NCA231152

State of North Carolina
Department of Environmental Quality
Division of Water Resources
Animal Feeding Operations Permit Application Form
(THIS FORM MAY BE PHOTOCOPIED FOR USE AS AN ORIGINAL)

RECEIVED/NCDEQ/DWR
SEP 29 2017
Water Quality
Regional Operations Section

NPDES General Permit - Existing Animal Waste Operations

1. GENERAL INFORMATION:

1.1 Facility name: Bowles & Sons Farm 2

1.2 Print Land Owner's name: Bowles & Sons Inc.

1.3 Mailing address: 607 Curtis Rd.

City, State: Warsaw, NC Zip: 28398

Telephone number (include area code): (910) 290 - 2656

1.4 Physical address: 1552-A Dobson Chapel Rd,

City, State: Magnolia, NC Zip: 28453

Telephone number (include area code): (_____) _____ - _____

1.5 County where facility is located: Duplin

1.6 Owner's email address: _____

1.7 Facility location (directions from nearest major highway, using SR numbers for state roads): From Kenansville, Take Hwy 50 South and turn right on Dobson Chapel Rd., Go approx.. 1.5 miles to farm entrance on the left.

1.8 Farm Manager's name (if different from Land Owner): _____

1.9 Lessee's / Integrator's name (if applicable; circle which type is listed): Murphy Brown, LLC DBA Smithfield Hog Prod.

1.10 Facility's original start-up date: _____ Date(s) of facility expansion(s) (if applicable): _____

2. OPERATION INFORMATION:

2.1 Facility number: 31-152

2.2 Operation Description:

Please enter the Design Capacity of the system. The "No. of Animals" should be the maximum number for which the waste management structures were designed.

Type of Swine	No. of Animals	Type of Poultry	No. of Animals	Type of Cattle	No. of Animals
☐ Wean to Feeder	_____	☐ Layer	_____	☐ Beef Brood Cow	_____
☑ Feeder to Finish	7344	☐ Non-Layer	_____	☐ Beef Feeder	_____
☐ Farrow to Wean (# sow)	_____	☐ Turkey	_____	☐ Beef Stocker Calf	_____
☐ Farrow to Feeder (# sow)	_____	☐ Turkey Poults	_____	☐ Dairy Calf	_____
☐ Farrow to Finish (# sow)	_____			☐ Dairy Heifer	_____
☐ Wean to Finish (# sow)	_____			☐ Dry Cow	_____
☐ Gilts	_____			☐ Milk Cow	_____
☐ Boar/Stud	_____				

☐ Other Type of Livestock on the farm: _____ No. of Animals: _____

2.3 Acreage cleared and available for application (excluding all required buffers and areas not covered by the application system): 43.89 Required Acreage (as listed in the CAWMP): 43.89

2.4 Number of lagoons: 1 Total Capacity (cubic feet): _____ Required Capacity (cubic feet): _____
Number of Storage Ponds: _____ Total Capacity (cubic feet): _____ Required Capacity (cubic feet): _____

2.5 Are subsurface drains present within 100' of any of the application fields? **YES** or **NO** (circle one)

2.6 Are subsurface drains present in the vicinity or under the waste management system? **YES** or **NO** (circle one)

2.7 Does this facility meet all applicable siting requirements? **YES** or **NO** (circle one)

3. REQUIRED ITEMS CHECKLIST:

Please indicate that you have included the following required items by signing your initials in the space provided next to each item.

Applicants Initials

3.1 One completed and signed original and one copy of the application for NPDES General Permit - Animal Waste Operations; _____

3.2 Two copies of a general location map indicating the location of the animal waste facilities and field locations where animal waste is land applied and a county road map with the location of the facility indicated; _____

3.3 Two copies of the entire Certified Animal Waste Management Plan (CAWMP). If the facility does not have a CAWMP, it must be completed prior to submittal of a permit application for animal waste operations. _____

The CAWMP **must** include the following components. *Some of these components may not have been required at the time the facility was certified but must be added to the CAWMP for NPDES permitting purposes*:

- 3.3.1 The Waste Utilization Plan (WUP) must include the amount of Plant Available Nitrogen (PAN) and Phosphorus produced and utilized by the facility
- 3.3.2 The method by which waste is applied to the disposal fields (e.g. irrigation, injection, etc.)
- 3.3.3 A map of every field used for land application, with setbacks to surface waters or any conduits to surface waters (including field ditches), with the exception of grassed waterways that are designed and maintained according to NRCS standards.
- 3.3.4 The soil series present on every land application field
- 3.3.5 The crops grown on every land application field
- 3.3.6 The Realistic Yield Expectation (RYE) for every crop shown in the WUP
- 3.3.7 The PAN and Phosphorus applied to every land application field
- 3.3.8 The waste application windows for every crop utilized in the WUP
- 3.3.9 The required NRCS Standard specifications
- 3.3.10 A site schematic
- 3.3.11 Emergency Action Plan
- 3.3.12 Insect Control Checklist with chosen best management practices noted
- 3.3.13 Odor Control Checklist with chosen best management practices noted
- 3.3.14 Mortality Control Checklist with the selected method noted
- 3.3.15 Lagoon/storage pond capacity documentation (design, calculations, etc.); please be sure to include any site evaluations, wetland determinations, or hazard classifications that may be applicable to your facility
- 3.3.16 Operation and Maintenance Plan
- 3.3.17 Phosphorus Loss Assessment Tool (PLAT) Results, including the data sheets for each field.

If your CAWMP includes any components not shown on this list, please include the additional components with your submittal. (Composting, waste transfers, etc.)

4. APPLICANT'S CERTIFICATION:

I, Bowles + Sons, Inc (Land Owner's name listed in question 1.2), attest that this application for Bowles + Sons 2 Farm (Facility name listed in question 1.1) has been reviewed by me and is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed and that if all required supporting information and attachments are not included, this application package will be returned to me as incomplete.

Signature _____ Date _____

5. MANAGER'S CERTIFICATION: (complete only if different from the Land Owner)

I, _____ (Manager's name listed in question 1.6), attest that this application for _____ (Facility name listed in question 1.1) has been reviewed by me and is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed and that if all required supporting information and attachments are not included, this application package will be returned as incomplete.

Signature Stan Bowles Date 9-28-17

THE COMPLETED APPLICATION PACKAGE, INCLUDING ALL SUPPORTING INFORMATION AND MATERIALS, SHOULD BE SENT TO THE FOLLOWING ADDRESS:

NORTH CAROLINA DIVISION OF WATER RESOURCES
WATER QUALITY REGIONAL OPERATIONS SECTION
ANIMAL FEEDING OPERATIONS PROGRAM
1636 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1636
TELEPHONE NUMBER: (919) 807-6464
FAX NUMBER: (919) 807-6496

Elaine F. Marshall
Secretary

North Carolina
DEPARTMENT OF THE SECRETARY OF STATE
PO Box 29622 Raleigh, NC 27626-0622 (919)814-5400

Account Login
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NC Secy of State

Click Here To:

View Document Filings File an Annual Report Amend a Previous Annual Report
Print a Pre-Populated Annual Report form

Corporate Names

Legal: Bowles & Sons Farm, Inc. ✓

Business Corporation Information

SosId:	0283982
Status:	Current-Active
Annual Report Status:	Current
Citizenship:	Domestic
Date Formed:	3/5/1991
Fiscal Month:	December
Registered Agent:	Bowles, Stan D

Corporate Addresses

Mailing:	620 veaches mill road Warsaw, NC 28398-8565
Principal Office:	620 veaches mill road Warsaw, NC 28398-8565
Reg Office:	620 veaches mill road Warsaw, NC 28398-8565
Reg Mailing:	620 veaches mill road Warsaw, NC 28398-8565

Officers

President: STAN D BOWLES
607 Curtis Rd.
Warsaw NC 28398 ✓

Stock

Class:	COMMON
Shares:	50000
Par Value:	1
Class:	Common
Shares:	150000
Par Value:	1

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

October 1, 2014

Existing COC

Stan Bowles
Bowles & Sons Farm Inc Farm 2
607 Curtis Rd
Warsaw, NC 28398

Subject: Certificate of Coverage No. AWS310152
Bowles & Sons Farm Inc Farm 2
Swine Waste Collection, Treatment,
Storage and Application System
Duplin County

Dear Stan Bowles:

In accordance with your renewal request, we are hereby forwarding to you this Certificate of Coverage (COC) issued to Stan Bowles, authorizing the operation of the subject animal waste management system in accordance with General Permit AWG100000.

This approval shall consist of the operation of this system including, but not limited to, the management and land application of animal waste as specified in the facility's Certified Animal Waste Management Plan (CAWMP) for Bowles & Sons Farm Inc Farm 2, located in Duplin County, with a swine animal capacity of no greater than the following annual averages:

Wean to Finish:	Feeder to Finish: **7344**	Boar/Stud:
Wean to Feeder:	Farrow to Wean:	Gilts:
Farrow to Finish:	Farrow to Feeder:	Other:

If this is a Farrow to Wean or Farrow to Feeder operation, there may be one boar for each 15 sows. Where boars are unnecessary, they may be replaced by an equivalent number of sows. Any of the sows may be replaced by gilts at a rate of 4 gilts for every 3 sows.

This COC shall be effective from the date of issuance until September 30, 2019, and shall hereby void Certificate of Coverage Number AWS310152 that was previously issued to this facility. Pursuant to this COC, you are authorized and required to operate the system in conformity with the conditions and limitations as specified in the General Permit, the facility's CAWMP, and this COC. An adequate system for collecting and maintaining the required monitoring data and operational information must be established for this facility. Any increase in waste production greater than the certified design capacity or increase in number of animals authorized by this COC (as provided above) will require a modification to the CAWMP and this COC and must be completed prior to actual increase in either wastewater flow or number of animals.

Please read this COC and the enclosed State General Permit carefully. Please pay careful attention to the record keeping and monitoring conditions in this permit. Record keeping forms are unchanged with this General Permit. Please continue to use the same record keeping forms.

1636 Mail Service Center, Raleigh, North Carolina 27699-1636
Phone: 919-807-6464 \ Internet: http://www.ncdenr.gov/

If your Waste Utilization Plan (WUP) has been developed based on site-specific information, careful evaluation of future samples is necessary. Should your records show that the current WUP is inaccurate you will need to have a new WUP developed.

The issuance of this COC does not excuse the Permittee from the obligation to comply with all applicable laws, rules, standards, and ordinances (local, state, and federal), nor does issuance of a COC to operate under this permit convey any property rights in either real or personal property.

Per NRCS standards a 100-foot separation shall be maintained between water supply wells and any lagoon, storage pond, or any wetted area of a spray field.

Please be advised that any violation of the terms and conditions specified in this COC, the General Permit or the CAWMP may result in the revocation of this COC, or penalties in accordance with NCGS 143-215.6A through 143-215.6C including civil penalties, criminal penalties, and injunctive relief.

If any parts, requirements, or limitations contained in this COC are unacceptable, you have the right to apply for an individual permit by contacting the Animal Feeding Operations Program for information on this process. Unless such a request is made within 30 days, this COC shall be final and binding.

In accordance with Condition II.22 of the General Permit, waste application shall cease within four (4) hours of the time that the National Weather Service issues a Hurricane Warning, Tropical Storm Warning, or a Flood Watch associated with a tropical system for the county in which the facility is located. You may find detailed watch/warning information for your county by calling the Newport/Morehead City, NC National Weather Service office at (252) 223-5737, or by visiting their website at: http://www.weather.gov/mhx/

This facility is located in a county covered by our Wilmington Regional Office. The Regional Office staff may be reached at 910-796-7215. If you need additional information concerning this COC or the General Permit, please contact the Animal Feeding Operations Program staff at (919) 807-6464.

Sincerely,

for Thomas A. Reeder
Director, Division of Water Resources

Enclosure (General Permit AWG100000)
cc: (Certificate of Coverage only for all ccs)
Wilmington Regional Office, Water Quality Regional Operations Section
Duplin County Health Department
Duplin County Soil and Water Conservation District
WQROS Central Files (Permit No. AWS310152)
AFO Notebooks
Murphy-Brown LLC

Murphy-Brown, LLC

9/26/2017

2822 Hwy 24 West
P.O. Box 856
Warsaw, NC 28398

NUTRIENT UTILIZATION PLAN

Grower(s):	Bowles & Sons
Farm Name:	Bowles & Sons Farm 2 Facility 31-152
County:	Duplin

Permit Capacity:	
Farrow to Wean	
Farrow to Feeder	
Farrow to Finish	
Wean to Feeder	
Wean to Finish	
Feeder to Finish	7344
Gilts	
Boars	

Storage Structure:	Anaerobic Lagoon
Storage Period:	>180 days
Application Method:	Irrigation

The waste from your animal facility must be land applied at a specified rate to prevent pollution of surface water and/or groundwater. The plant nutrients in the animal waste should be used to reduce the amount of commercial fertilizer required for the crops in the fields where the waste is to be applied.

This waste utilization plan uses nitrogen as the limiting nutrient. Waste should be analyzed before each application cycle. Annual soil tests are strongly encouraged so that all plant nutrients can be balanced for realistic yields of the crop to be grown.

Several factors are important in implementing your waste utilization plan in order to maximize the fertilizer value of the waste and to ensure that it is applied in an environmentally safe manner:

1. Always apply waste based on the needs of the crop to be grown and the nutrient content of the waste. Do not apply more nitrogen than the crop can utilize.

2. Soil types are important as they have different infiltration rates, leaching potentials, cation exchange capacities, and available water holding capacities.

3. Normally waste shall be applied to land eroding at less than 5 tons per acre per year. Waste may be applied to land eroding at 5 or more tons per acre annually, but less than 10 tons per acre per year providing that adequate filter strips are established.

4. Do not apply waste on saturated soils, when it is raining, or when the surface is frozen. Either of these conditions may result in runoff to surface waters which is not allowed under DWR regulations.

5. Wind conditions should also be considered to avoid drift and downwind odor problems.

6. To maximize the value of the nutrients for crop production and to reduce the potential for pollution, the waste should be applied to a growing crop or applied not more than 30 days prior to planting a crop or forages breaking dormancy. Injecting the waste or disking will conserve nutrients and reduce odor problems.

This plan is based on the waste application method shown above. If you choose to change methods in the future, you need to revise this plan. Nutrient levels for different application methods are not the same.

The estimated acres needed to apply the animal waste is based on typical nutrient content for this type of facility. In some cases you may want to have plant analysis made, which could allow additional waste to be applied. Provisions shall be made for the area receiving waste to be flexible so as to accommodate changing waste analysis content and crop type. Lime must be applied to maintain pH in the optimum range for specific crop production.

This waste utilization plan, if carried out, meets the requirements for compliance with 15A NCAC 2H .0217 adopted by the Environmental Management Commission.

AMOUNT OF WASTE PRODUCED PER YEAR (gallons, ft^3, tons, etc.):

Capacity	Type	Waste Produced per Animal	Total
	Farrow to Wean	3203 gal/yr	gal/yr
	Farrow to Feeder	3861 gal/yr	gal/yr
	Farrow to Finish	10478 gal/yr	gal/yr
	Wean to Feeder	191 gal/yr	gal/yr
	Wean to Finish	776 gal/yr	gal/yr
7344	Feeder to Finish	927 gal/yr	6,807,888 gal/yr
	Gilts	1015 gal/yr	gal/yr
	Boars	2959 gal/yr	gal/yr
		Total	**6,807,888 gal/yr**

AMOUNT OF PLANT AVAILABLE NITROGEN PRODUCED PER YEAR (lbs):

Capacity	Type	Nitrogen Produced per Animal	Total
	Farrow to Wean	3.84 lbs/yr	lbs/yr
	Farrow to Feeder	6.95 lbs/yr	lbs/yr
	Farrow to Finish	18.86 lbs/yr	lbs/yr
	Wean to Feeder	0.34 lbs/yr	lbs/yr
	Wean to Finish	1.4 lbs/yr	lbs/yr
7344	Feeder to Finish	1.67 lbs/yr	12,264 lbs/yr
	Gilts	1.83 lbs/yr	lbs/yr
	Boars	5.33 lbs/yr	lbs/yr
		Total	**12,264 lbs/yr**

Applying the above amount of waste is a big job. You should plan time and have appropriate equipment to apply the waste in a timely manner.

