Tennessee Department of Environment and Conservation,
Division of Water Pollution Control
401 Church Street, 6th Floor L & C Annex, Nashville, TN 37243
(615) 532-0625

CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)
STATE OPERATING PERMIT (SOP)
NOTICE OF INTENT (NOI)

Type of permit you are requesting: ☐ SOPCD0000 (designed to discharge) ☐ SOPC00000 (no discharge) ☐ Unknown, please advise

Application type: ☐ New Permit ☐ Permit Reissuance ☒ Permit Modification

If this NOI is submitted for Permit Modification or Reissuance provide the existing permit tracking number:

OPERATION IDENTIFICATION

Operation Name:	**D & M Farms**	County:	**McMinn**
Operation Location/ Physical Address:	**1051 CR 316, Niota, TN 37826**	Latitude:	**35.604820**
		Longitude:	**-84.580639**

Name and distance to nearest receiving water(s): **Little Foster Branch; 1,300 feet south**

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list those permit numbers:

Animal Type: ☒ Poultry ☐ Swine ☐ Dairy ☐ Beef ☐ Other ____

Number of Animals: 318,000 | Number of Barns: 6 | Name of Integrator: Koch Foods

Type of Animal Waste Management: (check all that apply)
☒ Dry
☐ Liquid
☐ Liquid, Closed System (i.e. covered tank, under barn pit, etc.)

Attach the NMP ☒ NMP Attached | Attach the closure plan ☒ Closure Plan Attached | Attach a topographic map ☒ Map Attached

PERMITTEE IDENTIFICATION

Official Contact (applicant): **Matt Henley**	Title or Position: **Owner/Operator**			
Mailing Address: **810 County Road 188**	City: Niota	State: **TN**	Zip: **37826**	☒ Correspondence ☒ Invoice
Phone number(s): **423-453-1304c**	E-mail:			
Optional Contact: Doug Price	Title or Position: Owner/Operator			
Address: **810 County Road 188**	City: Niota	State: **TN**	Zip: **37826**	☒ Correspondence ☒ Invoice
Phone number(s): **423-453-6426c,**	E-mail:			

APPLICATION CERTIFICATION AND SIGNATURE (must be signed in accordance with the requirements of Rule 1200-4-5-.05)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
Matt Henley/Doug Price		

STATE USE ONLY

Received Date	Reviewer	EFO	T & E Aquatic Fauna	Tracking No.
	Impaired Receiving Stream	High Quality Water		NOC Date

ManPlan.net
Practical, Comprehensive, Nutrient Management

Nutrient Management Plan

D & M Farms

Prepared by ManPlan Inc
Dennis J Godar, TSP# 03-2005
Date Prepared: 11-24-2015

For Years; 2016-2020

Operation Name:	**D & M Farms**
Owner / Operator's Name:	**Matt Henley / Doug Price**
Mailing Address:	**810 County Road 188** **Niota, TN 37826**
Farm Address:	**1051 County Road 316** **Niota, TN 37826**
Telephone Numbers:	**Matt Cell – (423) 453-1304** **Doug Cell- (423) 453-6426**
GPS Coordinates:	**35.602732, -84.580161**

D & M Farms is a planned poultry operation to have facilities with capacity for 318,000 broilers total in six houses.

TSP-Conservation Planner

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

Signature: _____ Date: _____
Name: Dennis J. Godar
Title: Certification Credentials: TSP # 03-2005

Owner/Operator

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

Signature: _____ Date: _____
Name:

TSP-Conservation Planner

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

Signature: Dennis J. Godar Date: 11-25-2015
Name: Dennis J. Godar
Title: Certification Credentials: TSP # 03-2005

Owner/Operator

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

Signature: _____ Date: _____
Name:

Table of Contents

Section 1. Background and Site Information

Purpose of the Nutrient Management Plan (NMP)

The Nutrient Management Plan (NMP) is a conservation system for your animal feeding operation. It is designed to address, at a minimum, the soil erosion and water quality concerns on your operation.

Manure and Nutrient Management is managing the source, rate, form, timing, placement and utilization of manure, other organic by-products, bio-solids, and other nutrients in the soil and residues. The goal is to effectively and efficiently use the nutrient resources to adequately supply soils and plants to produce food, forage, fiber, and cover while minimizing the transport of nutrients to ground and surface water and environmental degradation.

Nitrogen and Phosphorus vs. Water Quality

Nitrogen and Phosphorus are two nutrients that have the potential to impair the quality of our groundwater and surface water. Nitrogen leaching out the root zone may enter a tile and be transported to surface water or it may leach to the groundwater. The EPA Drinking Water Maximum Contaminant Level (MCL) for Nitrates is 10 mg/L. Phosphorus leachate, or runoff entering the surface water may contribute to excessive algae growth which may cause low oxygen levels in surface water. This in turn may impair aquatic life. This manure and nutrient management plan will help to protect the groundwater and surface water.

1.1. General Description of Operation

D & M Farms is a planned broiler operation that will have capacity for 318,000 broilers total in six houses. The Farm is operated by Mr. Matt Henley and Mr. Doug Price. Approximately 112.7 acres of spreadable hayland and pastures are included in the nutrient management plan.

Storm water runoff from around the broiler houses, including barn roofs and driveways will be diverted to drain through grass filters to grass waterways and hayfields surrounding the facilities. The Farm fields are located in a rural area of rolling land 3 miles east Kennedy Ridge and ½ mile west of Spring Creek Ridge in McMinn County Tennessee. The fields are drained by overland flow south to Little Foster Branch or west to riparian streams that flow southwest to Little Foster Branch which flows west approximately 2 miles to Little Sewee Creek. Land use in the area is mostly woodlands, pastures and hayfields. Most streams have riparian buffers. Grass buffers around the ponds and along streams also help reduce impacts of soil erosion and nutrient runoff from fields. Riparian and grass buffers also provide good wildlife habitat along the streams.

The water source for the poultry operations will be a well that will be drilled on site and a rural water district pipeline.

The closest neighbor is approximately 2200 feet northwest of the proposed facilities. There are 3 neighboring residences located within a ½ mile of the facilities.

General topography of the fields in the NMP have 2-12% slopes and slopes in the surrounding area range from 0 to 25 %.

Watershed Areas:

The operation and most of the fields are located in the Little Sewee Creek sub-watershed, (12-digit HUC: 060200010102) .The Northern halves of fields 3 and 4 are located in the Big Sewee Creek sub-watershed, (12-digit HUC: 060200010101).

Both of these watershed areas are in the Sewee Creek -10-digit watershed, (0602000101), which is part of the 8-digit HUC: 06020001 Sub-basin known as the Tennessee, Middle Tennessee-Chicamauga Watershed.

(See watershed reports at the end of this section).

1.2. Sampling, Calibration and Other Statements

- Manure sampling frequency: Litter and compost will be tested annually.

- Soil testing frequency: Soil testing should be done a minimum of every four years. Soil testing is an important tool to manage soil fertility with proper use of manure and fertilizers to match plant nutrients to crop rotations.

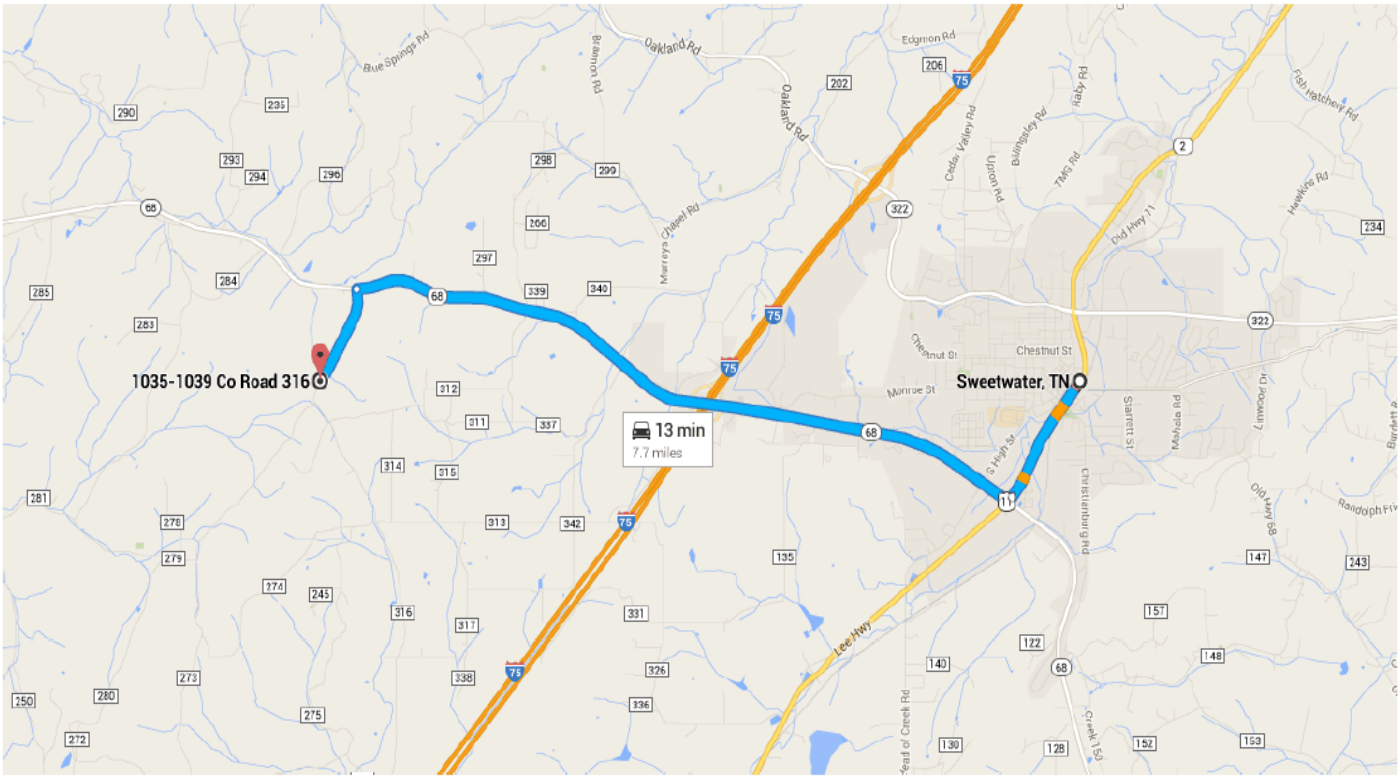
- Equipment calibration for litter trucks and manure spreaders should be accomplished annually and whenever changing rates. For surface applied solids, use of the 'tarp' method is recommended and also can be used to check spreading pattern and uniformity of applications.

- Measures to prevent direct contact of animals with water: Grazing cattle should be restricted from having free access to streams and stream banks. Ponds should be fenced where needed to restrict cattle from banks. These areas can be flash grazed when conditions allow without damage to sod or vegetation on the banks. Improved stream crossings are recommended where appropriate for moving cattle between pastures.

- This size poultry operation is required to obtain a general operating permit from Tennessee Department of Environment and Conservation, (TDEC). Permit holders are required to record total litter produced, quantities and rates land applied and quantity sold off-site and submit an annual report to TDEC.

Location & Driving Directions:

Directions from **Sweetwater, TN** to **1035-1039 Co Road 316**



Sweetwater, TN

1. Head southwest on N Main St toward E North St/Sweetwater Vonore Rd — 1.0 mi
2. Turn right onto TN-68 N — 5.8 mi
3. Turn left onto Union Grove Rd — 0.8 mi

   Destination will be on the right

1035-1039 Co Road 316
Niota, TN 37826

1.3. Resource Concerns

Soil Quality Concerns

	Soil Quality Concern	*Fields*
X	Ephemeral Gully Erosion	All Farmable land will be established in permanent vegetation for grazing or hay production.
X	Sheet and Rill Erosion	All Farmable land will be established in permanent vegetation for grazing or hay production.
	Stream/Ditchbank Erosion	No streams run through or border the property

Soil Erosion/Soil Quality:
This Farms practices conservation practices to minimize erosion and improve soil quality. These practices include: Permanent grass established with vegetative buffers around the ponds and sinkholes. More information on conservation practices, and "RUSLE 2" individual field profiles (soil loss estimate reports); can be found in Part 4, "Land Treatment Practices".

Water Quality Concerns

	Water Quality Concern	*Fields*
X	Manure Runoff from Field Applications	Manure runoff concerns are avoided by not applying at excessive rates, and maintaining a minimum of 40' vegetated buffer around ponds and sinkholes.
X	Manure Runoff From Facilities	All litter should be stored in the houses or litter sheds until sold off site or applied to fields. Planned Litter shed capacity is adequate for approximately 6 months of litter production.
X	Nutrients in Groundwater	Nutrient leaching is minimized by not over applying nutrients and using appropriate rates, timing and application methods for manure and fertilizer applications. Soil types have HIGH leaching risks, due to soil types and also sinkholes in fields 2, 3 & 4. A 150 foot manure application setback will be observed from water wells on-site or neighboring properties.
	Nutrients in Surface Water	No streams run through or border the property
	Silage Leachate	No silage storage on site. Bales are wrapped to preserve forage quality and minimizes nutrient leaching and runoff from stored hay.
	Excessive Soil Test Phosphorus	None of the fields have elevated soil P levels All fields have P-Index of Low.

Water Quality:
This farm practices conservation practices to improve water quality for the farms as well as the surrounding watersheds. Surface water is protected from erosion and surface runoff of nutrients by manure application setbacks, vegetative buffers and nutrient management. Water sources for livestock will be from wells on site. The rural water system pipeline is planned to be a backup supply. The wells should be monitored for water quality.

Other Concerns Addressed

	Other Concern	*Fields*
X	Acres Available for Manure Application	Excess litter will be sold off-site.
X	Aesthetics	Facilities location is setback from the public road approximately ½ mile. Farm will have well maintained gravel driveways and grass hayfields surrounding the facilities. The property lines have tree buffers as a visual screen for the operation.
X	Maximize Nutrient Utilization	Litter applications are recommended in summer for hay fields and pastures. This timing maximizes utilization of manure nutrients to increase productivity.
X	Minimize Nutrient Costs	Litter and manure nutrient content is maintained by storing under roofed structures until spreading on the fields. Fertilizer usage is minimized by utilizing litter and manure resources appropriately.
X	Neighbor Relations	No problems, good management of facilities should help keep good neighbor relations.
X	Profitability	Excess litter will be sold off-site and much will be used on-site to build fertility levels on the hayfields. Litter sales plus saving on fertilizer costs will improve the profitability of the farming operation.
X	Regulations	CNMP meets state regulations for a NMP as required by TDEC CAFO Class 1 non-discharge operating permit.
X	Soil Compaction	Avoid litter and manure applications in winter or early spring or whenever soil is too wet.
X	Time Available for Manure Application	The new litter storage shed capacity will allow litter to be stored until there is time available and field conditions are good for spreading.
X	Odors	Keeping litter de-caked and dry minimizes odors in the barn. Storing litter in a roofed stack shed and proper composting of the mortalities minimizes odors.
X	Air Quality	Maintaining litter quality with a housekeeper machine or litter rake and providing adequate depth of clean litter helps to keep birds healthy and also reduces odors. Tunnel ventilation improves air quality inside the broiler houses.
X	Biosecurity	Operation has a bio-security plan and also has selected a good location for the operation. Restricted entry signs will be posted to help control unnecessary traffic in and out of the Farms driveway. Workers wear clean clothes and boots to the Farms.

Other Concerns:

Air quality is an important resource to maintain.
Mortality management, feed management, and proper litter storage and handling methods are planned that will help to minimize dust and odors generated by this operation.

