solvita Maturity Test will be used to as a method to determine final product maturity prior to the sale of any product. This test uses a color key to measure ammonia and carbon dioxide levels in the cured compost. Our standard for product sales will be a final Solvita Index of 6-8 for product distribution. A copy of the Solvita test and the sampling protocol is provided in the appendix.

6. Compost Storage - The Finished Products Area will maintain a large static pile of curing compost prior to screening. The site will maintain a stockpile of 28,000 cubic yards (16,800 tons) for inventory.

a. Screening Area

A front-end loader will feed cured compost product into a Star Screen. The Star Screen will separate out large oversized material to meet particle size requirements. Fines are conveyed by a stacker and stockpiled for final sale in the Finished Products Area. Oversize product is stockpiled for re-incorporation into windrows as a bulking agent or sold as a mulch grade compost product.

The following products will be labeled and stored on site in the Finish Products Area:

1. Compost (curing)
2. Compost (finished)
3. Oversize wood chip material
4. Pine bark
5. Bulking material
6. Amendments
7. Finished product blends
8. Mulch products

b. Blending Area

Cured and screened finished compost product will be mixed by volume, using a front-end loader, with pine bark or other amendments depending on final product use. Once mixed these products will be stored as finished product ready for shipping.

Equipment Specifications

Novozymes Composting Facility Design Capacity

EQUIPMENT	
CAT 924G Front-end Loader Bucket	5.0 - 6.0 cubic yard bucket
Roto Chopper MC-266 Grinder	100 -150 cubic yards/hour
Water Tank Trailer	6000 gallon tank
Knight Reel Augie 3095 Electric Mixer	35 cubic yards
Backhus 16.43 Windrow Turner	3,000 cubic yards/hour
Hoist Lift Truck	One 20-40 cubic yard roll off (22 tons)
Roll-off Containers	20 - 40 cubic yards
Screen USA 4008 Tornado Star Screen	80 -125 cubic yards/hour
SITE CAPACITIES	
Compost Aeration Capacity	5 -15% oxygen/windrow
Active Composting Period	60 days
Curing Composting Period	30 days minimum
Annual Volume - (Year 1-3)	64,000 cubic yards (41,600 tons)
Annual Volume - (Year 4)	168,000 cubic yards (110,000 tons)
Storage Capacity Active Windrows - (Year 1-3)	6,500 cubic yards (4,225 tons)
Storage Capacity Active Windrows - (Year 4)	28,000 cubic yards (16,800 tons)
Storage Capacity Curing Compost	14,000 cubic yards (8,400 tons)
Storage Capacity Finished Compost	28,000 cubic yards (16,800 tons)

Feedstock Delivery

Hoist Lift Truck
Roll-off Containers

TRUCK SALES
Cleveland, Ohio 1-800-825-1255

PREMIER
Truck Sales, Inc.

Unit Number: T1789
Year: 1997
Model: RD688S
Manufacturer: MACK
Mileage: 264,071
Engine: E 7 350
Transmission: 8LL
Suspension: CAMELBACK
Wheel: DISC
Front Tire: 11R24.5
ALUM
Rear Tire: 11R24.5
STEEL
FA/RA: 18/44
Price: 65,500



Description: JAKE, TANDEM, 417 RATIO, 265" W.B., 22' OUTSIDE RAIL, I/O ACCURATE HOIST, P/S, A/C, NEW PAINT, DOUBLE FRAME, (1) 75 GAL ALUM FUEL TANK, PIONEER RACK & PINION TARPEN

www.premiertrucksales.com



Toll Free: 1-800-879-6464
Phone: 724-588-7711
Fax: 724-588-5657
E-Mail rolloff@nauticom.net

OPEN TOP CONTAINERS



MODEL Rectangular	BODY LENGTH	SIDE HEIGHT	OVERALL LENGTH	OVERALL HEIGHT	OVERALL CAPACITY APPROX.
2242	22'	42"	22' 8"	53"	20 CU. YD.
2262	22'	62"	22' 8"	73"	30 CU. YD.
2282	22'	82"	22' 8"	93"	40 CU. YD.

STANDARD FEATURES

Upper wall construction 12 Ga.
 Runners 2" x 6" x .220" standard
 3" x 4" x 11 Ga. tube top rail
 Floor 3/16" plate standard
 Interior solid weld
 7" x 3" w/ 4 way bend post on 24" centers
 Rear post 9" x 3 1/2" w/ 3 way bend
 Under structure 3" structural channel on 16" centers
 Primed and painted one solid color

OPTIONS

12" center under structure
 10 Ga. Or 7 Ga. side sheets
 3" x 4" top rail tube - 3/16" or 1/4" wall
 2" x 6" runners x 3/16", 5/16" or 3/8"
 Floor plate 10 Ga. Or 1/4"
 Full dog house
 Interior gussets, dirt shedders
 Dual grease fitting on rollers
 Heavy duty rollers
 Several style hook-ups available

MODEL Bath Tub	BODY LENGTH	SIDE HEIGHT	OVERALL LENGTH	OVERALL HEIGHT	OVERALL CAPACITY APPROX.
2245	22'	45"	22' 8"	56"	20 YD.CU.
2265	22'	65"	22' 8"	76"	30 CU. YD.
2285	22'	85"	22' 8"	96"	40 CU. YD.

STANDARD FEATURES

Upper wall construction 7 Ga.

Feedstock Preparation

Grinder

Front-end Loader

Mixer

Mobile Diesel Wood Waste Processor

MC 156

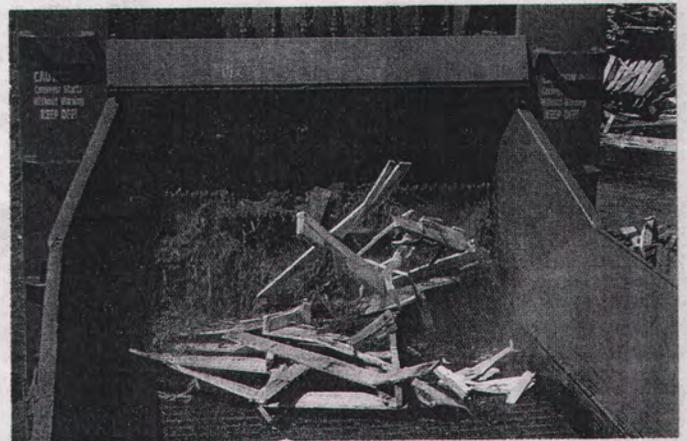


SAFE, SIMPLE AND FAST

A mid-sized grinder in terms of price, but not weight or features. At 36,000 lbs, 260HP, and with a 56" wide steel belt infeed deck, this machine has all the characteristics of the biggest and most expensive grinders on the market.

Ideal for pallets, bark, slabs, cutoffs, brush, small trees, and compost, this is the perfect machine for larger sawmills, city governments, and any business that needs versatile, mobile grinding ability at a reasonable price.

Think about it: A safe, reliable high capacity grinder that will *permanently* solve your wood waste problem and produce a marketable product.



Think about:

- One man changing screens in fifteen minutes.
- A big, tough grinder with a clutchless ABD (Auto Belt Drive™) drive system.
- A safe horizontal feed machine with a 56" wide infeed and enclosed grinding chamber.
- A road-ready, highway-legal grinder with "0" set up time.
- The only machine in the industry that can produce perfect colored landscape mulch *in one pass* (with optional Power Application System).

DIESEL ◀ **ROTOCHOPPER** ▶ ELECTRIC
THE THINKING MAN'S GRINDER

608-452-3651 • Fax: 608-452-3031 • E mail: info@rotochopper.com • www.rotochopper.com

ROTOCHOPPER®

Documented Performance

M-Series machines - mobile - CAT diesel engines

Model	HP	Screen	Location	Material	Production rate
MC 156	260HP	no	Withee, WI	Dry wall	60 tons/hr.
MC 156	260HP	2"	Lakeville, MN	Pallets & Crates	18 tons/hr.
MC 156	260HP	3"x5"		Garbage/paper & plastic film	6.5 tons/hr.
MC 156	260HP	3"x6"		plastic film	6 tons/hr.
MC 156	260HP	2" baf.	Peosta, IA	whole pallets, pallet scrap	70 yds./hr.
		1.5"		green edgings	50 yds./hr.
MC 156	260HP	6"	Windham, OH	dry bark	360 yds./hr.
		3" baf.		chips	300 yds./hr.
MC 166	260HP	2"	Michigan	Pallets & cutoffs	100 yds./hr.
MC 166	260HP	1"		Pallets	10 tons/hr.
MC 166	360HP		England	Steel beer cans	60 tons/hr.
MC 166	360HP	4"		Food waste / breads	60 tons/hr.
MC 166	400HP	8"	Durand WI	Bark	300 yds./hr.
MC 166	400HP	2" baf.	Michigan	Grind & color cedar slabs	100 yds./hr.
				1.4 lbs. of dye per yd.	
MC 166	435HP	1" baf.	Clear Lake IA	Furniture Mfg. scrap	15 tons/hr.
MC 166	435 HP	4" open	Buffalo NY	Pine Bark	340 yds./hr.
		4' open		Hardwood bark	230 yds./hr.
		4" baf.		Regind, black color 1.7#s/yd.	170 yds./hr.
MC 166	435 HP	2" baf.	Ohio	pallets & pallet scrap	150 yds./hr.
MC 166	435 HP	8"	Nova Scotia	organic food waste	60 tons/hr.
MC 166	460 HP	2" baf.		Grind & color pallets & boards	130 yds./hr.

E-Series machines - stationary - electric motors

Model	HP	Screen	Location	Material	Production rate
EC 156	150HP	2" Baf.	Newton, WI	Grind & color pallets & boards	35 yds./hr., colored
EC 156	200 HP	1.5" baf.	Sterling, VA	grind & color whole pallets	45 yds./hr.
EC 156	200HP	1.5"	Lakeville, MN	Crushed Pallets & Crates	60 yds./hr.
EC 156	250HP	1" baf	Buffalo, NY	Pallets & pallet waste	500 yds./ 8 hr.
EC 166	250HP	1.5" baf.	Biglerville, PA	Whole pallets & pallet waste	50 yds./hr.
EC 166	300HP	2" baf.	Northeast MD	Grind & color pallets	90 yds./hr. colored
EC 124	200HP	2" baf.	Fillmore, IN	green slabs on-line from mill	25 yds./hr.
EC 124	100HP	2" baf.	Ontario, Canada	pallet boards	20 yds./hr.

Teeth reface or replace interval

EC 156	150HP		Ava, MO - 1 refacing in 2 yrs. - oak slab wood
EC 166	200HP	1"	Kenosha, WI - 3 refacing in 5,000 hrs. - clean urban wood waste
EP 156	200HP		Portland, TN - reface once per year - slabs and pallets
MC 156	260HP	2" baf.	Little Rock, AR - 1,100 hours on 1st set of teeth
EC 166	200HP		Lakeville, MN - reface every 400 hrs. - urban wood waste

NOTE: - Expect to reface or replace teeth at intervals as short as 150 hrs. or as high as the examples above.

NOVOZYMES NORTH AMERICA
Franklinton, NC

CATERPILLAR
924G

146-3209	924G Wheel Loader with Versalink
118-0819	Seat, Contour/Air Suspension
121-7746	Precleaner, Dust Bowl
132-2342	Hydraulics, 3 Valve, 2 Lever, FNR
148-7680	Linkage, High Lift
203-2773	Differential, Standard, Rear
138-1615	Differential, Standard, Front
140-2772	Transmission, Standard
140-9295	Fenders, Standard
143-2662	Alternator, Standard
146-0151	Oil Cooler, Hyd., HD
205-0526	Heater and Air Conditioner
205-0618	Cab, Sliding Glass
154-4920	Lines, High Lift
	End of Consist
147-5573	Tires, 20.5-R25 XTLA * L2
132-2748	Guard, Crankcase
167-3912	Guard, Powertrain
118-7244	Installation Group, Radio 12V
178-4663	Bucket, 4.0 CYD Hook On
132-2448	Coupler, Hi-Lift
8E-4566	Cutting Edge, Bolt On (4 Piece)
132-2443	Carriage Fork
195-6935	Fork Tines, 2" x 5" x 48" (Qty: 2)
146-0059	Counterweight, Extra (385 lbs.)
195-3287	Fan, Reversing
	Rockland LRC Loader Rake with wide top clamp
156-3901	Instructions, English
0P-5042	Michelin Tires
0P-0210	Domestic Truck

Submitted By:

Glenn Foley
Gregory Poole Equip Co
919-819-2768



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EQUIPMENT

- Agricultural Implements
- Backhoe Loaders
- Compactors
- Front Shovels
- Knuckleboom Loaders
- Multi Terrain Loaders
- Paving Equipment
- Scrapers
- Soil Stabilizers
- Track-Type Tractors

- Agricultural Tractors
- Cold Planers
- Forest Machines
- Harvesters
- Material Handlers
- Off Highway Tractors
- Pipelayers
- Skid Steer Loaders
- Telehandlers
- Wheel Dozers

- Articulated Trucks
- Combines
- Forwarders
- Hydraulic Excavators
- Motor Graders
- Off Highway Trucks
- Road Reclaimers
- Skidders
- Track Loaders
- **Wheel Loaders**

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WHEEL LOADERS

> 924G Pin On

OTHER MODELS: 924G Pin On

> SPECIFICATIONS

FEATURES & BENEFITS:

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WORK TOOLS:

-- Select --

RELATED LINKS

- Incident Repo
- Get A Quote

Product Overview

The 924G is one of the most versatile wheel loaders in the world. Size, power, performance and interchangeability of work tools make this the ideal machine for a wider range of jobs than ever before.



Related Industries: Agriculture, Construction, Forestry, Heavy Construction, Industrial, Mining, Quarry/Aggregate, Waste



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> SPECIFICATIONS

FEATURES & BENEFITS:

WORK TOOLS:

RELATED LINKS

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- Get A Quote

Detailed Specifications

Engine	
Power - Net	85 kW (114 hp)
Model	Cat 3056T
Power - Gross	91 kW (122 hp)
Displacement	366 cm ³ (366.12 in ³)
Weights	
Operating Weight	10067 kg (22147 lb)
Optional Counterweight	175 kg (385 lb)
Operating Specifications	
Bucket Capacity (with bolt-on cutting edge)	1.8 m ³ (2.3 yd ³)
Breakout Force	9956 kN (21903 lb)
Static Tipping Load (Full Turn)	5268 kg (11590 lb)
Reach - full lift/45 degree dump angle	1068 mm (3.5 ft)
Dump clearance - Full lift/45 degree dump angle	3267 mm (10.75 ft)
Articulation Angle	40 Degrees
Dimensions	
Overall Height	3159 mm (10.42 ft)

Engine	
Power - Net	85 kW (114 hp)
Model	Cat 3056T
Power - Gross	91 kW (122 hp)
Weights	
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KNIGHT

3060

REEL AUGGIE

KNIGHT Home Products Dealers International

Reel Auggie Sludge and Organic Compost Mixer

Scales

Specifications

**Truck
Mount**



A truck mounted hydraulic drive unit mixes yard waste compost and discharges into a windrow a long belt conveyor.

Reel Applications

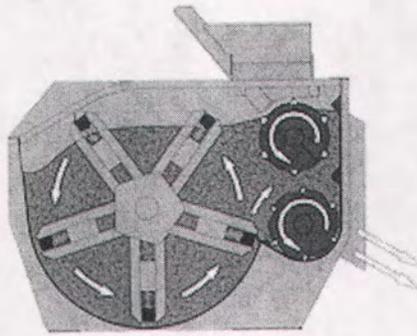
The Industrial Reel Auggie is designed for the initial mixing of compost materials prior to introduction into a windrow or in-vessel composting system. Specific uses include sludge stabilization and composting, food waste processing, leaf and lawn waste processing, solid waste composting, and hazardous waste handling.

The Reel Difference

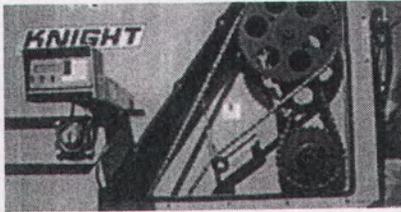
The Reel Auggie blends by gently lifting and tumbling the entire load at one time, substantially reducing the mixing time required. Sludge can be completely mixed with a variety of bulking and stabilizing agents while minimizing particle size reduction. Leaf and lawn waste, solid waste, and food wastes are easily mixed with bulking agents or water, providing a fast start into the composting process.

The "Reel" Concept

The large diameter Reel turns the entire load slowly, gently lifting the materials up and into the blending augers. The lower auger moves material toward the front during the mixing process, and charges the door opening during the unloading process. The upper auger turns at high speed, breaking up clumps and moving material toward the rear of the unit.



A cross section view shows the lifting action of the reel.

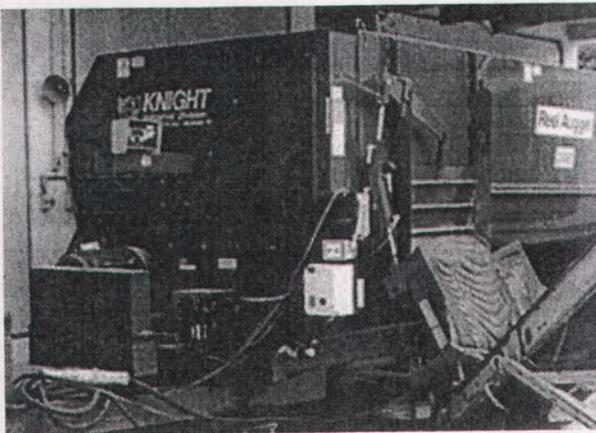


The front drive components in a dust-free oil bath environment.*

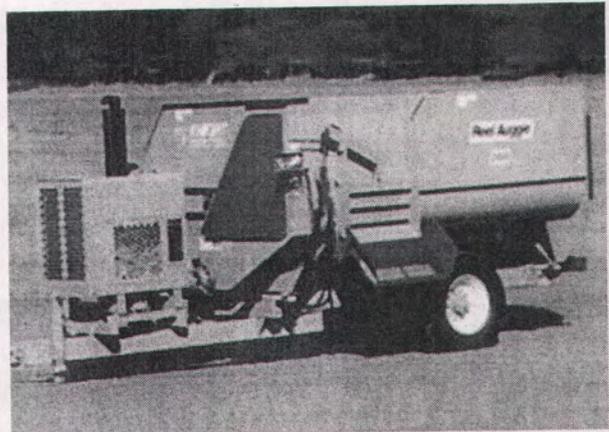
Oil Bath Enclosure

The rugged drive is enclosed in a dust-free oil bath environment. It features a simple chain and sprocket drive, sealed greasable bearings, and spring loaded, poly tension idlers. The final drive shafts and sprockets are splined for added strength and reliability. A grease bank allows lubrication of bearings within the oil bath enclosure without removing the cover.

*** Shields removed for illustration only. Do not operate without shields in place and functioning.**



A stationary electric drive unit mixes sludge and lime for stabilization.



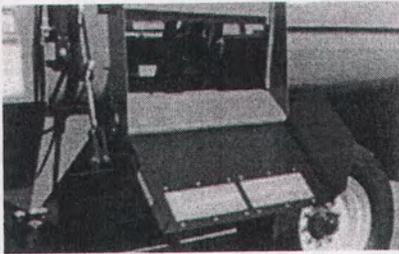
A towable diesel drive unit is ready for service.

