CRAVEN AG SERVICE COMPOST SITE APPLICATION FOR LARGE TYPE III FACILITY

15 February 2012

PREPARED FOR:

CRAVEN AG SERVICES, Inc.
RIVER ROAD
NEW BERN, NC

DEVELOPED BY:

GARY MACCONNELL, P.E,
President, MacConnell and Associates

ZACHARY FULLER, P.E.
Project Manager, MacConnell and Associates

ROBERT RUBIN
President, A. R. Rubin and Associates

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MACCONNELL

2/29/12

NORTH CAROLINA PROFESSIONAL SEAL 033776 ENGINEER ZACHARY L. FULLER

2/29/12

Craven
AG SERVICES, INC.
2115 Hwy 55 West New Bern, NC 28562

Billy Dunham, President
Office – 252-633-5334
Cell- 252-670-8530

RECEIVED NOI SECTION
MAR 23 2012
SOLID WASTE

To Whom It May Concern:
Composting and Land Application Branch
NC Division of Waste Management
1646 Mail Service Center
Raleigh NC 27699-1646

To Whom It May Concern:

The Craven AG Service compost facility located at 5391 River Road is owned by John W Dunham and Jene H Dunham. We are also the owners of Craven Ag Service and do here by give permission to Craven Ag Service to permit and operate a permanent composting facility on this property.

Billy Dunham John W. (Billy) Dunham

Jene Dunham Jene Dunham

Witness Frances Mills

I, Adelia Mills Davis, a Notary Public of the County Of CRAVEN

State of North Carolina, hereby certify that John W. Dunham, Jene Dunham

Appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him.

Witness my hand and notarial seal, this 23 day of September 2011

SEAL

Adelia Mills Davis
Notary

My Commission Expires 3-9-2015

Background and Introduction: Materials Contained herein are derived from North Carolina Administrative Code (NCAC) and the compost requirements contained in 15 A NCAC 13B 1400 et seq. and are intended to support the application to permit and operate a Compost Production facility in Craven County, NC.

The project proposal consists of two parts. The initial effort involves permitting the existing compost demonstration as a valid operation on the existing site footprint. The second phase of the operation involves expanding the operation to the west of the current site and developing a more permanent operation. The initial effort is intended to allow Craven Ag Service (CAS) to remain in operation while the activities on the expansion site occur. The operations on the existing site have demonstrated to CAS the viability of a compost operation. The existing site has capacity to function satisfactorily for approximately 18 additional months while the expansion area is developed.

This application is intended to support requirements in the .1400 rule to permit a septage/FOG/MSW compost facility. A supplemental permit application will be submitted for the expanded compost facility to be located immediately west of the current site.

A. Site Location (.1405 (b)(1))

The Craven Ag Service, Inc. Compost Facility is currently operating through a demonstration permit. The site is located on River Road in Craven County, NC. The site is located between River Road and the Neuse River. The location of the compost facility is shown on a site map and aerial photographic maps included in Attachment 1. The Craven Ag Service, Inc. Compost Site is located so as to meet or exceed all the applicable buffers for a Large Type 3 composting facility posed in NC Rule. The applicable buffers are shown on the site map in provided in Attachment 1.

The proposed compost site is located on portions of the Craven Ag Service permitted septage receiver areas. The area was investigated previously by Mr. Fred Smith. His site and soils report were submitted as a portion of the permitting package submitted to obtain the septage land application permit. This previously submitted report contains the relevant site and soil information required to obtain a land application permit and similar information is required for the compost operation. This site and soil report is in the record for the CAS site and is considered as representative of the current underlying soil features.

The application for the compost site permit does include feedstocks from the septage and grease trap operation. These activities have been ongoing as a part of a pre-existing, permitted septage operation at the Craven Ag site on Hwy 55. In addition to these regulated wastes, bulking materials such as: manure, shavings and animal waste from trailer wash, seafood processing

waste (crab scrap, fish waste) tobacco dust, wood and coal ash and agribusiness waste such as culled vegetable waste, produce from local food suppliers will be incorporated as available to provide nutrients and carbon (energy) to the compost operation.

B. Letter from Craven County Planning (1405(a)(2))

The Craven County Zoning letter, 12 May, 2011 is attached as appendix A.

C. Compliance: (.1405(b)(3) and .1404 (a)

(1) The Craven Ag site is located on a terrace landscape position adjacent to the Neuse River in Craven County, NC. Portions of the property are in designated 100 year flood elevation areas and designated as AE in the FEMA flood maps (FIRM Map, Map Number 37205544001, 2 July, 2004). The areas designated as Zone AE or the AE floodway are not intended to host compost operations.
(2) The site map attached identifies property boundaries and demonstrates compliance with mandated buffer requirements.
(3) The site map attached indicates adequate buffer between site operations and adjacent residences or dwellings.
(4) The site map attached indicates adequate buffer between site operations and wells.
(5) The site map attached indicates adequate buffer between compost operations and waterways.
(6) There is no direct discharge of pollutants from the site. An assessment by Ken Pickel, NCDENR - DWQ indicates no direct runoff. Water quality standards apply to discharge systems; non-point sources of discharge have been addressed through the operations plan.
(7) No portion of the operation is located over a closed solid waste operation.
(8) No portion of the operation is located within 25 feet of a berm or swale.
(9) No discharge of pollutants will impact section 404 waters or areas or violate water quality standards.
(10) Site assessments confirm no groundwater within 24 inches of soil surface.

Compliance: 1404(b)

1. Not applicable

Compliance: .1404(c)

1. Access to the site is controlled at locked gate along River Road
2. Effective sediment control practices are in place and practiced
3. Air emissions are controlled by turning appropriately and maintaining required buffers
4. Odor emissions are controlled by managing compost turning operations and feedstock management

QA/QC: 1405(c)(3)

1. The QA/QC plan addresses compliance with PFRP, VAR, regulated metal and nutrient levels. To assure product meets regulatory requirements, daily compliance monitoring will be accomplished recording temperature levels throughout the windrow area. Quality assurance will be assured through the product testing proposed. This testing assures representative samples will be collected at a frequency more rigid than required in rule.

D. Operational Details:

1. Waste types: The compost is manufactured from a mixture of hardwood and softwood sawdust, animal bedding, animal manure or animal haul truck wash water, poultry litter, ground corn cobs, ground and un-ground yard waste, Septage and FOG wastes (dewatered grease trap residuals and septage) and floating, fatty solids from animal processing or transportation operations such as Dissolved Air Flotation (DAF) skimmings, construction debris (clean, unfinished wallboard, wood pallets where nails can be removed, clean wood scrap from construction operations), pre and post consumer, source controlled food wastes, vegetative agricultural/agribusiness wastes such as wet, indigestible hay or forage, corn stover, cotton gin trash, or peanut hulls, land clearing debris material, lime mud from water treatment operations and non-toxic/non-hazardous coal combustion dust.

2. Site assessment: evaluations indicate seasonal groundwater elevations at a depth of well over 24 inches. Soil evaluation indicated the predominant soil texture in the expansion area as loamy sand. The soil materials in this area will be modified by addition of coal dust to introduce fine particles and modify soil texture in the control zone. The current permitted area has been modified over the last two (2) years through continued use as a compost production facility and the natural and planned addition of compost fines and coal combustion dust to the site. The soil texture in the existing compost manufacturing area is fine sandy loam to sandy loam as determined by hand-texture method and to be confirmed by laboratory analysis. This meets requirements contained in DWM Rule NCAC.1404 10 b. This texture has been modified over the original texture by the years of operation during which fine textured soil particles were deposited on the site. These materials consist of: fine textured ash, organic materials such as yard and leaf waste, and compost produced on the site.

   The site had been investigated previously to obtain the permit to operate a septage land application site. This report was submitted by Mr. Fred Smith, CPSS. Mr. Smith indicated that the report was on file at DWM and if additional site/soil work were required, he would be willing to accommodate DWM needs, but that the initial investigation did provide information relevant to the subsurface soil conditions.

The area proposed as an expansion area will contain a concrete pad to serve as a mixing and blending area and a compost pad area will be developed over the next 2 to 3 years to serve as an expansion area for compost operations. Presently the volume of compost can be accommodated on the existing pads located on the initial site. The expanded compost areas proposed will be compacted using ash (TCLP Attached) to provide a working surface and to produce reduced soil permeability. The ash material contains a mix of particle sizes and when compacted, the variation in particle size results in reduced permeability. The permeability will be confirmed by the project team (Mr. MacConnell and Mr. Rubin) and reported to DWM.

Groundwater monitoring wells are proposed along a compliance boundary between the active site and the down gradient property boundary. A single up-gradient well is proposed to establish and benchmark background levels of groundwater quality.

E. Site Plan: Site plan attached, see attachment 1

The site plan indicates that NO wells are located on the site and no surface water storage facilities are on the site nor will they be proposed. Drinking water for operators is provided as bottled water and supplemental process water required for compost operations is provided by the wet waste accepted at the facility and stormwater collected on site.

The plan indicates that no residences are located within 500 feet of the existing site or the expansion site proposed.

Portions of the large acreage site do contain areas that are clearly wetlands, BUT NO area proposed for the compost production or storage are located in wetland areas. Portions of the tract located between the Neuse River and the site are wetlands; these areas are unsuited for any of the operations proposed, they are untrafficable and are NOT proposed as a part of the compost operation. Portions of the site had been previously permitted as septage receivers, portions of the permitted septage receiver areas are proposed to host the compost production and storage. Those areas currently permitted as septage receivers will be excluded from land application as the compost operation expands.

F. Compost Facility Permittee

(1) Mr. J. W. (Billy) Dunham is the Permittee for this facility. The Craven Ag operation is a family business. Personnel involved in the compost operation are:

a. J. W. (Billy) Dunham, Operator in responsible charge
b. Mack Dunham, Assistant Facility Operator
c. Maintenance crew
d. Equipment crew
e. Transportation crew (over-the-road crew)

(2) Operations Schedule: The Craven Ag compost operation may be open between 7:00 am through 7:00 P.M. Monday through Saturday depending on the need to process and move compost. These operating hours will accommodate inflow, outflow of finish product and required compost production operations. Hours of operation may be less than reported here. Upon completion of a typical work day, the compost windrows will be checked to assure proper cover is in-place and the gate will be closed and locked as staff exit the site.

(3) HHW - Household hazardous Wastes are not composted at the site. If these materials are ever received on the site, they will be removed and handled through approved HHW operations.

(4) Special precautions: during inclement weather (excessive rain, severe winds, snow, ice, or weather warning associated with tornado or hurricane), the facility will not actively mix or blend incoming feedstock materials. Compost windrow turning may proceed if site and soil conditions permit access to the site and the operation can be conducted safely without generating runoff or endangering staff.

(5) Vector and nuisance conditions will be addressed by maintaining proper cover over windrows to prevent vector attraction. Noise associated with equipment operations will be controlled by operating only during posted hours of operation, no Sunday morning operation, and by controlling vehicle speed along River Road. Dust control if needed will be achieved by wetting roadways and other surfaces generating dust.

(6) Finished compost will be utilized as a component of bioretention mix in stormwater systems, as a medium for plant growth, as a landscape material and for agricultural, horticultural, and silvicultural operations and as substrate for plant growth. All compost materials will be certified as PFRP and representative samples of the material will be tested as accomplished by NCDA for organic matter, nutrient, regulated metal, and salt levels as required in rule.

An operations and maintenance manual is provided. The Operations manual lists activities of individuals involved, operational requirements during normal operations and adverse weather, turning frequencies, temperature monitoring requirements, product quality testing and disposition for the compost.

G. Compost Facility Design

(1) The current Craven Ag, Inc. Compost Facility consists of a series of compacted marl gravel, compost and compacted soil/ash pads each of varying size. The current site contains several distinct areas. These are:

Area 1 – Material receiving and mix area
Area 2 – Material processing area to assure PFRP and VAR compliance, these are active compost production areas
Area 3 – Screening and material curing
Area 4 - Outside storage and staging – areas suited for storing finished compost or dry feedstock materials and for short term storage while materials are held waiting disposition

In addition to these defined areas, the site may also contain temporary tank trucks for storage and treatment of the raw materials to be processed and composted. These consist of above ground portable tanks ranging from 1500 to 6500 gallons capacity. The proposed expansion area involves development of a concrete mixing/blending pad to be developed as the permit is issued and potential expansion areas to be developed as compost production dictates. Presently, the existing demonstration area contains sufficient area to support the operation.

The design team will certify to DWM that the concrete mix/blend pad is developed as permitted and that any expansion of the compost production pads into the expansion area are developed with the ash materials to reduce permeability and prepare a stable working surface. Groundwater wells are proposed.

The compost is manufactured from a mixture of hardwood and softwood chips and sawdust, animal bedding, animal manure, ground corn cobs, ground yard waste, FOG wastes (dewatered grease trap residuals and DAF skimmings), construction debris (clean, unfinished wallboard, construction debris such as saw wood or pallets), pre and post consumer, source controlled food wastes, vegetative agricultural/agribusiness wastes such as wet, indigestible hay or forage, corn stover, cotton gin trash, or peanut hulls, and land clearing debris material. New feedstock sources will be tested to determine levels of nutrients, regulated metals, organic carbon and salt prior to receipt. No new feedstock will be allowed if regulated metal levels exceed the Table 1 values listed in 40 CFR Part 503.

All of the putrescible material is mixed and blended with a suitable substrate on the compacted pad on the day of arrival to prevent nuisance problems. As the facility expands, a concrete pad will be developed. On day of arrival, the non-putrescible materials are stored in the raw material storage areas for subsequent use as needed for staging purposes. Raw feedstock materials are initially mixed and blended on the existing compacted pad using a front-end-loader. A mixer with a feed auger is used to combine the blended raw materials, which are then placed into the windrow compost production area. The windrow compost process continues in these open windrows for approximately 30 days from placement to PFRP product (15 consecutive days at required temperature). At the end of the composting process, the PFRP/VAR compliant compost is moved by loader onto the compacted finished compost storage pad for curing. The

finished compost is to be stored for a period of not less than 60 days and not to exceed 270 days for curing depending on markets. A maturity test will be used to assess the stage of maturity of the compost. The finished compost may be sold in bulk as a soil amendment, blended with topsoil or sand marketed as finish compost, topsoil or bio-retention blend.

The facility is intended to accommodate up to 50,000 tons per year of compostable materials. These materials will be received on a varying schedule and daily receipts may exceed 100 tons, while annual processing will not exceed 50,000 tons. This schedule supports 300 days of active operation per year. Compost mixes or blends will be developed each day based on incoming feedstocks and ultimate market opportunity. Coarse materials will be used to produce silvicultural product while the finer textured materials will be mixed and blended for the horticulture and bioretention blend markets.

2. Compost Recipes

The exact blends and mixtures are developed based on proprietary mixes and blends developed by Craven Ag Service, Inc., for specific end uses or general compost production. The compost is made from a mixture of hardwood sawdust and animal bedding from livestock operations, untreated wallboard and other untreated construction debris, land clearing debris, yard and leaf waste, dewatered grease trap wastes and vegetative wastes from food operations. The ground yard waste, ground corn cobs and land clearing debris material may be incorporated into the compost recipes to increase levels of solids and decrease moisture levels. Table 1 shows the characteristics of a portion of the raw materials used for compost mixture calculations.

Table 1. Raw Material Characteristics

Raw Material[1]	% N	C:N Ratio	% Moisture Content
Septage	1.0	40:1	95
Dewatered Grease Trap	1.0	60:1	70
Hardwood Sawdust	0.09	560	10
Sawdust Bedding	0.24	442	20
Ground Corn Cobs	.6	98	15
Animal Bedding	.5	120	40
Yard Waste	.9	54	40
Land Clearing Debris	.09	560	5
Food waste	1	30	95

[1]Nitrogen and Carbon Information based on data from "On-Farm Composting Handbook"

The composting operation serves primarily to receive septage and dewatered grease trap wastes in order to allow an increase in the hydraulic loads onto the land treatment operation permitted for Craven Ag Service and to provide an outlet for solids produced in dewatering operations operated by CAS. The mixtures of substrate and waste should result in an initial C:N ratio of ~30:1 and a moisture content of ~75%.

3. Availability of Raw Materials Protocol For Compost

The waste production assumptions for the compost operation are as follows:

a. 50,000 gallons grease trap waste processed 5 days per week (10 to 20 dry tons/day after dewatering)
b. 50,000 gallons of septage processed 5 days per week (10 to 20 dry tons per day after dewatering)
c. 5,000 gallons of portable toilet waste processed 5 days/week (0.5 DT/D)
d. 20,000 pounds (10 tons) of vegetative waste per day received
e. 100,000 pounds (50 tons) per day feedstock from municipal, commercial, agricultural/agribusiness, and industrial sources.

These volumes will vary seasonally, but total production from all sources will not exceed 50,000 tons annually.

The solids portion of the processed liquid waste is to be composted. The liquid will be accommodated through land application, transport to a separate and properly permitted land treatment facility or to a permitted POTW (such as Kinston POTW). In addition to the nitrogen sources available from the septage and dewatered grease trap waste, several sources of carbonaceous bulking materials are readily available for utilization in the composting process. These materials include hardwood and softwood sawdust from local manufacturing plants, mixed wood chips and sawdust from ground pallets (nail free), animal transport bedding materials from livestock operations, straw bedding material from the on-site free-stall dairy, horse, or cattle barns, poultry litter from local poultry growers, untreated wallboard from home/mobile home construction/manufacture, pre and post consumer food waste and hay/straw harvested form the land application fields.

4. Flow Diagram

The composting process at the Craven Ag Service Compost Facility is depicted on the site plan showing the processing area, the compacted mixing pad, the compost production windrows, the curing area and the screening/mixing area and may described as follows: dry raw materials such as sawdust, wood chips, bedding material and ground pallet materials (wooden pallets) are received and stored prior to use in the "dry material" storage areas. These materials are combined with a daily delivery of wet raw materials

and the dewatered materials generated off-site at the Craven Ag dewatering facility. The dry materials are placed directly onto the pad and the dewatered or processed septage/grease trap materials are placed over the top of the material, these materials are mixed and blended using a loader in an approximate 50/50 ratio. These raw feedstock materials are loaded via loader into the bulk mixer. The proper ratio of material introduced onto the mixing pad is determined by the number of "buckets" of material placed by the loader. The bulk mixing operation thoroughly combines the raw material and "mixed" raw materials are transferred to the compost production area. After initial treatment in the compost windrows for PFRP and VAR compliance, the compost is removed to the initial storage or curing area, where it is allowed to complete the compost curing process. A **Solvita** test will be used to assess the maturity of the compost.

A process flow diagram, showing the equipment and flow of materials through the composting system is included in Attachment 2. The critical flow duration in the active windrow is 15 days at required temperature with 5 consecutive turnings as required in rule. Typical time in an active windrow will be 4 to 6 weeks to allow for temperature rise from ambient to thermophilic and required mixing. Mixing and blending will be accomplished in a single day. Composting to comply with the PFRP and VAR requirement will require an estimated 30 days from placement in a windrow to compliance with PFRP. Curing will require between 60 and 270 days depending on end use and Solvita test results. Storage can be accomplished following a Solvita test indication that the material is stable. Storage will be dependent on end use and may require up to 270 days depending on users. Processing time, curing time and storage times will be recorded.

5. Leachate Collection and Recycle System

The site plan indicates that compost production areas/pads are sloped toward a runoff collection area which is intended to hold and treat a small volume of liquid and provide a basin or shallow unlined sink to return liquid to the active compost areas. Runoff will be returned to the compost windrow areas as liquid pumped from the basin onto the windrow and any excess runoff will transported off site to the City of Kinston Wastewater facility. Contents of the collection area or shallow basin are removed as needed and are normally incorporated back into compost batch as a liquid and nitrogen source or are allowed to evaporate. Any addition of leachate back to the windrow is carried out in the primary loading of the windrow and results in an additional full processing and heat cycle which results in the Process to Further Reduce Pathogens (PFRP) to be repeated. In very wet conditions or in an emergency, such as a sustained power outage or equipment breakdown, the collected leachate will be transferred to the nearby wastewater treatment facility in Kinston, NC.

6. Preliminary Compost Analysis/Quality

Detailed compost characterizations have been performed previously by NCDA on several samples of the finished compost. All units in the analysis are measured on a dry weight basis (mg/kg). Table 3 shows a summary of the results from NCDA sampling. The finished compost does not exhibit high concentration of regulated or heavy metals. The raw material sources are primarily agricultural in nature and do not have significant heavy metal concentrations.

7. Pathogen Reduction Verification

Pathogens are to be reduced as required in the NC Solid Waste Compost Rules, Section .1406. The CAS Facility shall maintain the compost process at a temperature above 55 degrees C (131 degrees F) for 15 days or longer and the average temperature for an additional 14 days shall be higher than 45 degrees C (113 degrees F) for the PFRP and VAR compliance.

The completed compost from the CAS Compost Facility will have a fecal coliform density of less than 1000 colonies Most Probable Number (MPN) per gram of dry solids. The materials will demonstrate pathogen reduction requirements by process monitoring (time and temperature).

8. Protocol For Compost Which does not Meet Pathogen Reduction Level

All finished compost which does not meet the time temperature requirements listed in rule (131 degrees F for 15 days) or tested fecal coliform level of 1,000 colonies per gram of dry material are to be returned to the windrow and subjected to an additional, high heat cycle (131 degrees Fahrenheit for 15 or more days with required turnings). Temperature probes will be calibrated annually to assure reliable measures. In the event that this process does not reduce the fecal coliform count or the manager/operator decides that the additional composting is of no value, then the material will be land applied to an appropriate, permitted off-site disposal area (permitted for class B material through NCDWQ or NCDWM) or transported to a permitted landfill.

9. Contingency Plans for the Operation

An operating manual detailing the composting facility operations and procedures, including recipes, equipment, monitoring, maintenance, and record keeping is included as Attachment 4.

Contingency plans for operation in the event of equipment breakdown or temporary power failure or inclement weather essential operations will be accomplished with alternative equipment; for example, if turning is required and the turner is inoperable, turning will be accomplished with front end loader.

Problems with operation of the composting facility during extreme weather conditions such as heavy rain or high winds will be minimized because of limited ingress to the site. Essential operations will be accomplished as required with equipment available.

In freezing conditions, it may be necessary to modify the compost cycle to assure temperatures are maintained adequately. This may require turning during late morning and early afternoon hours to take advantage of warmer day-time temperatures. This practice should allow the temperature to reach and maintain the desired level in excess of 131 degrees Fahrenheit for at least 15 days with the required turnings to meet the PFRP requirements. Special caution will need to be taken with the operation of skid loader equipment in any areas where the small amount of leachate could freeze and present a slippage hazard. Operators will be trained in proper operation of all equipment to assure a safe and sound operation.

10. Compost Equipment

Tractor: High HP, rubber tire

Loader: High volume, rubber tire

Two high capacity rubber tired front end loader/mixers (T1500) are used to mix the compost feedstock materials on the pad prior to introduction into the windrow. The capacity of the loader bucket is approximately 6 to 8 cubic yards. Product is moved through the operation with the loader.

Windrow turning:

Windrow turning accomplished by T1500 bucket loader

Truck:

A dump bed truck or a loader will be used internally to move compost materials, feedstocks, and other materials through the site.

Screen:

Ultra Screen

Mixer:

Knight

These activities are detailed in the operation and maintenance plan.

11. Vector Reduction

On day of arrival, putrescible materials will be mixed, blended and prepared for composting, then placed into the compost windrow on that same day to reduce nuisance vectors. These materials will be covered with 3 to 6 inches of finished compost, 3 to 6 inches of a carbon rich material such as sawdust or a layer of plastic as described in the operation and maintenance manual to prevent escape of adverse odor. Other component materials such as sawdust, bulking agents such as ground corn cobs or yard waste may be stored for longer periods. The VAR requirements established in rule shall be met through compost temperatures of 105 degrees for 15 days and 115 degrees for 5 of those days as established in 40 CFR Part 503 Rules.

12. Traffic Flow

Based on the maximum throughput production of the compost operation a maximum of two tractor trailer loads of compost per day would leave the facility on average. The over the road tractor trailers are anticipated to move on the gravel access road leading from the facility to River Road, thence to NC Highways and roads for ultimate distribution in the area. Given the existing truck traffic from the facility, the additional effect on local traffic of a maximum of two trucks of finish compost per day, 4 to 5 loads of dry feedstock materials, and 2 to 3 loads of dewatered material on average will be negligible.

H. Marketing Plan and Materials

A portion of the finished compost has normally been sold by bulk to local buyers. At present, CAS Compost Facility has established a strong working relationship and goodwill with growers and producers in the area to continue with expansion of markets for soil amendment, compost and bioretention area soil mixes.

Copies of the previous communication from the NC Division of Solid Waste regarding the Compost Facility are included as Attachment 9.

I. SUBMITTAL

Gary MacConnell and Zach Fuller with MacConnell and Associates and I appreciate the opportunity to compile this permit application for the CAS Compost Facility. Initial development and final review of these materials was provided by Billy Dunham, Gary MacConnell, Zach Fuller and A. R. Rubin. If either you or the NC DENR DWM representatives/reviewers have any questions regarding this report, please contact us directly.

Sincerely,

Gary MacConnell, P.E. | Zachary Fuller, P.E. | A. R. Rubin

attachments

List of Attachments

Attachment 1. Site and Topographic Maps of the Compost Facility

Attachment 2. Design Schematics

Attachment 3. Compost Analysis Report

Attachment 4. Composting Operations Manual

Attachment 5. Equipment Specifications

Attachment 6. Buffer and FEMA Maps

Attachment 7. Craven County Zoning Letter

Attachment 8. Marketing Information Sheets

Attachment 9. Division of Solid Waste Communications

Attachment 10. Sediment Trap Calculations

Attachment 11. Flow Diagram CAS

Attachment 12. Ash TCLP

Attachment 1. Site and Topographic Maps of the Compost Facility

Map Legend

- PARCEL HOOKS
- Recorded Survey Lot#s
- Parcels
- city_limits_outline
- City_Name_Labels
- Main Highways
- Railroad
- USGS Blueline Streams
- Building Sketches
- Flood Insurance Rate Maps
- SUBGROUPS

Craven County does NOT warrant the information shown on this map and should be used ONLY for tax assessment purposes.

1 inch equals 250 feet

N

Attachment 2. Design Schematics

Please see drawings titled "Craven Ag Services, Inc. – Compost Facility" dated February 29, 2012.

Attachment 3. Compost Analysis Report

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

February 3, 2010

Mr. Billy Dunham
Craven Ag Services, Inc.
2115 Hwy 55 West
New Bern, North Carolina 28562

Re: SWCD-25-01

Dear Mr. Dunham:

The Division of Waste Management, Solid Waste Section, has reviewed the results of the tests conducted on the compost produced at your compost demonstration project in Craven County. The test results meet the minimum requirements for pathogens, regulated metals and man made inerts in the Solid Waste Compost Rules. The compost is therefore approved for distribution.