PROPOSED IMPROVEMENTS:

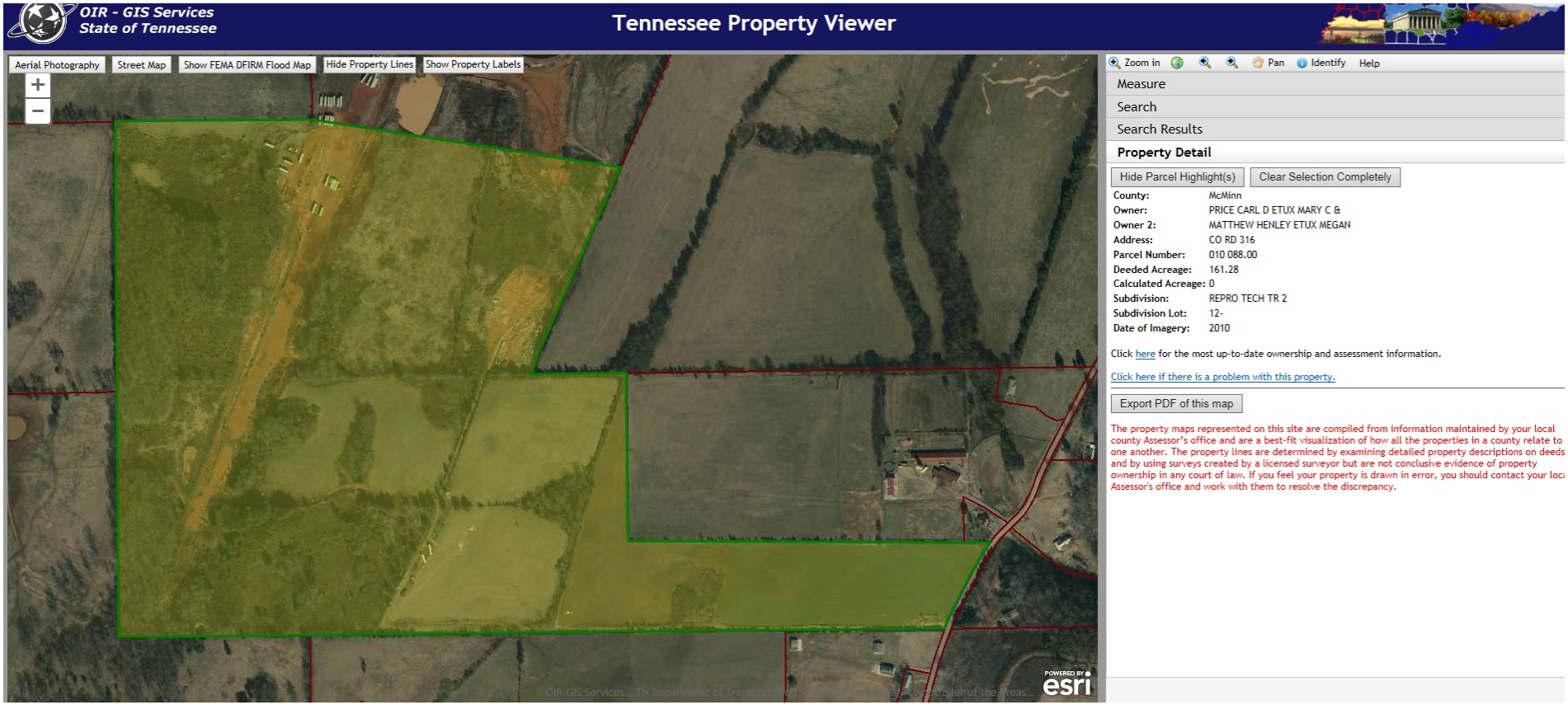
This farm is in the planning stages.

Construction planned to begin in winter/spring of 2016.

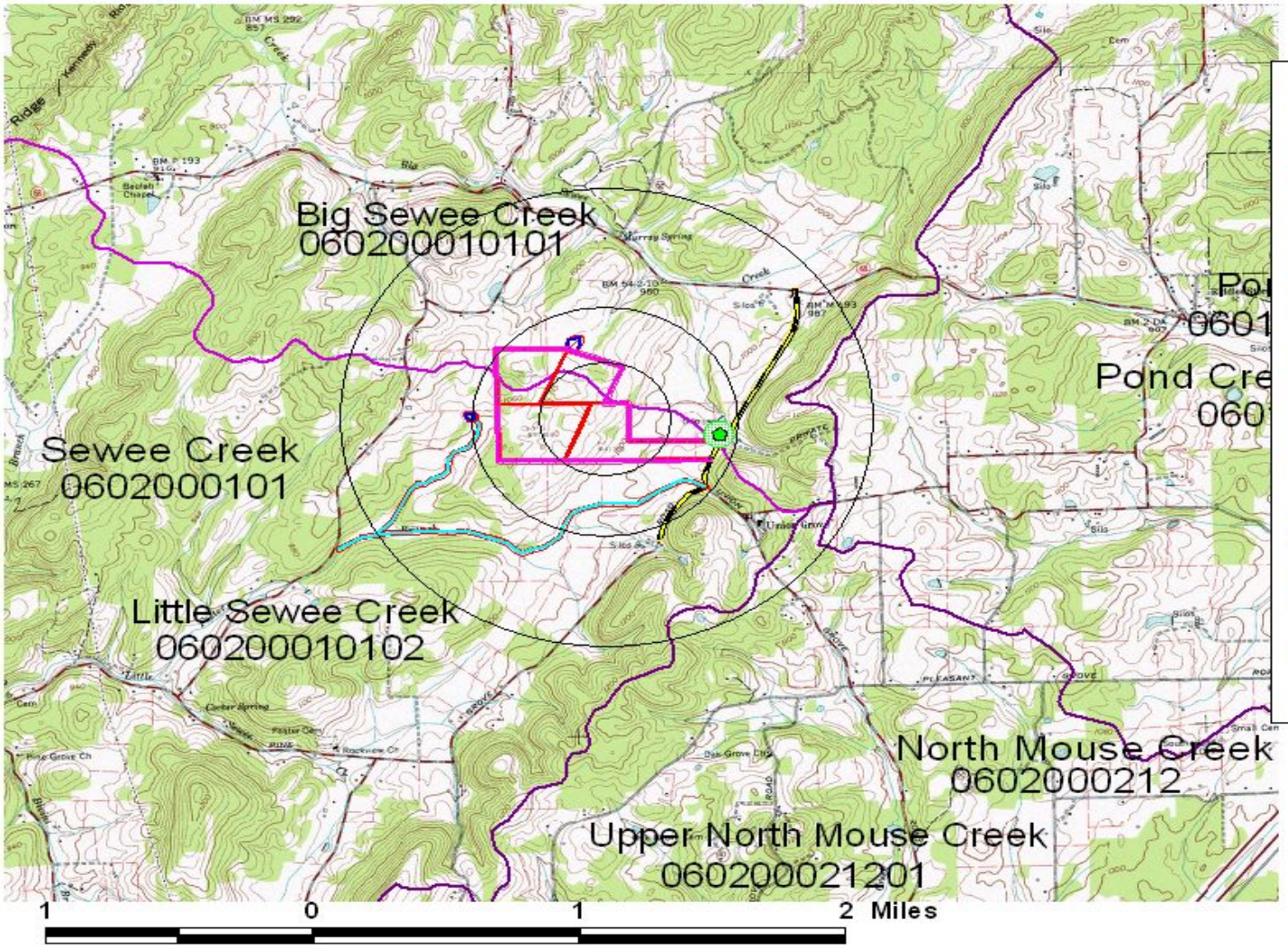
See site sketches on pages 12, 13 & 14.

Planned facilities include:

- 6 broiler houses. 66’ x 600’ in size.
- 1 litter shed with a composting area planned to be 60’ x 150’ in size.
- A new water well.
- Access roads as needed to bring in feed and remove litter.
- Heavy Use Areas, (concrete) at each end of each broiler house to facilitate removing birds and litter and loading in new wood shavings in between flocks.


OIR - GIS Services
State of Tennessee
Tennessee Property Viewer
Aerial Photography
Street Map
Show FEMA DFIRM Flood Map
Hide Property Lines
Show Property Labels
Zoom in
Pan
Identify
Help
Measure
Search
Search Results
Property Detail
Hide Parcel Highlight(s)
Clear Selection Completely
County: McMinn
Owner: PRICE CARL D ETUX MARY C &
Owner 2: MATTHEW HENLEY ETUX MEGAN
Address: CO RD 316
Parcel Number: 010 088.00
Deeded Acreage: 161.28
Calculated Acreage: 0
Subdivision: REPRO TECH TR 2
Subdivision Lot: 12-
Date of Imagery: 2010
Click here for the most up-to-date ownership and assessment information.
Click here if there is a problem with this property.
Export PDF of this map
The property maps represented on this site are compiled from information maintained by your local county Assessor's office and are a best-fit visualization of how all the properties in a county relate to one another. The property lines are determined by examining detailed property descriptions on deeds and by using surveys created by a licensed surveyor but are not conclusive evidence of property ownership in any court of law. If you feel your property is drawn in error, you should contact your loca
Assessor's office and work with them to resolve the discrepancy.
esri

HUC Watersheds



N

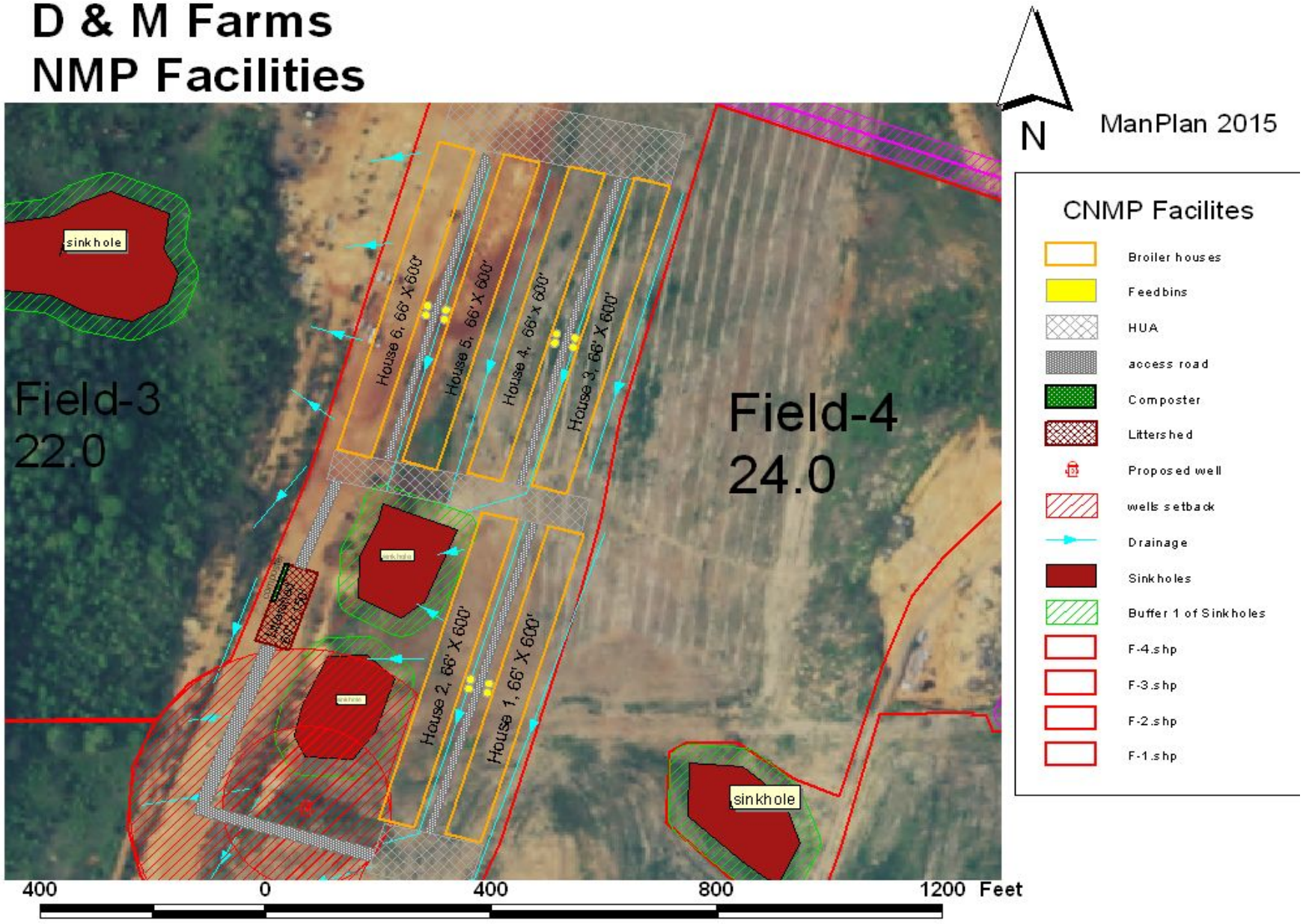
ManPlan 2015

HUC Watersheds

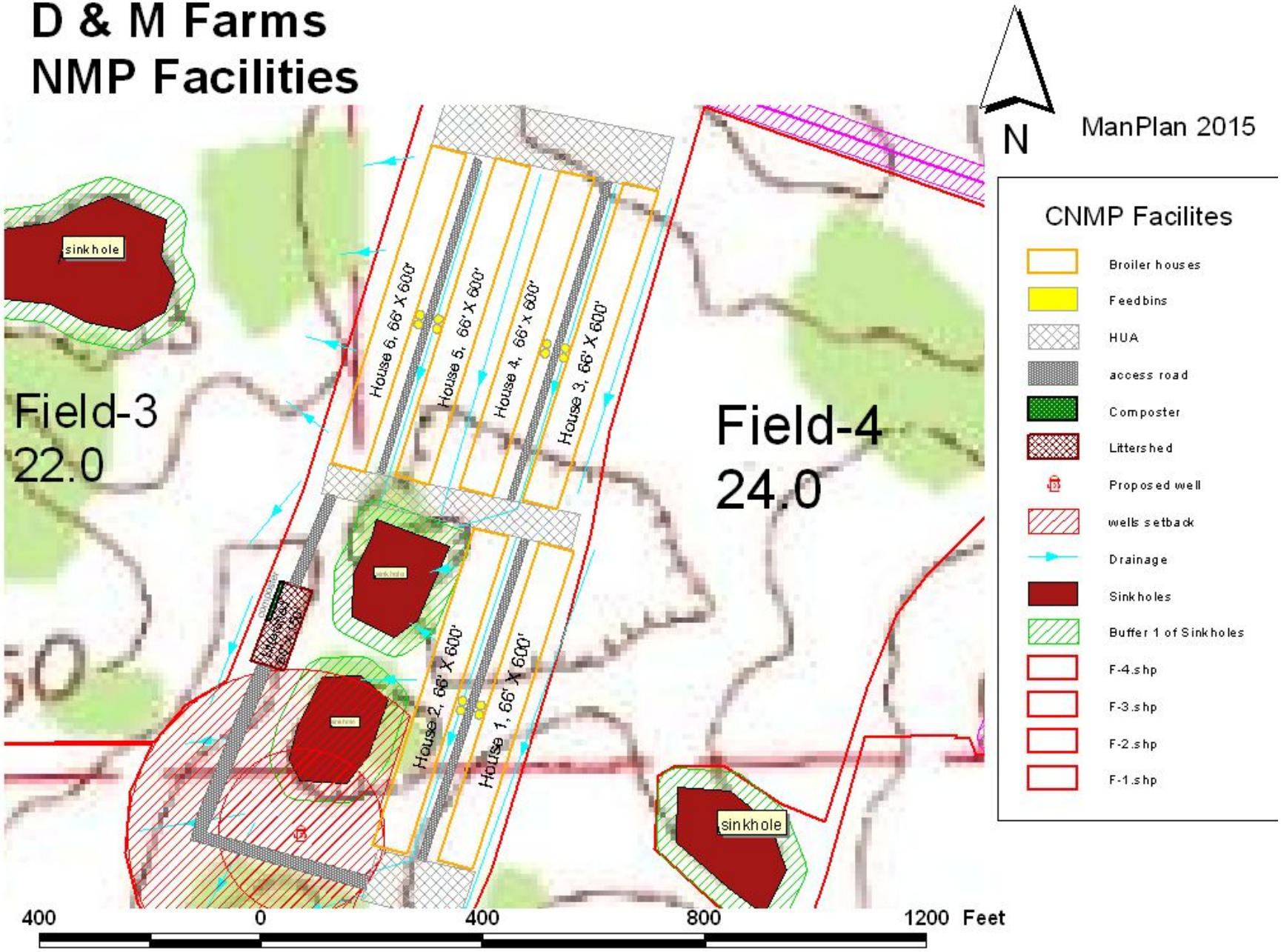
- Neighbor residence
- Neighbor-setback
- Property
- Property-setback
- Ponds
- Ponds-setback
- Streams
- Streams-setback
- Road
- Road-setback
- Field Boundaries
- Wbdhu10_a_tn107.shp
- Wbdhu12_a_tn107.shp
- Image Drg_s_tn107.sid