The Reel Auggie "Scrapper"

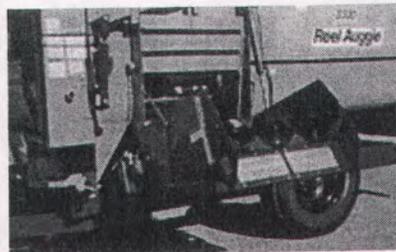
The Scrapper is a specially designed, self-contained mixer package which is used for combining food scraps or



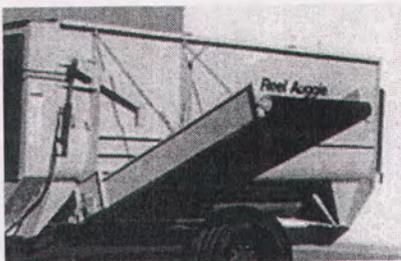
other waste materials with amendments prior to composting. It is easily towable and includes its own gasoline engine power for mixing at most any location. With a mixing capacity of 5.4 cubic yards, it is just the right size for smaller commercial and institutional mixing applications. The Scrapper is also available with optional surge brakes and electronic digital scales.



The slide tray offers simple operation with fewer moving parts.



The three or four-auger power chute provides versatility in unloading.



The long belt conveyor is available where stacking of material is required.

A Choice of Discharge Options

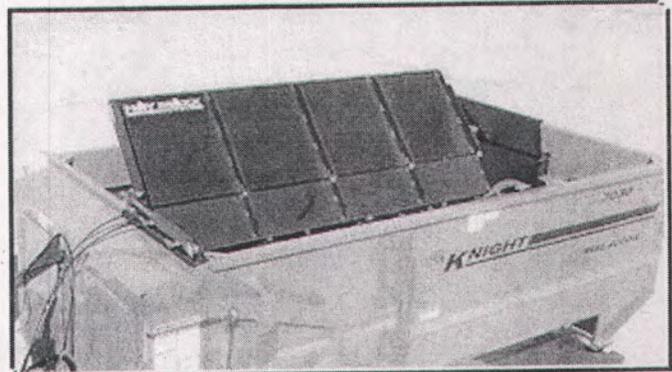
The Reel Auggie discharge door is higher off the ground than the traditional three or four-auger mixers. In many applications this will allow the use of a simple, hydraulically controlled slide tray rather than an elevated discharge method.

For those applications requiring a higher discharge height, several kinds of hydraulically driven discharge chutes are available. The three or four-auger power chute features nine inch diameter augers with replaceable poly liners. Belt-type discharge chutes are also available for stacking and for bulky or hard-to-handle materials.

Available Options Include:

- **Belt Conveyor Discharge** — 36" or 48" wide and 7' long, includes hydraulic drive and controls.
- **Electronic Scale System** — digital LCD readout, accuracy to within one percent, optional remote readout and zeroing, alarm and batching features.
- **Bale Processor** — breaks up small paper, hay or straw bales for processing in the mixer.
- **Diesel, Electric, or Hydraulic Drives**
- **Stainless Shells** — constructed from 304 stainless or equal.

The optional bale processor allows compressed material to be fed quickly and evenly into the mixing chamber for an even faster blending action.



Drive Options:

- **Tow-type Units** — usually driven with a tractor PTO.
- **Stationary and Tow Units** — can be driven with an electric motor or self-contained diesel engine.

Truck Mounting:

Truck mounted units are generally mounted on a standard, medium-duty truck chassis of the owner's choice. This allows customizing of the cab and accessories to meet the owner's needs, while providing a versatile chassis that continues to be useful, even if the mixer's use is seasonal or discontinued. Sales and service of these readily available trucks is usually local, reducing down time and maintenance costs.

Scales

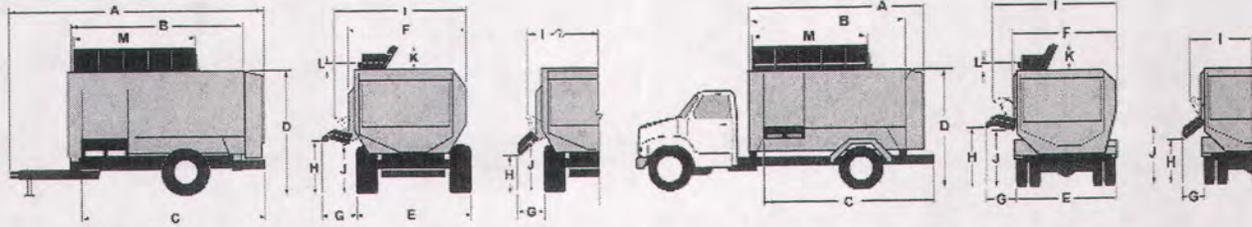
Specifications

**Truck
Mount**

[[Heides New/Products/Heides New/Footer_w_Shorts.htm](http://www.knightmfg.com/Heides%20New/Products/Industrial/reela...)]

Model Specifications

For truck chassis information on mounting Knight Commercial SDL mixers, or for stationary specifications, contact your Knight dealer or visit our website at www.knightmfg.com



MODEL-TRAILER-TR/TRUCK-TK	3050		3060		3070		3095	
DIMENSIONS (INCHES)	TR	TK	TR	TK	TR	TK	TR	TK
A - Overall Length	240	187	270	217	300	247	292	245
B - Mixing Chamber Length	168	168	198	198	228	228	216	216
C - Front Discharge to Bumper	177	175	207	205	237	235	226	227
D - Overall Height ^{1,2}	107	117	107	117	107	117	126	132
E - Tread Width ²	101	96	101	96	101	96	110	96
F - Overall Width (mixer only)	102	102	102	102	102	102	120	120
G - Slide Tray - max. reach	22	22	22	22	22	22	30	30
H - 4-Auger Discharge - max. reach - 2'/3'	32/42	NA	32/42	NA	32/42	NA	NA	NA
J - Slide Tray - max. height	35	45	35	45	35	45	50	56
K - 4-Auger Discharge - max. height - 2'/3'	50/56	NA	50/56	NA	50/56	NA	NA	NA
I - Slide Tray - transport width	114	114	114	114	114	114	128	128
L - 4-Auger Discharge - transport width - 2'/3'	126/130	NA	126/130	NA	126/130	NA	NA	NA
M - Hinge Height for Discharge	47	57	47	57	47	57	56	62
N - Height - Haypan Up	22	22	22	22	22	22	22	22
O - Height - Haypan Down	8	8	8	8	8	8	8	8
P - Length - Haypan	120	120	144	144	144	144	144	144
SPECIFICATIONS								
Unit Weight ³ - (TR/TK) pounds	14,618/12,703		16,190/14,749		20,580/18,399		24,854 est./21,554	
Maximum Net Load - pounds (30 lbs./cu.ft.)	15,000		18,000		21,000		28,500	
Mixing Capacity - cubic foot/bushels	500/402		600/482		700/563		950/763	
Reel Diameter	70"		70"		70"		84"	
Reel Drive Shaft Diameter	5"		5"		5"		8" tube	
Reel Arms	5		5		5		5	
Reel Hopper Thickness	3/8"		3/8"		3/8"		3/8"	
Reel Speed RPM	6.4		6.4		6.4		5.2	
Lower Auger								
Flighting Diameter	24"		24"		24"		28"	
Flighting Thickness ⁴ - Sectional	5/8"		5/8"		5/8"		5/8"	
Tube - Outside Diameter	6 5/8"		6 5/8"		8 5/8"		8 5/8"	
Drive Shaft Diameter	3 1/2"		3 1/2"		3 1/2"		5"	
Upper Auger								
Flight Diameter	22"		22"		24"		28"	
Flighting Thickness - Sectional	1/2"		1/2"		1/2"		1/2"	
Tube - Outside Diameter	6 5/8"		6 5/8"		8 5/8"		8 5/8"	
Drive Shaft Diameter	3 1/2"		3 1/2"		3 1/2"		4"	
Auger Hopper Thickness	3/8"		3/8"		3/8"		3/8"	
Side Sheets Thickness	3/16"		3/16"		3/16"		1/4"	
End Sheets Thickness	1/4"		1/4"		1/4"		1/4"	
Door Opening Size	42" x 22"		42" x 22"		42" x 22"		48" x 26"	
Roller Chain Drive	80-100-120-140		80-100-120-140		80-100-120-140		80-120-140-dbl 140	
Spindle Diameter - single axle/tandem axle	4 1/2" / NA		4 1/2" / 3 3/8"		4 1/2" / 3 3/8"		3 3/8"	
Hub	HD 10-bolt		HD 10-bolt		HD 10-bolt		HD 10-bolt	
Tongue Weight - empty (pounds)	715		1,000		1,100		1,480 est.	
Tractor Requirement - PTO ⁵	100		110		120		165	

¹Truck dimensions based on 38" truck frame height. ²Heights/widths will vary depending on tire size. ³Unit is equipped with most common options. ⁴3/8" flighting at convergence is standard. ⁵Horsepower requirement may vary with different materials. See operator's manual for proper tractor sizing.

Mixer design and specifications are subject to change without notice. These mixers are designed for mixing dairy rations up to 30 lbs. per cu. ft. If you have questions regarding your feed ration or have other applications, consult the factory.

KNIGHT

KNIGHT FACTORY AND SALES OFFICES :: P.O. Box 167 :: Brodhead, WI 53520 :: 608-897-2131 :: kmc@knightmfg.com
 :: 701 Cherry Ave. :: Greeley, CO 80631 :: 970-351-0444

Active Composting

Windrow Turner

Irrigation Reel

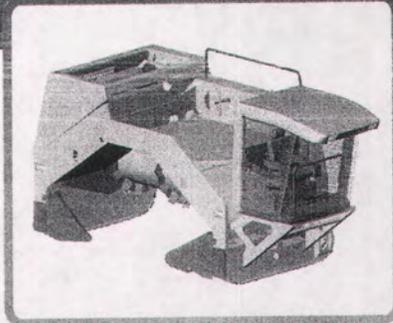
Monitoring Equipment



BACKHUS

Kompost-Technologie

NEW !



**Compost- and soil-turner
BACKHUS 16.43**





BACKHUS

BACKHUS 16.43

Soil- and Compost Transposer

The BACKHUS engineers succeeded in combining the newest technology with the practical experience of more than 10 years. The result is a transposing machine which distinguishes itself by high efficiency.

Track clearers

Due to "patent track clearers" the heaps can be set up close to each other without any lane. Thus an optimal use of the available area is possible.

Cabin

The completely glazed and air-conditioned pressurized cabin is a comfortable working place for the driver. Noxious gases and particles cannot reach the driver because of the protective ventilation system.

Drive

Due to the track drive a minimal turning circle and high traction are guaranteed. The hydraulic rotor drive ensures steerable rotor RPM, reverse direction of rotation of the rotor, adaption to different materials as well as height adjustability of the rotor.

Transport

The BACKHUS 16.43 can be transported on a 90 cm flatbed trailer and thus is usable on various plants.

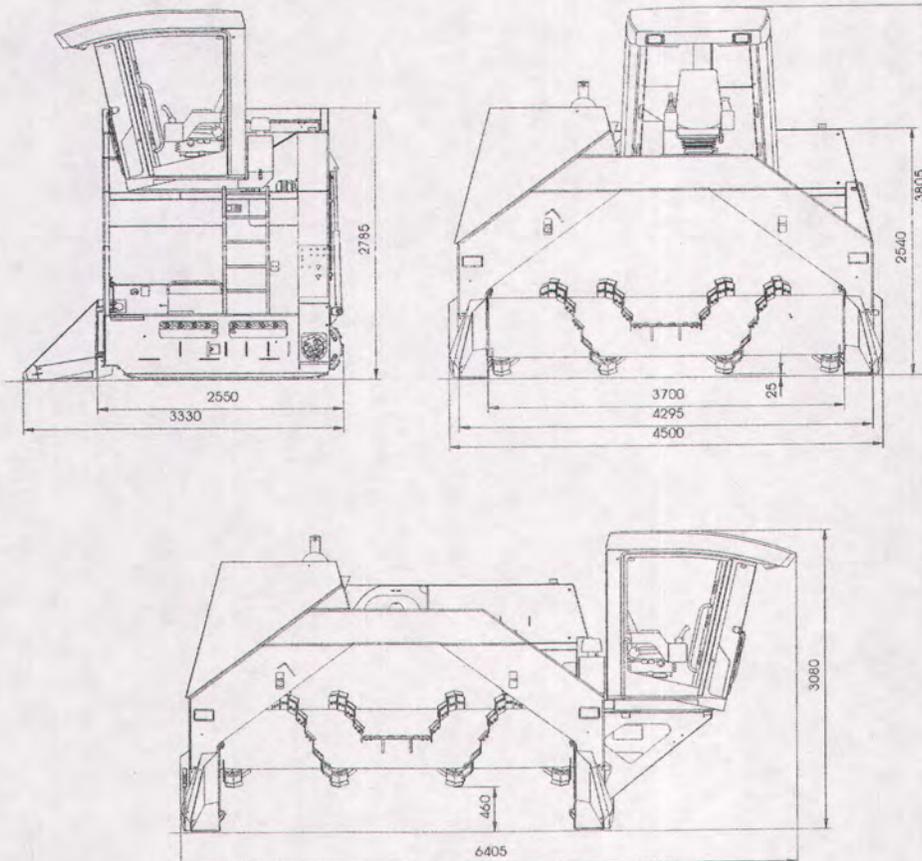
Quality

All BACKHUS transposing machines are manufactured according to EC-regulations and have the CE-sign. Additionally, a voluntary safety analysis offers the user a maximum amount of working safety. It is made out by the "TÜV" (organization for technical surveyance-north). Highly modern manufacturing technics, motivated specialists as well as a quality management system (EN ISO 9001) guarantee durable quality and economical operation of the machines.

Optional feature

On request the machine can be equipped with an irrigation system.

Technical data and measurements / dimensions



Technical data:

Heap width up to:	4,30 m
Heap height up to:	2,10 m
Heap cross-section:	ca. 4,5 m ²
Bulk angle approx.:	ca. 45°
Grain size:	300 mm

Engine:	Cummins QSC8.3-C260
	watercooled
Working volume:	5,9 l
Capacity:	160 kW
Speed:	2.300 1/min

Forward feed speed:
0-60 m/min. infinitely variable

Rotor:	
Diameter:	1.000 mm
Length:	4.680 mm
Height adjustment:	450 mm
Working capacity:	approx. 300-2.300 m ³ /h

Measurements/dimensions:

	Operation	Transport
Length:	3.330 mm	2.550 mm
Width:	4.500 mm	6.500 mm
Height:	3.800 mm	3.100 mm
Turning radius:		2.800 mm
Weight:		ca. 7,5 t

Different optional features on request.

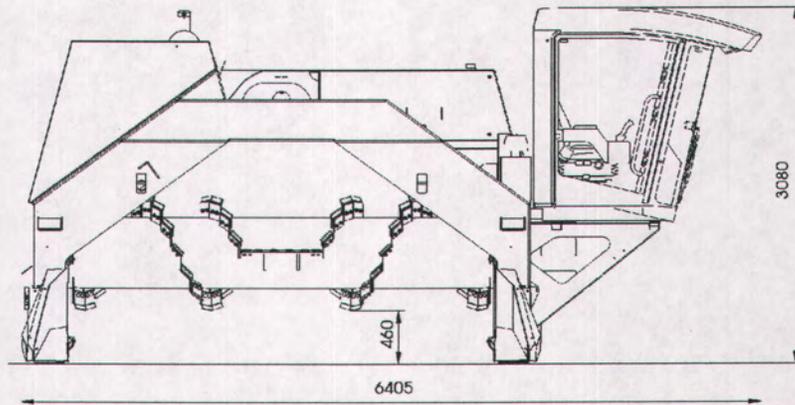
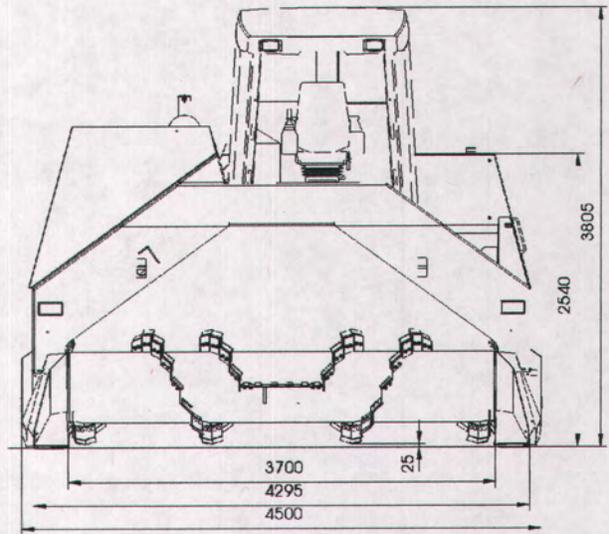
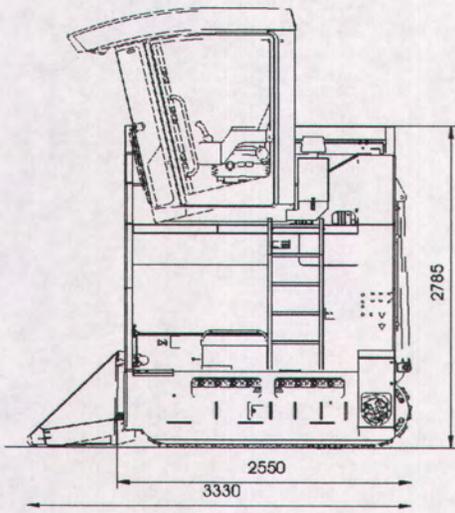
Also ask for: Transposing machines for triangular heaps and tunnel transposers, shredders, screening machines and compost processors.

1 piece

BACKHUS 16.43

Compost turner on crawler tracks for triangular heaps

- Heap width up to: 4,30 m
- Heap height up to: 2,00 m
- Heap cross-section up to: 4,4 m² per meter (bulk angle approx. 45°)
- Area utilization: 1,02 m³/m²
- Track-clearing width: 2 x 310 mm
- Track-clearing share: 1,86 % of heap cross-section
- Grain size up to: 300 mm
- Rate of feed: 0 – 50 m/min, steplessly controllable (forward and reverse)
- Working capacity: 300 – 2.500 m³/h (depending on the material)
- Engine: Cummins QSB 5,9 (watercooled)
153 kW, 2.500 1/min, 5,9 l
- Power supply: 24 volt, 2x12 V batteries 143 Ah each
three-phase alternator 85 A
- Rotor diameter: 1.000 mm
- Rotor length / passage-way width: 3.680 mm
- Passage-way height: 1.900 mm
- Number of throwing tools: 40
- Number of throwing rakes: 8
- Dimensions in working position:
 - Length: 3.340 mm
 - Width: 4.500 mm
 - Height: 3.805 mm
 - Track width: 4.020 mm
- Dimensions in transporting position:
 - Length: 2.550 mm
 - Width: 6.500 mm
 - Height: 3.100 mm
 - Track width: 4.020 mm
- Turning radius: 2.700 mm
- Heap displacement approx.: 2,5 m
- Weight approx.: 7,5 t
- Ground pressure: 0,75 kg/cm² in case of standard equipment



Engineering changes are subject to alteration





Functional description:

Power transmission

The hydraulic system is constructed in separate circuits. It is equipped with high-grade components (building-machinery quality). The hydraulic cylinder functions are electrically triggered. The switching condition of the magnetic valves is displayed by LED.