LAND UTILIZATION SUMMARY

The following table describes the nutrient balance and land utilization rate for this facility Note that the Nitrogen Balance for Crops indicates the ratio of the amount of nitrogen produced on this facility to the amount of nitrogen that the crops under irrigation may uptake and utilize in the normal growing season.

Total Irrigated Acreage:	**43.89**
Total N Required 1st Year:	**13407.53**
Total N Required 2nd Year:	**0.00**
Average Annual Nitrogen Requirement of Crops:	**13,407.53**
Total Nitrogen Produced by Farm:	**12,264.48**
Nitrogen Balance for Crops:	**(1,143.05)**

The following table describes the specifications of the hydrants and fields that contain the crops designated for utilization of the nitrogen produced on this facility. This chart describes the size, soil characteristics, and uptake rate for each crop in the specified crop rotation schedule for this facility.

Reception Area Specifications

Tract	Field	Irrigated Acreage	Soil Type	1st Crop Code	Time to Apply	1st Crop Yield	1st Crop lbs N/Unit	Lbs N/Ac Residual	Lbs N /Ac	Total lbs N Utilized	2nd Crop Code	Time to Apply	2nd Crop Yield	2nd Crop lbs N/Unit	Lbs N/Ac Residual	Lbs N /Ac	Total lbs N Utilized	Total Lbs N/Ac	Total lbs N Utilized
T8200	1A	21.33	AuB	BC	Mar-Sept	5.5	42.875		235.8125	5029.881	KL	Sept-April	1	50		50	1066.5	285.8125	6096.381
T8200	1B	2.96	AuB	BC	Mar-Sept	5.5	42.875		235.8125	698.005	KL	Sept-April	1	50		50	148	285.8125	846.005
T8200	1C	2.34	AuB	BC	Mar-Sept	5.5	42.875		235.8125	551.8013	KL	Sept-April	1	50		50	117	285.8125	668.8013
T8200	10	1.37	NbB	C	Mar-Sept	6.4	46		294.4	403.328	L	Sept-April	1	50		50	68.5	344.4	471.828
T8200	11	4.18	NbB	C	Mar-Sept	6.4	46		294.4	1230.592	L	Sept-April	1	50		50	209	344.4	1439.592
T8200	12	4.31	NbB	C	Mar-Sept	6.4	46		294.4	1268.864	L	Sept-April	1	50		50	215.5	344.4	1484.364
T8200	sub 1	7.4	AuB	BC	Mar-Sept	6.4	42.875		274.4	2030.56	KL	Sept-April	1	50		50	370	324.4	2400.56
Totals:		***43.89***								***11213.03***							***2194.5***		***13407.53***

Reception Area Specifications

Tract	Field	Irrigated Acreage	Soil Type	1st Crop Code	Time to Apply	1st Crop Yield	1st Crop lbs N/Unit	Lbs N/Ac Residual	Lbs N /Ac	Total lbs N Utilized	2nd Crop Code	Time to Apply	2nd Crop Yield	2nd Crop lbs N/Unit	Lbs N/Ac Residual	Lbs N /Ac	Total lbs N Utilized	Total Lbs N/Ac	Total lbs N Utilized
Totals:		*0*								*0*							*0*		*0*

This plan does not include commercial fertilizer. The farm should produce adequate plant available nitrogen to satisfy the requirements of the crops listed above.

The applicator is cautioned that P and K may be over applied while meeting the N requirements. In the future, regulations may require farmers in some parts of North Carolina to have a nutrient management plan that addresses all nutrients. This plan only addresses nitrogen.

In interplanted fields (i.e. small grain, etc, interseeded in bermuda), forage must be removed through grazing, hay, and/or silage. Where grazing, plants should be grazed when they reach a height of six to nine inches. Cattle should be removed when plants are grazed to a height of four inches. In fields where small grain, etc, is to be removed for hay or silage, care should be exercised not to let small grain reach maturity, especially late in the season (i.e. April or May). Shading may result if small grain gets too high and this will definitely interfere with stand of bermudagrass. This loss of stand will result in reduced yields and less nitrogen being utilized. Rather than cutting small grain for hay or silage just before heading as is the normal situation, you are encouraged to cut the small grain earlier. You may want to consider harvesting hay or silage two to three times during the season, depending on the time small grain is planted in the fall.

The ideal time to interplant small grain, etc, is late September or early October. Drilling is recommended over broadcasting. Bermudagrass should be grazed or cut to a height of about two inches before drilling for best results.

CROP CODE LEGEND

Crop Code	Crop	Description-Harvested As
A	Barley	Grain Crop
B	Grazed Hybrid Bermudagrass	Pasture/Grazed
C	Hybrid Bermudagrass Hay	Hay
B/C	Comb. Hybrid Bermudagrass	Graze/Hay Combination
D	Corn - Grain	Grain Crop
E	Corn - Silage	Silage
F	Cotton	Cotton Lint
G	Grazed Fescue	Pasture/Grazed
H	Fescue Hay	Hay
I	Oats	Grain Crop
J	Rye	Grain Crop
K	Grazed Overseed	Pasture/Grazed (Seeded in Bermudagrass)
L	Overseed Hay	Hay (Seeded in Bermudagrass)
M	Grain Sorghum	Grain Crop
N	Wheat	Grain Crop
O	Soybean	Grain Crop
P	Pine Trees	Pine Trees
S	Small Grain	Grain Crop/ Hay (After Grain Crop)
CC	Cover Crop	Not Harvested; Burned/Disked In
SWG	Swithgrass	Biomass Crop

Acres shown in the preceding table are considered to be the usable acres excluding required buffers, filter strips along ditches, odd areas unable to be irrigated, and perimeter areas not receiving full application rates due to equipment limitations. Actual total acres in the fields listed may, and most likely will be, more than the acres shown in the tables.

See attached map showing the fields to be used for the utilization of animal waste.

SLUDGE APPLICATION:

The following table describes the annual nitrogen accumulation rate per animal in the lagoon sludge

Farm Specifications		PAN/yr/animal	Farm Total/yr
	Farrow to Wean	0.8	
	Farrow to Feeder	0.96	
	Farrow to Finish	3.9	
	Wean to Feeder	0.07	
	Wean to Finish	0.27	
7344	Feeder to Finish	0.34	2496.96
	Gilts	0.39	
	Boars	0.55	

The waste utilization plan must contain provisions for periodic land application of sludge at agronomic rates. The sludge will be nutrient rich and will require precautionary measures to prevent over application of nutrients or other elements. Your production facility will produce approximately 2496.96 pounds of plant available nitrogen per year and will accumulate in the lagoon sludge based on the rates of accumulation listed above.

If you remove the sludge every 5 years, you will have approximately 12484.8 pounds of plant available nitrogen to utilize. Assuming you apply this PAN to hybrid bermuda grass hayland at the rate of 300 pounds of nitrogen per acre, you will need 41 acreas of land. If you apply the sludge to corn at a rate of 125 pounds per acre, you will need 99.8784 acres of land. Please note that these are only estimates of the PAN produced and the land required to utilize that PAN. Actual values may only be determined by sampling the sludge for plant available nitrogen content prior to application Actual utilization rates will vary with soil type, crop, and realistic yield expectations for the specific application fields designated for sludge application at time of removal.

APPLICATION OF WASTE BY IRRIGATION:

The irrigation application rate should not exceed the intake rate of the soil at the time of irrigation such that runoff or ponding occurs. This rate is limited by initial soil moisture content, soil structure, soil texture, water droplet size, and organic solids. The application amount should not exceed the available water holding capacity of the soil at the time of irrigation nor should the plant available nitrogen applied exceed the nitrogen needs of the crop.

If surface irrigation is the method of land application for this plan, it is the responsibility of the producer and irrigation designer to ensure that an irrigation system is installed to properly irrigate the acres shown in the preceding table. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

*This is the maximum application amount allowed for the soil assuming the amount of nitrogen allowed for the crop is not over applied. In many situations, the application amount shown cannot be applied because of the nitrogen limitation. The maximum application amount shown can be applied under optimum soil conditions.

Your facility is designed for >180 days of temporary storage and the temporary storage must be removed on the average of once every 6 months. In no instance should the volume of the waste stored in your structure be within the 25 year 24 hour storm storage or one foot of freeboard except in the event of the 25 year 24 hour storm.

It is the responsibility of the producer and waste applicator to ensure that the spreader equipment is operated properly to apply the correct rates to the acres shown in the tables. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

Call your technical specialist after you receive the waste analysis report for assistance in determining the amount of waste per acre and the proper application prior to applying the waste.

Application Rate Guide

The following is provided as a guide for establishing application rates and amounts.

Tract	Hydrant	Soil Type	Crop	Application Rate in/hr	Application Amount * inches
T8200	1A	AuB	BC	0.6	1
T8200	1B	AuB	BC	0.6	1
T8200	1C	AuB	BC	0.6	1
T8200	10	NbB	C	0.4	1
T8200	11	NbB	C	0.4	1
T8200	12	NbB	C	0.4	1
T8200	sub 1	AuB	BC	0.6	1

Additional Comments:

This NUP has been revised and now reflects the setbacks required under an NPDES permit. This plan is based on the newest recommended production rates and RYE's. This revision changes the current matua fields 1C and 11 from matua to bermuda. This change can not happen until the spring of 2018. Sub 1 will be applied on using either an Aerway machine or a honeywagon.

NUTRIENT UTILIZATION PLAN CERTIFICATION

Name of Farm: **Bowles & Sons Farm 2** **Facility 31-152**
Owner: **Bowles & Sons**
Manager:

Owner/Manager Agreement:

I/we understand and will follow and implement the specifications and the operation and maintenance procedures established in the approved animal waste nutrient management plan for the farm named above. I/we know that any expansion to the existing design capacity of the waste treatment and/or storage system, or construction of new facilities, will require a new nutrient management plan and a new certification to be submitted to DWR before the new animals are stocked.

I/we understand that I must own or have access to equipment, primarily irrigation equipment, to land apply the animal waste described in this nutrient management plan. This equipment must be available at the appropriate pumping time such that no discharge occurs from the lagoon in the event of a 25 year 24 hour storm. I also certify that the waste will be applied on the land according to this plan at the appropriate times and at rates which produce no runoff.

This plan will be filed on site at the farm office and at the office of the local Soil and Water Conservation District and will be available for review by NCDWR upon request.

Name of Facility Owner: **Bowles & Sons**

Signature: X Steven Bowles 9-28-17
Date

Name of Manager (if different from owner): _____

Signature: _____
Date

Name of Technical Specialist: **Toni W. King**
Affiliation: **Murphy-Brown, LLC.**
Address: **2822 Hwy 24 West, PO Drawer 856**
Warsaw, NC 28398
Telephone: **(910) 293-3434**

Signature: Toni W. King 9-26-2017
Date

NUTRIENT UTILIZATION PLAN

REQUIRED SPECIFICATIONS

1 Animal waste shall not reach surface waters of the state by runoff, drift, manmade conveyances, direct application, or direct discharge during operation or land application. Any discharge of waste which reaches surface water is prohibited.

2 There must be documentation in the design folder that the producer either owns or has an agreement for use of adequate land on which to properly apply the waste. If the producer does not own adequate land to properly dispose of the waste, he/she shall provide evidence of an agreement with a landowner, who is within a reasonable proximity, allowing him/her the use of the land for waste application. It is the responsibility of the owner of the waste production facility to secure an update of the Nutrient Utilization Plan when there is a change in the operation, increase in the number of animals, method of application, recieving crop type, or available land.

3 Animal waste shall be applied to meet, but not exceed, the nitrogen needs for realistic crop yields based upon soil type, available moisture, historical data, climatic conditions, and level of management, unless there are regulations that restrict the rate of applications for other nutrients.

4 Animal waste shall be applied to land eroding less than 5 tons per acre per year. Waste may be applied to land eroding at more than 5 tons per acre per year but less than 10 tons per acre per year provided grass filter strips are installed where runoff leaves the field (See USDA, NRCS Field Office Technical Guide Standard 393 - Filter Strips).

5 Odors can be reduced by injecting the waste or disking after waste application. Waste should not be applied when there is danger of drift from the land application field.

6 When animal waste is to be applied on acres subject to flooding, waste will be soil incorporated on conventionally tilled cropland. When waste is applied to conservation tilled crops or grassland, the waste may be broadcast provided the application does not occur during a season prone to flooding (See "Weather and Climate in North Carolina" for guidance).

7 Liquid waste shall be applied at rates not to exceed the soil infiltration rate such that runoff does not occur offsite or to surface waters and in a method which does not cause drift from the site during application. No ponding should occur in order to control odor and flies.

8 Animal waste shall not be applied to saturated soils, during rainfall events, or when the surface is frozen.

NUTRIENT UTILIZATION PLAN

REQUIRED SPECIFICATIONS

9 Animal waste shall be applied on actively growing crops in such a manner that the crop is not covered with waste to a depth that would inhibit growth. The potential for salt damage from animal waste should also be considered.

10 Nutrients from waste shall not be applied in fall or winter for spring planted crops on soils with a high potential for leaching. Waste/nutrient loading rates on these soils should be held to a minimum and a suitable winter cover crop planted to take up released nutrients. Waste shall not be applied more than 30 days prior to planting of the crop or forages breaking dormancy.

11 Any new swine facility sited on or after October 1, 1995 shall comply with the following: The outer perimeter of the land area onto which waste is applied from a lagoon that is a component of a swine farm shall be at least 50 feet from any residential property boundary and canal. Animal waste, other than swine waste from facilities sited on or after October 1, 1995, shall not be applied closer than 25 feet to perennial waters.

12 Animal waste shall not be applied closer than 100 feet to wells.

13 Animal waste shall not be applied closer than 200 feet of dwellings other than those owned by the landowner.

14 Waste shall be applied in a manner not to reach other property and public right-of-ways.

15 Animal waste shall not be discharged into surface waters, drainageways, or wetlands by discharge or by over-spraying. Animal waste may be applied to prior converted cropland provided the fields have been approved as a land application site by a "technical specialist". Animal waste shall not be applied on grassed waterways that discharge directly into water courses, and on other grassed waterways, waste shall be applied at agronomic rates in a manner that causes no runoff or drift from the site.

16 Domestic and industrial waste from washdown facilities, showers, toilets, sinks, etc., shall not be discharged into the animal waste management system.

NUTRIENT UTILIZATION PLAN

REQUIRED SPECIFICATIONS

17 A protective cover of appropriate vegetation will be established on all disturbed areas (lagoon embankments, berms, pipe runs, etc.). Areas shall be fenced, as necessary, to protect the vegetation. Vegetation such as trees, shrubs, and other woody species, etc., are limited to areas where considered appropriate. Lagoon areas should be kept mowed and accessible. Berms and structures should be inspected regularly for evidence of erosion, leakage, or discharge.

18 If animal production at the facility is to be suspended or terminated, the owner is responsible for obtaining and implementing a "closure plan" which will eliminate the possibility of an illegal discharge, pollution and erosion.

19 Waste handling structures, piping, pumps, reels, etc., should be inspected on a regular basis to prevent breakdowns, leaks and spills. A regular maintenance checklist should be kept on site.

20 Animal waste can be used in a rotation that includes vegetables and other crops for direct human consumption. However, if animal waste is used on crops for direct human consumption, it should only be applied pre-plant with no further applications of animal waste during the crop season.

