Comprehensive Nutrient Management Plan
(Version 1, 5/1/2007 Format)

The Comprehensive Nutrient Management Plan (CNMP) is an important part of the conservation management system (CMS) for your Animal Feeding Operation (AFO). This CNMP documents the planning decisions and operation and maintenance for the animal feeding operation. It includes background information and provides guidance, reference information and Web-based sites where up-to-date information can be obtained. Refer to the Producer Activity document for information about day-to-day management activities and recordkeeping. Both this document and the Producer Activity document shall remain in the possession of the producer/landowner.

Farm contact information: Sample Dairy Farm
c/o
123 Cow Drive
Holstein, TN 30000
555-555-5555

Latitude/Longitude:

Type and Size of the AFO: 175 Cow Dairy

Plan Period: Sep 2007 - Aug 2010

Conservation Planner

As a Conservation Planner, I certify that I have reviewed both the *Comprehensive Nutrient Management Plan* and *Producer Nutrient Management Activities* documents for technical adequacy and that the elements of the documents are technically compatible, reasonable and can be implemented.

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Conservation District

The Conservation District has reviewed the CNMP documents and concurs that the plan meets the District's goals.

Signature: _____ Date: _____
Name:
Title:

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all the necessary records associated with the implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: _____ Date: _____
Name:

Section 2. Manure and Wastewater Handling and Storage

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Sections 4. Land Treatment

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Section 6. Nutrient Management

The Nutrient Management component of this plan meets the Tennessee Nutrient Management 590 and Waste Utilization 633 Conservation Practice Standards.

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Section 7. Feed Management (if applicable)

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Section 8. Other Utilization Options (if applicable)

Signature: _____ Date: _____
Name:
Title: Certification Credentials:

Sensitive data as defined in the Privacy Act of 1974 (5 U.S.C. 552a, as amended) is contained in this report, generated from information systems managed by the USDA Natural Resources Conservation Service (NRCS). Handling this data must be in accordance with the permitted routine uses in the NRCS System of Records at http://www.nrcs.usda.gov/about/foia/408_45.html. Additional information may be found at http://www.ocio.usda.gov/qi_request/privacy_statement.html.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Table of Contents

Section 1. Background and Site Information
1.1. General Description of Operation
1.2. Sampling, Calibration and Other Statements
1.3. Resource Concerns

Section 2. Manure and Wastewater Handling and Storage
2.1. Map(s) of Production Area
2.2. Production Area Conservation Practices
2.3. Manure Storage
2.4. Animal Inventory
2.5. Normal Mortality Management
2.6. Planned Manure Exports off the Farm
2.7. Planned Manure Imports onto the Farm
2.8. Planned Internal Transfers of Manure

Section 3. Farmstead Safety and Security
3.1. Emergency Response Plan
3.2. Biosecurity Measures
3.3. Catastrophic Mortality Management
3.4. Chemical Handling

Section 4. Land Treatment
4.1. Map(s) of Fields and Conservation Practices
4.2. Land Treatment Conservation Practices

Section 5. Soil and Risk Assessment Analysis
5.1. Soil Information
5.2. Predicted Soil Erosion
5.3. Nitrogen and Phosphorus Risk Analysis
5.4. Additional Field Data Required by Risk Assessment Procedure

Section 6. Nutrient Management
6.1. Field Information
6.2. Manure Application Setback Distances
6.3. Soil Test Data
6.4. Manure Nutrient Analysis
6.5. Planned Crops and Fertilizer Recommendations
6.6. Manure Application Planning Calendar
6.7. Planned Nutrient Applications
6.8. Field Nutrient Balance
6.9. Manure Inventory Annual Summary
6.10. Fertilizer Material Annual Summary
6.11. Whole-Farm Nutrient Balance

Section 7. Feed Management

Section 8. Other Utilization Options

Section 9. Recordkeeping Forms (see Producer Activity document)

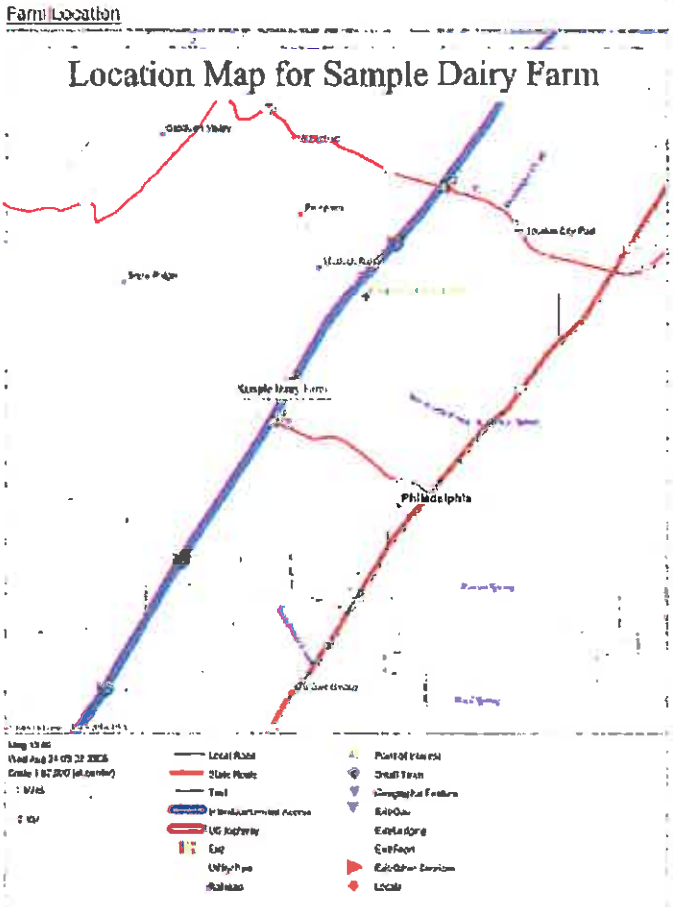
Section 10. References
10.1. Publications
10.2. Software and Data Sources

Section 1. Background and Site Information

1.1. General Description of Operation

(Directions to farm: Take I-40 east from Anytown, Exit 28. Travel South on HWY 111 south for 22 miles. Make a left onto Old Union Road. Travel 1.4 miles on Old Union Road. The farm is 1.4 miles on the left.)

Farm Location



The dairy has been in operation since 1972 at its current location. The current waste management system was designed by NRCS in 1991. The dairy herd consists of 175 lactating animals and 14 dry cows. Average lactating cow weight is 1300 lbs. Replacement heifers are produced on the farm with some purchased each year. The lactating herd is maintained in a covered freestall facility with an uncovered concrete loafing lot area approximately 50% of the time. The freestalls are bedded with sawdust. The concrete loafing lot area that contributes run-off to the earthen storage is approximately 13,100 ft $_2$.The cows spend the remaining 50% on vegetated loafing lots (29 acres) or pasture (Field 7, 50 rotational acres). Manure is collected only from the freestall and concrete loafing lot facility. As such, confinement of the lactating herd is estimated at 50% for manure volume calculations throughout this CNMP. Two groups of replacement heifers are maintained on the farm on pastures 100% of the time. Approximately 25 young heifers (6 to 12 months) and 55 heifers (12 to 24 months) are maintained and rotated on fields south of the dairy facilities. Calves are kept in a covered stall area prior to being placed in the pastures; the straw bedding and waste is applied to crop ground with a spreader. The dry cows are maintained in the rotational grazing lots around the facility.

The feed ration for the cows consists of corn silage, orchard grass hay, pearl millet haylage, and a formulated dry mix. Based on a feed analysis, this ration consists of 0.36% Phosphorus and 1.10% Potassium. Forages that are used in the ration (45% of the ration) are produced on the farm. Over the past 10 years the Sample dairy annual average milk production has ranged from 65 to 75 lbs per cow per day. Based on the feed ration estimates, the lactating herd generates 14,094 lbs. of P_2O_5 per year.

Land Base.
There are 272 acres of land available for crop production on the farm, but with setbacks for manure application only 254 acres are utilized for row and forage crops. With setbacks, 133 acres are used for corn silage production (Fields 3, 4, 5, and 6a), and 121 acres are use for pasture and hay production (Field 1, 2, 6b and 7). The farm is split by an interstate. It is important to note that the farmstead and waste storage facility are located on the west side of interstate with 169 acres of production ground, and the remaining production ground is on the east side of the interstate. At the current time no accommodations exist to allow the application of manure to any of the 103 acres on the eastern side of the interstate.
The whole farm crop removal of the 272 acres is 13,819 pounds of P_2O_5 annually. The 133 acres in corn silage production provide for 9,184 pounds of P_2O_5 crop removal annually.

Waste Management System.
The current earthen storage is 135 ft. x 121 ft. x 9 ft deep. Assuming 74,800 gallons permanent storage (non- available space in the bottom of the structure), and 121, 420 gallons of freeboard and 25yr – 24 hr storm rainfall and runoff, this storage has 502,020 gallons of available storage.

Manure is scrape collected from the freestall and concrete loafing lot area using a tractor and box scraper daily to the earthen storage. Wastewater from the milk parlor is collected in a sump and pumped to the earthen storage. Runoff from the concrete lot enters the earthen storage via the pushoff ramp. Leachate and runoff from a trench silo is collected and transported to the earthen storage. Clean-storm water running off the silage cover will be diverted into the grassed waterway. Silage leachate will be collected by the installation of a 30' x 30' concrete pad sloped from two directions into a pre-fabricated concrete drop box. The leachate will be transferred into the holding pond via an existing 6" pvc pipe. Clean storm water from the french-drains will be diverted into 6" pvc pipe and discharged into the existing grassed waterway.

The earthen storage was installed in 1991. NRCS conducted a soils and geologic investigation in 1991 to document the adequacy of placing an in-ground earthen structure at the site. At that time, the soils and geologic conditions were favorable for constructing the structure. However, there was no documentation regarding the depth of excavation of the pits in reference to the completed structure bottom elevation of 86.5. An investigation was performed on April 4, 2002 to collect shelby-tube samples from the bottom of the storage pond to determine the permeability of the material. The existing earthen liner was determined to be acceptable and met NRCS guidelines for allowable seepage

1.2. Sampling, Callbration and Other Statements

- Manure sampling frequency
- Soil testing frequency
- Equipment calibration method and frequency
- Clean water diversion
- Measures to prevent direct contact of animals with water

1.3. Resource Concerns

If checked, the indicated resource concerns have been identified and have been addressed in this plan.

Soil Quality Concerns

	Soil Quality Concern	*Fields*
	Ephemeral Gully Erosion	
	Gully Erosion	
	Sheet and Rill Erosion	
	Stream/Ditchbank Erosion	
	Wind Erosion	

Water Quality Concerns

	Water Quality Concern	*Fields*
	Facility Wastewater Runoff	
	Manure Runoff (Field Application)	
	Manure Runoff (From Facilities)	
	Nutrients in Groundwater	
	Nutrients in Surface Water	
	Silage Leachate	
	Excessive Soil Test Phosphorus	
	Tile-Drained Fields	

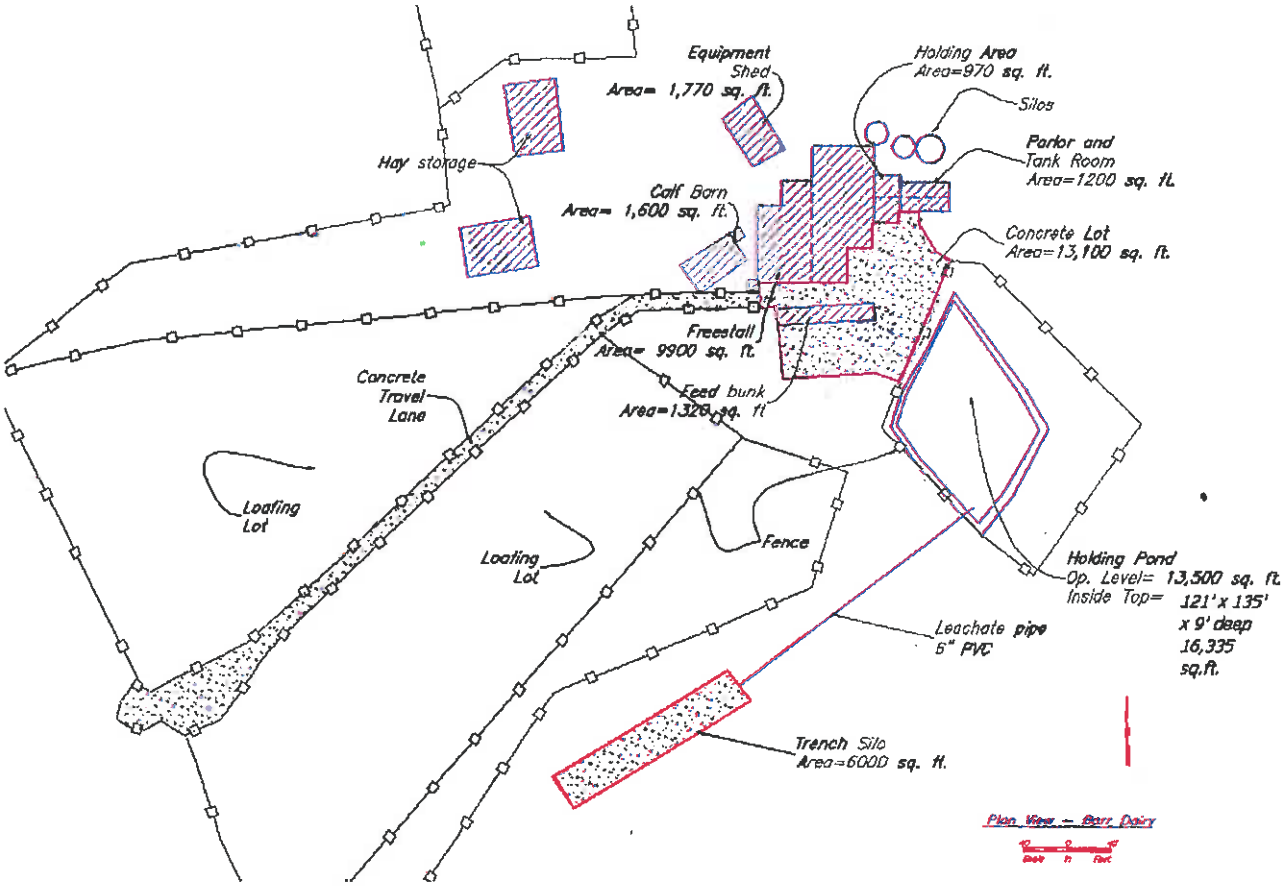
Other Concerns Addressed

	Other Concern	*Fields*
	Acres Available for Manure Application	
	Aesthetics	
	Maximize Nutrient Utilization	
	Minimize Nutrient Costs	
	Neighbor Relations	
	Profitability	
	Regulations	