The fully hydraulic rotor-drive system in a closed system provides a power transmission with a high efficiency of approx. 85%.

Through high-pressure axial-piston variable displacement pumps and high-pressure radial piston engines a full load torque is generated. The high performance of approx. 34,7 kW per m² of the windrow allows the turning of very heavy material of up to 2 t/m³.

Rotor

The rotor can be lifted infinitely variable up to 440 mm. Thus one can drive out of the heap easily. It is also possible to transpose with a texture mat and to transport the machine on a centre-axle trailer. Since only the rotor is lifted no material gets into the tracks. A rotor level indicator shows the rotor position to the driver. The diameter of the rotor tube is 610 mm and guarantees a high degree of protection from entanglement. In case of extraordinary operating conditions the rotation direction of the rotor can be reversed. At full load torque the number of rotor revolutions can be perfectly adjusted from 0 – 240 1/min to the prevailing material by means of a revolving switch. Thus wear is remarkably reduced.

The rotor is positioned in the rear part of the machine. Thus the rotting material can be freely thrown out of the machine. Because of this a new loose, oxygen-rich windrow can be set up.

Cooling system

The cooling systems of motor and hydraulics are designed for operation in extreme conditions (tropic-proof). The cooling-air induction takes in as little dirt and dust as possible. The cooler is simply cleaned by blowing-out with compressed air (optional with reversible fan).

Tools – type and kind

The bolted tools are resistant to wear (high-alloy heat-treated boron steel). The rotor is provided with tools and in the middle area it is provided with throwing rakes. Because of this, material contact is minimized. As a result wear and energy consumption are reduced to a minimum. At the same time the best possible material mixture and optimum setting out of the windrows is attained. For soil turning the tools can be adjusted to the material by means of an additional wearing protection. The bolted tools can be exchanged quickly and easily.

Frame and lacquer coating

The turner consists of a portal frame in box design. The construction is based on a frame calculation according to the finite element method (FEM) with which the stress limit is simulated. In conjunction with high-grade blister steel a long operating life is guaranteed.

All frame and bonnet parts are sandblasted according to SA 2,5. Thus they are perfectly pre-treated for lacquering. The ground coat is a two-component Epoxidharz-zinc-phosphate primer, the intermediate coat is a two-component acrylic Polyurethan protective coat, and the finishing lacquer is a two-component acrylic Polyurethan protective coat. The thickness of the different coats is state-of-the-art technology. The area of the undercarriage and various mounting parts are lacquered in mint green (RAL 6029), the frame and the bonnets are lacquered in golden yellow (RAL 1004). This colour coating guarantees a reliable corrosion protection even if wastes are ammonia-rich.

Crawler drive and track clearers

Because of the small compact style in the area of the tracks the windrow is picked up with nearly the complete rotor width. Thus the forces of feed are reduced to a minimum. Specially constructed plow shifters pick up the material in front of the crawler tracks and drop it onto the heap in the area of the passage way. Thus the heaps can be set up close to each other without any track. The track clearers adjust automatically to soil unevenness and thus create the premises for an optimum traction. For transportation the plow shifters are swung into the inside hydraulically.

Operational monitoring unit

An operational monitoring unit alarms the driver visually and acoustically about critical running states.

Panorama cabin for semi-mobile use

The panorama cabin is attached onto the frame. The convenient cabin door, which offers most comfort of entry, can be reached easily across the wide steps. All operating elements inside are arranged clearly and can be used easily and comfortably. This is the same for the comfortable seat, which is adjustable in different positions. Every driver is able to find his optimum working position in shortest time.

The centric positioning of the cabin offers a perfect panorama view so that the driver is always able to overlook the equipments like side conveyor and hose drum.

For transport the cabin is positioned laterally and has to be brought into the corresponding transporting position with the help of lifting tools.

Stereo radio

The cabin is provided with a radio with integrated cassette recorder and two stereo loudspeakers.

Cabin ventilation

The standard machine is equipped with a cabin ventilation system (G4 [EU 4] according to EN 779 standard [DIN 24185]). Two pocket-type filters (525 x 280 x 100) guarantee a separation efficiency of 96 %. The cabin is prepared for a protective ventilation system according to BG/581 (ZH 1/184) and can be upgraded at any time.

Air conditioning

Air conditioners with manual preselection of the temperature are especially designed for high pressure cabins to air-condition the circulating air. By keeping a good climate in the cabin the driver's concentration will last longer.

Cabin equipment

According to current EG-guidelines, the machine is equipped with an electrical heater that provides a quick warm-up of the cabin air.

After ignition, people, standing outside, will be warned by an acoustic signal. Besides this operation warning system the machine is equipped with an acoustic warning system for reverse drive.

There is a first-aid kit according to DIN 131 57 C inside the cabin.

Connection for towing hose (up to 500 l/min)

At the side of the machine is a hose coupling with swinging arm. Water supply is effected by a hose which is provided by the machine operator. With the help of a spiral jet the flow of up to 500 l/min is put directly into the throwing channel by a volume-flow control proportionally to the speed. Operating is effected from the driver's place. Operation is done electro-hydraulically from the cabin.

Flood lamps

Halogen lamps in front and at the rear of the machine ensure good working conditions even in case of poor visibility. The flood lamps are mounted shock-proof.

General quality and capability characteristics

Since 03 April 1996 BACKHUS is successfully certified according to the quality management system ISO 9001.

Additionally, a safety analysis has been worked out. This safety standard guarantees full accident prevention.

Acoustic emission

According to DIN ISO 6393 and 6394 sound-pressure test certificates have been drawn up. They show the prevailing peak values instead of equivalent acoustic-pressure values. If requested, a corresponding test certificate can be made available.

Maintenance and service

The clear arrangement and easy accessibility of all building components guarantee a simple and safe machine handling (There is for example no necessity for an additional chief fitter.)

The hydrostatic rotor drive guarantees long lifetime and low maintenance and service charge (no V-belt wear).

Machine instruction

During the instructions the operator gets theoretical and practical knowledge of the machine. On the basis of the instruction manual, technical details are explained theoretically and consolidated in practice. All skills which are necessary to operate, maintain and service the machine are imparted. The instruction takes part on the site. According to demand, the instruction lasts one or two days.

Documentation and tool outfit

According to current EG directives operating instruction and spare-parts catalogue are written in German language. Two further copies in English or in an other European language will be added. Motor operating instruction and spare-parts catalogue are enclosed in original.

The tool outfit contains a basic equipment of instruments like grease gun, socket wrench, fork wrench, hammer, pincers, compressed-air pistol, etc. for the performance of maintenance and for the implementation of simple repair works.

Optional features:

- Preparation of side conveyor belt

The preparation of the machine for an operation with side conveyor includes mechanical attachments and hydraulic equipment which are necessary to drive the conveyor belt. The cabin instruments are prepared for an operation with side conveyor. Electric components that control and safeguard the side conveyor are part of the installation, too.

- **Side conveyor belt (one-side discharge)**

Using a side conveyor allows a lateral "wandering" of the machine. The use of a side conveyor is highly advisable if facilities are provided with an automatic input system.

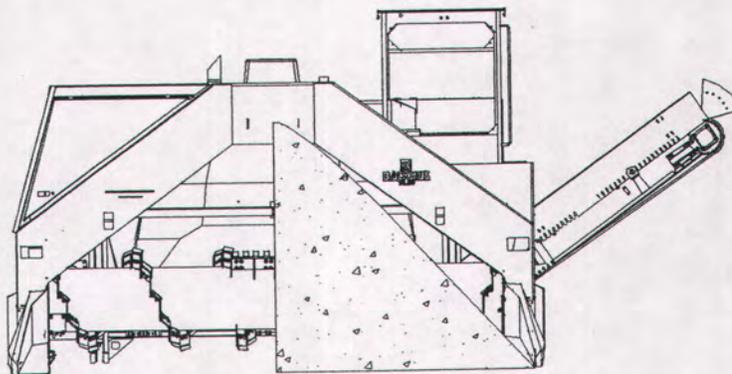
The turning machine is able to take in a side conveyor without delay by means of a hydraulic rear catch. Thus a high working capacity and operational safety is guaranteed.

The rotting material is placed onto the cross belt by the rotor in almost full width. From there it is deposited onto the neighbouring heap via a discharge belt which is 1.400 mm of width. A rubber-coated pusher installation ensures an accurate clearing of material from the ground.

After having reached the end of the windrow, the machine is driven back, across the cleared windrow area, to the starting position. Driving back is quick and easy. The side conveyor can be dismantled in a short time. Thus additional turning with the basis machine is possible.

If it does not exist yet, the price for the side-conveyor preparation has to be added.

- Depositing side in driving direction: left
- Working capacity: up to 1.200 m³/h

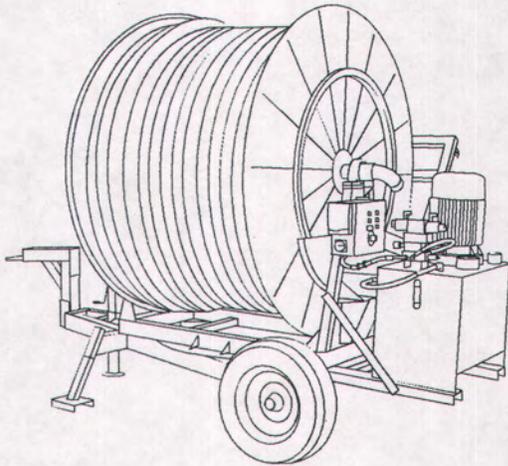
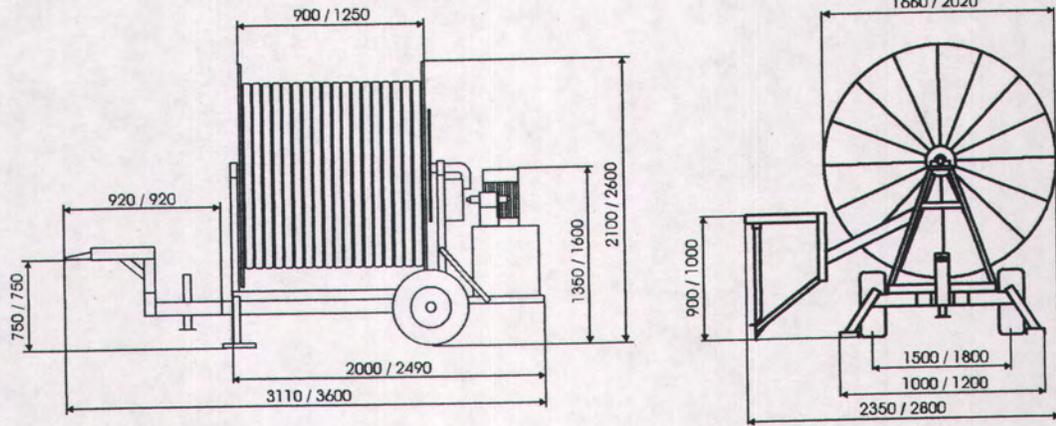


- **Armoured rotor tools**

Build-up welded throwing tools enhance the abrasion resistance and replace the standard tools. These are especially suitable, if the composting material contains stones etc.

- **Hose drum wagon for water supply of a BACKHUS turning machine**
amount of flow: up to 500 l/min, PE-HD-pipe: Ø 63 mm, 200 m

The hose drum wagon is equipped with a 200 m PE-HD-pipe, Ø 63 x 4 mm. It allows a flow rate of 500 l/min. The hose drum is mounted on a one-axle chassis. The water flows through an external supply hose which is connected to a hydrant or pump to be provided by the plant operator. During the turning process, the turner pulls the hose off the hose drum wagon and pulls it along in longitudinal direction between 2 heaps. Because of the drum drive (400 V / 500 Hz) continuous tension is applied to the pipe. Thus, the pull-in is automatically adjusted to the speed of the turner. As soon as the compost turner has reached the end of the heap, the machine turns into opposite direction in front of the heap which is on the other side of the hose. When the machine drives back, the hose is automatically winded up. The hose drum wagon is also equipped with a radio control (ON/OFF). Power supply is provided by CEE 16A connector:

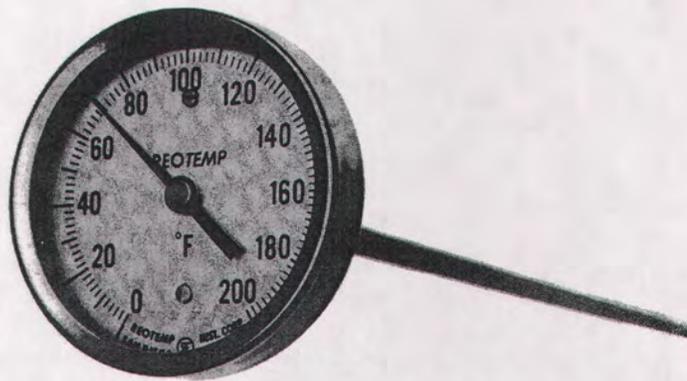


- **Steel track plates**

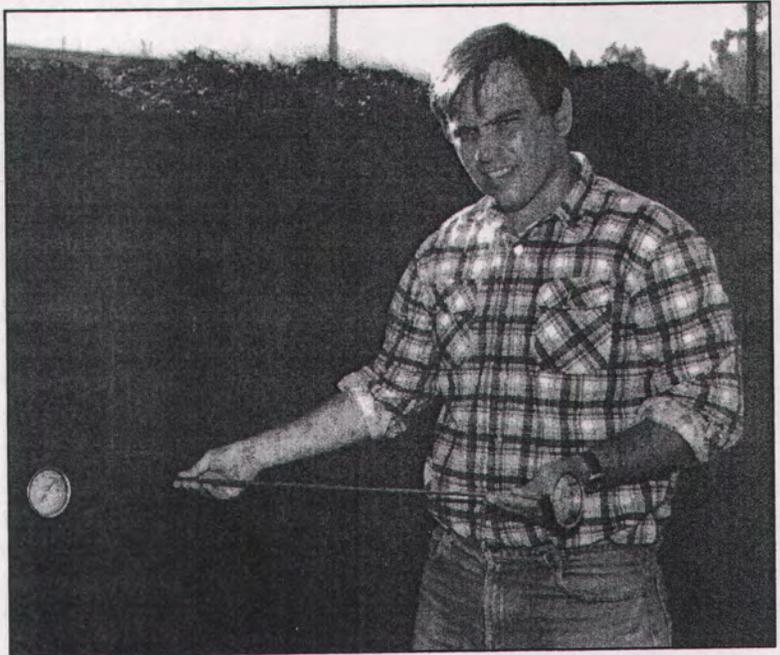
For the use on unsealed areas, e.g. gravel, the track chains can be equipped with steel plates instead of rubberized ones.

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*NOTE: When ordering Model 701K please specify 'F' for Fahrenheit or 'C' for Celsius.



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Model

320

Portable General-Purpose Oxygen Analyzers

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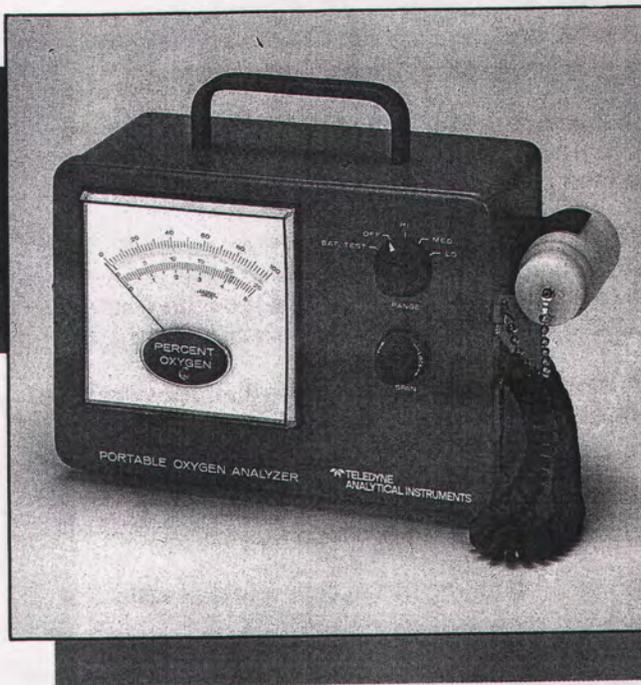
The Series 320 analyzers utilize Teledyne's patented* Micro-Fuel Cell to measure the concentration of oxygen in a sample gas. This oxygen sensor is specific to oxygen, has an absolute zero, is insensitive to flow, and produces a linear output from zero through 100 percent oxygen.

The Micro-Fuel Cell is a sealed electrochemical transducer with no electrolyte to change or electrodes to clean, so it is virtually maintenance-free. When the sensor reaches the end of its useful life, it is merely discarded and replaced as one would dispose of the battery in a flashlight.

Air Calibration

The Series 320 analyzers are designed for calibrating with ambient air, eliminating the need for supporting calibration gases. The cell is exposed to air (20.9% O₂), at

*U.S. Patent No. 3,429,796 and 3,767,552



which time the span control is rotated until the meter indicator coincides with the red calibration mark on the 0-25% range.

Cell-Saver

All Series 320 analyzers incorporate a cell-saver cap. With the cap in place, the cell will consume the oxygen in the trapped gas space and the output will drop off toward zero. This feature keeps oxygen away from the cell when the instrument is not in use, thereby prolonging the life of the cell.

Power Options

Models 320A, 320B and 320B/RC are configured identically, differing only in their power requirements and external signal outputs. Power options are as follows:

- 320A** — 115 VAC, 50/60 Hz (220 VAC, 50/60 Hz optional)
- 320B** — Dry cell battery powered
- 320B/RC** — Rechargeable battery powered

Also available is the AC-powered **Model 320C**. This dual-range instrument includes two fully adjustable alarm setpoints, with a built-in alarm annunciator and indicator lights.



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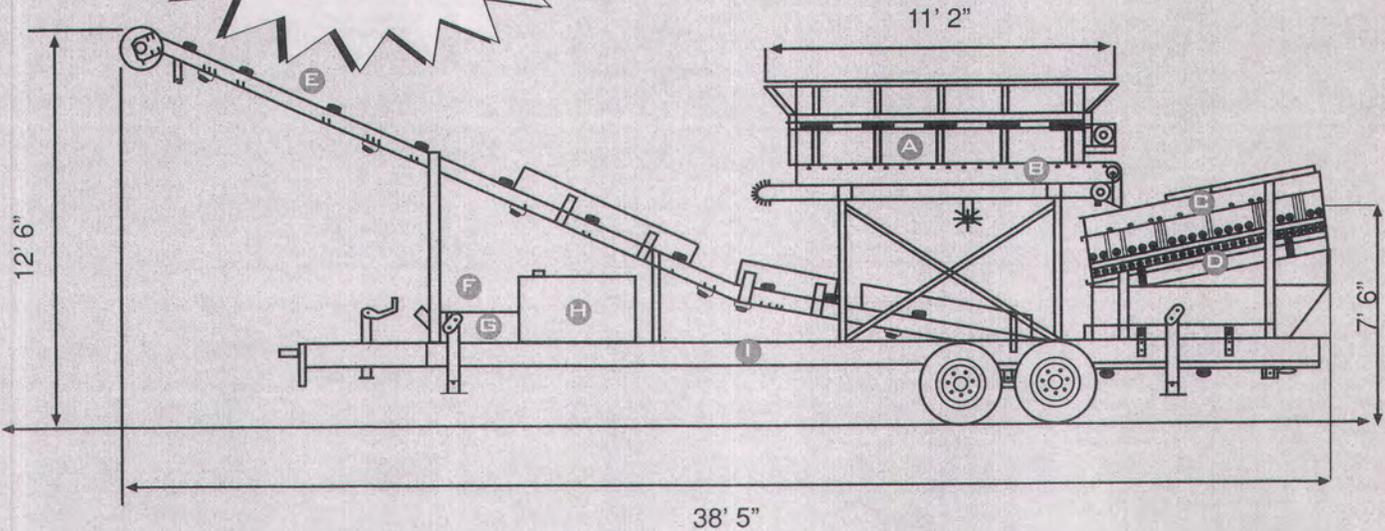
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Soil Data

December 31, 2001

Soils Report
Proposed Compost Site
Novozymes North America, Inc.
Franklin County, NC

Summary

This report summarizes the results of a soils investigation of a proposed large Type 3 composting site owned by Novozymes NA, Inc. in Franklin County, North Carolina. The soils were investigated according to requirements of the North Carolina Solid Waste Rules (15A NCAC 13B). More specifically, this investigation was conducted to meet requirements outlined in section .1405 (4)(B) of the rules.