This approval is ongoing as long as the required tests are conducted every 6 months or 20,000 tons, the results are acceptable and are submitted to the Division in a timely manner. In addition, operational records must be maintained and be available to Division staff during inspections.

If you have any questions please feel free to contact me at 919-508-8508.

Sincerely,

Michael E. Scott, Environmental Supervisor
Composting & Land Application Branch

cc: Ray Williams, Environmental Senior Specialist
Central File

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1646 Mail Service Center, Raleigh, North Carolina 27699-1646
Phone: 919-508-8400 \ FAX: 919-733-4810 \ Internet: www.wastenotnc.org

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One NorthCarolina Naturally

Craven
AG SERVICES, INC.
2115 Hwy 55 West New Bern, NC 28562

BILLY DUNHAM, PRESIDENT
(252) 633-5334
(252) 670-8530

RECEIVED
JAN 28 2010
SOLID WASTE SECTION

Mike Scott
Composti8ng and Land Application Branch
N.C. Division of Waste Management
1646 Mail Service Center
Raleigh, N. C. 27699-1646

Dear Mr. Scott:

I have completed testing requirements set fourth in section .1408 pages 13 of the N. C. Solid Waste Compost Rules. Sampling was done according to rules set fourth in this sections 1 through 5 a and b. I am sending you the following information:

1. Foreign Matter Content: 24 oz were taken from the sample collected (sample collection was taken according to Item 2 of section .1408) and dried in the oven at 300 degrees F. After drying the compost was allowed to cool to room temperature. Then we screened it with ¼ inch wire mesh over a pan. No foreign matter was found. Therefore, I am saying that we have less than 1 % foreign matter.

2. Waste Analysis Report. Two samples were analyzed. Sample number 1L1C is a 50 % lime and 50 % compost sample. Sample number ClS in 100 % compost. (See enclosed report)

3. Pathogen Analysis was done by Microbac Laboratories in Fayetteville, N.C. The samples were taken at 6:00 AM and hand delivered to the lab by 10:30 AM of the same day. (See enclosed report)

4. The temperature of the sampled batch was 105 degrees F. These piles were done in July and August of 2009.

What other information is needed before I can start moving this product as a class A Compost?

Billy Dunham

Billy Dunham
Craven Ag Service, Inc.

NCDA&CS Agronomic Division Phone: (919)733-2655 Web site: www.ncagr.gov/agronomi/ Report: W04858

Waste Analysis Report

Grower: Dunham, Billy/John/Mac
C/O Craven Ag Service
2115 Hwy 55 W
New Bern, NC 28562

Copies to:

Farm:

Craven County

Received: 01/11/2010 Completed: 01/14/2010 Links to Helpful Information

Sample Information	Laboratory Results (parts per million unless otherwise noted)														
Sample ID:	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	C
1L1C	Total 7767	1907	2213	94319	2616	763	856	120	57.1	21.1	9.37			167085
	IN-N													
Waste Code:	-NH4													
FCW	-NO3	Na	Ni	Cd	Pb	Al	Se	Li	pH	SS	C:N	DM%	CCE%	ALE (tons)
Description:	OR-N	1798	13.5	0.24	2.86				9.19	88	21.51	63.13		
Composted Waste - Other	Urea													

Recommendations:	Nutrients Available for First Crop										lbs/ton (wet basis)			Other Elements				lbs/ton (wet basis)		
Application Method	N	P2O5	K2O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Na	Ni	Cd	Pb	Al	Se	Li
Broadcast	3.9	3.3	2.7	71.5	2.0	0.58	0.65	0.09	0.04	0.02	0.01			2.3	0.02	T	T			
Soil Incorp	4.9	4.1	3.0	89.3	2.5	0.72	0.81	0.11	0.05	0.02	0.01			2.3	0.02	T	T			

Completed: January 14, 2010

Sample Information	Laboratory Results (parts per million unless otherwise noted)														
Sample ID:	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	C
C1S	Total 9608	1166	1635	18792	832	775	933	94.1	84.9	25.2	9.54			191805
	IN-N													
Waste Code:	-NH4													
FCW	-NO3	Na	Ni	Cd	Pb	Al	Se	Li	pH	SS	C:N	DM%	CCE%	ALE (tons)
Description:	OR-N	344	2.23	0.32	5.20				7.97	33	19.96	52.47		
Composted Waste - Other	Urea													

Recommendations:	Nutrients Available for First Crop										lbs/ton (wet basis)			Other Elements				lbs/ton (wet basis)		
Application Method	N	P2O5	K2O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Na	Ni	Cd	Pb	Al	Se	Li
Broadcast	4.0	1.7	1.7	11.8	0.52	0.49	0.59	0.06	0.05	0.02	0.01			0.36	T	T	0.01			
Soil Incorp	5.0	2.1	1.9	14.8	0.65	0.61	0.73	0.07	0.07	0.02	0.01			0.36	T	T	0.01			

North Carolina
Tobacco Trust Fund Commission

Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

Thank you for using agronomic services to manage nutrients and safeguard environmental quality.
- Steve Troxler, Commissioner of Agriculture

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CERTIFICATE OF ANALYSIS

Craven AG Service
Mr. Billy Dunham
2115 Hwy 5 SW
New Bern, NC 28562

Date Reported: 01/11/2010
Date Received: 01/06/2010
Order Number: 1001-00888
Invoice No.: 70585
Customer #: B900
Sample Date: 01/06/2010
Sample Time: 6:00

Permit No.
Sampler: Dunham

Subject: Compost, Class A

SMP	Test	Method	Result	Date	Time	Tech
001	Compost, Grab					
	SOLIDS, % TOTAL	SM 2540 G	64.1 %	01/06/2010	11:00	PGR
	COLIFORM, FECAL	SM18 9221E	<2.0 MPN/gram	01/06/2010	10:50	PGR

RESPECTFULLY SUBMITTED: R. W. Sanders
MICROBAC LABORATORIES, INC.

Thank you for your business. We invite your feedback on our level of service to you. Please contact the Laboratory Director, Ron Sanders at 910-864-1920, Robert Morgan, COO, at rmorgan@microbac.com or Trevor Boyce, CEO, at tboyce@microbac.com with any comments or suggestions.

LAB CODES: N/D = None Detected N/F = None Found < = Less than > = Greater than Est. = Estimated

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USDA-EPA-NIOSH Testing Food Sanitation Consulting Chemical and Microbiological Analyses and Research

MEMBER ACIL

NCDA&CS Agronomic Division **Phone: (919)733-2655** **Web site: www.ncagr.gov/agronomi/** **Report: W05353**

Waste Analysis Report

Grower: **Dunham, Billy/John/Mac**
C/O Craven Ag Service
2115 Hwy 55 W
New Bern, NC 28562

Copies to:

Farm:

Craven County

Received: 02/21/2012 **Completed:** 02/27/2012 **Links to Helpful Information**

Sample Information	**Laboratory Results (parts per million unless otherwise noted)**														
Sample ID:	*N*	*P*	*K*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*Cl*	*C*	
TD2	*Total* 27499	2896	30627	27383	5648	4983	3733	377	74.6	22.2	52.9				
	IN-N														
Waste Code:	*-NH4*														
100	*-NO3*	*Na*	*Ni*	*Cd*	*Pb*	*Al*	*Se*	*Li*	*pH*	*SS*	*C:N*	*DM%*	*CCE%*	ALE(tons)	
Description:	*OR-N*	208										64.92			
Indust.-Other	*Urea*														

Recommendations:	**Nutrients Available for First Crop**										***lbs/ton (wet basis)***			**Other Elements**						***lbs/ton (wet basis)***
Application Method	*N*	*P2O5*	*K2O*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*Cl*	*Na*	*Ni*	*Cd*	*Pb*	*Al*	*Se*	*Li*
Broadcast	10.7	5.2	38.2	21.3	4.4	3.9	2.9	0.29	0.06	0.02	0.04			0.27						
Soil Incorp	14.3	6.5	43.0	26.7	5.5	4.9	3.6	0.37	0.07	0.02	0.05			0.27						

Completed: 2/24/2012

Sample Information	**Laboratory Results (parts per million unless otherwise noted)**														
Sample ID:	*N*	*P*	*K*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*Cl*	*C*	
CP1	*Total* 16823	1817	1780	32321	920	4576	1783	83.3	129	62.0	21.8			249872	
	IN-N														
Waste Code:	*-NH4*														
FCW	*-NO3*	*Na*	*Ni*	*Cd*	*Pb*	*Al*	*Se*	*Li*	*pH*	*SS*	*C:N*	*DM%*	*CCE%*	ALE(tons)	
Description:	*OR-N*	1056							7.31	81	14.85	62.64			
Composted Waste - Other	*Urea*														

Recommendations:	**Nutrients Available for First Crop**										***lbs/ton (wet basis)***			**Other Elements**						***lbs/ton (wet basis)***
Application Method	*N*	*P2O5*	*K2O*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*Cl*	*Na*	*Ni*	*Cd*	*Pb*	*Al*	*Se*	*Li*
Broadcast	8.4	3.1	2.1	24.3	0.69	3.4	1.3	0.06	0.10	0.05	0.02			1.3						
Soil Incorp	10.5	3.9	2.4	30.4	0.86	4.3	1.7	0.08	0.12	0.06	0.02			1.3						

North Carolina
Tobacco Trust Fund Commission

Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

Thank you for using agronomic services to manage nutrients and safeguard environmental quality.
- Steve Troxler, Commissioner of Agriculture

Attachment 4. Composting Operations Manual

Craven Ag Service, Inc. Compost Facility Operations Guide For Large Type III Facility

February 2012

Prepared for: Craven Ag Service, Inc.
River Road
New Bern, NC

Developed by: J. W. (Billy) Dunham, Craven Ag Service
Dr. A. R. Rubin,
Gary MacConnell, P.E., and
Zach Fuller, P.E.

Craven Ag Service, Inc.; Large Type III Compost Facility Information

Owner: J. W. (Billy) Dunham

Location: Site Location: River Road
Office Location:
2115 W. Highway 55
New Bern NC

Permit: Pending

Primary Contact: J. W. (Billy) Dunham

Office: 252 663 5334
Cell: 252 670 8530

Regulatory Agency Emergency Contact:

NCDWM, Eastern Region: Joe Gallo

Hours of Operation:

Monday to Friday: 7:00 AM – 7:00 PM
Saturday: 7:00 am – 3:00PM
Sunday: Closed

Prohibited Feedstock:

Hazardous waste
Infectious waste

Craven Ag Service Compost Facility - Operations Guide

1.0 Introduction

The Craven Ag Service Compost Facility is located in the northern part of Craven County, North Carolina, near the intersection of River Road and Highway 4, approximately 5 miles southwest of Vanceboro, NC. This facility currently operates in accordance with a demonstration permit, and will be permitted by NCDENR-DWM as a Large Type 3 composting operation. The purpose of this operations guide is to comply with Section 1406 of the DWM regulations. Key personnel involved in the production of compost at this facility will acknowledge reading of this manual (below) to assure a basic understanding of the policies and procedures contained herein.

NAME:	DATE:
NAME:	DATE
NAME:	DATE:

Site management personnel will receive training as provided by the U.S. Compost Council, NC DWM, NCSU and the training activities shall be documented. The site owner is certified through DWQ as a residuals Land Applicator and through DWM a Septage Land Applier.

The raw feedstock materials for the composting operation will come from permitted sources. These include:

Permitted Materials:

- Dewatered Septage (regulated material IAW 40 CFR Part 503)
- Dewatered Grease trap wastes (regulated material IAW 40 CFR Part 257)
- Material from permitted waste sources such as scrapped manure or litter from local animal operations
- DAF Skimmings
- Sawdust from local wood products manufacture
- Ground yard waste
- Agribusiness residues or vegetative agricultural wastes and by-products (such as waste cotton fiber or gin trash, corn stover, tobacco dust, straw or wet hay)
- Land clearing debris
- Shavings and animal waste from any local livestock trailer wash
- Pre and post consumer food wastes from source controlled operations
- Untreated, unpainted new construction wallboard or gypsum-board, wood pallets
- Seafood processing waste such as crab scrap or fish processing waste
- Ash from wood burning operations or coal facilities

Prohibited Materials:

- Municipal sludge
- Hazardous waste

- Infectious waste

Materials composted must be permitted in the DWM permit. New feedstocks will be tested (typically by NCDA) and approved by consultants to Craven Ag Service or DWM prior to receipt.

The composting operation will be conducted in open windrows specifically designed for compost production. Feedstock storage and final composting/curing will occur on compacted soil based pads. The windrows are fed from a concrete bunker mixing pad and fresh compost is discharged following the PFRP and VAR compliance stage of the windrow process to a second portion of the compacted pad. The Concrete mix/blend pad will be developed as soon as permitted. The pad consists of a mix/blend area located on the expansion area. The concrete pad consists of a reinforced concrete pad as designed. The pad contains a sloping bottom mix/blend area and a flat storage/receiving area as specified on the attached drawing. The mixed/blended materials will be transported to the active compost production pads located on the current demonstration site for composting. This area consists of a soil pad compacted by years of compost site operation.

Construction assurance for the concrete area will be documented by the design team and certified by the team to DWM. Should documentation be required for the current soil pads that will be provided by the team to DWM. The existing compacted pads help prevent introduction of undesirable material such as stones into the compost. Liquid generated during the compost feedstock mixing area will be collected in the basin and reused as a moisture source in compost. Excess moisture will be treated on a portion of the site currently permitted for land application of septage and FOG. The existing permit will be modified to preclude commingling the liquid waste from the compost site and the septage/FOG.

1.1 Composting Requirements and General Operations

Compost is defined by the U.S. Composting Council as "the product resulting from the controlled biological decomposition of organic matter that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth." Composting is accomplished by mixing an energy source (carbonaceous material) with a nutrient source (nitrogen and phosphorus containing materials) in a prescribed manner to meet microbial requirements necessary to support metabolic processes. Moisture levels, solids levels, and nutrient levels in the compost feedstocks are controlled to assure the process reaches the required temperatures for the time prescribed by rule (15 days above 131 degrees F with 5 turnings in that 15 day time). The process is carried out under specific moisture and temperature conditions for a specified period of time. Certain steps and procedures are necessary to ensure that the composting process proceeds properly with a minimum of odors, adverse environmental impacts, and other process related problems.

The facility will be divided into four (4) distinct areas. A process flow diagram is provided below in the attachment to this report. These processes are accomplished in the areas or bays as listed herein.

These are receiving area 1, where raw materials are received, this does include the concrete mix bin at the entrance to the process; here incoming materials are mixed and blended in preparation for subsequent placement in the windrows and these materials are inspected visually to assure only permitted products are present (unpermitted materials will be removed placed in a small 8 to 10 cubic yard dumpster and transported to a MSW landfill); area 2, where the mixed/blended materials from area 1 are placed into the long windrows for compost operations and where PFRP and VAR compliance will take place; area 3 where composted materials and inert bulking material are stored or cured, screened and prepared for distribution; and area 4, where finished, screened materials are stored prior to transport off site. This is a compacted, exterior storage area where finish compost is field stored and awaiting transport to various markets.

Materials permitted for receipt at the facility will be received at area 1. Solid and Semi Dry materials from off-site sources (litter, shavings, etc) will be stored for short times to prevent addition of moisture on the compacted pad or the concrete pad waiting blending with the dewatered septage and FOG. If necessary, dry materials will be covered with a tarp to prevent moisture accumulation. Dewatered Grease Trap and Septic Waste which has been processed through the Dewatering box at the Craven Ag Dewatering facility off Highway 55 will be placed onto the concrete mixing pad for proper mixing with the dry bulking materials. The dewatered materials will be stored at the CAS Dewatering site and will be transported to the compost area only for processing into compost; NO FOG/septage will be stored on the compost site. The dewatered material from the dewatering site will be transported to the compost site in 20 cubic Yard boxes as currently accomplished for immediate mixing and blending – NO dewatered material storage is proposed. All putrescible materials will be mixed and blended during a workday. Prior to daily closing, mixed/blended material will be placed into a windrow.

A volume of wood shavings or litter equal to the volume of dewatered material will be placed on the pad. The material volumes are determined by loader scoop volume (typically 2 cubic yards per loader). The dewatered material and the dry bulking material will be mixed together for approximately 10 to 20 minutes to assure complete mixing. This process is not intended to generate excess liquid. Should liquid be generated during this initial mixing, it will be collected and discharged to the dry bulking materials for subsequent use or be collected in a tank for subsequent use as liquid; any excel moisture can be transported to Kinston for processing, but that is not anticipated. Materials will not be accepted at the site during inclement weather since ingress and egress is difficult.

Prior to blending or transport into the compost windrows in area 2, all materials will be examined to assure proper moisture level (upon firm squeezing, material will release a thin film of water to hand or a few drops of water). If material is too wet, additional bulking material will be added to dry the mixture; if too dry, liquid from the tank described above will be added to the mixture to provide moisture. Dry materials will be mixed or blended at the proprietary mix or blend ratios developed at Craven Ag Service for various compost end uses and markets.

Materials will be formed into the windrows using the loader- mixer buckets or by dump truck. Feedstock materials will be transported to the windrows and placed carefully in windrows by lifting and dropping materials to provide final mixing and blending, preliminary aeration, and minimal compaction prior to windrow activities. Typical windrows shall measure no more than 5

feet in height and no more than 15 feet at the base. Material placed in this manner should heat adequately to assure PFRP compliance. Temperatures will be monitored and recorded daily to demonstrate compliance with PFRP and VAR requirements. Windrow areas are designated on the facility permit and all windrows will be marked with date of formation and dates of turning.

The windrow compost process achieves the VAR and PFRP compliance. Demonstrated compliance with VAR requires temperatures exceeding 104 degrees F for 14 days or longer, and averaging 114 degrees F or higher for the 14 day period. This is the minimum temperature required and this is intended as PFRP, not PSRP consequently the higher temperature/longer time is required.

Compliance with PFRP requires maintaining temperatures above 131 degrees F for 15 days with at least 5 turnings of the windrows. The intent of this activity is to expose all particles in the windrow to the high PFRP temperatures. These PFRP temperatures have consistently been exceeded in the VAR area of windrow operations and a PFRP windrow is a "de facto" VAR. Material will be moved through the active compost production area (area 2) using a front-end-loader bucket to lift and drop or windrow turner (as available) until material has achieved required VAR and PFRP compliance and has been rotated in the windrow for a minimum of 60 days to cure unless a row crop operation has a need for the PFRP compliant product.

Temperatures will be monitored during active composting at specified locations located every 25 feet along each windrow and at depths of 24" and 36" into the windrow at each of these locations. Temperature monitoring will be accomplished Monday through Saturday. Once compliance with all PFRP and VAR requirements has been established through the time/temperature monitoring, the compost shall be moved to area 3 for curing and screening. Materials not meeting the required time/temperature standard will be transported to a permitted MSW facility, applied to a permitted septage site, or returned to the head of a windrow for reprocessing.

The curing/screening area (Bay or Area 3) is intended as an area where the compost matures and is prepared for distribution. This process is important in developing stable compost suitable for a wide variety of end-use applications. The stability and maturity of the compost will be assessed through the Solvita test. Once a material has met standards for the Solvita test, curing is complete and the material is mature compost suitable for any use. Compost material can be used any time following compliance with the 15 day, 5 turning, temperature over 131 degrees F if a suitable receiver crop is available. Typically this fresh compost is best suited to row crop applications.

Once ready for distribution, the compost will be transported by loader to a screening operation collocated in Bay or Area 3. The screen separates fine material from coarse material. The fines are placed into the final stage of the operation – storage area (4) while the larger materials are recycled back through the compost operation by transport back to the initial mix area (1) in dump-truck or loader to feedstock storage/mix/blend area. Here these coarse materials are mixed and blended with incoming material and returned to compost windrows as "seed". Undesirable materials removed during screening will be collected on site in a small dumpster and transported to a MSW landfill for disposal as required. These undesirable materials will be stored in a small dumpster located near the screen until sufficient volume is available for MSW disposal.

A quality assurance/quality control program will be instituted at Craven Ag Service. This process will help to assure:

A. Compliance with appropriate rules and regulations
B. Product quality consistent with specified or designated end use
C. Trained personnel remain available to manufacture quality compost

The QA/QC effort will involve the compliance testing and monitoring including: routine temperature monitoring and recording, nutrient and regulated metals testing, foreign material content and bacteriologic sampling. The compliance testing for regulated metals and bacteria will be conducted by a private certified laboratory. Sampling will be conducted initially for every 10,000 tons of material produced or four times (3 month intervals) per year to assure compliance with rule and adequate QA/QC is in place. This is more rigid than current rule and is deemed necessary to demonstrate compliance. Annual calibration will be required on temperature probes. An annual report submitted to DWM is required as a part of the QA/QC program.

In the event that an additional raw material stream becomes available to be added to the composting operation, the material will be submitted for review and approval by the DWM-Solid Waste Section or to this consultant prior to use as a feedstock. The following procedure will be utilized to submit raw materials for approval to the Solid Waste Section:

1. A sample of the raw material will be taken according to the protocol detailed in Section 5.2 of this manual.
2. The sample will be analyzed for the parameters listed in Table 2, Section 5.3 of this manual.
3. A report of the analysis results and a written request for inclusion of the raw material, including proposed handling instructions for the raw material, will be submitted to the Solid Waste Section.
4. Upon notification of approval of the raw material by the Solid Waste Section, the raw material may be incorporated into the process used for compost production.

Incoming or raw material will be inspected visually prior to and during the initial mix/blend operation by the facility operator to assure unwanted trash is not present, that no material received is prohibited by permit, and that the material received is authorized under the permit. As stated, undesirable materials will be transported to a MSW landfill or returned to the generator where possible.

During periods of excessive rainfall, runoff will result. The berms placed along the down gradient portions of the site are intended to trap this rainfall for at least 48 hours. Runoff collecting in the low areas will infiltrate. The soil material present above the water-table is well suited to treat this runoff during the infiltration process. Groundwater monitoring wells are recommended at down-gradient locations on the site.

1.2 Moisture

Appropriate moisture is necessary to compliment the biological processes of the microorganisms responsible for the degradation of organic matter and stabilization of compost. Composting is a naturally occurring aerobic process. Consequently, the moisture content is influenced by the necessity of supplying oxygen and venting off-gasses. As moisture increases, the particles in the compost become more dense and air spaces shrink, limiting the supply of oxygen and the ability to off-gas. If oxygen supply drops to below 8%, the process becomes anaerobic and slows dramatically. The results are foul odors, and the need to restore the aerobic conditions, which will delay the processing time and reduce production rates.

Experience has shown that oxygen consumption in compost operations increase at moisture levels above 40% and reaches a maximum at 60%. Based on the proposed ratio of materials, the initial moisture content will be reduced from approximately 70% to the optimum initial moisture level of 60 % by mixing the wetter feedstocks with dry materials such as wood-chip, poultry litter, sawdust shavings or gin trash, and cotton waste. The initial moisture levels encountered of near 70% will possibly slow the degradation process of the compost materials until moisture reduces to approximately 60%. As a consequence, the wetter feedstocks will be mixed with dry materials on a 50/50 volume ratio to increase solids levels and reduce moisture levels to a more optimum level prior to feeding the materials into the bin. The optimum moisture content for compost materials transported to the windrow is 60% to 65%. This is the target for this operation and it will be met by the 50/50 mix (by loader bucket volume) using the front-end-loader to lift and drop, mix and blend feedstocks. All blending of feedstocks will occur on the concrete pad located at the end of the initial receiving area and in the mix pit collocated with the pad.

The composting process may also be inhibited when moisture levels fall below 40%. Moisture levels will be maintained such that compost materials are thoroughly wetted without being waterlogged or dripping excess water. As a rule of thumb, the compost materials are too wet if water can be squeezed out of a handful and too dry if the handful does not feel moist to the touch or if firm squeezing does not result in a film of water on the hand or gloved hand. A moisture meter, similar to that described in the Equipment Specifications (Appendix 2), would provide a more accurate determination of the initial moisture content of the compost material, but is not considered necessary for operation of the facility.

No additional moisture is needed for the compost process, should excessively hot and dry weather prevail and supplemental moisture is required, it will be supplied from a potable system and the time temperature requirements will restart. The basic compost materials, with the exception of the sawdust, litter, cotton wastes or gin trash and corncobs, are wet and therefore it is unlikely that very much additional moisture will be needed. In all likelihood, the material will normally compost "as-is" as achieved through blending with semi-solid and dry feedstock materials.

Given that multiple windows are presently used, excess moisture can be managed by simply allowing the initial heating cycle to rise, or by turning the windrows frequently to drive water vapor off by venting excess moisture to the atmosphere. The higher the heat generated in the process will also have the additional beneficial effect of killing off potentially pathogenic

organisms such as coliform or salmonella, helminthes eggs or cysts, or inactivating viruses and other organisms regulated in waste treatment processes.

Particle size and structure are also important when determining the optimum moisture content. Generally, the smaller the particles the more available the surface area for microorganism habitat and the greater the microbial activity. This is only the case if sufficient oxygen is available. Insufficient oxygen presents the same problem described earlier with too much moisture. A combination of excessive moisture and small particles is doubly detrimental. A typical target for particles 15 mm (1/2 inch) in diameter or larger is to keep the compost mixture content at 55-65% moisture. If the particles are 5-15 mm (less than ½ inch), a 45-55% moisture content is recommended. If particles are too small and/or wet, bulking materials such as sawdust, ground corn stover or ground wall-board can be added. This is also subject to variation depending on the specific materials available for the compost

1.3 Temperature

Temperature should be monitored closely every 25 feet along the windrow length in all active windrows and recorded daily. Metabolic or biological activity increases with increasing temperature. The optimum temperature range for composting and pathogen reduction is between 131° F (54.4° C) and 160° F (71.1° C) once the process has begun. As stated in the North Carolina Solid Waste Compost Rules section .1406, the facility shall maintain the compost process at a temperature above 131° F (55° C) for 15 consecutive days or longer, with 5 turnings, and the average temperature during that time shall be higher than 131° F (55° C) to ensure the highest level of pathogen reduction. If pile temperature falls significantly during the composting period, odors may develop. If the pile material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing. Compost managed at the required temperatures will favor destruction of pathogens.

Monitor temperature of the compost windrows **daily – except Sunday.** Appendix 1 provides a Temperature Record form. The system operator should monitor temperatures at specified monitoring locations along the windrow. Temperature monitoring locations are every 25 feet along active windrows. The temperature monitoring probes consist of 36 inch to 48 inch long dial stem thermometers. Temperature monitoring shall be accomplished at the 24 to 30 inch depth at each monitoring location. The temperature probes must be calibrated annually to assure they are reading temperatures accurately.