Section 2. Manure and Wastewater Handling and Storage

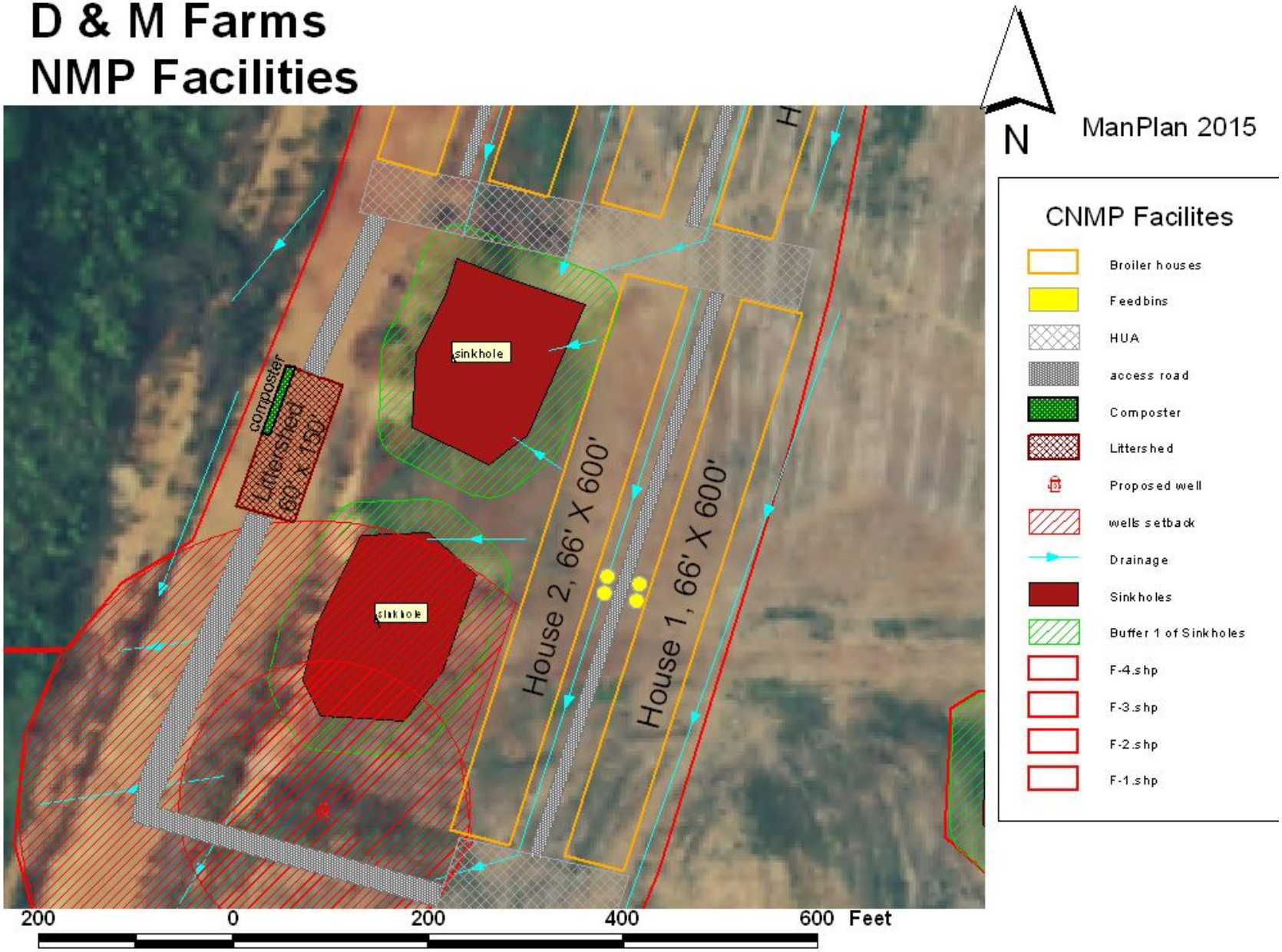
2.1. Map(s) of Production Area

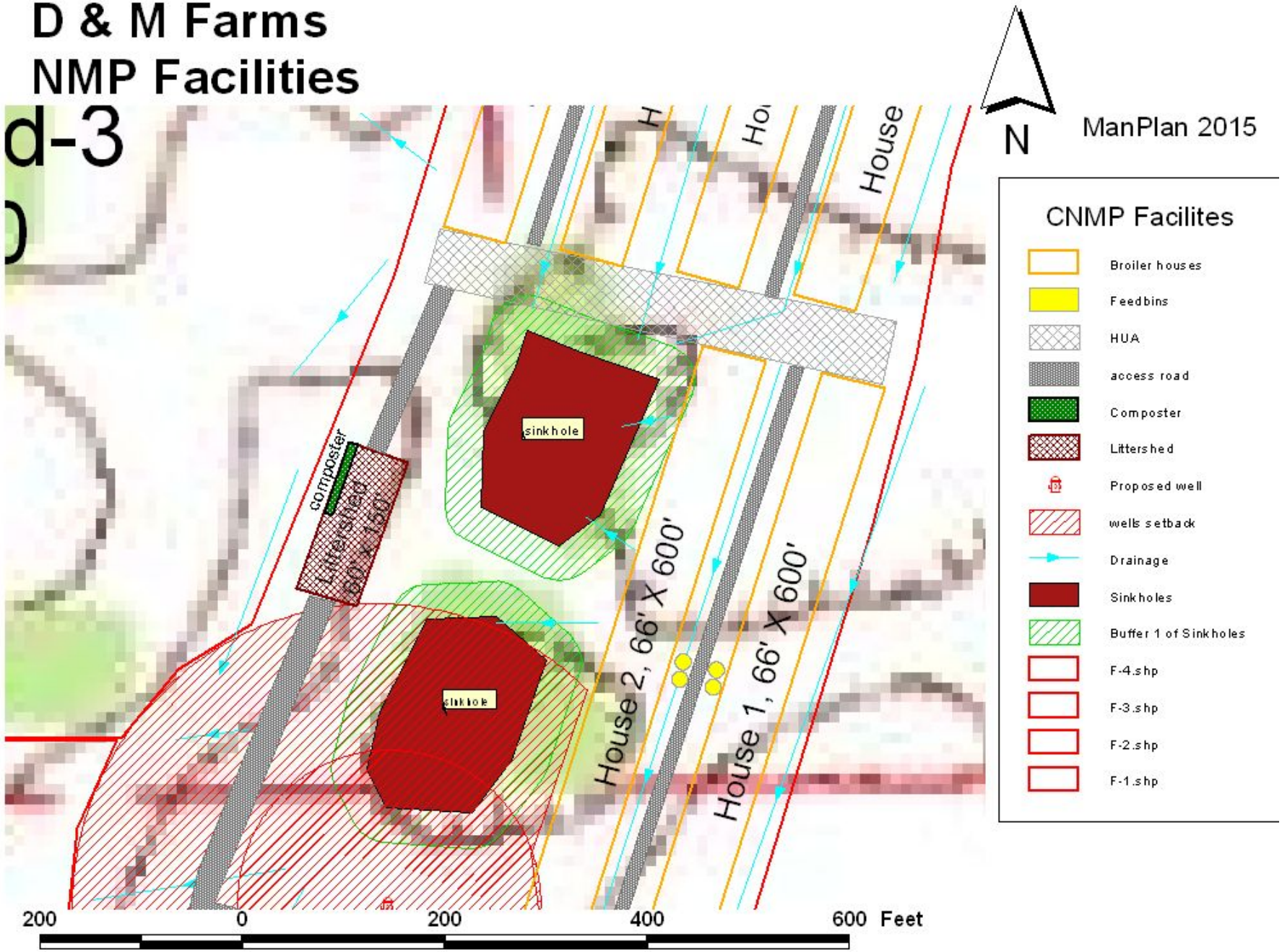


Production Area Topographical Map



Proposed Littershed / Composter




D & M Farms
NMP Facilities
d-3
N
ManPlan 2015
CNMP Facilites
Broiler houses
Feedbins
HUA
access road
Composter
Littershed
Proposed well
wells setback
Drainage
Sinkholes
Buffer 1 of Sinkholes
F-4.shp
F-3.shp
F-2.shp
F-1.shp
House
House 2, 66' X 600'
House 1, 66' X 600'
sinkhole
sinkhole
composter
Littershed
60' x 150'
200
0
200
400
600 Feet

2.2. Production Area Conservation Practices

Waste Storage Facility (313): A littershed is proposed to be constructed on this site with adequate capacity to store at least 6 months of production. No litter will be stored outside where runoff and leaching of nutrients may occur. Waste storage facilities are operated in compliance with all laws, regulations, ordinances, and easements and in a manner that is beneficial to the environment.
Operation & Maintenance:

- Work to prevent deterioration of the facility, repairing damage, or replacing components that may fail.
- To prevent spontaneous combustion, poultry litter in the stacking facility should have less than 40 percent moisture. Dry and moist litter should not be layered.
- In addition, the height of the litter stack shall not exceed 6 feet, with litter to wood contact limited to 4 feet.

Composting Facility (317): Composting will be used to manage mortalities. Collect dead birds as discovered and carry to the composter. In the event of catastrophic die-off, refer to Mortality Management Information contained in the Emergency Action Plan in Section 3.
Operation & Maintenance:

- Use litter as a base and place mortalities in layers with at least 6 inches between mortalities and 1 foot of cover on top. Proper moisture levels must be maintained for efficient composting.
- Compost shall be turned and mixed after minimum temperature of 130 °F is achieved. Secondary composting occurs after turning and aerating the compost. Make adjustments throughout the composting period to ensure proper composting processes is carried out.
- Properly composted material may be mixed in with litter for land application.
- Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F
- Inspect facility regularly and when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness.
- Roof structures should be examined for structural integrity and repaired as needed. Exposed metal components should be inspected for corrosion and painted or replaced as needed. as necessary.

362- Diversions: Clean water diversions for the production areas. Aerial and Topo maps on pages 13 & 14 indicate surface drainage patterns. Site location is at top of a ridge and grading around facilities will be maintained to keep stormwater runoff including roof runoff from entering litter storage and composting areas and the poultry production areas.

Operation & Maintenance:

1. Provide periodic inspections, especially immediately following significant storms
2. Promptly repair or replace damaged components of the diversions, as necessary.
3. Maintain diversion capacity, ridge height, and outlet elevations, especially if high sediment yielding areas are in the drainage area above the diversion. Establish necessary clean-out requirements.
4. Each inlet for underground drainage culverts or tiles must be kept clean and sediment buildup redistributed so that the inlet is at the lowest point. Inlets damaged by Farms machinery must be replaced or repaired immediately.
5. Redistribute sediment as necessary to maintain the capacity of the diversion.
6. Vegetation shall be maintained and trees and brush controlled by hand, chemical, and/or mechanical means.
7. Keep machinery away from steep, sloped ridges. Keep equipment operators informed of all potential hazards.

Animal and Manure Resources

Broilers: The poultry operation will have 6 broiler barns: All houses have capacities of 53,000, for a total capacity of 144,000 broilers. All houses are 54' x 500'. There is approximately 0.75 square feet of floor space per bird, depending on stocking densities. The operation raises broiler chickens under contract with an integrated poultry company. The operations will receive day old chicks which will be raised to market weights averaging 5.5 to 6.0 lbs. depending on the needs of the integrator company. The broiler chicks are brought in from a hatchery at 1-days old after hatching. Chicks are placed under brooders and bedded with sawdust or rice hulls litter. The barns are tunnel ventilated with large exhaust fans located on the end of the barns. Inlet air is drawn in through end walls or evaporative coolers located on the side walls, with automatically controlled curtains that raise and lower as needed. Each flock of birds will be marketed in approximately 45-48 days and with 4-7 days for cleanout and conditioning of the litter, approximately 6 flocks per year can be raised in these facilities.
The litter is planned to be totally cleaned out at least once per year and de-caked as needed.
Litter shed-is 60' x 150' with 6' side walls, ***(1600 ton capacity***. Litter can be stacked up to 6' depth to store the litter until transferred off site. Estimated annual litter and compost production of the 6 house site is approximately 2820 tons per year. Some of the litter produced will be applied to hayfields on site and the majority of litter is planned to be sold off site.

Mortality composting is planned to be practiced along the inside wall of the litter-shed.

MMP estimates of litter analysis were used because the facilities and litter shed have not been built yet. Estimated nutrient concentrations in the litter are: ***25.5 lbs/ton of total nitrogen, 6.9 lbs/ton of NH4, 20.3 lbs/ton of P2O5 and 26.6 lbs/ton of K2O and 70 % dry matter.***

ALUM: Alum, (aluminum sulfate) may be used as needed to treat litter in the houses prior to receiving chicks every other flock or as needed to reduce ammonia levels in the houses. Rates are 100 lbs per 1000 square feet of floor space. Benefits of treating litter with alum include: reduced ammonia levels in the houses, improved health and growth of birds, reduced ventilation requirements, reduced air emissions, increased nitrogen content of the litter and reduced soluble Phosphorus in the litter.

Litter sales and transfer records will be kept for each year of the plan. Annual Record-keeping forms are in Section 9, arranged year by year.

Litter and compost will be analyzed annually for total nitrogen, ammonia nitrogen, P2O5 and K2O.

The Animal Waste Management (AWM) program was used to estimate volumes of manure and litter produced by the broiler operation. Tables 2-3 and 2-4 summarize the animal housing and manure storage capacities.

2.3. Manure Storage

Storage ID	Type of Storage	Spreadable Capacity	Annual Manure Collected	Days of Storage
House 1	In-house litter storage	500 Tons	450 Tons	406
House 2	In-house litter storage	500 Tons	450 Tons	406
House 3	In-house litter storage	500 Tons	450 Tons	406
House 4	In-house litter storage	500 Tons	450 Tons	406
House 5	In-house litter storage	500 Tons	450 Tons	406
House 6	In-house litter storage	500 Tons	450 Tons	406
Litter Shed	Poultry manure dry stack	1,600 Tons	0 Tons	
Composter	Mortality composter	75 Tons	120 Tons	228

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
House 1	Broiler	53,000	3	Jan Early - Dec Late	100	House 1
House 2	Broiler	53,000	3	Jan Early - Dec Late	100	House 2
House 3	Broiler	53,000	3	Jan Early - Dec Late	100	House 3
House 4	Broiler	53,000	3	Jan Early - Dec Late	100	House 4
House 5	Broiler	53,000	3	Jan Early - Dec Late	100	House 5
House 6	Broiler	53,000	3	Jan Early - Dec Late	100	House 6
mortality	Broiler	50,000	3	Jan Early - Dec Late	100	Composter

(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.
NRCS Standard 317, 'Composting Facility', will be followed for proper management of dead animals. (See copy of Practice Standard 317 in Section 10, References, tab 6)

Plan for Proper Management of Dead Animals

It is a priority of the operation to handle mortalities promptly, removing them from the facilities as soon as possible after discovery and placing them in the composter. Broiler mortalities are composted along the sidewalls of the litter barn. Broiler mortalities are layered in with approximately 6 inches of litter from the stacking shed in between each layer of mortalities. The compost is turned at least twice during the compost-ing process. Finished compost has little odor and is high in plant nutrients and can be land applied with regular litter. Finished compost is planned to be applied to the fields in this NMP or sold off-site. Compost shall be analyzed for nutrients at least annually for total Nitrogen (N), Ammonia (NH3), phosphates, (P2O5) and potassium oxide (K2O). A copy of compost analysis shall be provided to the recipient for determining proper agronomic rates for land applications. Records of applications and transfers of compost shall be kept as part of the nutrient management plan.