Results indicate that there are 3 predominant soil units at the site. The Helena series is located in the concave head of a drain on the west side of the site. The Vance and Wedowee series occupy the ridge tops and slopes. All 3 units have dense argillic horizons. There is noticeable compaction across the site in the upper argillic and overlying Ap horizon in the Vance and Wedowee units.

These soils should be adequate for the proposed compost pad if the sandy Ap horizons are removed and the argillic horizons compacted prior to placement of the proposed crush and run pad.

The depth to the seasonal high water table is >12 feet. Long-term monitoring of nearby groundwater monitoring wells indicates that the depth to groundwater is 15 to 25 feet. This site meets the minimum requirement for vertical separation between the pad and indicators of seasonal high water table.

Site Description

The proposed composting pad site is located south of Hwy 56 approximately 6 miles east of Franklinton, North Carolina (**Figure 1**). The site is located on an upland agricultural field within the Cedar Creek watershed of the Tar River. The site is located on a broad ridge that slopes down to the north, south and east toward tributaries to Cedar Creek. The Franklin County soil survey shows that the site is predominantly Wedowee series. Associated soil series in this setting include Cecil, Appling, Vance, and Helena.

Field Investigations

Three representative pits were excavated to a depth of 5-6 feet. Pit 1 was located on the ridge top at the south end of the proposed compost pad area. Pit 2 was located in the head of a drainage on the west side of the site. Pit 3 was located on the north end of the site on the ridge top. Soil horizons were identified and described for each pit (**Appendix A**). Soil samples were collected from each horizon to a depth of 6 feet and analyzed for typical soil parameters (**Appendix B**). Soil map units were defined from features

expressed in the soil pits, and selected criteria were used to map soil units across the site. Approximately 75 soil borings were made to delineate the soil map units.

RESULTS

Soil Units

There were 3 distinct soil series identified and mapped (**Figure 2**). The Vance series was identified in Pit 3 at the north end of the site on the highest part of the ridge top. The Helena series was identified in Pit 2 and occupies the slopes and bottom of the drainage in the western portion of the site. Helena was differentiated from the Vance based on higher moisture content in the subsoil of Helena. The Wedowee unit was identified in pit 1 and was mapped in the remainder of the site. The Wedowee was distinguished from the Vance and Helena based on predominantly red to strong brown (5YR to 10 YR) subsoil colors compared to predominantly strong brown to yellow brown color (10YR to 2.5Y) in the subsoil for Vance and Helena. The boundaries between Helena and Vance and Helena and Wedowee were abrupt (less than 50 feet). Boundaries between Wedowee and Vance were broader (typically 50-100 feet).

Seasonal High Water Table

The depth to the seasonal high water table is >12 feet in the 3 soil pits. Nearby groundwater monitoring wells indicate that the depth to groundwater is 15 to 25 feet.

Low chroma redox depletion features and redox concentrations were observed in pit 2 (Helena unit) beginning at 36" in the BC horizon. These indicators reflect higher seasonal soil moisture content and slower permeability. Once the compacted compost pad is constructed, infiltration of rainwater will be greatly reduced, and it is unlikely that these conditions will persist.

For the pad area, the sandy textured upper horizons will be removed down to the clayey Bt horizons. In the Helena unit, the sandy upper horizons will be removed and filled with approximately 24" of compacted clay and 12" of compacted crush and run. This will result in a minimum separation of 48" between the pad surface and the low chroma redox depletion features.



Appendix 1. Soil Pit Profile Descriptions

Pit #1

Location: Novozymes North America, Inc. Farm 3, Field G3

Landscape position: Broad ridgetop

Slope: 1-3%

Horizon	Depth (inches)	Description
Ap	0-7	Dark brown to brown (10YR 4/3) sandy loam. Weak, fine subangular blocky structure. Nonsticky, non plastic, very friable. Abrupt, wavy boundary. Many fine and medium roots.
Bt1	9-14	Yellowish red (5YR 5/6) clay with few, fine, distinct red (2.5YR 4/8) redox concentrations and common, coarse, distinct brown to dark brown (10YR 4/3) depletions. Moderate, very coarse prismatic structure breaking into weak coarse subangular blocky structure. Common 10YR 4/3 coatings on ped faces extending greater than 10 cm into underlying horizons. Thick continuous clay films on ped faces. Many, continuous clay films within peds. Slightly sticky, slightly plastic, firm. Common fine and few medium roots.
Bt2	14-21	Yellowish red (5YR 5/6) clay with common coarse, distinct red (2.5 YR 4/8) redox concentrations. Weak to moderate, very coarse to medium prismatic structure breaking into coarse subangular blocky structure. Thick continuous brown (7.5 YR 4/3) clay films on ped faces extending > 10 cm into adjacent horizons. Slightly sticky to sticky, plastic, firm to very firm. Few fine roots.
Bt3	21-38	Yellowish red (5YR 5.6) clay loam with few medium faint red (2.5YR 5/8) redox concentrations. Common red (2.5 YR 5/8) grain coatings. Very coarse, moderate prismatic structure breaking into medium to coarse, moderate subangular blocky structure. Slightly sticky, slightly plastic to plastic, firm. Few fine roots. Gradual boundary.
CB	38-50	Yellowish red (5YR 5/8) clay loam with common medium distinct red (2.5 YR 4/8) redox concentrations. Weak medium subangular blocky structure. Slightly sticky, plastic, friable. Common areas of relict rock foliation with common K feldspar and quartz grains.
C1	50-62	Yellowish red (5YR 5/8) clay loam with few medium distinct red (2.5YR 4.8) redox concentrations. Weak medium subangular blocky structure.

Slightly sticky, plastic, friable. Relict rock foliation. Few thin continuous clay films in localized areas.

C2 62+ Gneissic granitic saprolite. Clay loam texture.

Pit #2

Location: Novozymes North America, Inc. Farm 3, Field G3

Landscape position: Head of concave depression below ridgetop.

Slope: 1-3%

Horizon	Depth	Description
Ap1	0-5	Dark brown (7.5 YR 3/2) sandy clay loam. Weak, medium subangular blocky structure. Nonsticky, slightly plastic to nonplastic, very friable. Many fine and common medium roots.
Ap2	5-11	Dark brown (10YR 3/3) sandy clay loam. Weak subangular blocky to massive structure. Compacted. Slightly sticky, plastic, friable to firm. Common fine roots.
Bt1	11-20	Dark yellowish brown (10YR 4/4 to 4/6) clay to clay loam. Weak, coarse subangular blocky structure. Slightly sticky, plastic, friable to firm. Few fine roots.
Bt2	20-36	Yellowish brown (10YR 5/6) clay. Weak, coarse subangular structure. Slightly sticky to sticky, plastic, friable to firm.
BC	36-51	Yellowish brown (10YR 5/6) clay with common, fine to medium, distinct grayish brown (2.5Y 5/2) redox depletions and few fine distinct yellowish red (5YR 5/6) redox concentrations. Weak subangular blocky to massive. Very sticky, plastic, firm.
C	51-60+	Light yellowish brown (2.5Y 6/4) clay to silty clay. Few, coarse, distinct strong brown (7.5YR 5/8) redox concentrations. Massive. Slightly sticky, slightly plastic to plastic, friable.

The Bt1 and Bt2 horizons were noticeably moister than overlying horizons.

Pit # 3

Location: Novozymes North America, Inc. Farm 3, Field G3

Landscape position: Broad ridgetop

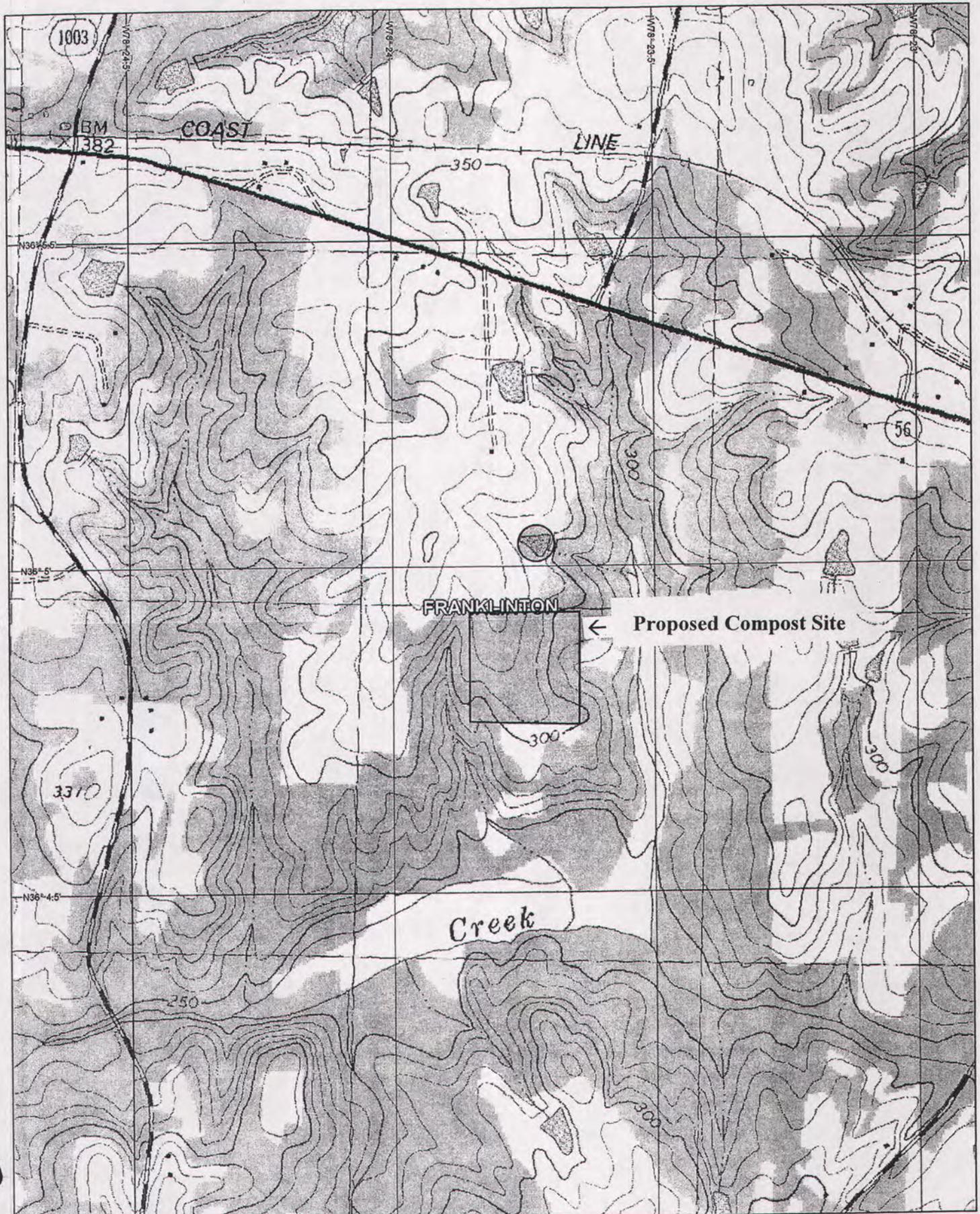
Slope: 1-3%

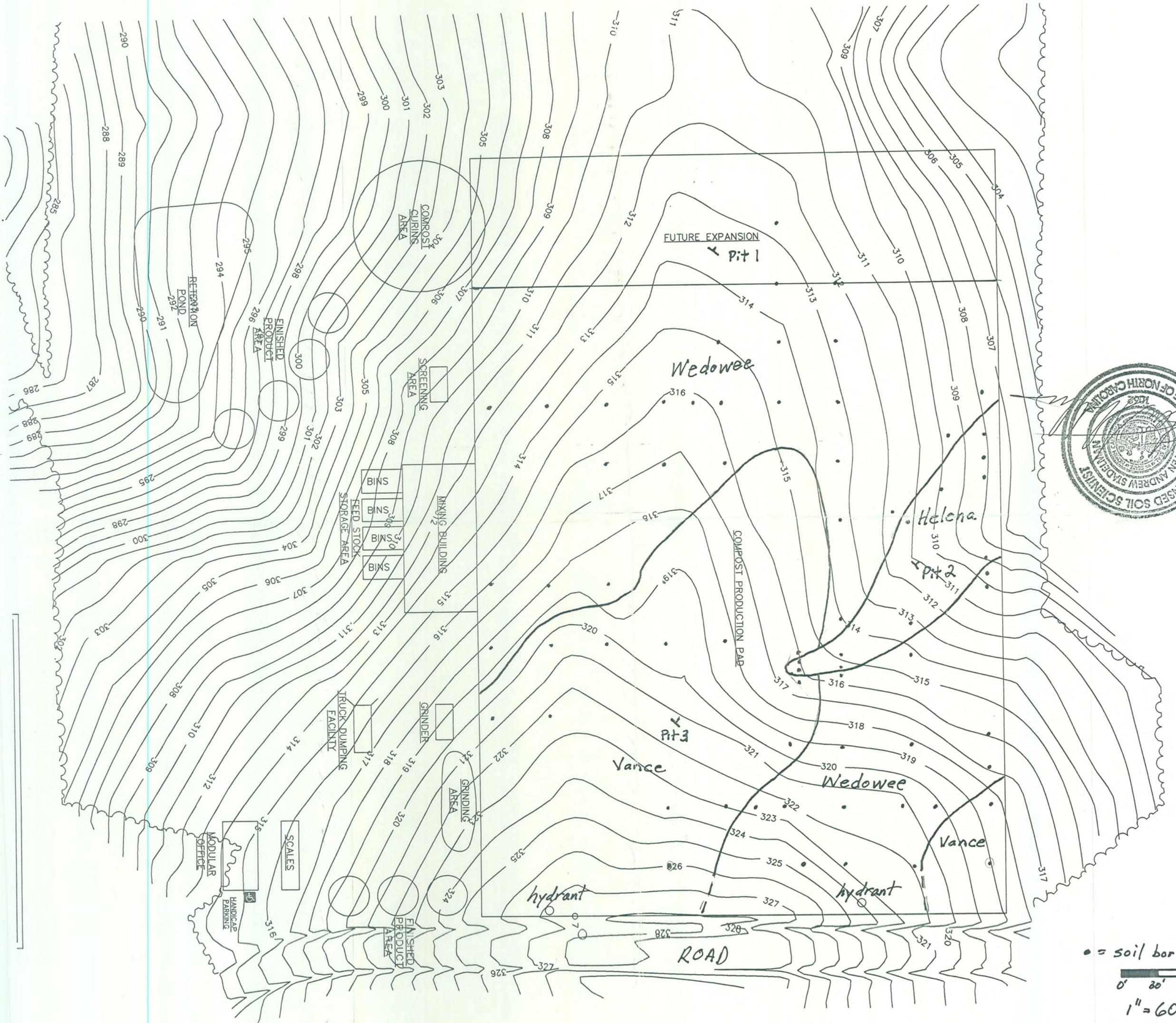
Horizon	Depth (in)	Description
Ap1	0-5	Brown (10YR 4/3) sandy clay loam. Weak medium subangular blocky structure. Slightly sticky, slightly plastic, very friable. Abrupt lower boundary. Many fine and common medium roots.
Ap2	5-10	Olive brown (2.5Y 4/3) sandy clay loam. Massive, compacted. Slightly sticky, slightly plastic, firm. Clear lower boundary.
Bt1	10-15	Light olive brown (2.5Y 5/4) clay. Weak medium subangular blocky to massive structure. Common, thin clay coatings on grain surfaces. Few discontinuous clay films. Sticky, plastic, firm. Clear lower boundary.
Bt2	15-23	Light olive brown (2.5Y 5/6) clay. Common, fine to medium, distinct red (2.5YR 5/8) redox concentrations. Weak subangular structure. Common discontinuous clay films. Sticky, plastic to very plastic, firm.
Bt3	23-33	Light olive brown (2.5Y 5/6) clay. Many, fine to medium distinct red (2.5Y 5/8) redox concentrations. Weak prismatic breaking into moderate subangular blocky structure. Many thick, olive brown (2.5Y 4/4) continuous clay films on ped faces. Clay coatings commonly extend > 10 cm. Sticky to very sticky, very plastic, firm.
Bt4	33-46	Light olive brown (2.5Y 5/6) clay with broad inclusions of red (2.5YR 5/8) redox concentrations sandy clay loam to clay loam. Few medium to coarse faint light yellowish brown (2.5Y 6/4) redox depletions. Many fine to medium very distinct red (2.5YR 5/8) redox concentrations. Moderate prismatic structure breaking into moderate subangular blocky structure. Common thick continuous clay coatings on ped faces extending > 10 cm. Many thin (2mm) clay layers interbedded with coarser feldspar and quartz grains. Sticky, plastic, firm.
C	46-70+	Strong brown (7.5YR 5/6) clay loam to sandy clay loam. Massive. Slightly sticky, slightly plastic, friable. Relict rock foliation and common feldspar, quartz, and mica. Granitic, gneissic saprolite.