21 Highly visible markers shall be installed to mark the top and bottom elevations of the temporary storage (pumping volume) of all waste treatment lagoons. Pumping shall be managed to maintain the liquid level between the markers. A marker will be required to mark the maximum storage volume for waste storage ponds.

22 Waste shall be tested within 60 days of utilization and soil shall be tested at least annually at crop sites where waste products are applied. Nitrogen shall be the rate-determining nutrient, unless other restrictions require waste to be applied based on other nutrients, resulting in a lower application rate than a nitrogen based rate. Zinc and copper levels in the soil shall be monitored and alternative crop sites shall be used when these metals approach excessive levels. pH shall be adjusted and maintained for optimum crop production. Soil and waste analysis records shall be kept for a minimum of five years. Poultry dry waste application records shall be maintained for a minimum of three years. Waste application records for all other waste shall be maintained for a minimum of five years.

23 Dead animals will be disposed of in a manner that meets North Carolina regulations.

IRRIGATION SYSTEM DESIGN PARAMETERS

Landowner/Operator Name: Bowles and Sons Farm #2; Fac. No. 31-152
Address: 607 Curtis Road
Warsaw, NC 28398
Telephone: 910-293-7654

County: Duplin

Date: 9/25/2017

Table 1 - Field Specifications

Field Number	Approximate Maximum Useable Size of Field (acres)	Soil Type	Slope %	Crop(s)	Maximum Application Rate (In/hr)	Maximum Application per Irrigation Cycle (inches)	Comments
1A	21.33	AuB	0-6	Bermuda / Overseed	0.5	1	Pivot
1B	2.96	AuB	0-6	Bermuda / Overseed	0.5	1	Pulls 4, 7
1C	2.34	AuB	0-6	Bermuda / Overseed	0.5	1	Pulls 6, 9
10	1.37	NbB	0-6	Bermuda / Overseed	0.5	1	Solid Set #10
11	4.18	NbB	0-6	Bermuda / Overseed	0.5	1	Solid Set #11
12	4.31	NbB	0-6	Bermuda / Overseed	0.5	1	Solid Set #12
	36.49						

TABLE 2 - Travelling Irrigation Gun Settings

Make, Model and Type of Equipment: ABI & Hobbs Travelers, Valley 8000 Center Pivot

Field No. and Hydrant No.	Travel Speed (ft/min)	Application Rate (in/hr.)	TRAVEL LANE Effective Width(ft.)	Effective Length(ft)	Wetted Diameter (feet)	Nozzle Diameter (Inches)	Operating Pressure at Gun(psi)	Operating Pressure at reel(psi)	Arc Pattern	Comments - Acres per pull
4	2.48	0.55	128	242	280	0.97	65	80	180	1.30
6	3.56	0.45	189	160	280	0.97	65	80	220	1.44
7	3.56	0.45	156	278	280	0.97	65	80	220	1.66
9	3.56	0.45	181	41	280	0.97	65	80	220	0.90
Pivot	Center pivot acreage computer calculated - machine length 600' w/90' end gun radius									21.33
								TOTAL		**26.63**

TABLE 3 - Solid Set Irrigation Gun Settings

Make, Model and Type of Equipment Senninger 7025

Field No and Line No.	Number of Hydrants	Wetted Diameter (feet)	Hydrant Spacing(ft) Along Pipelines	Between Pipelines	Application Rate (in/hr)	Operating Parameters Nozzle Diameter (inches)	Operating Pressure at Gun(psi)	Operating Time at Hydrant(hr.)	Comments-Acres per zone
10	10	135	80	80	0.25	#18	50	2.04	1.37
11	33	135	80	80	0.25	#19	50	2.04	4.18
12	30	135	80	80	0.25	#20	50	2.04	4.31
	73								
								TOTAL	9.86

TABLE 4 - Irrigation System Specifications

	Traveling Irrigation Gun	Solid Set Irrigation	Pivot Irrigation
Flow Rate of Sprinkler (gpm)	142	16.3	SEE MANUFACTURERS SPECIFICATIONS SHEETS (ATTACHED)
Operating Pressure at Pump (psi)	106.7	#DIV/0!	
Design Precipitation Rate (in/hr)	0.27	0.25	
Hose Length (feet)		XXXXXXXX	
Type of Speed Compensation	Mechanical	XXXXXXXX	
Pump Type (PTO, Engine, Electric)	Engine	Engine	
Pump Power Requirement (hp)	#DIV/0!	#DIV/0!	

TABLE 5 - Thrust Block Specifications			
	6"	4"	2"
	THRUST BLOCK	THRUST BLOCK	THRUST BLOCK
LOCATION	AREA (sq. ft.)	AREA (sq. ft.)	AREA (sq. ft.)
90 degree bend	8.8	4.3	1.1
Dead End	6.2	3.0	0.8
Tee	4.4	2.1	0.5
Gate Valve	6.2	3.0	0.8
45 degree bend	4.7	2.3	0.6

IRRIGATION SYSTEM DESIGNER

Name: Micah Kevin Weston, CID
Company: Murphy-Brown, LLC dba Smithfield Hog Production
Address: 2822 Hwy 24 West, P.O. Box 856 Warsaw, NC 28398
Phone: (910) 293-3434

Required Documentation

The following details of design and materials must accompany all irrigation designs:

1. A scale drawing of the proposed irrigation system which includes hydrant locations, pipelines, thrust block locations and buffer areas where applicable.
2. Assumptions and computations for determining total dynamic head and horsepower requirements.
3. Computations used to determine all mainline and lateral pipe sizes.
4. Sources and/or calculations used for determining application rates.
5. Computations used to determine the size of thrust blocks and illustrations of all thrust block configurations required in the system
6. Manufacturer's specifications for the irrigation pump, traveler and sprinkler(s).
7. Manufacturer's specifications for the irrigation pipe and/or USDA-NRCS standard for IRRIGATION WATER CONVEYANCE.
8. The information required by this form are the minimum requirements. It is the responsibility of the designer to consider all relevant factors at a particular site and address them as appropriate.
9. Irrigation pipes should not be installed in lagoon or storage pond embankments without the approval of the designer.

NOTE: A buffer strip of 25' or wider must be maintained between the limits of the irrigation system and all perennial streams and surface waters per NC Statutes.

Narrative of Irrigation System Operation

This design is for a "wetted acreage" determination for an existing facility. The acres were calculated based on the equipment specified and the charts created by NCSU for calculating Area Allowances for Stationary Sprinkler Systems and Area Allowances for Hard Hose Traveler Systems. The pivot acreage was computer calculated based on manufacturers specifications and GPS map of the fields.

Refer to owner's manual and irrigation dealer for information on maintenance, winterization, and operation of system.

Note: This "wetted acreage" determination done 9/25/2017, to reflect setbacks for NPDES permitting and is based on previous determination, field calibration, manufacturers specifications, a new GPS map of the fields and other information provided by the grower.

CALCULATIONS

Sprinkler Specifications

Sprinkler Type:	Nelson 150	
Nozzle Size:	0.97 inches	
Sprinkler Pressure:	65 psi	
Flowrate(GPM):	142 gpm	
Wetted Diameter:	280 feet	* Reflects field measurement

Lane Spacings

Desired Spacing (%):	70 %	
Design Spacing(feet):	196	*PVC irrigation pipe normally comes in 20' pieces, so round to the nearest multiple of 20.
Actual Spacing (feet):	200 feet	
Actual Spacing (%):	71 %	

Application Rate

Application Rate = (96.3xFlowrate)/(3.1415x(.9xradius)squared)

Design App. Rate =	0.27 in/hr		
300 degree arc =	0.33 in/hr	330 degree arc =	0.30 in/hr
220 degree arc =	0.45 in/hr		
180 degree arc =	0.55 in/hr		

Traveller Speed

Travel speed = 1.605 x Flowrate / Desired application amount x Lane Spacing

Desired app. (in.) =	0.5 inches	360 degree arc =	2.28 ft/min
300 degree arc =	2.73 ft/min	330 degree arc =	2.48 ft/min
220 degree arc =	3.65 ft/min		
180 degree arc =	4.56 ft/min		

Mainline Velocity

Velocity = .408 x Flowrate / pipe diameter squared feet/sec.**
**For buried pipelines, velocity should be below 5 feet per second

Pipe size:	4 inches
Velocity=	3.62 ft/sec.

CALCULATIONS

Sprinkler Specifications

Sprinkler Type:	Senninger 7025	
Nozzle Size:	#18	inches
Sprinkler Pressure:	50	psi
Flowrate(GPM):	16.3	gpm
Wetted Diameter:	135	feet

Sprinkler Spacings

Desired Spacing (%):	60	%
Design Spacing(feet):	81	*PVC irrigation pipe normally comes in 20' pieces, so round to the nearest multiple of 20.
Actual Spacing (feet):	80	feet
Actual Spacing (%):	59	%

Application Rate

Application Rate = (96.3xFlowrate)/sprinkler spacing squared

Design App. Rate = 0.25 in/hr

Run Time per Set

Run time per set = Desired application / Design application rate = hours

Desired app. (in.) = 0.5 inches

Run time per set = 2.04 hours

Mainline Velocity

Velocity = .408 x Flowrate / pipe diameter squared feet/sec.**
**For buried pipelines, velocity should be below 5 feet per second

Pipe size:		inches
# Sprinklers Oper.:		
Velocity=	#DIV/0!	ft/sec.

Maximum Lateral Line Entrance Velocity

Pipe size:	2 inches	4 inches
# Sprinklers Oper.:		
Velocity =	0.00 ft/sec.	0.00 ft/sec.

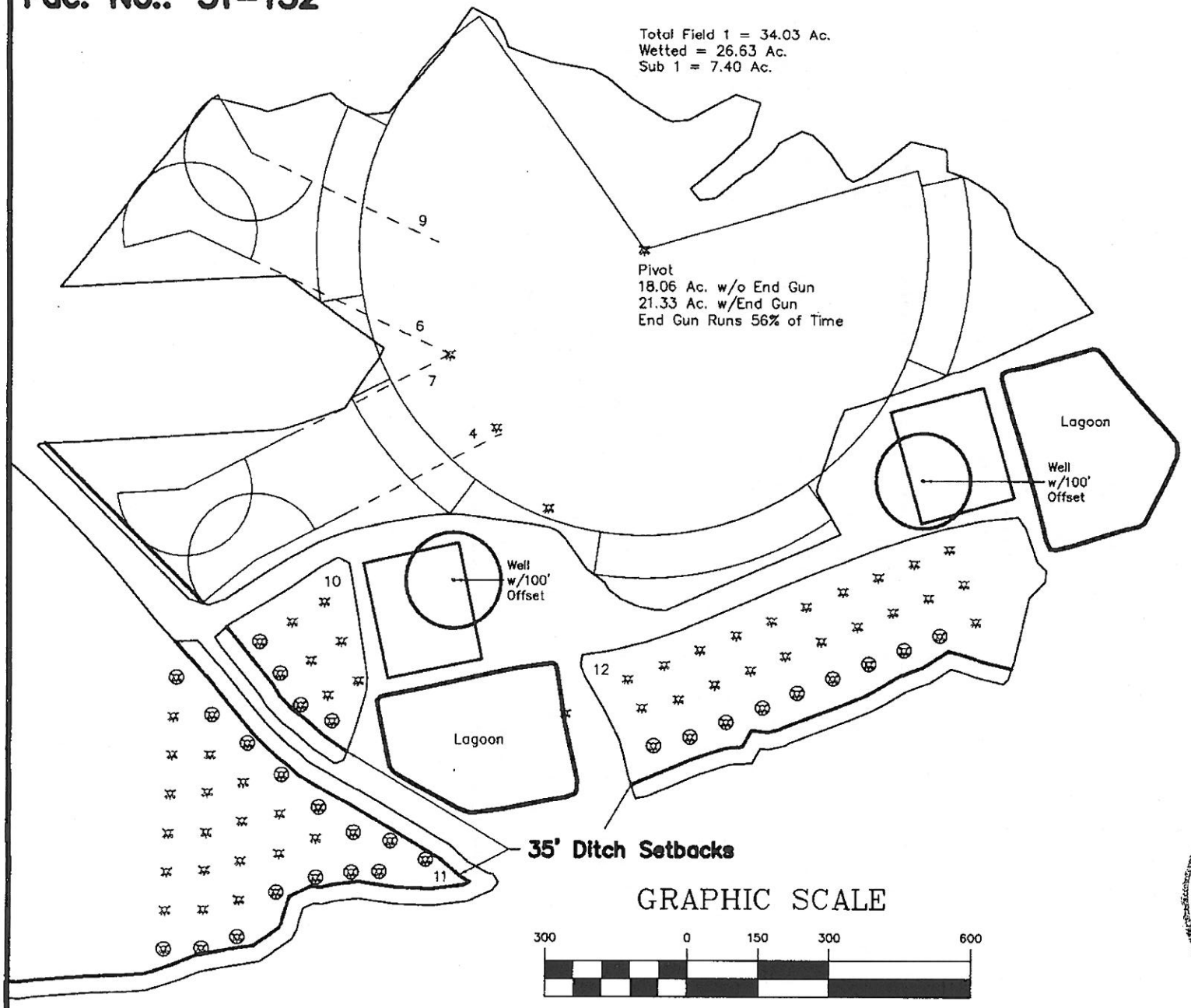
Bowles and Sons Farm #2; Fac. No.: 31-152

Acreage Calculation 9/25/2017

Zone #	Sprinkler Coverage	# Int.	Acres per Int.Sprink.	Total Int. Acres	# Ext.	Acres per Ext.Sprink.	Total Ext. Acres	#Single	Acres per Sing.Sprk.	Total Sing. Acres	Total Acres
10	Full	2	0.147	0.294	4	0.179	0.716	0	0.000	0.00	1.01
	Half	0	0.147	0.000	4	0.179	0.358	0	0.000	0.00	0.36
11	Full	12	0.147	1.764	6	0.179	1.074	0	0.000	0.00	2.84
	Half	0	0.147	0.000	15	0.179	1.343	0	0.000	0.00	1.34
12	Full	8	0.147	1.176	13	0.179	2.327	0	0.000	0.00	3.50
	Half	0	0.147	0.000	9	0.179	0.806	0	0.000	0.00	0.81
	Full	0	0.147	0.000	0	0.179	0.000	0	0.000	0.00	0.00
	Half	0	0.147	0.000	0	0.179	0.000	0	0.000	0.00	0.00
		22			51			0			
									Total Acres =		**9.86**

			Bowles and Sons Farm #2; Fac. No.: 31-152					
			Acreage Calculations 9/25/2017					
	Width	Length	Acres	Total Acres	Start End	Stop End		Total
Pull #	(ft.)	(ft.)	(midsection)	(midsection)	(ac.)	(ac.)		Pull Acres
4	128	242	0.711	0.711	0.330	0.262		1.30
6	189	160	0.694	0.694	0.487	0.262		1.44
7	156	278	0.996	0.996	0.402	0.262		1.66
9	181	41	0.170	0.170	0.466	0.262		0.90
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
	0	0	0.000	0.000	0.000	0.000		0.00
						Total Acres		**5.30**

Bowles and Sons Farm #2
Fac. No.: 31-152



Specifications:
Pivot
Valley 8000
600' Machine length
90' End Gun Radius

Travelers
ABI and Hobbs
Nelson 150 Big Gun
w/0.97" Nozzles @ 65 PSI
142 GPM; 280' WD
200' Lane Spacing (TYP)

Solid Sets
Senninger 7025
w/#18 Nozzles @ 50 PSI
16.3 GPM; 135' WD
80'x80' Spacing (TYP)
✲ – Full Circle Sprinkler
⊛ – Half Circle Sprinkler

Hyd	Acres
4	1.30
6	1.44
7	1.66
9	0.90
10	1.37
11	4.18
12	4.31
Pivot	21.33
Total	36.49

GRAPHIC SCALE

300 0 150 300 600

(IN FEET)
1 inch = 300 ft.