	Other Concern	Fields
	Soil Compaction	
	Time Available for Manure Application	
	Odors	
	Air Quality	
	Biosecurity	

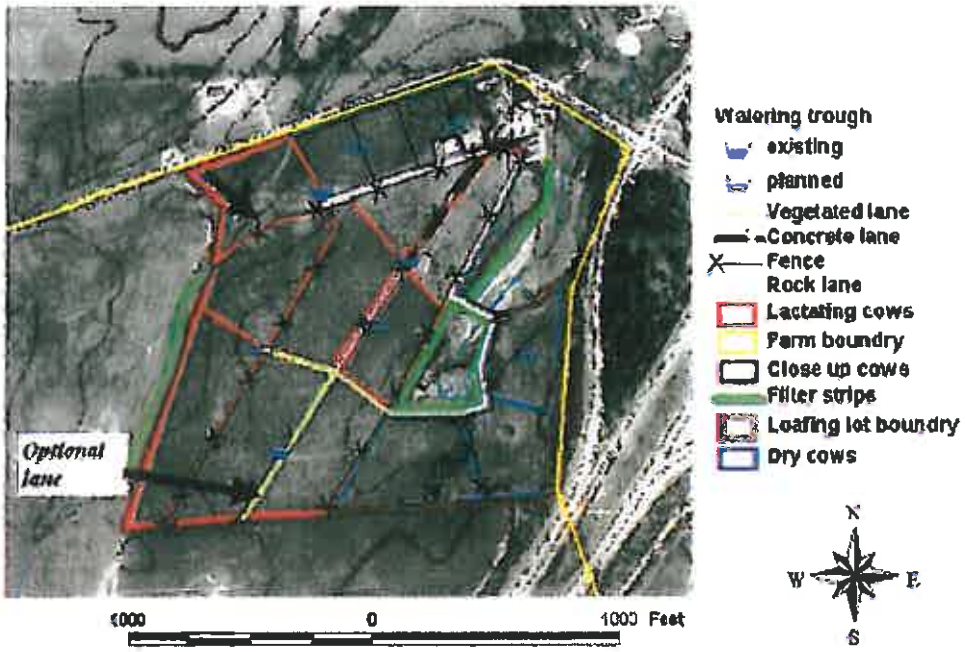
Section 2. Manure and Wastewater Handling and Storage

2.1. Map(s) of Production Area



Rotational Loafing Lot Layout

Loafing Lot Lanes



2.2. Production Area Conservation Practices

Composting Facility (Code 317)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
(None)	hq			1.3 ac	2003

Waste Storage Facility (Code 313)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
(None)	hq				

Operation and Maintenance Checklist

The following is a list of Operation and Maintenance activities associated with the conservation practices to be implemented with this CNMP. The facility operator and other employees should become familiar with the activities detailed below.

Earthen Holding Ponds & Lagoons

1. Earthen slopes shall be checked for rills and gullies. Seeding shall be as necessary to maintain a grass cover. Weeds shall be controlled. The top of dam and outside slopes shall be mowed annually to discourage weed growth and allow closer examination of the earth embankment. Quickly remove woody vegetation that begins to grow on the embankment to prevent root establishment.
2. Earthen slopes shall be checked for soft or damp/wet areas that may be a sign of potential leakage. Burrowing animals in the slopes shall be controlled. Animals shall be immediately removed and the burrow holes filled.

3. Fencing/gates shall be maintained around the structure to exclude animals and humans at all times.
4. Safety equipment (life buoys, ropes) and warning signs shall be maintained and checked periodically for wear.
5. High traffic areas, such as pump access areas, should be lined with aggregate or concrete if vegetative cover cannot be maintained.
6. Where dedicated agitation areas are established, inspect the bottom for scour holes. Where holes develop, fill with compacted clay, and line the surface with concrete to prevent further scouring. If this does occur, please contact the local NRCS/SWCD office for assistance.
7. The maximum operating level in the facility is 2 feet below the low point in the existing embankment that contains the manure and runoff. When this elevation is reached, pump-out should commence as long as soil conditions exist that will allow for infiltration of the manure liquids. Pump-out is not to occur in December, January, or February. Pump-out should not be scheduled if severe or wet weather is a threat. The elevation at which pump-out is to occur shall be marked with a post or other suitable device. Removing the storage volume (1,178,000 gallons per year) is estimated to take 40 hours of pumping per year with a 500 gallon per minute irrigation gun. If hauling with a 1500 - gallon spreader, then it will take 392 hours per year to empty the waste storage facility based on a 1/2-hour round trip.
8. Thoroughly agitate the storage facility one hour before pump-out and during pump-out to ensure uniform distribution of nutrients in manure.
9. Domestic and industrial waste from toilets shall not be discharged into the storage facility(s).
10. In the event of closure or shutdown where there is no longer need to manage manure and runoff from this operation, the closure plan will be followed

.

Gutters & Downspouts:
1. Blockages/debris – Material shall be removed.
2. Loose/unconnected hangers – Shall be made secure.
3. Leakage – Patching or replacement made.
4. Downspouts shall be shielded from livestock access. Downspouts shall be periodically checked for:
a. Damage – Crushed sections shall be removed and replaced. Guards/shields shall be maintained.
b. Outlets – Water from gutters and downspouts shall be directed away from feedlots and animal holding areas.
c. Outlets shall be maintained to prevent pooling of water or the occurrence of excessive erosion.

Manure Sump Management and Operation
Gases produced in manure pits and sumps can reach lethal concentrations. It is therefore essential to take all reasonable precautions to avoid contact with these gases.
1. A lid or cover over the sump access opening should be in place at all times to prevent accidental entry.
2. At least two persons shall be present when work involving the sump is to be done. One person shall act as observer and remain outside the sump at all times.
3. Do not enter manure sump without wearing an approved correctly fitted, self-contained breathing apparatus. In addition, a safety harness and lifeline should be used.

Manure Transfer Systems:
To prevent plugging in pipe transfer systems:
1. Dry, dense "clumps" of manure/ bedding or frozen manure shall not be placed in reception pit/pipe. Frozen manure shall be allowed to thaw before placing in the transfer pipe. Water shall be added to dry material.
2. Care shall be given to avoid foreign objects such as wood, concrete or metal entering the system.
3. Changes made in the type of bedding materials originally proposed for the system may result in plugging or blockage of the transfer system. A change to sand bedding will almost certainly cause a sand buildup at the outlet and plug the transfer pipe. Please contact the NRCS/SWCD office for planning assistance if you are considering a switch to sand bedding in a system not initially designed for sand.
Each time the system is emptied, the following shall be checked:
4. Condition of the reception box. Look for deterioration of the box material. Examine the connection area of the box and transfer pipe. If an additional pipe enters the box (milkhouse line),, check for any blockages.
5. Condition of the transfer pipe. Look for low areas or blowholes over the pipe for signs of pipe joint problems.

Pushoff Ramps:
For pushoff ramps/piers, all traffic barriers/guards shall be maintained in good condition. Safety barriers/guards/grates shall be maintained around reception/pumping boxes. Components showing wear shall be immediately replaced.

Mortality Management Facility:
1. Keep composter fenced
2. When placing fresh carcass on compost, cover with a minimum of 1 foot of sawdust.
3. Prevent area run-off water from entering the compost facility.

Manure and Wastewater Application:
1. Nutrients should not be applied in December, January, or February unless following the University of Tennessee recommendations.
2. If the crop, method of application, feed ration or consistency of manure changes, it will be necessary to re-calculate an appropriate application amount.
3. Nutrients from any source shall not be applied on saturated, frozen and/or snow-covered soil.
4. Nutrients will not be spread in an established waterway or any defined drainage way that carries concentrated flow. Manure may be applied to newly constructed grass waterways if incorporated immediately.
5. Manure cannot be applied on land that is subject to frequent flooding unless the manure is incorporated immediately.
6. Nutrients cannot be applied when imminent rain is expected.
7. Injecting or incorporating manure into the soil versus surface application will reduce odors.
8. Soil profile sampling for nitrogen when corn is knee high. Follow Pre-Sidedress Nitrogen Test (PSNT) (UT SP427 for corn).
9. Application rates must not exceed soil infiltration rates (i.e., it may take 2 applications to achieve 1-inch rate).
10. Equipment shall be calibrated to ensure uniform distribution of manure at recommended rates.
11. Non-application buffer widths will be maintained around fields receiving manure. See guidance table below for maintaining non-application buffer widths.
12. Avoid unnecessary contact with chemical fertilizers and organic byproducts. Wear protective clothing when working with plant nutrients. Extra caution should be taken when handling ammonia sources of nutrients, or when dealing with organic wastes in stored or unventilated enclosures.
13. Vehicles used to transport manure on State or federally maintained roads will be covered when the hauling distance is greater than one mile.
14. When manure is removed from facilities, it should be applied directly to the field or if dry enough, stockpiled and covered with plastic or stored in roofed storage facility.
15. Fields receiving nutrients should be soil tested at least every 2 or 3 years or according to soil testing section.
16. Maintain records of where, when and how much nutrients are applied.

Non-Application Buffer Widths

Object, Site	Situation	Buffer Width (ft) from Object, Site [1/]
Well	Located up-slope of application site	150
Well	Located down-slope of application site provided conditions warrant application	300
Waterbody or Stream[2/]	Predominate slope <5% with good vegetation[3/]	30
Waterbody or Stream[2/]	Predominate slope 5-8% with good vegetation[3/]	50
Waterbody or Stream[2/]	Poor vegetative cover or Predominate slope >8%[3/]	100
Waterbody or Stream[2/]	Cultivated land, low erosion	30
Public Road	Irrigated wastewater	50
Public Road	Solids applied with spreader truck	50
Dwelling	Other than Producer	300
Public Use Area	All	300
Property Line	Located downslope of application site	30

Waterbody includes pond, lake, wetland, or sinkhole. "Open" sinkholes should be protected the same as a well. Where sinkholes are not "open", a buffer width should be established in the flat area around the rim of the basin before the change in slope up out of the basin begins.
Stream includes both perennial and intermittent streams. Good vegetation refers to a well-managed, dense stand which is not overgrazed.

Grassed loafing lots (pastures):
1. Cows should be rotated to a rested loafing lot before conditions in the occupied loafing lot deteriorate or vegetation begins to become damaged. During wet weather, restrict cows to the free stall barn.

Recommended Heights and Rest Period:

Species	Beginning Height	Ending Height	Days Rest
Tall Fescue/ Bermudagrass Mix	5" to 8"	2" to 4"	14 to 45 days

2. Inspect pastures just prior to University of Tennessee recommended seeding and fertilizer dates. Reseed pastures if tall fescue plants are greater than 6" apart with less than two tillers or bermudagrass is greater than 2'apart. Preferably bermudagrass will be established first with tall fescue established the following fall.
3. When cows are in the loafing lot, readily accessible water must be provided, in the lot, or feed and water may be provided at the barn. Access to the other grassed loafing lots must be restricted. If shading is provided, it should be portable or accessible at the barn.
4. Weed invasion is likely to occur both during and following establishment of the grassed loafing lots. Control broadleaf weeds by mowing. In some cases, it will be necessary to control weeds with herbicides. Consult extension agent or pest management specialist for pest management recommendation. As always, read and follow label directions when using pesticides. Do not allow the milking herd in the sprayed lot(s) for seven days after application or follow directions on the label.
5. Follow University of Tennessee recommendations for amount of N, P, and K to apply and dates to make applications. Apply nitrogen fertilizer as needed to stimulate growth. Nitrogen applied in the spring and fall will favor tall fescue; nitrogen applied in the summer will favor bermudagrass.
6. Harvest hay from the grassed loafing lots when conditions warrant.

Maintain all support practices such as fence, watering facilities, heavy use areas in good working order. Inspect these practices regularly for repairs and maintenance.

2.3. Manure Storage

Waste Management System.
The current earthen storage is 135 ft. x 121 ft. x 9 ft deep. Assuming 74,800 gallons permanent storage (non-available space In the bottom of the structure), and 121, 420 gallons of freeboard and 25yr – 24 hr storm rainfall and runoff, this storage has 502,020 gallons of available storage.