Appendix B. Soil Test Results

Sample #	Horizon	Depth (inches)	pH	CEC	OM %	P ppm	K ppm	Mg ppm	Ca ppm	Na ppm	Na %	B ppm	Cl ppm	Sol. salts mmhos/cm	Nitrate ppm	S ppm	Zn ppm	Fe ppm	Cu index	Mn index
Pit 1 (Wedowee)																				
P1-AP	Ap	0-9	7.7	7.0	1.8	173	788.5	48	822.5	113	7.0	5	140	0.31	21	17	16	97	0.1	13
P1-BT1	Bt1	9-14	7.4	6.4	1.5	17.5	1099.5	89	465	123	8.3	4.5	62	0.24	8	18	2	25	0.3	12
P1-BT2	Bt2	14-21	7.4	7.5	2	3	1397.5	107	489.5	142	8.2	5.2	68	0.25	3	21	2	19	0.3	10
P1-BT3	Bt3	21-38	7.3	5.3	0.4	0.5	724.5	110.5	345.5	183	15.0	0.1	75	0.27	2	30	1	9	0.4	13
P1-BC	CB	38-50	6.3	6.5	0.5	0.5	412.5	99.5	320	148	9.9	0.2	77	0.19	2	41	1	7	1.0	27
P1-C1	C1	50-62	4.5	5.8	0.6	0.5	208	95.5	266	162	12.2	0.1	67	0.20	2	60	1	8	2.0	52
P1-C2	C2	62	4.5	5.2	0.4	1	174.5	83.5	222	135	11.2	0.1	55	0.18	2	53	1	8	2.0	52
Pit 2 (Helena)																				
P1-AP1	Ap1	0-5	7.4	7.1	1.6	119.5	742.5	67.5	837	110	6.7	4.6	92	0.26	7	17	13	52	0.1	22
P1-AP2	Ap2	5-11	7.4	5.0	0.7	67	620.5	56.5	520.5	77	6.7	2.3	75	0.14	5	15	7	39	0.1	29
P1-BT1	Bt1	11-20	7.2	3.9	0.5	8.5	582.5	48.5	289	80	9	2.6	61	0.14	2	15	3	27	0.4	29
P1-BT2	Bt2	20-36	7.2	3.9	0.3	0.5	601	57	271.5	75	8.4	2.7	46	0.14	3	16	1	20	0.4	16
P2-BC	BC	36-51	5.2	4.0	0.5	0.5	366.5	123	326.5	100	10.8	0.1	44	0.14	6	65	1	20	1.6	42
P2-C	C	51-60	4.5	7.3	1.1	0.5	57.5	91	453.5	121	7.2	0.1	49	0.15	16	22	1	15	2.0	51
Pit 3 (Vance)																				
P3-AP1		0-5	6.9	7.2	1.6	83.5	651.5	62.5	693.5	105	6.4	4.0	66	0.33	15	17	14	59	0.3	26
P3-AP2		5-10	7.2	3.5	0.1	55	344.5	39.5	388.5	42	5.2	1.1	43	0.1	5	14	6	47	0.2	25
P3-BT1		10-15	7.2	3.1	0.5	13	419.5	40	273	44	6.1	1.3	45	0.07	3	14	2	27	0.3	18
P3-BT2		15-23	7.2	5.1	0.6	2	824.5	68.5	370	69	5.9	2.6	38	0.08	3	16	1	20	0.4	14
P3-BT3		23-33	6.1	4.4	1.2	0.5	605.5	111.5	322	76	7.5	0.1	47	0.11	2	54	1	16	1.1	29
P3-BT4		33-46	5.8	4.2	0.5	1	458	114	331	87	9.1	0.2	44	0.1	2	42	1	13	1.2	34
P3-C		46-70	4.5	3.0	0.1	1.5	89	53.5	151	79	11.6	0.1	38	0.09	2	42	1	10	2.0	52

Figure 1. Site Location (USGS Franklinton Quadrangle)





• = soil boring
 0' 30' 60'
 1" = 60'

Erosion Control

**State of North Carolina
Department of Environment
and Natural Resources
Raleigh Regional Office**

**Michael F. Easley, Governor
William G. (Bill) Ross, Secretary**



**DIVISION OF LAND RESOURCES
LETTER OF APPROVAL
May 6, 2003**

Novozymes North America, Inc.
P. O. Box 576
Franklinton, NC 27525

**RE: Project Name: Novozymes Composting Facility
County: Franklin
Submitted by: Jeffrey B. Clauss, P.E.
Date Received: 04/09/03; 04/29/03
Date Processing Initiated: 04/09/03
Watershed: Tar-Pamlico #1/03-03-01
New Submittal (X) Revised ()**

Dear Sir/Madam:

This office has reviewed the subject Erosion and Sedimentation Control Plan. We find the plan to be acceptable and hereby issue this letter of approval. If any modifications, performance reservations, or recommendations are applicable, a list is enclosed and is incorporated as a part of this letter of approval. The enclosed Certificate of Approval should be posted at the job site. In addition, it should be noted that this plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, in accordance with Title 15A, North Carolina Administrative Code (NCAC) 4B.0029.

If any modifications are not incorporated into the plan and implemented in the field, the site will be in violation of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute (NCGS), 113A-61.1).

15A NCAC 4B.0018(a) requires that a copy of the approved plan be on file at the job site. Also, this letter gives the notice required by NCGS 113A-61.1(a) concerning our right to perform periodic inspections to ensure compliance with the approved plan.

North Carolina's sedimentation pollution control program is performance oriented, requiring protection of the natural resources and adjoining properties. If at any time during this project it is determined that the Erosion and Sedimentation Control Plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (NCGS 113A-51 through 66), this office may require revisions in the plan and its implementation to ensure compliance with the Act.

PLAN REVIEW COMMENTS

PROJECT NAME: Novozymes Composting Facility	DATE RECEIVED: 4/9/03; 4/29/03
LOCATION: Franklin County	REVIEWED BY: Charles Phillips; Bill Denton
New Submittal (X) Revised ()	Approved (X) Disapproved ()
Reasons for Disapproval ()	Modifications (X) Performance Reservations ()

Once Rock Dam Sediment Trap Structures are built, tie silt fence below these structures to ends of spillways so as not to direct concentrated discharge through silt fence. Similarly, the silt fence below the 24-inch RCP at the southeast corner of the site should be relocated above the pipe outlet once installation of the pipe and outlet protection is done.

RECOMMENDATIONS AND/OR COMMENTS:

**NOVOZYMES COMPOSTING FACILITY
EROSION AND SEDIMENTATION CONTROL PLAN**

NOVOZYMES NA, INC.

FRANKLINTON, NC.

APRIL 2003

PREPARED BY Jeffrey B. Clauss, P.E.

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NARRATIVE

Project Description Overview

Novozymes NA, Inc wishes to construct a composting facility on the existing farm property. This compost site is situated in the center of the large tract of existing farm land owned by Novozymes. The tract is located approximately six miles east of Franklinton, south of highway 56, in Franklin County, North Carolina. The aerial photograph included in this presentation graphically shows that the site is far removed from adjacent property lines and also from Cedar Creek which drains to the Tar River Basin. Approximately 15 acres will be disturbed during construction of the site. A vicinity map is included showing the proposed site on Smith Farm Road. This road is now a gravel sub-secondary road and, as such, the problem of gravel entrance protection is avoided.

The composting operation and construction of this site is controlled by the North Carolina Solid Waste Rules which require on-site containment of storm water from a 25 year/24 hour storm. The process equipment for that operation are not part of this Erosion Control Permit Application. In accordance with the North Carolina Department of Environment, and Natural Resources, Land Quality Division regulations, the site ditches, slope protection, vegetation, culvert and basins are designed for a 10 year/24 hour storm event. A detailed site grading and erosion control *Drawing C-1* is included. Also the Soil Investigation Report is included for the specific site.

The supporting calculations are included for runoff, ditch, and culvert design along with the construction drawings and specifications for erosion control practices. The *Drawing C-1* is coded to define the ditch numbers and structure numbers used in preparation of the corresponding calculations. All existing topo was surveyed and referenced to the Novozymes plant coordinate system with elevation bench marks accordingly transferred to the site. Final grading topo was developed to satisfy the compost process requirements.

The compost windrow turning equipment must have a reasonably flat slope so the interior of the site does not have defined road/ditch sections and profiles. The *Drawing C-1* shows the compost site requirements inside the containment dike. The compost primary and secondary containment basins are shown. The primary and secondary containment holding basin will be constructed and used during the site construction process. These basins will be cleaned regularly during construction per specifications.

Site Description

The site is located on existing rolling farm land that has been cleared and farmed. The aerial photograph and the *Drawing C-1* define the site topography. The existing drainage patterns will remain in tact and the construction process will reduce the slope of the drainage area. Drainage onto the site should not be a problem during construction. Also the runoff to Cedar Creek and tributaries will not appreciably change after construction because of on site

containment requirements. The thin layer of cultivated topsoil can be reused during the landscape and seeding operations.

Site Adjacent Property

The adjacent property is farmland with the property lines far removed from the construction site. The nearest highway is highway 56 which is approximately one mile from the site. The farm road will remain usable and remain after site construction.

Soils

The geologist site specific soil report is included for reference. From this report and much previous construction experience, the soils work well and are stable for a 2:1 slope. The on site soils do not erode easily and with proper construction sequencing and control practices, silting of existing streams should not be a significant issue.

From the soils classifications and the information included in section 8.01.1, the soil erodability factor "k" =0.24 which should not cause unforeseen problems during construction.

DESCRIPTION OF EROSION CONTROL PRACTICES TO BE CONSTRUCTED FOR THE COMPOST SITE

Sediment Fence: Practice Nr. 6.62

Sediment fence shall be installed as shown on *Drawing C-1* and around the small stockpile of suitable topsoil. The locations specified will intercept sediment laden runoff from the construction process. See construction specification and drawing.

Temporary Gravel Construction Entrance: Practice Nr. 6.06

The site location on the gravel farm road eliminates the customary need for this practice; however, the initial construction activities will be to set up the Compost Office Trailer. For convenience of access, the practice will be employed near the office trailer. The physical requirements for the scales dictate finish grading per the *Drawing C-1* so a specific practice construction specification is not included.

Rock Dam #1: Practice Nr. 6.63

The rock dam is located at the south east side of the project as shown on *Drawing C-1*. The interior of the basin embankment on three sides will be covered with rip rap placed over filter fabric. A temporary rock weir 12 inches high will be placed at the inlet channels from Ditch #1 and Ditch #2 to reduce the entrance velocity. This reduction will enhance the sediment stripping capability of the practice. The rock dam/outlet will be crushed rock Class B rip rap with #57 stone filter on the inside. The outlet channel protection will be constructed 25 feet wide and 45 feet long with little or no slope to dissipate the energy. Reference the construction specification and drawing attached.

Rock Dam #2: Practice Nr. 6.63

The rock dam is located at the south west side of the project as shown on *Drawing C-1*. The interior of the basin embankment on three sides will be covered with rip rap placed over filter fabric. A temporary Class B rip rap rock weir 12 inches high will be placed at the inlet channel from Ditch #3SW to reduce the velocity below 4 fps. The rock dam/outlet will be crushed rock Class B rip rap with #57 stone filter on the inside. The outlet channel protection will be constructed 20 feet wide and 35 feet long. Rip rap stone shall be placed as level as possible with a 12 inches high cross channel dissipation apron at the outlet end. Reference the construction specification and drawing attached.

Rock Dam #3: Practice Nr. 6.63

The rock dam is located at the west side of the project as shown on *Drawing C-1*. The interior of the basin embankment on three sides will be covered with rip rap placed over filter fabric. A temporary Class B rip rap rock weir 12 inches high will be placed in the inlet channel from Ditch #6 to reduce velocity below 4.75 fps. The rock dam/outlet will be crushed rock Class B rip rap with #57 stone filter on the inside. The outlet channel protection will be constructed 25 feet wide and 20 feet long. Rip rap stone shall be placed as level as possible with a 12 inch high cross channel dissipation apron at the outlet end. Reference the construction specification and drawing attached.

Check Dams: Practice Nr. 6.83

Check dams are to be located at the west end of Ditch #7N and Ditch #7S at each side of regarded farm road shown on *Drawing C-1*. These structures will be Class B rip rap with #57 stone filter on the interior. Place three check dams on each side of the road starting at the end of the road grading limit. Reference the construction specification and drawing attached.

Temporary Block and Gravel Drop Inlet Protection: Practice Nr. 6.52

Two block and gravel drop inlet protection measures are required. One is located at the inlet of the culvert draining Ditch #8 and Ditch #9W. The remaining measure is located at the catch basin north east of the scale. Reference the construction sketches and the specifications.

Grass Lined Channels: Practice Nr. 6.30

The ditch identification and hydraulic regions are labeled on *Drawing C-1*. Grass lined channels will be used for all ditching except for the lower portions of Ditch #1. Bermuda grass has been successfully used to restore similar farm areas on Novozymes property; therefore, the project will continue that practice. Temporary Curlex type 1 or Curlex type 2 protective liners are required as noted below.

Ditch #1 upper portion, Ditch #3-#7N & #7S, #8, #9E & #9W, #10, #11

Bermuda grass

Curlex type 1 bottom and side protection

Ditch #2 through

Bermuda grass

Curlex type 2 bottom and side protection

Calculations are enclosed for the site runoff flows and resulting ditch designs.

Rip Rap Lined Channels: Practice Nr. 6.31

The ditch identification and hydraulic regions are labeled on *Drawing C-1*. Rip Rap channel protection will be utilized for the lower reaches of Ditch #1. The hydraulic divisions of this channel range from the basin inlet to "Q4 sequentially to "Q1". The section above Q1 is a grass lined channel.

All ditch bottoms and side slopes are constructed from Class B rip rap placed on filter fabric. Reference the construction sketches and specifications.

Culvert and Outlet Stabilization Structures: Practice Nr. 6.41

One 24" diameter RCP, Class B, T&G culvert will be installed on this project. The outfall of the culvert will terminate in a precast concrete flared end section. A rip rap down stream stabilization apron will be constructed to reduce outlet velocity. Reference the attached construction sketches and calculations.

Surface Roughening: Practice: Nr. 6.03

Project site cut slopes are 2:1 and will be roughened by disking or tracked in prior to application of lime, fertilizer, and Bermuda grass. The fill slopes are also on 2:1 and will be tracked in prior to application of lime, fertilizer, and Bermuda grass.

Slope and Surface Stabilization

The Novozymes practice of stabilizing slopes with Curlex Type 1 after seeding has been successfully used for rehabilitation and will be utilized in the compost site construction.

Dust Control and Farm Road Maintenance

The grading contractor shall be responsible for dust control and maintenance of the existing sub-secondary farm road to the site. The Novozymes Project Site Engineer, J.B. Clauss, P.E. will direct the contractor should a problem become evident.

Site Grading and Excavation: Practice Nr. 6.02

The north end of the site will be cut to approximate elevation 315.00 as shown on *Drawing C-1* and the existing farm road grade will be significantly reduced. This will actually reduce the potential of future erosion. The cut and fill slopes are 2:1 and shall be seeded upon constructing to finish grade. All organic and unsuitable material will be removed and stockpiled to the south of the site. The fill embankments at the south east side of the site will be placed as shown following installation of the compost process piping to and from the retention basins. The fill shall be placed in 10 inch lifts and compacted to 98% standard Proctor. Upon completion of the process ponds, they will be used in conjunction with erosion control measures until the site grading is completed.

Culverts, ditches, and control measures listed herein will be placed and maintained throughout the grading contract

SITE WORK CONSTRUCTION SEQUENCE

1. The site grading permit and the compost facility permit (solid waste) are required prior to commencing construction.
2. During the permit approval process, layout the construction limits, set line and grade stakes, layout sediment control structures, and define clearing and grubbing limits.
3. Conduct on site walk through and preconstruction meeting with the selected grading contractor prior to site mobilization.
4. Install the silt fences and the rock dams. Permanently seed the areas disturbed during installation upon completion of these structures.
5. Relocate the existing irrigation line and add one valve (process piping).
6. Install the drop inlet and the 24 inch diameter culvert structure. Install the flared end section and the down stream rip rap apron. Place the specified control practices at this location.
7. Install compost process pipe for the ponds and for the process discharge line. (process piping).
8. Cut and final grade for the farm road and road ditches, including the control measures specified. Place filter fabric and place 10 inches of ABC stone for the road surface.
9. Prepare and seed the cut slopes at the north end of the site and seed disturbed areas from road construction.
10. Begin cut and fill operations to allow installation of the compost site offices.
11. Remove organic and unsuitable material (very limited quantity) from the main site and place in the temporary stockpile south of the site. Install silt fence around stock pile.
12. Remove organic and unsuitable material (very limited quantity) from the main site and place in the temporary stockpile south of the site.
13. Begin mass cut and fill operations concentrating on construction of the perimeter containment dikes and retention ponds.
14. Complete finish grade and permanently seed site slopes and grass lined channels.
15. Place the rip rap for the Ditch #1 lower portion

16. Install all remaining rip rap outlet protection practices to tie the new construction into the existing topography as shown on *Drawing C-1*.
17. Inspect and maintain the erosion control structures and maintain the grassed slopes and ditch lining. See the attached maintenance plan.
18. Upon stabilization of the site, remove all temporary control measures and repair any disturbed areas.
19. Estimated time for completion of site work is 4 months.

MAINTENANCE PLAN FOR COMPOST FACILITY
EROSION AND SEDIMENT CONTROL STRUCTURES

During Construction Phase

1. All erosion and sediment control practices will be inspected for stability and operation after each storm event and at one week intervals. Repairs and silt cleaning will be directed by the Novozymes site engineer, J.B. Clauss, P.E.
2. The basins on site shall be cleaned out when the trapped sediment has accumulated to 50% of the design capacity of the structure. If filter stone is not functional for drainage due to trapped silt, clean or replace the filter stone.
3. The two block and gravel protection structure at the culvert and catch basin shall be cleaned when silt has accumulated to 50% capacity. Remove silt and replace or wash silt from stone to assure drainage. Replace the silt fabric should it become clogged with silt.
4. Silt fence shall be back graded to remove accumulated silt. This will be performed when approximately 8 inches of silt is trapped above the existing grade slope. The fence and posts shall be maintained in the original configuration. Replace any fabric that is torn or saturated and clogged with silt.
5. Constructed channel linings will be inspected and repaired as required and directed by the Site Engineer.
6. All seeded areas will be protected by Curlex Type 1. The seeding and proactive mat shall be inspected and repaired as required.
7. The contractor shall water the grassed areas as required to assure a vigorous growth of protective grasses.

After Construction Phase

1. Maintain the above inspection routine until the stand of vegetation is established.
2. Once the vegetation is established the Compost Site Operator shall inspect the control measures every 30 days or after an unusually severe storm event.
3. Refertilize the site grasses each April with 50 pounds per acre of nitrogen.
4. Mow as desired.

VEGETATION PLAN FOR COMPOSTING SITE

Temporary Seeding: Practice Nr. 6.10

Temporary seeding shall be applied to stripped and denuded areas that will not be completed per lines and grades for more than 30 days.

- Roughen these areas by disking or tracking in slopes in accordance with Practice Nr. 6.03.
- Apply ground agricultural limestone at the rate of 1 ton per acre. Apply uniformly to the applicable areas and work into the soil by raking or disking.
- Apply fertilizer (10-10-10) at a rate of 800 pounds per acre. Apply uniformly to the applicable areas and work into soil by raking or disking. If hydro-seeding is utilized, do not mix seed and fertilizer more than 30 minutes prior to application.
- Seed with German Millet at the rate of 40 pounds per acre. This applies for the construction process which will be completed before fall.
- Mulch with straw at a rate of 2 tons per acre. Anchor straw by tacking with asphalt or netting.
- Maintain temporary seeded areas by watering, refertilizing, reseeding, and remulching due to damage or erosion.