1.4 Mixing and Process Time

Mixing the compost with the loader bucket turner method is necessary to ensure that all particles are exposed to the high temperatures required to inactivate potentially pathogenic microorganisms. The mixing redistributes air pockets to insure proper oxygen levels for the composting process. The mixing is accomplished by the rotation of the composting mass. Mixing in the windrow with the lift and drop loader bucket turning method assures that all particles in the compost mass are exposed to the required temperatures for the required time. Pathogen reduction (PFRP) is achieved in the active compost windrow. Should any batch of material fail the PFRP requirement it will be reprocessed to achieve the 131 degree for 15 day

with 5 turning requirement, transported to an approved MSW facility or applied to a permitted land receive site IAW septage/FOG land treatment rules. The operator recognizes this will reduce the volume of septage and FOG which can be applied and the nutrient management plan will be adjusted accordingly. Records indicate NO "off spec" material has been produced during the CAS demonstration and the "recipe" for success is well established.

Mixing of raw materials with the loader is done to evenly distribute additives and bulk materials throughout the composting material. Feedstock mixing and blending shall be done on the concrete pad proposed; the pad is shown on the drawing attached. Feedstock mixing and blending prior to composting shall be done by mixing approximately 50% by volume active materials such as the dewatered septage and grease trap wastes with approximately 50% by volume wood chip/sawdust, 50% yard and leaf waste, etc. The pre-compost mixing shall be accomplished by successive scooping, lifting and dropping of materials with a 2 to 3 cubic yard front-end-loader bucket. At least three scoop/lift/fall cycles will be required to mix materials adequately. Liquids will be placed in the mass of material by creating a "v" shaped trough in the dry materials prior to adding the liquid materials.

The PFRP compliance temperature is achieved in Bay or Area 2, and a curing stage follows the active compost phase. The curing phase will require between 60 days and 270 days of storage in Bay or Area 3. Curing time depends on end use; agricultural use is typically a 60 day cure time while horticultural uses may require up to 270 days of curing. Materials processed in the curing area will be tested using a Solvita test to assure adequate curing. Materials may be bagged or moved to bulk outside storage at off-site locations following finishing in Bay 4. Disposition of compost following compliance depends on market outlets. The finished product is normally dark brown to black in color with a 60%-65% solids composition based on analysis. The odor is slightly earthy or musty and texture is loose. The volume is roughly half of the original volume.

Composting time required is primarily a function of the amount of air supplied. The efficiency can be increased and composting time decreased with added aeration by forced air or increasing turning cycles. This also produces a cooling effect which must be monitored. Once the most active of the composting processes is complete (as measured by PFRP Compliance), the compost can be stockpiled without further temperature monitoring until used.

1.5 Carbon:Nitrogen Ratio (C:N)

The carbon to nitrogen ratio is the most important chemical consideration in compost. The C:N ration desired is between 25:1 and 40:1. Other nutrients are generally contained in sufficient ratios for composting in most organic wastes. Carbon and nitrogen are consumed in the decomposition process at a rate which is proportional to one another.

The main goal is to produce compost which will not deprive soil of its natural nitrogen due to a nitrogen deficiency in the compost. A low carbon to nitrogen ratio during decomposition will result in ammonia volatilization. A high carbon to nitrogen ratio reduces the efficiency of the process, because more microbial activity is required to reduce the C:N ratio. The optimum C:N ratio for finished compost is between 25:1 and 40:1 (carbon to nitrogen).

1.6 Compost Recipes

Ongoing analysis has produced several compost recipes with potential for use at the composting facility. These recipes assume a "Plug Flow" batch of compost. The process time for the compost batch is normally 30 days in a windrow to comply with VAR and PFRP requirements and another 60 to 270 days in the Curing Pile prior to being screened and ready for market. Once cured and compliant with a Solvita test, the process can be considered a finish product and is suitable for distribution and beneficial use. The finish product may be moved off site and stocked for ultimate use. Typical chemical and moisture characteristics of common raw materials used in composting operations are shown in the following table.

Table 1. Raw Material Characteristics

Raw Material[1]	% N	C:N Ratio	% Moisture Content
Vegetable Waste	4.2	10:1	82
Dewatered Septage	3	25:1	70
Dewatered FOG	1.5	50-60:1	70
Hardwood Sawdust	0.09	560:1	25
Sawdust Bedding	0.24	442:1	40
Ground Corn Cobs	.6	98:1	15
Ash	<0.5	400:1	5
Gin trash/cotton waste	.5	120:1	10
Tobacco Dust	0.75 to 1.5	40:1	15
Ground Yard Waste	.9	80:1	40
Land Clearing Debris	.09	560:1	--

[1]Nitrogen and Carbon Information based on data from "On-Farm Composting Handbook" or testing on-site materials

2.0 Operations

The Craven Ag Service Compost Facility will be operated daily, from 7:00 am until 7:00 pm Monday through Friday and 7:00 am through 3:00 PM on Saturday. Additional hours of operation may occur during periods of high demand for the finished compost material; however, no Sunday operations are planned and these will be accomplished on a strict as needed basis. Operations will proceed according to the requirements and procedures detailed in this operations manual.

2.1 Personnel Duties and Requirements

1. Compost Facility Operator - This individual is responsible for overall operation of the Compost facility. He is responsible for loading the proper amount of the selected raw material into the mixer to insure a good quality finished compost. In addition, the facility operator is responsible for maintaining all the temperature monitoring logs and collecting samples of the finished compost for analysis.

2. Assistant Facility Operator(s) - This individual will assist the facility operator, as necessary, and additionally will be responsible for upkeep and clean up around the compost facility. This individual will perform routine preventative maintenance on the composting equipment. This position will be filled as required, and may require more than one person.

3. Maintenance crew - These personnel will be provided from the on-site pre-treatment plant or staff available to Craven Ag Environmental from other operations as maintenance staff required to perform major maintenance or repairs on the composting equipment.

4. Equipment crew - These personnel will be responsible for screening and custom blending the finished compost material, and for loading trucks for delivery.

5. Transport - These personnel will operate over-the-road transfer trucks. The compost will either be trucked to the final destination by over-the-road trucks, or may be removed by vendor trucks as well, depending on size of the order. It is anticipated that direct sale of bulk material to local contractors would be accommodated by direct loading of the buyer vehicles (private trucks or trailers).

2.2 Compost Testing Needs

In addition to the routine testing of the compost material every 10,000 tons or every 3 months for the parameters specified in Section 5 of this manual, and the 6 day/wk monitoring of the composting process for temperature, it may be advantageous to test compost material for carbon, nitrogen, moisture, and pH should compost fail to reach desired temperature or if odor problems develop. The finished compost material will be monitored every 3 months or 10,000 tons of compost processed (the smaller of the two) for nutrients and regulated metals tested by the North Carolina Department of Agriculture. More frequent testing will be accomplished as additional feedstock is added or as process optimization begins, to ensure that the composting process has been successful and that the NC Solid Waste Section annual reporting requirements have been met. Testing may be accomplished on a more frequent basis than required by rule as varying feedstocks are added to the compost and as end users require test product quality information.

2.3 Storage

Storage of finished compost should be limited to 4 to 6 months after completion of the process depending on market needs. Compost should be utilized within this time period if at all possible.

Storage will be provided in either open areas of Area/Bay 4, or open exterior storage in the area designated, immediately south of the processing area, on land out of the flood-plain or at off site locations awaiting disposition and use.

2.4 Maintenance Practices and Cleanliness

In order to optimize the composting process, proper maintenance of the facility and equipment is recommended. Listed below are some maintenance practices that can be implemented to ensure the productivity of the facility.

1. Do not allow any equipment that exceeds design load limits on or within twenty feet of the concrete pad.

2. Maintain all electrical and mechanical equipment in good operating condition by following electrical codes and manufacturers' recommendations. Inspect and repair grounding rods, switches, wiring, and all vehicles and equipment involved in the process.

3. Fences, railing, roofing, and/or warning signs must be maintained to provide warning and prevent unauthorized entry.

4. Repair any vehicular, vandalism or animal damage. Inspect and maintain runoff control structures.

5. Keep the area around the composting facility mowed and free of tall weeds and brush.

6. Clean, shovel, or dry sweep compost production and bagging areas as required to maintain pleasant work environment. Clean and dry any oil spills, wet material spills immediately to sustain reasonably safe work environment.

7. A small liquid collection basin or sink will be used to handle any leachate from the compost mixing area. Contents of the basin will be removed as needed and will normally be incorporated back into compost batch as a liquid and nitrogen source. The addition of leachate to any of the compost requires the Process to Further Reduce Pathogens (PFRP) to start at the time the leachate is added to the compost. In an emergency, the collected leachate will be transferred to the City Of Kinston, NC WWTP.

The following is a list of practices that will reduce the potential of odors being emitted from the Compost Site. Where practical, some or all of these practices may be utilized. The odor management practices include:

1. Avoid overly wet feedstocks and compost. The use of relatively coarse co-composting materials that allow oxygen diffusion into the pile can help avoid odor problems.

2. Activities such as mixing and movement of odorous raw materials shall be scheduled to minimize the impact of odors. Accomplish these activities only early in the work day to take advantage of rising air currents. Avoid doing these activities on hot, still days or holidays and weekends. Windy conditions or early morning hours are better times to conduct such activities. Monitor the wind direction and postpone activities that may release significant odors when the wind is blowing toward the most sensitive neighbors.

3. Prevent puddles and standing water on the compost pad.

4. Minimize dust, which can transport odor by spraying a fine mist over roads and other surfaces.

5. Ensure that proper aeration, pH, and temperature control is maintained during the composting process.

6. Covering the upper third of the windrow with either 3 to 6 inches of finished compost, 3 to 6 inches of a stable, carbon rich material such as wood chip, or covering the area with a heavy (20 ml) plastic sheet or tarp.

2.5 Seasonal and Weather Management

Composting can continue year round, even during cold weather. Seasonal and weather variations may require operational adjustments that compensate for the change in weather conditions. The insulation layer covering the windrows should sufficiently buffer the mass of materials in the windrow against temperature variation, and changes in the operation should not be required.

Cold weather can slow the composting process by increasing the heat transfer rate from the composting operation into the atmosphere, but the insulation layer should mitigate this transfer. The lower air temperatures reduce the microbial activity, especially near the surface. This, in turn, decreases the amount of heat generated.

Warm weather enhances water loss due to evaporation from the windrows. Water or recovered leachate should be added if materials become too dry (moisture content drops below 40%). Again, the loss should not be excessive from the windrow, and controls can be implemented by scheduling turning operations or adding moisture as required.

In event excess liquid accumulates on the site because of wet weather or other adverse condition. That excess liquid will be collected in a tank truck and transported to an approved liquid handling facility such as City of Kinston POTW or CRSWMA.

2.6 Contingency Plans

1. Equipment Breakdown

In the event of a breakdown of the compost equipment (mixer, loader, screens, etc.), delivery of raw materials from the on-site treatment facilities will be suspended until the equipment is repaired or replaced and material passes all VAR and PFRP requirements.

2. Fire

In the case of a fire, immediately notify the local fire department. If employee safety is not compromised, the company pump truck may be utilized to extinguish the fire.

3. Freezing Conditions

Operation in freezing conditions requires inspection of system components to assure cold weather will not produce safety hazards. Additional caution in operation of the loader is necessary during conditions where ice may have formed on the site. Frozen raw materials should not be added to the bulk mixer (Knight) due to the possibility of damaging the mixer blades and auger.

4. Extended Power Failure

Operations during an extended power failure may be accomplished by the use of a portable generator for any system components requiring electricity. No critical process equipment requires electricity and a power loss will not impact operation of the equipment either on the site or proposed. Temperature monitoring of the composting windrows during a power failure must be continued, and any compost which does not meet the temperature criteria must be re-processed. Again, no critical equipment requires electricity.

5. Windy Conditions

Windy conditions should have little effect on the composting operation since windrows are in open areas. However, during windy conditions, special attention must be given to the temperature of the windrows, and care must be taken during the loading of raw materials (especially light materials such as sawdust) which could tend to "blow off" the composting area. It is anticipated that the local vegetation (tree line) will tend to block a great deal of the wind from the facility. However, if windy conditions are demonstrated to have a detrimental effect on the continued processing of the compost, consideration will be given to planting additional windbreaks.

6. Disposal or Re-Processing of Poor Quality Products

The design team anticipates that the compost produced at this facility will easily meet the standards for Class A compost. In the event that a batch of compost does not meet the requirements for Class A compost, several options exist. An initial option would be to re-process the batch in an attempt to meet the Class A compost requirements. This option would be selected if the controlling factor indicating poor quality was pathogen reduction.

Compost materials which do not meet Class A compost requirements but meet the Class B or PSRP compost may be land applied under specific circumstances in accordance with a separate permit. Specifically, these materials could be applied to agricultural land, provided the land is used for silvicultural or non-food chain related production, or the material could be used for land reclamation projects. Compost which does not meet either Class A or Class B criteria, and is deemed undesirable for any attempt at re-processing, will be disposed of in an appropriate approved, sub-part D landfill site such as CRSWMA.

3.0 Equipment Specifications

The equipment required to operate the Craven Ag Service Composting Site can be characterized as either processing or monitoring equipment.

3.1 Processing Equipment

The primary processing equipment currently utilized at the site for composting is a Loader to serve as a Compost Windrow Turner, a mixer to assure feedstocks are properly mixed prior to placement in the windrow and a screen to assure high quality end product is generated. The windrow turning is achieved by lifting and cascading compost to allow reaeration. Equipment may change with time, but basic functions associated with each will remain as critical to the process. Equipment may be replaced with like equipment and new equipment will be reported to NCDWM as it is obtained.

A rubber tired Loader and a dump truck will be used to transport the raw compost mix to the windrows. Finished compost shall be transported by loader or dump truck to the curing area and ultimately to the finish product storage area (Bay 4) and segregated into batches in the storage area. Final screening will be accomplished in a rotating screen as material is transported off site or as finished/cured material is placed into storage. Large screened particles (over 1.5 inch diameter) will be reused in the compost operation as bulking material. This coarse material will be moved to the initial mix/blend area and reused to inoculate incoming material and facilitate aeration in the process.

3.2 Monitoring Equipment

A probe-type dial stem thermometer (as manufactured by REOTEMP) with a 36" stainless steel stem is currently used to measure the temperature of the compost in the windrows or compost piles in Bay 2. The thermometer has a temperature range of 0-200 degrees Fahrenheit. CAS has several thermometers available on site. These will be calibrated annually and replacement thermometers will be purchased as needed. Calibration of all thermometers shall be accomplished annually.

An additional, optional device that can prove very useful in the production of compost is a moisture meter. This device is more accurate than the "hand squeeze" method of moisture determination. REOTEMP Instrument Corporation has developed a moisture meter which determines moisture levels via a sensor that measures electrical conductivity of the raw materials. The device is available in lengths of 36", 48", and 60". CAS has purchased this process monitoring device and has been using it throughout the demonstration process.

Equipment specifications for the equipment discussed above can be found in Appendix 2.

4.0 Nutrient Management Plan

The majority of the compost produced by the Composting Facility will ideally be sold as a soil amendment. Additional or excess compost will be sold in bulk to local greenhouses and landscape contractors for use as a soil amendment or to the NCDOT for use in highway landscape projects.

In the event of a long term market decline, it may be desirable to land apply some compost off-site. In this case, the material must be a Class A product, or an approval from the NCDWM must be obtained. Land application to agricultural cropland may be used as long as appropriate records are maintained. Compost application rates will vary depending on the agronomic needs of the crop and whether the compost is being used as a primary nutrient source. If the finished compost is used as a primary nutrient source, it should be spread following agronomic practices used for spreading manure. However, compost is generally spread onto land at a thickness of 0.5 to 1 inch. If it is applied at a rate greater than this, it becomes too difficult to incorporate into the soil. Conventional manure spreaders are ideal for handling and spreading compost.

5.0 Compost Record Keeping, Analysis and Reporting Requirements

The compost produced at the Craven Ag Service Compost Facility will be routinely analyzed to insure quality control is maintained. Analysis shall be conducted by the North Carolina Department of Agriculture (NCDA), Soil Test Laboratory on Blue Ridge Road in Raleigh, or by a certified analytical laboratory (A and L, Prism Laboratories, Southern Testing, etc.). The compost will be monitored for temperature daily to insure vector and pathogen reduction compliance (see record keeping forms in Appendix 1). An annual report will be submitted to the NC Solid Waste Section by August 1st of each year, in compliance with NCAC 13B Section .1408 (c).

5.1 Daily Record Keeping

The compost facility will maintain daily (except Sunday) temperature, compost processing length and daily volume of compost processed records for the composting operation. In addition, the volumes of the various feedstocks will be recorded to ascertain the optimum mix and blend ratios for the continued operation at this facility. Each day's production will be flagged as it is transported from the mix/blend area to the windrow. Each section of windrow will be identified with the day of mixing and placement and these areas will be tracked through the entire process. Each area within the windrows will be monitored for temperature and turn date to assure the 15 day/131 degree/5 turning requirements are met. In addition, once a windrow is completed, similar records will be developed until the time requirement is met for the entire windrow. The existing recordkeeping program has indicated the PFRP compliance is addressed by the ongoing program.

5.2 Routine Compost Sampling Procedure

The compost must be sampled once per every 20,000 tons of compost produced or every six (6) months, whichever comes first; for purposes of this project more frequent testing shall be accomplished (every 10,000 T) and every quarter. The samples will be obtained in a sterile manner according to the following procedure. The sample will be obtained from the finished compost piles, immediately prior to the screening and bagging equipment. The sample will consist of a multiple position composite grab sample. A minimum of 5 discrete locations within the finished compost pile in Bay 3, immediately prior to the screening /bagging and bulk loading processing of the pile, will be sampled as a composite sample.

These sample locations should be taken from within the finished pile, and should represent a "cross section" of the pile, not just the "surface". The sampling will be conducted wearing latex or nitrile gloves, and the composite samples should be well mixed to insure a representative sample is tested. Samples should be immediately refrigerated or placed in sealed containers in a cooler for transport to the laboratory. Collected composite samples should be placed in sterile bags provided by the laboratory when pathogen samples are to be run on the material. Samples shall be delivered to the laboratory within 24 hours if pathogen testing is to be performed. It is essential to coordinate with the laboratory ahead of sampling to insure that the proper "hold times" for the various parameters to be tested are not exceeded. It may be desirable to run intermediate nutrient and heavy metal content samples at a more frequent interval than the once every 20,000 tons as specified by regulation and CAS has agreed to accomplish testing at a more frequent basis.

5.3 Routine Compost Analysis

The analysis must include the parameters listed in Table 2. Metal testing must comply with measurements less than the regulatory limits in 40 CFR part 503, Table 3 based on dry weight (mg/kg). Testing shall be conducted by private certified laboratories for regulated metals and bacteria. NCDA testing is adequate for nutrients, metals as process (non-compliance) values and foreign matter can be tested by trained personnel.

Foreign matter testing will be determined as follows. The compost material will be dried (EPA Method 160.3), weighed and passed through a one quarter inch (1/4") screen. All materials remaining on the screen will be visually inspected and all foreign material (glass, plastic, metal, etc.) will be removed and weighed. The weight of the removed foreign material, divided by the weight of the total dried sample, multiplied by 100% will be recorded and reported as the percentage foreign material observed in the sample.

Table 2. Routine Compost Analysis Requirements

Parameter	Reporting Unit	Test Method
Foreign Matter	%	As described in Subparagraph (5) of 13B Section .1408
Cadmium	mg/kg dry weight basis	EPA Standard Methods 3050/3051
Copper	mg/kg dry weight basis	"
Lead	mg/kg dry weight basis	"
Nickel	mg/kg dry weight basis	"
Zinc	mg/kg dry weight basis	"
Pathogens (Fecal Coliform)	MPN/1000 grams of Sample	Standard Methods for the Examination of Water and Wastewater, Part 9221 E or Part 9222 D
Total Kjeldahl Nitrogen*	%	NCDA
Phosphorus*	%	NCDA
Potassium*	%	NCDA
Salts*		NCDA Standard Analysis

* Not required by statute, but these analyses provide useful information on product quality

5.4 Annual Report

Craven Ag Service will submit an annual report to the NC Solid Waste Section by August 1st of each year, in compliance with NCAC 13B Section .1408 (c). The annual report will contain the facility name, address, permit number, a summary of the total quantities of raw material received at the facility, the total quantity of compost produced by the facility, and the total quantity of compost removed from the facility (marketed or disposed of off-site). The annual report will also include temperature monitoring records and the results of the required analysis for metals,

pathogen reduction analysis (fecal coliform), and for the percentage of foreign matter in the finished compost.

6.0 Safety & Health

Proper attention to health and safety at composting facilities can prevent most occupational risks. The safety concerns in composting relate primarily to the use of equipment. If front-end loaders or other standard farm equipment is used, eye and ear protection should be used. Normal safety precautions, such as those provided with the equipment, should be followed. The Farm Safety Association has developed a fact sheet (No. F-017 - Agricultural Machinery Hazards - See Appendix 3) which should be reviewed by all personnel operating or working near machinery.

Fires are rarely a problem in outdoor composting, as properly moist composting material does not readily burn. However, if material does dry out and if storage piles are too large, spontaneous combustion becomes a possibility. This phenomenon occurs at moisture contents approximately between 25% and 45%. In piles over 12 feet high, it is possible for the internal heat of the compost to initiate chemical reactions, which then lead to spontaneous combustion. Proper attention to moisture, temperature, and pile size is the best protection against this problem. An accessible water supply is a valuable safety precaution.

Human health concerns relating to compost depend both on the individual and on the material being composted. While few pathogenic organisms found in farm animal manures or vegetative wastes affect humans, normal sanitary measures are important (such as washing hands before touching food, eyes, etc.). Some individuals may be hyper-sensitive to some of the organisms in compost. The high population of many of the species of mold and fungi in an active compost process can cause allergic reactions in sensitive individuals. Simple precautions, such as wearing dust masks or even half-mask respirators with disposable cartridges, can help limit human exposure to organisms that may cause allergic reactions. Conditions which may predispose individuals to an infection or allergic response include allergies, asthma, such medication conditions such as antibiotics, punctured eardrum, weakened immune system, adrenal cortical hormones, etc. Workers with any of these conditions should not be assigned to a composting operation. If a worker does develop an allergic reaction to compost, it is important to recognize the problem promptly so that it does not develop into a chronic condition. To prevent health concerns during particularly dry and dusty conditions, a dust mask or half mask respirators should be worn.

Blood borne pathogen testing should be accomplished on employees of the compost operation as a part of the annual physical.

With proper knowledge, equipment, caution, and precautions, these sources of harm can be removed or limited, and injuries, illnesses, and deaths can be prevented.

List of Appendices

Appendix 1. Record Keeping Forms

Appendix 2. Equipment Specifications

Appendix 3. Safety Information

Appendix 1. Record Keeping Forms

OFF-SITE COMPOST REMOVAL RECORD

Recipient's Name & Address	Date	Quantity Received	Signature

Craven Ag Service - Composting Site

Composting Activity Record

Batch Number	Date	Temperature Recorded (Yes/No)	Samples Taken and Submitted?	Moisture Added (gal)	Mixture Used - Volume of Feedstock, Sawdust, Manure and Bulking Material Used

Craven Ag Service - Composting Facility
Temperature Monitoring Record

Batch Identification Number: _____

Date Batch Started: _____

Data Collected By: _____

Sample Location Windrow	Month/Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Sample Location (Drum or Windrow)	Month/Year	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Appendix 2. Equipment Specifications

TROMMEL SCREEN

N 40 Inc
P.O. Box 1330
Rockwell, NC 28138
Phone: (336) 499-5881
Fax: (336) 499-5882
Web: www.n40compost.com

TERRA SELECT
T 7

Specifications:

- **Machine Length:** 44.6'
- **Machine Height:** 13'
- **Machine Width:** 8.3'

- **Hopper Capacity:** 8 Yds^3

- **Screening Drum:**
  - **Length:** 25'
  - **Diameter:** 7.2'
  - **Drum Speed:** 0-23 rpm. Infinitely Adjustable

- **Discharge Belts:**
  - **Fines**
    - **Belt Length:** 16'
    - **Belt Width:** 39"
  - **Overs:**
    - **Belt Length:** 16'
    - **Belt width:** 39"
  - **Cross Belt Width:** 39"

- **Engine:**
  - **Type:** Turbo Diesel
  - **Manufacturer:** Perkins
  - **Horsepower:** 121

- **Fuel Tank:** 79 Gallons

- **Supports:** (2) Hydraulic Actuated at Front
  (1) Hydraulic Actuated at Rear

- **Machine Weight:** 50,705 lbs.

- **Central Lubrication Points**

Warranty:

Warranty covers proven defects in workmanship and material for a period of Twelve (12) months or 1000 hours from date of delivery to the customer's site.
The warranty includes Parts, Labor, Travel, and Shipping.
The warranty does not cover Rubber Parts, Wear and Spare Parts and Glass

Delivery:

Machine will be delivered to your site
Total price includes all Shipping, Trucking, Freight, Set-up charges, etc.

Optional Equipment:

- Wind Sifter
- Additional Screening Drum
- Automatic Central Lubrication unit
- Radio Control 8 channel
- Remote Control Tipping Grizzly
- Additional hydraulic connection
- Additional hydraulic rear support
- Hydraulic Drive
- **T**erra Select – **E**nergy – **C**ontrol – **S**ystem

This exclusive control monitors the level of the hopper by means of a sensor. When the hopper is empty, the control automatically stops the screening machine and the engines speed is reduced to idling speed of approximately 700 rpm. When the hopper is filled again, the screen is automatically restarted and the engine is accelerated to nominal speed. This leads to a considerable saving, when for example the wheel loader has to load a truck during the screening process

RC 200 SERIES

Reel Commercial

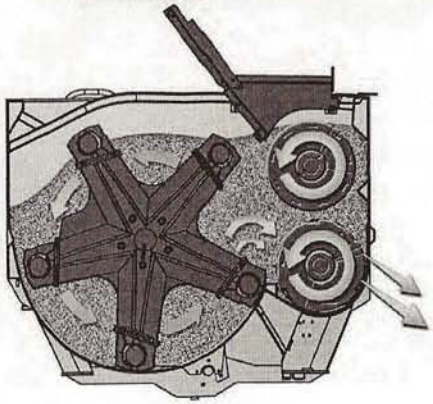
TMR Mixers - with Optional Helix Reel

500 – 950 Cubic Feet

WORLD-WIDE LEADER IN TMR MIXERS

RC 200 SERIES

Fully-redesigned RC 200 Series Commercial Reel mixers provide superior durability and performance, with new advanced options that separate them from the competition. The all-new, open-concept Helix reel option offers faster, more consistent mixing and improved load leveling with any ration. The Helix Reel design optimizes the mixing of wet by-product rations, but through extensive testing has proven to provide quality performance in all rations. The Heavy-Duty Drive option offers extended life, in even the most extreme use cycles, and provides the ability to mix the heaviest feedstuffs. These enhancements, combined with the versatility and low horsepower requirement that are the hallmark of the reel and auger design, put these new RC models at the head of their class! With truck, trailer and stationary models there's a machine to fit every feeding situation.

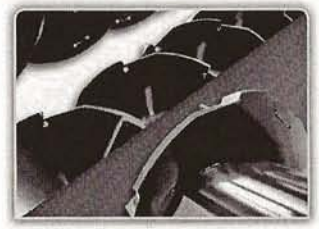


Low Fuel Consumption!