Additional discussion of contingency planning for proper animal disposal in case of catastrophic deaths and can be found in Section 3 under the Emergency Action Plan.

2.6. Planned Manure Exports off the Farms

Begin operations in April, 2016

Month-Year	Manure Source	Amount	Receiving Operation	Location
Sep 2016	Litter Shed	700 Tons	sell off-site	
Mar 2017	Litter Shed	750 Tons	sell off-site	
Apr 2017	Litter Shed	1,000 Tons	sell off-site	
Sep 2017	Litter Shed	700 Tons	sell off-site	
Mar 2018	Litter Shed	1,000 Tons	sell off-site	
Apr 2018	Litter Shed	900 Tons	sell off-site	
Sep 2018	Litter Shed	700 Tons	sell off-site	
Mar 2019	Litter Shed	1,000 Tons	sell off-site	
Apr 2019	Litter Shed	1,000 Tons	sell off-site	
Sep 2019	Litter Shed	700 Tons	sell off-site	
Mar 2020	Litter Shed	1,000 Tons	sell off-site	
Apr 2020	Litter Shed	800 Tons	sell off-site	
Sep 2020	Litter Shed	700 Tons	sell off-site	
Mar 2021	Litter Shed	1,000 Tons	sell off-site	

2.7. Planned Manure Imports onto the Farms

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

(None planned)

2.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination
May 2016	House 1	50 Tons	Litter Shed
May 2016	House 2	50 Tons	Litter Shed
May 2016	House 3	50 Tons	Litter Shed
May 2016	House 4	50 Tons	Litter Shed
May 2016	House 5	50 Tons	Litter Shed
May 2016	House 6	50 Tons	Litter Shed
Jul 2016	House 1	50 Tons	Litter Shed
Jul 2016	House 2	50 Tons	Litter Shed
Jul 2016	House 3	50 Tons	Litter Shed
Jul 2016	House 4	50 Tons	Litter Shed
Jul 2016	House 5	50 Tons	Litter Shed
Jul 2016	House 6	50 Tons	Litter Shed
Sep 2016	Composter	40 Tons	Litter Shed
Sep 2016	House 1	50 Tons	Litter Shed
Sep 2016	House 2	50 Tons	Litter Shed
Sep 2016	House 3	50 Tons	Litter Shed
Sep 2016	House 4	50 Tons	Litter Shed

Month-Year	Manure Source	Amount	Manure Destination
Sep 2016	House 5	50 Tons	Litter Shed
Sep 2016	House 6	50 Tons	Litter Shed
Nov 2016	House 1	50 Tons	Litter Shed
Nov 2016	House 2	50 Tons	Litter Shed
Nov 2016	House 3	50 Tons	Litter Shed
Nov 2016	House 4	50 Tons	Litter Shed
Nov 2016	House 5	50 Tons	Litter Shed
Nov 2016	House 6	50 Tons	Litter Shed
Jan 2017	Composter	40 Tons	Litter Shed
Jan 2017	House 1	50 Tons	Litter Shed
Jan 2017	House 2	50 Tons	Litter Shed
Jan 2017	House 3	50 Tons	Litter Shed
Jan 2017	House 4	50 Tons	Litter Shed
Jan 2017	House 5	50 Tons	Litter Shed
Jan 2017	House 6	50 Tons	Litter Shed
Mar 2017	House 1	200 Tons	Litter Shed
Mar 2017	House 2	200 Tons	Litter Shed
Mar 2017	House 3	200 Tons	Litter Shed
Mar 2017	House 4	200 Tons	Litter Shed
Mar 2017	House 5	200 Tons	Litter Shed
Mar 2017	House 6	200 Tons	Litter Shed
May 2017	Composter	40 Tons	Litter Shed
May 2017	House 1	50 Tons	Litter Shed
May 2017	House 2	50 Tons	Litter Shed
May 2017	House 3	50 Tons	Litter Shed
May 2017	House 4	50 Tons	Litter Shed
May 2017	House 5	50 Tons	Litter Shed
May 2017	House 6	50 Tons	Litter Shed
Jul 2017	House 1	50 Tons	Litter Shed
Jul 2017	House 2	50 Tons	Litter Shed
Jul 2017	House 3	50 Tons	Litter Shed
Jul 2017	House 4	50 Tons	Litter Shed
Jul 2017	House 5	50 Tons	Litter Shed
Jul 2017	House 6	50 Tons	Litter Shed
Sep 2017	Composter	40 Tons	Litter Shed
Sep 2017	House 1	50 Tons	Litter Shed
Sep 2017	House 2	50 Tons	Litter Shed
Sep 2017	House 3	50 Tons	Litter Shed
Sep 2017	House 4	50 Tons	Litter Shed
Sep 2017	House 5	50 Tons	Litter Shed
Sep 2017	House 6	50 Tons	Litter Shed
Nov 2017	House 1	50 Tons	Litter Shed
Nov 2017	House 2	50 Tons	Litter Shed
Nov 2017	House 3	50 Tons	Litter Shed
Nov 2017	House 4	50 Tons	Litter Shed
Nov 2017	House 5	50 Tons	Litter Shed
Nov 2017	House 6	50 Tons	Litter Shed

Month-Year	Manure Source	Amount	Manure Destination
Jan 2018	Composter	40 Tons	Litter Shed
Jan 2018	House 1	50 Tons	Litter Shed
Jan 2018	House 2	50 Tons	Litter Shed
Jan 2018	House 3	50 Tons	Litter Shed
Jan 2018	House 4	50 Tons	Litter Shed
Jan 2018	House 5	50 Tons	Litter Shed
Jan 2018	House 6	50 Tons	Litter Shed
Mar 2018	House 1	200 Tons	Litter Shed
Mar 2018	House 2	200 Tons	Litter Shed
Mar 2018	House 3	200 Tons	Litter Shed
Mar 2018	House 4	200 Tons	Litter Shed
Mar 2018	House 5	200 Tons	Litter Shed
Mar 2018	House 6	200 Tons	Litter Shed
May 2018	Composter	40 Tons	Litter Shed
May 2018	House 1	50 Tons	Litter Shed
May 2018	House 2	50 Tons	Litter Shed
May 2018	House 3	50 Tons	Litter Shed
May 2018	House 4	50 Tons	Litter Shed
May 2018	House 5	50 Tons	Litter Shed
May 2018	House 6	50 Tons	Litter Shed
Jul 2018	House 1	50 Tons	Litter Shed
Jul 2018	House 2	50 Tons	Litter Shed
Jul 2018	House 3	50 Tons	Litter Shed
Jul 2018	House 4	50 Tons	Litter Shed
Jul 2018	House 5	50 Tons	Litter Shed
Jul 2018	House 6	50 Tons	Litter Shed
Sep 2018	Composter	40 Tons	Litter Shed
Sep 2018	House 1	50 Tons	Litter Shed
Sep 2018	House 2	50 Tons	Litter Shed
Sep 2018	House 3	50 Tons	Litter Shed
Sep 2018	House 4	50 Tons	Litter Shed
Sep 2018	House 5	50 Tons	Litter Shed
Sep 2018	House 6	50 Tons	Litter Shed
Nov 2018	House 1	50 Tons	Litter Shed
Nov 2018	House 2	50 Tons	Litter Shed
Nov 2018	House 3	50 Tons	Litter Shed
Nov 2018	House 4	50 Tons	Litter Shed
Nov 2018	House 5	50 Tons	Litter Shed
Nov 2018	House 6	50 Tons	Litter Shed
Jan 2019	Composter	40 Tons	Litter Shed
Jan 2019	House 1	50 Tons	Litter Shed
Jan 2019	House 2	50 Tons	Litter Shed
Jan 2019	House 3	50 Tons	Litter Shed
Jan 2019	House 4	50 Tons	Litter Shed
Jan 2019	House 5	50 Tons	Litter Shed
Jan 2019	House 6	50 Tons	Litter Shed
Mar 2019	House 1	200 Tons	Litter Shed

Month-Year	Manure Source	Amount	Manure Destination
Mar 2019	House 2	200 Tons	Litter Shed
Mar 2019	House 3	200 Tons	Litter Shed
Mar 2019	House 4	200 Tons	Litter Shed
Mar 2019	House 5	200 Tons	Litter Shed
Mar 2019	House 6	200 Tons	Litter Shed
May 2019	Composter	40 Tons	Litter Shed
May 2019	House 1	50 Tons	Litter Shed
May 2019	House 2	50 Tons	Litter Shed
May 2019	House 3	50 Tons	Litter Shed
May 2019	House 4	50 Tons	Litter Shed
May 2019	House 5	50 Tons	Litter Shed
May 2019	House 6	50 Tons	Litter Shed
Jul 2019	House 1	50 Tons	Litter Shed
Jul 2019	House 2	50 Tons	Litter Shed
Jul 2019	House 3	50 Tons	Litter Shed
Jul 2019	House 4	50 Tons	Litter Shed
Jul 2019	House 5	50 Tons	Litter Shed
Jul 2019	House 6	50 Tons	Litter Shed
Sep 2019	Composter	40 Tons	Litter Shed
Sep 2019	House 1	50 Tons	Litter Shed
Sep 2019	House 2	50 Tons	Litter Shed
Sep 2019	House 3	50 Tons	Litter Shed
Sep 2019	House 4	50 Tons	Litter Shed
Sep 2019	House 5	50 Tons	Litter Shed
Sep 2019	House 6	50 Tons	Litter Shed
Nov 2019	House 1	50 Tons	Litter Shed
Nov 2019	House 2	50 Tons	Litter Shed
Nov 2019	House 3	50 Tons	Litter Shed
Nov 2019	House 4	50 Tons	Litter Shed
Nov 2019	House 5	50 Tons	Litter Shed
Nov 2019	House 6	50 Tons	Litter Shed
Jan 2020	Composter	40 Tons	Litter Shed
Jan 2020	House 1	50 Tons	Litter Shed
Jan 2020	House 2	50 Tons	Litter Shed
Jan 2020	House 3	50 Tons	Litter Shed
Jan 2020	House 4	50 Tons	Litter Shed
Jan 2020	House 5	50 Tons	Litter Shed
Jan 2020	House 6	50 Tons	Litter Shed
Mar 2020	House 1	200 Tons	Litter Shed
Mar 2020	House 2	200 Tons	Litter Shed
Mar 2020	House 3	200 Tons	Litter Shed
Mar 2020	House 4	200 Tons	Litter Shed
Mar 2020	House 5	200 Tons	Litter Shed
Mar 2020	House 6	200 Tons	Litter Shed
May 2020	Composter	40 Tons	Litter Shed
May 2020	House 1	50 Tons	Litter Shed
May 2020	House 2	50 Tons	Litter Shed

Month-Year	Manure Source	Amount	Manure Destination
May 2020	House 3	50 Tons	Litter Shed
May 2020	House 4	50 Tons	Litter Shed
May 2020	House 5	50 Tons	Litter Shed
May 2020	House 6	50 Tons	Litter Shed
Jul 2020	House 1	50 Tons	Litter Shed
Jul 2020	House 2	50 Tons	Litter Shed
Jul 2020	House 3	50 Tons	Litter Shed
Jul 2020	House 4	50 Tons	Litter Shed
Jul 2020	House 5	50 Tons	Litter Shed
Jul 2020	House 6	50 Tons	Litter Shed
Sep 2020	Composter	40 Tons	Litter Shed
Sep 2020	House 1	50 Tons	Litter Shed
Sep 2020	House 2	50 Tons	Litter Shed
Sep 2020	House 3	50 Tons	Litter Shed
Sep 2020	House 4	50 Tons	Litter Shed
Sep 2020	House 5	50 Tons	Litter Shed
Sep 2020	House 6	50 Tons	Litter Shed
Nov 2020	House 1	50 Tons	Litter Shed
Nov 2020	House 2	50 Tons	Litter Shed
Nov 2020	House 3	50 Tons	Litter Shed
Nov 2020	House 4	50 Tons	Litter Shed
Nov 2020	House 5	50 Tons	Litter Shed
Nov 2020	House 6	50 Tons	Litter Shed
Jan 2021	Composter	40 Tons	Litter Shed
Jan 2021	House 1	50 Tons	Litter Shed
Jan 2021	House 2	50 Tons	Litter Shed
Jan 2021	House 3	50 Tons	Litter Shed
Jan 2021	House 4	50 Tons	Litter Shed
Jan 2021	House 5	50 Tons	Litter Shed
Jan 2021	House 6	50 Tons	Litter Shed
Mar 2021	House 1	200 Tons	Litter Shed
Mar 2021	House 2	200 Tons	Litter Shed
Mar 2021	House 3	200 Tons	Litter Shed
Mar 2021	House 4	200 Tons	Litter Shed
Mar 2021	House 5	200 Tons	Litter Shed
Mar 2021	House 6	200 Tons	Litter Shed

2.9 Facility Closure Plan

If the facilities are no longer used for animal production or litter storage, the following activities should be carried out prior to decommissioning:

- All manure, litter and bedding shall be cleaned out of the facilities and the litter stack shed and mortality composter as soon as possible. Litter and compost should be transferred off site or applied per the Nutrient Management Plan. Any dead birds in the houses at the time of closure will be disposed of according to the current Nutrient Management plan. The most current litter analysis will be provided to anyone removing litter from the Farms.
- This closure/ rehabilitation plan for the waste system storage/treatment structure(s) will meet or exceed NRCS technical standards and guidelines.
- The schedule for closure will not exceed 360 days from the time broiler production at this location ceases.

The facilities may be converted to other uses such as equipment storage barns after performing the clean-out activities listed above.

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:

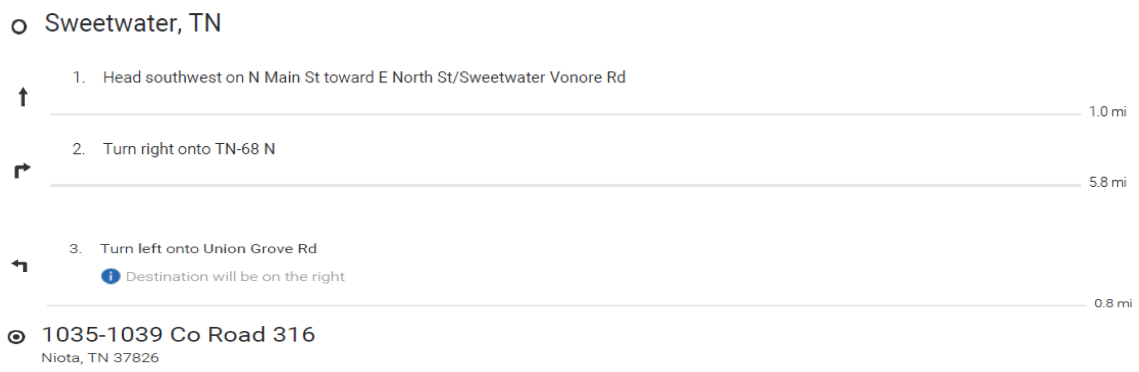
a. Stop all other activities to address the spill.
b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
c. Call for help and excavator if needed.
d. Complete the clean-up and repair the necessary components.
e. Assess the extent of the emergency and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

Farms Information

Farms Name	**D & M Farms**
Address	**Farm Address: 1061 County Road 316 Niota, TN 37826** **Mailing address: 810 County Road 188 Niota, TN 37826**
Farms Phone	**Matt Henley: 423-453-1304 cell** **Doug Price:423-453-6426 cell**
Permit #	*none*
Directions to Farms	

Emergency Contacts

	Name	Emergency Phone	Cell Phone	Home Phone
Farms Owner	Matt Henley Doug Price	423-453-1304 423-453-6426	423-453-1304 423-453-6426	
McMinn County Sheriffs Office	Joe Guy	911 (423) 745-5622		
Fire Department	Athens City Fire Dept	911 (423) 744-2762		
Ambulance	American medical Response	911 (423) 746-2725		
Excavation Equipment: Backhoe, Dozer	Hampton Backhoe Service LLC	(423) 744-0121		

Agency Contacts

Contact Agency	Person	Day Phone	Emergency Number
TWRA - Tenn. Wildlife Resources Agency			(800) 890 TENN or (800) 890-8366
TDEC-Environmental Assistance Center			(888) 891-8332
McMinn County Sheriffs Office	Joe Guy	(423) 745-5622	911 (423) 745-5622
State Veterinarian: (If mortality issues)	Dr. Charles Hatcher, Nashville, TN	(615) 837-5120	
UT Extension Athens, TN		423-745-2852	

Be prepared to provide the following information:

a. Your name and contact information.
b. Farms 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. The Farms has signs posted on entry doors restricting entry to authorized personnel only.