9/25/2017

Bowles + Sons 2

System Calibration

Information presented in manufacturer's charts are based on average operation conditions with relatively new equipment. Discharge rates and application rates change over time as equipment gets older and components wear. In particular, pump wear tends to reduce operating pressure and flow. With continued use, nozzle wear results in an increase in the nozzle opening which will increase the discharge rate while decreasing the wetted diameter.

You should be aware that operating the system differently than assumed in the design will alter the application rate, diameter of coverage, and subsequently the application uniformity. For example, operating the system with excessive pressure results in smaller droplets, greater potential for drift, and accelerates wear of the sprinkler nozzle. Clogging of nozzles can result in pressure increase. Plugged intakes or crystallization of mainlines will reduce operating pressure. Operating below design pressure greatly reduces the coverage diameter and application uniformity.

For the above reason, you should calibrate your equipment on a regular basis to ensure proper application rates and uniformity. Calibration at least once every three years is recommended. Calibration involves collecting and measuring flow at several locations in the application area. Any number of containers can be used to collect flow and determine the application rate. Rain gauges work best because they already have a graduated scale from which to read the application amount without having to perform additional calculations. However, pans, plastic buckets, jars, or anything with a uniform opening and cross-section can be used provided the liquid collected can be easily transferred to a scaled container for measuring.

For stationary sprinklers, collection containers should be located randomly throughout the application area at several distances from sprinklers. For traveling guns, sprinklers should be located along a transect perpendicular to the direction of pull. Set out collection containers 25 feet apart along the transect on both sides of the gun cart. You should compute the average application rate for all nonuniformity of the application. On a windless day, variation between containers of more than 30 percent is cause for concern. You should contact your irrigation dealer or technical specialist for assistance.

**Reprinted for Certification Training for Operations of Animal Waste Management Systems Manual*

Phosphorus Loss Assessment Tool Completion

Name of Facility: Bowles & Sons 2 Facility Number: 31.152

Owner(s) Name: Stan Bowles Phone No: 910-290-2654

Mailing Address: 1552-A Dobson Chapel Rd. Magnolia

Check the appropriate box below, and sign at the bottom:

☑ No fields received a high or very high rating.

☐ Yes, the fields listed below received a high or very high rating:

Field Number	Size (Acres)	Rating (High or Very High)

Please use as many additional attachment forms (PLAT-A-07-15-16) as needed for additional fields.

By completing the above section and any additional attachments and by signing this form, the facility owner and Technical Specialist acknowledge all application fields were evaluated within the last five (5) years using the Phosphorus Loss Assessment Tool. All necessary calculations were completed to conduct the Assessment. A copy will be kept on site with the Certified Animal Waste Management Plan. Any future modifications must be approved by a technical specialist and filed with the Soil and Water Conservation District prior to implementation. Waste plans with fields having a high or very high rating will have to be modified to address phosphorus loss by the next permit cycle beginning July 1, 2017.

Owner Name: Stan Bowles

Owner Signature: Stan Bowles Date: 9-28-17

Technical Specialist Name: Toni King

Technical Specialist Signature: Toni King Date: 9-13-2017

Affiliation: Smithfield HP Phone No: 910-293-3434

Submit this form to:
NC Division of Water Resources
Water Quality Regional Operations Section
Animal Feeding Operations Program
1636 Mail Service Center
Raleigh, NC 27699-1636

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 1:55:24 PM

INPUTS

Calendar Year:	2015
County:	Duplin
Producer Identifier:	31-152
Tract Number:	8200
Field Number:	Pivot
Soil Series:	AuB: Autryville loamy fine sand, 0 to 6 percent slopes
Crop:	Hybrid Bermudagrass (Pasture) :
Fertilizers:	Swine-Lagoon liquid
	Yearly Applied Amount: 6.46 ac in
	Lb P2O5: 53.4 lb
	Application Method: All other surface applications
Soil Loss:	.044 t/ac/yr
Receiving Slope Distance	0-9 ft
Soil Test 0" - 4"	110
WV_Factor (USER)	1.13
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	1
TOTAL P RATING	=	2 (LOW)

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 1:57:02 PM

INPUTS

Calendar Year:	2015
County:	Duplin
Producer Identifier:	31-152
Tract Number:	8200
Field Number:	6,9
Soil Series:	AuB: Autryville loamy fine sand, 0 to 6 percent slopes
Crop:	Hybrid Bermudagrass (Pasture) :
Fertilizers:	Swine-Lagoon liquid
	Yearly Applied Amount: 6.46 ac in
	Lb P2O5: 53.4 lb
	Application Method: All other surface applications
Soil Loss:	0.044 t/ac/yr
Receiving Slope Distance	0-9 ft
Soil Test 0" - 4"	11
WV_Factor (USER)	1.09
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	0
LEACHATE P	=	0
SOURCE P	=	1
TOTAL P RATING	=	1 (LOW)

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 1:59:07 PM

INPUTS

Calendar Year:	2015
County:	Duplin
Producer Identifier:	31-152
Tract Number:	8200
Field Number:	4,7
Soil Series:	AuB: Autryville loamy fine sand, 0 to 6 percent slopes
Crop:	Other Pasture :
Fertilizers:	Swine-Lagoon liquid
	Yearly Applied Amount: 6.46 ac in
	Lb P2O5: 53.4 lb
	Application Method: All other surface applications
Soil Loss:	0.044 t/ac/yr
Receiving Slope Distance	0-9 ft
Soil Test 0" - 4"	282
WV_Factor (USER)	1.29
Soil Test 28" - 32"	13
WV_Factor (DATABASE)	1.4
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	2
LEACHATE P	=	5
SOURCE P	=	1
TOTAL P RATING	=	8 (LOW)

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 2:01:02 PM

INPUTS

Calendar Year:	2015	
County:	Duplin	
Producer Identifier:	31-152	
Tract Number:	8200	
Field Number:	ZONE 10	
Soil Series:	NbB: Noboco loamy fine sand, 2 to 6 percent slopes	
Crop:	Hybrid Bermudagrass (Hay) :	
Fertilizers:	Swine-Lagoon liquid	
	Yearly Applied Amount:	6.46 ac in
	Lb P2O5:	53.4 lb
	Application Method:	All other surface applications
Soil Loss:	.074 t/ac/yr	
Receiving Slope Distance	0-9 ft	
Soil Test 0" - 4"	57	
WV_Factor (USER)	1.15	
Hydrologic Condition:	GOOD	

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	4
TOTAL P RATING	=	5 (LOW)

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 2:02:28 PM

INPUTS

Calendar Year:	2015	
County:	Duplin	
Producer Identifier:	31-152	
Tract Number:	8200	
Field Number:	ZONE 11	
Soil Series:	NbB: Noboco loamy fine sand, 2 to 6 percent slopes	
Crop:	Hybrid Bermudagrass (Hay) :	
Fertilizers:	Swine-Lagoon liquid	
	Yearly Applied Amount:	6.46 ac in
	Lb P2O5:	53.4 lb
	Application Method:	All other surface applications
Soil Loss:	0.074 t/ac/yr	
Receiving Slope Distance	0-9 ft	
Soil Test 0" - 4"	76	
WV_Factor (USER)	1.08	
Hydrologic Condition:	GOOD	

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	4
TOTAL P RATING	=	5 (LOW)

NCANAT Version: 2.02

PLAT Results For: Duplin 9/13/2017 2:03:16 PM

INPUTS

Calendar Year:	2015	
County:	Duplin	
Producer Identifier:	31-152	
Tract Number:	8200	
Field Number:	ZONE 12	
Soil Series:	NbB: Noboco loamy fine sand, 2 to 6 percent slopes	
Crop:	Hybrid Bermudagrass (Hay) :	
Fertilizers:	Swine-Lagoon liquid	
	Yearly Applied Amount:	6.46 ac in
	Lb P2O5:	53.4 lb
	Application Method:	All other surface applications
Soil Loss:	0.074 t/ac/yr	
Receiving Slope Distance	0-9 ft	
Soil Test 0" - 4"	12	
WV_Factor (USER)	1.30	
Hydrologic Condition:	GOOD	

OUTPUTS

PARTICULATE P	=	0
SOLUBLE P	=	0
LEACHATE P	=	0
SOURCE P	=	4
TOTAL P RATING	=	4 (LOW)

Grower:	Stan Bowles #2	Designed By:	KBW
Address:	PO Box 759	Checked By:	DSE
	Rose Hill, NC 28458	Date:	03/17/06
County:	Duplin	Sheet 1 of 7	

ANAEROBIC WASTE LAGOON DESIGN

FARM INFORMATION

		Farm Population:	
Nursery:	----------		0
Finishing:	----------		3672 Hd.
Farrow to weanling:	----------		0
Farrow to feeder:	----------		0
Farrow to finish:	----------		0
Boars:	----------		0
Storage Period:	----------		180 Days
25 Yr. / 24 Hr Storm Event	----------		7.5 In.
"Heavy Rain" Factor	Not Applicable		7.5 In.
Rainfall in Excess of Evaporation	----------		7.0 In.
Additional Water Usage:	----------		0
Additional Drainage Area:	----------		0

LAGOON INFORMATION

Is Lagoon Designed as an Irregular Shape?	(Y/N) ----------		N
Does Operator Want Emergency Spillway?	(Y/N) ----------		N
Was This Design Built Prior to Sept. 1996?	(Y/N) ----------		Y
Is Drain Tile Req'd to Lower SHWT?	(Y/N) ----------		N
Seasonal High Water Table Elev:	----------		48.50 Ft.
Freeboard:	----------		1.0 Ft.
Emergency Spillway Flow Depth:	Not Applicable		0.3 Ft.
Side Slopes:	----------		3 :1 (H:V)
Inside Top Length:	----------		372.0 Ft.
Inside Top Width:	----------		248.0 Ft.
Top of Dike Elevation:	----------	Depth	53.50 Ft.
Finished Bottom Elevation:	----------	12.00 Ft.	41.50 Ft.
Start Pump Elevation:	----------	19.92 In.	51.84 Ft.
Stop Pump Elevation:	----------	51.6 In.	49.20 Ft.

LAGOON VOLUME	REQUIRED VOL.	DESIGN VOLUMES	% REQ'D.
Storm Stor =	**57660 (Cu.Ft.)**	**57,886 (Cu.Ft.)**	100.39%
Temporary =	**174874 (Cu.Ft.)**	**215,172 (Cu.Ft.)**	123.04%
Permanent =	**495720 (Cu.Ft.)**	**497,022 (Cu.Ft.)**	100.26%
Total Volume =	**728,254 (Cu.Ft.)**	**770,080 (Cu.Ft.)**	105.74%

Min. Required Liner Thickness	----------	1.8 Ft.
Lagoon Surface Area: (Inside TOD)	----------	92,256 S.F.

Grower:	Stan Bowles #2	Designed By:	KBW
Address:	PO Box 759	Checked By:	DSE
	Rose Hill, NC 28458	Date:	03/17/06
County:	Duplin	Sheet 2 of 7	

ACTUAL DESIGN VOLUME CALCULATIONS

BASE VOLUME: [ ] Cu. Ft.

LAGOON STAGE-AREA VOLUMES

Elevation (FT.)	Contour Area (SF)	Incr. Vol. (Cu. FT)	Cumul. Vol. (Cu. FT)
41.50	52,800		0
42.00	54,237	26,759	26,759
43.00	57,165	55,701	82,460
44.00	60,165	58,665	141,125
45.00	63,237	61,701	202,826
46.00	66,381	64,809	267,635
47.00	69,597	67,989	335,624
48.00	72,885	71,241	406,865
49.00	76,245	74,565	481,430
50.00	79,677	77,961	559,391
51.00	83,181	81,429	640,820
52.00	86,757	84,969	725,789
53.00	90,405	88,581	814,370
53.50	92,256	45,665	860,036

These volumes were calculated using the vertical average end area method.

TOTAL REQD VOL	728,254	CF	CUMULATIVE VOL.	ZONE VOL.	105.74%
END PUMP = = = =	49.20	FT	497,022 CF TR'MT	497,022	100.26%
START PUMP = = =	51.84	FT	712,194 CF TEMP	215,172	123.04%
MAX STORAGE =	52.50	FT	770,080 CF STORM	57,886	100.39%

Grower:	Stan Bowles #2	Designed By:	KBW
Address:	PO Box 759	Checked By:	DSE
	Rose Hill, NC 28458	Date:	03/17/06
County:	Duplin	Sheet 3 of 7	

MINIMUM REQUIRED VOLUME CALCULATIONS

Permanent Storage:

Required Treatment Volume:

Animal Type	Capacity	* ALW	* (cu.ft./lb)	= Total
Nursery	0	30	1.00	0
Finishing	3,672	135	1.00	495,720
Farrow to weanling	0	433	1.00	0
Farrow to feeder	0	522	1.00	0
Farrow to finish	0	1,417	1.00	0
Boars	0	400	1.00	0

Total Required Treatment Volume (cu. ft.)= 495,720

Sludge Storage Volume:

Animal Type	Capacity	* ALW	* (cu.ft./lb)	= Total
Nursery	0	30	0.00	0
Finishing	3,672	135	0.00	0
Farrow to weanling	0	433	0.00	0
Farrow to feeder	0	522	0.00	0
Farrow to finish	0	1,417	0.00	0
Boars	0	400	0.000	0

Total Required Sludge Storage Volume (cu. ft.)= 0

Temporary Storage Volume:

Manure Production:

Animal Type	Capacity *	Sto. Period d./day) = Total		
Nursery	0	180	0.30	0
Finishing	3,672	180	1.37	905,515
Farrow to weanling	0	180	4.39	0
Farrow to feeder	0	180	5.30	0
Farrow to finish	0	180	14.38	0
Boars	0	180	4.06	0

Total Manure Production (gals.)= 905,515

Total Manure Production (cu.ft.)= 121,058

Excess Fresh Water:

Animal Type	Capacity *	Sto. Period d./day) = Total		
Nursery	0	180	0.00	0
Finishing	3,672	180	0.00	0
Farrow to weanling	0	180	0.00	0
Farrow to feeder	0	180	0.00	0
Farrow to finish	0	180	0.00	0
Boars	0	180	0.00	0

Total Fresh Water Excess (gals.)= 0

Total Fresh Water Excess (cu.ft.)= 0

Temporary Storage Volume: (Cont.)

Rainfall in Excess of Evaporation:

Vol.=(Lagoon Surface Area + Additional Drainage Area) * Rainfall / 12in./ft

Vol.= (92256 sq.ft. + 0 sq.ft.) * 7 in. /12 in./ft.

Total Required Volume for Rainfall in Excess of Evap. (cu.ft.)= 53,816

Storm Storage:

Vol.=(Lagoon Surf. Area + Addt'l Drainage Area) * 25Yr./24Hr. Storm(in) / 12in./ft.

Vol.= (92256 sq.ft + 0 sq.ft.) * 7.5 in. /12 in./ft.

Total Required Volume for 25Yr.-24Hr. Storm Event (cu.ft)= 57,660

"Heavy Rain" Storage:

Vol.=(Lagoon Surf. Area + Addt'l Drainage Area) * "Heavy Rain" Factor (in) / 12in./ft.

Vol.= (92256 sq.ft + 0 sq.ft.) * 7.5 in. /12 in./ft.

Total Required Volume for "Heavy Rain" (cu.ft.) = 0

(for Extended Periods of Chronic Rainfall)

Additional Water Storage:

No Additional Water Storage is Required

Total Required Storm Storage

(25 Yr. / 24 Hr. Storm + "Heavy Rain") = **57,660 (CU.FT)**

Total Required Temporary Storage

(Manure Prod. + Excess Fr. Water + Rainfall Excess) = **174,874 (CU.FT)**

Total Required Permanent Storage

(Treatment + Sludge) = **495,720 (CU.FT)**

TOTAL REQUIRED VOLUME = 728254 (CU.FT.)