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Holding pond	Holding pond	502,000 Gal	1,244,000 Gal	147
Calf shed	Manure pack	300 Tons	264 Tons	415

Existing Holding Structure Volume		
	ft^3	gallons
Freeboard (1 ft)	16,092	120,293
25 yr-24 hr Storm Direct Rainfall	7,112	53,201
25 yr-24 hr Storm Runoff	9,120	68,218
Average Annual Direct Rainfall (precip. – evaporation)	13,270	99,260
Waste & Runoff	53,848	402,761
Permanent Storage	10,000	74,800
Total	109,429	818,532
Available Storage Capacity	67,115	502,020
Available Storage Capacity + Emergency Storm	83,947	623,499

Manure and Wastewater Storage and Handling

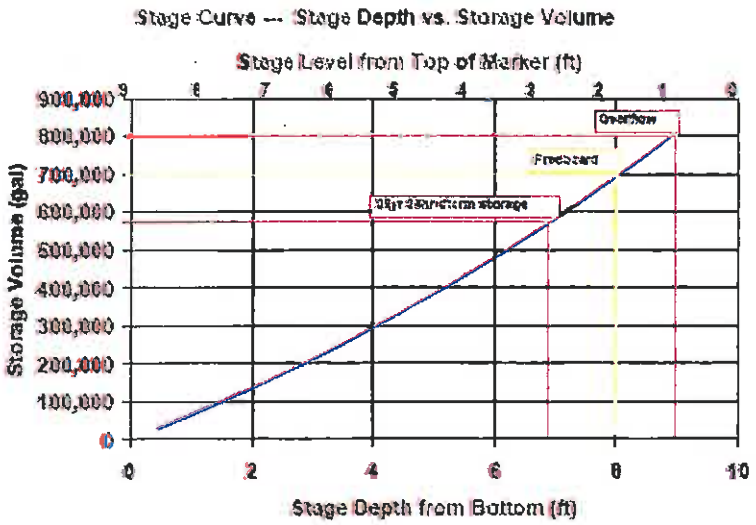
The earthen storage facility (holding pond) has the capacity to store 50 percent of the manure and 100 percent of the runoff from the lot during the wettest period of winter. The existing earthen storage structure is 135 ft. x 121 ft. x 9 ft deep and has a total storage volume of approximately 818,500 gallons. The storage volume to the bottom of freeboard is ~ 700,000 gallons. With 74,800 gallons permanent storage (non-available space in the bottom of the structure), there is 502,020 gallons of storage available, not including the 25 yr-24 hr emergency storm storage. Including 25 yr-24 hr emergency storm storage, there is 623,500 gallons of storage. The system must be operated with two storage periods during the year; however, during these periods waste levels may enter into emergency storm storage depending on weather conditions. When emergency storm storage is entered, the material should be applied on field 6a. As it exists, the system is manageable, but is undersized and additional storage capacity should be considered. The table below provides detailed estimates for the waste volumes entering the storage system during each period. Approximately 644,000 gallons of manure and wastewater are available to land apply in the spring to fields 5 and 6a. Approximately 598,000 gallons accumulates during summer months and is available for application in the fall to fields 4 and 6a. The other 50 percent of the manure is presumed to be deposited in the loafing lots by the cattle.

	Storage Period 1 November – March (151 Days)	Storage Period 2 April – October (214 Days)	Yearly Storage Totals
	Gallons	Gallons	Gallons
Manure (60% of 175 lactating cows)	167,062	236,765	403,827
Bedding (Sawdust)	18,865	26,735	45,600
Wash water (249 gal./day)	37,724	53,470	91,194
Silage leachate	7,630	7,630	15,260
Runoff From silage bunker and 13,000 ft² concrete lot	269,290	312,994	582,284
Direct rainfall (precip-evap)	142,496	-39,414	103,080
Total	~ 644,000	~ 698,000	~ 1,244,000

** Table does not include permanent storage, 25yr-24hr storm storage, or freeboard volume.

Waste Storage Structure Stage Curves

A stage curve for the holding pond has been included. The Stage Curve allows the operator to estimate the volume of waste available for spreading as a function of the waste depth on the stage marker. For Sample, if the storage level is 6 ft from the bottom and the storage pond can be pumped to with 1.5 ft of the bottom, then the volume of material available for spreading is 350,000 gallons.



Closure Plan

If the storage facility is no longer used for animal confinement and manure storage, it shall be closed as in accordance with Closure of Waste Impoundments (Code 360). Manure and wastewater will be agitated and pumped to the extent conventional pumping will allow. Clean water shall be added as necessary to facilitate the agitation and pumping. The wastewater shall be utilized in accordance with NRCS conservation practice standard, Nutrient Management (Code 590). The sludge remaining on the bottom and sides of the waste treatment lagoons or waste storage ponds may remain in place if it will not pose a threat to the environment. If leaving the sludge in place would pose a threat, it shall be removed to the fullest extent practical and utilized in accordance with NRCS conservation practice standard, Waste Utilization (Code 633) and/or Nutrient Management (Code 590).

Land reclamation. Impoundments with embankments may be breached so that they will no longer impound water and excavated impoundments may be backfilled so that these areas may be reclaimed for other uses. Waste impoundments that have water impounded against the embankment are considered embankment structures if the depth of water is three (3) feet or more above natural ground.

(1) *Embankment Impoundments.* Manure shall be removed from the site before the embankment is breached. The slopes and bottom of the breach shall be stable for the soil material involved, however the side slopes shall be no steeper than three horizontal to one vertical (3:1).

(2) *Excavated Impoundments.* The backfill height shall exceed the design finished grade by 5 percent to allow for settlement. The finished surface shall be constructed of the most clayey material available and mounded to shed rainfall runoff. Incorporate available topsoil where feasible to aid establishment of vegetation.

Conversion to fresh water storage. The converted impoundment shall meet the requirements of the appropriate NRCS conservation practice standard for the intended purpose (e.g., Pond, Code 378; Irrigation Pit or Regulating Reservoir, Code 552; or Irrigation Storage Reservoir, Code 436). This will require an investigation of the structural integrity of the impoundment if not originally constructed with NRCS technical assistance.

Safety. When sludge is not removed from an embankment or excavated pond, precautions (fencing and warning signs) will be used to ensure that the pond is not used for incompatible purposes (such as swimming, livestock watering, fish production, etc.) until water quality is adequate for the intended purpose. Water quality sampling and analysis shall be used to determine when the pond is safe for these uses.

Protection. All disturbed areas not returned to crop production shall be vegetated in accordance with NRCS conservation practice standard Critical Area Planting, Code 342.

2.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals	Average Weight (Lbs)	Confinement Period	Manure Collected (%)	Storage Where Manure Will Be Stored
Lactating cows	Milk cow (dairy)	175	1,300	Jan Early - Dec Late	50	Holding pond
Dry cows & close ups	Dry cow (dairy)	60	1,300	Jan Early - Dec Late	0	
Heifers	Growing heifer/steer (dairy)	75	1,000	Jan Early - Dec Late	0	
New calves	Calf (dairy)	75	200	Jan Early - Dec Late	100	Calf shed
Young heifers	Weaned heifer/steer (dairy)	75	500	Jan Early - Dec Late	0	

(1) Number of Animals is the average number of animals that are present in the production facility at any one time.
(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

2.5. Normal Mortality Management

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses. If on-farm storage or handling of animal mortality is done, NRCS Standard 316, Animal Mortality Facility, will be followed for proper management of dead animals.

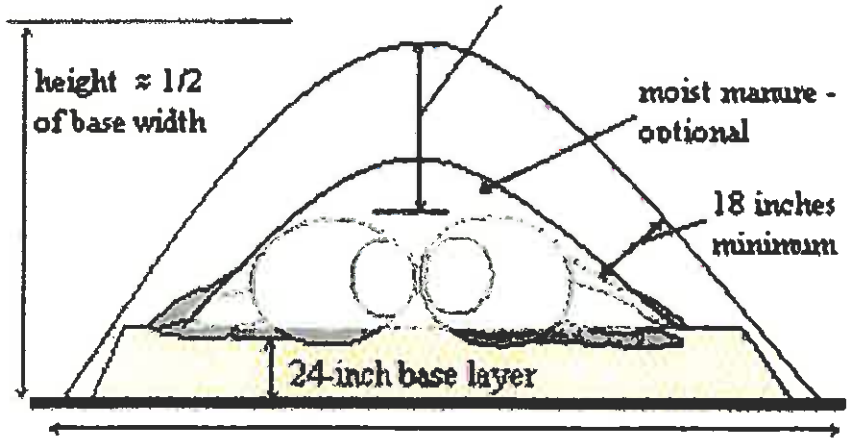
Plan for Proper Management of Dead Animals

The following table describes how you plan to manage normal animal mortality in a manner that protects surface and ground water quality.

Dead animals will be disposed of according to state or local laws and in a way that does not adversely affect ground or surface water or create public health concerns. The mortalities will be composted. All dead animals will be placed in the composting area within 24 hours of carcass discovery. The dead animal will be placed over 24-inches of sawdust, and then covered with an additional 12-inches of sawdust. The composting area is an abandoned silage bunker. Compost piles will be formed along the length of the bunk. The sawdust will be stacked such that rain will be shed from the pile. Dead animals will be placed such that there is at least one foot of sawdust between any sidewalls or edges to act as biofilters. Install features to prevent outside run-off water from entering the compost piles.

Burial will be employed as a secondary means of disposal. Burials will be limited to equivalent of five 1400-pound animals per acre per year. A site has been selected that meets the following criteria.

- ☐ can provide a minimum of 30-inches of suitable clayey soil cover over the carcass (soil map indicates possible suitable areas – Dewey or Decatur silty clay loam soils)
- ☐ bottom of burial is two-feet above highest groundwater elevation
- ☐ it is greater than 100 feet away from private well
- ☐ it is greater than 200 feet away from public well
- ☐ it is greater than 50 feet from an adjacent property line
- ☐ it is greater than 500 feet from a residence
- ☐ and it is greater than 100 feet from a stream, lake, pond, wetland, or 100 year floodplain.



Width typically 16-18 feet for mature cattle)

2.6. Planned Manure Exports off the Farm

Month-Year	Manure Source	Amount	Receiving Operation	Location

(None)

2.7. Planned Manure Imports onto the Farm

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location

(None)

2.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination

(None)

Section 3. Farmstead Safety and Security

3.1. Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

a. Stop all other activities to address the spill.
b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
c. Call for help and excavator if needed.
d. Complete the clean-up and repair the necessary components.
e. Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

a. Stop all other activities to address the spill and stop the flow.
b. Call for help if needed.
c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
e. If flow is coming from a tile, plug the tile with a tile plug immediately.
f. Assess the extent of the emergency and request additional help if needed.

Emergency Contacts

Department / Agency	Phone Number
Fire	
Rescue services	
State veterinarian	
Sheriff or local police	

Nearest available excavation equipment/supplies for responding to emergency

Equipment Type	Contact Person	Phone Number

Contacts to be made by the owner or operator within 24 hours

Organization	Phone Number
EPA Emergency Spill Hotline	
County Health Department	
Other State Emergency Agency	

Be prepared to provide the following information:

a. Your name and contact information.
b. Farm location (driving directions) and other pertinent information.
c. Description of emergency.
d. Estimate of the amounts, area covered, and distance traveled.
e. Whether manure has reached surface waters or major field drains.
f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
g. Current status of containment efforts.

3.2. Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Visitors must contact and check in with the producer before entering the operation or any production or storage facility.

Visitor Control (A "no visitor" policy is recommended)

- ☐ Install signs in visible locations indicating a bio security area and directing visitor flow.
- ☐ Install gates at all entrances/ exits and any additional fencing needed for security.
- ☐ Insure parking areas are kept 100 feet from the livestock
- ☐ Security lighting is adequate
- ☐ Make all visitors sign in
- ☐ Maintain a visitor disinfectant scrubbing area w/ necessary equipment (ie brushes, fresh disinfectant, boots etc.) and a sprayer for vehicles.
- ☐ Restrict all non essential vehicles from entering the farm and spray with disinfectant if allowed to enter.

Add

Livestock Concerns

- ☐ Purchase replacement stock, borrowed bulls, etc. from uninfected herds or herds with known health status.
- ☐ Isolate or quarantine replacement stock, returning stock and new additions for an appropriate period.
- ☐ Isolate sick animals
- ☐ Keep accurate records of medications and vaccinations.
- ☐ Utilize the US Animal Identification Number (USAIN)
- ☐ Maintain perimeter fences to keep livestock from mixing with neighbors livestock

Sanitation

- ☐ Disinfect houses between flocks
- ☐ Treat mortality safely and quickly—Carcasses are disposed of in a timely manner and according to state regulations
- ☐ Employ a rodent, insect and wildlife control (include pets) plan.
- ☐ Do not use the same equipment to handle manure and feed.
- ☐ Clean up feed spills quickly
- ☐ Know the bio-security measures in place where feed is manufactured/processed.

Management

- ☐ Doors and gates are kept locked
- ☐ Employ a training plan for employees
- ☐ Have an emergency bio-security plan posted

3.3. Catastrophic Mortality Management

Catastrophic losses due to disease must be reported to the State Veterinarian and the Animal and Plant Health Inspection Service (APHIS).