3.3. Catastrophic Mortality Management

Refer to NRCS standards, or state guidance, regarding appropriate catastrophic animal mortality handling methods.

Plan for Catastrophic Animal Mortality Handling

The following section 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.

Rendering is the first choice *to manage large quantities of mortalities. The poultry integrator company should be called immediately and appropriate measure taken for trucking the mortalities to rendering facilities.*

If rendering is not available, composting or burial may be used as alternative methods.

Composting**:** Temporary composting may be allowed under direction of the State Veterinarian's office. The litter stack house should have adequate capacity for this purpose. If additional space is needed, the site will have an impermeable surface to prevent leaching into groundwater. Sufficient composting material must be used. Finished compost must be spread at agronomic rates.

Burial on site **i**s an alternative method for mortality management following these conditions:

Burial sites will be located according to the following setbacks:

- 300 feet setback from any well head,
- 165 feet setback from property lines or public use area,
- 100 feet setback from waters of the state or wet weather conveyance, (waterways etc),

Burial sites will be in deep suitable soils more than 2 feet above bedrock and ground water table. Ground water shall be greater than 2 feet below the bottom of the burial pit or trench.

A suitable burial location for this CAFO operation is in trenches and observing all necessary setbacks is north of the proposed Littershed in Field 1 or in the northwest part of Field 2. These areas are composed of Fullerton Silt Loam (FgC2). A severe restriction for burial is anywhere within 100 feet of any of the sinkholes on this property.

(See Tennessee Emergency Disposal of Dead Animals in this section.)

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

Authority name: State Veterinarian of Tennessee
Contact name: Dr. Charles Hatcher
Phone number: (615) 837-5120

Fuels & Chemical Handling

Gasoline and diesel fuel is stored on site in above-ground storage tanks located northwest of the dairy barn. These tanks are inspected frequently. No leaks were observed. Detergents and disinfectants are stored in the tank room south of the dairy barn to be used for power washing and cleanup of the milking equipment. Roundup herbicide and other weed control chemicals are stored in the machine shed and used for maintaining fence lines and pastures as needed.
No other hazardous chemicals are stored at this location.

Fuel handling:

Small spills during fuel transfer are bound to occur from time to time. Petroleum fuel evaporates rapidly at the land surface; however fuel readily seeps into the soil. Local geology and soil type determines how quickly fuel may reach groundwater supplies. Once in the groundwater environment, fuel is relatively stable, making it difficult to clean up. Even small spills or leaks in the same place over time are a potential threat to water resources. To reduce potential leaks and spills during fuel transfer:

- Always supervise fuel transfer from storage to equipment to prevent spillover.
- Use a can to catch any drops that may follow after shutting off the fuel nozzle.
- Replace a leaking or defective nozzle promptly.
- Enforce a "no smoking" rule at the fuel handling and storage facility.
- Keep fuel pumps and nozzles secure from children or vandalism.
- Label each pump or nozzle as to the type of fuel dispensed.

Above-ground Storage Tanks (ASTs) provide easy access and greater opportunity to observe and monitor tanks that may be leaking as compared to underground tanks. However, placement of tanks above the ground requires that tanks be protected from impact by Farms equipment and personal vehicles. Spending some time on the proper placement of a new tank or implementing safety procedures to an existing tank can greatly reduce any risks associated with an AST.

Following are specific points that should be addressed when conducting an assessment of your ASTs.

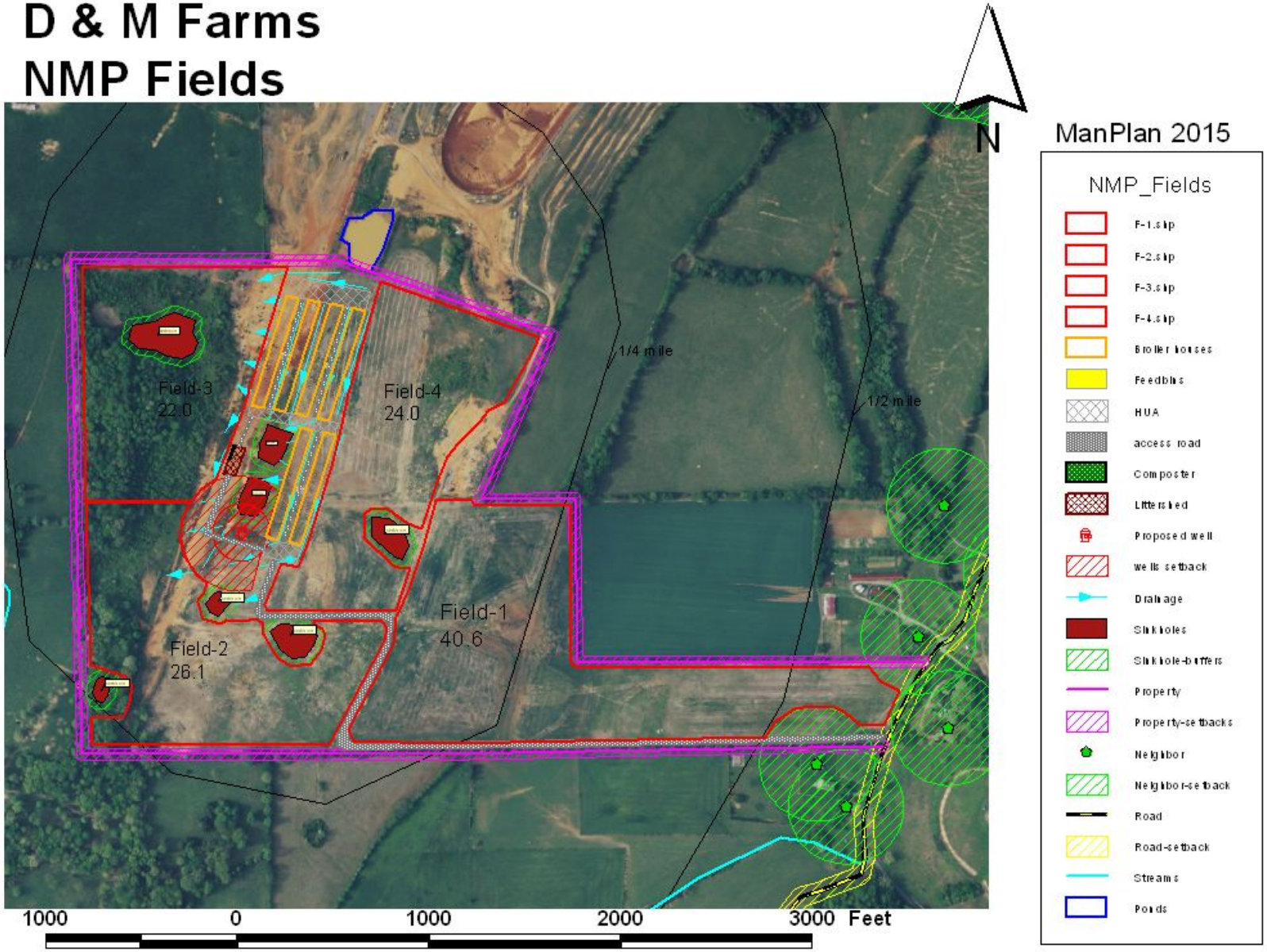
- Comply with state-local rules for electrical safety and fire prevention. Keep a fire extinguisher in close proximity (e.g. within 75 feet) of ASTs.
- AST’s should be located at least 50 feet from any building or combustible storage.
- Properly label tank contents, describe the health and physical hazards of the product.
- Secure against vandalism and tampering.
- If top-opening only, place on a stable base of timbers, blocks, concrete, etc. ASTs should not be in contact with bare soil.
- Display a "No Smoking" sign.
- Guard tank against impact. Choose a site where Farms vehicles can easily maneuver for fueling.
- Enclose wiring in a conduit.
- Locate ASTs where soil strength is adequate to hold the weight of a full storage tank (or tanks).

CHEMICALS: *For hazardous chemicals that may be stored on this site, the following guidelines should be implemented.*

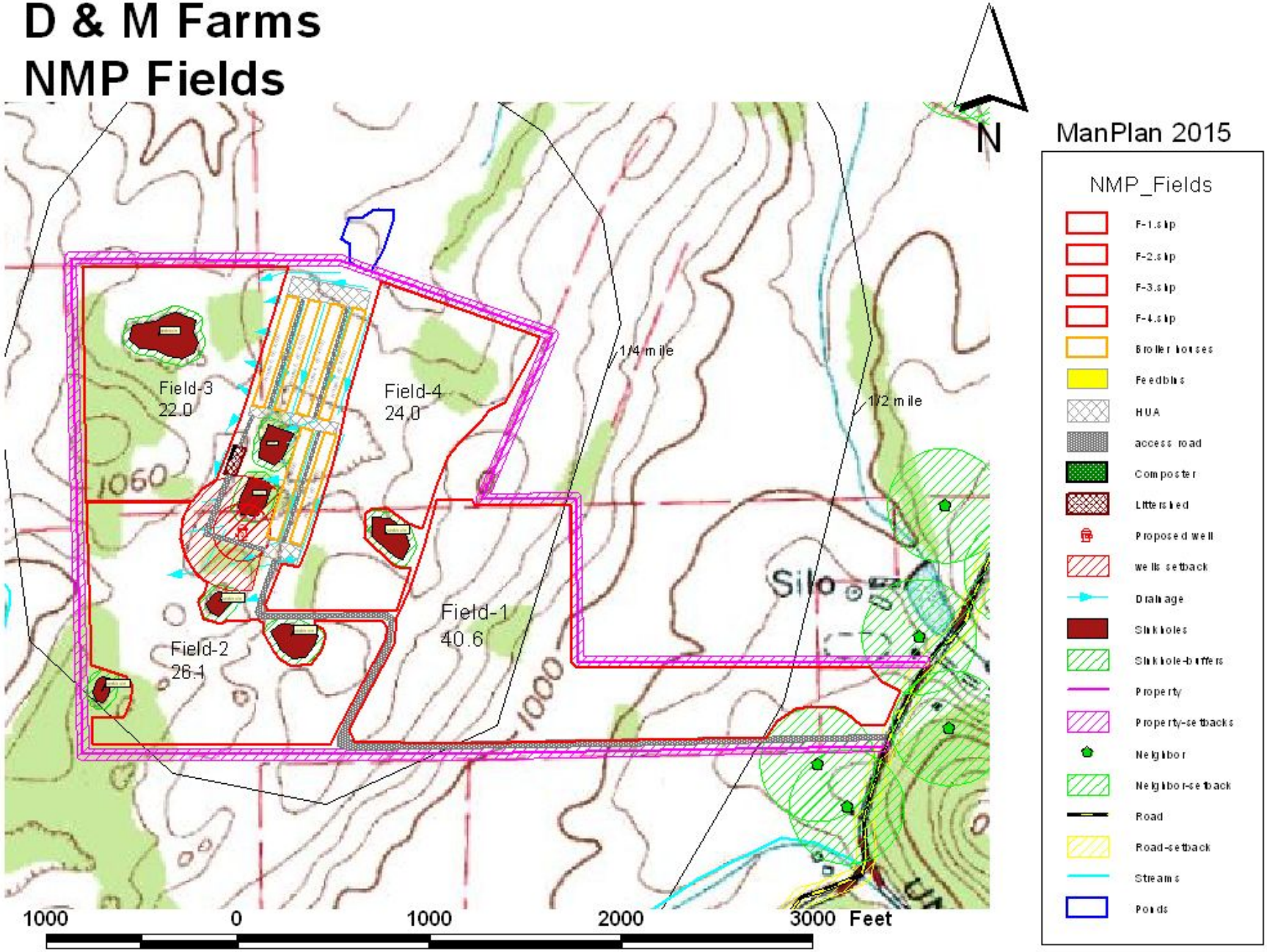
	Measure
X	All chemicals will be stored in proper containers. Expired chemicals and empty containers are properly disposed of in accordance with state and federal regulations. Pesticides and associated refuse are disposed of in accordance with the FIFRA label.
X	Chemical storage areas are self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
X	Chemical storage areas are covered to prevent chemical contact with rain or snow.
X	Emergency procedures and equipment are in place to contain and clean up chemical spills.
X	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.

Section 4. Land Treatment

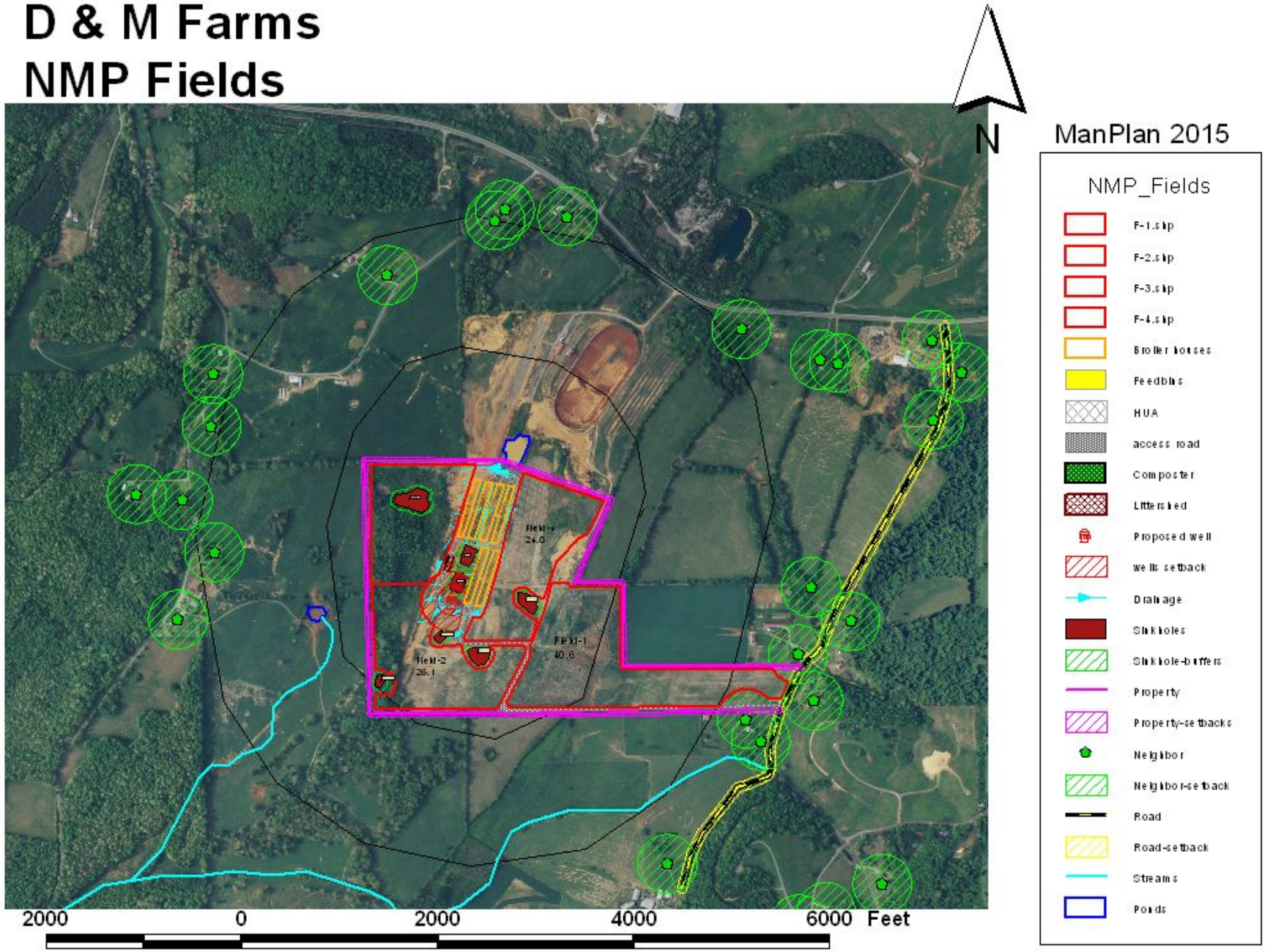
4.1. Map(s) of Fields and Conservation Practices