The gentle tumbling action of the reel works with the two side blending augers for fast, thorough end-to-end and side-to-side mixing. The design minimizes force and pressure, resulting in low horsepower requirements and, correspondingly, less fuel consumption for economical operation.

Rugged and Durable

An optional heavy-duty drive provides heavier chains throughout and a larger diameter countershaft and bearings for added strength and extended life in the toughest mixing conditions and heaviest use cycles.



Flexible for Roughage and Grains

The grain-auger option provides gentle handling of more delicate feeds like flaked corn to maintain ration quality. The roughage-auger option features notched, sectional flighting with welded-in, self-sharpening, hardened knives for better hay-handling capability.

Improved Discharge

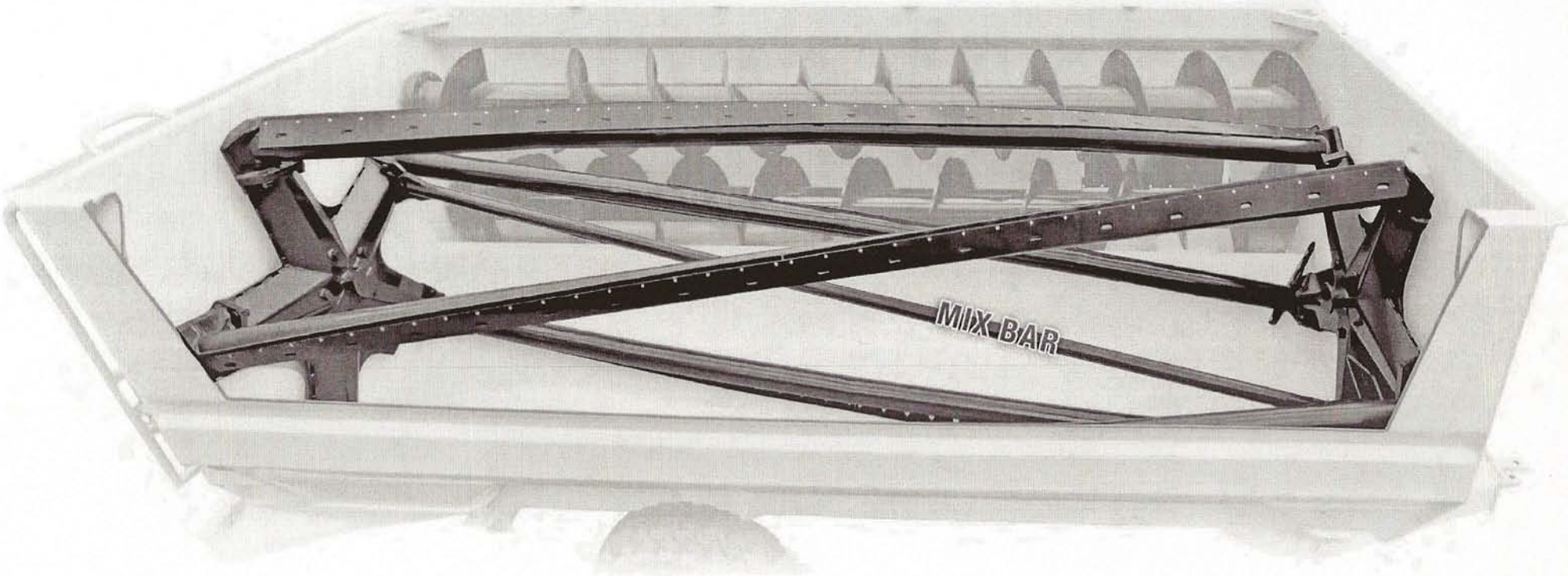
The discharge door and linkage have been reinforced to provide reliable service and long life. The slide tray linkage has also been improved, with increased adjustability to adapt to different feeding situations.

Secure, but Accessible

The improved, single handled latch provides easy access to the oil bath and secure closure to protect the drive system. An improved lip seal keeps oil in and dirt and debris out to help minimize wear on drive components.

RC 200 SERIES

Helix Reel Technology



The Helix Design

The optional Helix Reel has a robust build and has been thoroughly tested to withstand the most challenging conditions. The helical design of the reel crossbars evens the pressure across the length of the reel for smoother, more consistent operation. It also engages with the feed more smoothly.

Open Center Reel

The all-new, open-center design eliminates obstructions in the reel and provides superior feed movement and unparalleled mixing action. The benefits are unmistakable, with faster, more consistent mixing, improved load leveling, optimized mixer space utilization and fewer dead spots for the ultimate in ration quality.

Superior Mixing of Wet By-Product Rations

A mix bar runs diagonally across the center of the reel to help ensure consistent feed movement throughout the entire mixing chamber. The reel crossbars keep feed moving efficiently around the outside of the chamber. The secondary mechanical mixing action from the mix bar provides a fast and thorough mix even in wet, heavy rations with large amounts of distillers grains.

Improved Load Leveling

With all potential obstacles removed from the center of the reel, feed is free to flow unobstructed from one end of the mixing chamber to the other. This greatly improves the end-to-end mixing action and helps eliminate uneven filling for optimum load leveling in any ration. Even leveling allows consistent use of the full capacity of the machine for maximum efficiency.

Faster, More Even Unloading and Cleanout

Cleanout speed is a key factor that can limit feeding efficiency, extending feeding cycles and ultimately costing valuable time and money. The new open-center Helix design provides fast, consistent unloading, with quicker, more complete cleanout than competitive models. The result is optimum performance, allowing the operator to move on to the next batch faster.

Enhanced Performance for Grain and Roughage Rations

The cutting-edge design has been extensively tested with the toughest beef and dairy rations. The results are clear, from dry, dusty materials, to wet, heavy rations, the new RC 200 series mixers with Helix Reel technology set a new standard for quality performance and superior mixing to meet the needs of even the most demanding producers.

EFFECTIVE HAY HANDLING!

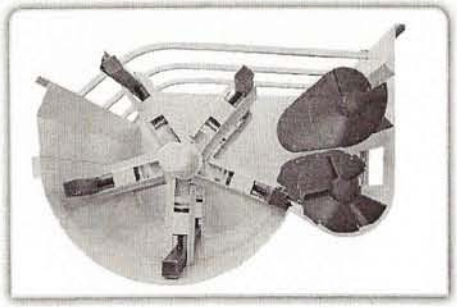
Roughage Maxx

With the Roughage Maxx System, scalloped knives are added to the lower auger to maximize hay processing. The knives provide a more consistent particle length and more even blending of the ration. The result is a more uniform and palatable ration with reduced sorting for overall better feed efficiency.

Hay Maxx

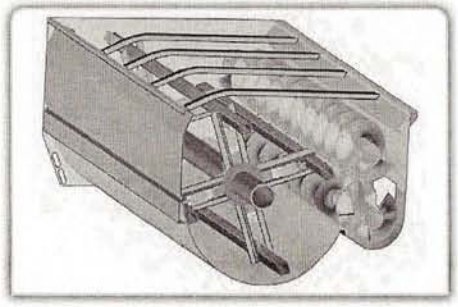
The Hay Maxx System provides enhanced processing of a wide variety of materials. Hay and other bulky materials can be placed on the pan, allowing them to be preprocessed by the upper auger before entering the mixing chamber.

STANDARD REEL OPTION



Large-Diameter Reel

The large-diameter reel gently lifts material up into the side blending augers. The large reel provides ample room for feed movement and quality mixing action. It ensures fast mixing and unloading, which saves time and helps ensure ration quality.



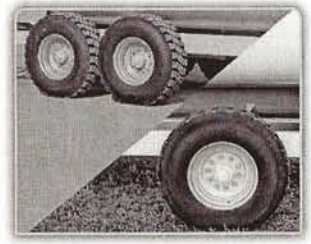
Four- or Five-Arm Reel

The four-arm reel minimizes the pressure placed on higher-roughage feed and the extra space within the reel enhances hay processing and reduces mixing time. The five-arm reel ensures faster mixing and unloading in heavier grain rations and provides more even load distribution on the reel arms.

CUSTOMIZED OPTIONS

Standard or Lowered Right Side

The option of a standard or lowered right side allows customers the flexibility to choose the setup that best matches the needs of their operation.

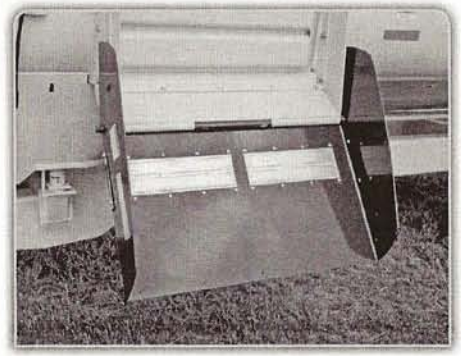


Rugged Undercarriage Options

Straight-single and walking-tandem bogie axle options are available for trailer models, providing flexibility for varied terrain. Both feature heavy-duty spindles and hubs for maximum durability and long life.

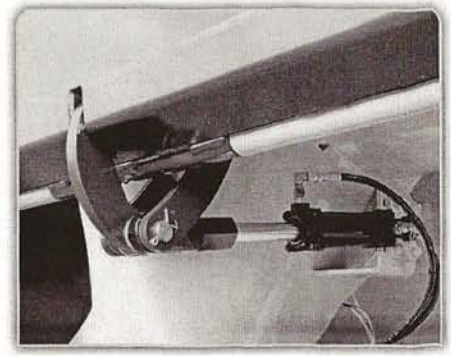
Truck Tire Option

The truck tire option includes wheels and tires or wheels only. These tires provide outstanding reliability and performance at an economical price. (Aircraft tires no longer available.)



Discharge Options

Truck models come with a standard slide tray for fast, consistent discharge. Trailer models offer the slide tray plus a 4-auger discharge option with adjustable height for feeding into higher bunks.

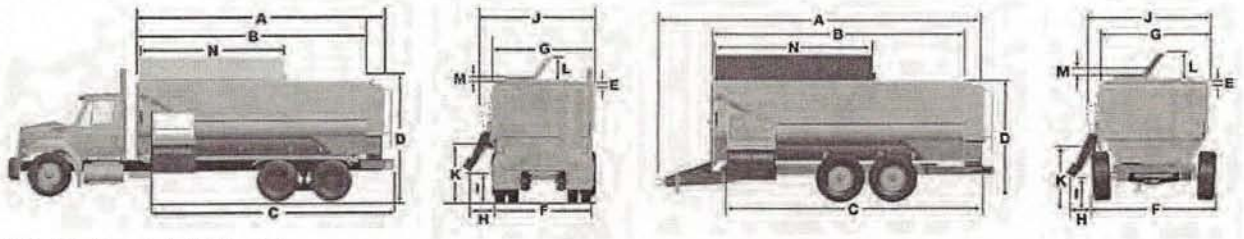


Improved Slide Tray Linkage

The cylinder and linkage for the slide tray option have been relocated and improved. This change provides increased adjustability and eliminates the possibility of the tray extending over center when opened.

MODEL SPECIFICATIONS

Visit your dealer or our website at www.KuhnNorthAmerica.com for information on all Kuhn Knight products.



TRAILER-TR TRUCK-TK

MODEL	RC 250		RC 260		RC 270		RC 295	
DIMENSIONS (INCHES)	**TR**	**TK**	**TR**	**TK**	**TR**	**TK**	**TR**	**TK**
A - Overall Length	242	189	272	219	302	249	294	247
B - Mixing Chamber Length	168	168	198	198	228	228	216	216
C - Front Discharge to Bumper	182	180	212	210	242	240	231	232
D - Overall Height [1,2]	107	120	107	120	107	120	126	135
E - Lowered Right Side Reduction	12	12	12	12	12	12	NA	NA
F - Tread Width [2]	101	96	101	96	101	96	110	96
G - Overall Width (mixer only)	102	102	102	102	102	102	120	120
H - Slide Tray - max. reach	22	22	22	22	22	22	30	30
- 4-Auger Discharge - max. reach 2' / 3'	32/42	NA	32/42	NA	32/42	NA	NA	NA
I - Slide Tray - max. height	35	48	35	48	35	48	50	59
- 4-Auger Discharge - max. height 2' / 3'	50/56	NA	50/56	NA	50/56	NA	NA	NA
J - Slide Tray - transport width	114	114	114	114	114	114	128	128
- 4-Auger Discharge - transport width - 2' / 3'	126/130	NA	126/130	NA	126/130	NA	NA	NA
K - Hinge Height for Discharge	47	56	47	56	47	56	56	65
L - Height - haypan up	22	22	22	22	22	22	22	22
M - Height - haypan down	8	8	8	8	8	8	8	8
N - Length - haypan	120	120	144	144	144	144	144	144

SPECIFICATIONS				
Unit Weight [3] - Helix Reel (TR/TK) pounds	16,000/14,950	17,200/16,090	21,000/18,820	25,300/20,250
Unit Weight [3] - Std. Reel (TR/TK) pounds	14,800/13,750	16,000/14,830	19,800/17,620	24,450/19,400
Maximum Net Load - pounds	15,000	18,000	21,000	28,500
Mixing Capacity - cubic foot	500	600	700	950
Reel				
- Diameter	70"			84"
- Drive Shaft Diameter	5"			8" Tube
- Arms	Standard Reel - Roughage:4, Grain:5 / Helix Reel:5			5 (all)
- Hopper Thickness	3/8"			3/8"
- Speed RPM	5.6 - 6.8			4.6 - 5.2
Lower Auger				
- Flighting Diameter	24"			28"
- Flighting Thickness[4] - sectional	5/8"			5/8"
- Drive Shaft Diameter	3 1/2"			5"
- Tube - outside diameter	6 5/8"		8 5/8"	8 5/8"
Upper Auger				
- Flighting Diameter	22"		24"	28"
- Tube - outside diameter	6 5/8"		8 5/8"	8 5/8"
- Flighting Thickness - sectional	1/2"			1/2"
- Drive Shaft Diameter	3 1/2"			4"
Auger Hopper Thickness	3/8"			3/8"
Side Sheets Thickness	1/4"			1/4"
End Sheets Thickness	1/4"			1/4"
Standard or Lowered Right Side	Either Option Available			Standard Only
Door Opening Size	42" x 22"			48" x 26"
Roller Chain Drive				
- Standard	80-100-120-140			100-140-160-200
- Optional Heavy-Duty	100-120-140-140			HD Standard
Spindle Diameter - single axle / tandem axle	4 1/2" / NA	4 1/2" / 3 3/8"		NA / 4 1/2"
Hub	HD 10-bolt			HD 10-bolt
Tongue Weight - % gross weight	9%	11%	10%	11.5%
Tractor Requirement - PTO HP [5]	100	110	120	170

[1] Truck dimensions based on 41" truck frame height.
[2] Heights and widths will vary depending on tire size.
[3] Unit is equipped with most common options.
[4] 3/4" flighting at convergence is standard.
[5] Horsepower requirement may vary with different materials. Consult operator's manual for proper tractor sizing.

We reserve the right to change any equipment specifications, design, or materials without notice. These mixers are designed for agricultural use only with materials estimated up to 30 lbs. per cubic foot. Contact factory for non-agricultural use or heavier materials. Equipment shown in this literature may be protected by at least one patent and/or trademark.

SAFETY FIRST

Always read and understand the Operator's Manual and all Safety Decals before using the equipment.

YOUR KUHN KNIGHT DEALER

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Appendix 3. Safety Information

FARM SAFETY ASSOCIATION
Growing Safety

FACTSHEET

AGRICULTURAL MACHINERY HAZARDS

The very fact that agricultural machinery uses tremendous power to do work makes its operation a potential hazard for both the operator and bystanders. Even though manufacturers try to ensure that their machinery is as safe as possible, the nature of some work creates inherent hazards, which cannot be removed. Most accidents with agricultural machinery can be attributed to human error.

In many cases the operator forgot something, took a shortcut or a risk, ignored a warning, wasn't paying close attention or failed to follow safety rules. Accidents with farm machinery can be crippling or even fatal. It is important to recognize and be alert to possible hazards and to take precautions to avoid injury.

There are many different kinds of agricultural machinery--mowers, tractors, shredders, harvesters, grinders, blowers, augers, balers, etc.--but they all have similar characteristics and similar hazards. You can be cut, crushed, pulled in or struck by an object thrown by these machines.

They can have cutting edges, gears, and chains, revolving shafts, rotating blades, levers and similar hazards. You can also be injured if you fall while working on or near any of these machines.

Some machine parts cannot be completely shielded in order to do their job. For instance, a cutting blade cannot be totally enclosed, or it could not cut. Operators remove guards for maintenance and often they don't get replaced. This creates a potentially dangerous situation.

Most agricultural machines have similar or common components to do their work. A basic understanding of these and the hazards they pose will heighten your safety awareness and prevent injury.

SHEAR POINTS

Shear points are created when the edges of two objects are moved closely enough together to cut a soft material, as in the case of a pair of shears or an auger.

Cutting points are created when a single object moves forcefully or rapidly enough to cut, as in the case of a sickle blade.

Both shear and cutting points are created on machinery designed to cut, as in harvesters, and on those that are not designed to cut, as in an auger. They are hazards because of their cutting force, and because they often move so rapidly that they may not be visible. It can be easy to forget that they are operating.

Because some cutting and shearing points cannot be guarded, it is important to be aware of the hazard and to be especially alert when they are operating. It is also important to warn others and to look out for their safety, because of the danger of thrown objects while using cutting-type equipment.

PINCH POINTS

Pinch points are formed when two rotating objects move together and at least one of them moves in a circle. For example, the point at which a belt runs onto a pulley is a pinch point.

Belt drives, chain drives and gear drives are other sources of pinch points in power transmission devices. Feed rolls, gathering chains and similar equipment to draw crops into the machine also create pinch points.

Fingers, hands and feet can be caught directly in pinch points, or they may be drawn into the pinch points by loose clothing that becomes entangled. Contact may be made by just brushing against unshielded parts or by falling against them.

You can become entangled in pinch points if you take chances and reach over or work near rotating parts. Machines move too fast to get out of a pinch point once you become caught in it.

To avoid injury from pinch points, be aware of the areas where pinch points occur and avoid them. Wear clothing that fits well and is not loose or floppy. Never reach over or work near rotating parts. Turn off machinery to work on it. Always replace shields if you must remove them for maintenance.

WRAP POINTS

Rotating shafts are the most common source of wrap point accidents, although any exposed machine part that rotates can be a wrap point. A cuff, sleeve, pant leg or just a thread can catch on a rotating part and result in serious injury. Entanglement with a wrap point can pull you into the machine, or clothing may become so tightly wrapped that you are crushed or suffocated. In other cases, you could be thrown off balance and fall into other machine parts.

Even a perfectly round shaft can be a hazard if there is enough pressure to hold clothing against the shaft. Shafts that are not round increase the hazard significantly. Clothing is more likely to catch if there is a little mud or dried manure, or a nick on the shaft. Ends of shafts that protrude beyond bearings are also dangerous. Universal joints, keys and fastening devices can also snag clothing.

Check all equipment for potential wrap points, and shield those that can be shielded. Place warnings on those that cannot be covered, or paint them a bright color, perhaps with wide stripes. Be aware of wrap points and be alert to their danger.

CRUSH POINTS

Crush points are created when two objects move toward each other or one object moves toward a stationary one. For example, hitching tractors to implements may create a potential crush point.

Failure to block up equipment safely can result in a fatal crushing injury. A jack may slip, a hose or overhead support may break, or the equipment may roll. Be sure to take extra precautions when working with machinery that is raised for any reason.

Crushing injuries most commonly occur to fingers that are crushed at the hitching point. Wait until the tractor has stopped before stepping into the hitching position.

If possible arrange the hitch point so that the tractor can be backed into position without anyone between. Always know what the other person is doing.

The head or chest of an operator may be crushed between the equipment and a low beam or other part of a building. Usually, these accidents occur when operating the machine in reverse Tree limbs are also potential hazards when working with tractors and other machinery.

To prevent being crushed or pinned, first, recognize the potentially dangerous situations, then, avoid them whenever possible.

Block all machinery securely if you must work under it. If an implement can roll freely, block its wheels so it cannot roll.

FREE-WHEELING PARTS

Many machine parts continue to spin after the power is shut off. Examples of this are cutter heads of forage harvesters, hammer mills of feed grinders, rotary mower blades, fans, flywheels, etc.

Never touch these parts until they have stopped moving completely. This may take as long as several minutes.

SPRINGS

Springs are commonly used to help lift equipment such as shock absorbers, and to keep belts tight and may harbour potentially dangerous stored energy. Springs under compression will expand with great force when released, and springs that are stretched will contract rapidly when released.

Know what direction a spring will move and how it might affect other machine parts when released, and stay out of its path.

HYDRAULIC SYSTEMS

Hydraulic systems store considerable energy. They lift implements, such as plows, change the position of implement components, such as a combine header or bulldozer blade, operate hydraulic motors and assist in steering and braking.

Careless servicing, adjustment or replacement of parts can result in serious injury. High-pressure blasts of hydraulic oil can injure eyes or other body parts by burning or penetrating the tissue due to the liquid being hot. Leaks are a serious hazard.

Never inspect hydraulic hoses with your hands because a fine jet of hydraulic fluid can pierce the skin. Jet streams from even pinhole leaks can penetrate flesh. Get medical attention quickly, or you could lose that part of the body that was injected.

Use a piece of cardboard to test the hose for leaks. Before attempting any service on hydraulic systems, shut off the engine, which powers the hydraulic pump.

Lower the implement to the ground and relieve the pressure. Follow the instructions in your operator's manual, because the specific procedures for servicing the systems are very important to your safety.

PULL-IN POINTS

Pull-in points usually occur when someone tries to remove plant material or other obstacles that have become stuck in feed rolls or other machinery parts. Always shut off the power before attempting to clear plugged equipment.

The information and recommendations contained in this publication are believed to be reliable and representative of contemporary expert opinion on the subject material. The Farm Safety Association Inc. does not guarantee absolute accuracy or sufficiency of subject material, nor can it accept responsibility for health and safety recommendations that may have been omitted due to particular and exceptional conditions and circumstances.

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(519) 823-5600

Attachment 5. Equipment Specifications

TROMMEL SCREEN

N 40 Inc
P.O. Box 1330
Rockwell, NC 28138
Phone: (336) 499-5881
Fax: (336) 499-5882
Web: www.n40compost.com

TERRA SELECT
T 7

Specifications:

- **Machine Length:** 44.6'
- **Machine Height:** 13'
- **Machine Width:** 8.3'

- **Hopper Capacity:** 8 Yds^3

- **Screening Drum:**
  - **Length:** 25'
  - **Diameter:** 7.2'
  - **Drum Speed:** 0-23 rpm. Infinitely Adjustable

- **Discharge Belts:**
  - **Fines**
    - **Belt Length:** 16'
    - **Belt Width:** 39"
  - **Overs:**
    - **Belt Length:** 16'
    - **Belt width:** 39"
  - **Cross Belt Width:** 39"

- **Engine:**
  - **Type:** Turbo Diesel
  - **Manufacturer:** Perkins
  - **Horsepower:** 121

- **Fuel Tank:** 79 Gallons

- **Supports:** (2) Hydraulic Actuated at Front
  (1) Hydraulic Actuated at Rear

- **Machine Weight:** 50,705 lbs.

- **Central Lubrication Points**

Warranty:

Warranty covers proven defects in workmanship and material for a period of Twelve (12) months or 1000 hours from date of delivery to the customer's site.
The warranty includes Parts, Labor, Travel, and Shipping.
The warranty does not cover Rubber Parts, Wear and Spare Parts and Glass

Delivery:

Machine will be delivered to your site
Total price includes all Shipping, Trucking, Freight, Set-up charges, etc.

Optional Equipment:

- Wind Sifter
- Additional Screening Drum
- Automatic Central Lubrication unit
- Radio Control 8 channel
- Remote Control Tipping Grizzly
- Additional hydraulic connection
- Additional hydraulic rear support
- Hydraulic Drive
- **T**erra Select – **E**nergy – **C**ontrol – **S**ystem

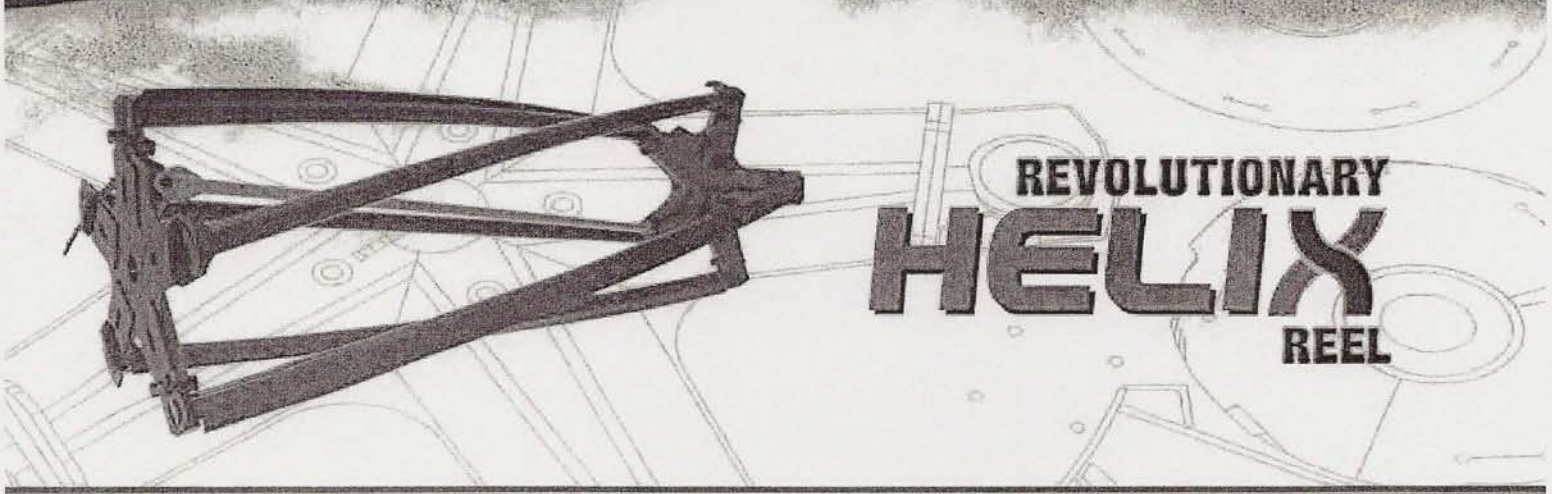
This exclusive control monitors the level of the hopper by means of a sensor. When the hopper is empty, the control automatically stops the screening machine and the engines speed is reduced to idling speed of approximately 700 rpm. When the hopper is filled again, the screen is automatically restarted and the engine is accelerated to nominal speed. This leads to a considerable saving, when for example the wheel loader has to load a truck during the screening process

RC 200 SERIES

Reel Commercial

TMR Mixers - with Optional Helix Reel

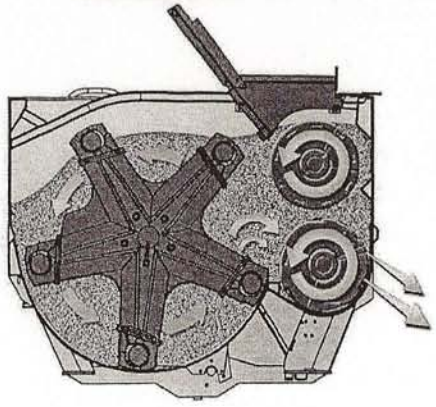
500 – 950 Cubic Feet



WORLD-WIDE LEADER IN TMR MIXERS

RC 200 SERIES

Fully-redesigned RC 200 Series Commercial Reel mixers provide superior durability and performance, with new advanced options that separate them from the competition. The all-new, open-concept Helix reel option offers faster, more consistent mixing and improved load leveling with any ration. The Helix Reel design optimizes the mixing of wet by-product rations, but through extensive testing has proven to provide quality performance in all rations. The Heavy-Duty Drive option offers extended life, in even the most extreme use cycles, and provides the ability to mix the heaviest feedstuffs. These enhancements, combined with the versatility and low horsepower requirement that are the hallmark of the reel and auger design, put these new RC models at the head of their class! With truck, trailer and stationary models there's a machine to fit every feeding situation.