Important! In the event of catastrophic animal mortality, contact the following authority before beginning carcass disposal:

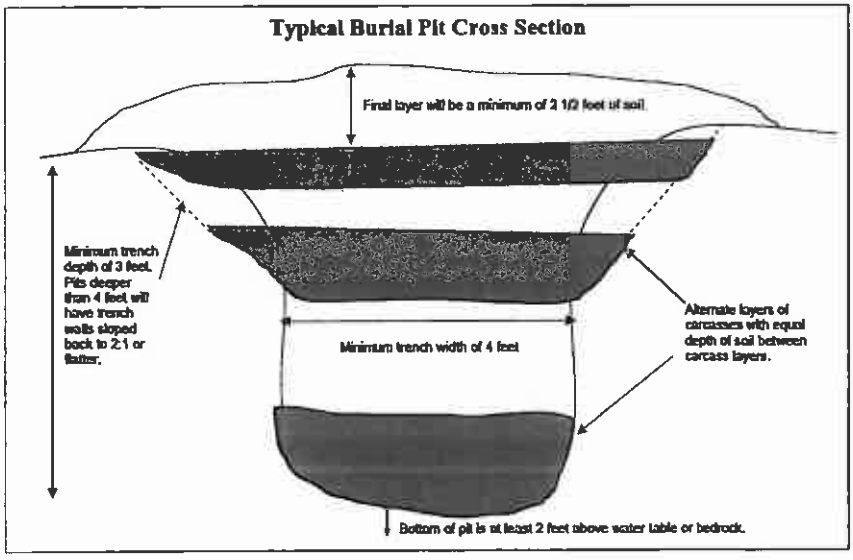
Authority name
Contact name
Phone number

Plan for Catastrophic Animal Mortality Handling

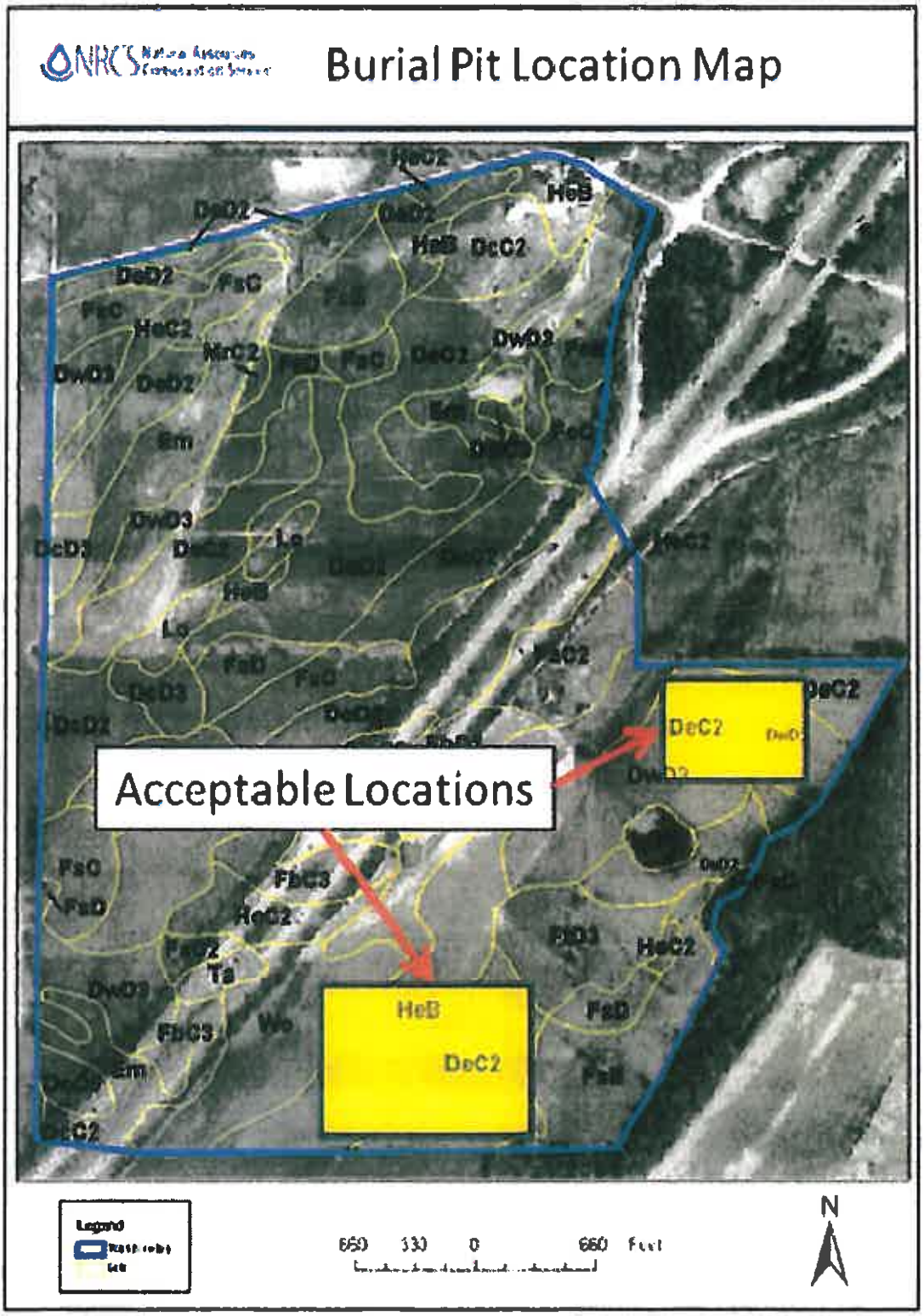
The following table describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

PROCEDURES FOR USING BURIAL PITS

- Dig a trench at least four feet wide to a minimum depth of 3 feet. Maximum vertical trench wall is 4 feet. For trenches deeper than 4 feet vertical, the earthen wall shall be sloped back at 2 feet horizontal and 1 foot vertical.
- Begin placing animals in one end of the pit. One layer of carcasses will be followed with a minimum depth of soil equal to the carcass depth, not to exceed 3 layers of carcasses and covered with a minimum of 2 1/2 feet of soil above the last layer. For poultry, multiple layers of carcasses can be used, not to exceed two feet in thickness.
- As the animals begin to decay, it may be necessary to place additional soil material in areas that subside.
- Vegetate the fill areas or insure that vegetation establishes naturally.



Burial Pit Location Map



3.4. Chemical Handling

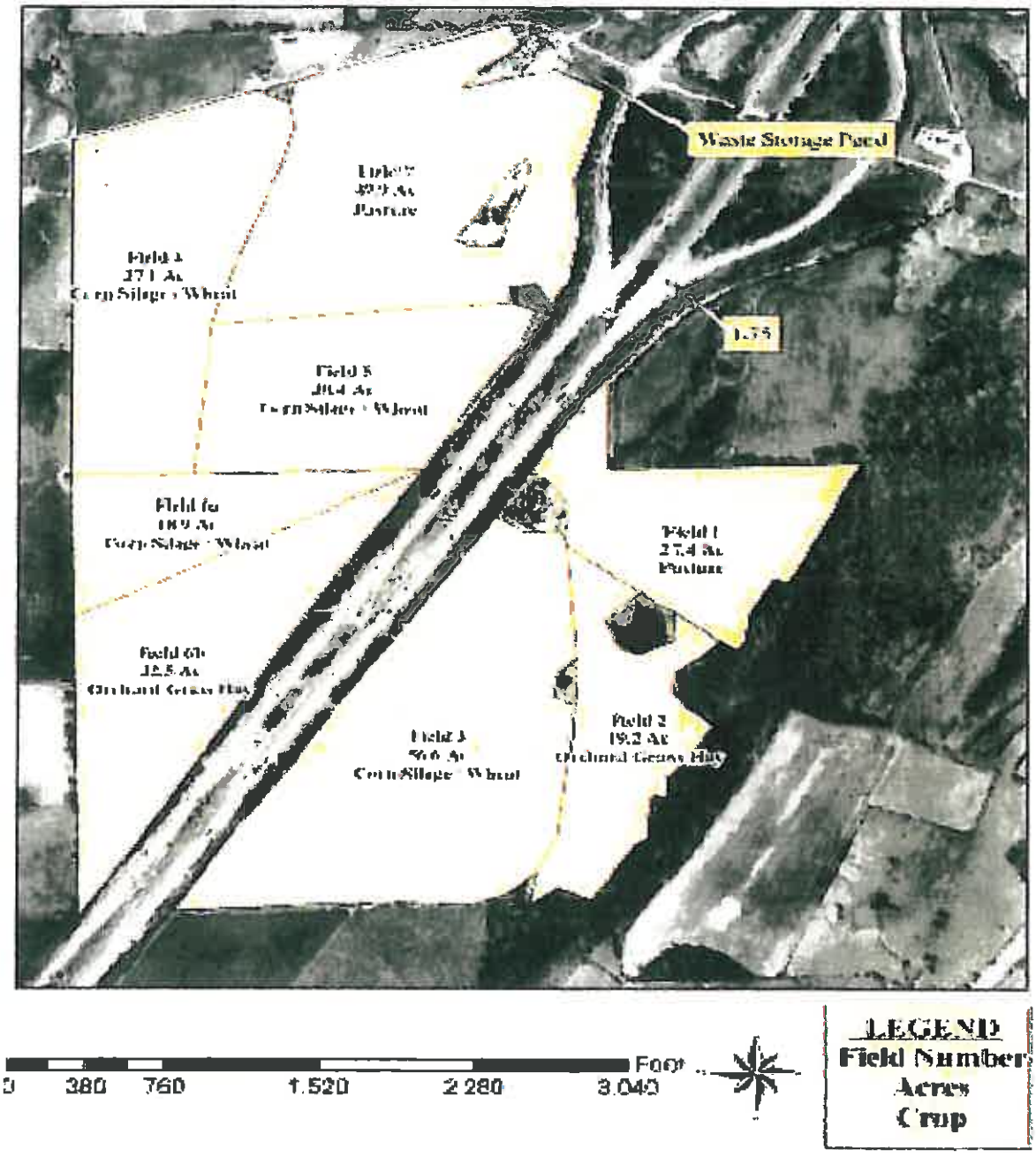
If checked, the indicated measures will be taken to prevent chemicals and other contaminants from contaminating process waste water or storm water storage and treatment systems.

	This is not a regulatory-agency permitted facility. This section does not apply.

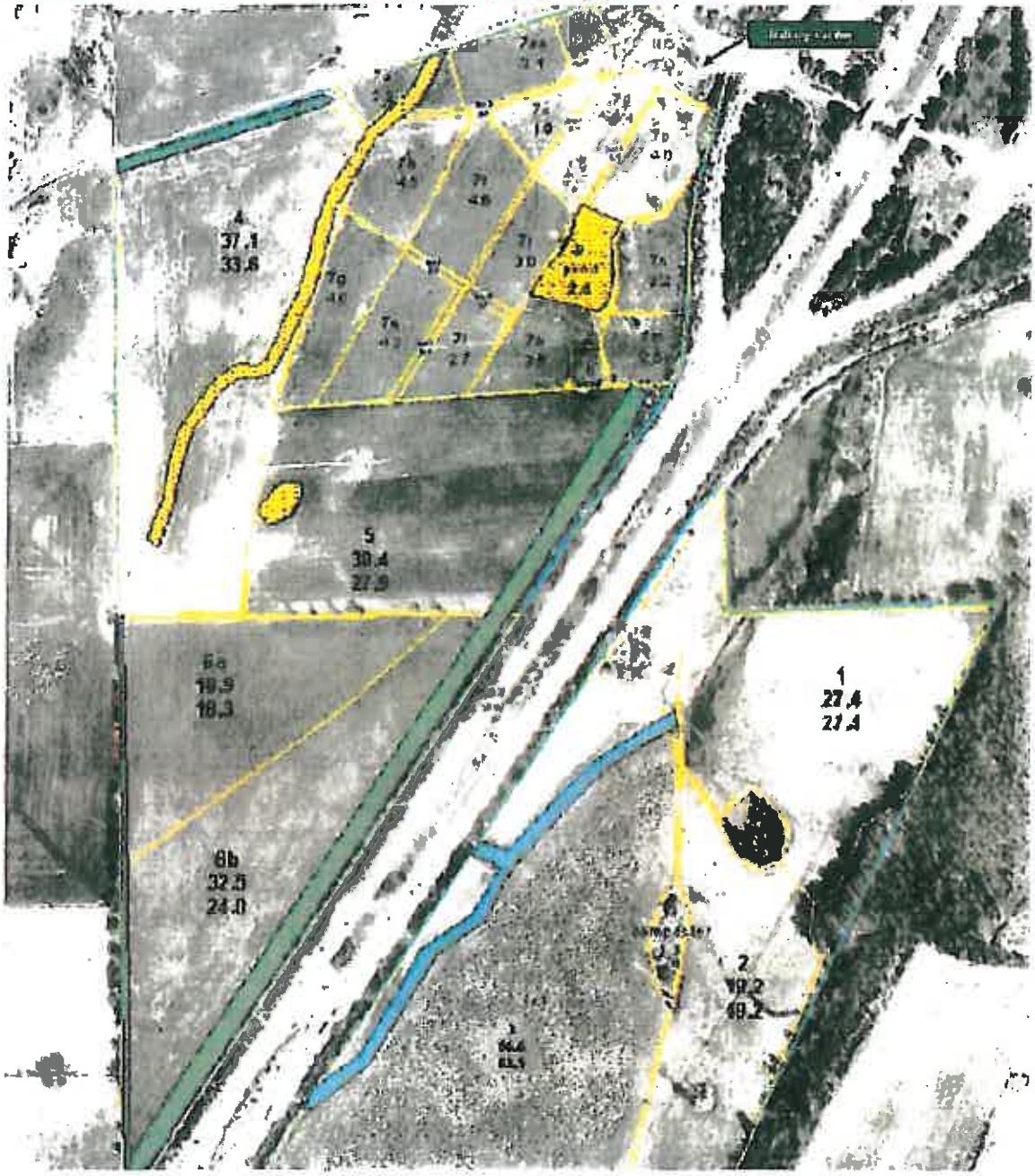
	Measure
	All chemicals are stored in proper containers. Expired chemicals and empty containers are properly disposed of in accordance with state and federal regulations. Pesticides and associated refuse are disposed of in accordance with the FIFRA label.
	Chemical storage areas are self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
	Chemical storage areas are covered to prevent chemical contact with rain or snow.
	Emergency procedures and equipment are in place to contain and clean up chemical spills.
	Chemical handling and equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.
	All chemicals are custom applied and no chemicals are stored at the operation. Equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.