Grower:	Stan Bowles #2	Designed By:	KBW
Address:	PO Box 759	Checked By:	DSE
	Rose Hill, NC 28458	Date:	03/17/06
County:	Duplin	Sheet 5 of 7	

LAGOON DESIGN SUMMARY

Top of Dike Elevation	53.50	FT.
Emergency Spillway Crest Elevation	Not A	Applicable
Top of 25 yr/24 hr Storm Storage	52.50	FT.
Top of "Heavy Rain" Storage	Not	Applicable
Start Pump Elevation	51.84	FT.
End Pump Elevation	49.20	FT.
Top of Sludge Storage	Not	Applicable
Seasonal High Watertable Elev.	48.50	FT.
Finished Bottom Elevation	41.50	FT.
Inside Top Length	372.00	FT.
Inside Top Width	248.00	FT.
Side Slopes	3:1	H:V
Lagoon Surface Area	92,256	SF
Min. Liner Thickness (if required)	1.8	FT.
Freeboard Depth	1.00	FT.
Temporary Storage Period	180	Days

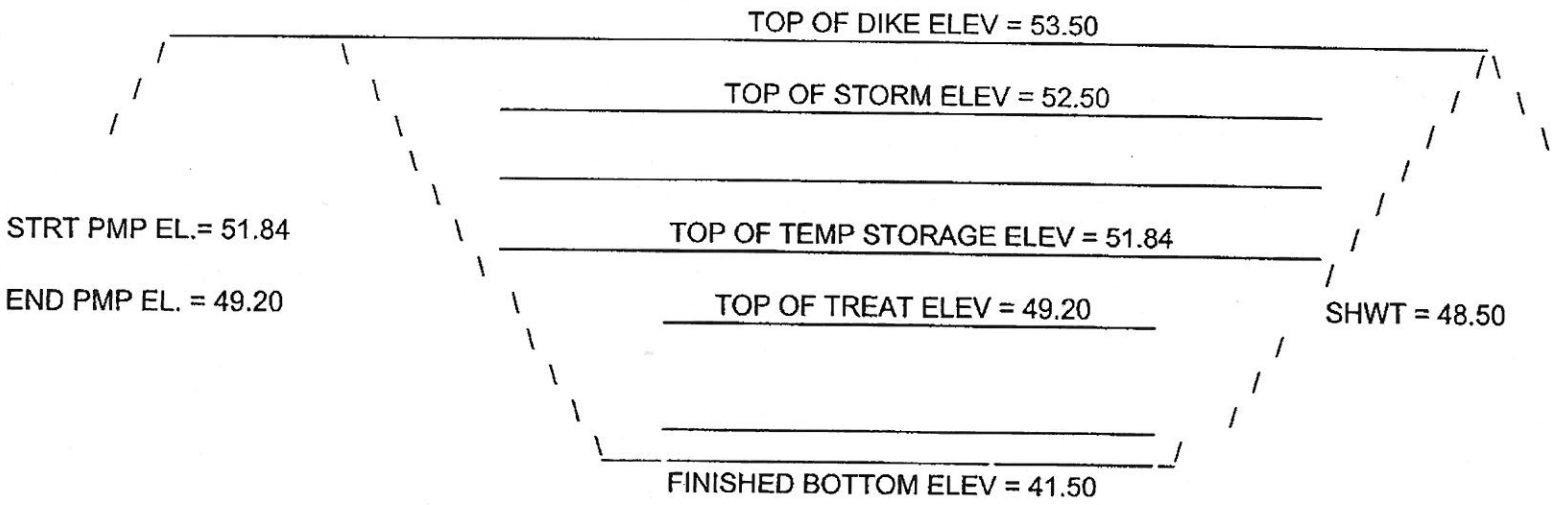
TOTAL DESIGN VOLUME = 770080 (CU.FT.)

Zone Depths:

Treatment / Sludge Storage Zone Depth	7.7	FT.
Temporary Storage Zone Depth	2.6	FT.
Freeboard / Storm Storage Zone Depth	1.7	FT.
Total Lagoon Depth	12.0	FT.

Grower:	Stan Bowles #2	Designe KBW
Address:	PO Box 759	Checke DSE
	Rose Hill, NC 28458	Date: 03/17/06
County:	Duplin	Sheet 6 of 7

ZONE ELEVATIONS



Grower:	Stan Bowles #2	Designed By:	KBW
Address:	PO Box 759	Checked By:	DSE
	Rose Hill, NC 28458	Date:	03/17/06
County:	Duplin	Sheet 7 of 7	

This livestock waste treatment lagoon is designed in accordance with the North Carolina Natural Resources Conservation Service PRACTICE STANDARD 359- WASTE TREATMENT LAGOON, revised prior to June, 1996.

Emergency Spillway:

An Emergency Spillway is not required.

NOTE: See attached Waste Utilization Plan

DESIGNED: David S. Elkin

DATE: 3/17/06

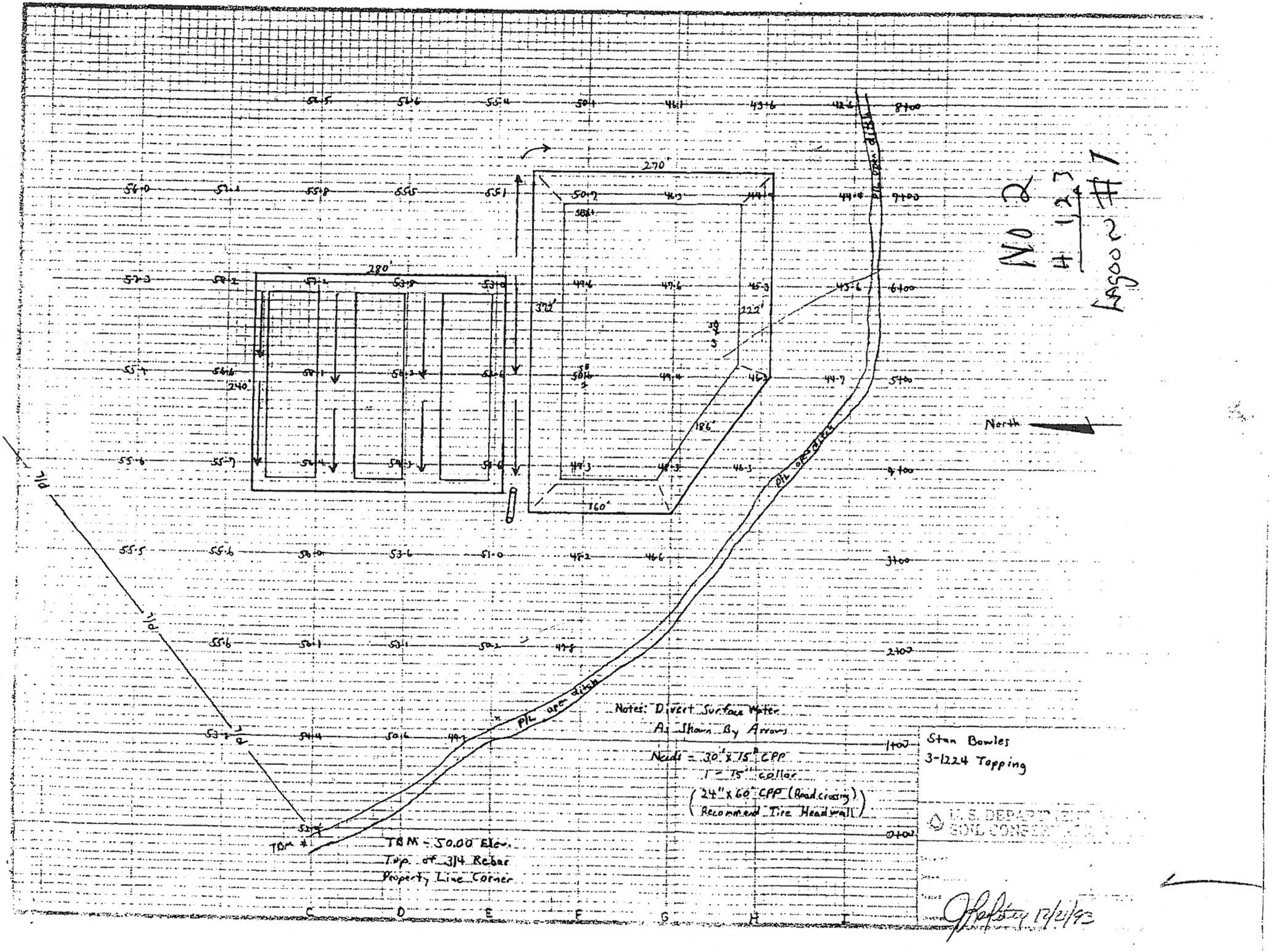
COMMENTS: This farms lagoon was designed 12/21/93. (See Attached original)

The original design spreadsheet was used to supply the elevations shown in this as-built design.

This spreadsheet acts only as documentation of revised design operating

levels for the farms files. This design does not supercede the original certification

of the farm or the lagoon construction.



NO 2
4 1,2,3
Lagoon #1
270'
280'
240'
186'
160'
222'
P/L
P/L open ditch
North
Notes: Divert Surface Water
As Shown By Arrows
Needs = 30' x 15" CPP
1 = 15" collar
(24" x 60' CPP (Road crossing))
(Recommend Tire Headwall)
TBM #1
TBM = 50.00 Elev.
Top of 3/4 Rebar
Property Line Corner
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
C
D
E
F
G
H
I
Stan Bowles
3-1224 Topping
U.S. DEPARTMENT
SOIL CONSERVATION
12/2/93

Operator: Stan Bowles County: Duplin Date: 12/21/93

Distance to nearest residence (other than owner): 850.0 feet

1. STEADY STATE LIVE WEIGHT

0 sows (farrow to finish)	x	1417 lbs.	=	0 lbs
0 sows (farrow to feeder)	x	522 lbs.	=	0 lbs
3,672 head (finishing only)	x	135 lbs.	=	495,720 lbs
0 sows (farrow to wean)	x	433 lbs.	=	0 lbs
0 head (wean to feeder)	x	30 lbs.	=	0 lbs

TOTAL STEADY STATE LIVE WEIGHT (SSLW) = 495,720 lbs

2. MINIMUM REQUIRED TREATMENT VOLUME OF LAGOON

Volume = 495,720 lbs. SSLW x Treatment Volume(CF)/lb. SSLW
Treatment Volume(CF)/lb. SSLW= 1.0 CF/lb. SSLW
Volume = 495,720 Cubic Feet

3. STORAGE VOLUME FOR SLUDGE ACCUMULATION

Volume = 0.0 cubic feet (As per owner's request)

4. TOTAL DESIGN VOLUME

Inside top length = 372.00 feet ; Inside top width = 248.00 feet
Top of dike at elevation = 53.50 feet
Freeboard = 1.30 feet ; Side slopes 3.0 : 1 (Inside lagoon)
Total design lagoon liquid level at elevation = 52.20 feet
Bottom of lagoon elevation = 41.50 feet
Seasonal high water table elevation = 48.50 feet

23.1 inches freeboard

Total design volume using prismoidal formula

SS/END1	SS/END2	SIDE1	SIDE2	LENGTH	WIDTH	DEPTH
3.00	3.00	3.00	3.00	364.20	240.20	10.70

AREA OF TOP = LENGTH * WIDTH
364.20 240.20 = 87,481 SF (AREA OF TOP)

AREA OF BOTTOM = LENGTH * WIDTH
300.00 176.00 = 52,800 SF (AREA OF BOTTOM)

AREA OF MIDSECTION = LENGTH * WIDTH * 4
332.10 208.10 = 276,440 SF (AREA OF MIDSECTION * 4)

CU. FT. = [AREA TOP + (4*AREA MIDSECTION) + AREA BOTTOM] * DEPTH/6
(87,481 + 276,440 + 52,800) * 1.78

VOLUME OF LAGOON AT TOTAL DESIGN LIQUID LEVEL = 743,152 CU. FT.

5. TEMPORARY STORAGE REQUIRED

DRAINAGE AREA:
Lagoon (top of dike)

Length	* Width =		
372.00	248.00	92,256	square feet

Buildings (roof and lot water)

Length	* Width =	
0.0	0.0	0.0 square feet

TOTAL DA 92,256 square feet

Design temporary storage period to be 180 days.

5A. Volume of waste produced

Approximate daily production of manure in CF/LB SSLW 0.00136

Volume = 495,720 Lbs. SSLW * CF of Waste/Lb./Day * 180 days
Volume = 121,352 cubic feet

5B. Volume of wash water

This is the amount of fresh water used for washing floors or volume of fresh water used for a flush system. Flush systems that recirculate the lagoon water are accounted for in 5A.

Volume = 0.0 gallons/day * 180 days storage/7.48 gallons per CF

Volume = 0.0 cubic feet

5C. Volume of rainfall in excess of evaporation

Use period of time when rainfall exceeds evaporation by largest amount.

180 days excess rainfall = 7.00 inches

Volume = 7.00 in * DA / 12 inches per foot

Volume = 53,816 cubic feet

5D. Volume of 25 year – 24 hour storm

Volume = 7.50 inches / 12 inches per foot * DA

Volume = 57,660 cubic feet

TOTAL REQUIRED TEMPORARY STORAGE

5A.	121,352	cubic feet
5B.	0	cubic feet
5C.	53,816	cubic feet
5D.	57,660	cubic feet
TOTAL	232,828	cubic feet

6. SUMMARY

6.1: Total required volume 728,548 cubic feet

6.1A: Total design volume avail. 743,152 cubic feet

6.2: Min. req. treatment volume plus sludge accumalation 495,720 cubic feet

6.2A: At elev. 49.30 feet ; Volume is 504,414 cubic feet (end pumping)

6.3: Total design volume less 25yr–24hr storm is 685,492 cubic feet

6.3A: At elev. 45.30 feet ; Volume is 221,919 cubic feet (start pumping)

Seasonal high water table elevation 48.50 feet

7. Designed By: John Lenfestey Approved By: John Lenfestey

Date: 12/21/93 Date: 12/21/93

NOTE: SEE ATTACHED WASTE UTILIZATION PLAN

COMMENTS:_____

_____

_____

_____

QUARTER M FARMS
P.O. Box 759
Rose Hill, NC 28458
Phone: 919-289-2111

Calculations By: John Lenfestey

Operator:	=====>	Stan Bowles	
County:	=====>	Duplin	
Date:	=====>	12/21/93	
Dist.to nearest residence (other than owner):	=====>	850	Feet
Sows (farrow to finish):	=====>	0	
Sows (farrow to feeder):	=====>	0	
Head (finishing only):	=====>	3,672	
Sows (farrow to wean):	=====>	0	
Head (wean to feeder):	=====>	0	
Storage volume for sludge accum. (cu. ft.):	=====>	0.00	Cu. Ft.
Treatment Volume (min. 1 cu. ft./lb.)	=====>	1.00	
Inside top length:	=====>	372.00	Feet
Inside top width:	=====>	248.00	Feet
Top of dike at elevation:	=====>	53.50	Feet
Freeboard:	=====>	1.30	Feet
Side slopes:	=====>	3.0	: 1
25 Year – 24 Hour Rainfall	=====>	7.50	Feet
Bottom of lagoon elevation:	=====>	41.50	Feet
Minimum Permanent Storage Depth of Lagoon:	=====>	7.80	Feet
Total required volume:	=====>	728,548	Cu. Ft.
Total design volume avail.:	=====>	743,152	Cu. Ft.
Design end pumping elev.:	=====>	49.30	Feet
Minimum required treatment volume:	====>	495,720	Cu. Ft.
Treatment vol. at end pumping avail.:	====>	504,414	Cu. Ft.
Design start pumping elev.:	=====>	45.30	Feet
Design Vol. – 25 Yr/24 Hr Rainfall:	====>	685,492	Cu. Ft.
Design vol. at start pumping elev.:	=====>	221,919	Cu. Ft.
Seasonal high water table elevation:	=====>	48.50	
NOTE: Verify that bottom of temp. storage is above water table elevation:	=====>	49.30	
NOTE: Verify that temp. storage is adequate:			
Min. required temporary volume:		232,828	Cu. Ft.
Design temporary volume available:		238,738	Cu. Ft.