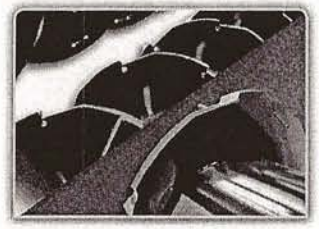


Low Fuel Consumption!

The gentle tumbling action of the reel works with the two side blending augers for fast, thorough end-to-end and side-to-side mixing. The design minimizes force and pressure, resulting in low horsepower requirements and, correspondingly, less fuel consumption for economical operation.

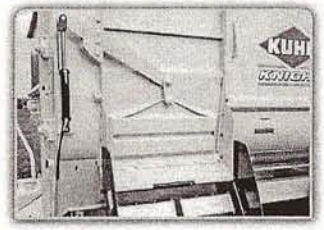
Rugged and Durable

An optional heavy-duty drive provides heavier chains throughout and a larger diameter countershaft and bearings for added strength and extended life in the toughest mixing conditions and heaviest use cycles.



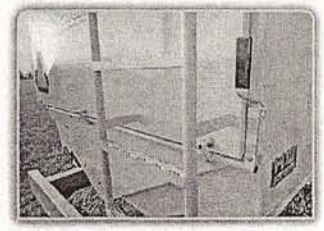
Flexible for Roughage and Grains

The grain-auger option provides gentle handling of more delicate feeds like flaked corn to maintain ration quality. The roughage-auger option features notched, sectional flighting with welded-in, self-sharpening, hardened knives for better hay-handling capability.



Improved Discharge

The discharge door and linkage have been reinforced to provide reliable service and long life. The slide tray linkage has also been improved, with increased adjustability to adapt to different feeding situations.

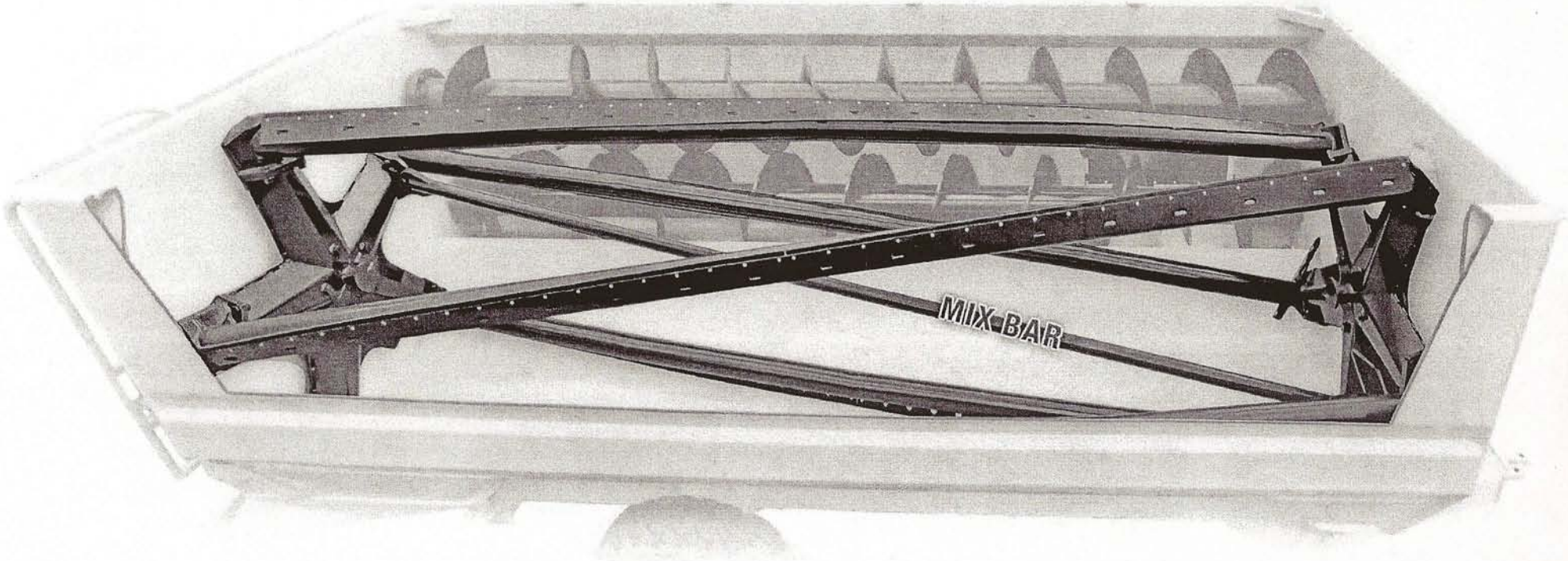


Secure, but Accessible

The improved, single handled latch provides easy access to the oil bath and secure closure to protect the drive system. An improved lip seal keeps oil in and dirt and debris out to help minimize wear on drive components.

RC 200 SERIES

Helix Reel Technology



The Helix Design

The optional Helix Reel has a robust build and has been thoroughly tested to withstand the most challenging conditions. The helical design of the reel crossbars evens the pressure across the length of the reel for smoother, more consistent operation. It also engages with the feed more smoothly.

Open Center Reel

The all-new, open-center design eliminates obstructions in the reel and provides superior feed movement and unparalleled mixing action. The benefits are unmistakable, with faster, more consistent mixing, improved load leveling, optimized mixer space utilization and fewer dead spots for the ultimate in ration quality.

Superior Mixing of Wet By-Product Rations

A mix bar runs diagonally across the center of the reel to help ensure consistent feed movement throughout the entire mixing chamber. The reel crossbars keep feed moving efficiently around the outside of the chamber. The secondary mechanical mixing action from the mix bar provides a fast and thorough mix even in wet, heavy rations with large amounts of distillers grains.

Improved Load Leveling

With all potential obstacles removed from the center of the reel, feed is free to flow unobstructed from one end of the mixing chamber to the other. This greatly improves the end-to-end mixing action and helps eliminate uneven filling for optimum load leveling in any ration. Even leveling allows consistent use of the full capacity of the machine for maximum efficiency.

Faster, More Even Unloading and Cleanout

Cleanout speed is a key factor that can limit feeding efficiency, extending feeding cycles and ultimately costing valuable time and money. The new open-center Helix design provides fast, consistent unloading, with quicker, more complete cleanout than competitive models. The result is optimum performance, allowing the operator to move on to the next batch faster.

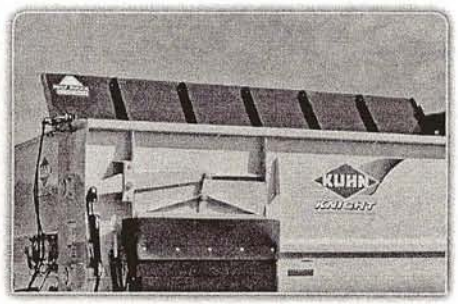
Enhanced Performance for Grain and Roughage Rations

The cutting-edge design has been extensively tested with the toughest beef and dairy rations. The results are clear, from dry, dusty materials, to wet, heavy rations, the new RC 200 series mixers with Helix Reel technology set a new standard for quality performance and superior mixing to meet the needs of even the most demanding producers.

RC 200 SERIES

Customize an RC to fit your operation

EFFECTIVE HAY HANDLING!



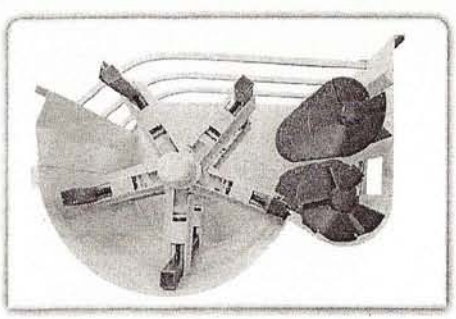
Roughage Maxx

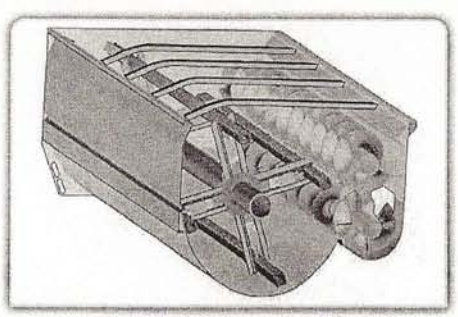
With the Roughage Maxx System, scalloped knives are added to the lower auger to maximize hay processing. The knives provide a more consistent particle length and more even blending of the ration. The result is a more uniform and palatable ration with reduced sorting for overall better feed efficiency.

Hay Maxx

The Hay Maxx System provides enhanced processing of a wide variety of materials. Hay and other bulky materials can be placed on the pan, allowing them to be preprocessed by the upper auger before entering the mixing chamber.

STANDARD REEL OPTION





Large-Diameter Reel

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Four- or Five-Arm Reel

The four-arm reel minimizes the pressure placed on higher-roughage feed and the extra space within the reel enhances hay processing and reduces mixing time. The five-arm reel ensures faster mixing and unloading in heavier grain rations and provides more even load distribution on the reel arms.

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The option of a standard or lowered right side allows customers the flexibility to choose the setup that best matches the needs of their operation.

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Straight-single and walking-tandem bogie axle options are available for trailer models, providing flexibility for varied terrain. Both feature heavy-duty spindles and hubs for maximum durability and long life.

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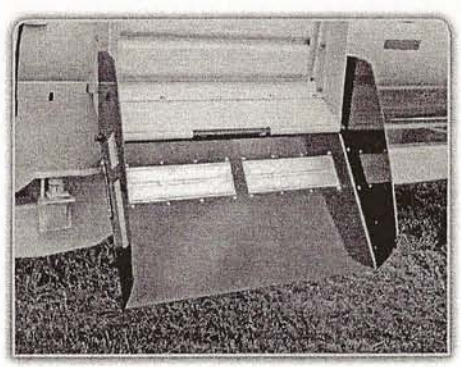
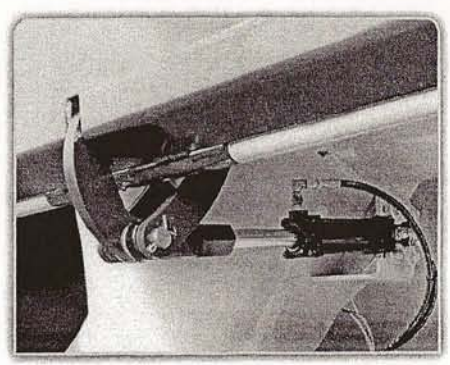




Discharge Options

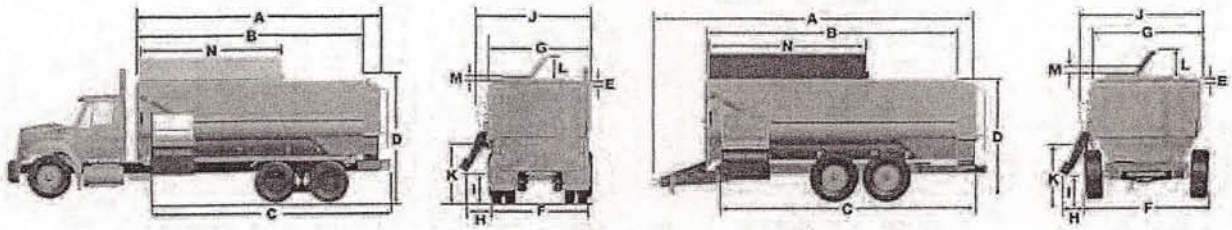
Truck models come with a standard slide tray for fast, consistent discharge. Trailer models offer the slide tray plus a 4-auger discharge option with adjustable height for feeding into higher bunks.

Improved Slide Tray Linkage

The cylinder and linkage for the slide tray option have been relocated and improved. This change provides increased adjustability and eliminates the possibility of the tray extending over center when opened.

MODEL SPECIFICATIONS

Visit your dealer or our website at www.KuhnNorthAmerica.com for information on all Kuhn Knight products.



TRAILER-TR TRUCK-TK

MODEL	RC 250		RC 260		RC 270		RC 295	
DIMENSIONS (INCHES)	**TR**	**TK**	**TR**	**TK**	**TR**	**TK**	**TR**	**TK**
A - Overall Length	242	189	272	219	302	249	294	247
B - Mixing Chamber Length	168	168	198	198	228	228	216	216
C - Front Discharge to Bumper	182	180	212	210	242	240	231	232
D - Overall Height [1,2]	107	120	107	120	107	120	126	135
E - Lowered Right Side Reduction	12	12	12	12	12	12	NA	NA
F - Tread Width [2]	101	96	101	96	101	96	110	96
G - Overall Width (mixer only)	102	102	102	102	102	102	120	120
H - Slide Tray - max. reach	22	22	22	22	22	22	30	30
- 4-Auger Discharge - max. reach 2' / 3'	32/42	NA	32/42	NA	32/42	NA	NA	NA
I - Slide Tray - max. height	35	48	35	48	35	48	50	59
- 4-Auger Discharge - max. height 2' / 3'	50/56	NA	50/56	NA	50/56	NA	NA	NA
J - Slide Tray - transport width	114	114	114	114	114	114	128	128
- 4-Auger Discharge - transport width - 2' / 3'	126/130	NA	126/130	NA	126/130	NA	NA	NA
K - Hinge Height for Discharge	47	56	47	56	47	56	56	65
L - Height - haypan up	22	22	22	22	22	22	22	22
M - Height - haypan down	8	8	8	8	8	8	8	8
N - Length - haypan	120	120	144	144	144	144	144	144

SPECIFICATIONS				
Unit Weight [3] - Helix Reel (TR/TK) pounds	16,000/14,950	17,200/16,090	21,000/18,820	25,300/20,250
Unit Weight [3] - Std. Reel (TR/TK) pounds	14,800/13,750	16,000/14,830	19,800/17,620	24,450/19,400
Maximum Net Load - pounds	15,000	18,000	21,000	28,500
Mixing Capacity - cubic foot	500	600	700	950
Reel				
- Diameter	70"			84"
- Drive Shaft Diameter	5"			8" Tube
- Arms	Standard Reel - Roughage:4, Grain:5 / Helix Reel:5			5 (all)
- Hopper Thickness	3/8"			3/8"
- Speed RPM	5.6 - 6.8			4.6 - 5.2
Lower Auger				
- Flighting Diameter	24"			28"
- Flighting Thickness[4] - sectional	5/8"			5/8"
- Drive Shaft Diameter	3 1/2"			5"
- Tube - outside diameter	6 5/8"		8 5/8"	8 5/8"
Upper Auger				
- Flighting Diameter	22"		24"	28"
- Tube - outside diameter	6 5/8"		8 5/8"	8 5/8"
- Flighting Thickness - sectional	1/2"			1/2"
- Drive Shaft Diameter	3 1/2"			4"
Auger Hopper Thickness	3/8"			3/8"
Side Sheets Thickness	1/4"			1/4"
End Sheets Thickness	1/4"			1/4"
Standard or Lowered Right Side	Either Option Available			Standard Only
Door Opening Size	42" x 22"			48" x 26"
Roller Chain Drive				
- Standard	80-100-120-140			100-140-160-200
- Optional Heavy-Duty	100-120-140-140			HD Standard
Spindle Diameter - single axle / tandem axle	4 1/2" / NA	4 1/2" / 3 3/8"		NA / 4 1/2"
Hub	HD 10-bolt			HD 10-bolt
Tongue Weight - % gross weight	9%	11%	10%	11.5%
Tractor Requirement - PTO HP [5]	100	110	120	170

[1] Truck dimensions based on 41" truck frame height.
[2] Heights and widths will vary depending on tire size.
[3] Unit is equipped with most common options.
[4] 3/4" flighting at convergence is standard.
[5] Horsepower requirement may vary with different materials. Consult operator's manual for proper tractor sizing.

We reserve the right to change any equipment specifications, design, or materials without notice. These mixers are designed for agricultural use only with materials estimated up to 30 lbs. per cubic foot. Contact factory for non-agricultural use or heavier materials. Equipment shown in this literature may be protected by at least one patent and/or trademark.

SAFETY FIRST

Always read and understand the Operator's Manual and all Safety Decals before using the equipment.

YOUR KUHN KNIGHT DEALER

Kuhn North America, Inc.
Corporate Headquarters – 1501 West Seventh Avenue
Brodhead, WI 53520 – Phone: (608) 897-2131 – Fax: (608) 897-2561
www.KuhnNorthAmerica.com

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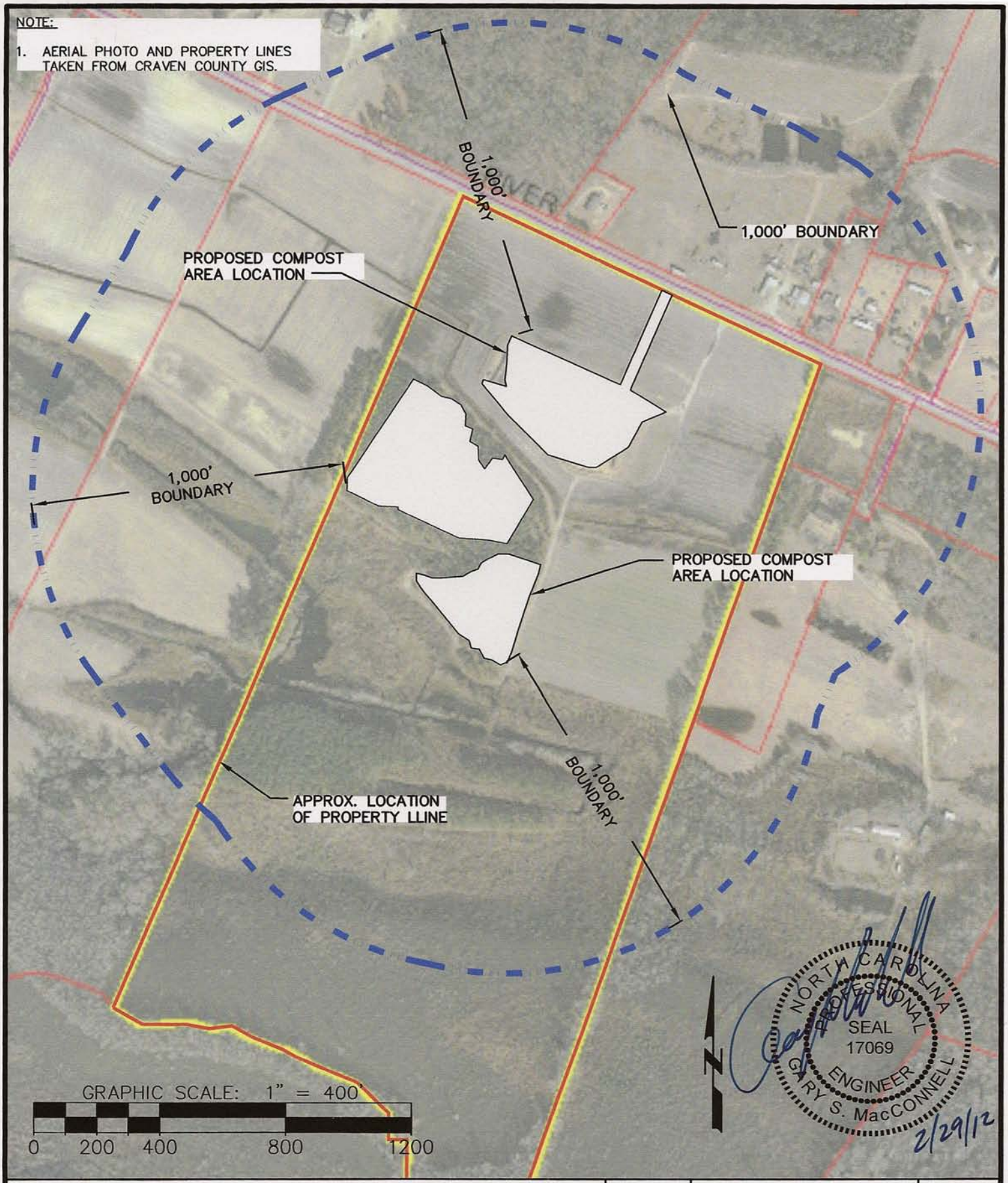
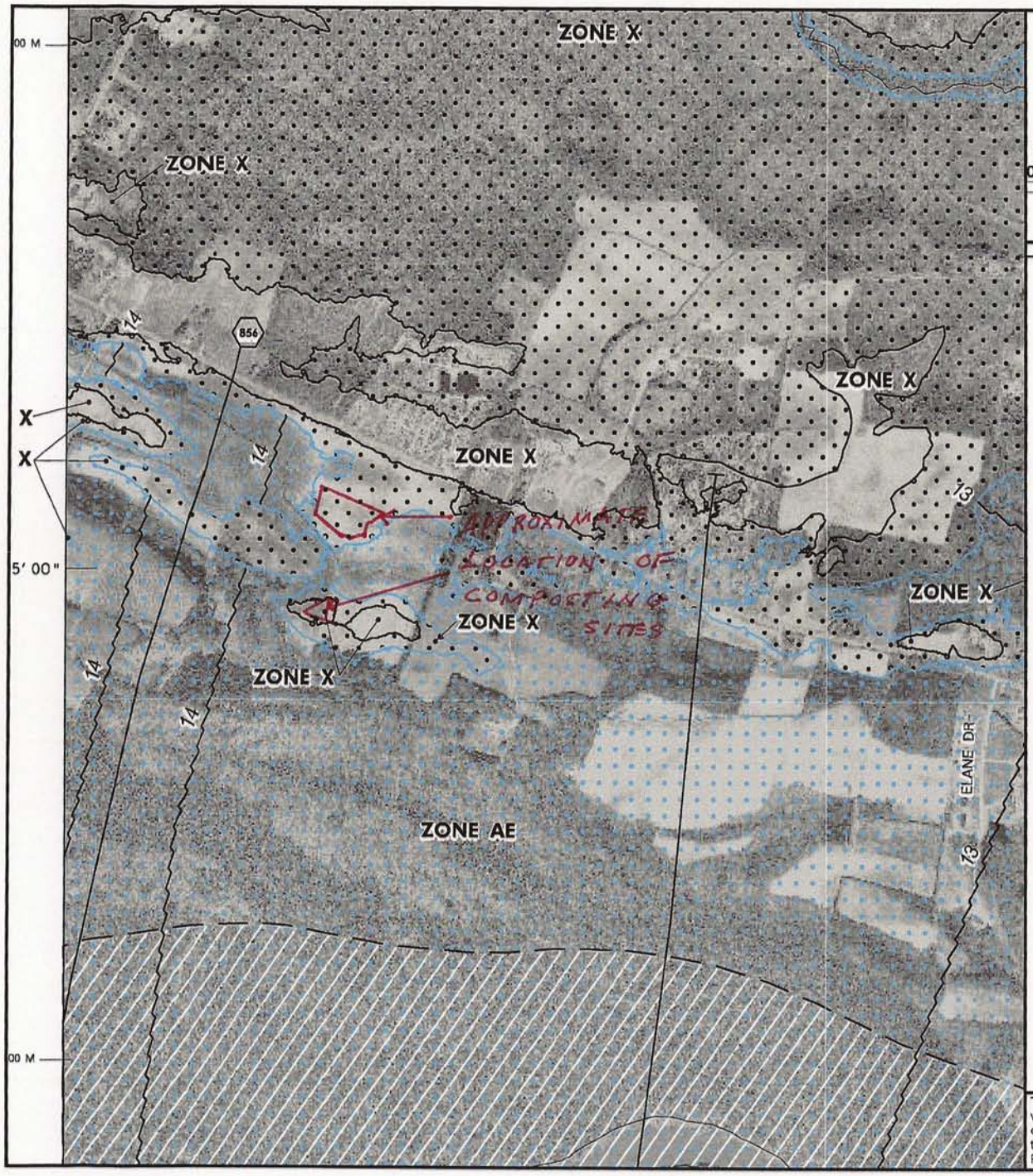
Attachment 6. Buffer Maps

NOTE:

1. AERIAL PHOTO AND PROPERTY LINES TAKEN FROM CRAVEN COUNTY GIS.



MacCONNELL & Associates, P. C.	1903 NORTH HARRISON AVE., SUITE 102 CARY, NORTH CAROLINA 27513 P. O. BOX 129 MORRISVILLE, NORTH CAROLINA 27560 TEL: (919) 467-1239 FAX: (919) 319-6510	BY: MAE JOB #: A45201.00 DATE: 12/30/11	PROJECT: CRAVEN AG SERVICES, INC. COMPOSTING FACILITY CRAVEN COUNTY, NC	REFERENCE C—1



GRID NORTH

SCALE 1" = 1000' (1 : 12,000)

0 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 5544J

FIRM

FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 5544

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CRAVEN COUNTY	370072	5544	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE
JULY 2, 2004

MAP NUMBER
3720554400J

State of North Carolina
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Attachment 7. Craven County Zoning Letter

Craven County

Office of Planning
and
Community Development

Donald R. Baumgardner, Director
R. Chad Strawn, Assistant Director
Shelton P. Toler, Chief Building Codes Inspector

Human Services Annex
2828 Neuse Boulevard
New Bern, North Carolina 28562

Planning & CD (252) 636-6618
Fax (252) 636-5190
Inspections (252) 636-4987
Fax (252) 636-4984

May 11, 2011

RE: Parcel ID# 1-057-026

To Whom It May Concern:

The above property located in Craven County, North Carolina does not fall within any municipality and, therefore, is regulated by the county. Craven County has no applicable ordinances regulating development on this property.

Therefore the property is not zoned and could be used for residential or commercial purposes at this time.

If you have any further questions or comments regarding this property or county policies, please do not hesitate to contact me at 252-636-6618.