Section 4. Land Treatment

4.1. Map(s) of Fields and Conservation Practices



Filter Strips, Waterways and Manure Application Buffers Map



Field Name
Subfield Name (Optional)
Acres
Spreadable Acres

0 500 1000 1500 Feet

N
W E
S

BUFFER KEY

4.2. Land Treatment Conservation Practices

Field Border (Code 386)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	4			1.7 ac	
1234	5			10.2 ac	
1234	6			10.2 ac	

Filter Strip (Code 393)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	4			3.5 ac	
1234	7			3.5 ac	

Grassed Waterway (Code 412)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	3			3.1 ac	

Nutrient Management (Code 590)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	1	25.5 ac	2007-09-01		
1234	2	17.5 ac	2007-09-01		
1234	3	53.8 ac	2007-09-01		
1234	4	33.9 ac	2007-09-01		
1234	5	26.8 ac	2007-09-01		
1234	6	22.8 ac	2007-09-01		
1234	6	17.5 ac	2007-09-01		
1234	7	50.5 ac	2007-09-01		

Pond (Code 378)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	7			2.2 ac	

Waste Utilization (Code 633)

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	4	33.9 ac	2007-09-01		
1234	5	26.8 ac	2007-09-01		
1234	6	16.9 ac	2007-09-01		

Section 5. Soil and Risk Assessment Analysis

5.1. Soil Information

Field	Soil Survey	Map Unit	Soil Component Name	Surface Texture	Slope Range (%)	OM Range (%)	Bedrock Depth (in.)
1	105	DwD3	Dewey	SIC	12-20%	0.5-1%	
2	105	FsE	Dewey	SIL	20-30%	1-3%	
3	105	HeB	Etowah	SIL	2-5%	1-3%	
4	105	Em	Emory	SIL	1-3%	1-4%	
5	105	DeD2	Dewey	SICL	12-20%	0.5-2%	
6a	105	DcD2	Decatur	SICL	12-20%	0.5-2%	
6b	105	DeD2	Dewey	SICL	12-20%	0.5-2%	
7	105	DeC2	Dewey	SICL	5-12%	0.5-2%	

Soils Map

5.2. Predicted Soil Erosion

Field	Predominant Soil Type	Slope (%)	Wind (Ton/Ac/Yr)	Irrigation (Ton/Ac/Yr)	Gully (Ton/Ac/Yr)	Ephemeral (Ton/Ac/Yr)	Plan Avg. Soil Loss (Ton/Ac/Yr)
1	DwD3 (Dewey SIC)	16.0					0.8
2	FsE (Dewey SIL)	25.0					1.4
3	HeB (Etowah SIL)	3.5					2.4
4	Em (Emory SIL)	2.0					1.4
5	DeD2 (Dewey SICL)	16.0					6.9
6a	DcD2 (Decatur SICL)	16.0					4.7
6b	DeD2 (Dewey SICL)	16.0					2.1
7	DeC2 (Dewey SICL)	8.5					0.2

Field	Crop Year	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Soil Loss (Ton/Ac)	Primary Crop
1	2008	9/11/2007	9/1/2008	0.6	Corn silage
	2009	9/2/2008	9/1/2009	1.0	Grass-clover hay new
	2010	9/2/2009	9/10/2010	0.8	Grass-clover hay maint
2	2008	9/2/2007	9/10/2008	1.3	Grass-clover hay maint
	2009	9/11/2008	9/1/2009	1.1	Corn silage
	2010	9/2/2009	9/1/2010	1.7	Grass-clover hay new
3	2008	9/2/2007	9/1/2008	2.4	Corn silage
	2009	9/2/2008	9/1/2009	2.4	Corn silage
	2010	9/2/2009	9/1/2010	2.4	Corn silage
4	2008	9/2/2007	9/1/2008	1.4	Corn silage
	2009	9/2/2008	9/1/2009	1.4	Corn silage
	2010	9/2/2009	9/1/2010	1.4	Corn silage
5	2008	9/2/2007	9/1/2008	6.9	Corn silage
	2009	9/2/2008	9/1/2009	6.9	Corn silage
	2010	9/2/2009	9/1/2010	6.9	Corn silage
6a	2008	9/2/2007	9/1/2008	5.0	Corn silage
	2009	9/2/2008	9/1/2009	4.5	Corn silage
	2010	9/2/2009	9/1/2010	4.4	Corn silage

Field	Crop Year	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Soil Loss (Ton/Ac)	Primary Crop
6b	2008	9/2/2007	9/1/2008	3.6	Grass-clover hay new
	2009	9/2/2008	9/10/2009	1.2	Grass-clover hay maint
	2010	9/11/2009	9/1/2010	0.9	Corn silage
7	2008	8/28/2007	8/27/2008	0.2	Bermuda common pasture
	2009	8/28/2008	8/27/2009	0.2	Bermuda common pasture
	2010	8/28/2009	8/27/2010	0.2	Bermuda common pasture

5.3. Nitrogen and Phosphorus Risk Analysis

Tennessee Phosphorus Index

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
1	2008	20	2	40	40	Low
1	2009	20	2	40	40	Low
1	2010	20	2	40	40	Low
2	2008	13	2	26	26	Low
2	2009	13	2	26	26	Low
2	2010	13	2	26	26	Low
3	2008	6	4	24	24	Low
3	2009	6	4	24	24	Low
3	2010	6	4	24	24	Low
4	2008	6	20	24	120	Medium
4	2009	6	20	24	120	Medium
4	2010	6	20	24	120	Medium
5	2008	15	27	120	405	Very High
5	2009	15	27	120	405	Very High
5	2010	15	27	120	405	Very High
6a	2008	15	18	60	270	High
6a	2009	15	18	60	270	High
6a	2010	15	18	60	270	High
6b	2008	13	4	52	52	Low
6b	2009	13	4	52	52	Low
6b	2010	13	4	52	52	Low
7	2008	6	8	48	48	Low
7	2009	6	8	48	48	Low
7	2010	6	8	48	48	Low

5.4. Additional Field Data Required by Risk Assessment Procedure

Field	Distance to Water (Feet)	Slope Length (Feet)	Buffer Width (Feet)	Tillage/Cover Type
1	0	50	None	Pasture/Hay
2	999	50	None	Pasture/Hay
3	30	100	30	No-till w/ heavy residues
4	30	100	30	No-till w/ heavy residues
5	999	50	None	No-till w/ heavy residues
6a	999	50	None	No-till w/ heavy residues
6b	999	50	None	Pasture/Hay
7	30	100	30	Pasture/Hay

Section 6. Nutrient Management

6.1. Field Information

Field ID	Sub-field ID	Total Acres	Spread-able Acres	FSA Farm	FSA Tract	FSA Field	County	Predominant Soil Type	Slope (%)
1		25.5	25.1		1234	1	Loudon	DwD3 (Dewey SIC)	
2		17.5	17.5		1234	2	Loudon	FsE (Dewey SIL)	
3		53.8	50.5		1234	3	Loudon	HeB (Etowah SIL)	
4		33.9	33.9		1234	4	Loudon	Em (Emory SIL)	
5		26.8	26.8		1234	5	Loudon	DeD2 (Dewey SICL)	
6a		17.5	16.9		1234	6	Loudon	DcD2 (Decatur SICL)	
6b		22.8	22.0		1234	6	Loudon	DeD2 (Dewey SICL)	
7		50.5	48.9		1234	7	Loudon	DeC2 (Dewey SICL)	

6.2. Manure Application Setback Distances

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150
Waterbody	Predominant slope <5% with good vegetation	30
Waterbody	Predominant slope >8%	100
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590 (http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

6.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/ 100g)
1	2003		Mehlich-1	40	128			lbs/a	6.3		
2	2003		Mehlich-1	40	128			lbs/a	6.3		
3	2003		Mehlich-1	76	196			lbs/a	7.0		
4	2003		Mehlich-1	220	340			lbs/a	6.4		
5	2003		Mehlich-1	250	488			lbs/a	5.6		
6a	2003		Mehlich-1	86	208			lbs/a	6.0		
6b	2003		Mehlich-1	86	208			lbs/a	6.0		
7	2003		Mehlich-1	362	688			lbs/a	6.0		

6.4. Manure Nutrient Analysis

Manure Source	Dry Matter (%)	Total N	NH_4-N	Total P_2O_5	Total K_2O	Avail. P_2O_5	Avail. K_2O	Units	Analysis Source and Date
Holding pond		10.0	5.0	3.0	12.5	3.0	12.5	Lb/1000Gal	Lab analysis 11/08/2003; no NH4-N so assume 50%.
Calf shed		6.1	1.2	2.3	2.7	2.3	2.7	Lb/Ton	MMP Estimate

(1) Entered analysis may be the average of several individual analyses.
(2) Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm).

Manure Sampling

When collecting a manure sample from a storage facility, the most important thing to keep in mind is to **collect a sample representative of what will be land applied to the crop**. Holding ponds should be sampled immediately before or during land application; time of sample collection should be noted in reference to actual land application. The condition of the holding pond during sample collection should reflect the condition of the holding pond during land application. The agitation time required for the storage facility to become well mixed is dependent on its size and shape and the agitation equipment. Small holding ponds are usually well agitated after one to two hours. Sampling from an agitated pond will provide the most representative sample. Whether the pond is agitated or not, three samples should be collected; a sample should be collected at the beginning, middle and end of the land application event. Holding pond samples can be collected from the holding pond itself, the outlet line on the pump or from the application equipment. A one-pint sample should be sent to the lab in a well-sealed container. A wide mouthed plastic bottle works well. The sample should be mailed or delivered to the lab the day of collection to reduce sample degradation with time. If samples are to be mailed, ship them with ice in an insulated container. Do not mail samples that will not be delivered within one to two business days. For Sample, do not send on a Thursday and allow it to set in the post office or mail-box during a weekend. The sample should be analyzed for total nitrogen, ammonical nitrogen, phosphorus, potassium and total solids. Contact the lab prior to sending in a sample to receive a sample analysis form to mail in with the sample.

6.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P_2O_5 Rec (Lbs/A)	K_2O Rec (Lbs/A)	N Removed (Lbs/A)	P_2O_5 Removed (Lbs/A)	K_2O Removed (Lbs/A)	Custom Fert. Rec. Source
1	2008	Corn silage	22.0 Ton	150	0	160	183	79	183	
1	2009	Grass-clover hay new	4.0 Ton	30	0	60	200	60	240	
1	2010	Grass-clover hay maint	6.0 Ton	60	0	30	300	90	360	
2	2008	Grass-clover hay maint	6.0 Ton	60	0	30	300	90	360	
2	2009	Corn silage	22.0 Ton	150	0	160	183	79	183	
2	2010	Grass-clover hay new	4.0 Ton	30	0	60	200	60	240	
3	2008	Small grain cover*		0	0	0	0	0	0	
3	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
3	2009	Small grain cover*		0	0	0	0	0	0	
3	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
3	2010	Small grain cover*		0	0	0	0	0	0	
3	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2008	Small grain cover*		0	0	0	0	0	0	
4	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2009	Small grain cover*		0	0	0	0	0	0	
4	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2010	Small grain cover*		0	0	0	0	0	0	
4	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2008	Small grain cover*		0	0	0	0	0	0	
5	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2009	Small grain cover*		0	0	0	0	0	0	
5	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2010	Small grain cover*		0	0	0	0	0	0	
5	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
6a	2008	Small grain cover*		0	0	0	0	0	0	
6a	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
6a	2009	Small grain cover*		0	0	0	0	0	0	
6a	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
6a	2010	Small grain cover*		0	0	0	0	0	0	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P_2O_5 Rec (Lbs/A)	K_2O Rec (Lbs/A)	N Removed (Lbs/A)	P_2O_5 Removed (Lbs/A)	K_2O Removed (Lbs/A)	Custom Fert. Rec. Source
6a	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
6b	2008	Grass-clover hay new	4.0 Ton	30	0	0	200	60	240	
6b	2009	Grass-clover hay maint	6.0 Ton	60	0	0	300	90	360	
6b	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
7	2008	Bermuda common pasture	4.0 Ton	230[a]	0	0	184	48	200	Pasture includes fescue so increased N.
7	2009	Bermuda common pasture	4.0 Ton	230[a]	0	0	184	48	200	Pasture includes fescue so increased N.
7	2010	Bermuda common pasture	4.0 Ton	230[a]	0	0	184	48	200	Pasture includes fescue so increased N.

* Unharvested cover crop or first crop in double-crop system.
[a] Custom fertilizer recommendation.

6.6. Manure Application Planning Calendar – September 2007 through August 2008

Field	Total Acres	Spread Acres	Predominant Soil Type	Primary 2008 Crop (Prev. Primary Crop)	Sep '07	Oct '07	Nov '07	Dec '07	Jan '08	Feb '08	Mar '08	Apr '08	May '08	Jun '08	Jul '08	Aug '08
1	0.0	0.0	Dewey SIC (DwD3 12-20%)	Corn silage (Grass-clover hay maint)												
2	0.0	0.0	Dewey SIL (FsE 20-30%)	Grass-clover hay maint (Grass-clover hay new)												
3	0.0	0.0	Etowah SIL (HeB 2-5%)	Corn silage (Corn silage)												
4	33.9	33.9	Emory SIL (Em 1-3%)	Corn silage (Corn silage)	X	X										
5	26.8	26.8	Dewey SICL (DeD2 12-20%)	Corn silage (Corn silage)							X	X				
6a	17.5	16.9	Decatur SICL (DcD2 12-20%)	Corn silage (Corn silage)		84.5										
6b	0.0	0.0	Dewey SICL (DeD2 12-20%)	Grass-clover hay new (Corn silage)												
7	0.0	0.0	Dewey SICL (DeC2 5-12%)	Bermuda common pasture (Bermuda common pasture)												
Total	*78.2*	*77.6*			*X*	*84.5 X*					*X*	*X*				

No. indicates total loads
"X" indicates other manure apps

Manure Application Planning Calendar – September 2008 through August 2009

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2009 Crop (Prev. Primary Crop)	Sep '08	Oct '08	Nov '08	Dec '08	Jan '09	Feb '09	Mar '09	Apr '09	May '09	Jun '09	Jul '09	Aug '09
1	0.0	0.0	Dewey SIC (DwD3 12-20%)	Grass-clover hay new (Corn silage)												
2	0.0	0.0	Dewey SIL (FsE 20-30%)	Corn silage (Grass-clover hay maint)												
3	0.0	0.0	Etowah SIL (HeB 2-5%)	Corn silage (Corn silage)												
4	33.9	33.9	Emory SIL (Em 1-3%)	Corn silage (Corn silage)	X	X										
5	26.8	26.8	Dewey SICL (DeD2 12-20%)	Corn silage (Corn silage)							X	X				
6a	17.5	16.9	Decatur SICL (DcD2 12-20%)	Corn silage (Corn silage)		84.5										
6b	0.0	0.0	Dewey SICL (DeD2 12-20%)	Grass-clover hay maint (Grass-clover hay new)												
7	0.0	0.0	Dewey SICL (DeC2 5-12%)	Bermuda common pasture (Bermuda common pasture)												
Total	*78.2*	*77.6*			*X*	*84.5 X*					*X*	*X*				