Permanent Seeding for Channels and 2:1 Cut or Fill Slopes: Practice Nr. 6.11

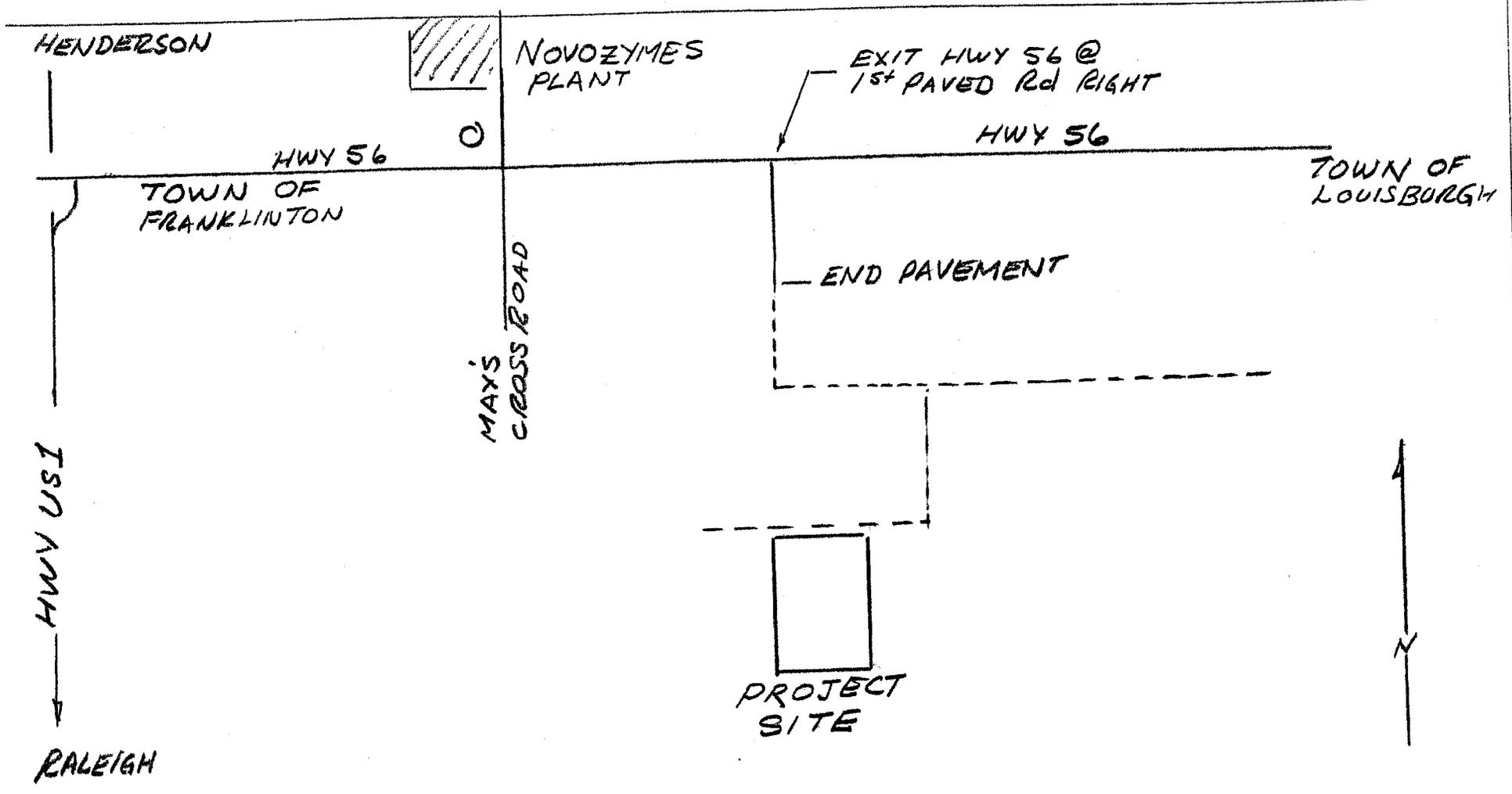
For general site and for slopes excluding channel protection, the following procedure shall be used. This practice is defined as Seeding Nr. 1P.

- Roughen these areas by disking or tracking in slopes in accordance with Practice Nr. 6.03.
- Apply ground agricultural limestone at the rate of 2 ton per acre. Apply uniformly to the applicable areas and work into the soil by raking or disking.
- Apply fertilizer (10-10-10) at a rate of 1000 pounds per acre. Apply uniformly to the applicable areas and work into soil by raking or disking. If hydro-seeding is utilized, do not mix seed and fertilizer more than 30 minutes prior to application.
- Seed with the following seed mixture:
 1. Tall fescue at 100 pounds per acre
 2. Sericea lespedeza at 30 pounds per acre
 3. Kobe lespedeza at 10 pounds per acre
 4. Common Bermuda grass at 10 pounds per acre.
- Mulch with grain straw at a rate of 2 tons per acre. Anchor straw by tacking with asphalt or netting. For slopes at 2:1 apply Curlex Type 1
- Maintain permanent seeded areas by watering, refertilizing, reseeding, and remulching due to damage or erosion.

For ditch bottoms and side slopes, the channel protection shall be installed per the following procedure. This practice is defined as Seeding Nr. 7CP.

- Roughen these areas by disking or tracking in slopes in accordance with Practice Nr. 6.03.
- Apply ground agricultural limestone at the rate of 2 ton per acre. Apply uniformly to the applicable areas and work into the soil by raking or disking.

- Apply fertilizer (10-10-10) at a rate of 500 pounds per acre. Apply uniformly to the applicable areas and work into soil by raking or disking. If hydro-seeding is utilized, do not mix seed and fertilizer more than 30 minutes prior to application.
- Seed with the following seed mixture:
 1. Common Bermuda grass at 80 pounds per acre.
- Mulch with grain straw at a rate of 2 tons per acre. Anchor straw by tacking with asphalt or netting. For slopes at 2:1 apply Curlex Type 1 or Curlex Type 2 depending upon the ditch design. See description.
- Maintain permanent seeded areas by watering, refertilizing, reseeding, and remulching due to damage or erosion.

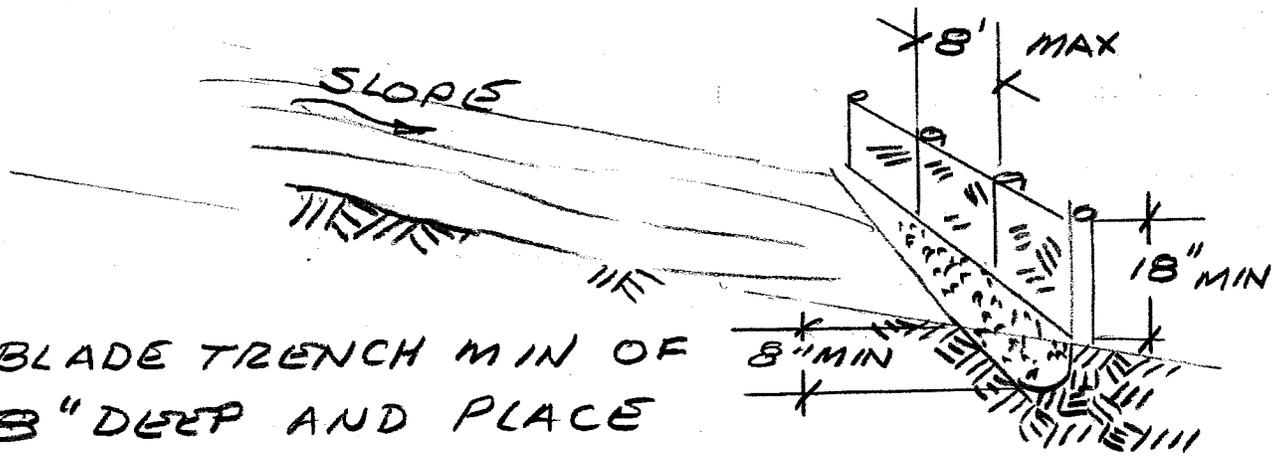


VICINITY MAP

**DETAIL DRAWINGS AND
SPECIFICATIONS FOR
INDIVIDUAL PRACTICES
SPECIFIED**

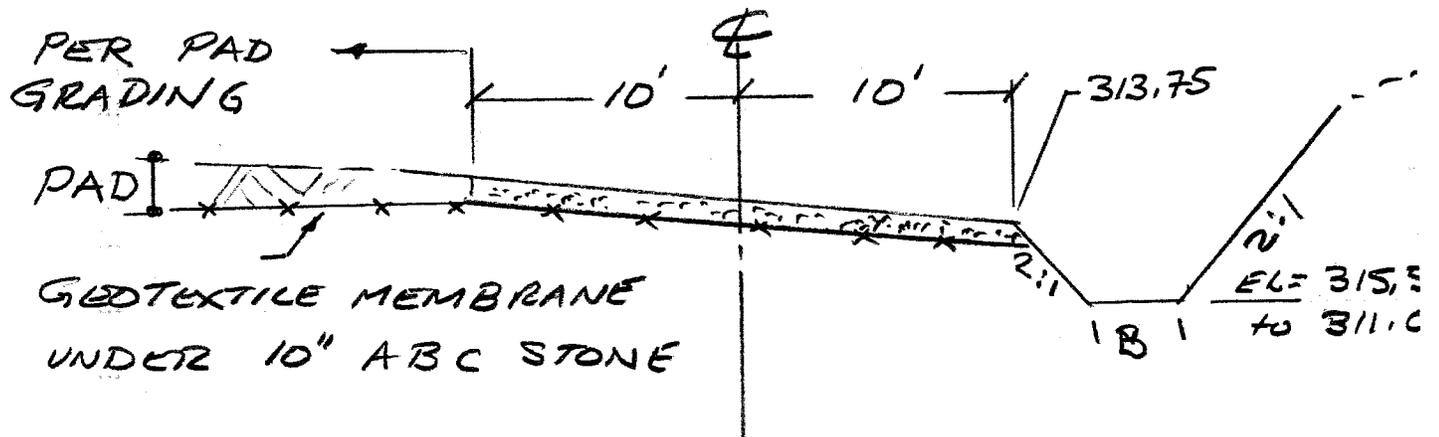
SEDIMENT FENCE

SEE DWG C-1 FOR LOCATION



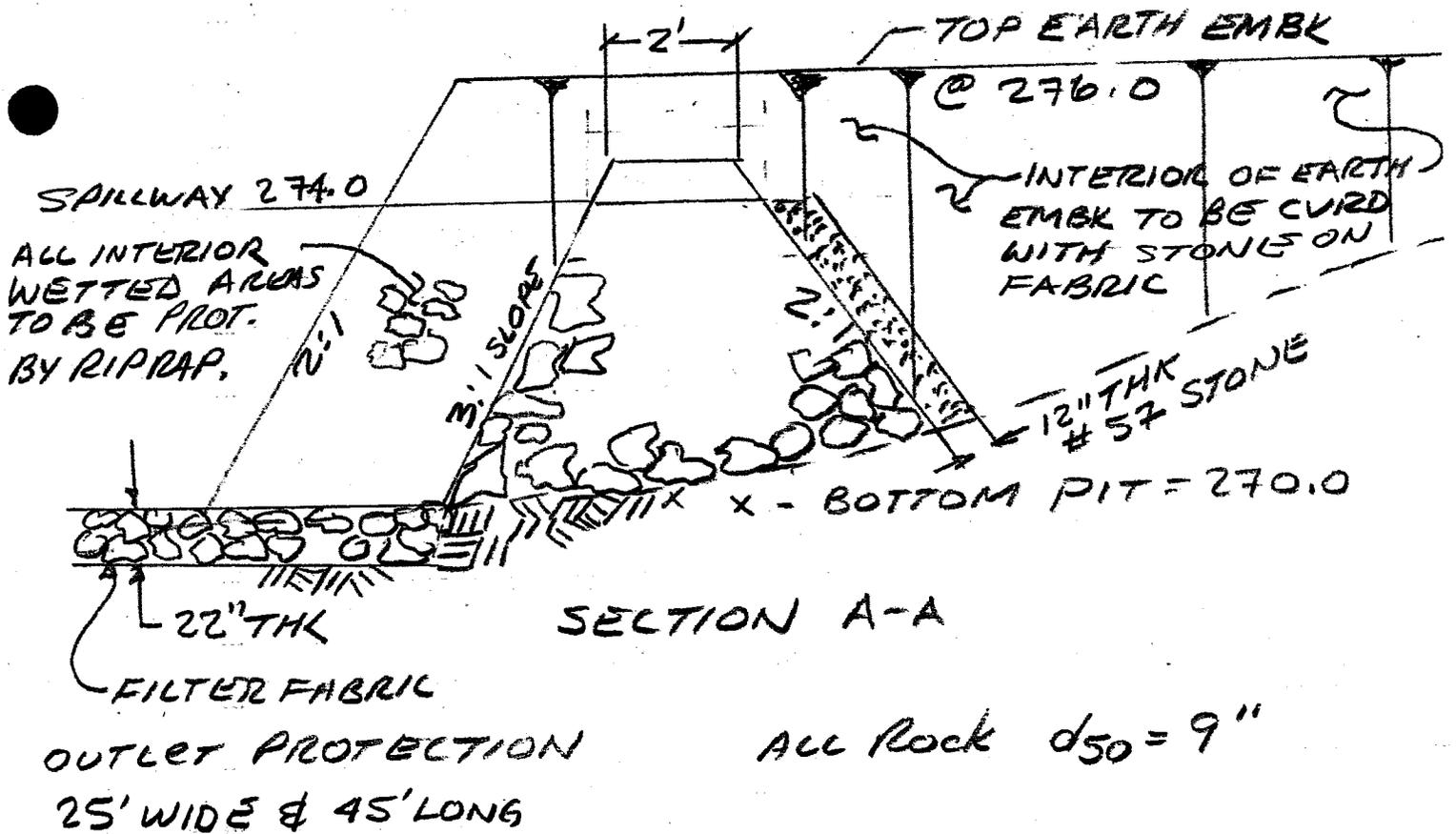
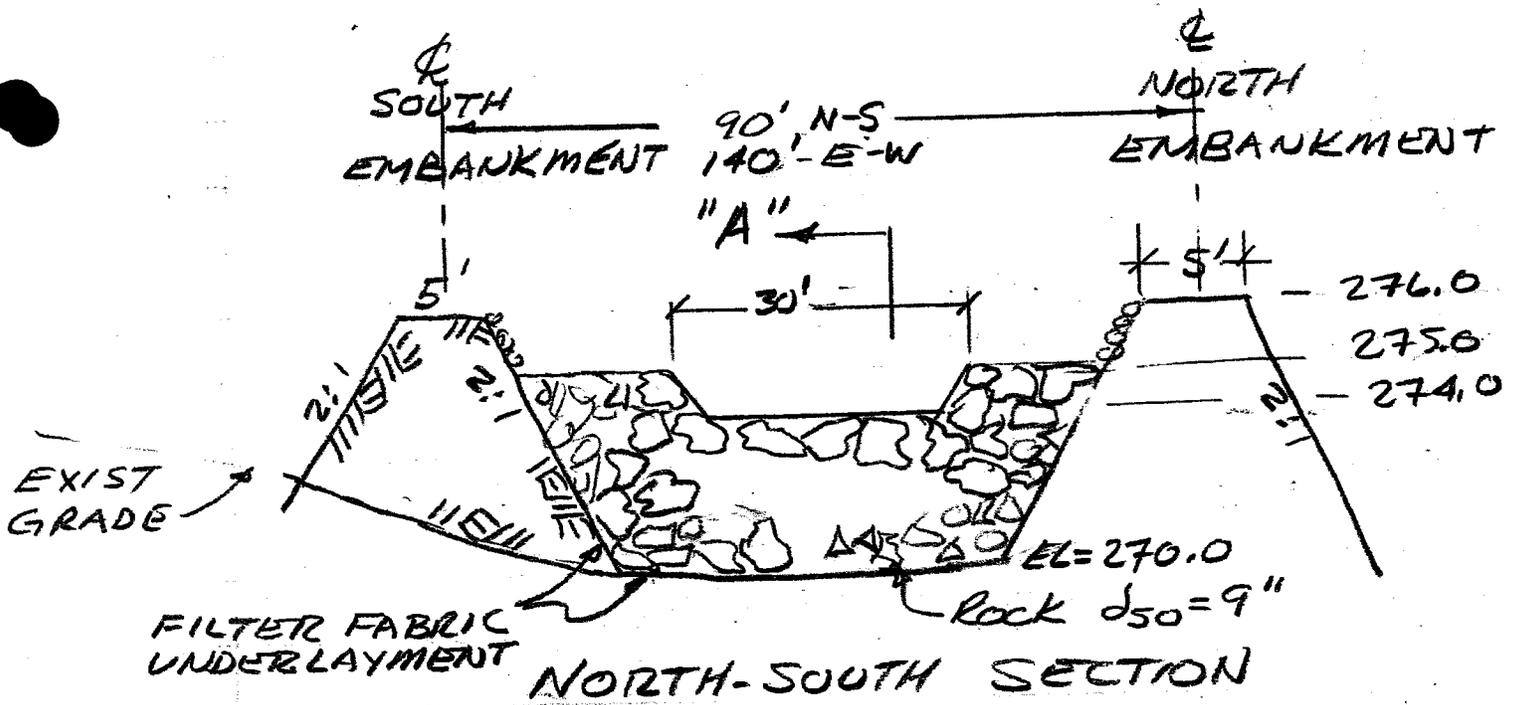
1. BLADE TRENCH MIN OF 8" DEEP AND PLACE SILT FENCE INTO DITCH AS SHOWN.
2. INSTALL & TIE OFF FABRIC TO POSTS. POSTS ARE 8' OR MAX. ON THE LOW SIDE OF FENCE.
3. OVERLAP FENCE FABRIC 8' MIN & TIE OFF TO POSTS.
4. FABRIC TO BE NYLON, POLYESTER, POLYPROPYLENE, OR ETHYLENE VARN WITH EXTRA STRENGTH (50 #/LINEAR INCH) MINIMUM. FLOW CAPACITY TO BE MINIMUM OF 0.3 GAL/FT²/MINUTE. ULTRAVIOLET INHIBITORS ARE REQD.
5. POST TO BE PROPRIETARY OR 4" DIA. PINE 4 FEET LONG.

FARM ROAD & CONST ENTRANCE.



1. NO IDENTIFIABLE TEMP. CONSTRUCTION ENTRANCE TO THE EXISTING FARM ROAD IS REQUIRED. THE ABOVE SECTION COVERS THE REGRADED ROADWAY.
2. CONSTRUCT THIS SECTION PER LINES & GRADES SHOWN ON DWG C-1.