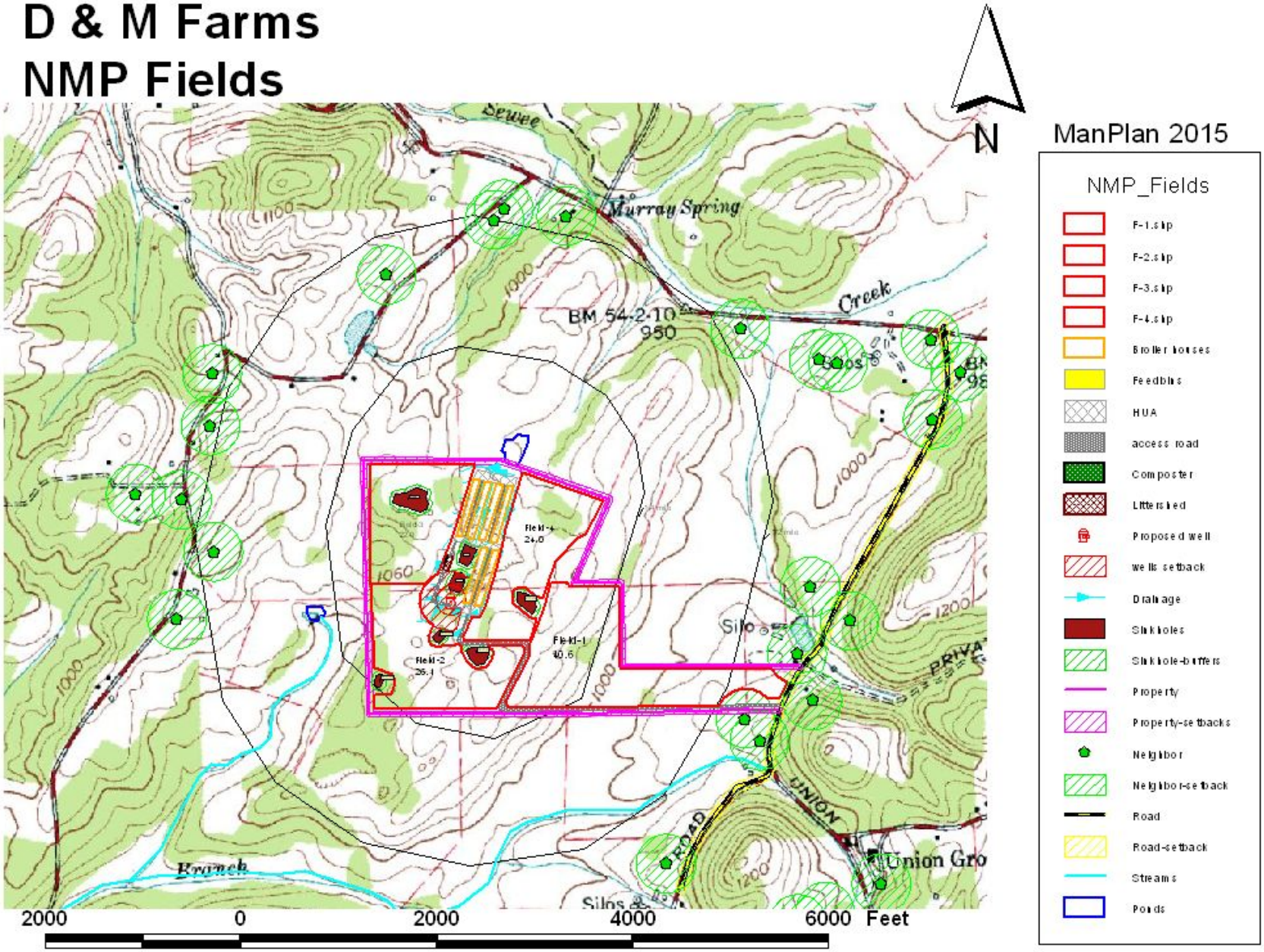
D & M Farms
NMP Fields



D & M Farms
NMP Fields



D & M Farms
NMP Fields



4.2. Land Treatment Conservation Practices

This section has individual field information for all fields in the nutrient management plan, including: Aerial photos and topographical maps, marked with setbacks and conservation practices implemented, soil tests results and RUSLE-2 individual field profiles.

Tabbed Information for each field:

- **FSA map**
- **Overview Map, (with conservation practices)**
- **Soil type maps**
- **RUSLE2 Individual Field Profile Report**
- **Soil Test results**

Necessary conservation practices have been established and maintained on hayfields and pastures where animal by-products are applied. All fields to maintain 40 foot vegetative buffers established next to intermittent streams or ponds. Refer to the conservation plan for any additional practices that may be implemented on this farm.

The following NRCS Standard Practices apply to this CNMP and are included in Section 10 for reference.

313 – Waste Storage Structure
317 - Mortality Composter
527 – Karst Sinkhole Treatment
590 - Nutrient Management

Planned Land Treatment:

This section of the plan addresses management practices for all fields to reduce soil losses to or below tolerable soil losses or “T” values. Topography, soil types, slopes and lengths of slopes, crop yields, and crop management practices were taken into consideration as well as conservation practices and land treatment operations. RUSLE2 soil loss calculations were completed for all fields in this plan and field inspections were carried out in the fall of 2014.

All fields are below “T” levels with the current system of land treatment, forage crops and grazing management.

Soil types present in the fields included in this Nutrient Management Plan are:

Area Symbol: TN107, Soil Area Version: 9

Code	Soil Description	Acres	Percent of field	Non-Irr Class Legend	Non-Irr Class	Corn	Corn silage	Small grains silage	Soybeans	Wheat	Alfalfa hay	Grass hay	Grass legume hay	Grass legume pasture
FgC2	Fullerton gravelly silt loam, 5 to 12 percent slopes, eroded	95.03	62.9%		IIIe	65	13	6	24	37	3	2	3	7
FgD2	Fullerton gravelly silt loam, 12 to 25 percent slopes, eroded	19.52	12.9%		IVe	59	12		23	32		2	2	5
DwD2	Dewey silty clay loam, 15 to 25 percent slopes, eroded	15.78	10.4%		IVe									8
WaB2	Waynesboro clay loam, 2 to 5 percent slopes, eroded	8.73	5.8%		IIe	84	17	6	28	37	4	3	3	7
DwC2	Dewey silty clay loam, 5 to 12 percent slopes, eroded	4.95	3.3%		IIIe	88	18	8	29	49	4	3	3	8
WbB2	Waynesboro silt loam, 2 to 5 percent slopes, eroded	4.90	3.2%		IIe	85	17	6	30	38	3	3	3	8
Rk	Rockdell gravelly loam, occasionally flooded	2.29	1.5%		IIIw	47	9		14	22		1	2	5
					Weighted Average	**59.7**	**12**	**4.6**	**21.8**	**32.7**	**2.3**	**1.9**	**2.5**	**6.9**

Include Soil Map Unit Descriptions next page.

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.)	Hydro-logic Group
F1	107	DwD2	Dewey	SICL	15-25%	0.5-1.75%		B
F2	107	FgC2	Fullerton	GR-SIL	5-12%	0.5-2%		B
F3	107	FgC2	Fullerton	GR-SIL	5-12%	0.5-2%		B
F4	107	FgC2	Fullerton	GR-SIL	5-12%	0.5-2%		B

SIL= Silt Loam L= Loam CN-SIL= Shaly Silt Loam

5.2. Predicted Soil Erosion

Field	Predominant Soil Type	Slope (%)	Conservation Plan Soil Loss (Ton/A/Yr)	Gully (Ton/A/Yr)	Ephemeral (Ton/A/Yr)	T Factor (Ton/A/Yr)
F1	DwD2 (Dewey SIL)	12.0	0.3			5
F2	FgC2 (Fullerton GR-SIL)	5.0	0.5			4
F3	FgC2 (Fullerton GR-SIL)	5.0	0.5			4
F4	FgC2 (Fullerton GR-SIL)	5.0	0.5			4

5.3. Nitrogen and Phosphorus Risk Analysis

Tennessee Phosphorus Index

The Tennessee Phosphorus (P) index was used to determine the potential for phosphorus transport off the fields. Considering all of the parameters that go into calculating the Phosphorus Index, Table 9 (next page), summarizes the P-Index for each field.

Planned litter and manure applications will supply maintenance and build up for fields with Low soil P currently. Soil P is projected to increase moderately over time, but have little impact on the P-Index. All fields have P-Indexes rated **LOW** with planned litter application rates and average phosphorus content of manure. (See planned litter rates in Table 6-7).

While soil test P is not the only factor affecting Phosphorus environmental risks, this plan considers soil P levels which range from *very low* to *medium* agronomically. The nutrient management plan recommends that manure and litter be applied in summer months to minimize runoff risks at planned rates of 2 tons per acre for litter and 6 to 7 tons per acre for beef manure.

No commercial P2O5 fertilizers should be required if litter is applied as planned.

Environmental Considerations for Managing Phosphorus:

Phosphorus (P) loading to surface water can accelerate Eutrophication. The availability of other nutrients and light penetration into the water column will also influence the response of water bodies to phosphorus. Factors such as: the amount of erosion and runoff, the form, amount, and distribution of phosphorus in the soil: and fertilizer and manure application rate, timing and placement determine P loss from agricultural fields and the resulting P loading to water resources. Most phosphorus compounds found in soils have low water solubility. Consequently, P loss from agricultural land was once thought to be primarily associated with soil erosion. In many cases, sediment-bound P is still the dominant form in which P losses from agricultural fields occur. Over the past decade, research has shown that phosphorus can be lost in runoff in dissolved forms. High dissolved P concentration in runoff is more frequently observed where soil P levels are high particularly near the soil surface. High soil P levels, however, do not automatically equate to high dissolved P in runoff. As stated earlier, numerous factors interact to create the potential for P losses from agricultural fields. Many of the basis processes that govern P transport are known.

The Tennessee P Index rates the application fields based on the following factors:

- Soil Test P
- P2O5 application rate (all sources)
- Form of Phosphorus applied
- Timing of Phosphorus applications
- Method of application
- Hydrological group rating of the soils in the application field.
- Buffer and Setback widths, slopes % and length, vegetative cover, and soil texture

According to the NRCS nutrient management standard, fields ranked in the MEDIUM risk category may receive organic (manure) or inorganic (commercial fertilizer) applications at nitrogen-based rates per the table below.

Total Points from P Index	***Generalized Interpretation of P Index Points for the Site***
< 100	**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.
100 - 200	**MEDIUM** potential for P movement from the field. The chance for adverse impact to surface waters exists. *Nitrogen-based nutrient management planning may be 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 - 300	**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.
> 301	**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.

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
F1	2016	5	14	5	70	Low
F1	2017	5	14	5	70	Low
F1	2018	5	14	5	70	Low
F1	2019	5	14	5	70	Low
F1	2020	5	14	5	70	Low
F2	2016	4	14	4	56	Low
F2	2017	5	14	5	70	Low
F2	2018	4	14	4	56	Low
F2	2019	4	14	4	56	Low
F2	2020	4	14	4	56	Low
F3	2016	4	14	4	56	Low
F3	2017	5	14	5	70	Low
F3	2018	4	14	4	56	Low
F3	2019	4	14	4	56	Low
F3	2020	4	14	4	56	Low
F4	2016	4	14	4	56	Low
F4	2017	5	14	5	70	Low
F4	2018	4	14	4	56	Low
F4	2019	4	14	4	56	Low
F4	2020	4	14	4	56	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
F1	1,100	100	40	Pasture/Hay
F2	1,450	200	40	Pasture/Hay
F3	1,100	200	40	Pasture/Hay
F4	700	200	40	Pasture/Hay

TN Phosphorus -Index, Detailed Report

Field: F1

Crop Year: 2016

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 12%, RCN: 58	2	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	29 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F1

Crop Year: 2017

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 12%, RCN: 58	2	
RUSLE2	0.5 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	29 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F1

Crop Year: 2018

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 12%, RCN: 58	2	
RUSLE2	0.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Management Characteristics			
Soil test P	29 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F1
Crop Year: 2019

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 12%, RCN: 58	2	
RUSLE2	0.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	29 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F1
Crop Year: 2020

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 12%, RCN: 58	2	
RUSLE2	0.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	29 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F2
Crop Year: 2016

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 59	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1450 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F2
Crop Year: 2017

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 66	2	
RUSLE2	1.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1450 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F2
Crop Year: 2018

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 64	1	
RUSLE2	0.4 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1450 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F2
Crop Year: 2019

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 62	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1450 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F2
Crop Year: 2020

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 60	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1450 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F3
Crop Year: 2016

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 59	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	1 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F3
Crop Year: 2017

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 66	2	
RUSLE2	1.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	1 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F3
Crop Year: 2018

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 64	1	
RUSLE2	0.4 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	1 lbs/ac (Mehlich-1)	1	

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F3
Crop Year: 2019

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 62	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	1 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F3
Crop Year: 2020

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 60	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	1100 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	1 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F4
Crop Year: 2016

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 59	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	700 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F4
Crop Year: 2017

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 66	2	
RUSLE2	1.3 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	700 ft	1	
	Site Total	5	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	70	Low

Field: F4
Crop Year: 2018

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 64	1	
RUSLE2	0.4 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	700 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F4
Crop Year: 2019

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 62	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	700 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

Field: F4
Crop Year: 2020

Site Information	Information Used to Determine P Loss Rating	Value for P Index Calculation	
Site Characteristics			
Runoff class	Slope: 5%, RCN: 60	1	
RUSLE2	0.2 t/ac	1	
Permanent veg. buffer	40 ft	1	
Non-application width from surface water	700 ft	1	
	Site Total	4	
Management Characteristics			
Soil test P	5 lbs/ac (Mehlich-1)	1	
P application rate	Total P_2O_5 applied (all sources): 41 lbs/ac	4	
Application timing	Actively growing crop	1	
Application method	Surface applied (no incorporation)	8	
	Management Total	14	
	Phosphorus Index (Site Total x Management Total)	56	Low

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Tennessee Nitrogen Leaching Index

The potential for nitrate nitrogen to leach through an agricultural soil depends on several factors, including soil properties that affect rate of water movement through the soil and rate of surface runoff, rainfall, and the amount and type of nitrogen fertilizer being applied to the field. Soil infiltration rate, the ease with which water moves into and through the soil, is by far the best indicator of leaching potential. This permeability is determined by factors such as soil texture, soil structure, bulk density and depth to restrictive layers such as bedrock and fragipans (hard pans). Different soil map unit components have been categorized into different soil hydrologic groups, where soils with different runoff and infiltration potential are grouped into one of the following four groups:

- **Group A**. Well drained soils with a high infiltration rate and thus a high potential for leaching nitrate.
- **Group B**. Moderately well-drained soils with a moderate infiltration rate and thus a moderate potential for leaching nitrate.
- **Group C**. Somewhat poorly drained soils with a slow infiltration rate and thus a low potential for leaching nitrate.
- **Group D**. Poorly drained soils with a very slow infiltration rate and thus a very low potential for leaching nitrate.