Thank you,

Don LaVelle Jr.
Planning Technician

Attachment 8. Marketing Information Sheet

CAS Compost Quality and Use

Feedstock materials: Craven Ag Service has been producing high quality compost from a variety of waste or by product materials generated in the Coastal Plain of North Carolina. The feedstocks utilized in the compost include regulated waste materials (septage and fats, oils and grease), agribusiness wastes, and yard waste. The compost is tested and monitored and all sampling indicates the compost produce meets the most stringent regulatory requirements imposed by federal and state agencies.

Sample testing: CAS samples the composted material daily to assure compliance with regulatory requirements. Temperatures are important in compost production and all temperature monitoring accomplished indicates the temperatures within the compost windrows exceed 140 degrees F. This assures pathogens and weed seeds are eliminated.

Testing indicates nutrient levels as presented in the table below.

	Test results	Pounds per ton
Nitrogen	3.0%	30 (allows 50% for mineralization)
Phosphorus	0.5%	10
Potassium	1%	20

Typical loadings for the compost should supply nutrients required for specific cropping systems and should be based on soil test data. In general, 3 to 5 tons of compost applied per acre will provide required nutrients for crops typical in the Coastal Plain.

Attachment 9. Division of Solid Waste Communications

Donna Wilson

Environmental Engineer, Solid Waste Section

NCDENR-DWM

1646 Mail Center

Raleigh, NC, 27699-1646

Dear Ms. Wilson:

Subject: Craven Ag Service Compost Application

Thank you for your November, 2011 letter containing the section comments on the compost site application. Representatives from MacConnell and associates and I have been working on the reply. Please find our comments herein and the revised application attached.

1. Craven Ag is Craven Ag Service, Inc.
2. Mr. MacConnell and I have reviewed and signed the application.
3. Attachments are contained in the application.
4. The application and the operations document are combined into the application.
5. FEMA map is included in the attachments.
6. Property lines and compost areas have been adjusted.
7. Soil texture issues will be addressed by addition of fines, compaction, and monitoring.
8. The nearest residence in over 500 feet from the compost areas.
9. No wells are located on the site.
10. No wetlands are on areas proposed to host compost operations.
11. Corrected.
12. Waste and compostable materials have been reviewed for consistency.
13. The concrete pad is described in the plans attached.
14. The existing compost demonstration permit allows mixing and blending on a compacted soil pad; as the system is developed and the concrete mix pad is developed these initial mixing and blending activities will take place on the pad.
15. Materials removed from the compost will be collected in dumpsters and transported to an approved landfill (CRSWMA).
16. Materials will be blended on a "by volume" basis, wood chip, sawdust, and chip is ground before composting – it is received as ground material.
17. Dry materials are stored for short times on the site, if necessary the small volume of dry material will be covered with a tarp to maintain dry feedstock. Dry waste materials will be transported to the site only when the compost mixing and blending activity can take place.
18. The facility will NOT receive materials during inclement weather.
19. Area designations have been corrected on the plans

20. Temperature monitoring as described is referenced in the O and M manual.
21. Steps have been discussed in the O and M manual for handling materials which do not meet the required time and temperature mandates.
22. The O and M manual addresses the necessity to repeat the time/temperature/turning regimen for materials which do not meet the standard.
23. Hours of operation have been reviewed.
24. Changed
25. The O and M manual addresses leachate management; no pooling is not the recommended management option.
26. A 36 inch long dial stem thermometer will be used. Calibration procedures are discussed in the O and M Manual.
27. Changed
28. Methods have been corrected.
29. Zoning letter is contained in the application. The site/soil report is on file in the DWM. The report to permit the compost site was submitted by Mr. Fred Smith with the initial permit application.
30. We understand that the existing septage permit does not allow application of the leachate and initial plans are to reapply the leachate as a liquid to the compost (fully cognizant of the time and temperature issue), to apply for an amended septage permit to allow this land application activity, or to transport liquid off site to an approved wastewater treatment facility such as the City of Kinston. Class B compost has not been produced during the demonstration and there is NO intent to produce that in the future.
31. Compost age, time, temperature and turning is tracked as a discrete batch for each of the materials produced.
32. The process flow diagram is included in the O and M manual.
33. Equipment used in the process is described in the application and the O and M manual.
34. Time periods have been reviewed and adjusted for consistency.
35. Windrow width has been adjusted in the Plans
36. C:N will be measured by NCDA as a routine waste analysis.
37. NCDA waste analysis provides moisture levels, porosity is assessed visually in conjunction with hand or "squeeze method" assessments of quality.
38. Turning is described in the O and M Manual. Active windrows will be turned 5 times in 15 days to meet pathogen reduction requirements. Subsequent turning will be accomplished as needed to adequately cure the material.
39. Odor is controlled by covering the active windrow with mature (odor free) compost. Dust emissions are controlled by addition of a fine moisture layer during dry, windy conditions. The moisture will be imported from an off-site location and will contain no runoff from this facility.
40. Material in the initial phase of the compost operation will remain in active windrows for between 20 and 30 days (time required to increase from ambient temperature to over 131 degrees varies). The volume of material in this phase is estimated to be no more than 5000 cubic yards per quarter. Curing area storage may reach 20,000 cubic yards, and finish compost storage will range between zero and 20,000 cubic yards depending on markets.

41. A label will be developed listing the source of feedstock used in production of the compost and the nutrient (NPK) levels in the material. In addition, the label will provide recommended application rates for the product such as 0.25 pound per square foot in a garden to as much as 10 tons per acre on an agricultural site.
42. Signed, sealed plans and specifications are provided.
43. Personnel have received training through NCSU, the Compost Council, and Bio-Cycle. Continuing training is required for operators and owners. This should be required in the permit.
44. The QA/QC plan is discussed in the O and M manual.
45. Fact sheet for recommended use is provided in the O and M manual
46. The initial plans specified infiltration basins and treatment wetlands. The plans now call for small sinks or basins to collect runoff from the area between windrows. The windrows and curing piles themselves will catch and hold rainwater falling thereon. The anticipated windrow coverage is calculated as 2000 sq feet per windrow and the curing operation is expected to cover 1 acre. Open areas potentially generating runoff from process or curing operations are estimated to cover 40,000 sq ft or 1 acre. This will generate approximately 75,000 gallons of liquid in a storm event. Berms, swales and the basins or sinks are suggested to accommodate this liquid. Liquid collected in these facilities will infiltrate into the soil or be pumped and hauled to an approved wastewater treatment facility.
47. The sedimentation and erosion control plan was developed and forwarded to NCDWQ-WRO.
48. Drawings are provided.
49. Corrected
50. Paper and electronic copies provided.

Thank you for your attention to this request. Mr. MacConnell, Mr. Dunham and I appreciate your assistance on this project.

Sincerely;

A. R. Rubin

Gary MacConnell, P.E.

Attachment 10. Sediment Trap Calculations

Client: **A. R. Rubin & Associates**
Project: **Craven Ag Services - Compost Facility**
Project No.: **A45201.00**
Subject: **Stormwater , Soil & Erosion Control - Sediment Trap Calculations**
Date: **March 9, 2012**

DRAINAGE AREA: COMPOST PAD RUNOFF

SEDIMENTATION TRAP #1
DESIGN CRITERIA:

FOR AREAS LESS THAN 5 ACRES
LIMITED LIFE: 2 YEARS
TRAP EFFICIENCY : 75 %
MINIMUM EMBANKMENT WIDTH: 5 FEET
EMBANKMENT SLOPES: 2:1 OR FLATTER
STONE SIZE: CLASS B LINED WITH 1 FOOT #57 ON INSIDE FACE
SIDE SLOPES: 2:1 OR FLATTER
SPILLWAY: LINE WITH STONE MINIMUM OF 21 INCHES THICK UP BANK
SPILLWAY CREST: MINIMUM 1.5 FEET BELOW SETTLED TOP OF EMBANKMENT
SPILLWAY DESIGNED FOR 10 YEAR STORM
LINE BANK WITH FILTER CLOTH BEFORE PLACEMENT OF RIPRAP

GIVEN:

TOTAL AREA	0.21	ACRES:
TOTAL DISTURBED AREA	0.21	ACRES:
10 YEAR FLOW	1.44	CFS

DESIGN CRITERIA:

MINIMUM TRAP VOLUME	3,600	C.F./ACRE
MINIMUM SURFACE AREA	0.01	ACRES/CFS

FIND:

TRAP VOLUME, MAXIMUM DEPTH, SURFACE AREA, AND WEIR LENGTH.
24-HOUR STORM - QP 10, 24

SOLUTION:

MINIMUM VOLUME (MIN. TRAP VOL. * DISTURBED AREA)	756	C.F.
MINIMUM SURFACE AREA (0.01 * PEAK FLOW)	0.0144	ACRES
MINIMUM SURFACE AREA	627	SQ. FEET
MAXIMUM POOL DEPTH	3	FEET
MINIMUM WEIR LENGTH	4	FEET
MINIMUM LENGTH	35	FEET
MINIMUM WIDTH	18	FEET

Client: **A. R. Rubin & Associates**
Project: **Craven Ag Services - Compost Facility**
Project No.: **A45201.00**
Subject: **Stormwater - Runoff Calculations**
Date: **3/12/2012**

Given: **Calculate runoff**
Use Rational Method - Q=CiA
Ref.: NC Erosion and Sediment Control Planning and Design Manual.

Q =	Peak Runoff in CFS
C =	Runoff Coefficient
i =	Average Intensity in Inches/Hour
Tc =	Time of Concentration in Minutes
A =	Drainage Area in acres

Given:
Runoff Coeffcients Used:

Land Use	C Value
Compost Pad:	0.80

Tc =	5 Minutes
Rainfall Intensity:	New Bern
Storm:	10 Year
i =	8.72 Inches/Hour

Description: **Compost Pad Runoff**

Land Use	**Area SF**	**Area Acres**	**Runoff CFS**
Compost Pad:	9,000	**0.2066**	**1.4413**
Total	**9,000**	**0.2066**	**1.4413 CFS**

DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	Zachary L. Fuller, PE	**Date:**	March 13, 2012
Checked By:	Gary S. MacConnell, PE	**Date:**	March 13, 2012
Company:	MacConnell & Associates		
Project Name:	Craven Ag Services		
Project No.:	A45201.00		

Site Location (City/Town)	Vanceboro
Culvert Id.	Sediment Trap
Total Drainage Area (acres)	0.21

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	12
Tailwater depth (in.)	0
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	1.44
Velocity (ft./s)	N/A

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	**Maximum TW**
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.5	
Minimum apron length, L_a (ft.)	8	
Apron width at pipe outlet (ft.)	3	3
Apron shape	Trapezoidal	
Apron width at outlet end (ft.)	9	1

Step 4. Determine the maximum stone diameter:

Step 4. Determine the minimum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	0.75	0

Step 5. Determine the apron thickness:

$$\text{Apron thickness} = 1.5 \times d_{max}$$

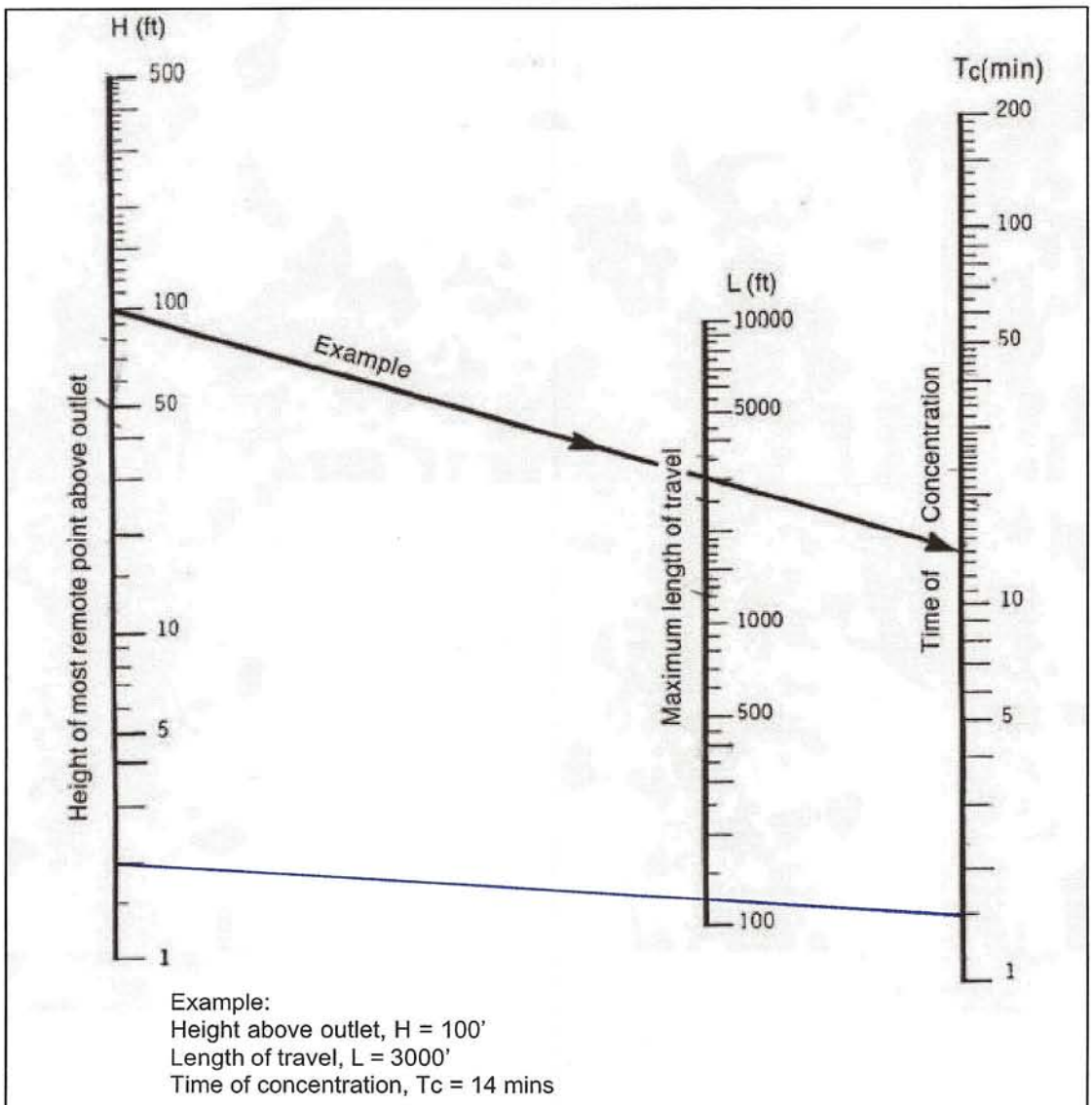
	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.125	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.

Figure 2.4 Kirpich Equation
(Source: North Carolina Erosion and Sediment Control Planning and Design Manual)



Example:
Height above outlet, H = 100'
Length of travel, L = 3000'
Time of concentration, Tc = 14 mins

NOAA Atlas 14, Volume 2, Version 3NEW BERN 3 NW
Station ID: 31-6103
Location name: New Bern, North Carolina, US*
Coordinates: 35.1333, -77.0833
Elevation:
Elevation (station metadata): 10ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	5.74 (5.27-6.28)	6.72 (6.18-7.32)	7.70 (7.07-8.38)	8.72 (7.99-9.49)	9.84 (8.96-10.7)	10.8 (9.79-11.7)	11.7 (10.5-12.7)	12.6 (11.3-13.7)	13.7 (12.2-14.9)	14.7 (13.0-16.1)
10-min	4.58 (4.21-5.01)	5.37 (4.94-5.85)	6.17 (5.66-6.71)	6.97 (6.39-7.59)	7.84 (7.14-8.52)	8.59 (7.80-9.34)	9.28 (8.38-10.1)	9.96 (8.93-10.8)	10.8 (9.62-11.8)	11.6 (10.2-12.7)
15-min	3.82 (3.50-4.18)	4.50 (4.14-4.90)	5.20 (4.78-5.66)	5.88 (5.39-6.40)	6.62 (6.04-7.20)	7.25 (6.58-7.88)	7.82 (7.06-8.50)	8.38 (7.51-9.12)	9.08 (8.07-9.90)	9.69 (8.54-10.6)
30-min	2.62 (2.40-2.86)	3.11 (2.86-3.39)	3.70 (3.39-4.02)	4.26 (3.90-4.64)	4.91 (4.47-5.33)	5.46 (4.96-5.93)	5.99 (5.41-6.51)	6.52 (5.85-7.10)	7.22 (6.42-7.88)	7.84 (6.91-8.57)
60-min	1.63 (1.50-1.79)	1.95 (1.80-2.13)	2.37 (2.18-2.58)	2.77 (2.54-3.02)	3.27 (2.98-3.55)	3.70 (3.36-4.02)	4.12 (3.72-4.48)	4.57 (4.10-4.98)	5.18 (4.61-5.65)	5.73 (5.05-6.26)
2-hr	0.976 (0.890-1.08)	1.18 (1.08-1.29)	1.46 (1.33-1.60)	1.75 (1.59-1.91)	2.11 (1.91-2.31)	2.45 (2.20-2.67)	2.79 (2.50-3.05)	3.16 (2.81-3.45)	3.68 (3.24-4.03)	4.15 (3.62-4.55)
3-hr	0.702 (0.637-0.783)	0.846 (0.769-0.938)	1.06 (0.958-1.17)	1.27 (1.15-1.41)	1.56 (1.40-1.72)	1.82 (1.63-2.01)	2.10 (1.86-2.31)	2.41 (2.12-2.65)	2.85 (2.48-3.14)	3.26 (2.80-3.60)
6-hr	0.425 (0.384-0.478)	0.511 (0.463-0.574)	0.639 (0.577-0.716)	0.770 (0.693-0.863)	0.946 (0.847-1.06)	1.11 (0.986-1.24)	1.29 (1.13-1.43)	1.48 (1.29-1.64)	1.76 (1.51-1.95)	2.02 (1.72-2.25)
12-hr	0.248 (0.223-0.281)	0.299 (0.270-0.337)	0.375 (0.337-0.423)	0.455 (0.407-0.513)	0.563 (0.500-0.632)	0.665 (0.586-0.744)	0.774 (0.675-0.866)	0.897 (0.774-1.00)	1.08 (0.914-1.20)	1.25 (1.04-1.39)
24-hr	0.145 (0.133-0.161)	0.177 (0.162-0.195)	0.229 (0.208-0.252)	0.272 (0.247-0.300)	0.337 (0.304-0.371)	0.393 (0.351-0.432)	0.454 (0.403-0.499)	0.523 (0.457-0.575)	0.625 (0.537-0.689)	0.712 (0.603-0.788)
2-day	0.084 (0.076-0.094)	0.102 (0.092-0.113)	0.131 (0.118-0.146)	0.156 (0.140-0.173)	0.193 (0.173-0.214)	0.226 (0.200-0.250)	0.262 (0.230-0.290)	0.303 (0.263-0.336)	0.365 (0.311-0.406)	0.418 (0.351-0.468)
3-day	0.060 (0.054-0.066)	0.072 (0.066-0.080)	0.092 (0.084-0.102)	0.109 (0.099-0.121)	0.134 (0.121-0.148)	0.156 (0.139-0.171)	0.180 (0.159-0.198)	0.206 (0.180-0.227)	0.245 (0.211-0.272)	0.280 (0.237-0.313)
4-day	0.047 (0.043-0.052)	0.057 (0.052-0.063)	0.073 (0.067-0.080)	0.086 (0.078-0.094)	0.105 (0.095-0.115)	0.121 (0.108-0.132)	0.138 (0.123-0.152)	0.157 (0.138-0.173)	0.186 (0.161-0.205)	0.210 (0.179-0.236)
7-day	0.032 (0.029-0.034)	0.038 (0.035-0.042)	0.048 (0.044-0.052)	0.056 (0.051-0.061)	0.068 (0.062-0.074)	0.077 (0.070-0.084)	0.088 (0.079-0.096)	0.099 (0.088-0.108)	0.115 (0.101-0.127)	0.129 (0.111-0.143)
10-day	0.025 (0.023-0.027)	0.030 (0.028-0.033)	0.037 (0.034-0.041)	0.043 (0.040-0.047)	0.052 (0.047-0.056)	0.059 (0.053-0.064)	0.066 (0.060-0.072)	0.074 (0.066-0.081)	0.086 (0.076-0.095)	0.096 (0.083-0.106)
20-day	0.017 (0.016-0.018)	0.020 (0.019-0.022)	0.024 (0.023-0.026)	0.028 (0.026-0.030)	0.033 (0.030-0.036)	0.037 (0.034-0.040)	0.042 (0.038-0.045)	0.046 (0.042-0.050)	0.053 (0.047-0.057)	0.058 (0.051-0.063)
30-day	0.014 (0.013-0.015)	0.016 (0.015-0.018)	0.020 (0.018-0.021)	0.022 (0.021-0.024)	0.026 (0.024-0.028)	0.029 (0.027-0.031)	0.032 (0.030-0.035)	0.035 (0.032-0.038)	0.040 (0.036-0.043)	0.043 (0.038-0.047)
45-day	0.011 (0.011-0.012)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.020)	0.022 (0.020-0.023)	0.024 (0.022-0.026)	0.027 (0.024-0.029)	0.029 (0.027-0.032)	0.033 (0.030-0.036)	0.036 (0.032-0.039)
60-day	0.010 (0.010-0.011)	0.012 (0.011-0.013)	0.014 (0.014-0.015)	0.016 (0.015-0.017)	0.019 (0.017-0.020)	0.021 (0.019-0.022)	0.022 (0.021-0.024)	0.024 (0.022-0.026)	0.027 (0.025-0.029)	0.029 (0.026-0.032)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

Attachment 11. Flow Diagram CAS

Flow Diagram CAS

Area 1: Receiving area Mix pad

⇩

Area 2: Compost Windrow area, active PFRP and VAR compliance

⇩

Area 3: Compost curing and screening area

⇩

Area 4: Storage area for finished compost

Product suitable for unrestricted use

Attachment 12. Ash TCLP

PRISM LABORATORIES, INC. | Full-Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert No. 37735
VA Certification No. 1287

Case Narrative

02/06/2012

A. R. Rubin & Associates
Bob Rubin
192 Fearrington Post
Pittsboro, NC 27312

Project: CAS

Lab Submittal Date: 01/31/2012
Prism Work Order: 2020013

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

PRISM LABORATORIES, INC.

Robbi A. Jones

President/Project Manager

Robbi A. Jones

Reviewed By

Data Qualifiers Key Reference:

BRL	Below Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
*	Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

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Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

PRISM LABORATORIES, INC. | Full-Service Analytical & Environmental Solutions

Sample Receipt Summary

02/06/2012

Prism Work Order: 2020013

Client Sample ID	Lab Sample ID	Matrix	Date Sampled	Date Received
ASH	2020013-01	Solid	01/15/12	01/31/12

Samples received in good condition at 18.8 degrees C unless otherwise noted.

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Summary of Detections

Prism Work Order:

Prism ID	Client ID	Parameter	Method	Result	Units

There were no detections reported.

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PRISM LABORATORIES, INC. | Full-Service Analytical & Environmental Solutions

Laboratory Report

02/06/2012

A. R. Rubin & Associates
Attn: Bob Rubin
192 Fearrington Post
Pittsboro, NC 27312

Project: CAS

Sample Matrix: Solid

Client Sample ID: ASH
Prism Sample ID: 2020013-01
Prism Work Order: 2020013
Time Collected: 01/15/12 17:00
Time Submitted: 01/31/12 13:18

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
TCLP Extraction by EPA 1311									
TCLP Extraction	Complete	N/A			1	*1311	2/2/12 8:15	BGM	P2B0039
TCLP Metals									
Mercury	BRL	mg/L	0.010	0.000014	1	*7470A	2/2/12 14:26	BGM	P2B0040
Arsenic	BRL	mg/L	0.050	0.010	1	*6010C	2/3/12 0:59	LTB	P2B0046
Barium	BRL	mg/L	5.0	0.013	1	*6010C	2/3/12 0:59	LTB	P2B0046
Cadmium	BRL	mg/L	0.025	0.00043	1	*6010C	2/3/12 0:59	LTB	P2B0046
Chromium	BRL	mg/L	0.25	0.00085	1	*6010C	2/3/12 0:59	LTB	P2B0046
Lead	BRL	mg/L	0.050	0.0038	1	*6010C	2/3/12 0:59	LTB	P2B0046
Selenium	BRL	mg/L	0.10	0.012	1	*6010C	2/3/12 0:59	LTB	P2B0046
Silver	BRL	mg/L	0.25	0.0017	1	*6010C	2/3/12 0:59	LTB	P2B0046

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A. R. Rubin & Associates
Attn: Bob Rubin
192 Fearrington Post
Pittsboro, NC 27312

Project: CAS

Prism Work Order: 2020013
Time Submitted: 1/31/2012 1:18:00PM

TCLP Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P2B0040 - 7470A										
Blank (P2B0040-BLK1)				Prepared & Analyzed: 02/02/12						
Mercury	BRL	0.010	mg/L							
LCS (P2B0040-BS1)				Prepared & Analyzed: 02/02/12						
Mercury	0.00952	0.010	mg/L	0.009375		102	80-120			
Matrix Spike (P2B0040-MS1)		**Source: 2020013-01**		Prepared & Analyzed: 02/02/12						
Mercury	0.00973	0.010	mg/L	0.009375	BRL	104	80-120			
Matrix Spike Dup (P2B0040-MSD1)		**Source: 2020013-01**		Prepared & Analyzed: 02/02/12						
Mercury	0.00981	0.010	mg/L	0.009375	BRL	105	80-120	0.8	20	
Batch P2B0046 - 3010A										
Blank (P2B0046-BLK1)				Prepared: 02/02/12 Analyzed: 02/03/12						
Arsenic	BRL	0.050	mg/L							
Barium	BRL	5.0	mg/L							
Cadmium	BRL	0.025	mg/L							
Chromium	BRL	0.25	mg/L							
Lead	BRL	0.050	mg/L							
Selenium	BRL	0.10	mg/L							
Silver	BRL	0.25	mg/L							
LCS (P2B0046-BS1)				Prepared: 02/02/12 Analyzed: 02/03/12						
Arsenic	1.16	0.050	mg/L	1.250		93	80-120			
Barium	1.11	5.0	mg/L	1.250		88	80-120			
Cadmium	1.14	0.025	mg/L	1.250		91	80-120			
Chromium	1.05	0.25	mg/L	1.250		84	80-120			
Lead	1.11	0.050	mg/L	1.250		89	80-120			
Selenium	1.21	0.10	mg/L	1.250		96	80-120			
Silver	1.12	0.25	mg/L	1.250		89	80-120			

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A. R. Rubin & Associates
Attn: Bob Rubin
192 Fearrington Post
Pittsboro, NC 27312