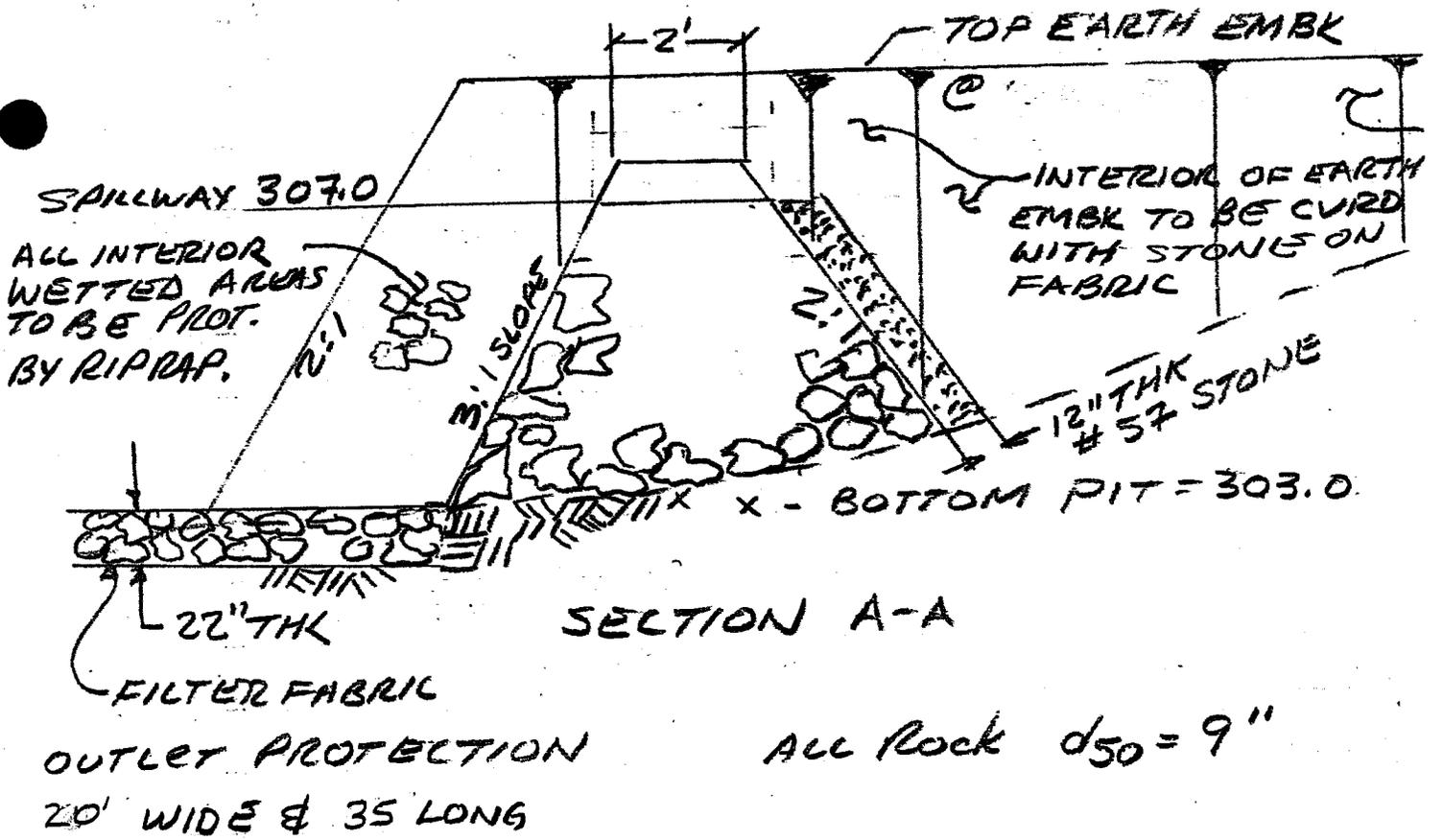
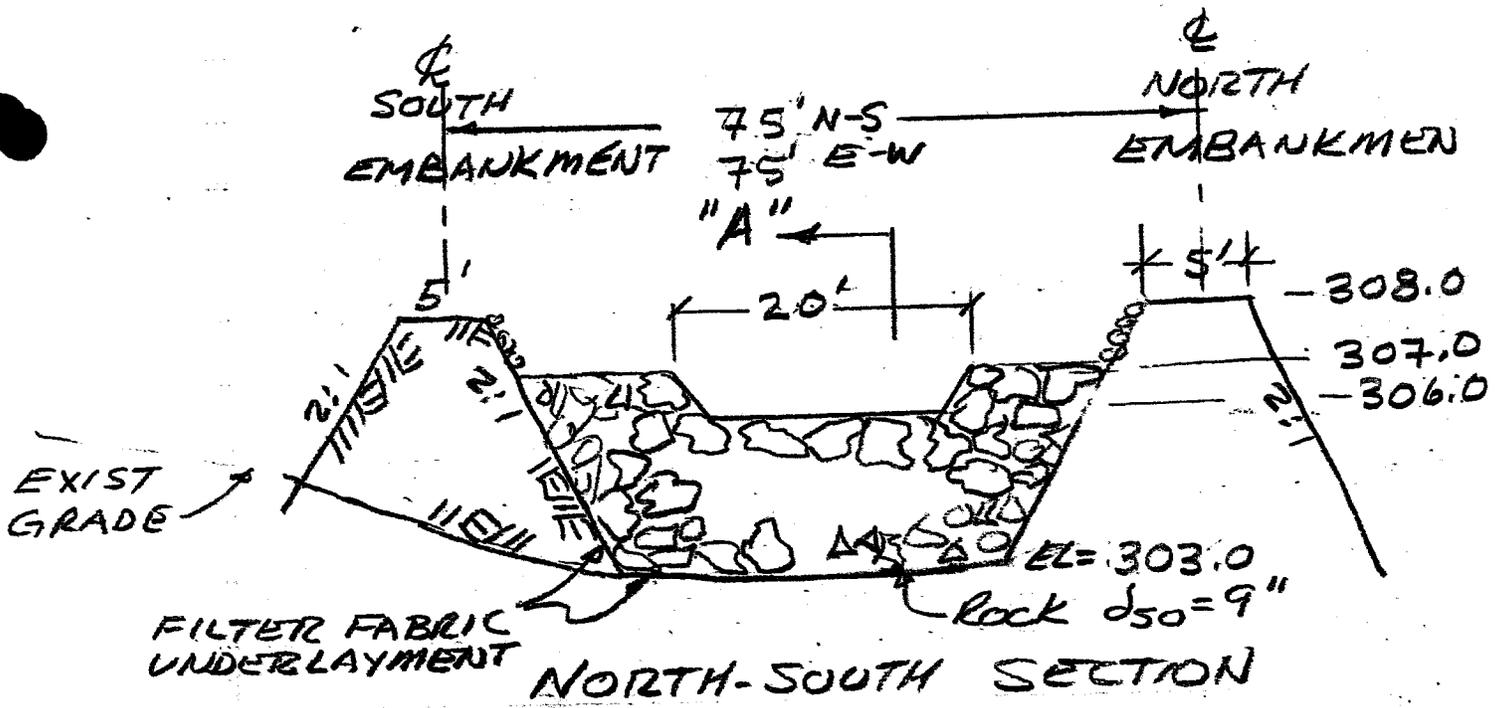
ROCK DAM STRUCTURE #1



ROCK DAM CONSTRUCTION SPECIFICATION

1. STRIP & CLEAR AREA UNDER ROCK & EARTH EMBANKMENTS. REMOVE ALL ORGANIC & UNSUITABLE MATERIAL.
2. BENCH AND PLACE COMPACTED CLAY MATERIAL TO FORM SIDE EMBANKMENT PER SKETCHES.
3. EXCAVATE A 2' DEEP TRENCH UNDER THE FOOTPRINT OF THE ROCK DAM. PLACE EXTRA HEAVY FILTER FABRIC AND PLACE RIP RAP WITH $d_{50} = 9"$ MIN. TO TOP OF GRADE.
4. PLACE FILTER FABRIC & KEY TOP & BOTTOM INTO EMBANKMENT. OVERLAP SHALL BE 2' MINIMUM & PLACE SO FLOWING WATER WILL HOLD EDGES IN PLACE.
5. INSTALL ROCK DAM AND INTERIOR RIP RAP PER SKETCHES.
6. PLACE # 57 STONE FILTER BLANKET AS SHOWN
7. EXCAVATE OUTFALL TO 22" BELOW GRADE. INSTALL FILTER FABRIC AND PLACE RIP RAP AFTON AS SHOWN ON DRAWING.
8. SEED EXTERIOR SLOPES PER VEGETATION PLAN

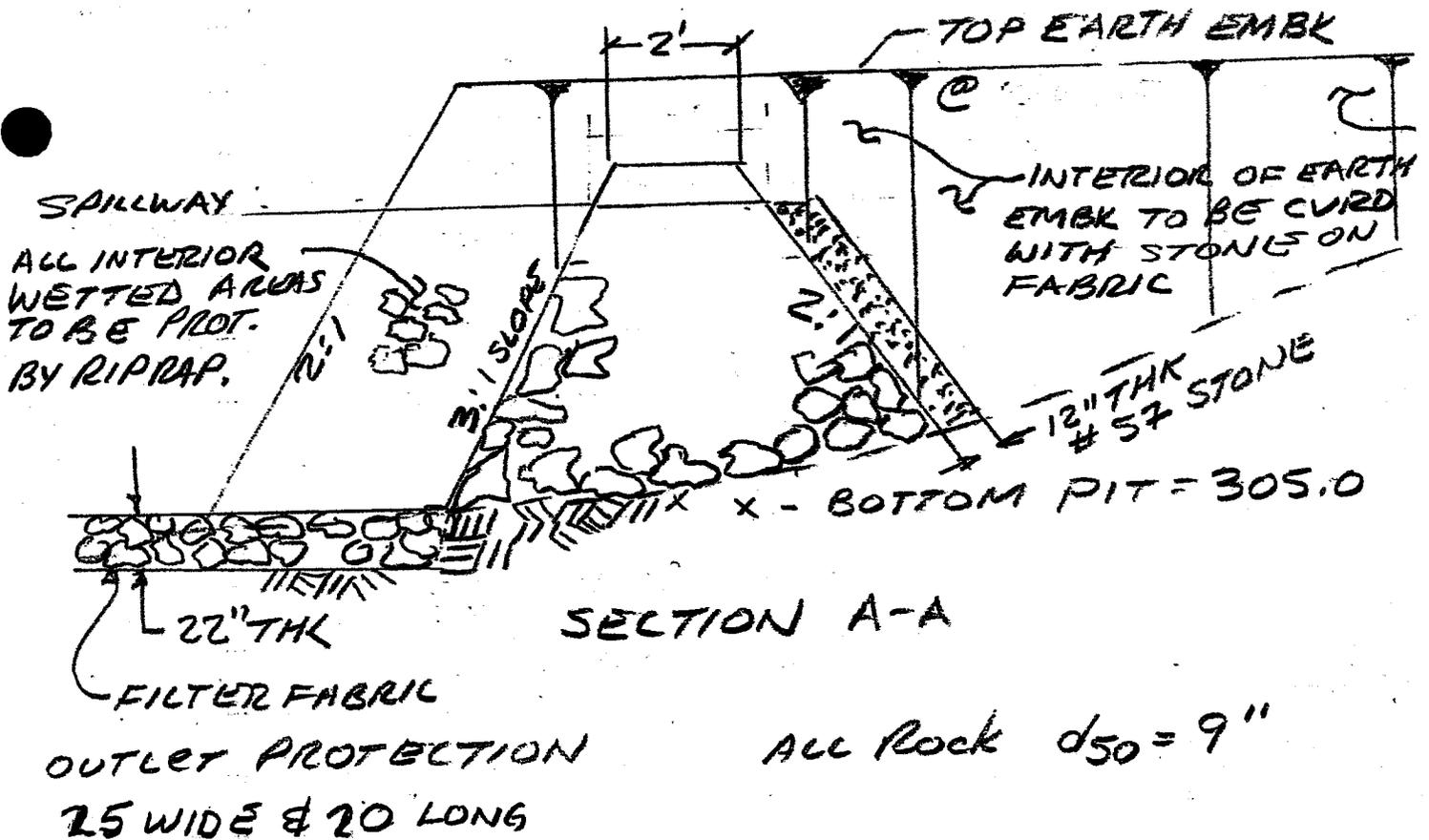
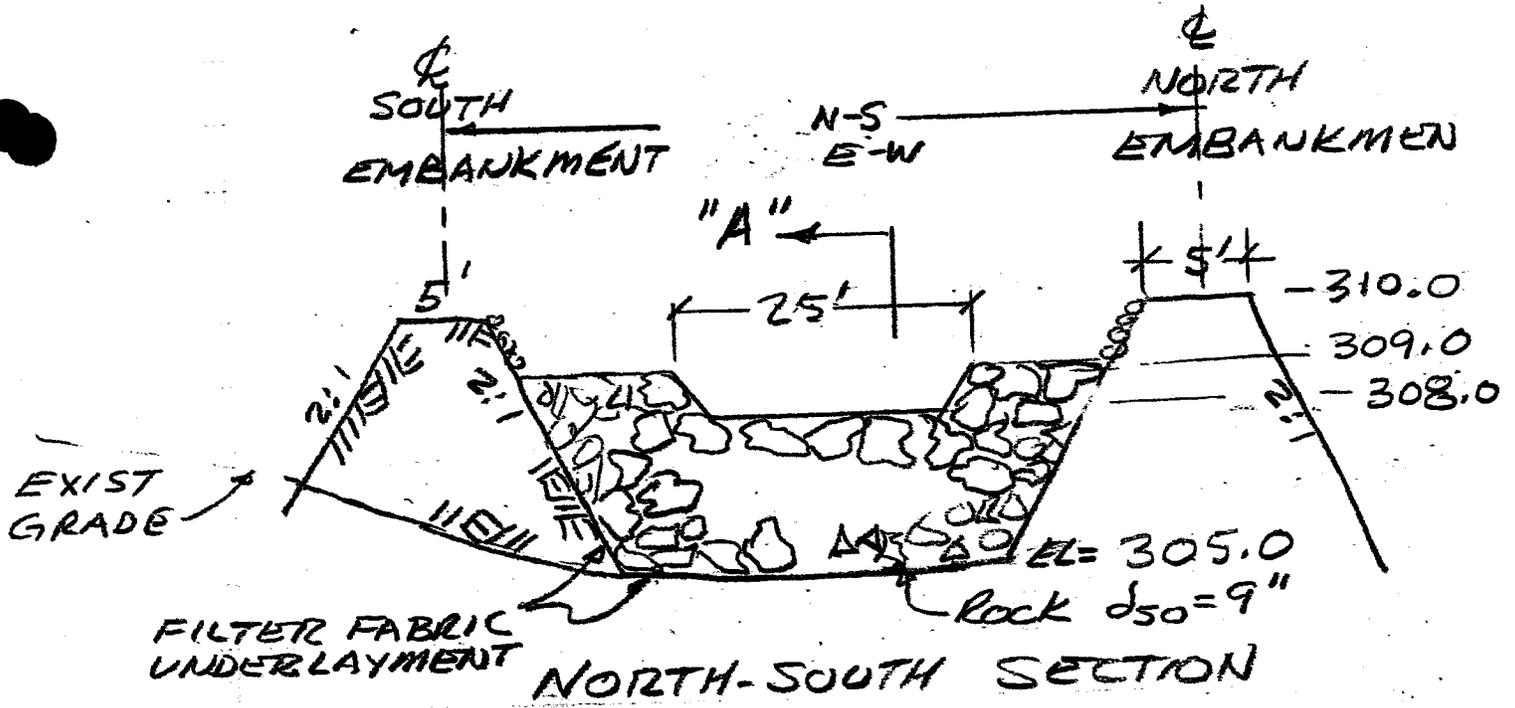
ROCK DAM STRUCTURE #2



ROCK DAM CONSTRUCTION SPECIFICATION

1. STRIP & CLEAR AREA UNDER ROCK & EARTH EMBANKMENTS. REMOVE ALL ORGANIC & UNSUITABLE MATERIAL.
2. BENCH AND PLACE COMPACTED CLAY MATERIAL TO FORM SIDE EMBANKMENT PER SKETCHES.
3. EXCAVATE A 2' DEEP TRENCH UNDER THE FOOTPRINT OF THE ROCK DAM. PLACE EXTRA HEAVY FILTER FABRIC AND PLACE RIP RAP WITH $d_{50} = 9"$ MIN. TO TOP OF GRADE.
4. PLACE FILTER FABRIC & KEY TOP & BOTTOM INTO EMBANKMENT. OVERLAP SHALL BE 2' MINIMUM & PLACE SO FLOWING WATER WILL HOLD EDGES IN PLACE.
5. INSTALL ROCK DAM AND INTERIOR RIP RAP PER SKETCHES.
6. PLACE # 57 STONE FILTER BLANKET AS SHOWN
7. EXCAVATE OUTFALL TO 22" BELOW GRADE. INSTALL FILTER FABRIC AND PLACE RIP RAP AROUND AS SHOWN ON DRAWING.
8. SEED EXTERIOR SLOPES PER VEGETATION PLAN

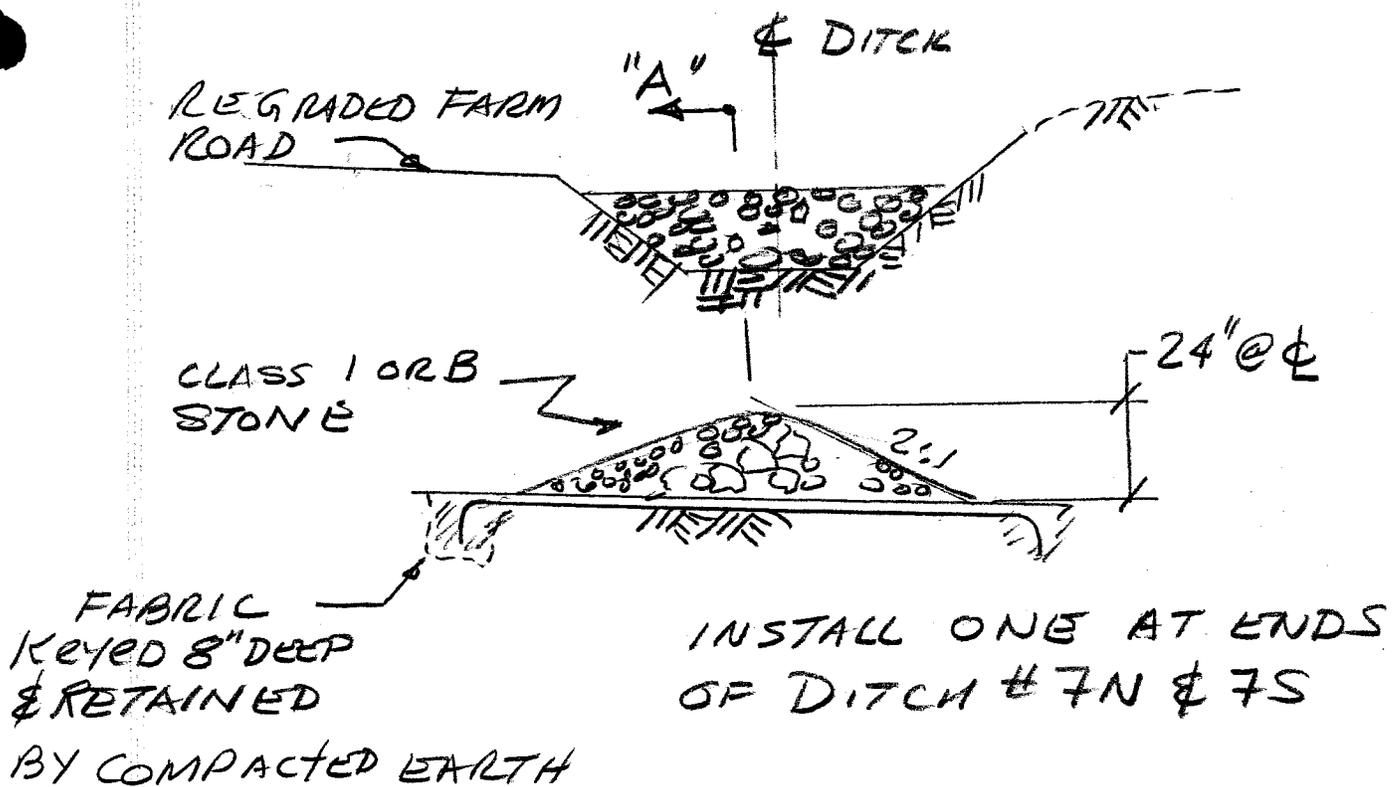
ROCK DAM STRUCTURE #3



ROCK DAM CONSTRUCTION SPECIFICATION

1. STRIP & CLEAR AREA UNDER ROCK & EARTH EMBANKMENTS. REMOVE ALL ORGANIC & UNSUITABLE MATERIAL.
2. BENCH AND PLACE COMPACTED CLAY MATERIAL TO FORM SIDE EMBANKMENT PER SKETCHES.
3. EXCAVATE A 2' DEEP TRENCH UNDER THE FOOTPRINT OF THE ROCK DAM. PLACE EXTRA HEAVY FILTER FABRIC AND PLACE RIP RAP WITH $d_{50} = 9"$ MIN. TO TOP OF GRADE.
4. PLACE FILTER FABRIC & KEY TOP & BOTTOM INTO EMBANKMENT. OVERLAP SHALL BE 2' MINIMUM & PLACE SO FLOWING WATER WILL HOLD EDGES IN PLACE.
5. INSTALL ROCK DAM AND INTERIOR RIP RAP PER SKETCHES.
6. PLACE # 57 STONE FILTER BLANKET AS SHOWN
7. EXCAVATE OUTFALL TO 22" BELOW GRADE. INSTALL FILTER FABRIC AND PLACE RIP RAP AFTON AS SHOWN ON DRAWING.
8. SEED EXTERIOR SLOPES PER VEGETATION PLAN