No. indicates total loads
"X" indicates other manure apps

Manure Application Planning Calendar – September 2009 through August 2010

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2010 Crop (Prev. Primary Crop)	Sep '09	Oct '09	Nov '09	Dec '09	Jan '10	Feb '10	Mar '10	Apr '10	May '10	Jun '10	Jul '10	Aug '10
1	0.0	0.0	Dewey SIC (DwD3 12-20%)	Grass-clover hay maint (Grass-clover hay new)												
2	0.0	0.0	Dewey SIL (FsE 20-30%)	Grass-clover hay new (Corn silage)												
3	0.0	0.0	Etowah SIL (HeB 2-5%)	Corn silage (Corn silage)												
4	33.9	33.9	Emory SIL (Em 1-3%)	Corn silage (Corn silage)	X	X										
5	26.8	26.8	Dewey SICL (DeD2 12-20%)	Corn silage (Corn silage)							X	X				
6a	17.5	16.9	Decatur SICL (DcD2 12-20%)	Corn silage (Corn silage)		84.5										
6b	0.0	0.0	Dewey SICL (DeD2 12-20%)	Corn silage (Grass-clover hay maint)												
7	0.0	0.0	Dewey SICL (DeC2 5-12%)	Bermuda common pasture (Bermuda common pasture)												
Total	*78.2*	*77.6*			*X*	*84.5 X*					*X*	*X*				

No. **indicates** total **loads**
"X" indicates **other** manure apps

6.7. Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
4	Sep 2007	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	553,600 Gal	29.1	86	57	238
4	Oct 2007	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	91,200 Gal	4.8	86	57	238
4	Jun 2008	Corn silage	28-0-0	Surface band	Supp. N	22 Gal		746 Gal	33.9	66	0	0
4	Sep 2008	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	562,200 Gal	29.6	86	57	238
4	Oct 2008	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	81,700 Gal	4.3	86	57	238
4	Jun 2009	Corn silage	28-0-0	Surface band	Supp. N	17 Gal		576 Gal	33.9	51	0	0
4	Sep 2009	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	571,000 Gal	30.1	86	57	238
4	Oct 2009	Corn silage	Holding pond	Splash plate unit, Not incorporated	Custom	19,000 Gal	0.8 mph	72,200 Gal	3.8	86	57	238
4	Jun 2010	Corn silage	28-0-0	Surface band	Supp. N	15 Gal		509 Gal	33.9	45	0	0
5	Mar 2008	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	530,400 Gal	24.1	99	66	275
5	Apr 2008	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	59,400 Gal	2.7	99	66	275
5	Jun 2008	Corn silage	28-0-0	Surface band	Supp. N	17 Gal		456 Gal	26.8	51	0	0
5	Mar 2009	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	539,900 Gal	24.5	99	66	275
5	Apr 2009	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	50,600 Gal	2.3	99	66	275
5	Jun 2009	Corn silage	28-0-0	Surface band	Supp. N	12 Gal		322 Gal	26.8	36	0	0
5	Mar 2010	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	549,400 Gal	25.0	99	66	275
5	Apr 2010	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	39,600 Gal	1.8	99	66	275
5	Jun 2010	Corn silage	28-0-0	Surface band	Supp. N	10 Gal		268 Gal	26.8	30	0	0
6a	Oct 2007	Corn silage	Calf shed	Flail spreader, Not incorporated	Custom	15 Ton	84.5 Lds	253.5 Ton	16.9	36	35	41
6a	Jun 2008	Corn silage	28-0-0	Surface band	Supp. N	39 Gal		659 Gal	16.9	116	0	0
6a	Oct 2008	Corn silage	Calf shed	Flail spreader, Not incorporated	Custom	15 Ton	84.5 Lds	253.5 Ton	16.9	36	35	41
6a	Jun 2009	Corn silage	28-0-0	Surface band	Supp. N	36 Gal		608 Gal	16.9	107	0	0
6a	Oct 2009	Corn silage	Calf shed	Flail spreader, Not incorporated	Custom	15 Ton	84.5 Lds	253.5 Ton	16.9	36	35	41
6a	Jun 2010	Corn silage	28-0-0	Surface band	Supp. N	35 Gal		591 Gal	16.9	104	0	0

Planned Nutrient Applications (Non-manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
1	Oct 2007	Corn silage	0-0-60	Surface broadcast	1-yr K	266 Lbs	6,783 Lbs	25.5	0	0	160

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
1	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	1,301 Gal	25.5	152	0	0
1	Oct 2008	Grass-clover hay new	0-0-60	Surface broadcast	1-yr K	100 Lbs	2,550 Lbs	25.5	0	0	60
1	Jun 2009	Grass-clover hay new	33-0-0	Surface broadcast	1-yr N	90 Lbs	2,295 Lbs	25.5	30	0	0
1	Oct 2009	Grass-clover hay maint	0-0-60	Surface broadcast	1-yr K	50 Lbs	1,275 Lbs	25.5	0	0	30
1	May 2010	Grass-clover hay maint	33-0-0	Surface broadcast	1-yr N	181 Lbs	4,616 Lbs	25.5	60	0	0
2	Oct 2007	Grass-clover hay maint	0-0-60	Surface broadcast	1-yr K	50 Lbs	875 Lbs	17.5	0	0	30
2	May 2008	Grass-clover hay maint	33-0-0	Surface broadcast	1-yr N	181 Lbs	3,168 Lbs	17.5	60	0	0
2	Oct 2008	Corn silage	0-0-60	Surface broadcast	1-yr K	266 Lbs	4,655 Lbs	17.5	0	0	160
2	Jun 2009	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	893 Gal	17.5	152	0	0
2	Oct 2009	Grass-clover hay new	0-0-60	Surface broadcast	1-yr K	100 Lbs	1,750 Lbs	17.5	0	0	60
2	Jun 2010	Grass-clover hay new	33-0-0	Surface broadcast	1-yr N	90 Lbs	1,575 Lbs	17.5	30	0	0
3	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,744 Gal	53.8	152	0	0
3	Jun 2009	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,744 Gal	53.8	152	0	0
3	Jun 2010	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,744 Gal	53.8	152	0	0
6a	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	31 Gal	0.6	152	0	0
6a	Jun 2009	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	31 Gal	0.6	152	0	0
6a	Jun 2010	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	31 Gal	0.6	152	0	0
6b	Jun 2008	Grass-clover hay new	33-0-0	Surface broadcast	1-yr N	90 Lbs	2,052 Lbs	22.8	30	0	0
6b	May 2009	Grass-clover hay maint	33-0-0	Surface broadcast	1-yr N	181 Lbs	4,127 Lbs	22.8	60	0	0
6b	Jun 2010	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	1,163 Gal	22.8	152	0	0
7	Oct 2007	Bermuda common pasture	33-0-0	Surface broadcast	Custom	90 Lbs	4,545 Lbs	50.5	30	0	0
7	May 2008	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0
7	Jul 2008	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
7	Oct 2008	Bermuda common pasture	33-0-0	Surface broadcast	Custom	90 Lbs	4,545 Lbs	50.5	30	0	0
7	May 2009	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0
7	Jul 2009	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0
7	Oct 2009	Bermuda common pasture	33-0-0	Surface broadcast	Custom	90 Lbs	4,545 Lbs	50.5	30	0	0
7	May 2010	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0
7	Jul 2010	Bermuda common pasture	33-0-0	Surface broadcast	Custom	303 Lbs	15,302 Lbs	50.5	100	0	0

6.8. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[1]			Nutrients Applied[2]			Balance After Recs[3]			Balance After Removal[4]	
		Acres		/Acre	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	P_2O_5 Lb/A	K_2O Lb/A
2008	4	33.9	Small grain cover		0	0	0								
2008	4	33.9	Corn silage	22	150	0	0	152	57	238	2	57	238	-22	55
2009	4	33.9	Small grain cover		0	0	0								
2009	4	33.9	Corn silage	22	150	0	0	137	57	238	0†	114	476	-22	110
2010	4	33.9	Small grain cover		0	0	0								
2010	4	33.9	Corn silage	22	150	0	0	131	57	238	0†	171	714	-22	165
Total	**4**				**450**	**0**	**0**	**420**	**171**	**714**					
2008	5	26.8	Small grain cover		0	0	0								
2008	5	26.8	Corn silage	22	150	0	0	150	66	275	0	66	275	-13	92
2009	5	26.8	Small grain cover		0	0	0								
2009	5	26.8	Corn silage	22	150	0	0	135	66	275	0†	132	550	-13	184
2010	5	26.8	Small grain cover		0	0	0								
2010	5	26.8	Corn silage	22	150	0	0	129	66	275	1†	198	825	-13	276
Total	**5**				**450**	**0**	**0**	**414**	**198**	**825**					
2008	6a	16.9	Small grain cover		0	0	0								
2008	6a	16.9	Corn silage	22	150	0	0	152	35	41	2	35	41	-44	-142
2009	6a	16.9	Small grain cover		0	0	0								
2009	6a	16.9	Corn silage	22	150	0	0	143	35	41	2†	70	82	-44	-142
2010	6a	16.9	Small grain cover		0	0	0								
2010	6a	16.9	Corn silage	22	150	0	0	140	35	41	2†	105	123	-44	-142
Total	**6a**				**450**	**0**	**0**	**435**	**105**	**123**					

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[1]			Nutrients Applied[2]			Balance After Recs[3]			Balance After Removal[4]	
		Acres		/Acre	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	P_2O_5 Lb/A	K_2O Lb/A
2008	1	25.5	Corn silage	22	150	0	160	152	0	160	2	0	0	-79	-23
2009	1	25.5	Grass-clover hay new	4	30	0	60	30	0	60	0	0	0	-60	-180

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[1]			Nutrients Applied[2]			Balance After Recs[3]			Balance After Removal[4]	
		Acres		/Acre	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	P_2O_5 Lb/A	K_2O Lb/A
2010	1	25.5	Grass-clover hay maint	6	60	0	30	60	0	30	0	0	0	-90	-330
Total	**1**				**240**	**0**	**250**	**242**	**0**	**250**					
2008	2	17.5	Grass-clover hay maint	6	60	0	30	60	0	30	0	0	0	-90	-330
2009	2	17.5	Corn silage	22	150	0	160	152	0	160	2	0	0	-79	-23
2010	2	17.5	Grass-clover hay new	4	30	0	60	30	0	60	0	0	0	-60	-180
Total	**2**				**240**	**0**	**250**	**242**	**0**	**250**					
2008	3	53.8	Small grain cover		0	0	0								
2008	3	53.8	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2009	3	53.8	Small grain cover		0	0	0								
2009	3	53.8	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2010	3	53.8	Small grain cover		0	0	0								
2010	3	53.8	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
Total	**3**				**450**	**0**	**0**	**456**	**0**	**0**					
2008	6a	0.6	Small grain cover		0	0	0								
2008	6a	0.6	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2009	6a	0.6	Small grain cover		0	0	0								
2009	6a	0.6	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2010	6a	0.6	Small grain cover		0	0	0								
2010	6a	0.6	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
Total	**6a**				**450**	**0**	**0**	**456**	**0**	**0**					
2008	6b	22.8	Grass-clover hay new	4	30	0	0	30	0	0	0	0	0	-60	-240
2009	6b	22.8	Grass-clover hay maint	6	60	0	0	60	0	0	0	0	0	-90	-360
2010	6b	22.8	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
Total	**6b**				**240**	**0**	**0**	**242**	**0**	**0**					
2008	7	50.5	Bermuda common pasture	4	230[¤]	0	0	230	0	0	0	0	0	-48	-200
2009	7	50.5	Bermuda common pasture	4	230[¤]	0	0	230	0	0	0	0	0	-48	-200
2010	7	50.5	Bermuda common pasture	4	230[¤]	0	0	230	0	0	0	0	0	-48	-200
Total	**7**				**690**	**0**	**0**	**690**	**0**	**0**					

[1] Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

[2] Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

[3] For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applicaitions. For P_2O_5 and K_2O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

[4] Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

¤ Indicates a custom fertilizer recommendation in the Fertilizer Recs column.

* Indicates in the Balance After Recs N column that the legume crop is assumed to utilize some or all of the supplied N.

† Indicates in the Balance After Recs N column that the value includes residual N expected to become available that year from prior years' manure applications.