SCS-ENG-538
Rev. 5-70

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL INVESTIGATION TO DETERMINE SUITABILITY OF PROPOSED POND SITE

FARMER'S NAME Stan Bowley — DISTRICT /
DATE — COUNTY Dolin
S. C. S. PHOTO SHEET NO. — WORK UNIT MX-4

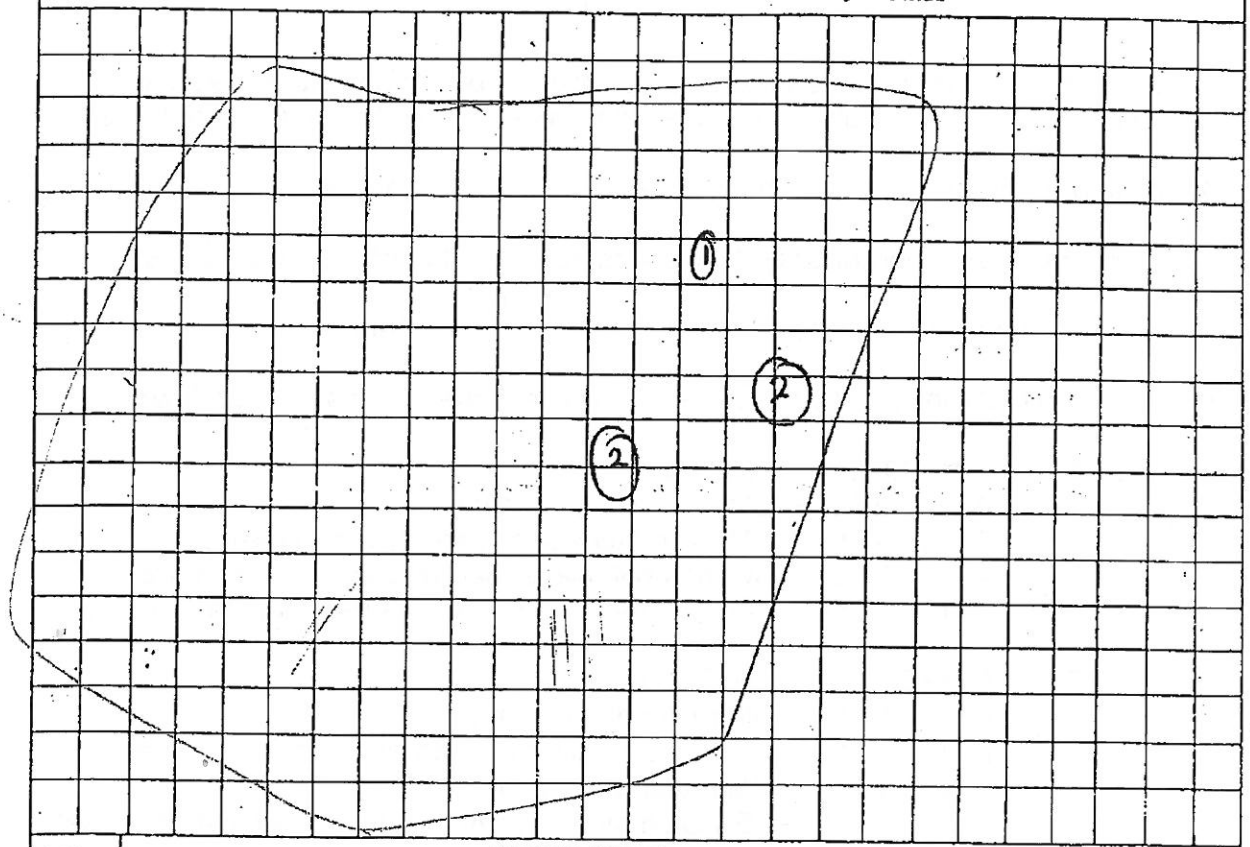
WATERSHED AREA MEASUREMENTS

CROPLAND ____ ACRES PASTURE ____ ACRES
WOODLAND ____ ACRES TOTAL ____ ACRES

POND CLASS

WORK UNIT CONSERVATIONIST

SKETCH OF PROPOSED POND SHOWING WHERE BORINGS WERE MADE (Approx. scale 1" = ____ feet)
Locate reference point on center line of dam and identify on sketch.



SHOW DEPTH SCALE

BORING NUMBER AND PROFILE

Make and list dam-site and spillway borings first - then ponded area and borrow pit borings - separate with vertical red line. (Continued on back where necessary) Show water table elevations on dam-site borings.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	F 6+80	Elev 50.5				P 5+00	Elev 50.6				B+50 5+50	Elev 47.1											
0-1	SM					SM					SM												
1-2	SM					SM					SC												
2-3	SM	SC				SC					SC												
3-4	SM	SC				SC			W/T		SM	SC											
4-5	SC			W/T		SC					SM	SC	SM										
5-6	SC					SM					SC	CL											
6-7	SC					SM					SC	SM											
7-8	SC	CL				SC	CL				SC	CL											
8-9	SC	CL				SC	CL				SC	CL											
9-10	SC	CL				SC	CL				SC	CL											
10-11	SC	SM	SC			SC	CL				CL	SC											

BORINGS MADE BY Backhoe — SIGNATURE & TITLE Johnny Jones

QUARTER M FARMS
P.O. Box 759
Rose Hill, NC 28458

Farm Operator: Stan Bowles #2
County: Duplin
Date: 12/21/93

Soil Investigation to Determine Suitability of Proposed Lagoon Site

A total of three (3) soil borings were taken on this site by Johnny Lanier, SCS, to determine if the existing soils would be suitable for embankment material for the lagoon.

All of the borings were made in the vicinity of the proposed lagoon.

The benchmark elevation of 50.00 feet is located on the top of 3/4" rebar, 20' SW of C,0+00.

The estimated high water table elevation = 48.5 Feet, +/-

Using the Unified Classification System, the results of the borings are as follows:

Boring #1: F, 6+80; Elev. = 50.5 feet
0 Ft. – 2 Ft. – SM material (silty sand)
2 Ft. – 4 Ft. – SM,SC materials (silty sands; clayey sands)
4 Ft. – 7 Ft. – SC material (clayey sands; sand–clay mixtures)
7 Ft. – 11 Ft. – SC,CL materials (clayey sands; low plasticity clays)

Boring #2: F, 5+00; Elev. = 50.6 feet
0 Ft. – 2 Ft. – SM material (silty sand)
2 Ft. – 5 Ft. – SC material (clayey sands; sand–clay mixtures)
5 Ft. – 7 Ft. – SM material (silty sand)
7 Ft. – 11 Ft. – SC,CL materials (clayey sands; low plasticity clays)

Boring #3: B+50, 5+50; Elev. = 47.1 feet
0 Ft. – 1 Ft. – SM material (silty sand)
1 Ft. – 3 Ft. – SC material (clayey sands; sand–clay mixtures)
3 Ft. – 5 Ft. – SM,SC materials (silty sands; clayey sands)
5 Ft. – 7 Ft. – SC,SM materials (clayey sands; silty sands)
7 Ft. – 11 Ft. – SC,CL materials (clayey sands; low plasticity clays)

Based on the results of these borings, some of the soils available on this site are suitable to be used as embankment material for the lagoon site. A suitable clay material (SC,CL,etc.) for the liner will be required.

QUARTER M FARMS
P.O. Box 759
Rose Hill, NC 28458

Farm Operator: Stan Bowles #2
Date: 12/21/93

OPERATION AND MAINTENANCE PLAN

This lagoon is designed for waste treatment (permanent storage) with minimum odor control. The time required for the planned fluid level to be reached (permanent + temporary storage) may vary due to soil conditions, flushing operations, and the amount of fresh water added to the system.

The designed 6 months temporary storage is an estimated volume based on:

1) waste from animals
2) excess rainfall after evaporation

and 3) the largest 24 hour (one day) rainfall that occurs on the average of once every 25 years.

The volume of waste generated from a given number of animals will be fairly constant throughout the year and from year to year.

This estimate is based on 7.0 inches of excess rainfall which is equal to or exceeds the highest 6 months excess in a year. The average annual excess rainfall is approximately 8 inches. Therefore, an average of 8 inches of excess rainfall will need to be pumped each year. The 25 year rainfall will not be a factor to consider in an annual pumping cycle, but this storage volume must always be available. A maximum elevation is determined in each design to begin pumping and this is usually the outlet invert of pipe(s) from the building(s). If the outlet pipe is not installed on the elevation to begin pumping, a permanent marker must be installed on this elevation to indicate when pumping should begin. An elevation must be established to stop pumping to maintain the minimum treatment depth of 6 feet.
Pumping can be started or stopped at any time between these two elevations for operating convenience as site conditions permit, such as weather, soils, crop, and equipment in order to apply waste without runoff or leaching.

Land application of waste water is recognized as an acceptable method of disposal. Methods of application include solid set, center pivot guns and traveling gun irrigation. Care should be taken when applying waste to prevent damage to crops.

QUARTER M FARMS
P.O. Box 759
Rose Hill, NC 28458

Farm Operator: Stan Bowles #2

OPERATION AND MAINTENANCE PLAN (continued)

The following items are to be carried out:

1. It is strongly recommended that the treatment lagoon be precharged to 1/2 of its capacity to prevent excessive odors during start–up. Precharging reduces the concentration of the initial waste entering the lagoon, thereby reducing odors. Solids should be covered with effluent at all times. When precharging is complete, flush buildings with recycled lagoon liquid. Fresh water should not be used for flushing after initial filling.

2. The attached waste utilization plan shall be followed. This plan recommends sampling and testing of waste (see attachment) before land application.

3. Begin pump–out of the lagoon when fluid level reaches elevation [redacted] feet as marked by the permanent marker.
Stop pump–out of the lagoon when fluid level reaches elevation 49.30 feet or before the fluid depth is less than [redacted] feet deep (this prevents the loss of favorable bacteria).
The designed temporary storage volume less the 25 year – 24 hour storm volume is 175,168 cubic feet or 1,310,259 gallons.
As stated before, this volume will vary considerably from year to year.

4. The recommended maximum amount to apply per irrigation is one (1) inch and the recommended maximum application rate is 0.3 inches per hour.

5. Keep vegetation on the embankment and areas adjacent to the lagoon mowed annually. Vegetation should be fertilized as needed to maintain a vigorous stand.

6. Repair any eroded areas or areas damaged by rodents and establish in vegetation.

7. All surface runoff is to be diverted from the lagoon to stable outlets.

8. Keep a minimum of 25 feet of grass vegetated buffer around waste utilization fields adjacent to perennial streams. Waste will not be applied in open ditches. Do not pump within 200 feet of a residence or within 100 feet of a well.

9. The Clean Water Act of 1977 prohibits the discharge of pollutants into waters of the United States. The Department of Environment, Health and Natural Resources, Division of Environmental Management, has the responsibility for enforcing this law.

QUARTER M FARMS
P.O. Box 759
Rose Hill, NC 28458

Farm Operator: Stan Bowles #2
Date: 12/21/93

SPECIFICATIONS FOR CONSTRUCTION OF WASTE TREATMENT LAGOONS

SECTION 1: CLEARING

All trees and brush shall be removed from the construction area before any excavation or fill is started. Stumps will be removed within the area of the foundation of the embankment, all fill areas and all excavated areas. All All stumps and roots exceeding one (1) inch in diameter shall be removed to a minimum depth of one (1) foot below final grade. Satisfactory disposition will be made of all debris.

The foundation area shall be loosened thoroughly before placement of the embankment material. The lagoon site (and pad site if needed) is to be stripped of topsoil (minimum of 3") and stockpiled for use on dike and pad slopes (finished depth of 2–3").

SECTION 2: CUT–OFF TRENCH

A cut–off trench (when specified) shall be installed as shown on the plans.

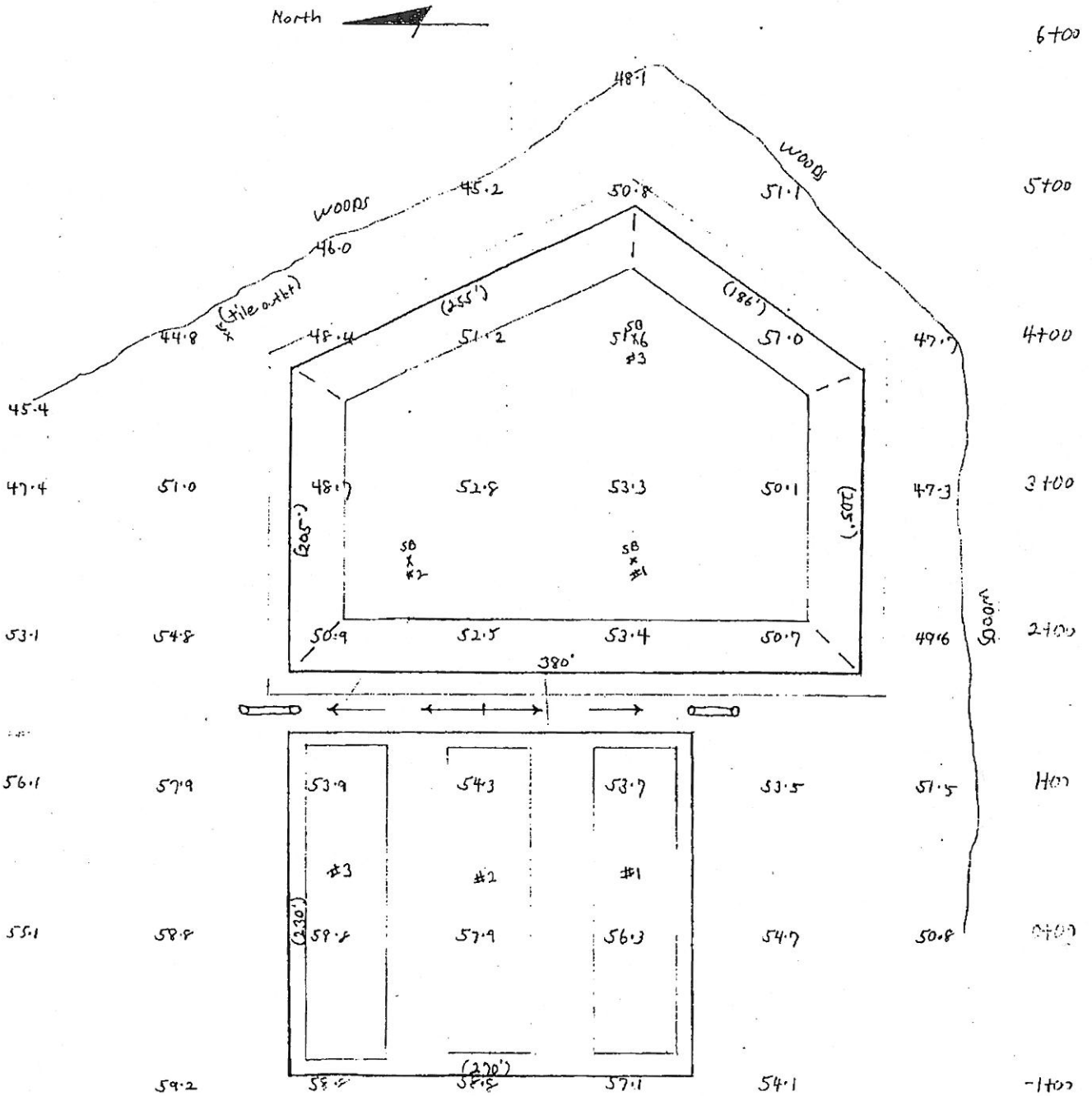
SECTION 3: CONSTRUCTION

Construction of excavated and earthfill areas shall be performed to the neat lines and grades as planned. Deviations from this will require prior approval of the SCS. Earthfill shall be placed in a maximum of 6" lifts and shall not be placed in standing water. Compaction shall be performed by the construction equipment or by a sheeps–foot roller during placement.