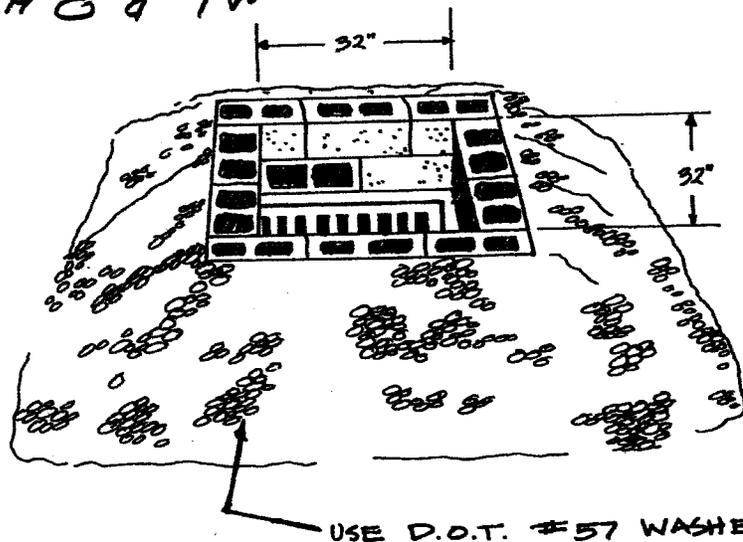
CHECK DAM FOR END OF DITCH #7N & 7S
PRACTICE # 6.83



1. PLACE FILTER FABRIC & KEY AS SHOWN.
2. PLACE STONE AS SHOWN. EXTEND TO CUT/FILL BANK.
3. SEED AND MULCH AREA PER VEGETATION PLAN
4. CLEAN WHEN CAPACITY IS @ $\pm 50\%$.
WASH OR REPLACE STONE AS REQUIRED

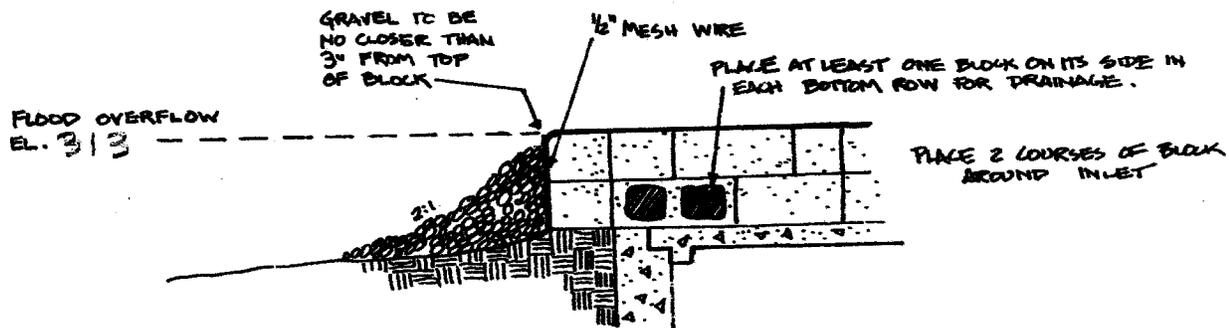
TEMPORARY BLOCK AND GRAVEL DROP INLET PROTECTION

DITCH 8 & 9W



INLET OPENING TO BE
32" SQUARE.

USE D.O.T. #57 WASHED STONE



GRAVEL TO BE
NO CLOSER THAN
3" FROM TOP
OF BLOCK

1/2" MESH WIRE

PLACE AT LEAST ONE BLOCK ON ITS SIDE IN
EACH BOTTOM ROW FOR DRAINAGE.

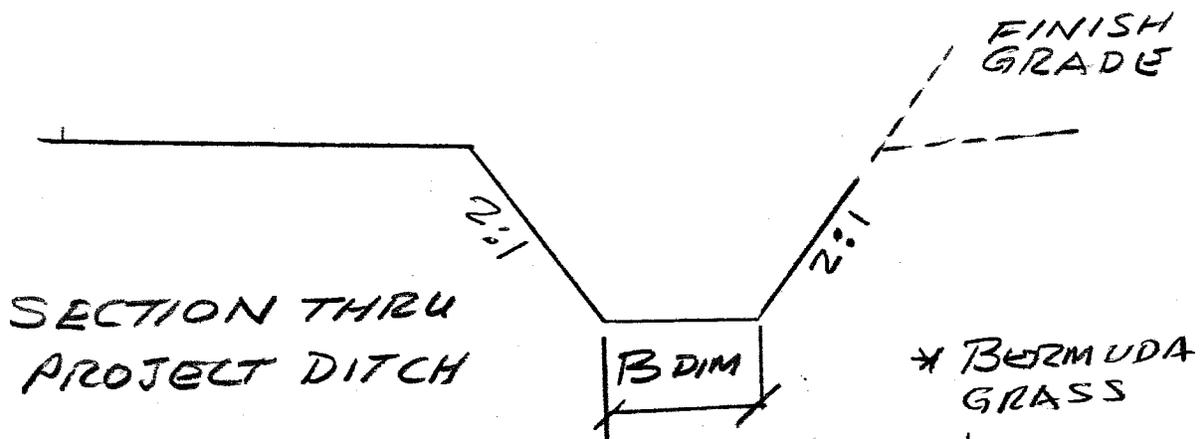
PLACE 2 COURSES OF BLOCK
AROUND INLET

FLOOD OVERFLOW
EL. 313

(3) CONSTRUCTION SPECIFICATIONS

1. LAY CONCRETE BLOCKS ON FIRM, SMOOTH FOUNDATION EXCAVATED 3" BELOW STORM DRAIN TOP. PLACE BLOCKS AGAINST DRAIN INLET FOR LATERAL SUPPORT.
2. PLACE AT LEAST ONE CONCRETE BLOCK ON ITS SIDE IN EACH BOTTOM ROW OF BLOCKS.
3. PLACE WIRE MESH WITH 1/2" OPENINGS OVER ALL BLOCK OPENINGS USED FOR DRAINAGE.
4. USE D.O.T. #57 WASHED STONE TO REDUCE FLOW RATE BUT ALLOW DRAINAGE. PLACE STONE ON 2:1 SLOPE TO WITHIN 3" OF TOP OF BLOCK.
5. ANY SOIL LEFT EXPOSED BETWEEN THE BLOCK AND CONCRETE DRAIN INLET SHOULD BE FILLED WITH 3" DIAMETER STONE TO PREVENT WASHING WHEN WATER FLOWS OVER BLOCKS INTO DRAIN.

GRASS LINED DITCHES



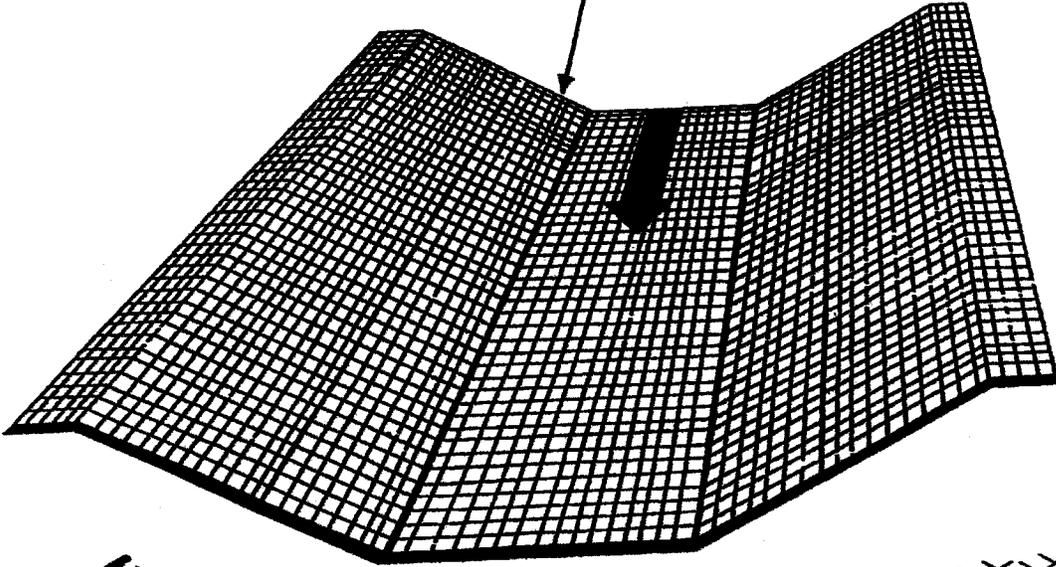
DITCH	B (FT)	* LINING	I CURLEX	II CURLEX	
1 UPPER	3'	BERM	X		
2	5'	"	No	X	
3 (ALL)	2'	"	X		3S, 3W, 3SW
4	2	∩	X		
5	2	∪	X		
6	4	BERM	X		
7 ALL	2		X		7N, 7S
8	3		X		
9 ALL	2	∪	X		9E, 9W
10 W	2	BERM	X		WEST SIDE, B=2'
10 S	5		X		SOUTH SIDE, B=5'
11	5'	BERM	X		

SEE APPLICATION DIAGRAM NEXT PAGE FOR INSTALLATION OF CURLEX.

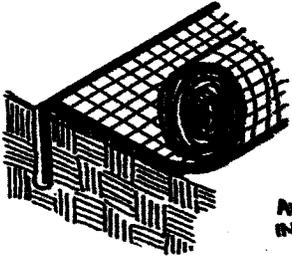
SEED IN ACCORDANCE WITH THE VEGETATION PLAN.

GRASS-LINED CHANNELS

TEMPORARY LINER, STRAW MULCH HELD
IN PLACE WITH PLASTIC OR JUTE NETTING

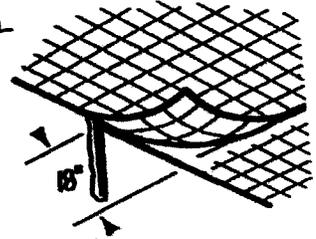


ROLL OUT STRIPS OF NETTING PARALLEL
TO THE DIRECTION OF FLOW



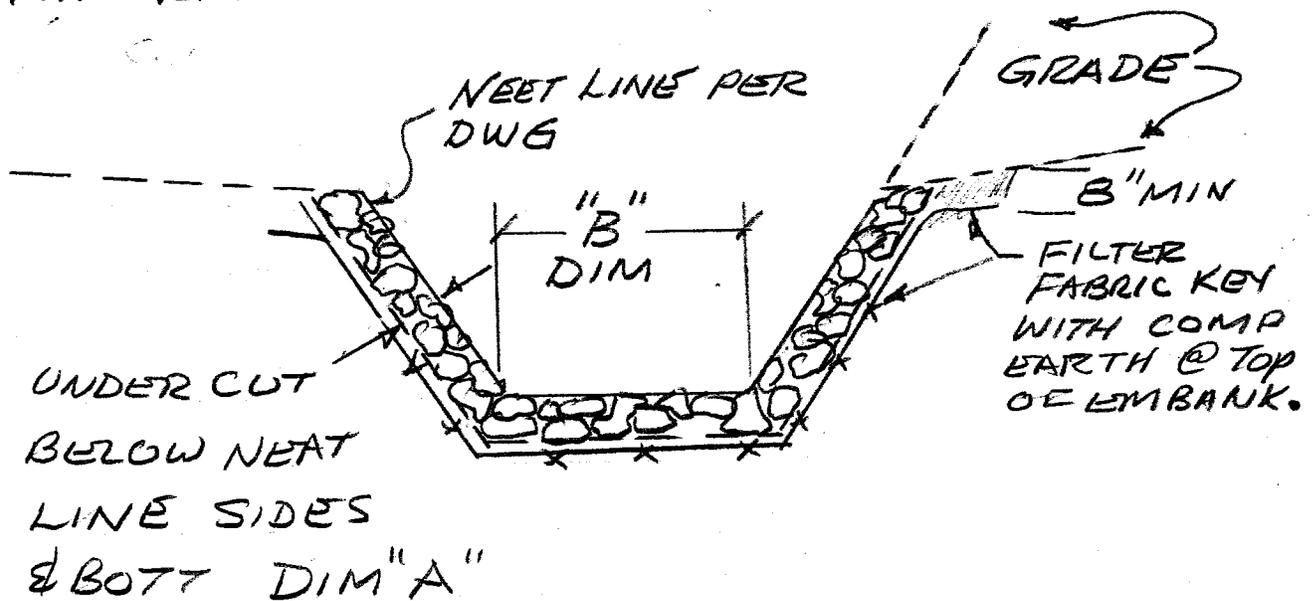
ANCHOR NETTING
IN A 6" TRENCH

JOIN STRIPS BY
ANCHORING AND
OVERLAPPING



INSTALLATION OF CURLEX I & II

RIP RAP CHANNEL FOR DITCH #1

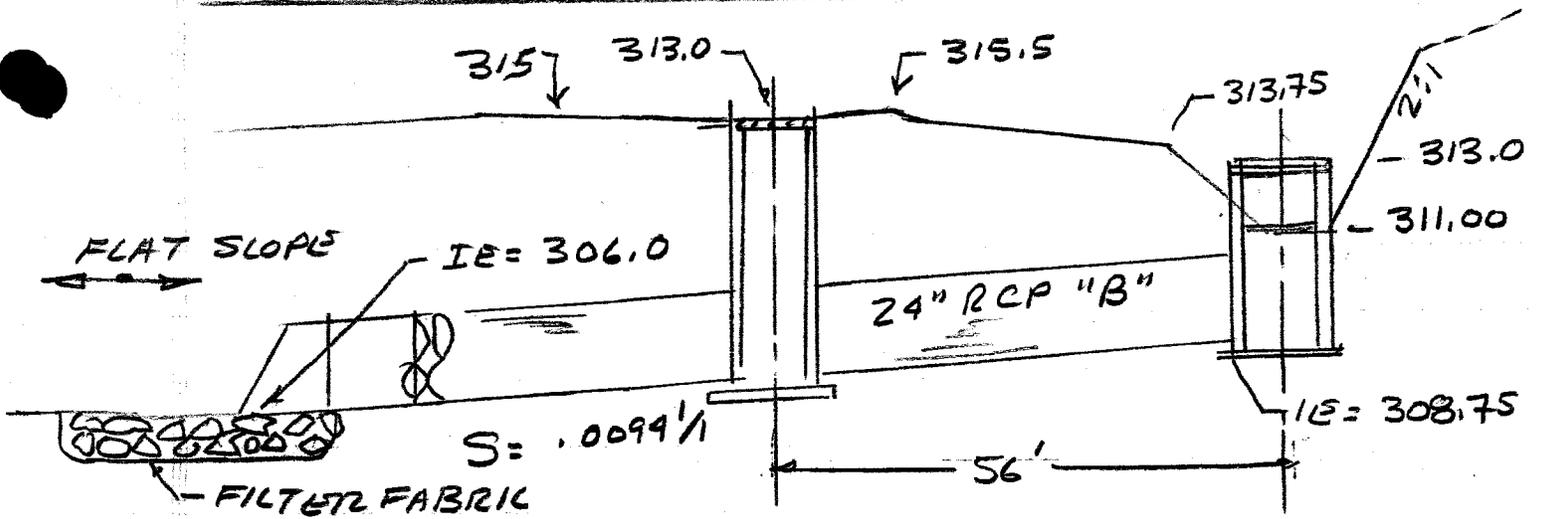


1. DITCH FROM OUTFALL "Q4" to "Q3" SHOWN ON DWG C-1.
 BOTTOM STONE $d_{50} = 12"$ (SIDE STONE SAME)
 UNDERCUT "A" = 27" & THICKNESS
 "B" DIMENSION = 4'
2. DITCH FROM "Q3 to Q2"
 BOTTOM STONE $d_{50} = 10"$ (SIDE STONES SAME)
 UNDERCUT "A" = 24" & THICKNESS
 "B" DIM = 4'
3. DITCH FROM "Q2 TO Q1"
 BOTTOM & SIDE STONE $d_{50} = 9"$
 UNDERCUT "A" = 21" & THICKNESS
 "B" DIMENSION = 4'

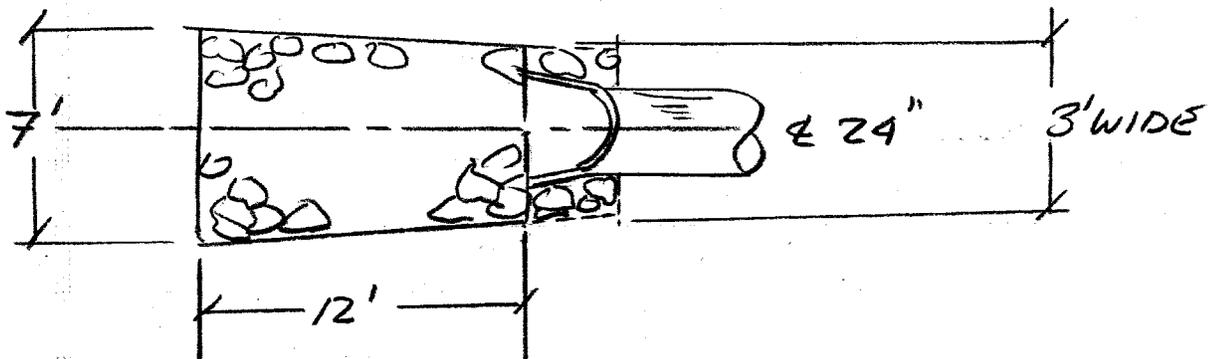
RIP RAP DITCH CONSTRUCTION SPEC.

1. CLEAR DITCH OF ORGANIC & UNSUITABLE MATERIAL
2. EXCAVATE CHANNEL TO NEAT LINES PLUS THE APRON THICKNESS SHOWN IN THE TABLE.
3. INSTALL EXTRA STRENGTH FILTER FABRIC ON BOTTOM & SIDES. OVERLAP JOINTS A MINIMUM OF 18" AND IN A SEQUENCE THAT ASSURES THE FLOW WILL HOLD LOOS ENDS DOWN. STAPLE &/OR PIN FABRIC.
4. PLACE RIP RAP EVENLY TO NEAT LINES & GRADES. PLACE RIP RAP IMMEDIATELY UPON COMPLETION OF FABRIC INSTALLATION
5. RIP RAP TO MEET SPECS FOR DOT CLASS 2 RIP RAP.

FARM ROAD CULVERT AND OUTLET APRON



± 291 LF. 24" CLASS B WALL RCP T&G



STONE $d_{50} = 9"$ DOT CLASS "B" STONE.