Another important aspect to know is whether the field is in an area that has karst topography. Karst topography is formed in limestone, gypsum or other soluble rocks by dissolution. It is characterized by closed depressions, sinkholes, caves or underground drainage. Tennessee is well known for its areas of karst topography such as the Central Basin, the Highland Rim and the Cumberland Plateau. If the field is in an area that potentially has karst topography, then the potential risk of nitrate leaching maybe higher.

Step 4: Interpreting your Nitrate Leaching Index Rating.

The leaching index rating score (Table 1) will determine whether the field has a high, medium or low risk of nitrate leaching. Use the table below to determine if the field is at a low, medium or high risk of nitrate leaching.

Index Rating	Risk of Leaching
< 10	Low
≥10 to 16	Medium
> 16	High

If the risk score is greater than 16 or the field has karst topography, the field has a **high** risk of leaching nitrate. It is required to implement the best management practices that are appropriate for the specific field operations to minimize soil nitrate leaching losses.

Best Management Practices to Reduce Nitrate Leaching

For fields with a **medium** risk of nitrate leaching (risk score ≥ 10 to 16), it is required to implement practices that will reduce the amount of nitrogen that could be leached as nitrate. At a minimum, implement practices 1 to 3 (see below).

For fields with a **high** risk of nitrate leaching (risk score >16), in addition to implementing practices 1 to 3, it is required to implement one or more of practices 4 to 8 (see below).

1. Follow a Nutrient Management (590) budget based on the realistic yield goals. The realistic yield goals are to be established on historical yield data (minimum of 5 years).
2. Do not apply nitrogen fertilizer until ready to plant, ideally within a few days of planting, or if possible, after germination and crop emergence.
3. Manure and litter applications should be based on a Nutrient Management (Conservation Practice Standard 590) budget.
4. When applying urea or urea ammonium nitrate (UAN), consider using a fertilizer stabilizer that will reduce nitrogen losses for a few weeks after the fertilizer has been applied. Choose a fertilizer stabilizer that blocks the enzyme urease (which converts urea into the ammonium and nitrate forms that plants use). Delaying the conversion of urea means there will be more nitrogen available to the plant when it needs it and less will be lost.
5. If growing corn, split the nitrogen applications. Apply no more than 50 pounds of nitrogen per acre at planting and side-dress the remainder of the recommended fertilizer. Side-dress application should be made once the corn has emerged and has at least four leaves.
6. If applying manures, use the pre-side-dress nitrate test (PSNT) to determine side-dress nitrogen application rates[1].
7. Implement the Cover Crop (Conservation Practice Standard 340) practice on the field. Cover crops will not only reduce soil erosion over the winter but will also scavenge residual nitrogen.
8. Implement one or more NRCS conservation practice standards (CPS) that will minimize nitrate losses. These practices include (but are not limited to) the following:
    - Conservation Cover (CPS 327)
    - Conservation Crop Rotation (CPS 328)
    - Forage and Biomass Planting (CPS 512)
    - Irrigation Water Management (CPS 449)
    - Karst Sinkhole Treatment (CPS 527)

1 http://soilplantandpest.utk.edu/pdffiles/PSNTCinfosheet105.pdf

TN Nitrogen Index Leaching

Landowner:	D & M Farms	**Field Number:**	1,2,3,4
County:	McMinn		

Predominate Soil Map Unit:

Dewey Silt Loam,(DwD2) & Fullerton Gravelly Silt Loam, (FgC2)

Soil Hydrologic Group:

☐ A ☑ B ☐ C ☐ D

County Index Rating Based on Soil Hydrologic Group:

☐ <10 ☐ ≥10 to 16 ☑ >16

Nitrogen Leaching Index Score:

☐ Low ☐ Medium ☑ High

Medium Nitrogen Leaching Index Score requires the implementation of the following:

1. Follow Nutrient Management (590) budget based on realistic yield goals.
2. Do not apply nitrogen fertilizer until ready to plant, ideally within a few days of planting, or if possible, after germination and crop emergence.
3. Manure and litter applications shall be based on a Nutrient Management (Conservation Practice Standard 590) budget.

High Nitrogen Leaching Index Scores requires the implementation of the three requirements for a Medium risk, plus one or more of the best management practices or conservation practice standards (CPS) listed below. Put a check mark by all that apply.

☐ Use a fertilizer stabilizer when applying urea or urea ammonium nitrate (UAN).

☐ Split application of nitrogen when growing corn.

☐ Use the pre-sidedress nitrate test (PSNT) to determine the side-dress nitrogen application.

☐ Use Cover Crop (CPS 340) to scavenge residual nitrogen.

Implementation of one or more of the following NRCS conservation practice standards (check all that apply):

- ☐ Conservation Cover (CPS 327)
- ☐ Conservation Crop Rotation (CPS 328)
- ☐ Forage and Biomass Planting (CPS 512)
- ☐ Irrigation Water Management (CPS 449)
- ☑ Karst Sinkhole Treatment (CPS 527)
- ☐ Other conservation practice standard(s) that meet the quality criteria for reducing nitrogen leaching (list):

Section 6. Nutrient Management

6.1. Field Information

Field ID	Sub-field ID	Total Acres	Spreadable Acres	County	Predominant Soil Type	Slope (%)	FSA Farms	FSA Tract	FSA Field
F1		40.6	40.6	McMinn	DwD2 (Dewey SIL)	12.0			
F2		26.1	26.1	McMinn	FgC2 (Fullerton GR-SIL)	5.0			
F3		22.0	22.0	McMinn	FgC2 (Fullerton GR-SIL)	5.0			
F4		24.0	24.0	McMinn	FgC2 (Fullerton GR-SIL)	5.0			
Total Acres		**112.7**	**112.7**						

OVERVIEW: This Nutrient Management Plan conforms to the Tennessee NRCS 590 Nutrient Management Standard Practice.

P1, Phosphorus:
Soil Sample results indicated that field 1 is in the Medium range for soil P, and fields 2, 3 & 4 and Very Low in soil P. Litter applications of 3 tons per acre annually are recommended for hay fields to build soil fertility. Litter is recommended to be applied in summer after hay harvest. Over time the litter applications recommended are expected to build soil P moderately but not increase the P risk above Low. The Phosphorus Index, a measure of risk of phosphorus pollution, is rated Low for all fields with litter application as planned. *Commercial P2O5 fertilizers will not be needed if litter is applied as planned.*

K, Potassium:
Soil Sample results indicated that field 1 and 4 are in the High range for soil K, and fields 2 & 3 are in the Low range for soil K. Hay removes a lot of potassium from the soil and litter applications are a good way to maintain potassium levels in the soil. Litter applications of 3 tons per acre annually are recommended for hay fields to build soil fertility. Litter is recommended to be applied in summer after hay harvest. Over time the litter applications recommended are expected to build soil P moderately Supplemental potash fertilizer (0-0-60) at 100 lbs/acre is recommended for fields 2 & 3 only for the first year to build soil K levels.

pH:
For maximum yields and soil fertility, it is recommended to maintain a soil pH of at least 6.0 for cool season hay & pastures. If pH is less than 6.0, liming material should be applied at UT recommended rates based on the CCE (Calcium Carbonate Equivalent) rating and the fineness of the limestone material. To establish or maintain alfalfa or clovers, soil pH should be maintained between 6.5 and 7.0. Field 4 has soil pH 6.7 which is within the optimal range. Fields 2, 3 & 4 have a pH of 5.0 to 5.9 with a buffer pH of 7.2 to7.7 and have the following lime recommendation at this time.

Fields 1 = 2 ton per acre, Field 2 = 1.5 tons/acre Field 3 = 3.5 tons/acre.

Fields should be retested at least 6 months after lime is applied to re-evaluate pH.
See Fertilizer & Lime Recommendations in Appendix 8.

Planned CROPS

- All fields need renovation to improve hayfields and pastures productivity. Field 1 has been a hay field, and fields 2, 3 & 4 have been pastured and recently large areas cleared of trees.
- Fields are planned initially to be harvested for hay and could be used for rotational pastures in the future as well.
- It is recommended to bush-hog, mow with rotary cutter mower and no-till drill cool season grasses to re-establish desirable mix of forages.
- It is recommended to frost-seed or inter-seed legumes in the future after good stand of cool season grasses is established. Grass-legume systems are a somewhat more challenging to manage than grasses only pastures, but are worth the extra management to reduce nitrogen needs.
- Increasing the number of paddocks can increase productivity of pastures.
- Stockpiling forages for early winter grazing can also reduce hay requirements.
- Planned crops and fertilizer recommendations are shown in Table 6-5.

Planned Litter Applications:

A litter truck with 7 tons capacity will be used to surface apply the poultry litter. The spreader should be calibrated annually to set application rates as needed. Setback areas will be avoided along surface waters, around sink-holes and ponds, property lines and public roads. Manure will be stored in the litter-shed until field conditions are good for spreading. Having sufficient capacity for manure storage under roof allows more efficient utilization of manure resources.

- Litter applications of ***2 tons per acre per year*** in summer to hay fields is recommended to provide maintenance and build-up rates for soil P & K.
- Over time fields with LOW soil P and K are projected to increase moderately towards optimal levels.
- Planned manure applications should provide substantial amounts of Phosphorus (P) and Potassium (K), P & K dry fertilizer needs will be satisfied by planned litter applications.
- A combination of litter and nitrogen fertilizers are recommended that total up to 165 units of nitrogen per acre.
- Spring application of Urea (46-0-0) is recommended for cool season grasses and litter applications in summer.

Planned applications of manure and commercial fertilizers for manure spreadable acres and setback acres are shown in Table 6-7.

This strategy for planned manure and fertilizer application is to match applications to crop uptake of nutrients. This also improves nutrient utilization and reduces risks of nutrient losses and protects surface water resources. This strategy also will prevent excessive build-up of soil Phosphorus and provides N, P & K from manure supplemented by commercial fertilizers if needed.

An ongoing soil testing program should be used to identify low fertility areas that require build-up fertility to promote optimum growth of forage crops.

Nutrient Management Guidance in developing a nutrient budget may be obtained from your NRCS Field Office or your University of Tennessee Agricultural Extension Service Agent. Land application procedures must be planned and implemented in a way that minimizes potential adverse impacts to the environment and public health.

6.2. Manure Application Setback Distances

Setback Requirements: Class I CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, permanent vegetated setback >=35 feet	35
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Open tile line inlet structures	Applied upgradient, permanent vegetated setback >=35 feet	35
Sinkholes	Applied upgradient, permanent vegetated setback >=35 feet	35
Agricultural well heads	Applied upgradient, permanent vegetated setback >=35 feet	35
Other conduits to surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Potable well, public or private	Application down-gradient of feature	150
Potable well, public or private	Application upgradient of feature	300

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf)

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 5 to 8% with good vegetation	50
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
F1	2014		Mehlich-1	29	224	186	1,336	lbs/a	5.9	7.4	4.4
F2	2014		Mehlich-1	5	82	128	1,272	lbs/a	6.0	7.7	3.8
F3	2014		Mehlich-1	1	53	101	664	lbs/a	5.0	7.2	2.1
F4	2014		Mehlich-1	5	182	200	1,897	lbs/a	6.7		

6.4. Manure Nutrient Analyses

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
House 1	70.0	25.5	6.9	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)
House 2	70.0	25.5	6.9	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)
House 3	70.0	25.5	6.9	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)
House 4	70.0	25.5	6.9	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)
Litter Shed	70.0	25.5	6.9	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)
composter	70.0	17.7	4.8	20.3	26.6	20.3	26.6	Lb/Ton	MMP & MWPS, estimates, (Littershed not built yet)

(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/Pubs/PB1510.pdf).

Litter Sampling notes:

- All litter is planned to be transferred to the *Littershed* when cleaning or de-caking the poultry houses in between flocks.
- If any litter is sold directly from the houses in the future, house specific litter samples will be obtained.

MANURE SAMPLING:

Manure sampling should be performed annually to establish a benchmark for nutrient content with this system of management. Refer to NRCS 590 Standard Appendix B for Manure Sampling procedures.(See in Section 10.) as a guide for proper manure sampling techniques. Table 5-2 shows the book values for manure analysis.
In the future, samples should be taken 'as applied' and mixed to make a composite sample for analysis. A convenient way to collect manure or poultry litter samples is the following field sampling procedure.

- Spread a sheet of plastic or tarp on the field. A plastic sheet works well for sampling manure.
- Drive the manure spreader over the top of the plastic, spreading litter on the sheet.
- Collect several sub-samples around the field to mix together.
- Samples can also be collected to represent the first, middle and last part of the storage facility or loads applied and should be correlated as to which loads are applied on certain fields to track changes in nutrient concentrations throughout the storage facility.

Calibration tip: lbs manure collected on 5' x 4' 4" sheet = tons per acre applied

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
F1	2016	Fescue hay maint	3.0 Ton	165	30	0	114	54	156	
F1	2017	Fescue hay maint	3.0 Ton	165	30	0	114	54	156	
F1	2018	Fescue hay maint	3.0 Ton	165	30	0	114	54	156	
F1	2019	Fescue hay maint	3.0 Ton	165	30	0	114	54	156	
F1	2020	Fescue hay maint	3.0 Ton	165	30	0	114	54	156	
F2	2016	Fescue hay new	2.0 Ton	30	90	60	76	36	104	
F2	2017	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F2	2018	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F2	2019	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F2	2020	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F3	2016	Fescue hay new	2.0 Ton	30	90	60	76	36	104	
F3	2017	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F3	2018	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F3	2019	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F3	2020	Fescue hay maint	3.0 Ton	165	60	60	114	54	156	
F4	2016	Fescue hay new	2.0 Ton	30	90	0	76	36	104	
F4	2017	Fescue hay maint	3.0 Ton	165	60	0	114	54	156	
F4	2018	Fescue hay maint	3.0 Ton	165	60	0	114	54	156	
F4	2019	Fescue hay maint	3.0 Ton	165	60	0	114	54	156	
F4	2020	Fescue hay maint	3.0 Ton	165	60	0	114	54	156	

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

6.6. Manure Application Planning Calendar – April 2016 through March 2017

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2016 Crop (Prev. Primary Crop)	Apr '16	May '16	Jun '16	Jul '16	Aug '16	Sep '16	Oct '16	Nov '16	Dec '16	Jan '17	Feb '17	Mar '17
F1	40.6	40.6	Dewey SICL (DwD2 15-25%)	Fescue hay maint (Fescue hay maint)				11.6								
F2	26.1	26.1	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay new (Fescue hay maint)				7.5								
F3	22.0	22.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay new (Fescue hay maint)				6.3								
F4	24.0	24.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay new (Fescue hay maint)				6.9								
Total	*112.7*	*112.7*						*32.3*								

Crop in field

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

Manure Application Planning Calendar – April 2017 through March 2018

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2017 Crop (Prev. Primary Crop)	Apr '17	May '17	Jun '17	Jul '17	Aug '17	Sep '17	Oct '17	Nov '17	Dec '17	Jan '18	Feb '18	Mar '18
F1	40.6	40.6	Dewey SICL (DwD2 15-25%)	Fescue hay maint (Fescue hay maint)				11.6								
F2	26.1	26.1	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay new)				7.5								
F3	22.0	22.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay new)				6.3								
F4	24.0	24.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay new)				6.9								
Total	*112.7*	*112.7*						*32.3*								

Crop in field

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

Manure Application Planning Calendar – April 2018 through March 2019

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2018 Crop (Prev. Primary Crop)	Apr '18	May '18	Jun '18	Jul '18	Aug '18	Sep '18	Oct '18	Nov '18	Dec '18	Jan '19	Feb '19	Mar '19
F1	40.6	40.6	Dewey SICL (DwD2 15-25%)	Fescue hay maint (Fescue hay maint)				11.6								
F2	26.1	26.1	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				7.5								
F3	22.0	22.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.3								
F4	24.0	24.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.9								
Total	*112.7*	*112.7*						*32.3*								