The embankment of the lagoon shall be installed using the more impervious materials. Construction of fill heights shall include ten (10) percent overage for settlement.

NO 2
Lagoon #2
1?

Stan Bowles
3-024 Tipping
Quarter M Farms



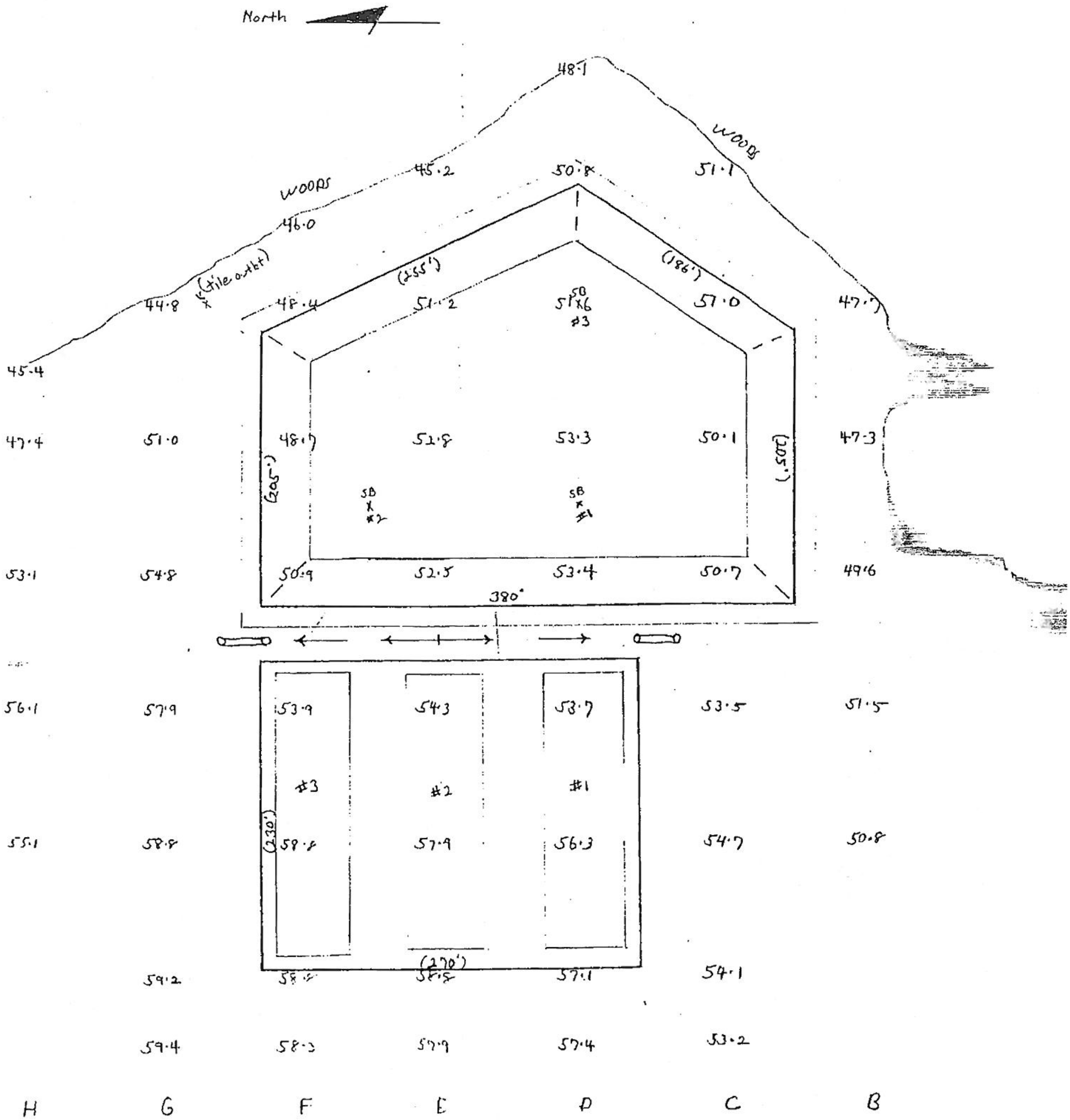
(1) Divert surface water as shown by arrows.
(2) Install outlet pipes as needed to divert surface water runoff

Needs
2-15" x 30' CPP

TBM - Elev. 50.00
Nail in 10" pine approx.
50 ft South of Sta B, 1+00

NO 1
Lagoon #2
17

Sto...
3-...
Qua...



(1) Divert surface water as shown by arrows.
(2) Install outlet pipes as needed to divert surface water runoff

Needs
2-15" x 30' CPP

TBM - Elev. 50.0
Nail in 10" pine
50 ft South of

Operation: Stan Bowles County: Duplin Date: 10/29/93

Distance to nearest residence (other than owner): 2300 feet

1. STEADY STATE LIVE WEIGHT

0 Sows (farrow to finish)	X	1417 lbs.	=	0
0 Sows (farrow to feeder)	X	582 lbs.	=	0
3672 Head (finishing only)	X	135 lbs.	=	495720
0 Sows (farrow to wean)	X	433 lbs.	=	0
0 Head (wean to feeder)	X	30 lbs.	=	0

TOTAL STEADY STATE LIVE WEIGHT (SSLW) = 495720

2. MINIMUM REQUIRED TREATMENT VOLUME OF LAGOON

Volume = 495720 lbs. SSLW X Treatment Volume CF/lb. SSLW
Treatment Volume CF/lb. SSLW= 1.0 CF/lb. SSLW
Volume = 495720 cubic feet

3. STORAGE VOLUME FOR SLUDGE ACCUMULATION

Volume = 0 cubic feet

SLUDGE NOT COMPUTED AT LANDOWNER REQUEST. SLUDGE TO BE BE REMOVED AS NEEDED.

23.1" freeboard

4. TOTAL DESIGN VOLUME

Inside top: length 380 feet ; width 240 feet
Top of dike at elevation ~~56.0~~ ~~55.50~~ feet
Freeboard [illegible] feet Side slopes 3.0:1(inside)
Total design lagoon liquid level at elevation 54.90 feet
Bottom of lagoon at elevation ~~44.0~~ ~~43.50~~ feet
Seasonal high water table elevation 50.50 feet

Total design volume using prismoidal formula:

SS/END1	SS/END2	SS/SIDE1	SS/END2	LENGTH	WIDTH	DEPTH
3.0	3.0	3.0	3.0	372.2	232.2	10.70

AREA OF TOP
LENGTH X WIDTH
372 232 86425 (Area of Top)

AREA OF BOTTOM
LENGTH X WIDTH =
308 168 51744 (Area of Bottom)

AREA OF MIDSECTION
LENGTH X WIDTH X 4
340 200 272216 (Area of Midsection X 4)

CU. FT. = [Area top+(4XArea Midsection)+Area Bottom] X Depth/6
86425 272216 51744 2

VOL. OF LAGOON AT TOTAL DESIGN LIQUID LEVEL = 731853 CU. FT.

5. TEMPORARY STORAGE REQUIRED

Drainage Area:

Lagoon (top of dike)

Length X Width =

380 240 91200 Square Feet

Buildings (roof and lot water)

Length X Width =

0 0 0 Square Feet

TOTAL DA 91200 Square Feet

===> Design temporary storage to be 180 days.

A. Volume of waste produced

Approximate daily production of manure in CF/LB SSLW 0.00136

Volume = 495720 Lbs. SSLW X CF of waste/lb/day X 180
Volume = 121352 Cubic feet

B. Volume of wash water

This is the amount of fresh water used for washing floors or volume of fresh water used for a flush system. Flush systems that recirculate the lagoon water are accounted for in 5A.

Volume = 0 Gallons/day X 180 days storage/7.48 gallons per CF

Volume = 0 Cubic feet

C. Volume of rainfall in excess of evaporation

Use period of time when rainfall exceeds evaporation by largest amount.

180 days excess rainfall = 7.0 inches

Volume = 7.0 Inches X DA / 12 inches per foot

Volume = 53200 Cubic feet

D. Volume of 25 year - 24 hour storm

Volume = [redacted] / 12 inches per foot X DA

Volume = 57000 Cubic feet

TOTAL REQUIRED TEMPORARY STORAGE

5A.	121352 Cubic feet
5B.	0 Cubic feet
5C.	53200 Cubic feet
5D.	57000 Cubic feet
TOTAL	231552 Cubic feet

6. SUMMARY

Total required volume = 727272 Cubic feet

Total design volume avail.= 731853 Cubic feet 738310 MGJ

Min. reqrd. trtmnt. vol. plus sludge accum.= 495720 Cu. Ft.

At elev. 51.80 Ft; Vol= 496177 Cubic feet (end pumping)

Total design volume less 25yr-24hr storm = 674853 Cu. Ft.

At elev. 54.00 Ft; Vol= 672240 Cubic feet (start pumping)

Seasonal high water table elevation is 50.50 Feet, which must be lower than the elevation of top of treatment volume 51.80

DESIGNED BY: [signature]

DATE: 11-3-93

APPROVED BY: M. E. Sugg Jr

DATE: 11/15/93

SCS DOES NOT CERTIFY THAT EXCAVATION AND FILL VOLUMES ARE CORRECT

NOTE: SEE ATTACHED WASTE UTILIZATION

ADDITIONAL NOTES: Tile outlet located at Sta Ft70, 4+00. Tile line may need to be relocated during construction of lagoon. Tile should be a minimum of 15 feet North of outside dike slope. Recommend using solid tile.

OPERATION & MAINTENANCE PLAN

Proper lagoon management should be a year-round priority. It is especially important to manage levels so that you do not have problems during extended rainy and wet periods.

Maximum storage capacity should be available in the lagoon for periods when the receiving crop is dormant (such as wintertime for bermudagrass) or when there are extended rainy spells such as a thunderstorm season in the summertime. This means that at the first sign of plant growth in the later winter / early spring, irrigation according to a farm waste management plan should be done whenever the land in dry enough to receive lagoon liquid. This will make storage space available in the lagoon for future wet periods. In the late summer / early fall the lagoon should be pumped down to the low marker (see Figure 2-1) to allow for winter storage. Every effort should be made to ***maintain*** the lagoon close to the minimum liquid level as long as the weather and waste utilization plan will allow it.

Waiting until the lagoon has reached its maximum storage capacity before starting to irrigated does not leave room for storing excess water during extended wet periods. Overflow from the lagoon for any reason except a 25-year, 24-hour storm is a violation of state law and subject to penalty action.

The routine maintenance of a lagoon involves the following:

- Maintenance of a vegetative cover for the dam. Fescue or common bermudagrass are the most common vegetative covers. The vegetation should be fertilized each year, if needed, to maintain a vigorous stand. The amount of fertilized applied should be based on a soils test, but in the event that it is not practical to obtain a soils test each year, the lagoon embankment and surrounding areas should be fertilized with 800 pounds per acre of 10-10-10, or equivalent.

- Brush and trees on the embankment must be controlled. This may be done by mowing, spraying, grazing, chopping, or a combination of these practices. This should be done at least once a year and possibly twice in years that weather conditions are favorable for heavy vegetative growth.

NOTE: If vegetation is controlled by spraying, the herbicide must not be allowed to enter the lagoon water. Such chemicals could harm the bacteria in the lagoon that are treating the waste.

Maintenance inspections of the entire lagoon should be made during the initial filling of the lagoon and at least monthly and after major rainfall and storm events. Items to be checked should include, as a minimum, the following:

Waste Inlet Pipes, Recycling Pipes, and Overflow Pipes -- look for:

1. separation of joints
2. cracks or breaks
3. accumulation of salts or minerals
4. overall condition of pipes

Lagoon surface -- look for:

1. undesirable vegetative growth
2. floating or lodged debris

Embankment -- look for:

1. settlement, cracking, or "jug" holes
2. side slope stability -- slumps or bulges
3. wet or damp areas on the back slope
4. erosion due to lack or vegetation or as a result of wave action
5. rodent damage

Larger lagoons may be subject to liner damage due to wave action caused by strong winds. These waves can erode the lagoon sidewalls, thereby weakening the lagoon dam. A good stand of vegetation will reduce the potential damage caused by wave action. If wave action causes serious damage to a lagoon sidewall, baffles in the lagoon may be used to reduce the wave impacts.

Any of these features could lead to erosion and weakening of the dam. If your lagoon has any of these features, you should call an appropriate expert familiar with design and construction of waste lagoons. You may need to provide a temporary fix if there is a threat of a waste discharge. However, a permanent solution should be reviewed by the technical expert. Any digging into a lagoon dam with heavy equipment is a serious undertaking with potentially serious consequences and should not be conducted unless recommended by an appropriate technical expert.

Transfer Pumps -- check for proper operation of:

1. recycling pumps
2. irrigation pumps

Check for leaks, loose fittings, and overall pump operation. An unusually loud or grinding noise, or a large amount of vibration, may indicate that the pump is in need of repair or replacement.

NOTE: Pumping systems should be inspected and operated frequently enough so that you are not completely "surprised" by equipment failure. You should perform your pumping system maintenance at a time when your lagoon is at its low level. This will allow some safety time should major repairs be required. Having a nearly full lagoon is not the time to think about switching, repairing, or borrowing pumps. Probably, if your lagoon is full, your neighbor's lagoon is full also. You should consider maintaining an inventory of spare parts or pumps.

- Surface water diversion features are designed to carry *all* surface drainage waters (such as rainfall runoff, roof drainage, gutter outlets, and parking lot runoff) away from your lagoon and other waste treatment or storage structures. The only water that should be coming from your lagoon is that which comes from your flushing (washing) system pipes and the rainfall that hits the lagoon directly. You should inspect your diversion system for the following:
    1. adequate vegetation
    2. diversion capacity
    3. ridge berm height

Identified problems should be corrected promptly. It is advisable to inspect your system during or immediately following a heavy rain. If technical assistance is needed to determine proper solutions, consult with appropriate experts.

You should record the level of the lagoon just prior to when rain is predicted, and then record the level again 4 to 6 hours after the rain (assumes there is no pumping). This will give you an idea of how much your lagoon level will rise with a certain rainfall amount (you must also be recording your rainfall for this to work). Knowing this should help in planning irrigation applications and storage. If your lagoon rises excessively, you may have an overflow problem from a surface water diversion or there may be seepage into the lagoon from the surrounding land.

Lagoon Operation

Startup:

1. Immediately after construction establish a complete sod cover on bare soil surfaces to avoid erosion.

2. Fill new lagoon design treatment volume at least half full of water before waste loading begins, taking care not to erode lining or bank slopes.

3. Drainpipes into the lagoon should have a flexible pipe extender on the end of the pipe to discharge near the bottom of the lagoon during initial filling or another means of slowing the incoming water to avoid erosion of the lining.

4. When possible, begin loading new lagoons in the spring to maximize bacterial establishment (due to warmer weather).

5. It is recommended that a new lagoon be seeded with sludge from a healthy working swine lagoon in the amount of 0.25 percent of the full lagoon liquid volume. This seeding should occur at least two weeks prior to the addition of wastewater.

6. Maintain a periodic check on the lagoon liquid pH. If the pH falls below 7.0, add agricultural lime at the rate of 1 pound per 1000 cubic feet of lagoon liquid volume until the pH rises above 7.0. Optimum lagoon liquid pH is between 7.5 and 8.0.

7. A dark color, lack of bubbling, and excessive odor signals inadequate biological activity. Consultation with a technical specialist is recommended if these conditions occur for prolonged periods, especially during the warm season.

Loading:

The more frequently and regularly that wastewater is added to a lagoon, the better the lagoon will function. Flush systems that wash waste into the lagoon several times daily are optimum for treatment. Pit recharge systems, in which one or more buildings are drained and recharged each day, also work well.