6.9. Manure Inventory Annual Summary

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Trans-ferred In	Total Applied	Total Exported	Total Trans-ferred Out	On Hand at End of Period	Units
Holding pond	Sep '07 - Aug '08	450,000	1,244,000	0	0	1,234,600	0	0	459,400	Gal
Calf shed	Sep '07 - Aug '08	220	264	0	0	254	0	0	231	Ton
Holding pond	Sep '08 - Aug '09	459,400	1,244,000	0	0	1,234,400	0	0	469,000	Gal
Calf shed	Sep '08 - Aug '09	231	264	0	0	254	0	0	241	Ton
Holding pond	Sep '09 - Aug '10	469,000	1,244,000	0	0	1,232,200	0	0	480,800	Gal
Calf shed	Sep '09 - Aug '10	241	264	0	0	254	0	0	252	Ton

6.10. Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Sep - Dec	Product Needed Jan - Aug	Total Product Needed	Units
0-0-60	Sep '07 - Aug '08	7,658	0	7,658	Lbs
28-0-0	Sep '07 - Aug '08	0	5,936	5,936	Gal
33-0-0	Sep '07 - Aug '08	4,545	35,824	40,369	Lbs
0-0-60	Sep '08 - Aug '09	7,205	0	7,205	Lbs
28-0-0	Sep '08 - Aug '09	0	5,173	5,173	Gal
33-0-0	Sep '08 - Aug '09	4,545	37,026	41,571	Lbs
0-0-60	Sep '09 - Aug '10	3,025	0	3,025	Lbs
28-0-0	Sep '09 - Aug '10	0	5,306	5,306	Gal
33-0-0	Sep '09 - Aug '10	4,545	36,795	41,340	Lbs

6.11. Whole-farm Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P_2O_5 (Lbs)	K_2O (Lbs)
Total Manure Nutrients on Hand at Start of Plan[1]	5,842	1,856	6,219
Total Manure Nutrients Collected[2]	42,151	13,018	48,788
Total Manure Nutrients Imported[3]	0	0	0
Total Manure Nutrients Exported[4]	0	0	0
Total Manure Nutrients on Hand at End of Plan[5]	6,342	2,021	6,689
Total Manure Nutrients Applied[6]	41,675	12,878	48,393
Available Manure Nutrients Applied[7]	20,962	12,878	48,393
Commercial Fertilizer Nutrients Applied[8]	14,154	0	0
Available Nutrients Applied[9]	35,116	12,878	48,393
Nutrient Utilization Potential[10]	34,920	18,391	42,602
Nutrient Balance of Spreadable Acres[11*]	196	-5,513	5,791
Average Nutrient Balance per Spreadable Acre per Year[12*]	1	-24	25

1. Values indicate total manure nutrients present in storage(s) at the beginning of the plan.
2. Values indicate total manure nutrients collected on the farm.
3. Values indicate total manure nutrients imported onto the farm.
4. Values indicate total manure nutrients exported from the farm to an external operation.
5. Values indicate total manure nutrients present in storage(s) at the end of plan.
6. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.
7. Values indicate available manure nutrients applied on the farm based on rate, time and method of application. These values are based on the total manure nutrients applied (row 6) after accounting for state-specific nutrient losses due to rate, time and method of application.
8. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
9. Values are the sum of available manure nutrients applied (row 7) and commercial fertilizer nutrients applied (row 8).
10. Values indicate nutrient utilization potential of crops grown. For N the value generally is based on crop N recommendation for non-legume crops and crop N uptake or other state-imposed limit for N application rates for legumes. P_2O_5 and K_2O values generally are based on fertilizer recommendations or crop removal (whichever is greatest).
11. Values indicate available nutrients applied (row 9) minus crop nutrient utilization potential (row 10). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
12. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres (row 11) by the number of spreadable acres in plan and by the length of the plan in years. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

* Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. For example, plans that include legume crops often will not utilize the full N utilization potential for legume crops if manure can be applied to non-legume crops that require N for optimum yield. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was not developed properly. For example, producers may be allowed to apply N-based application rates of manure to fields with low soil test P values or fields with a low potential P-loss risk based on the risk assessment tool used by the state. Negative values for P_2O_5 and K_2O indicate that planned applications to some fields are less than crop removal rates.

Whole-farm Nutrient Balance (Non-manure-spreadable Area)

	N (Lbs)	P_2O_5 (Lbs)	K_2O (Lbs)
Commercial Fertilizer Nutrients Applied[1]	75,575	0	10,750
Nutrient Utilization Potential[2]	75,117	0	10,750
Nutrient Balance of Non-spreadable Acres[3*]	458	0	0
Average Nutrient Balance per Non-spreadable Acre per Year[4*]	1	0	0

1. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
2. Values indicate nutrient utilization potential of crops grown based on crop fertilizer recommendations.

3. Values indicate commercial fertilizer nutrients applied (row 1) minus crop nutrient utilization potential (row 2). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
4. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres (row 3) by number of non-spreadable acres in plan. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

* Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utllization potential which may or may not be intentional. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was not developed properly. For example, multiple year applications may have been planned during the final plan year(s) and these nutrients will not be utilized by crops in the current plan. Negative values for P_2O_5 and K_2O indicate that applications to some fields may have been delayed to allow the producer to apply the nutrients in accordance with their fertllization schedule.

Section 7. Feed Management *(Optional)*

(Include only if Feed Management Plan is required to reduce the total nutrients excreted by livestock on the farm.)

Feed Management

The primary focus in evaluating the feeding program is to manage the quantity and quality of available nutrients fed to dairy for their intended purpose. That is, to supply the quantity of available nutrients required by the dairy for maintenance, milk production, growth of young animals and reproduction; while reducing the quantity of nutrients, especially nitrogen and phosphorus, excreted in manure by minimizing the over-feeding of these and other nutrients. In addition, with more precision feeding, there is a potential to improve net farm income by feeding nutrients more efficiently. The feeding program for the transition calves, heifers, close-up cows and the dry cows includes a pasture based diet with a protein supplement. The lactating cow feeding program is a total mixed ration (TMR). A summary of the rations by animal type with total P in the diet is shown in the table below.

The TMR ration is formulated to meet the needs of the entire group with one ration which includes a range of potentially lower producing cows or freshening heifers to very high producing cows. In addition, the potential for low ration dry matter intakes during extremely high temperature have been accommodated by additional nutrients in the ration formulation. The targeted phosphorus level in the TMR is 0.35 – 0.36% on a dry matter basis for an average 1300 lb cow with a range of dry matter intakes from 45 to 50 lb/d. The NRC (2001) requirement for this size of cow is about 0.33 - 0.35% P. Sample nutrient requirements are shown in table 2 from NRC (2001).

Following are some suggested feed management practices that may enhance nutrient efficiency and reduce excretion of N and P from the Sample dairy herd:

- Develop a routine forage feed analysis program to estimate nutrient intake by the animals that are on pasture. This will assist in adjusting the formulation of the supplement feed for the different classes of animals.
- Determine the dry matter content of various components of the ration routinely to control the ingredient dry matter content at feeding. This will help reduce variation in ration nutrients and make necessary adjustment to deliver the correct amount of nutrients to the cows.
- Group the lactating cows in the herd according to their requirements, if it is reasonable, based upon the amount of milk produced.
- Reformulate the rations as needed to improve the accuracy of meeting the requirements of the cows as dry matter intake changes. This is especially critical with extreme weather conditions (high temperatures).
- Reformulate the rations when new feed ingredients are used and evaluate the potential impact on nutrient excretion and the nutrient balance on the farm.
- Use milk production, milk components and milk urea N to track the impact of changes in ration formulation and feed management.

Maintaining animal feed formulations, feed analyses, reproduction, health, and milk production records are valuable components in determining the nutrient flow on farm. The animal feed records can be correlated with various aspects of animal productivity and the nutrient flow through manure, soil and crop production to see if there is an impact on the recycling of the nutrients on farm and to determine if a whole farm nutrient balance is achieved.

Animal Rations

Feed content and weight by animal group
Source: Producer, Animal Nutritionist, Farmers Co-op
And composition estimates *(in italics)* for farm grown ingredients from National Research Council (NRC) (2001)

ID	Age	Weight	Ration (wet wt.)
New calves	Birth to 8-12 weeks	80/100lbs to 200/300 lbs	5.5 lbs/calf/day
Transition calves	3 mo. to 6/8 mo.	Up to 600lbs	Free choice ~10 lbs/calf/day
Heifers	8 mo. to 20/22 mo.	Up to 1100 lbs	4.5 lbs/cow/day
Dry cows		1300 lbs	4 lbs/cow/day
Close up cows (cows ready to calve)		1300 lbs	4lb/cow/day
Lactating cows		1300 lbs	99 lbs/cow/day

Animal Type	Ration Name	Feed Disappearance Wet Basis (lbs/group/yr)	Feed Disappearance Dry Basis (lbs/group/yr)	% DM	Feed Nutrients[a] % Protein	Feed Nutrients[a] % P	Total Nutrients Fed N (lb/yr)	Total Nutrients Fed P (lb/yr)	Import or Farm Grown
New Calves	New Calf Ration	150,562	135,506	0.9	17.8%	0.56%	3,859	759	Import
75 calves	Ration Summary	6.50 lb/animal/d	4.95 lb/animal/d		17.8%	0.56%			
Transition Calves	Wheat Silage	105,941	36,020	34%	12.5%	0.29%	720	104	Farm
	48% Soybean Meal	13,550	11,924	88%	55.3%	0.69%	1,055	82	Import
	849 Mineral Pack	3,698	3,622	98%	0.1%	4.00%	1	145	Import
75 calves	Ration Summary	4.5 lb/animal/d	1.9 lb/animal/d		21.5%	0.64%			
Heifers	Wheat Silage	235,425	80,515	34%	12.5%	0.29%	1,610	233	Farm
	48% Soybean Meal	30,112	26,499	88%	55.3%	0.69%	2,345	183	Import
	849 Mineral Pack	8,212	8,048	98%	0.1%	4.00%	1	322	Import
75 heifers	Ration Summary	10.0 lb/animal/d	4.2 lb/animal/d		21.5%	0.64%			
Dry Cows	Orchard grass/timothy	547,500	487,275	89%	11.9%	0.27%	9,200	1,330	Farm
	Formulated feed	43,800	39,070	89%	34.2%	0.52%	2,139	203	Import
Close up Cows	Orchard grass/timothy	273,750	243,638	89%	11.9%	0.27%	4,600	665	Farm
(close to calving)	Formulated feed	43,800	39,070	89%	34.2%	0.52%	2,139	203	Farm
	Corn silage	99,550	34,493	35%	6.7%	0.26%	477	90	Import
	Animate	8,212	8,048	98%	0.0%	0.50%	-	40	Import
60 cows	Ration Summary	46.4 lb/animal/d	39.9 lb/animal/d		13.6%	0.30%			
Lactating Cows	Corn silage	3,516,935	1,230,577	35%	6.7%	0.26%	17,031	3,200	Farm
	Pearl millet	543,841	484,018	89%	13.7%	0.11%	10,810	532	Farm
	Formulated feed	2,283,857	2,039,735	89%	29.7%	0.52%	98,928	10,607	Import
175 cows	Ration Summary	99.0 lb/animal/d	58.8 lb/animal/d		20.7%	0.38%			
Total Nutrients Fed							152,713	18,899	
Total Nutrients Imported							106,804	12,430	

[a] Feed Nutrients are shown on a % dry basis

Section 8. Other Utilization Options

Section 9. Record keeping (See PAD)

Section 10. References

10.1. Publications

Animal Waste

AWMFH Chapter 4, Table 4-5(b), March 2008

Crop Fertilizer Recommendations

"Lime and Fertilizer Recommendations for the Various Crops of Tennessee," BEES Info #100, Aug 2008
http://soilplantandpest.utk.edu/publications/soilfertilizerpubs.htm

Manure Application Setback Features/Distances

Nutrient Management Standard 590
http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc

Manure Nutrient Availability

"Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94
http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm

Phosphorus Assessment

"Tennessee Phosphorus Index," Tennessee NRCS, Nov. 2001

Practice Standards

Tennessee NRCS Nutrient Management Standard (590), Jan. 2003
http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc

10.2. Software and Data Sources

MMP Version	MMP 0.2.8.0
MMP Plan File	6/4/2009 12:30:36 PM
MMP Initialization File for Tennessee	6/4/2009
MMP Soils File for Tennessee	6/2/2009
Phosphorus Index Tool Version	2009.02.20
NRCS Conservation Plan(s)	Plan name: MMP Tools Export Service date: none

AWM Output

Number of Operating Periods: 2 **Data Source:** NRCS AWM program

1st Operating Period: November - March
2nd Operating Period: April - October

Climate Data

State: TN

County: Loudon
Station: LENOIR CITY TN5153
25 Yr - 24 Hr Storm Event: 5.6 inches

Month	Prec. (in)	Evap. (in)
January	4.73	1.80
February	4.32	1.90
March	5.85	3.00
April	4.24	4.00
May	4.82	4.90
June	3.80	5.50
July	5.08	5.80
August	3.88	5.20
September	3.41	4.30
October	3.29	2.90
November	4.27	1.80
December	4.83	1.70
	52.50	42.40

Animal Data

Animal	Type	Quantity	Weight	Manure	VS	TS	Manure	VS	TS
			lbs	cu.ft/day/AU	lbs/day/AU	lbs/day/AU	cu.ft/day	lbs/day	lbs/day
Dairy	Lactating	175	1300	1.30	8.50	10	295	1933	2275
	Totals	175	N/A	N/A	N/A	N/A	295	1933	2275

Location Data

Percent of Manure Deposited in Each Location:

Period 1			
	Freestall	Lactating	35
	Holding Area	Lactating	10
	Parlor	Lactating	5
	Totals	Lactating	50
Period 2			
	Freestall	Lactating	35
	Holding Area	Lactating	10
	Parlor	Lactating	5
	Totals	Lactating	50

Additions Data

Operating Period:	1				
	Location	Wash Water	Flush Water	Bedding	Amount
		gal/day	gal/day		lbs/day
	Freestall	0.00	0.00	Sawdust / Shavings	263.00
	Holding Area	50.00	0.00	0.00	
	Parlor	200.00	0.00	0.00	
Operating Period:	2				
	Freestall	0.00	0.00	Sawdust / Shavings	263.00
	Holding Area	50.00	0.00	0.00	
	Parlor	200.00	0.00	0.00	

Runoff Data

Runoff Volume Method:	Calculate Monthly Runoff Volumes with AWM
Pervious Watershed Area:	acres
Pervious Curve Number Storm:	
Pervious Curve Number Monthly:	(30 day)
Impervious Area:	20420 sq. ft
25 Year Pervious:	0.00 cu. ft
25 Year Impervious:	9120.00 cu ft
25 Year Total:	9120.00 cu ft

Runoff Volumes (1000 cu. ft.)