Crop in field

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

Manure Application Planning Calendar – April 2019 through March 2020

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2019 Crop (Prev. Primary Crop)	Apr '19	May '19	Jun '19	Jul '19	Aug '19	Sep '19	Oct '19	Nov '19	Dec '19	Jan '20	Feb '20	Mar '20
F1	40.6	40.6	Dewey SICL (DwD2 15-25%)	Fescue hay maint (Fescue hay maint)				11.6								
F2	26.1	26.1	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				7.5								
F3	22.0	22.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.3								
F4	24.0	24.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.9								
Total	*112.7*	*112.7*						*32.3*								

Crop in field

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

Manure Application Planning Calendar – April 2020 through March 2021

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2020 Crop (Prev. Primary Crop)	Apr '20	May '20	Jun '20	Jul '20	Aug '20	Sep '20	Oct '20	Nov '20	Dec '20	Jan '21	Feb '21	Mar '21
F1	40.6	40.6	Dewey SICL (DwD2 15-25%)	Fescue hay maint (Fescue hay maint)				11.6								
F2	26.1	26.1	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				7.5								
F3	22.0	22.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.3								
F4	24.0	24.0	Fullerton GR-SIL (FgC2 5-12%)	Fescue hay maint (Fescue hay maint)				6.9								
Total	*112.7*	*112.7*						*32.3*								

Crop in field

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)
F1	Apr 2016	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		8,120 Lbs	40.6	92	0	0
F1	Jul 2016	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	11.6 Lds	81.2 Ton	40.6	26	41	53
F1	Apr 2017	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		8,120 Lbs	40.6	92	0	0
F1	Jul 2017	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	11.6 Lds	81.2 Ton	40.6	26	41	53
F1	Apr 2018	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		8,120 Lbs	40.6	92	0	0
F1	Jul 2018	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	11.6 Lds	81.2 Ton	40.6	26	41	53
F1	Apr 2019	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		8,120 Lbs	40.6	92	0	0
F1	Jul 2019	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	11.6 Lds	81.2 Ton	40.6	26	41	53
F1	Apr 2020	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		8,120 Lbs	40.6	92	0	0
F1	Jul 2020	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	11.6 Lds	81.2 Ton	40.6	26	41	53
F2	Jul 2016	Fescue hay new	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	7.5 Lds	52.5 Ton	26.3	26	41	53
F2	Apr 2017	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		5,220 Lbs	26.1	92	0	0
F2	Jul 2017	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	7.5 Lds	52.5 Ton	26.3	26	41	53
F2	Apr 2018	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		5,220 Lbs	26.1	92	0	0
F2	Jul 2018	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	7.5 Lds	52.5 Ton	26.3	26	41	53
F2	Apr 2019	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		5,220 Lbs	26.1	92	0	0
F2	Jul 2019	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	7.5 Lds	52.5 Ton	26.3	26	41	53
F2	Apr 2020	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		5,220 Lbs	26.1	92	0	0
F2	Jul 2020	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	7.5 Lds	52.5 Ton	26.3	26	41	53
F3	Jul 2016	Fescue hay new	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.3 Lds	44.1 Ton	22.0	26	41	53
F3	Apr 2017	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,400 Lbs	22.0	92	0	0
F3	Jul 2017	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.3 Lds	44.1 Ton	22.0	26	41	53
F3	Apr 2018	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,400 Lbs	22.0	92	0	0
F3	Jul 2018	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.3 Lds	44.1 Ton	22.0	26	41	53
F3	Apr 2019	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,400 Lbs	22.0	92	0	0
F3	Jul 2019	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.3 Lds	44.1 Ton	22.0	26	41	53
F3	Apr 2020	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,400 Lbs	22.0	92	0	0
F3	Jul 2020	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.3 Lds	44.1 Ton	22.0	26	41	53

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)
F4	Jul 2016	Fescue hay new	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.9 Lds	48.3 Ton	24.1	26	41	53
F4	Apr 2017	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,800 Lbs	24.0	92	0	0
F4	Jul 2017	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.9 Lds	48.3 Ton	24.1	26	41	53
F4	Apr 2018	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,800 Lbs	24.0	92	0	0
F4	Jul 2018	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.9 Lds	48.3 Ton	24.1	26	41	53
F4	Apr 2019	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,800 Lbs	24.0	92	0	0
F4	Jul 2019	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.9 Lds	48.3 Ton	24.1	26	41	53
F4	Apr 2020	Fescue hay maint	46-0-0	Surface broadcast	Custom	200 Lbs		4,800 Lbs	24.0	92	0	0
F4	Jul 2020	Fescue hay maint	Litter Shed	Litter truck, Not incorporated	Custom	2 Ton	6.9 Lds	48.3 Ton	24.1	26	41	53

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
2016	F1	40.6	Fescue hay maint	3	165	30	0	118	41	53	-47	11	53	-13	-103
2017	F1	40.6	Fescue hay maint	3	165	30	0	118	41	53	-42†	22	106	-13	-103
2018	F1	40.6	Fescue hay maint	3	165	30	0	118	41	53	-40†	33	159	-13	-103
2019	F1	40.6	Fescue hay maint	3	165	30	0	118	41	53	-40†	44	212	-13	-103
2020	F1	40.6	Fescue hay maint	3	165	30	0	118	41	53	-40†	55	265	-13	-103
Total	**F1**				**825**	**150**	**0**	**590**	**205**	**265**					
2016	F2	26.1	Fescue hay new	2	30	90	60	26	41	53	-4	-49	-7	5	-51
2017	F2	26.1	Fescue hay maint	3	165	60	60	118	41	53	-42†	-19	-7	-8	-103
2018	F2	26.1	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
2019	F2	26.1	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
2020	F2	26.1	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
Total	**F2**				**690**	**330**	**300**	**498**	**205**	**265**					
2016	F3	22.0	Fescue hay new	2	30	90	60	26	41	53	-4	-49	-7	5	-51
2017	F3	22.0	Fescue hay maint	3	165	60	60	118	41	53	-42†	-19	-7	-8	-103
2018	F3	22.0	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
2019	F3	22.0	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
2020	F3	22.0	Fescue hay maint	3	165	60	60	118	41	53	-40†	-19	-7	-13	-103
Total	**F3**				**690**	**330**	**300**	**498**	**205**	**265**					
2016	F4	24.0	Fescue hay new	2	30	90	0	26	41	53	-4	-49	53	5	-51
2017	F4	24.0	Fescue hay maint	3	165	60	0	118	41	53	-42†	-19	106	-8	-103
2018	F4	24.0	Fescue hay maint	3	165	60	0	118	41	53	-40†	-19	159	-13	-103
2019	F4	24.0	Fescue hay maint	3	165	60	0	118	41	53	-40†	-19	212	-13	-103
2020	F4	24.0	Fescue hay maint	3	165	60	0	118	41	53	-40†	-19	265	-13	-103
Total	**F4**				**690**	**330**	**0**	**498**	**205**	**265**					

TABLE 6.8: NOTES:

[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 applications. 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.

[a] 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
House 1	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
House 2	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
House 3	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
House 4	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
House 5	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
House 6	Apr '16 - Mar '17	0	450	0	0	0	0	450	0	Ton
Litter Shed	Apr '16 - Mar '17	0	0	0	2,780	226	1,450	0	1,104	Ton
Composter	Apr '16 - Mar '17	0	120	0	0	0	0	80	40	Ton
All Sources	**Apr '16 - Mar '17**	**0**	**2,820**	**0**	**2,780**	**226**	**1,450**	**2,780**	**1,144**	**Ton**
House 1	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
House 2	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
House 3	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
House 4	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
House 5	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
House 6	Apr '17 - Mar '18	0	450	0	0	0	0	450	0	Ton
Litter Shed	Apr '17 - Mar '18	1,104	0	0	2,820	226	2,700	0	998	Ton
Composter	Apr '17 - Mar '18	40	120	0	0	0	0	120	40	Ton
All Sources	**Apr '17 - Mar '18**	**1,144**	**2,820**	**0**	**2,820**	**226**	**2,700**	**2,820**	**1,038**	**Ton**
House 1	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
House 2	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
House 3	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
House 4	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
House 5	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
House 6	Apr '18 - Mar '19	0	450	0	0	0	0	450	0	Ton
Litter Shed	Apr '18 - Mar '19	998	0	0	2,820	226	2,600	0	992	Ton
Composter	Apr '18 - Mar '19	40	120	0	0	0	0	120	40	Ton
All Sources	**Apr '18 - Mar '19**	**1,038**	**2,820**	**0**	**2,820**	**226**	**2,600**	**2,820**	**1,032**	**Ton**
House 1	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
House 2	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
House 3	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
House 4	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
House 5	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
House 6	Apr '19 - Mar '20	0	450	0	0	0	0	450	0	Ton
Litter Shed	Apr '19 - Mar '20	992	0	0	2,820	226	2,700	0	886	Ton
Composter	Apr '19 - Mar '20	40	120	0	0	0	0	120	40	Ton
All Sources	**Apr '19 - Mar '20**	**1,032**	**2,820**	**0**	**2,820**	**226**	**2,700**	**2,820**	**926**	**Ton**

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
House 1	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
House 2	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
House 3	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
House 4	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
House 5	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
House 6	Apr '20 - Mar '21	0	450	0	0	0	0	450	0	Ton
Litter Shed	Apr '20 - Mar '21	886	0	0	2,820	226	2,500	0	980	Ton
Composter	Apr '20 - Mar '21	40	120	0	0	0	0	120	40	Ton
All Sources	**Apr '20 - Mar '21**	**926**	**2,820**	**0**	**2,820**	**226**	**2,500**	**2,820**	**1,020**	**Ton**

6.10. Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Apr - Aug	Product Needed Sep - Dec	Product Needed Jan - Mar	Total Product Needed	Units
46-0-0	Apr '16 - Mar '17	8,120	0	0	8,120	Lbs
46-0-0	Apr '17 - Mar '18	22,540	0	0	22,540	Lbs
46-0-0	Apr '18 - Mar '19	22,540	0	0	22,540	Lbs
46-0-0	Apr '19 - Mar '20	22,540	0	0	22,540	Lbs
46-0-0	Apr '20 - Mar '21	22,540	0	0	22,540	Lbs

6.11. Plan Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P_2O_5 (Lbs)	K_2O (Lbs)
Total Manure Nutrients on Hand at Start of Plan[1]	0	0	0
Total Manure Nutrients Collected[2]	354,870	286,230	375,060
Total Manure Nutrients Imported[3]	0	0	0
Total Manure Nutrients Exported[4]	304,725	242,585	317,870
Total Manure Nutrients Gained/Lost in Transfer[5]	4,368	0	0
Total Manure Nutrients on Hand at End of Plan[6]	25,685	20,696	27,119
Total Manure Nutrients Applied[7]	28,815	23,165	29,945
Available Manure Nutrients Applied (Utilized by plan's crops)[8]	17,628	23,165	29,945
Available Manure Nutrients Applied (Not utilized by plan's crops)[9]	1,017	0	0
Commercial Fertilizer Nutrients Applied (Utilized by plan's crops)[10]	45,209	0	0
Commercial Fertilizer Nutrients Applied (Not utilized by plan's crops)[11]	0	0	0
Available Nutrients Applied (Manure and fertilizer; utilized by plan's crops)[12]	62,837	23,165	29,945
Nutrient Utilization Potential[13]	83,244	34,755	84,157
Nutrient Balance of Spreadable Acres[14*]	-20,407	-11,590	-54,212
Average Nutrient Balance per Spreadable Acre per Year[15*]	-36	-21	-96

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 Farms. 3. Values indicate total manure nutrients imported onto the Farms.
4. Values indicate total manure nutrients exported from the Farms to an external operation.
5. Values indicate changes in total manure nutrients due to internal transfers between storage units with differing analyses.
6. Values indicate total manure nutrients present in storage(s) at the end of plan. 7. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.
8. Values indicate available manure nutrients applied on the Farms based on rate, time and method of application. These values are based on the total manure nutrients applied (row 7) after accounting for state-specific nutrient losses due to rate, time and method of application. Nutrients which will not be utilized by crops in the plan (row 9) are excluded from these values.
9. Values indicate manure nutrients applied that will be utilized by crops outside the plan.
10. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water. Nutrients that will not be utilized by crops in the plan (row 11) are excluded from these values.
11. Values indicate nutrients applied as commercial fertilizer which will be utilized by crops outside the plan.
12. Values are the sum of available manure nutrients applied (row 8) and commercial fertilizer nutrients applied (row 10).
13. 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).
14. Values indicate available nutrients applied (row 12) minus crop nutrient utilization potential (row 13). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
15. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres (row 14) 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.
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Section 7. Feed Management

Not applicable at this time.

Section 8. Other Utilization Options

No “Other Utilization” options are being practiced at this time.

All litter and manure will be applied to Fields according to the NMP or sold off-site.

Section 9. Record Keeping Forms
Annual Reports 2016-2021

9.1. Producer Activity Checklist

Calendar Year _____

Activity	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
Soil Sampling **Date / Initials**												
Manure Sampling **Date / Initials**												
Spreader or Equipment Calibration **Date / Initials**												
Record Manure Volume Storage: **Volume / Initials**	X	X	X	X	X	X	X	X	X	X	X	X
Record Manure Volume Storage: **Volume / Initials**												
Record Manure Volume Storage: **Volume / Initials**												
Mow Grass on Earthen Berm **Date / Initials**												
Other **Date / Initials**												
Recordkeeping (see forms on following pages)	X	X	X	X	X	X	X	X	X	X	X	X

Notes: An X indicates that the indicated activity is scheduled for that month. Duplicate this form as needed for additional years.

9.2. Inspection/Monitoring Records

Date	Activity Description	Operator/ Inspector	Activity Data

9.3. Crop Records

Field	Crop	Planting Date	Hybrid or Variety	Pop-ulation Planted	Crop Residue (%) (1)	Tillage and Dates	Harvest Date	Yield/ Acre

(1) Percent residue cover left after planting

9.4 Fertilizer and Manure Application Record, Daily Log

Applicator Name:_____

Field	Date	Manure or Fertilizer Type	Method of Application (Surface, Injected, Irrigated, Incorporated, etc.)	Ground Cover	% Soil Moisture	Rate of Application					Weather and Comments
						Rate Gallons or Tons /Acre	Acres Applied	N Lbs/Ac	P2O5 Lbs/Ac	K2O Lbs/Ac	

9.5. Commercial Fertilizer and Irrigation Water Application Records

Field	Date	Analysis (1)	Form Dry or Liquid	Application Method	Material Rate/A Lbs or Gal	Total Applied Lbs or Gal	Acres Cov.	Notes/Comments

(1) With commercial fertilizers, enter the analysis in the form of N-P_2O_5-K_2O (examples: anhydrous ammonia is 82-0-0, diammonium phosphate is 18-46-0). With irrigation water, enter the nitrate concentration in ppm.

9.6. Manure Exports off the Farms

Manure Source	Date	Amount Gal or Ton	Receiving Operation	Address	Contact	Phone

9.7. Manure Imports onto the Farms

Manure's Animal Type and Form	Date	Amount Gal or Ton	Originating Operation	Address	Contact	Phone

9.8. Internal Transfers of Manure

Manure Source	Date	Amount Gal or Ton	Manure Destination	Purpose of Transfer

Section 10. References

10.1. Publications

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

TN DEQ Rule 1200-4-5-.14(17)(d)
http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf

TN DEQ Rule 1200-4-5-.14(17)(d)
http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf

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 0.3.5.0
MMP Plan File	D&M-MMP.mmp 11/24/2015 5:14:29 PM
MMP Initialization File for Tennessee	4/6/2015
MMP Soils File for Tennessee	3/26/2015
Phosphorus Assessment Tool	2014.09.18
NRCS Conservation Plan(s)	n/a
RUSLE2 Library	Version: 2.5.2.11 Build: Aug 26 2014 Science: 20140728
RUSLE2 Database	Moses-TN.gdb