- Practice water conservation --- minimize building water usage and spillage from leaking waterers, broken pipes and washdown through proper maintenance and water conservation.
- Minimize feed wastage and spillage by keeping feeders adjusted. This will reduce the amount of solids entering the lagoon.

Management:

- Maintain lagoon liquid level between the permanent storage level and the full temporary storage level.

- Place visible markers or stakes on the lagoon bank to show the minimum liquid level and the maximum liquid level. (Figure 2-1).

- Start irrigating at the earliest possible date in the spring based on nutrient requirements and soil moisture so that temporary storage will be maximized for the summer thunderstorm season. Similarly, irrigate in the late summer / early fall to provide maximum lagoon storage for the winter.

- The lagoon liquid level *should never* be closer than 1 foot to the lowest point of the dam or embankment.

- Don not pump the lagoon liquid level lower than the permanent storage level unless you are removing sludge.

- Locate float pump intakes approximately 18 inches underneath the liquid surface and as far away from the drainpipe inlets as possible.

- Prevent additions of bedding materials, long-stemmed forage or vegetation, molded feed, plastic syringes, or other foreign materials into the lagoon.

- Frequently remove solids from catch basins at end of confinement houses or wherever they are installed.

- Maintain strict vegetation, rodent, and varmint control near lagoon edges.

- Do not allow trees or large bushes to grow on lagoon dam or embankment.

- Remove sludge from the lagoon either when the sludge storage capacity is full or before it fills 50 percent of the permanent storage volume.

- If animal production is to be terminated, the owner is responsible for obtaining and implementing a closure plan to eliminate the possibility of a pollutant discharge.

Sludge Removal:

Rate of lagoon sludge buildup can be reduced by:

- proper lagoon sizing,
- mechanical solids separation of flushed waste,
- gravity settling of flushed waste solids in an appropriately designed basin, or
- minimizing feed wastage and spillage.

Lagoon sludge that is removed annually rather than stored long term will:

- have more nutrients,
- have more odor, and
- require more land to properly use the nutrients.

Removal techniques:

- Hire a custom applicator.

- Mix the sludge and lagoon liquid with a chopper - agitator impeller pump through large - bore sprinkler irrigation system onto nearby cropland; and soil incorporate.

- Dewater the upper part of lagoon by irrigation onto nearby cropland or forageland; mix remaining sludge; pump into liquid sludge applicator; haul and spread onto cropland or forageland; and soil incorporate.

- Dewater the upper part of lagoon by irrigation onto nearby cropland or forageland; dredge sludge from lagoon with dragline or sludge barge; berm an area beside lagoon to receive the sludge so that liquids can drain back into lagoon; allow sludge to dewater; haul and spread with manure spreader onto cropland or forageland; and soil incorporate.

Regardless of the method, you must have the sludge material analyzed for waste constituents just as you would your lagoon water. The sludge will contain different nutrient and metal values from the liquid. The application of the sludge to fields will be limited by these nutrients as well as any previous waste applications to that field and crop requirement. Waste application rates will be discussed in detail in Chapter 3.

When removing sludge, you must also pay attention to the liner to prevent damage. Close attention by the pumper or drag-line operator will ensure that the lagoon liner remains intact. If you see soil material or the synthetic liner material being disturbed, you should stop the activity immediately and not resume until you are sure that the sludge can be removed without liner injury. If the liner is damaged it must be repaired as soon as possible.

Sludge removed from the lagoon has a much higher phosphorus and heavy metal content than liquid. Because of this it should probably be applied to land with low phosphorus and metal levels, as indicated by a soil test, and incorporated to reduce the chance of erosion. Note that if the sludge is applied to fields with very high soil-test phosphors, it should be applied only at rates equal to the crop removal of phosphorus. As with other wastes, always have your lagoon sludge analyzed for its nutrient value.

The application of sludge will increase the amount of odor at the waste application site. Extra precaution should be used to observe the wind direction and other conditions which could increase the concern of neighbors.

Possible Causes of Lagoon Failure

Lagoon failures result in the unplanned discharge of wastewater from the structure. Types of failures include leakage through the bottom or sides, overtopping, and breach of the dam. Assuming proper design and construction, the owner has the responsibility for ensuring structure safety. Items which may lead to lagoon failures include:

- Modification of the lagoon structure -- an example is the placement of a pipe in the dam without proper design and construction. (Consult an expert in lagoon design before placing any pipes in dams.)
- Lagoon liquid levels -- high levels are a safety risk.
- Failure to inspect and maintain the dam.
- Excess surface water flowing into the lagoon.
- Liner integrity -- protect from inlet pipe scouring, damage during sludge removal, or rupture from lowering lagoon liquid level below groundwater table.

NOTE: If lagoon water is allowed to overtop the dam, the moving water will soon cause gullies to form in the dam. Once this damage starts, it can quickly cause a large discharge of wastewater and possible dam failure.

EMERGENCY ACTION PLAN

PHONE NUMBERS

DIVISION OF WATER QUALITY (DWQ)	910-796-7215
EMERGENCY MANAGEMENT SERVICES (EMS)	910-296-2160
SOIL AND WATER CONSERVATION DISTRICT (SWCD)	910-296-2120
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)	910-296-2120
COOPERATIVE EXTENSION SERVICE (CES)	910-296-2143

This plan will be implemented in the event that wastes from your operation are leaking, overflowing or running off site. You should not wait until wastes reach surface waters or leave your property to consider that you have a problem. You should make every effort to ensure that this does not happen. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. Stop the release of wastes. Depending on the situation, this may or may not be possible. Suggested responses to some possible problems are listed below.

A. Lagoon overflow - possible solutions are:
   a) Add soil to berm to increase elevation of dam.
   b) Pump wastes to fields at an acceptable rate.
   c) Stop all flow to the lagoon immediately.
   d) Call a pumping contractor.
   e) Make sure no surface water is entering lagoon.

B. Runoff from waste application field-actions include:
   a) Immediately stop waste application.
   b) Create a temporary diversion to contain waste.
   c) Incorporate waste to reduce runoff.
   d) Evaluate and eliminate the reason(s) that cause the runoff.
   e) Evaluate the application rates for the fields where runoff occurred.

C. Leakage from the waste pipes and sprinklers - action include:
   a) Stop recycle pump.
   b) Stop irrigation pump.
   c) Close valves to eliminate further discharge.
   d) Repair all leaks prior to restarting pumps.

D. Leakage from flush systems, houses, solid separators - action include:
   a) Stop recycle pump.
   b) Stop irrigation pump.
   c) Make sure siphon occurs.
   d) Stop all flow in the house, flush systems, or solid separators.

E. Leakage from base or sidewall of lagoon. Often this is seepage as opposed to flowing leaks - possible action:
   a) Dig a small sump or ditch from the embankment to catch all seepage, put in a submersible pump, and pump back to lagoon.
   b) If holes are caused by burrowing animals, trap or remove animals and fill holes and compact with a clay type soil.
   c) Have a professional evaluate the condition of the side walls and the lagoon bottom as soon as possible.

2. Assess the extent of the spill and note any obvious damages.

   a. Did the waste reach surface waters?
   b. Approximately how much was released and for what duration?
   c. Any damage notes, such as employee injury, fish kills, or property damage?
   d. Did the spill leave the property?
   e. Does the spill have the potential to reach surface waters?
   f. Could a future rain event cause the spill to reach surface waters?
   g. Are potable water wells in danger (either on or off the property)?
   h. How much reached surface waters?

3. Contact appropriate agencies.

   a. During normal business hours call your DWQ regional office; Phone #, After hours, emergency number: (919) 733-3942. Your phone call should include: your name, facility number, telephone number, the details of the incident from item 2 above, the exact location of the facility, the location or direction of the movement of the spill, weather and wind conditions. The corrective measures that have been under taken, and the seriousness of the situation.
   b. If the spill leaves property or enters surface waters, call local EMS phone number.
   c. Instruct EMS to contact local Health Department.
   d. Contact CE's phone number, local SWCD office phone number and the local NRCS office for advice / technical assistance phone number.

4. If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask the person to contact the proper agencies for you.

5. Contact the contractor of your choice to begin repair or problem to minimize offsite damage.

   a. Contractors Name: Murphy Brown, LLC
   b. Contractors Address: P.O. Box 856, Warsaw, NC 28398
   c. Contractors Phone: (910)293-3434

6. Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc.)

   a. Name: Kraig Westerbeek
   b. Phone: (910) 293 - 5330

7. Implement procedures as advised by DWQ and technical assistance agencies to rectify the damage, repair the system, and reassess the waste management plan to keep problems with release of wastes from happening again.

INSECT CONTROL CHECKLIST FOR ANIMAL OPERATIONS

Source	Cause	BMP's to Minimize Odor	Site Specific Practices
		(Liquid Systems)	
Flush Gutters	Accumulation of solids	(✓) Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed. ( ) Remove bridging of accumulated solids at discharge	
Lagoons and Pits	Crusted Solids	(✓) Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6-8 inches over more than 30% of surface.	
Excessive Vegetative Growth	Decaying vegetation	(✓)Maintain vegetative control along banks of lagoons and other impoundment's to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter.	
		(Dry Systems)	
Feeders	Feed Spillage	( ) Design, operate and maintain feed systems (e.g.. bunkers and troughs) to minimize the accumulation of decaying wastage. ( ) Clean up spillage on a routine basis (e.g. 7-10 day interval during summer; 15-30 day interval during winter).	
Feed Storage	Accumulation of feed residues	( ) Reduce moisture accumulation within and around immediate perimeter of feed storage areas by insuring drainage away from site and/or providing adequate containment (e.g., covered bin for brewer's grain and similar high moisture grain products). ( ) Inspect for and remove or break up accumulated solids in filter strips around feed storage as needed.	
Animal Holding Areas	Accumulation of animal wastes and feed wastage	( ) Eliminate low area that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal. ( ) Maintain fence rows and filter strips around animal holding areas to minimize accumulations of wastes (i.e. inspect for and remove or break up accumulated solids as needed).	

Dry Manure Handling Systems	Accumulations of animal wastes	( ) Remove spillage on a routine basis (e.g. 7-10 day interval during summer; 15-30 days interval during winter) where manure is loaded for land application or disposal. ( ) Provide for adequate drainage around manure stockpiles ( ) Inspect for and remove or break up accumulated wastes in filter strips around stockpiles and manure handling areas as needed.

The issues checked ( ) pertain to this operation. The landowner / integrator agrees to use sound judgment in applying insect control measures as practical.

I certify the aforementioned insect control Best Management Practices have been reviewed with me.

Steve Bowden
(Landowner Signature)

For more information contact the Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613.

AMIC – November 11, 1996

SWINE FARM WASTE MANAGEMENT ODOR CONTROL CHECKLIST

Source	Cause	BMP's to Minimize Odor	Site Specific Practices
Farmstead	Swine production	(✓)Vegetative or wooded buffers: (✓)Recommended best management practices; (✓)Good judgment and common sense	
Animal body surfaces	Dirty manure covered animals	( )Dry floors	
Floor surfaces	Wet manure-covered floors	(✓)Slotted floors; (✓)Waterers located over slotted floors; (✓)Feeders at high end of solid floors; (✓)Scrape manure buildup from floors; ( )Underfloor ventilation for drying	
Manure collection pits	Urine Partial microbial decomposition	(✓)Frequent manure removal by flush, pit recharge or scrape ( )Underfloor ventilation	
Ventilation exhaust fans	Volatile gases Dust	(✓)Fan maintenance; (✓)Efficient air movement	
Indoor surfaces	Dust	(✓)Washdown between groups of animals ( )Feed additives; ( )Feeder covers; ( )Feed delivery downspout extenders to feeder covers	
Flush Tanks	Agitation of recycled lagoon liquid while tanks are filling	( )Flush tank covers ( )Extend fill lines to near bottom of tanks with anti-siphon vents	
Flush alleys	Agitation during waste water conveyance	( )Underfloor flush with underfloor ventilation	
Pit recharge points	Agitation of recycled lagoon liquid while pits are filling	( )Extend recharge lines to near bottom of pits with anti-siphon vents	
Lift stations	Agitation during sump tank filling and drawdown	( )Sump tank covers	
Outside drain collection or junction boxes	Agitation during waste water conveyance	( )Box Covers	
End of drain pipes at lagoon	Agitation during waste water	( )Extend discharge point of pipes underneath lagoon liquid level	
Lagoon surfaces	Volatile gas emissions Biological mixing Agitation	(✓)Proper lagoon liquid capacity (✓)Correct lagoon startup procedures ( )Minimum surface area-to-volume ratio (✓)Minimum agitation when pumping ( )Mechanical aeration ( )Proven biological additives	
Irrigation sprinkler nozzles	High pressure agitation Wind draft	(✓)Irrigate on dry days with little or no wind (✓)Minimum recommended operation pressure (✓)Pump intake near lagoon liquid surface ( )Pump from second-stage lagoon	

AMOC – November 11, 1996

Storage tank or basin surface	Partial microbial decomposition Mixing while filling Agitation when emptying	( )Bottom or midlevel loading ( )Tank covers ( )Basin surface mats of solids ( )Proven biological additives or oxidants
Settling basin surface	Partial microbial decomposition Mixing while filling Agitation when emptying	( )Extend drainpipe outlets underneath liquid level ( )Remove settled solids regularly
Manure, slurry or sludge spreader outlets	Agitation when spreading Volatile gas emissions	( )Soil injection of slurry/sludges ( )Wash residual manure from spreader after use ( )Proven biological additives or oxidants
Dead animals	Carcass decomposition	( )Proper disposition of carcasses
Dead animal disposal pits	Carcass decomposition	( )Complete covering of carcasses in burial pits ( )Proper location / construction of disposal pits
Incinerators	Incomplete combustion	( )Secondary stack burners
Standing water around facilities	improper drainage Microbial decomposition of organic matter	(✓)Farm access road maintenance away from facilities
Manure tracked onto public roads from farm access	Poorly maintained access roads	(✓)Farm access road maintenance

Additional Information:	Available From:
Swine Manure Management 0200 Rule / BMP Packet	NCSU-County Extension Center
Swine Production Farm Potential Odor Sources and Remedies, EBAE Fact Sheet	NCSU-BAE
Swine Production Facility Manure Management:Pit Recharge--Lagoon Treatment:EBAE128-88	NCSU-BAE
Swine Production Facility Manure Management:Underfloor Fluse-Lagoon Treatment 129-88	NCSU-BAE
Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE103-83	NCSU-BAE
Calibration of Manure and Wastewater Application Equipment EBAE Fact Sheet	NCSU-BAE
Controlling Odors from Swine Buildings; PIH-33	NCSU-Swine Extension
Environmental Assurance Program: NPPC Manual	NC Pork Producers Assoc
Options for Managing Odor; a report from the Swine Odor Task Force	NCSU Agri Communication
Nuisance Concerns in Animal Manure Management: Odors and Flies; PR0101, 1995 Conference Proceedings	Florida Cooperative Extension

The issues checked ( ) pertain to this operation. The landowner / integrator agrees to use sound judgment in applying odor control measures as practical.

I certify the aforementioned odor control Best Management Practices have been reviewed with me.

Stan Bender
(Landowner Signature)

MORTALITY MANAGEMENT METHODS

(Check which method(s) are being implemented)

( ) Burial three feet beneath the surface of the ground within 24 hours after knowledge of the death. The burial will be at least 300 feet from any flowing stream or public body of water.

(✓) Rendering at a rendering plant licensed under G. S. 106 - 168.7

( ) Complete incineration

( ) In the case of dead poultry only, placing in a disposal pit of a size and design approved by the Department of Agriculture.

( ) Any method which in the professional opinion of the State Veterinarian would make possible the salvage of part of a dead animal's value without endangering human or animal health. (Written approval of the State Veterinarian must be attached)