Month	Pervious	Impervious	Month Total
January	0.00	7.08	7.08
February	0.00	6.39	6.39
March	0.00	8.97	8.97
April	0.00	6.26	6.26
May	0.00	7.23	7.23
June	0.00	5.62	5.62
July	0.00	7.67	7.67
August	0.00	5.62	5.62
September	0.00	4.67	4.67
October	0.00	4.67	4.67
November	0.00	6.31	6.31
December	0.00	7.25	7.25
Total	0.00	77.93	77.93

Facility Volume Data

	Facility	Manure	Wash Water	Flush Water	Bedding	Total Vol
Operating Period 1						
	Storage Pond #1	147.88	33.42	0.00	16.70	197.99
Operating Period 2						
	Storage Pond #1	147.88	33.42	0.00	16.70	197.99

Storage Pond

Max. Storage Vol. Method:		Cum. Storage Vol			
Storage Months:		4 months		Critical Months:	Dec - Mar
Design Dimensions				Design Quantities	
Shape:	Rectangle	Top Length:	134.9 ft	25yr-24hr Storm Depth:	5.8 in
Sideslope:	2:1	Bottom Length:	99.8 ft	Prec Minus Evap Depth:	11.53 in
Storage Depth:	6.6 ft	Top Width:	121.1 ft		
Waste Volume:	53845 cu. ft				
Final Depth:	9.0 ft	Bottom Width:	85.0 ft		
Freeboard:	1.0 ft	Bot Dimensions:	85.0 x 99.8 ft		
		Top Dimensions:	121.1 x 134.9 ft		

Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal or Pumpdown	Waste Volume	Prec - Evap	Cum Storage Vol
January	7.08		6.14	-4.28	35.13
February	6.39		5.74	-2.29	50.55
March	8.97	Yes	6.14	-5.86	59.54
April	6.26	Yes	5.94	-0.33	12.53
May	7.23		6.14	-0.11	13.26
June	5.52		5.94	-2.31	22.40
July	7.67		6.14	-0.71	35.50
August	5.82		6.14	-1.82	45.44
September	4.87	Yes	5.94	-1.21	55.04
October	4.87	Yes	6.14	0.53	60.37
November	6.31		5.94	3.36	15.61
December	7.25		6.14	-4.26	17.65

Shelby Tube Tests

Eight undisturbed samples collected from an existing holding pond on the Sample Dairy Farm were submitted to the NRCS Soil Mechanics Laboratory in Fort Worth, Texas for permeability testing to verify compliance with seepage standards.

Index Tests and Permeability Group

The samples were all very similar. They were all moderately to highly plastic and classified as lean clay (CL) or fat clay (CH) according to the Unified Soil Classification System (USCS). Index properties of the submitted samples are shown on the attached form SCS-ENG-354. Basic soil index properties and the permeability group associated with each sample (as defined in Appendix 10D to the Agricultural Waste Management Field Handbook) are summarized in the table below.

SAMPLE NUMBER FIELD/LAB	% PASSING 2 MICRONS (0.002MM)	% PASSING #200 SIEVE	% PASSING #4 SIEVE	LL	PI	G_s	USCS CLASS	APPENDIX 10D PERM. GROUP
1W / F02-381	59	98	100	50	29	2.68	CL/CH	III
1S / F02-382	57	100	100	48	24	2.67	CL	III
1 / F02-383	57	98	100	53	33	2.67	CH	IV
2W / F02-384	62	100	100	53	28	2.70	CH	III
2S / F02-385	59	100	100	54	29	2.68	CH	III
2 / F02-386	50	97	100	47	22	2.67	CL	III
3 / F02-387	59	99	100	55	29	2.68	CH	III
4 / F02-388	58	100	100	44	22	2.70	CL	III

Permeability Tests

A flexible wall permeability test was performed on each of the samples. The resulting permeability rates or *k* values are summarized in the table below. The degree of saturation of each undisturbed sample was calculated using the "as received" water content and a measured specific gravity and dry unit weight.

SAMPLE NUMBER FIELD/LAB	IN PLACE DENSITY (PCF) *	NAT. W%	G_s	INITIAL SATURATION (%)	K VALUE, (CM/SEC)	K VALUE, (FT/DAY)
1W / F02-381	89.2	31.6	2.68	93.7	1.8×10^{-4}	0.000052
1S / F02-382	91.4	30.6	2.67	93.9	1.6×10^{-3}	0.000044
1 / F02-383	92.4	29.6	2.67	98.2	1.6×10^{-4}	0.000046
2W / F02-384	87.4	35.7	2.70	104.0	1.8×10^{-4}	0.000051
2S / F02-385	88.8	34.3	2.68	93.8	9.6×10^{-3}	0.0027
2 / F02-386	87.8	33.2	2.67	93.0	1.2×10^{-4}	0.000035
3 / F02-387	84.1	27.0	2.68	93.0	1.6×10^{-4}	0.000045
4 / F02-388	95.8	28.7	2.70	95.0	6.1×10^{-4}	0.00017

Conclusions

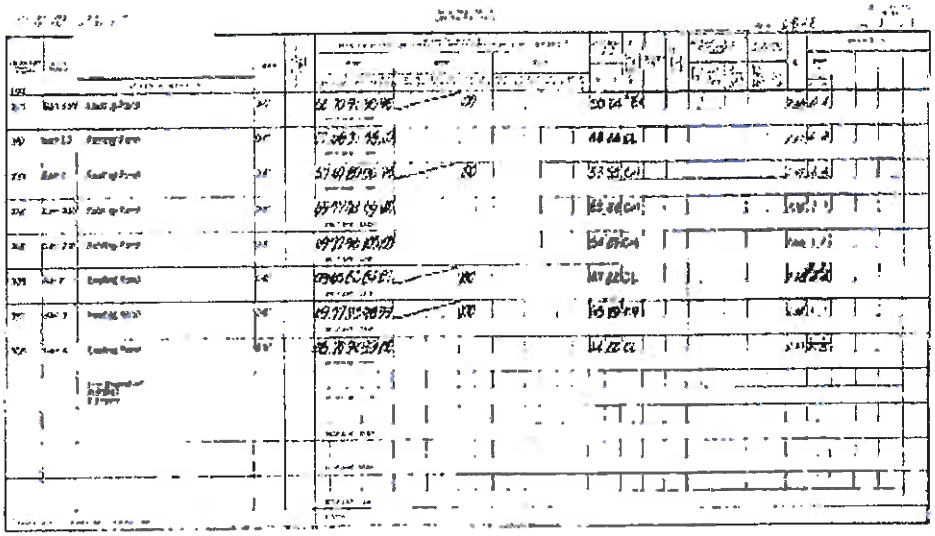
The specific discharge formula from Appendix 10D of AWMFH is:

$$v = \frac{k^*(H+d)}{d}$$

where; v is specific discharge in $ft^3/ft^2/day$
k is permeability of 9.6×10^{-7} cm/sec (0.0027 ft/day)
H is 9 feet of liquid waste
d equals 1 foot for the liner

Using the values above give a specific discharge of 9.6×10^{-4} $cm^3/cm^2/sec$ (0.027 $ft^3/ft^2/day$) for the sample which does not meet the acceptable standard of 1.0×10^{-6} (0.0028 $ft^3/ft^2/day$). However, this sample contained a rock which may have negatively influenced testing. Also, one order of magnitude credit (1.0×10^{-1} or 0.028) can be given to the effect of ruminant sealing. Given this factor, the specific discharge of 0.027 $ft^3/ft^2/day$ is acceptable and meets the current NRCS standard for seepage for this sample.

Atterberg Test



Background Soil and Manure Tests

Initial Soil Test Report

Field #	Water pH	Phosphorus P (lbs/Ac)	Potassium K (lbs/Ac)	Crop	Acres	Recommend Rate $N/P_2O_5/K_2O$ & Lime (lbs/Ac)
1	6.8	18 L	62 L	Timothy/Ograss	27.4	60-120/60/60*
2	7.2	30 M	96 M	Timothy/Ograss	19.2	60-120/40/40*
3	6.1	88 H	320+ V	CS 19-25 T/A	58	150/60/0*
4	6.9	88 H	221 H	CS 19-25 T/A	37.1	150/60/100*
5	6.2	120+ V	320+ V	CS 19-25 T/A	30.4	150/0/0*
6	6.9	30 M	66 L	CS 19-25 T/A	51.4	150/60/240*
7	6.7	120+ V	320+ V	Pasture	50	60-120/0/0*

*No Lime recommended

The analysis from the storage pond is as follows:

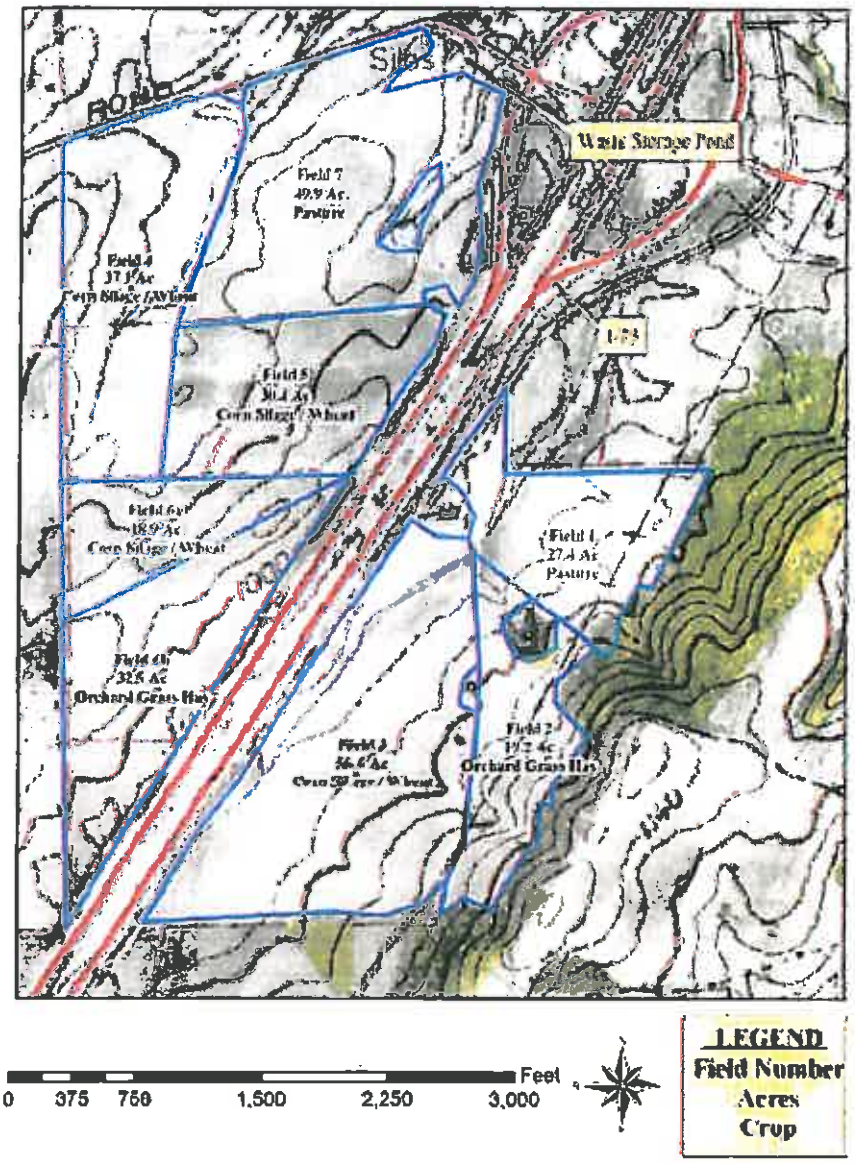
Source & Testing Date	Total Nitrogen	Total Phosphorus as P_2O_5	Total Potassium as K_2O	pH
Storage Facility – 11/01	10 lbs/1000 gal	3 lbs/1000 gal	12.5 lbs/1000 gal	7.6

RUSLE

The following RUSLE soil loss calculations for the farm demonstrate that soil loss on the farm will occur at or close to soil loss tolerance (5 tons/ac/yr). The planned cropping system is No-till corn silage with winter cover planted in November and killed in April or NT corn and wheat silage followed by 2 years orchardgrass/red clover.

Field	R	K	LS	C	P	A (ton/ac/yr)
3	190	0.303	0.99	0.069	1	3.9
4	190	0.303	1.31	0.069	1	5.2
5	190	0.303	1.31	0.069	1	5.2
6A	190	0.265	1.52	0.069	0.93	4.9
6B	190	0.303	1.85	006	1	0.6
7	190	0.303	1.85	0.043	1	4.6

Farm with Contours



P-Index Information

Tennessee Phosphorus Index Risk Rating

Tract Number:	1234	**Rating:**	MEDIUM
Field Number:	4	**Phos. Index:**	198
Field Name:	-	**Controlling Nutrient:**	Nitrogen

Soil Test P:	Very High	Applied As	Application Timing: April,May,Oct,Mar or Nov. w/ winter cover
Application Rate:	150	Surface applied (no incorporation)	Application Method: Surface applied (no incorporation)

Hydrologic Soil Group	Permanent Vegetative Buffer Width	Non-Application Width from Surface Water Conveyance
B	>29	>29

Slope	Cover	Texture	Length of Horizontal Slope
5 - 12	No-till row crops with heavy residues	All textures	75

Tract Number:	1234	**Rating:**	MEDIUM
Field Number:	5	**Phos. Index:**	198
Field Name:	-	**Controlling Nutrient:**	Nitrogen

Soil Test P:	Very High	Applied As	Application Timing: April,May,Oct,Mar or Nov. w/ winter cover
Application Rate:	150	Surface applied (no incorporation)	Application Method: Surface applied (no incorporation)

Hydrologic Soil Group	Permanent Vegetative Buffer Width	Non-Application Width from Surface Water Conveyance
B	>29	>29

Slope	Cover	Texture	Length of Horizontal Slope
5 - 12	No-till row crops with heavy residues	All textures	75

Total Points from P Index	***Generalized Interpretation of P Index Points for the Site***
< 160	LOW potential for P movement from the field. If farming practices are maintained at the current level there is a low probability of an adverse impact to surface waters from P losses. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
160 - 200	MEDIUM potential for P movement from the field. The chance for adverse impact to surface waters exist. *Nitrogen-based nutrient management planning is satisfactory for this field when conservation measures are implemented to lessen the probability of P loss.* Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
201 - 350	HIGH potential for P movement from the field. The chance for adverse impact to surface waters is likely unless remedial action is taken. Soil and water conservation practices are necessary (if practical) to reduce the risk of P movement and water quality degradation. If risk cannot be reduced, then a P-based nutrient management plan will be implemented.
> 351	VERY HIGH potential for P movement from the field and an adverse impact on surface waters. All necessary soil and water conservation practices, plus a P-based nutrient management plan must be put in place to avoid the potential for water quality degradation.