Project: CAS

Prism Work Order: 2020013
Time Submitted: 1/31/2012 1:18:00PM

TCLP Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P2B0046 - 3010A										
Matrix Spike (P2B0046-MS1)		**Source: 2020013-01**		Prepared: 02/02/12		Analyzed: 02/03/12				
Arsenic	1.22	0.050	mg/L	1.250	0.0385	94	75-125			
Barium	1.71	5.0	mg/L	1.250	0.571	91	75-125			
Cadmium	1.17	0.025	mg/L	1.250	0.00145	93	75-125			
Chromium	1.08	0.25	mg/L	1.250	BRL	86	75-125			
Lead	1.16	0.050	mg/L	1.250	0.0151	92	75-125			
Selenium	1.23	0.10	mg/L	1.250	0.0179	97	75-125			
Silver	1.14	0.25	mg/L	1.250	BRL	92	75-125			
Matrix Spike Dup (P2B0046-MSD1)		**Source: 2020013-01**		Prepared: 02/02/12		Analyzed: 02/03/12				
Arsenic	1.23	0.050	mg/L	1.250	0.0385	95	75-125	1	20	
Barium	1.71	5.0	mg/L	1.250	0.571	91	75-125	0.3	20	
Cadmium	1.18	0.025	mg/L	1.250	0.00145	95	75-125	1	20	
Chromium	1.10	0.25	mg/L	1.250	BRL	88	75-125	2	20	
Lead	1.18	0.050	mg/L	1.250	0.0151	93	75-125	2	20	
Selenium	1.25	0.10	mg/L	1.250	0.0179	99	75-125	2	20	
Silver	1.16	0.25	mg/L	1.250	BRL	93	75-125	1	20	

Sample Extraction Data

Prep Method: 1311

Lab Number	Batch	Initial	Final	Date/Time
2020013-01	P2B0039	100 g	2000 mL	02/01/12 14:45

Prep Method: 3010A

Lab Number	Batch	Initial	Final	Date/Time
2020013-01	P2B0046	10 mL	50 mL	02/02/12 13:05

Prep Method: 7470A

Lab Number	Batch	Initial	Final	Date/Time
2020013-01	P2B0040	20 mL	30 mL	02/02/12 9:15

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Phone: 704/529-6364 • Fax: 704/525-0409

CHAIN OF CUSTODY RECORD

PAGE ___ OF ___ QUOTE # TO ENSURE PROPER BILLING: ___

Client Company Name: A.R. RUBIN & ASSOC
Report To/Contact Name: A.R. RUBIN
Reporting Address: 192 FERRINGTON RD PITTSBORO NC 27312
Phone: 919-545-3066 Fax (Yes) (No): ___
Email (Yes) (No) Email Address: RUBIDANCSU.EDU
EDD Type: PDF___ Excel___ Other___
Site Location Name: CAS
Site Location Physical Address: RIVER RD

Project Name: CAS
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)
*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements
Invoice To: ___
Address: ___

Purchase Order No./Billing Reference ___
Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days
"Working Days" ☐ 6-9 Days ☐ Standard 10 days ☐ Rush Work Must Be Pre-Approved
Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 18.8		✓	
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		✓
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL
Certification: NELAC___ USACE___ FL___ NC___ SC___ OTHER___ N/A___
Water Chlorinated: YES___ NO___
Sample Iced Upon Collection: YES___ NO___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED: TCLP MEMS						REMARKS	PRISM LAB ID NO.
ASH	15JAN	1700	ASH					1							01

Sampler's Signature [signature] Sampled By (Print Name) A.R. Rubin Affiliation ___

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature)	Received By: (Signature)	Date	Military/Hours
[signature]			
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By: [signature]	Date 1/31/12	1318

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.
☐ Fed Ex ☐ UPS ☒ Hand-delivered ☐ Prism Field Service ☐ Other ___
COC Group No. 2020013 2/1/12 2020013

Additional Comments:

PRISM USE ONLY
Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

SEE REVERSE FOR TERMS & CONDITIONS

DES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC

CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic; TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

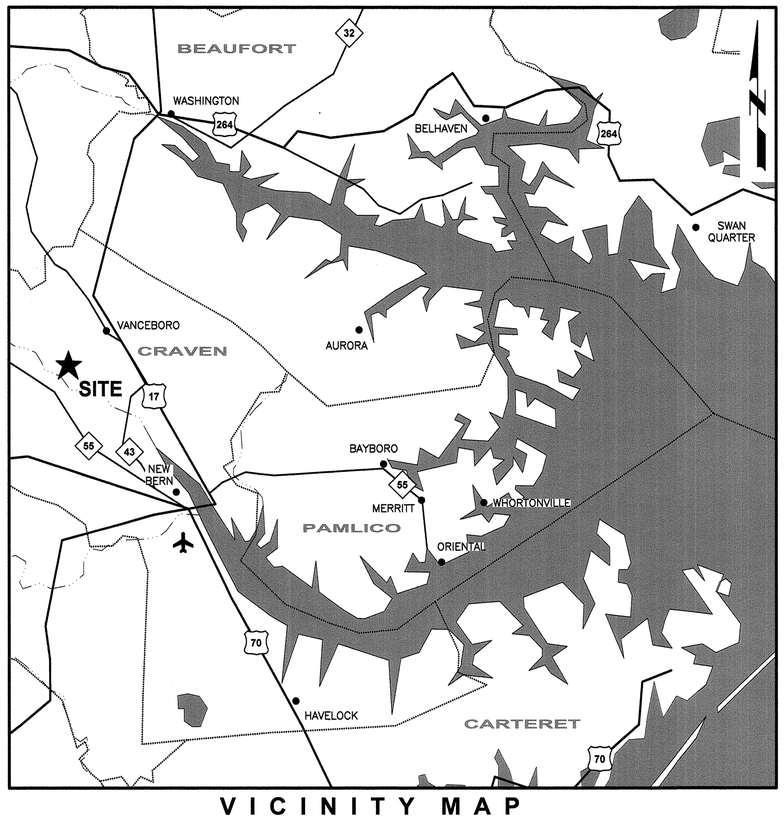
ORIGINAL

CRAVEN AG SERVICES, INC.

COMPOST FACILITY

CRAVEN COUNTY, NC

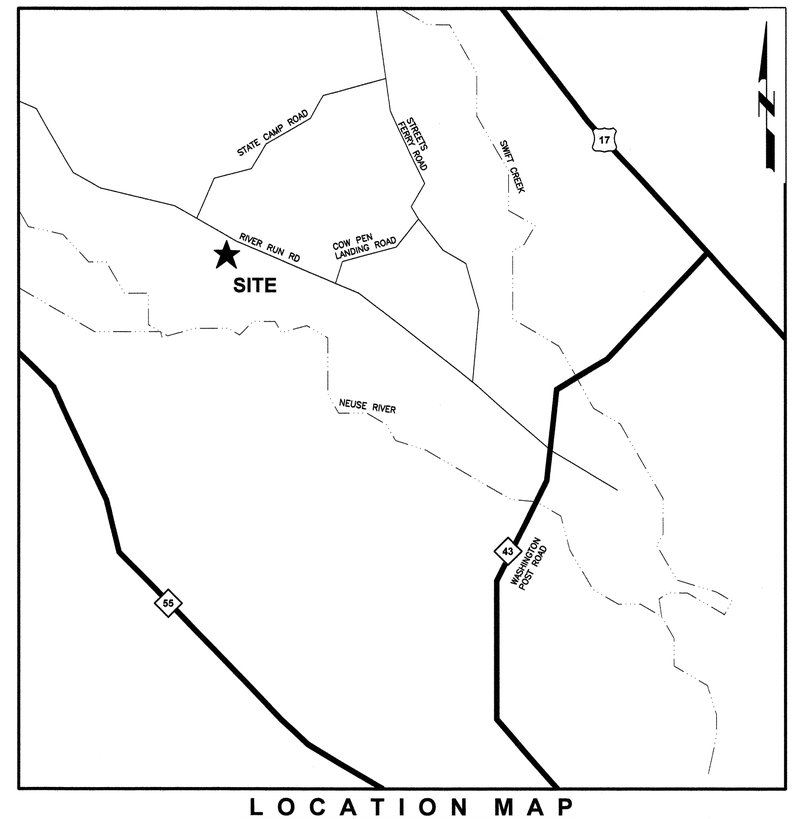
PROJECT No. A45201.00



VICINITY MAP

SCHEDULE OF DRAWINGS:

	COVER SHEET
C-101	SITE PLAN
C-102	SITE LAYOUT
C-103	STORMWATER/SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 1 OF 2
C-104	STORMWATER/SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 2 OF 2
D-101	DETAILS
D-102	MIXING PAD DETAILS



LOCATION MAP

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

192 fearrington post
pittsboro, nc, 27312

919 545 3066
919 270 0344

MacCONNELL
& Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NC 27513
P. O. BOX 129
MORRISVILLE, NC 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL 2/29/12

PROJECT MANAGEMENT

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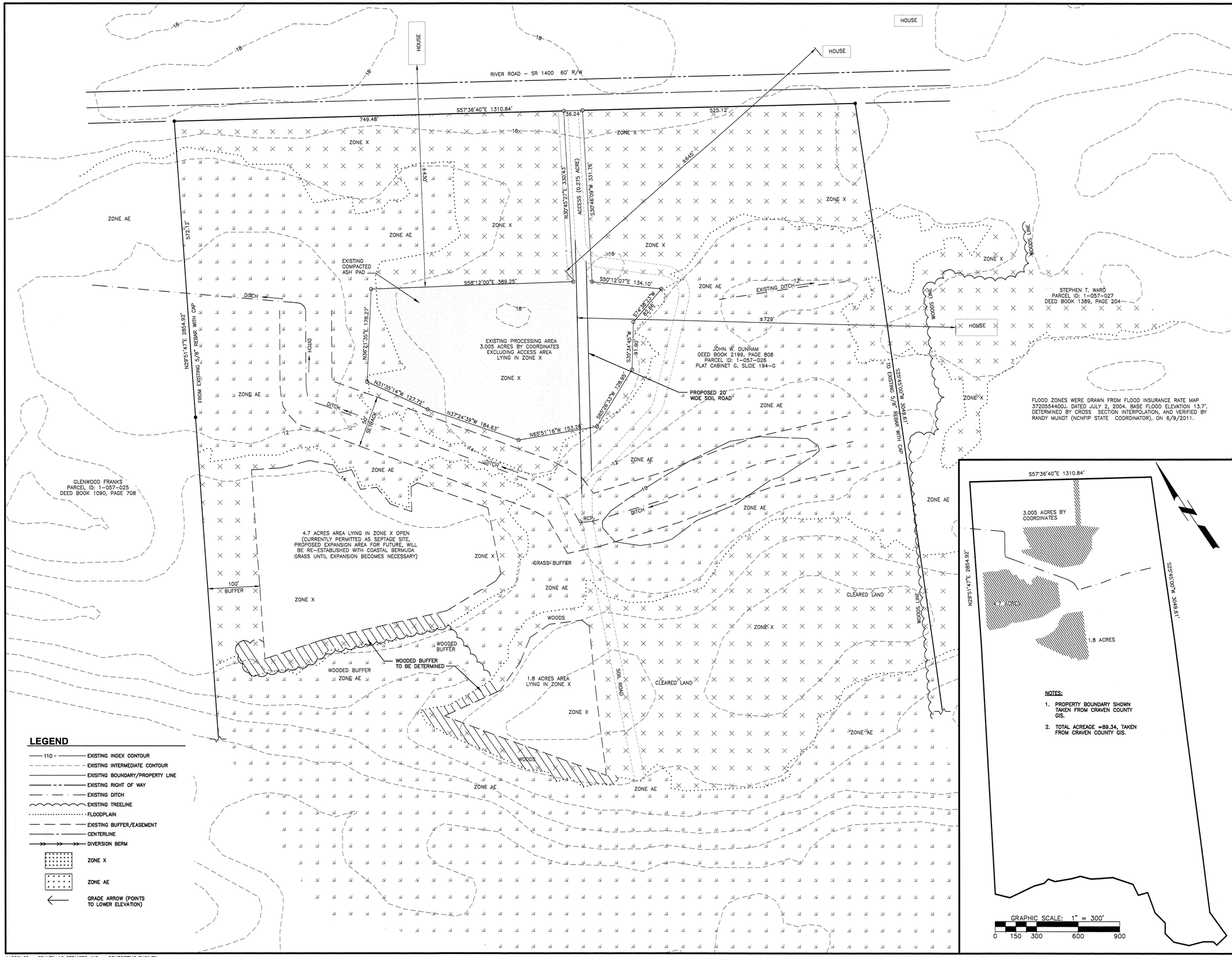
JUNE 28, 2011

REVISIONS			
NO.	DATE	DESCRIPTION	SHEET
1	08/08/11	REV. PER LQS	ALL
2	02/29/12	REV. PER SWS	ALL

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOST FACILITY



NOTES

1. SURVEY PROVIDED BY:
   MAYO & ASSOCIATES, P.A. LAND SURVEYING
   10121 US HWY 17 SOUTH
   VANCEBORO, NC 28586
   DATED: JUNE 17, 2011
2. TOPOGRAPHY TAKEN FROM NCDOT LIDAR.
3. MACCONNELL & ASSOCIATES UTILIZED THE DATA AND THE EQUIPMENT INFORMATION TO DESIGN SITE DETAILS FOR THIS FACILITY. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND UTILITIES BEFORE BEGINNING ANY CONSTRUCTION.
4. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS OF THE COUNTY AND STATE.
5. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OSHA AND SAFETY REQUIREMENTS OF THE COUNTY AND STATE.
6. ADJACENT RESIDENCE LOCATIONS ARE APPROXIMATE AND WERE LOCATED USING THE CRAVEN COUNTY GIS WEBSITE.

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A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

192 fearrington post
pittsboro, nc, 27312
919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 80'
0 40 80 160 240

REVISIONS

NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER ZACHARY S. MacCONNELL
2/29/12

MacCONNELL & Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NORTH CAROLINA 27513
P. O. BOX 129
MORRISVILLE, NORTH CAROLINA 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

CRAVEN AG SERVICES, INC.

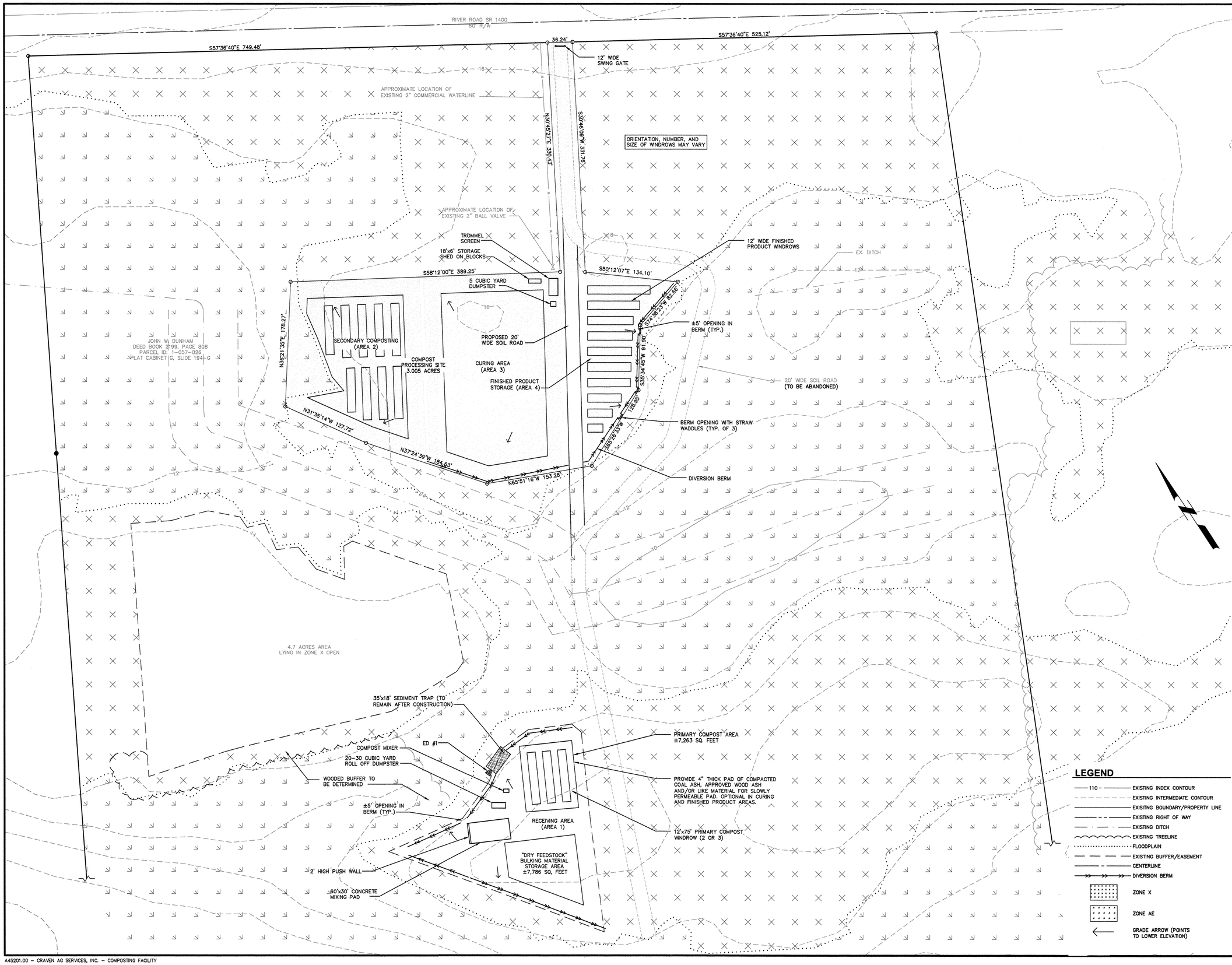
COMPOSTING FACILITY

CRAVEN COUNTY, NC

SITE PLAN

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-101

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY



NOTES

1. SEE C-101 FOR GENERAL NOTES.

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

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pittsboro, nc, 27312
919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 60'
0 30 60 120 180

REVISIONS

NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS

PROJECT MANAGER: GSM	PROJECT ENGINEER: ZLF
DRAWN BY: MAE	CHECKED BY: GSM

DATE: JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL 2/29/12

MacCONNELL & Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NORTH CAROLINA 27513
P. O. BOX 129
MORRISVILLE, NORTH CAROLINA 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

CRAVEN AG SERVICES, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

SITE LAYOUT

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-102

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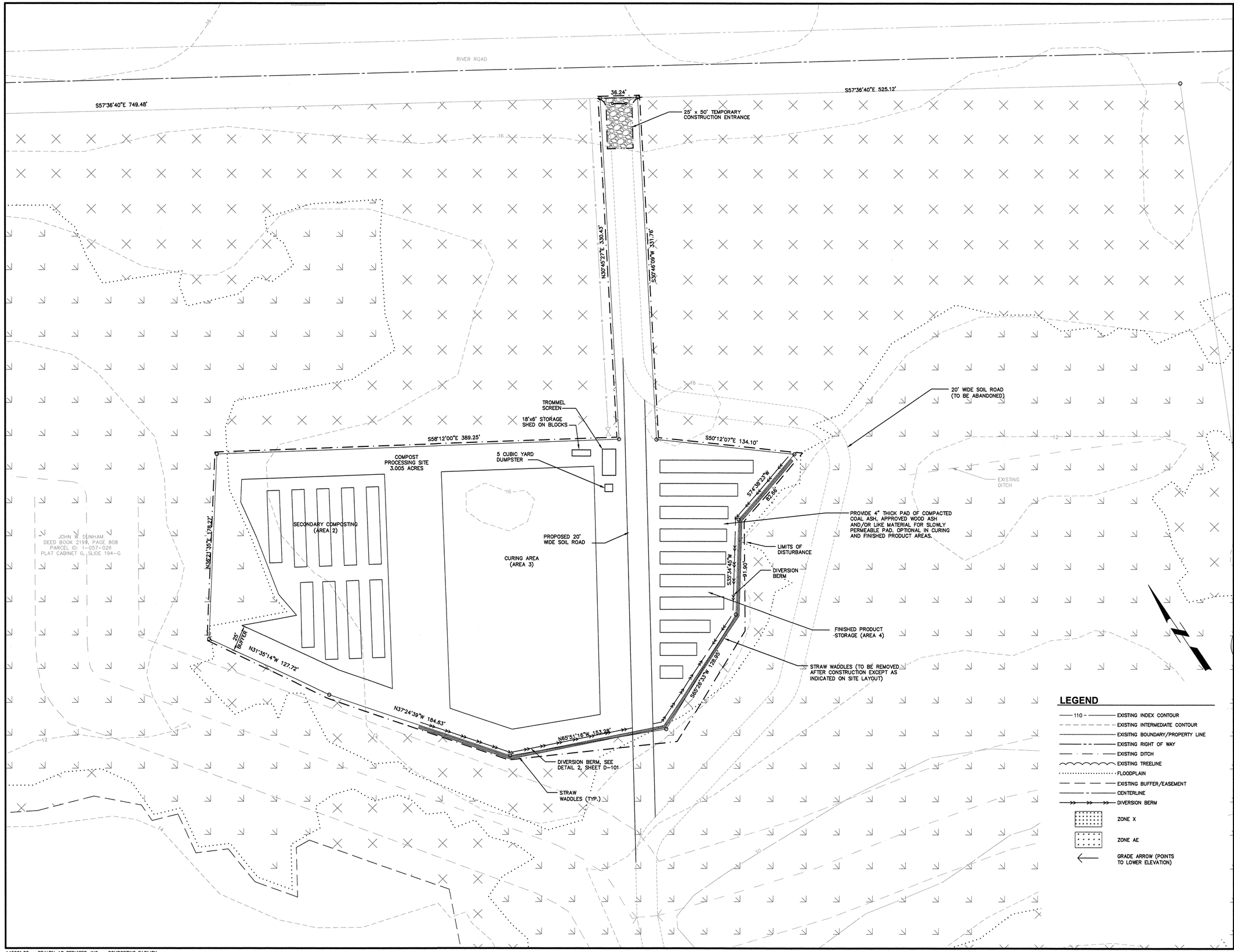

LEGEND

- 110 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING BOUNDARY/PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING DITCH
- EXISTING TREELINE
- FLOODPLAIN
- EXISTING BUFFER/EASEMENT
- CENTERLINE
- DIVERSION BERM
- ZONE X
- ZONE AE
- GRADE ARROW (POINTS TO LOWER ELEVATION)

NOTES

1. SEE C-101 FOR GENERAL NOTES.
2. FILL IN OPENINGS IN BERM AFTER CONSTRUCTION IS COMPLETE AND SITE IS STABILIZED.
3. ALL EXCAVATED SOILS WILL BE USED FOR CONSTRUCTION OF DIVERSION BERMS AND GRADING OF COMPOST PAD.
4. HAY BALES (OPTIONAL) MAY BE PLACED DOWN SLOPE (OUTSIDE) OF STRAW WADDLES.

S & EC LEGEND

- LIMITS OF GRADING/DISTURBANCE
- DIVERSION BERM
- STRAW WADDLE
- CONSTRUCTION ENTRANCE/EXIT

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

192 fearrington post
pittsboro, nc, 27312

919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 40'
0 20 40 80 120

REVISIONS

NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY: MAE	CHECKED BY: GSM

DATE: JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL 2/29/12

MacCONNELL & Associates, P. C.
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CRAVEN AG SERVICES, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

STORMWATER/ SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 1 OF 2

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-103

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NOTES

1. SEE C-101 FOR GENERAL NOTES.
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S & EC LEGEND

- LIMITS OF GRADING/DISTURBANCE
- DIVERSION BERM
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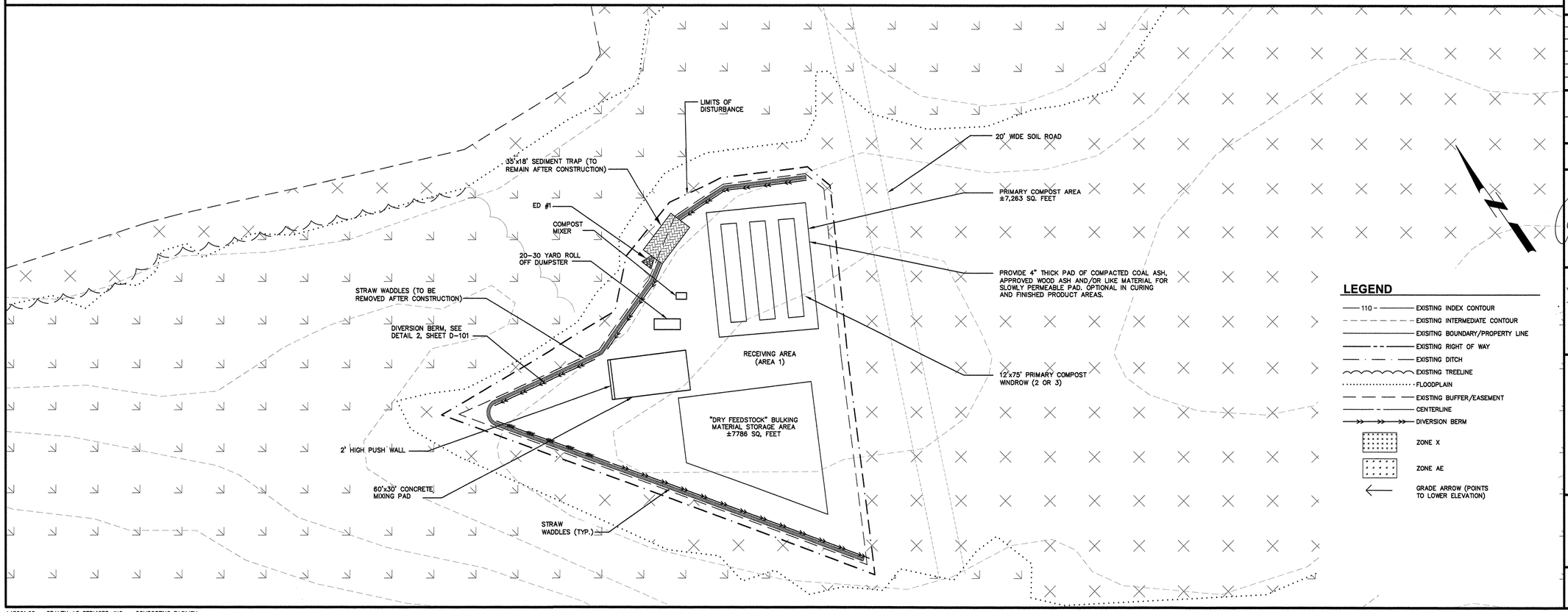

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CRAVEN AG SERVICES, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

STORMWATER/ SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 2 OF 2

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-104

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY

SEEDING SPECIFICATIONS

1. PERMANENT SEEDING: PERMANENT SEEDING IS REQUIRED FOR ALL AREAS DISTURBED BY CONSTRUCTION EXCEPT FOR AREAS COVERED BY STRUCTURES, PAVEMENTS, ETC.
2. TEMPORARY SEEDING: TEMPORARY SEEDING IS REQUIRED FOR THOSE AREAS DISTURBED BY CONSTRUCTION AND LEFT EXPOSED FOR PERIODS OF 15 DAYS OR MORE BEFORE BEING BROUGHT TO FINAL GRADE AND PERMANENTLY SEEDED. THE FORCE MAIN SHALL BE SEEDED AT THE END OF EACH WORKING DAY TO MINIMIZE CONSTRUCTION DISTURBANCE ACTIVITIES.

*PRODUCTS:

MATERIALS:

1. FERTILIZER: PROVIDE 10-10-10 COMMERCIAL FERTILIZER CONFORMING TO STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE.
2. LIMESTONE: PROVIDE LIMESTONE CONFORMING TO ALL STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE.
3. SEEDING: PROVIDE SEED CONFORMING TO ALL STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE. PROVIDE SEED MIXTURES AS TABULATED BELOW. DELIVER SEED TO THE SITE IN ORIGINAL CONTAINERS BEARING THE APPROPRIATE GUARANTEED MIXTURES. SEED SHALL SHOW A PURITY OF NOT LESS THAN 90 PERCENT AND GERMINATION QUALITY OF NOT LESS THAN 85 PERCENT.

3A. TEMPORARY MIXTURE:

A. FOR DECEMBER 1st THROUGH APRIL 15th, THE MIXTURE SHALL CONSIST OF 120 lbs./ac. RYE (GRAIN) AND 50 lbs./ac. KOBE.

B. FOR APRIL 15th THROUGH AUGUST 15th, THE MIXTURE SHALL CONSIST OF 40 lbs./ac. GERMAN MILLET.

C. FOR AUGUST 15th THROUGH DECEMBER 30th, THE MIXTURE SHALL CONSIST OF 120 lbs./ac. RYE (GRAIN).

3B. PERMANENT MIXTURE:

A. THE PERMANENT SEED MIXTURE FOR GENERAL AREAS SHALL CONSIST OF MINIMUM RATE OF 50 lbs./ac. PENSACOLA BAHIAGRASS, 30 lbs./ac. SERICEA LESPEDEZA, 10 lbs./ac. COMMON BERMUDA GRASS, AND 10 lbs./ac. GERMAN MILLET. THE BEST SEEDING DATES FOR THIS MIXTURE ARE FROM APRIL 1st TO JULY 15th.

B. OTHER MIXTURES: OTHER MIXTURES, AS APPROVED OR RECOMMENDED BY THE SOIL CONSERVATION SERVICE OR THE NORTH CAROLINA AGRICULTURAL EXTENSION OFFICE MAY BE USED.

4. MULCH: MULCH ALL SEEDED AREAS, EXCEPT WHERE JUTE MESH IS REQUIRED AND DURING PERMANENT SEEDING. USE UNDAMAGED, AIR-DRIED, THRESHED SMALL GRAIN STRAW FREE OF UNDESIRABLE WEED SEED. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, BY ROVING, OR THROUGH USE OF A MULCH ANCHORING TOOL

*EXECUTION

1. FOLLOW PROCEDURES SET FORTH IN THE PUBLICATION "GUIDE FOR SEDIMENT CONTROL ON CONSTRUCTION SITES IN NORTH CAROLINA" BY THE SOIL CONSERVATION SERVICE OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, AND AS SPECIFIED HEREIN.
2. SPREAD A MINIMUM OF FOUR (4) INCHES OF TOP SOIL OVER ALL DISTURBED AREAS TO THE FINISHED GRADE.
3. REMOVE ALL GRASS AND WEEDS AND SHAPE THE OVERALL AREA TO EVEN OUT HIGH AND LOW SPOTS.
4. SCARIFY SOIL TO A DEPTH OF THREE (3) INCHES AND WORK INTO A SATISFACTORY SEED BED BY DISKING OR THROUGH THE USE OF CULTIPACKERS, HARROWS, DRAGS, OR OTHER APPROVED MEANS.
5. THE PREPARATION OUTLINED ABOVE SHALL NOT BE DONE WHEN THE SOIL IS FROZEN, WET, OR OTHERWISE IN AN UNFAVORABLE CONDITION.
6. BEGIN AND COMPLETE SEEDING OPERATIONS, AS OUTLINED BELOW, AS SOON AS POSSIBLE AFTER FINAL OR INTERMEDIATE GRADING IS COMPLETED.
7. DISTRIBUTE LIME AND FERTILIZER, AS REQUIRED, UNIFORMLY OVER THE SEED BED. HARROW RAKE OR OTHERWISE WORK THESE ADDITIONS INTO THE SEED BED.
8. DISTRIBUTE SEED UNIFORMLY OVER THE ESTABLISHED SEED BED. LIGHTLY RAKE THE SURFACE OF THE SEED BED IN ORDER TO COVER SEED TO A MAXIMUM DEPTH OF 0.25 INCH.
9. COMPACT THE SEED BED WITH AN APPROVED ROLL OR DRAG AFTER COVERING THE SEED.
10. NO LIME, FERTILIZER, OR SEED SHALL BE APPLIED DURING A STRONG WIND, WHEN THE SOIL IS WET, OR WHEN THE SOIL IS OTHERWISE UNWORKABLE. SHOULD RAIN FOLLOW SEEDING BEFORE ROLLING IS INITIATED, THE SEED BED SHALL NOT BE ROLLED.
11. NO RIP-RAP IS TO BE PLACED ALONG THE BANKS OF NEW FILL. MAINTAIN THE AREA AND REPAIR ANY EROSION DAMAGE UNTIL A PERMANENT GROUND COVER IS ESTABLISHED. USE MULCH OR MESH AS REQUIRED.

*APPLICATION

TEMPORARY SEEDING: FOR DECEMBER 1st THROUGH AUGUST 15th:

1. APPLY LIME ACCORDING TO THE SOIL TESTS OR AT A RATE OF 2000 lbs./ac. BEFORE SEEDING.
2. APPLY FERTILIZER ACCORDING TO THE SOIL TESTS OR AT A RATE OF 750 lbs./ac.
3. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE FOR THE RECOMMENDED PLANTING SEASON.
4. APPLY GRAIN STRAW AT A RATE OF 4000 lbs./ac. OR PROVIDE EQUIVALENT COVER OF ANOTHER SUITABLE COVER. MULCH SHALL BE ANCHORED IN A SUITABLE WAY. WHERE JUTE MESH IS REQUIRED, APPLY THE PRODUCT ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND ANCHOR WITH STEEL HAIRPIN-SHAPED WIRE STAPLES.
5. REFERTILIZE SEED BED IF GROWTH IS NOT FULLY ADEQUATE, AS DETERMINED BY THE ENGINEER. RE-SEED, FERTILIZE, AND MULCH ALL DAMAGED, BARE, AND ERODED AREAS IMMEDIATELY AND UNTIL A SUITABLE COVER IS ESTABLISHED.

TEMPORARY SEEDING: FOR AUGUST 15th THROUGH DECEMBER 30th:

1. APPLY LIME ACCORDING TO THE SOIL TESTS OR AT A RATE OF 2000 lbs./ac. BEFORE SEEDING.
2. APPLY FERTILIZER ACCORDING TO THE SOIL TESTS OR AT A RATE OF 1000 lbs./ac.
3. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE FOR THE RECOMMENDED PLANTING SEASON.
4. APPLY GRAIN STRAW AT A RATE OF 4000 lbs./ac. OR PROVIDE EQUIVALENT COVER OF ANOTHER SUITABLE COVER. MULCH SHALL BE SUITABLY ANCHORED. WHERE JUTE MESH IS REQUIRED, APPLY THE PRODUCT ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND ANCHOR WITH STEEL HAIRPIN-SHAPED WIRE STAPLES.
5. REFERTILIZE SEED BED IF GROWTH IS NOT FULLY ADEQUATE, AS DETERMINED BY THE ENGINEER. RE-SEED, FERTILIZE, AND MULCH ALL DAMAGED, BARE, AND ERODED AREAS IMMEDIATELY AND UNTIL A SUITABLE COVER IS ESTABLISHED.

PERMANENT SEEDING: APPLICATION OF LIME, FERTILIZER, SEED, AND MULCH:

1. WHERE A NEAT APPEARANCE IS DESIRED, OMIT SERICEA.
2. USE COMMON BERMUDAGRASS ONLY ON ISOLATED SITES WHERE IT CANNOT BECOME A PEST. BERMUDAGRASS MAY BE REPLACED WITH 5 lbs./ac. CENTIPEDEGRASS.
3. SOIL AMENDMENTS: APPLY LIME AND FERTILIZER ACCORDING TO SOIL TESTS, OR APPLY 3000 lbs./ac. GROUND AGRICULTURAL LIMESTONE AND 500 lbs./ac. 10-10-10 FERTILIZER.
4. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE DURING RECOMMENDED PLANTING SEASONS. IF GRADING IS COMPLETED AT TIMES OTHER THAN THE RECOMMENDED SEASON, PROVIDE TEMPORARY SEEDING OR OTHER EROSION AND SEDIMENTATION PROTECTION APPROVED BY THE ENGINEER UNTIL THE APPROPRIATE PLANTING SEASON BEGINS.
5. MULCH: APPLY 4000 lbs./ac. GRAIN STRAW OR EQUIVALENT COVER OF ANOTHER SUITABLE MULCH. ANCHOR BY TACKING ASPHALT, ROVING, OR NETTING OR BY CRIMPING WITH A MULCH ANCHORING TOOL. A DISC WITH BLADES SET NEARLY STRAIGHT MAY BE USED AS A MULCH ANCHORING TOOL.
6. MAINTENANCE: REFERTILIZE THE FOLLOWING APRIL WITH 50 lbs./ac. NITROGEN. REPEAT AS GROWTH REQUIRES. MOW ONLY ONCE PER YEAR. WHERE A NEAT APPEARANCE IS DESIRED, OMIT SERICEA AND MOW AS OFTEN AS NEEDED.

CONSTRUCTION SCHEDULE

THE CONTRACTOR MUST COMPLY WITH THE REQUIREMENTS HEREIN:

1. INSTALL EROSION CONTROL MEASURES AS REQUIRED, SUCH AS THE CONSTRUCTION ENTRANCE, DIVERSION BERMS, AND STRAW WADDLES.
2. CLEAR AND GRUB THE WOODED AREAS TO BE DEVELOPED. STOCKPILE TOPSOIL AND SUITABLE FILL MATERIAL IN AREAS DESIGNATED AS STOCKPILES.
3. BEGIN EXCAVATION AND GRADING ACTIVITIES AFTER ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED AND CONSTRUCTED. SALVAGE ANY TOPSOIL THAT MAY BE USED AFTER CONSTRUCTION.
4. SEED TEMPORARY AREAS THAT HAVE BEEN LEFT DORMANT FOR LONGER THAN 15 DAYS.
5. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH HEAVY RUNOFF PRODUCING RAINFALL. NEEDED REPAIRS SHALL BE MADE IMMEDIATELY.
6. AFTER CONSTRUCTION REMOVE ALL TEMPORARY STRUCTURES AND ENSURE ALL SEEDING IS COMPLETED FOR AREAS DISTURBED.

MAINTENANCE PLAN

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH HEAVY STORMWATER-PRODUCING RAINFALL. ALL NEEDED REPAIRS SHALL BE MADE IMMEDIATELY TO PREVENT FURTHER DAMAGE AND EROSION. STRUCTURES THAT WILL BE MAINTAINED WILL INCLUDE:

   CONSTRUCTION ENTRANCE/EXIT: INSPECT CONSTRUCTION ROAD SURFACE REGULARLY, MAINTAIN IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE SITE, AND TOP-DRESS WHEN NEEDED. SEDIMENT TRANSPORTED TO PUBLIC ROADS SHALL BE REMOVED DAILY.

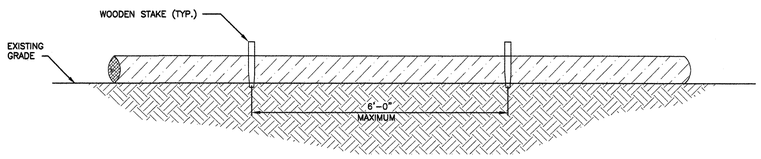
   STRAW WADDLE: CLEAN OUT SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS THAT COULD CLOG THE CHANNEL WHEN NEEDED. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE STRAW WADDLE AND EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE STRAW WADDLE. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN STRAW WADDLES, ADDITIONAL MEASURES CAN BE TAKEN SUCH AS, INSTALLING A PROTECTIVE RIPRAP LINER IN THAT PORTION OF THE CHANNEL.

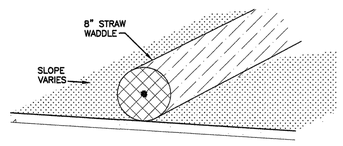
   REMOVE SEDIMENT ACCUMULATED BEHIND THE STRAW WADDLES AS NEEDED TO PREVENT DAMAGE TO CHANNEL VEGETATION, ALLOW THE CHANNEL TO DRAIN THROUGH THE STRAW WADDLES, AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE STRAW WADDLE.

   SEEDING, FERTILIZING, AND MULCHING: SEEDED AREAS SHALL BE INSPECTED FOR FAILURE AND NECESSARY REPAIRS SHALL BE MADE WITHIN THE SAME SEASON, IF POSSIBLE.

2. THE ANGLE FOR GRADED SLOPES AND FILLS SHALL BE NO GREATER THAN THE ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER OR OTHER ADEQUATE EROSION CONTROL DEVICES OR STRUCTURES. IN ANY EVENT, SLOPES LEFT EXPOSED WILL, WITHIN 21 CALENDAR DAYS OF COMPLETION OF ANY PHASE OF GRADING, BE PLANTED OR OTHERWISE PROVIDED WITH TEMPORARY GROUND COVER, DEVICES OR STRUCTURES SUFFICIENT TO RESTRAIN EROSION. PERMANENT GROUND COVER SHALL BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR NO MORE THAN 90 CALENDAR DAYS.

TOTAL DISTURBED AREA: 5.63 AC.

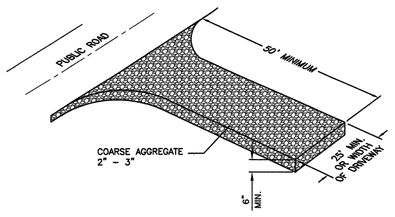




NOTE:

1. COMPOST SOCKS MAY BE USED IN LIEU OF WADDLE.

2 D-101 STRAW WADDLE DETAIL
NTS



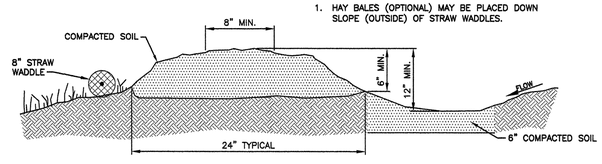
NOTES:

1. GRAVEL PAD TO BE 25'-0" x 50'-0" AND 6" THICK MINIMUM
2. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS IS TO BE PROVIDED.
3. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
4. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE SHALL BE NECESSARY.
5. ANY MATERIAL DEPOSITED ONTO THE ROAD MUST BE CLEANED UP IMMEDIATELY.
6. APPLICABLE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS AND TIMELY MAINTENANCE OF THIS DEVICE MUST BE PROVIDED.

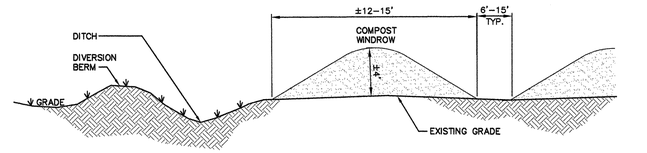
3 D-101 TEMPORARY CONSTRUCTION ENTRANCE
NTS

NOTE:

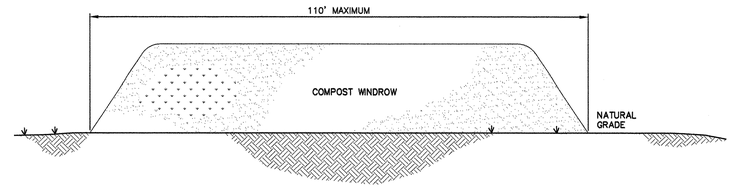
1. HAY BALES (OPTIONAL) MAY BE PLACED DOWN SLOPE (OUTSIDE) OF STRAW WADDLES.



4 D-101 DIVERSION BERM
NTS

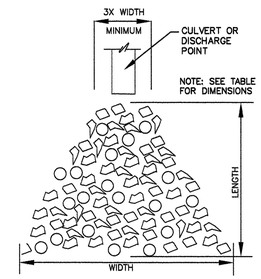


SECTION VIEW



SIDE VIEW

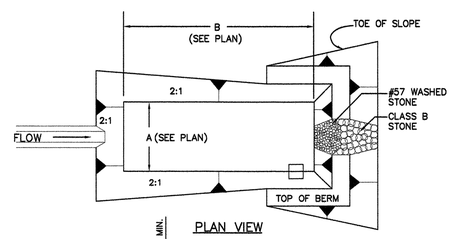
1 D-101 COMPOST WINDROW
NTS



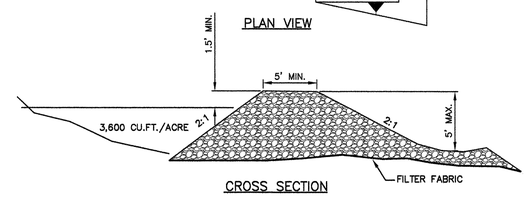
ENERGY DISSIPATOR TABLE

CRITERIA	ED #1
CONDUIT SYMBOL	NA
CULVERT SIZE (IN.)	NA
DESIGN FLOW QP 10,24 (C.F.S.)	1.44
D50 OF STONE (FT.)	0.5
APRON LENGTH (FT.)	8
UPSTREAM APRON WIDTH (FT.)	3
DOWNSTREAM APRON WIDTH (FT.)	9
MAXIMUM STONE DIAMETER (FT.)	0.75
APRON THICKNESS (FT.)	1.125
FILTER NECESSARY	NO

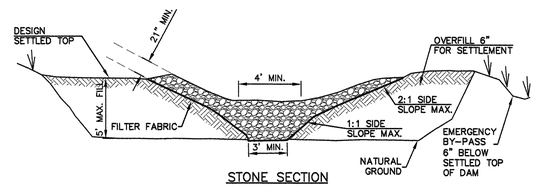
5 D-101 ENERGY DISSIPATOR AND SCHEDULE
SCALE: NTS



PLAN VIEW



CROSS SECTION



STONE SECTION

SEDIMENT TRAP

CRITERIA	TRAP #1
DISTURBED AREA (ACRES)	0.21
DESIGN FLOW QP 10,24 (C.F.S.)	1.44
MINIMUM TRAP VOLUME (C.F.)	756
MINIMUM SURFACE AREA (S.F.)	627
MINIMUM WEIR LENGTH (FEET)	4
MINIMUM DEPTH (FEET)	3
MAXIMUM DEPTH (FEET)	4
MINIMUM LENGTH (FEET)	35
MINIMUM WIDTH (FEET)	18

MAINTENANCE:

1. INSPECT SEDIMENT TRAPS AFTER EACH PERIOD OF SIGNIFICANT RAINFALL. REMOVE SEDIMENT AND RESTORE TRAP TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT THAT IS REMOVED IN A DESIGNATED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING.
2. CHECK THE STRUCTURE FOR DAMAGE FROM EROSION OR PIPING. PERIODICALLY CHECK THE DEPTH OF THE SPILLWAY TO ENSURE IT IS A MINIMUM OF 1.5 FT. BELOW THE LOW POINT OF THE EMBANKMENT. IMMEDIATELY FILL ANY SETTLEMENT OF THE EMBANKMENT TO SLIGHTLY ABOVE DESIGN GRADE. ANY RIP RAP DISPLACED FROM THE SPILLWAY MUST BE REPLACED IMMEDIATELY.
3. STABILIZE THE EMBANKMENT AND ALL DISTURBED AREAS ABOVE THE SEDIMENT POOL AND DOWNSTREAM FROM THE TRAP IMMEDIATELY AFTER CONSTRUCTION WITH SEEDING.

6 D-101 SEDIMENT TRAP
NTS

NOTES

1. SEE C-101 FOR ALL GENERAL NOTES.

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CRAVEN AG SERVICE, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

DETAILS

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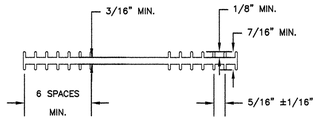
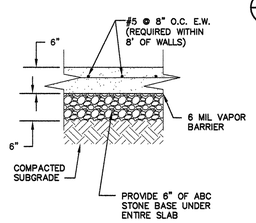
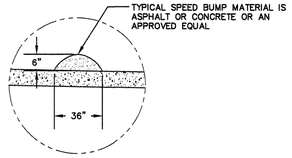


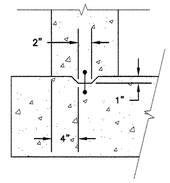
2 D-102 **6" FLATSTRIP WATERSTOP**
NTS



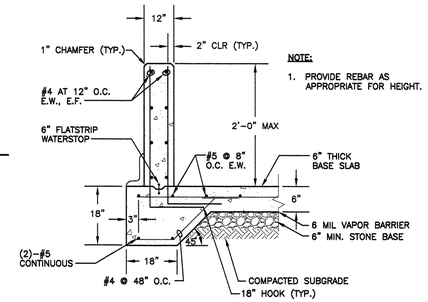
1 D-102 **TYPICAL CONCRETE PAD DETAIL**
NTS



3 D-102 **SPEED BUMP DETAIL**
NTS

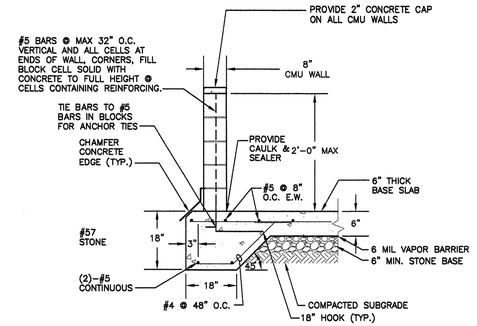


4 D-102 **KEY DETAIL**
NTS

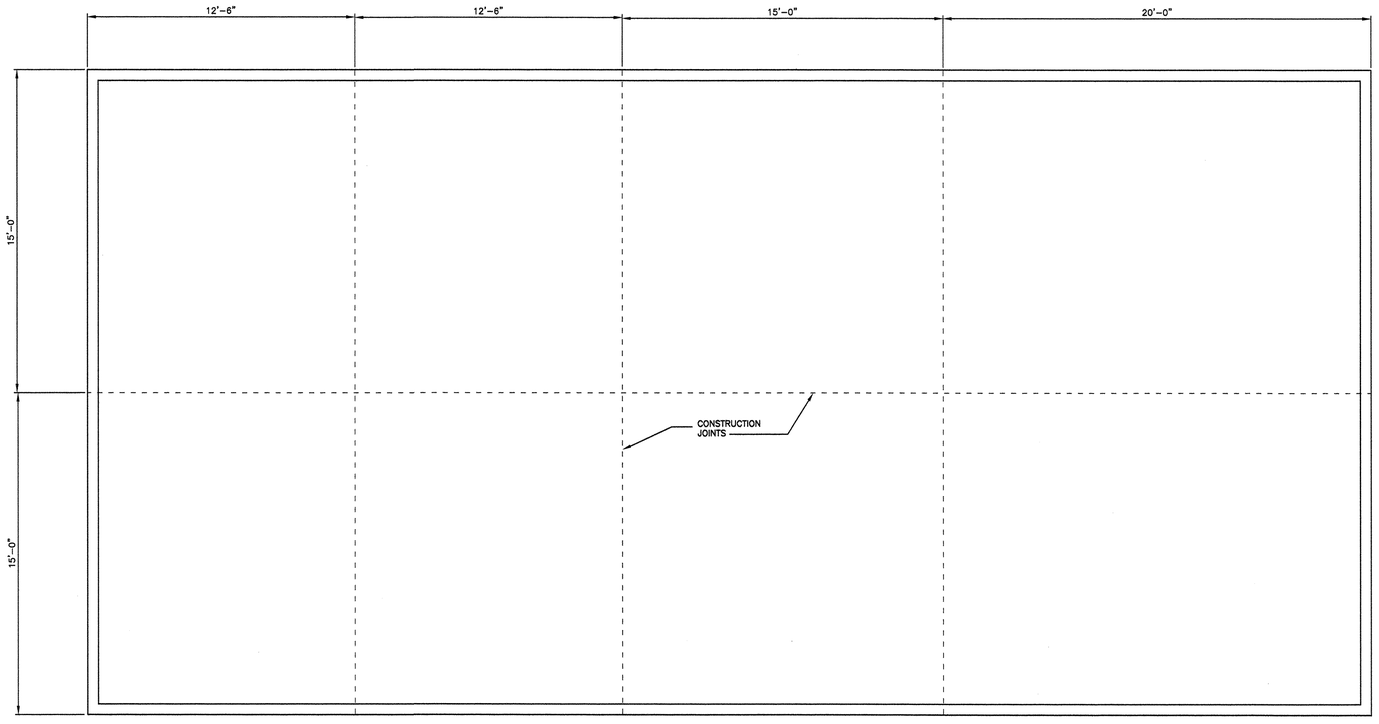


NOTE:
1. PROVIDE REBAR AS APPROPRIATE FOR HEIGHT.

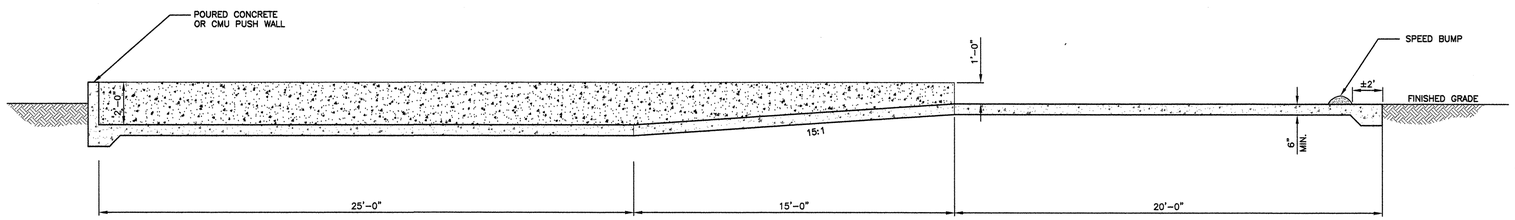
5 D-102 **WALL POURED SECTION**
NTS



6 D-102 **TYPICAL SLAB AND CMU WALL DETAIL**
NTS



PLAN VIEW



SECTION VIEW

7 D-102 **MIXING PAD DETAIL**
NTS

NOTES

1. SEE C-101 FOR ALL GENERAL NOTES.

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REVISIONS

NO.	DATE	DESCRIPTION
2	02/29/12	PER SWS

PROJECT MANAGER: GSM	PROJECT ENGINEER: ZLF
DRAWN BY: MAE	CHECKED BY: GSM

DATE: JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL
2/29/12

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CRAVEN AG SERVICE, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

MIXING PAD DETAILS

PROJECT NUMBER	DRAWING NUMBER
A45201.00	D-102

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY