MARYLAND DEPARTMENT OF THE ENVIRONMENT

Land and Materials Administration • Resource Management Program
1800 Washington Boulevard • Suite 610 • Baltimore Maryland 21230-1719
410-537-3314 • 800-633-6101 x3314 • www.mde.maryland.gov

NOTICE OF INTENT

General Discharge Permit for Animal Feeding Operations (AFOs) (19AF, MDG01)
Land and Materials Administration – Resource Management Program
Issued Pursuant to Title 9, Environment Article, *Annotated Code of Maryland*, and Code of Maryland Regulations (COMAR) 26.08.04

Submission of this Notice of Intent (NOI) constitutes notice that the person identified in this form intends to operate under and comply with all terms and conditions of the State/NPDES General Discharge Permit for AFOs (AFO Permit). The discharge of animal waste, including manure, poultry litter, and process wastewater to waters of the State is prohibited unless an AFO has been registered under the AFO Permit by the Maryland Department of the Environment ("MDE"). A person shall hold a CAFO discharge permit issued by MDE before beginning construction on any part of a new CAFO.

Please submit this completed NOI Form to the following address:

Maryland Department of the Environment
Land and Materials Administration/AFO Division
1800 Washington Boulevard, Suite 610
Baltimore, Maryland 21230-1719

General Information

AI Number: 67961

1. LEGAL Name of Applicant *(must match name on required plan)*:
Howard Harding Farms, LLC

2. AFO Type *(circle one)*: CAFO / MAFO

3. Applying for *(check one)*:
☒ New Coverage *see column 'A' in Question 4*
☐ Continuation of Coverage (renewal) *see column 'B' in Question 4*
☒ Modification of 19AF Coverage *see column 'C' in Question 4*

4. Reason for NOI *(please fill out corresponding column)*:

A. New Coverage	B. Continuation of Coverage (renewal)	C. Modification of 19AF Coverage
☒ New owner/operator ☐ Proposed operation *(NO construction may begin until permit coverage is obtained)* • Date of anticipated start of AFO operation: ________	☐ No changes in operation ☐ There has been a change in one or more of the following *(please indicate)*: o Size or number of houses o Animal number, resulting in change of size category o CAFO to MAFO, MAFO to CAFO o No-Land to Land, Land to No-Land o Conventional operation to organic	☐ Expanding ☐ Change in animal number, resulting in change of size category ☐ Change from CAFO to MAFO ☒ Change from MAFO to CAFO ☐ Change from no-land to land ☐ Change from land to no-land ☐ Change from conventional to organic operation

Applicant (Owner/Operator Information)

5. Mailing Address of Applicant: 29654 Penny Lane	
City: Easton **State:** MD	**Zip Code:** 21659

6. Telephone Number(s) of Applicant: (Home)	
(Cell)	[redacted]

7. Email of Applicant: [redacted]

Farm Information

Please attach a topographic map including the production area as well as the land application area (if applicable)

8. Farm Name: ☐ Same as Legal Name
☐ Other *(please specify)*: Brookview Farms

9. Farm Address: 5549 Indiantown Road
City: Rhodesdale **County:** Dorc. **Zip Code:** 21659

10. Watershed/Hydrologic Unit Code (HUC) (12-digit): 021303060601

11. Latitude/Longitude of Production Area (Deg/Min/Sec): 38 - 34 - 08 / 75 - 47 - 15

12. Animal Information:

A. Animal Type(s) *(from AFO size chart)*	**B. Maximum Number of Animals *at any given time*** *(For poultry, please indicate bird type and number per flock)*	**C. Operation Size** *(consult AFO size chart)*	**D. Animal Confinement Type** *(e.g. house, feedlot, barn, milking parlor, pen)*
chickens, dry, non-layer	c. 81,600	med.	house

**For poultry only (13-16):*

13. *Number of poultry houses: 4 active

14. *Combined square footage of *all* poultry houses: c. 80,000 sf

15. *Date(s) poultry houses constructed: c. 2004

16. *Integrator *(check one)*:

☐ Allen-Harim ☒ Mountaire
☐ Amick ☐ Perdue
☐ Coleman ☐ Tyson
☐ Other *(please specify)*: ____________

Contact Information:
Phone No.: 302-934-1100
Address: PO Box 1320
Millsboro, DE 19966

Manure/Mortality Management

17. Total Manure/Litter/Wastewater generated *annually*: c. 612 *circle one:* (tons / lbs / gallons)

18. Total Manure/Litter/Wastewater transported offsite *annually*: varies see NMP *circle one:* (tons / lbs / gallons)

19. **Total number of acres controlled by applicant available for land application of manure/litter/process wastewater: *Owned:* c. 213.3 *Leased:*

***40 CFR Parts 122.23(b)(3) and 412.2(e) define "land application area" as all land under the control of the AFO owner/operator, whether by ownership, lease, or agreement, to which manure, litter or process wastewater is or may be applied.*

20. Manure Storage *(please list individually)*:

A. Type *(e.g. shed, lagoon, pit)*	**B. Capacity** *(ft^3, gal)*	**C. Solid/Liquid**
PWSS	c. 37,600 cf	solid

21. Mortality Management Method:

- ☒ Compost
- ☐ Freeze
- ☐ Render
- ☐ Incinerate
- ☐ Other *(please specify)*: ________________

CAFOs Only - Fees

Once a completed NOI is received by MDE and processed, MDE will invoice the applicant for any permit fees owed pursuant to COMAR 26.08.04.09-1.

Required Plan

CAFO permit application requirements at 40 CFR §122.21(i)(1)(x) specify that applications for coverage (including NOIs) must include nutrient management plans (NMPs) that at a minimum satisfy the requirements specified in 40 §122.42(e). Comprehensive Nutrient Management Plans (CNMPs), as defined in the General Discharge Permit for Animal Feeding Operations (AFOs) (19AF, MDG01), satisfy these requirements. An application will not be processed until a completed NOI form and a current CNMP are received. A CNMP must be developed by a certified and licensed plan writer, and in addition to the federal requirements, must satisfy the nutrient management requirements in COMAR 15.20.07 and 15.20.08.

Certification

By signing this form, I the applicant or duly authorized representative, do solemnly affirm under the penalties of perjury that the contents of this application are true to the best of my knowledge, information, and belief. I hereby authorize the representatives of MDE to have access to the AFO and associated lots/facilities (farms) for inspection and to records relating to this application at any reasonable time. I acknowledge that depending on the type of permit applied for, other permits or approvals may be required. The personal information requested on this form is intended to be used in processing your NOI. This Notice is provided pursuant to Title 4 of the General Provisions Article, Annotated Code of Maryland. Your NOI may not be processed if you fail to provide all requested information. You have the right to inspect, amend, or correct this form. MDE is a public agency and subject to the Maryland Public Information Act (Md. Code Ann., Gen. Prov. §§ 4-101, et seq.). This form may be made available on the Internet via MDE's website and is subject to inspection or copying, in whole or in part, by the public and other governmental agencies, if not otherwise protected by federal or State law.

Mary Harding — 10/29/21

Signature of Applicant / duly authorized representative — **Date**

Howard Harding Farms, LLC — Owner

Printed Name of Applicant / duly authorized representative — **Title**

AFO Size Chart

Animal Type	Circumstances under which Animal Feeding Operations Require Permit Coverage		
	CAFO or MAFO Registration Required	CAFO/MAFO Registration Required under Certain Circumstances	Registration Needed Only if Designated
	Large	Medium	Small
Cattle (includes heifers)	1000 or more animals	300—999 animals	less than 300 animals
Dairy cattle	700 or more animals	200—699 animals	less than 200 animals
Horses	500 or more animals	150—499 animals	less than 150 animals
Veal	1000 or more animals	300—999 animals	less than 300 animals
Swine ≥ 55 pounds	2500 or more animals	750—2499 animals	less than 750 animals
Swine < 55 pounds	10,000 or more animals	3,000—9,999 animals	less than 3,000 animals
Sheep and lambs	10,000 or more animals	3,000—9,999 animals	less than 3,000 animals
Ducks with liquid manure handling+	5,000 or more animals	1,500—4,999 animals	less than 1,500 animals
Chickens with liquid manure handling	30,000 or more animals	9,000—29,999 animals	less than 9,000 animals
Ducks with dry manure handling	30,000 or more animals	10,000—29,999 animals	less than 10,000 animals
Laying hens with dry manure handling	82,000 or more animals	25,000—81,999 animals	less than 25,000 animals
Chickens (other than laying hens) with dry manure handling	125,000 or more animals or greater than or equal to total house size of 100,000 ft^2	37,500—124,999 animals *and* less than total house size of 100,000 ft^2	less than 37,500 animals
Turkeys	55,000 or more animals	16,500—54,999 animals	less than 16,500 animals

+A separate discharge permit is required for large category duck CAFOs

CNMP WEB TOOL

Version 4.0

COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

Brookview Farm
Howard Harding Farms, LLC

5549 Indiantown Road
Rhodesdale, Maryland 21659

[redacted]

MAILING ADDRESS
29654 Penny Lane
Easton, Maryland 21601

PREPARED IN COOPERATION WITH THE

U.S. Department of Agriculture
Natural Resources Conservation Service

AND THE

Dorchester Soil Conservation District
204 Cedar Street, Suite 200
Cambridge, MD 21613

Prepared by: Cathy Scott

Plan Date: October 2021

Poultry Operation (Land Plan)

Maryland Animal Feeding Operation (MAFO)
M.D.E. Agency Interest # 67961

COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

FOR

Brookview Farm
Howard Harding Farms, LLC

LOCATION ADDRESS
5549 Indiantown Road
Rhodesdale, Maryland 21659

MAILING ADDRESS
29654 Penny Lane
Easton, Maryland 21601

PREPARED BY

Dorchester Soil Conservation District
204 Cedar Street, Suite 200
Cambridge, MD 21613

Plan Date:
October 2021

SECTION 1: CNMP Purpose and Agreement

The Comprehensive Nutrient Management Plan (CNMP) is an important part of the conservation management system (CMS) for your Animal Feeding Operation (AFO). This CNMP documents the planning decisions and operation and maintenance for the AFO.

This CNMP is valid as long as there are no major changes to the operation. A plan revision will be needed when the numbers of animals deviates by 10% from the planned amount or when the operation changes from one type of livestock to another. Annual revisions will be necessary for the nutrient management system in order to account for crop changes and soil sample result changes.

This CNMP was developed paying special attention to the USEPA's required nine minimum practices for water quality protection. This plan when implemented by Howard Harding Farms, LLC will ensure clean runoff is diverted from manure storage and production areas and livestock are prevented from making direct contact with waters.

Owner/Operator

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

Mary Harding | 10/29/21

Howard Harding Farms, LLC | Date

Certified Comphrensive Nutrient Management Plan (CNMP) Planner

As an approved Comprehensive Nutrient Management Plan (CNMP) Planner, I certify that I have reviewed the Comprehensive Nutrient Management Plan and that the elements of the documents are technically compatible, reasonable and can be implemented.

Cathy Scott | 10-14-2021

Cathy Scott | Date

NRCS Planner Certification # 233

Nutrient Management Certification # 1977

Dorchester Soil Conservation District

As the Dorchester Soil Conservation District Manager, I certify that I have reviewed this CNMP and concur that the plan meets the Dorchester Soil Conservation District's conservation goals.

Karen Houtman | 10/14/2021

Karen Houtman | Date

SECTION 2: Farmstead (Production Area)

This element addresses the components and activities associated with the production facility, feedlot or animal loafing facilities, manure and wastewater storage and treatment structures and areas, animal mortality facilities, feed and other raw material storage areas, and any areas used to facilitate transfer of manure and wastewater.

Farm Locations

Farm Name	Owner	Tax Account ID	Farm #	Tract #	Account ID Acres	Watershed
Brookview Farm	Howard Harding	[redacted]	2804	1317	103.73	02-13-03-06-0601
Cokesbury Farm	Howard Harding Farms, LLC Farms	[redacted]	3650	2538	45.0	02-13-03-06-0601
Hubbard Farm	Linda & Oliver Hubbard	[redacted]	3396	2750	119.0	02-13-04-03-0466

Description of Operation / Additional Information

This is a 4-house poultry operation, known as Brookview Farm owned and operated by the Howard Harding Farms, LLC. There are 2 older houses, 1 & 2, located on the North side of the farm that are no longer in production. Brookview Farm raises approx. 80,000, 8.5 lb. large birds for Mountaire Farms. Some of the manure is utilized on the farming operation, excess manure is exported to Thomas A Barnett & Son, Inc. or local farmers. Howard Harding Farms, LLC has been approved by DSCD to utilize the Channel of the composter instead of the bins if they so choose.
Howard Harding Farms, LLC has a farming operation as well, raising Corn, Wheat, soybeans and some vegetable crops. Some tillage is utilized due to the vegetable crops. No Till / Minimum tillage is utilized as much of the operation as possible. Manure is utilized on the owned Cokesbury Farm and leased Hubbard Farm.

Sensitive Environmental Information

Name of nearest regulatory waterbody	Distance to nearest regulatory waterbody (ft.)	Distance to nearest regulatory wetland (ft.)
Spears Creek	196 ft	98 ft

Account ID	12 Digit Watershed	Watershed Name	Tier II High Quality Waters Watershed	Impairments			
				Nitrogen	Phosphorus	Bacteria (e.coli, enterocci or fecal)	Sediment
[redacted]	02-13-03-06-0601	Marshyhope Creek	No	No	Yes	Yes	No
[redacted]	02-13-03-06-0601	Marshyhope Creek	No	No	Yes	Yes	No
[redacted]	02-13-04-03-0466	Lower Choptank	No	Yes	Yes	Yes	No

Animal Production

Poultry

Bird Type	Average Bird Weight (lbs)	Number of Houses	Total Number of Birds (All Houses)	Number of Flocks per year	Manure Generated/Produced (tons/year)*	Manure Available for Utilization/Removed (tons/year)**
Roaster	8.5 lb	4	80,000 per flock	4.5	604 Tons/Year	Varies see NMP

* See poultry litter quantity estimation sheets in the "Nutrient Management" section of this plan.

Operators must keep records of the actual:

1. Quantity estimate of litter removed from production and/or storage facility; and
2. Date of removal of litter from production and/or storage facility.

Manure Collection

Depending upon time of year and condition of manure, Mr. Harding may utilize either in-house windrowing or crusting after each flock. Manure that is collected from the chicken houses from crust outs is stored in the manure shed until spring when it is used by the receiving farm. When using an in-house windrowing method of litter management, litter is piled in the center of the house, heated, and spread back out.
Some of the manure is used in the composting unit on the farm and then removed when it can be utilized. The operator must keep records of the quantity, date and destination of manure removed from the house and off the farm.

Manure Storage

Manure is stored in a 188 ft X 40 ft Waste Storage Facility

Current / Proposed Manure Storage Conditions

Animal Type	Storage Structure	Size of Storage Structure	Storage Capacity	Date Constructed
Poultry	Poultry Waste Storage Structure	188 ft X 40 ft	37,600 cu ft	5/26/1998

IMPORTANT! Manure should not be stockpiled or staged anywhere in the production area other than permanent manure storage structure for any length of time.

Transfer Information (Farm(s) receiving exported manure)

Animal Type	Name	Address
Poultry	Thomas A Barnett & Son, Inc	5125 Eldorado-Rhodesdale Road , Rhodesdale , Maryland 21659

Animal Mortality Disposal

Animals die because of disease, injury, or other causes in any confined livestock operation. The mortality rate is generally highest for newborn animals because of their vulnerability.

Catastrophic mortality can occur if an epidemic infects and destroys a large portion of the herd or flock in a short time, or if a natural disaster, such as a flood or excessive heat strikes. There are also incidences when an entire herd or flock must be destroyed to protect human health or other farms in the area.

Methods for managing mortality include:

1. Rendering
2. Composting
3. Incineration*
4. Sanitary landfills
5. Burial**
6. Disposal pits**

* Incineration may only be used with proper equipment and permits must be obtained by the producer.
** Burial and Disposal pits should only be considered for catastrophic mortality if all other methods are not possible. Howard Harding Farms, LLC will follow local and state guidance if it is determined that burial is an acceptable means of disposal.

Typical Mortality Management

Current Normal Mortality Disposal Method(s)

Animal Type	Disposal Method	Number of Bins/Capacity	Location of Disposal/Facility
Poultry	Composting - Bins/Channels	6 Bins- 1 Channel	Attached to PWSS

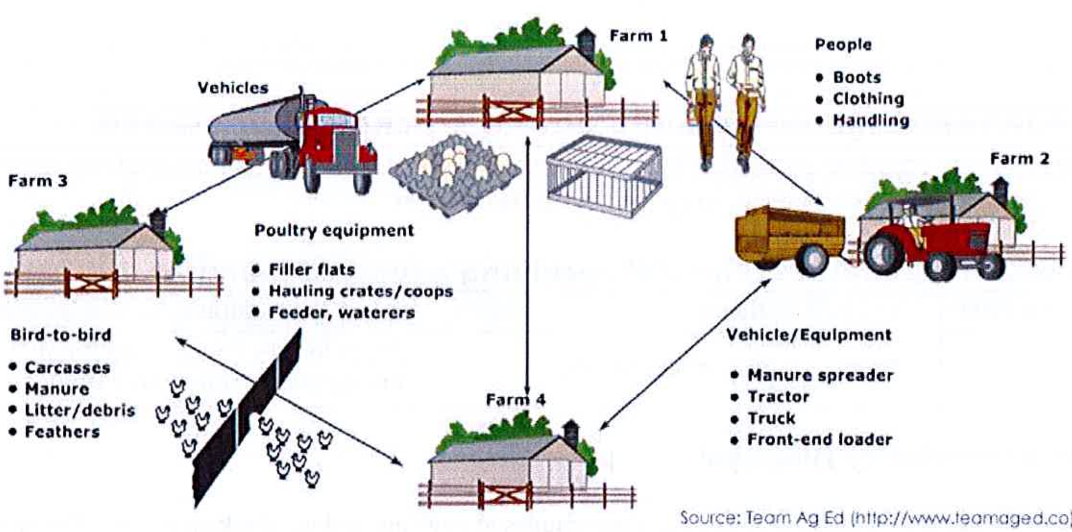
Catastrophic Mortality Management

In the event of catastrophic mortality, the operator will notify MDE, contact the integrator and most likely, follow an "in house" or "in PWSS" windrow method of composting as outlined in UMD-Ext fact sheets # 723 and #801.

Biosecurity

Biosecurity means doing everything possible to protect the health of livestock by preventing the transmission of disease. An outbreak of animal disease could not only harm your livestock, it could affect other nearby animals and quickly spread through your area. The economic consequences of a disease outbreak could be devastating. Taking common sense precautions to prevent disease from coming onto your farm is the best investment you can make.

How Diseases Spread (Example - Poultry Operation)



Source: Team Ag Ed (http://www.teamaged.co)

Steps to Take to Avoid Disease Spread

To reduce the risk of introducing disease entering into an animal feeding operation, maintain a biosecurity barrier (physical barrier, personal hygiene, and equipment sanitation) between wildlife, animals, animal containment areas, and other commercial facilities. Some examples of good biosecurity practices include:

1. Permit only essential workers and vehicles on the premises.
2. Give germs the boot
    a. Keep a pair of shoes or boots to wear only around your animals.
    b. Clean and disinfect your shoes often.
    c. Always ask visitors and employees to clean their boots and shoes.
3. Don't haul home disease
    a. Always clean and disinfect vehicles used for moving animals.
    b. Limit traffic of incoming people, products and vehicles that could bring in a disease.
    c. Clean and disinfect all equipment that comes in contact with your animals.
4. Keep your farm secure
    a. Restrict access to your property and animals.
    b. Keep doors and gates locked.
    c. Have tracking records on animals.
    d. Give germs space - Newly acquired animals should be isolated for at least two weeks to ensure you don't introduce disease to your main herd or flock. As an added protection, isolate and quarantine new animals for 30 days before putting them with your other animals. Keep show animals segregated for at least two weeks after they've been to a fair or exhibit.
5. Look for signs
    a. Unusual animal health symptoms or behavior
    b. Sudden, unexplained death loss in the herd or flock
    c. Severe illness affecting a high percentage of animals
    d. Blisters around an animal's mouth, nose, teats or hooves
    e. Staggering, falling or central nervous system disorders that prevent animals from rising or walking normally.
    f. Large number of dead insects, rodents or wildlife
6. Don't wait - call in signs of disease immediately. Do not self-diagnose. Seek veterinary services, as early detection is your best protection. If you have animals with signs of suspect disease, call your local veterinarian, UMD extension agent () or the state veterinarian. Rapid response and investigation are the only ways to control and eliminate disease and stop large numbers of casualties or damage to our economic system.

Farm Contact Information

The following tables contain important contact information specific to this CNMP for Howard Harding Farms, LLC.

Emergency Contact Information

Farm Name	Brookview Farm
Farm Address	5549 Indiantown Road, Rhodesdale, Maryland 21659
Mailing Address	29654 Penny Lane, Easton, Maryland 21601
Directions to the farm	Traveling East on MD 392 Turn right onto MD 313 traveling East to Eldorado Road (approx. 4.2 miles). Turn right onto Indiantown Road approximately .8 miles.

Farm Contacts

	Name	Farm Phone	Cell Phone
Farm Owner	Howard Harding Farms, LLC		[redacted]
Farm Operator	Howard Harding Farms, LLC		[redacted]
Fire or Ambulance	911		

State Agency Contacts

	Phone	Emergency
Natural Resources Conservation Service	410-757-0861	410-757-0861
MDA Nutrient Management	410-841-5959	1-800-492-5590
Maryland Department of the Environment	1-800-633-6101	1-866-633-4686
USDA Veterinary Services State Veterinarian	1-866-536-7593	301-854-5699

Dorchester County Agency Contacts

	Day Phone	Emergency Number
MDA Regional Nutrient Management (Region)	410-228-5640	410-228-5640
Health Department	410-228-3223	410-228-3223
Sherriff's Office	911	911
University of Maryland Extension Office (Cambridge)	410-228-5640	410-228-5640

Integrator Information

Name	Address	Phone
Mountaire Farms	P.O. Box 1320, Millsboro DE 19966	302-934-1100

Operation and Maintenance for BMP's in Farmstead

This section addresses the operation and maintenance for the structural, non-structural, and land treatment measures for your farm. These documented measures require effort and expenditures throughout the life of the practice to maintain safe conditions and assure proper functioning. Operation includes the administration, management, and performance of non-maintenance actions needed to keep a completed practice safe and functioning as planned. Maintenance includes work to prevent deterioration of practices, repairing damage, or replacement of the practice if one or more components fail.

Waste Storage Facility (313)

- Check backfill areas around the structure (concrete, steel, timber, etc.) frequently for excessive settlement. Determine if the settlement is caused by backfill consolidation, piping, or failure of the structure walls or floor. Necessary repairs must be made.
- Check walls and floors often - minimum of 2 times a year when facility is empty - for cracks and/or separations. Make needed repairs immediately.
- Outlets of foundations and sub-drains should be checked frequently and kept open. The outflow from these drains should be checked when the facility is being used to determine if there is leakage from the storage structure into these drains. Leakage may be detected by the color and smell of the out-flowing liquid, by lush dark-green growth of vegetation around the outlet, by the growth of algae in the surface ditch, or by the vegetation being killed by the out-flowing liquid. If leakage is detected, repairs should be planned and made to prevent the possible contamination of groundwater. To prevent erosion, a good vegetative cover should be established and maintained on berms and embankments. Plantings should be clipped 3 times a year to kill noxious weeds and encourage vigorous growth. If the vegetation is damaged, berms and embankments will need to be re-vegetated as soon as possible.
- Fences should be inspected and maintained in order to exclude livestock from the berms and embankments and to exclude unauthorized entry by people.
- Check the channels and berms of the clean water diversions around the barnyard, buildings and storage structure frequently. Channels must be protected from erosion and berms must be maintained at the proper height to ensure adequate capacity. These channels and berms should not be used as haul roads unless they are designed and constructed for this purpose.
- Check frequently for burrowing animals around buildings, structures, and in the berms and embankments. Remove them when they are found and repair any damage.
- Inspect haul roads and approaches to and from the storage facility frequently to determine the need for stone, gravel or other stabilizing material.
- Do not allow runoff from loading areas and from spills to flow into streams or road ditches.
- Examine and repair all warning and hazard signs as needed.
- Install and maintain a marking gauge post that clearly shows the design levels of one-half and full for manure storage pits, ponds, and lagoons.
- Clear blockages from roof gutters and outlets as needed.
- Notify the Soil Conservation District of any major problems or repairs needed.
- The roof must be maintained to operate as intended for the life of the practice (15 years). The function of the roof is critical because the manure storage facility is sized accordingly.

Animal Mortality Facility (316)

- Facilities for normal mortality will be operated or used on a regular basis. At each operation or use, inspect the facility to note any maintenance needs or indicators of operation problems, and promptly make repairs or adjustments to operation of the facility.
- Follow the management plan requirements for:
- The mix proportions, moisture requirements, and materials used.
- The sizing requirements.
- The timing of the disposal/utilization process including loading, unloading, and turning or aeration of the material.
- Temperature monitoring requirements, including a temperature log.
- What must be done to prevent scavenging animals and leachate problems.
- Bio-security requirements.
- If catastrophic mortality occurs, contact NRCS or the Soil Conservation District for assistance concerning proper disposal of the mortality.

Heavy Use Area Protection (561)

- Inspect the Heavy Use Area at least twice a year and after severe storm events.
- Scrape the surface as needed to remove excess manure and/or sediment.
- Repair paved areas by repairing holes and replacement of paving materials.
- Replace loose surfacing material such as gravel, cinders, sawdust, tanbark, etc. as needed when removed by livestock, equipment traffic, or scraping.
- Repair any deteriorating areas.
- Maintain all vegetation that is part of the plan by fertilizing and liming according to soil test recommendations and reseeding or replanting as necessary.
- Inspect inlets and outlets of pipes and culverts and remove any obstructions present.
- Maintain flow into filter areas by removing accumulated solids, reconstructing waterbars, etc.

Implementation Schedule for Farmstead

This element addresses the need for and implementation of appropriate conservation practices to meet the quality criteria for soil erosion, air and water quality.

Practice and Facility Implementation Schedule

Description	Date
All resource concerns have been addressed and no additional best management practices are recommended or required at this time.	October 2021

The schedule of conservation practices presented here has been reviewed by Howard Harding Farms, LLC, who is responsible for compliance with the requirements of the agricultural farm operation.

I, Howard Harding Farms, LLC, certify that as the decision-maker, I have been involved in the planning process and agree that the items/practices listed in the table above are needed on my farm operation. I understand that I am responsible for implementing these practices according to the scheduled above. Should I not be able to implement any of the above items according to the schedule, I will contact the Dorchester Soil Conservation District and have this schedule revised.

Mary Harding 10/29/21

Howard Harding Farms, LLC Date

SECTION 3: Land Treatment Area (Crop and/or Pasture)

This element addresses evaluation and implementation of appropriate conservation practices on sites proposed for land application of manure and organic by-products from an Animal Feeding Operation. On fields where manure and organic by-products are applied as beneficial nutrients, it is essential that runoff and soil erosion be minimized to allow for plant uptake of these nutrients.

The following documents are located in this section:

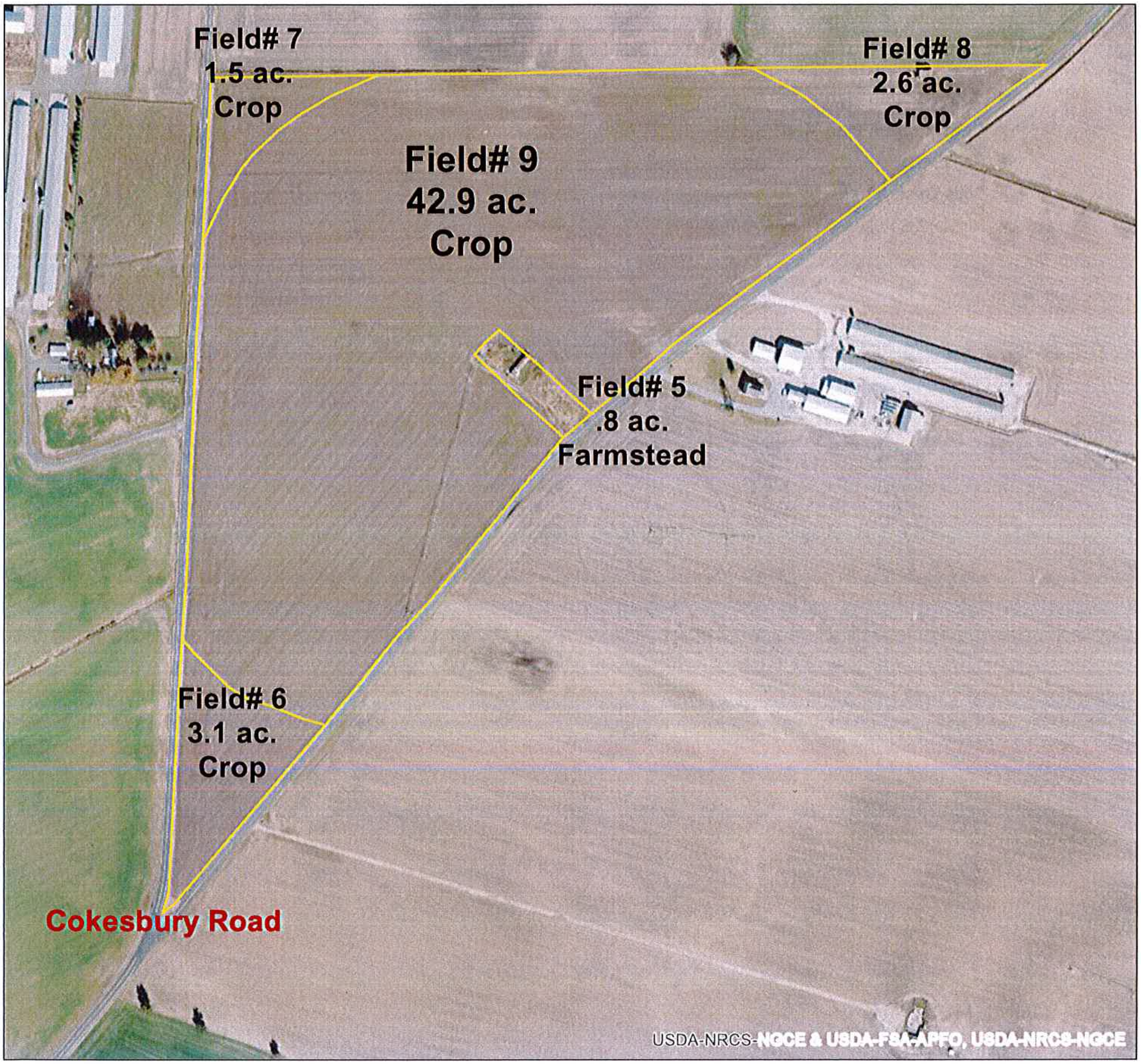
- Conservation Plan
- Conservation Plan Map
- Soils Map
- Soils Descriptions
- RUSLE2 Soil Loss Calculations

Date: 9/3/2021

Conservation Plan Map

Client(s): HOWARD HARDING FARMS, LLC
Location: OPID: 33140
Farm 3650 Tract 2538
Approximate Acres: 50.83

Assisted By: Catherine Scott
DORCHESTER COUNTY SERVICE CENTER
DORCHESTER SCD



Prepared with assistance from USDA-Natural Resources Conservation Service

0 400 Feet

Practice Schedule PLUs

N

USDA

Implementation Schedule for Land Treatment Area

This element addresses the need for and implementation of appropriate conservation practices to meet the quality criteria for soil erosion, air and water quality.

Practice and Facility Implementation Schedule

Description	Date
All resource concerns have been addressed and no additional best management practices are recommended or required at this time.	October 2021

The schedule of conservation practices presented here has been reviewed by Howard Harding Farms, LLC, who is responsible for compliance with the requirements of the agricultural farm operation.

I, Howard Harding Farms, LLC, certify that as the decision-maker, I have been involved in the planning process and agree that the items/practices listed in the table above are needed on my farm operation. I understand that I am responsible for implementing these practices according to the scheduled above. Should I not be able to implement any of the above items according to the schedule, I will contact the Dorchester Soil Conservation District and have this schedule revised.

Mary Harding 10/29/21

Howard Harding Farms, LLC Date

Operation and Maintenance for BMP's in Land Treatment Area

This section addresses the operation and maintenance for the structural, non-structural, and land treatment measures for your farm. These documented measures require effort and expenditures throughout the life of the practice to maintain safe conditions and assure proper functioning. Operation includes the administration, management, and performance of non-maintenance actions needed to keep a completed practice safe and functioning as planned. Maintenance includes work to prevent deterioration of practices, repairing damage, or replacement of the practice if one or more components fail.

Conservation Crop Rotation (328)

- Follow the specified crop rotation. Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that will accomplish the purpose of the original crop.
- Evaluate the rotation and the crop sequence to determine if the planned system is meeting the planned purpose(s).

Cover Crop (340)

- Follow management requirements as specified to manage the cover crop for the desired period of time. Management may consist of mowing, mechanical harvesting, prescribed grazing, nutrient management, pest management, or other actions, as appropriate.
- Control weeds as needed by mowing or by spraying with an appropriate herbicide. To the extent feasible, "spot" spray or mow to control weeds so that desirable cover is not destroyed unnecessarily. Noxious weeds must be controlled as required by state law. Weed control must be part of a pest management plan.
- If forage use is desired, green-chop or graze the cover crop in the late boot to early head stages when optimal nutritional content and yield is available.
- For all purposes other than supplemental forage, terminate a grass cover crop no later than the late joint to early boot stage, or no later than 2 to 4 weeks prior to planting the next crop. Termination should be early enough that the crop does reach the flowering stage. The timing of the termination date permits maximum growth of the cover and maximum uptake of residual nutrients while allowing sufficient time for the decomposition of the vegetation, release of nutrients, and recharge of soil moisture.
- Legumes killed while succulent decompose more rapidly than grasses, so killing a legume cover crop 1 to 2 weeks before planting the next crop is usually sufficient.
- When optimum wildlife habitat is desired, do not mow or mechanically harvest fields during the nesting season of the desired wildlife species. For Maryland, the primary nesting season is generally from April 15 through August 15.
- Comply with acceptable uses (e.g., grazing, haying) and time of year/frequency of use restrictions, if any.

Residue Management, Reduced-Till (345)

- Follow the specified crop rotation and implements to be used for each field. Contact NRCS before changing the cropping sequence and/or tillage methods, especially on HEL fields or when receiving financial assistance for this practice.
- Evaluate/measure crop residue cover and orientation after each crop to ensure the planned amounts and orientation are being achieved. Adjust management as needed to either plan a new residue amount and orientation or adjust the planting and/or harvesting equipment.
- A Soil Tillage Intensity Rating (STIR) value of 80 or less must be maintained in order to be considered reduced-till.
- If there are areas of heavy residue accumulation in the field because of movement of water or wind, spread the residue prior to planting so that it does not interfere with planter operation.

Nutrient Management (590)

- Review or revise plans periodically to determine if adjustments or modifications are needed. At a minimum, review and revise plans as needed with each soil test cycle, changes in manure management, volume or analysis, plants and crops, or plant and crop management.
- Monitor fields receiving animal manures and biosolids for the accumulation of heavy metals and P in accordance with University of Maryland guidance and state law.
- For animal feeding operation, significant changes in animal numbers, management, and feed management will necessitate additional manure analyses to establish a revised average nutrient content.
- Calibrate application equipment to ensure accurate distribution of material at planned rates. For products too dangerous to calibrate, follow University of Maryland or equipment manufacturer guidance on proper equipment design, plumbing, and maintenance.
- Document the nutrient application rate. When the applied rate differs from the planned rate, provide appropriate documentation to explain the difference.
- Protect workers from and avoid unnecessary contact with nutrient sources. Take extra caution when handling anhydrous ammonia or when managing organic wastes stored in unventilated tanks, impoundments, or other enclosures.
- Use material generated from cleaning nutrient application equipment in an environmentally safe manner. Collect, store, or field apply excess material in an appropriate manner.
- Recycle or dispose of nutrient containers in compliance with State and local guidelines or regulations.
- Organic waste and commercial fertilizer application will be based on the nutrient rates shown Nutrient Management Section of this CNMP.

Waste Recycling (633)

Records shall be kept for a period of three years (as required by MDA) or longer, and shall include when appropriate:

- Quantity of manure and other wastes produced, and their nutrient content.*
- Soil test results.*
- Dates and amounts of waste application where land applied, and the dates and amounts of waste removed from the system due to feeding, energy production, or export from the operation*.
- Crops grown and yields (both yield goals and measured yield).*
- Waste application methods.
- Other tests as applicable, such as determining the nutrient content of the harvested product.
- Calibration of application equipment.

*Note: These records are required by the State of Maryland as part of a Nutrient Management Plan, and may be maintained in that document, unless program requirements specify otherwise.

SECTION 4: Nutrient Management

This element addresses the Nutrient Management component of the CNMP. The nutrient management plan is developed by a Maryland Department of Agriculture certified nutrient management consultant.

Soil Sampling and Testing

Maryland Department of Agriculture regulations require up-to-date soil analyses be included in the Nutrient Management Plan. To fulfill this requirement you must follow these guidelines:

- Soil test(s) are required to be taken every 3 years or sooner for each management unit;
- It is recommended that soil sampling be conducted consistently at the same time of the year;
- Soil sampling depth for P and K shall be 8 inches;
- pH testing sampling depth for no-till is only 4 inches.

Soil testing shall include analysis for any nutrients for which specific information is needed to develop the plan. The minimum analysis for Maryland is to include: pH, organic matter, phosphorus, potassium, calcium, magnesium, and CEC.

Manure and Wastewater Testing/Analysis

Maryland Department of the Environment and the Environmental Protection Agency require an analysis of manure generated on your operation be obtained to meet conditions in a General Discharge Permit for Animal Feeding Operations under CAFO regulations. If you land-apply manure, it is a required component of your NMP according to MDA regulations. To fulfill this requirement you may do one of the following:

1. Collect a sample of manure and obtain an analysis OR
2. If exported, obtain a copy of the manure analysis from one of the farmers who will be receiving the manure from your operation

Manure should be analyzed on an annual basis from each storage structure for: % Solids or % Moisture, Total N, Organic N, NH_4 or NH_3, P_2O_5, K_2O, and pH. These analyses are part of the required Record Keeping and are stored under the Record Keeping element of this CNMP.

Description of Chemical Handling:

- If used, most chemicals are custom applied. Small quantities (<5 gal) of chemicals (i.e. Bleach, Chlorite, Virucides or Quat-A-Mone) may be stored at the operation for water conditioning & disinfecting purposes. All chemicals are stored in proper containers, in a designated area.

Online References

1. **MDE Regulations and General Permit for Animal Feeding Operations (AFO)**
   http://www.mde.state.md.us/programs/Land/SolidWaste/CAFOMAFO/Pages/Programs/LandPrograms/Solid_Waste/cafo/index.aspx
2. **Environmental Protection Agency (EPA) Concentrated Animal Feeding Operations (CAFO) - Final Rule**
   http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm
3. **Crop Fertilizer Recommendations**
   "Soil Fertility Management," Maryland Cooperative Extension, SFM-1, Oct. 2002
   http://www.anmp.umd.edu/Pubs/Pubs_Crops.cfm
4. **Nutrient Management Information Sheets**
   http://www.anmp.umd.edu/Pubs/index.cfm
5. **Manure Nutrient Availability**
   Maryland Department of Agriculture, COMAR 15.20.08.05
   http://mda2.maryland.gov/ resource_conservation/ Documents/consultant_information/2009%20I-C%20p1-3%20s6.pdf
6. **Calibrating Manure Spreaders**
   University of Maryland Extension Fact Sheet 416 and Worksheets
   http://www.anmp.umd.edu/Pubs/Pubs_Manure.cfm
   http://www.anmp.umd.edu/Pubs/Pubs_Equip.cfm
7. **Phosphorus Assessment**
   "The Maryland Phosphorus Site Index: An Overview," Maryland Cooperative Extension SFM-6, April 2005
   http://www.anmp.umd.edu/files/SFM-6.pdf
   "The Maryland Phosphorus Site Index: Technical Users Guide," Maryland Cooperative Extension SFM-7, March 2008
   http://www.anmp.umd.edu/files/SFM-7.pdf
8. **Mid-Atlantic Nutrient Management Handbook**
   http://www.mawaterquality.org/Publications/pubs/manhcomplete.pdf
9. **Maryland Pesticide Regulation**
   http://www.mda.state.md.us/plants-pests/pesticide_regulation/index.php
10. **Maryland Practice Standards**
    eFOTG Section IV - Practice Standards and Specifications
    http://www.nrcs.usda.gov/technical/efotg/
11. **Dorchester County University of Maryland Extension Office**
12. **Dorchester Soil Conservation District**
13. **Mountaire Farms**
    http://www.mountaire.com/

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor
Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

Nutrient Land Application Log Sheet

Facility Name: ________________________________ **NPDES Permit No.:** ____________________

Instructions:
For each land application for each field, provide the following information in the table below:

- Date: the date you applied the manure/litter/process wastewater to the field
- Field ID: the field where you applied manure/litter/process wastewater. Use the same field identification that is used in your nutrient management plan
- Method: how you applied the manure/litter/process wastewater (e.g. surface w/incorporation, surface w/out incorporation, subsurface injection…)
- Application Rate: the number of tons or gallons *actually* applied per acre
- Acres Applied: the number of acres the manure/litter/process wastewater was applied to on the field
- Total N: the total amount of nitrogen you applied to the field from animal waste
- Total P: the total amount of phosphorous you applied to the field from animal waste

Date	Field ID	Method	Actual Application Rate	Acres Applied	Total N	Total P

Date	Field ID	Method	Actual Application Rate	Acres Applied	Total N	Total P

Weather and Soil Condition Documentation

When land applying manure/litter/process wastewater, you also need to document the **weather and soil conditions**. Please provide this information in the following table:

Date	Field ID	Weather Conditions			Soil Conditions
		24 hours before	*During*	*24 hours after*	

Weekly Storage and Containment Structure Inspections Log Sheet

Facility Name: ______________________________ NPDES Permit No.: _________________

Instructions:
Use this form to keep records of weekly visual inspections of the structures you use to store or contain manure/litter/process wastewater. Use a separate form for each structure.

**Any deficiencies observed must be corrected within 30 days*

Storage or Containment Structure: ____

	Date	**Initials**	**Depth Marker Reading** (N/A for dry manure handling)	**OK** (√ if no problems)	**Description of any Deficiencies Observed** (put "N/A" if none observed)	**Date Deficiency Corrected***
Week 1						
Week 2						
Week 3						
Week 4						
Week 5						
Week 6						
Week 7						

	Date	Initials	Depth Marker Reading (N/A for dry manure handling)	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 8						
Week 9						
Week 10						
Week 11						
Week 12						
Week 13						
Week 14						
Week 15						
Week 16						
Week 17						
Week 18						
Week 19						

	Date	Initials	Depth Marker Reading (N/A for dry manure handling)	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 20						
Week 21						
Week 22						
Week 23						
Week 24						
Week 25						
Week 26						
Week 27						
Week 28						
Week 29						
Week 30						
Week 31						

	Date	Initials	Depth Marker Reading (N/A for dry manure handling)	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 32						
Week 33						
Week 34						
Week 35						
Week 36						
Week 37						
Week 38						
Week 39						
Week 40						
Week 41						
Week 42						
Week 43						

	Date	Initials	Depth Marker Reading (N/A for dry manure handling)	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 44						
Week 45						
Week 46						
Week 47						
Week 47						
Week 49						
Week 50						
Week 51						
Week 52						

Weekly Wastewater Facilities Inspections Log Sheet

Facility Name: ______________________________ NPDES Permit No.: _____________

Instructions:
Use this form to keep records of weekly visual inspections of your wastewater facilities (including pumps, storm water and runoff diversion devices, and devices used to channel contaminated storm water to a wastewater storage or containment structure).

**Any deficiencies observed must be corrected within 30 days*

List the items that need to be inspected below:

_____________________________ _____________________________
_____________________________ _____________________________
_____________________________ _____________________________
_____________________________ _____________________________

	Date	**Initials**	**OK** (√ if no problems)	**Description of any Deficiencies Observed** (put "N/A" if none observed)	**Date Deficiency Corrected***
Week 1					
Week 2					
Week 3					
Week 4					
Week 5					
Week 6					

	Date	Initials	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 7					
Week 8					
Week 9					
Week 10					
Week 11					
Week 12					
Week 13					
Week 14					
Week 15					
Week 16					
Week 17					
Week 18					
Week 19					
Week 20					

	Date	Initials	OK (√ if no problems)	**Description of any Deficiencies Observed** (put "N/A" if none observed)	Date Deficiency Corrected*
Week 21					
Week 22					
Week 23					
Week 24					
Week 25					
Week 26					
Week 27					
Week 28					
Week 29					
Week 30					
Week 31					
Week 32					
Week 33					
Week 34					

	Date	Initials	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 35					
Week 36					
Week 37					
Week 38					
Week 39					
Week 40					
Week 41					
Week 42					
Week 43					
Week 44					
Week 45					
Week 46					
Week 47					
Week 48					

	Date	Initials	OK (√ if no problems)	Description of any Deficiencies Observed (put "N/A" if none observed)	Date Deficiency Corrected*
Week 49					
Week 50					
Week 51					
Week 52					

Manure, Litter, and Wastewater Storage Structures Documentation

Facility Name: ______________________ NPDES Permit No.: ______________

Instructions:
For each storage structure, provide the following information in the table below:

- Structure Type: the type of storage structure (e.g. roofed storage shed, storage pond, anaerobic lagoon…)
- Total Design Storage Volume: the total capacity the storage structure was designed to hold (e.g. 100 ft^3 or 1000 gallons)
- Design Treatment Volume: **(*N/A for dry manure storage)** the treatment capacity the structure was designed to treat
- Days of Storage Capacity: **(*N/A for dry manure storage)** the number of days the structure can accommodate its contents at the rate the operation places waste in it
- Volume for Solids Accumulation: the capacity of the structure available to accumulate solids

Structure Type	**Total Design Storage Volume**	**Design Treatment Volume** (N/A for dry manure storage)	**Days of Storage Capacity** (N/A for dry manure storage)	**Volume for Solids Accumulation**

Manure Application Equipment Inspection and Calibration Record

Facility Name: ______________________ NPDES Permit No.: ______________

Instructions:
Use this form to keep records of your manure equipment inspections. For each inspection, provide the following information in the table below:

- Inspection/Calibration Date: the date of the inspection/calibration
- Calibration Method: method used for calibration (e.g. weight-area method, load-area method…)
- Inspection/Calibration Results: provide statements such as "recalibrated equipment" or "equipment in calibration"
- Date Calibration Corrected: the date that any observed deficiencies were fixed **must be corrected within 30 days*

Inspection/Calibration Date	**Calibration Method**	**Inspection/Calibration Results**	**Date Re-Calibrated or Fixed***

Manure, Litter, and Wastewater Transfer Record Keeping Form

Facility Name: ______________________ NPDES Permit No.: ______________

Use this sheet any time that manure or poultry litter is removed from a production or storage area and transferred to other persons (not under the control of your CAFO). Use additional sheets as necessary.

Date of Transfer (indicate whether import or export)	**Manure Type** (e.g. litter, wastewater)	**Name and Address of Person(s) Received From or Transferred To**	**Quantity Transported** (tons/gallons)

Daily Water Line Inspection Log Sheet

Facility Name: ________________________________ NPDES Permit No.:_______________

Instructions:

- Initial the form *each day* after the inspection is complete
- If a leak is detected, place a check in the "leak detected" column

January, 20____		
Day	Initials	√ if Leak Detected
1		
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February, 20____		
Day	Initials	√ if Leak Detected
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March, 20____		
Day	Initials	√ if Leak Detected
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April, 20____		
Day	Initials	√ if Leak Detected

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May, 20____

Day	Initials	√ if Leak Detected
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June, 20____

Day	Initials	√ if Leak Detected
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July, 20____

Day	Initials	√ if Leak Detected
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August, 20____

Day	Initials	√ if Leak Detected
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September, 20____

Day	Initials	√ if Leak Detected
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October, 20____

Day	Initials	√ if Leak Detected
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November, 20____

Day	Initials	√ if Leak Detected
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December, 20____

Day	Initials	√ if Leak Detected
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HOWARD HARDING FARMS, LLC.

2024

FERTILITY RECOMMENDATIONS

Prepared By:
McConnell Agronomics, Inc.
7735 Dyer Road
Denton, Maryland 21629
(410) 479-3664

Farm Operation:
HOWARD HARDING FARMS, LLC
ATTN: MARY HARDING
29564 PENNY LANE
EASTON MD 21601

Dorchester County

[redacted]

Start Date: March 1, 2024 **End Date:** March 1, 2025

Nutrient Management Consultant:

McConnell Agronomics, Inc.
Luke McConnell
7735 Dyer Road
Denton, Maryland 21629

410-479-3664 Office
410-479-0564 Fax

#0053 Nutrient Management Certification Number (Delaware)

#2078 Nutrient Management License Number (Maryland)

#1045 Nutrient Management Certification Number (Maryland)

HOWARD HARDING FARMS, LLC
YIELD GOALS

Wheat	90 bushels per acre
Second Crop Soybeans	40 bushels per acre
Irrigated Full Season Soybeans	60 bushels per acre
Dry land Full Season Soybeans	40 bushels per acre
Irrigated Field Corn	260 bushels per acre
Dry land Field Corn	170 bushels per acre
Sweet Corn	9 tons per acre
Peas	4,500 lbs per acre
Watermelons	50,000 lbs per acre
Green Beans	5 tons per acre
Lima Beans	2,500 lbs per acre

Yield goals determined from farmer's knowledge of past production.

HOWARD HARDING FARMS, LLC

DORCHESTER

Farm Name	Watershed	Acres	Tax ID No.	Location Code
Barnes	02130306	43.40	[redacted]	0033
Cokesbury	02130306	45.0	[redacted]	0033
Faulkner	02130305	135.50	[redacted]	0034
Granruth	02130305	12.0	[redacted]	0034
Greenhawk, Ed	02130308	56.45	[redacted]	0036
Hastings	02130305	165.0	[redacted]	0034
Home	02130306	102.7	[redacted]	0033
	02130306	56.0	[redacted]	0033
	02130306	50.23	[redacted]	0033
Hubbard	02130403	315.0	[redacted]	0035
	02130403	119.0	[redacted]	0035
Young, Henry	02130403	25	[redacted]	0035
Za Thang	02130306	147.50	[redacted]	0033

DELAWARE

Wilson, Kenny	Nanticoke	140.55	[redacted]
		44.63	[redacted]
		17.03	[redacted]

HOWARD HARDING FARMS, LLC
CROP ROTATION

FARM	IRR	ACRES	2022 CROP	2023 CROP	PLANNED 2024 CROP
Barnes					
BN1	I	19.7	Wheat/Soybeans	Watermelons	FS Soybeans
BN2		6.9	Wheat/Soybeans	FS Lima Beans	Watermelons
BN3		10.4	Wheat/Soybeans	FS Lima Beans	Watermelons
		37.0			
Cokesbury					
CO1	I	29.2	Wheat/Soybeans	Lima Beans/Soybeans	Watermelons
CODC		20.4	Wheat/Soybeans	Lima Beans/Soybeans	Watermelons
		49.6			
Faulkner					
FA1		21.3	FS Soybeans	Wheat/Soybeans	FS Soybeans
Granruth					
GR1		5.3	FS Soybeans	FS Soybeans	Field Corn/FS Soybeans
GR2		1.1	FS Soybeans	FS Soybeans	Field Corn/FS Soybeans
		6.4			
Greenhawk, Ed					
EG1		15.0	--	Watermelons	Lima Beans/Soybeans
EG2		23.2	--	Watermelons	Lima Beans/Soybeans
EG3-4		7.1	--	Watermelons	Lima Beans/Soybeans
		45.3			
Hastings Farm					
HA1		51.0	Sweet Corn	Sweet Corn/Lima Beans	Green Beans/Soybeans or Field Corn
HA1A		18.0	Field Corn	Sweet Corn/Lima Beans	Green Beans/Soybeans or Field Corn
		69.0			

HOWARD HARDING FARMS, LLC
CROP ROTATION

FARM	IRR	ACRES	2022 CROP	2023 CROP	PLANNED 2024 CROP
Home Farm					
HF1		2.8	Wheat/Melons (B&K)	Wheat/Soybeans	Field Corn
HF2	I	20.2	Wheat/Melons (B&K)	Wheat/Soybeans	Field Corn
HF3		4.4	Wheat/Soybeans	Wheat/Soybeans	Field Corn
HF4		6.1	Wheat/Soybeans	Wheat/Soybeans	Field Corn
HF5	I	15.5	Wheat/Melons (B&K)	Watermelons (B&K Farms)	Field Corn
HF6	I	19.0	Wheat/Melons (B&K)	Watermelons (B&K Farms)	Field Corn
HF7	I	38.0	Wheat/Soybeans	Watermelons (B&K Farms)	Field Corn
HF8	I	14.7	Wheat/SB/Melons (B&K)	Watermelons (B&K Farms)	Field Corn
HF9		35.8	Wheat/Soybeans	Wheat/Soybeans	Watermelons
HF9A		8.5	Wheat/Soybeans	Wheat/Soybeans	FS Soybeans
		165.0			
Hubbard Farm					
HB1	I	52.3	Field Corn	Wheat/Soybeans	Field Corn
HB1A	I	14.5	Field Corn	Field Corn	Field Corn
HB1DC		5.7	Field Corn	Field Corn	Field Corn
HB2	I	52.3	FS Soybeans	Watermelons	Field Corn
HB2A	I	17.1	FS Soybeans	Field Corn	Field Corn
HB3	I	27.1	Watermelons	Field Corn	Field Corn
HB3DC		10.6	Watermelons	FS Soybeans	Field Corn
HB4	I	36.7	FS Soybeans	Wheat/Soybeans	Field Corn
HB4A	I	17.4	FS Soybeans	Wheat/Soybeans	Field Corn
HB4ADC		7.3	FS Soybeans	Wheat/Soybeans	Field Corn
		241.0			

HOWARD HARDING FARMS, LLC
CROP ROTATION

FARM	IRR	ACRES	2022 CROP	2023 CROP	PLANNED 2024 CROP
Wilson, Kenny - DE					
KW1		6.6	Wheat/Soybeans	FS Soybeans	Field Corn/FS Soybeans
KW2		7.5	Wheat/Soybeans	FS Soybeans	Field Corn/FS Soybeans
KW3		14.7	Wheat/Soybeans	FS Soybeans	Field Corn/FS Soybeans
KW4		12.1	Wheat/Soybeans	FS Soybeans	Field Corn/FS Soybeans
KW5	I	29.1	Watermelons	Watermelons	Field Corn/FS Soybeans
KW6	I	21.1	Wheat/Soybeans	Watermelons	Field Corn/FS Soybeans
KW7	I	29.2	Wheat/Soybeans	Watermelons	Field Corn/FS Soybeans
KW8	I	16.9	Wheat/Soybeans	Watermelons	Field Corn/FS Soybeans
		137.2			
Young, Henry					
HUY		18.0	--	--	Watermelons
Za Thang					
Z1		12.5	FS Soybeans	Watermelons	FS Soybeans
Z2		4.0	FS Soybeans	Watermelons	FS Soybeans
		16.5			
		806.3	**Total Acres**		
		137.2	**Delaware Acres**		
		669.1	**Maryland Acres**		

MCCONNELL AGRONOMICS
NITROGEN CREDITS FROM MANURE AND PREVIOUS CROPS

Fertilizer is based on average yields given at the beginning of these recommendations. If there is a variance in the yield potential for specific fields or irrigation is added, there should be adjustments made in fertilizer rates, particularly nitrogen.

If soybeans were planted the previous year, there should be a 15 lb. nitrogen credit given for all of this year's crops requiring nitrogen fertilizer.

If manure was applied the previous year, there should be a nitrogen credit given for this year's crops. Residual nitrogen from manure is calculated on a separate sheet for each field.

<u>This Plan Was Developed to Use For 2024 Crops.</u>

The following is a list of situations that will impact whether or not the attached Nutrient Management Plan will need updating before the end of the time period for the which the plan was developed.

1) A change to the planned crop or cropping rotation, or introduction of a new crop not currently addressed in the existing nutrient management plan.

2) A change in nutrient source or soil test results

3) A change in acreage managed of 10 percent or greater, or 30 acres, whichever is less.

4) A change in animal units of 10 percent or greater if resultant manure production will require significant management adjustments.

Nutrient Application Setbacks

If the watercourse is:	It is defined as a:	For crop and pasture land adjacent to the watercourse, the setbacks requirements:
Natural <u>and</u> either perennial or intermittent	Stream	Apply
Channelized <u>and</u> perennial <u>and;</u> A. Lies within a floodplain soil map unit, or B. Lies within a hydric soil map unit "mapped as a narrow, elongated feature in a fluvial (stream-like)/floodplain position, or C. Lies within a "B" slope or greater soil D. And greater than 50% of field length	Stream (Water/ 365 days/yr.)	Apply
Ponds: with an outlet…		Apply
Channelized and intermittent	Ditch	Do Not Apply
Ponds: without an outlet…		Do Not Apply
Ephemeral (natural or channelized)	Ditch	Do Not Apply

Nutrient Application Setbacks

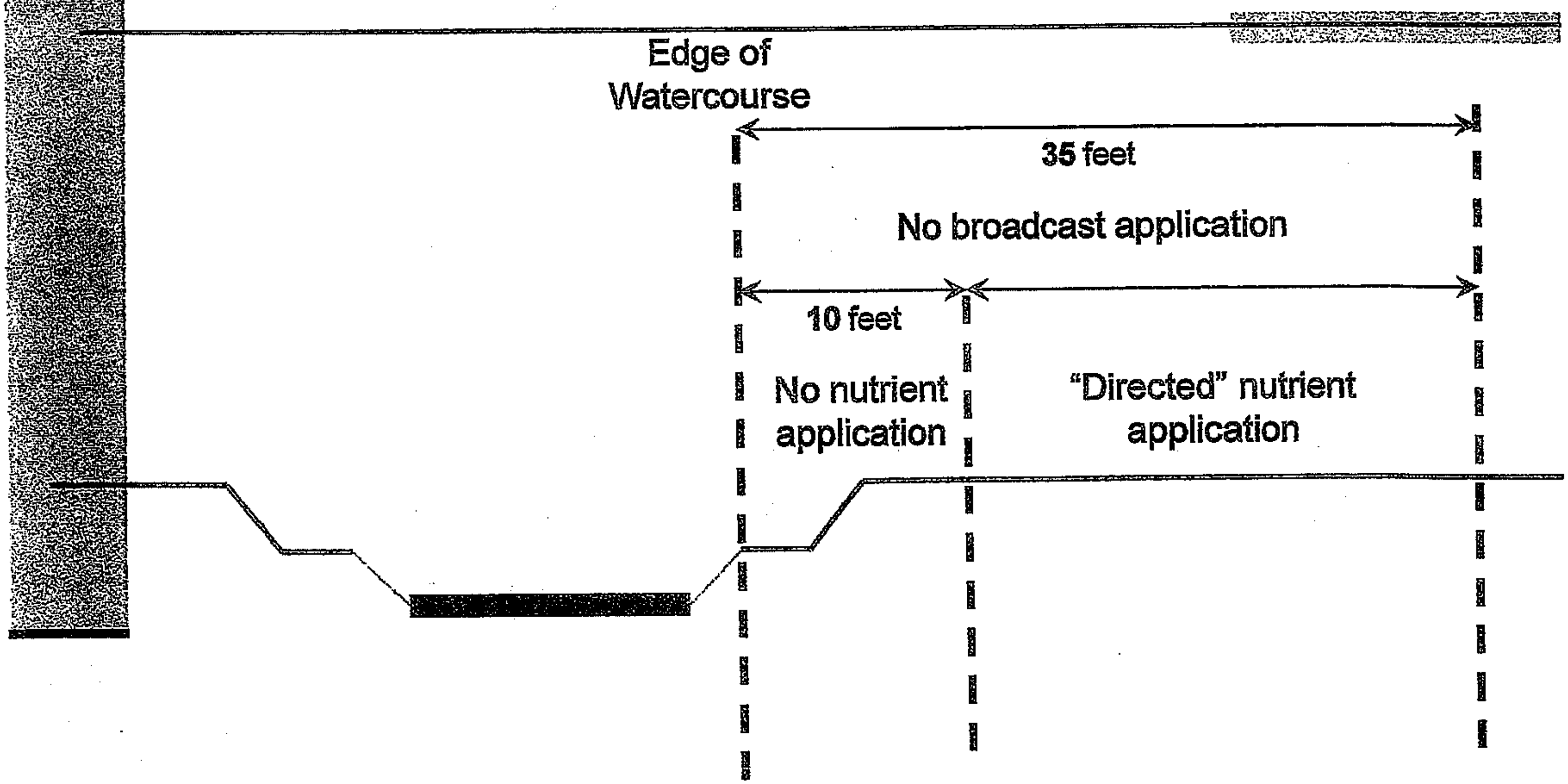
- What is a stream vs. a ditch?

- Stream
  - Naturally occurring
  - Generally sinuous or winding
  - Generally accompanied by certain biotic and vegetative species
- Ditch
  - Man made
  - Generally straight lines

Nutrient Application Setbacks

- Definitions
  - Perennial
    - Contains water all the time (365 days of the yr.)
    - Influenced primarily by groundwater flow
  - Intermittent
    - Contains water or flows seasonally
    - Influenced by both groundwater & surface runoff
  - Ephemeral
    - Contains water or flows only as a result of precipitation events

Nutrient Application Setbacks



Nutrient Application Setbacks

- Broadcast applications
  - Spinner spreader
  - High volume horizontal nozzle

- Directed applications
  - Vertical fan nozzles
  - Knifed/injected applications
  - Drop nozzles
  - Planter-applied fertilizers

Nutrient Application Setbacks

Setbacks for Nutrient Application cont:
Effective January 1, 2014

- Broadcast method *(e.g.,* spinners, splashers) either with or without incorporation requires a **35' surface water setback**
- Directed spray application or injection of crop nutrients requires a **l0' surface water setback**
- Excepting perennial forage crops grown for hay or pasture, vegetation in the l0-foot setback area may not include plants that would be considered part of the crop grown in the field.
- Pastures and hayfields are subject to a **l0-foot** nutrient application setback.

Nutrient Application Setbacks

Application setback alternative:

- MDA may approve other BMP's including:
  - USDA or NRCS practice standards
  - UM or other land grant university research & demonstration establishing the effectiveness of those practices
- Livestock shall be excluded from the 10' setback to prevent direct deposition of nutrients within the setback, excepting BMP's under SCWQ plan
- Sacrifice lots (less than 75% grass or grass legume mix) shall maintain a 35-foot set back.

Denali WATER SOLUTIONS

DENALI WATER SOLUTIONS, LLC.
Professional Beneficial Use & Recycling Services
1221 Bruceville Road, Unit B, Keymar, MD 21757
410-339-1754

FIELD NUTRIENT BALANCE SUMMARY REPORT

(Note: This Field Nutrient Balance Summary Report has been developed to inform you of the amount of Nitrogen, Phosphorus, Potassium and/or Lime was applied to the farm/field(s) below as a result of residual application. Should you have any questions regarding this report, please contact Samantha Pope @ 410-463-0278.)

Report Date: **12/5/2022** **Consultant: Samantha Pope MDA License # 2395 Certification # 4414**

Farm Operator: **Howard Harding Farms**
Farm Name: **Hastings**
Operator Address: **29564 Penny Lane Easton, MD**

Residual Source: Burns/Harcum DAF Liquid Blend (2022) **Method of Application: Injection**

Field #	Field Acres	Acres Applied	Expected Crop	Expected Yield (bu/ac or tons/ac)	Residual N Credits (lbs./ac)	Summary of Nitrogen, Phosphorus, Potassium and/or Lime Applied											
						Date(s) of application	Rate (gallons/ac)	Total gallons applied	Plant Requirements			Actual Applied			Additional Nutrients Needed		
									N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
HA1	51.0	50.5	Wheat	90	0	9/2/22-9/9/22	2,200	111,000	30	0	42	30	22	4	0	0	38
Field 1– Medium (Phosphorus crop removal for 2 Crops) 80 – 22 = 58 lbs P remains for 2022																	
HA1A	18.0	17.7	Wheat	90	0	9/2/22-9/9/22	2,200	39,000	30	0	0	30	22	4	0	0	0
Field 1– Medium (Phosphorus crop removal for 2 Crops) 80 – 22 = 58 lbs P remains for 2022																	

Important!! The availability of Nitrogen from the application of residuals can vary depending on soil type, weather and management. As a consultant, I highly recommend you to have a Pre-Sidedress Nitrate Test (PSNT), Chlorophyll or Tissue test completed depending on crop grown. Contact myself, your consultant or your local Extension Agent to obtain additional information on these tests.

Note: There is significant nutrient value based on the application of residuals. The amounts of Nitrogen, Phosphorus and Potash supplied by the application of residuals must be credited to your Nutrient Management Plan Farm/Field nutrient recommendations.

Nutrient Management Plan Supplement

For Residual Application

Prepared For: Howard Harding Farms, LLC. (Farm Operator)
Hastings Farm (Account ID [redacted]
Maiden Forest Rd, Dorchester County, MD

Prepared by: Tim Pilkowski (Certification #1110, License #2237)

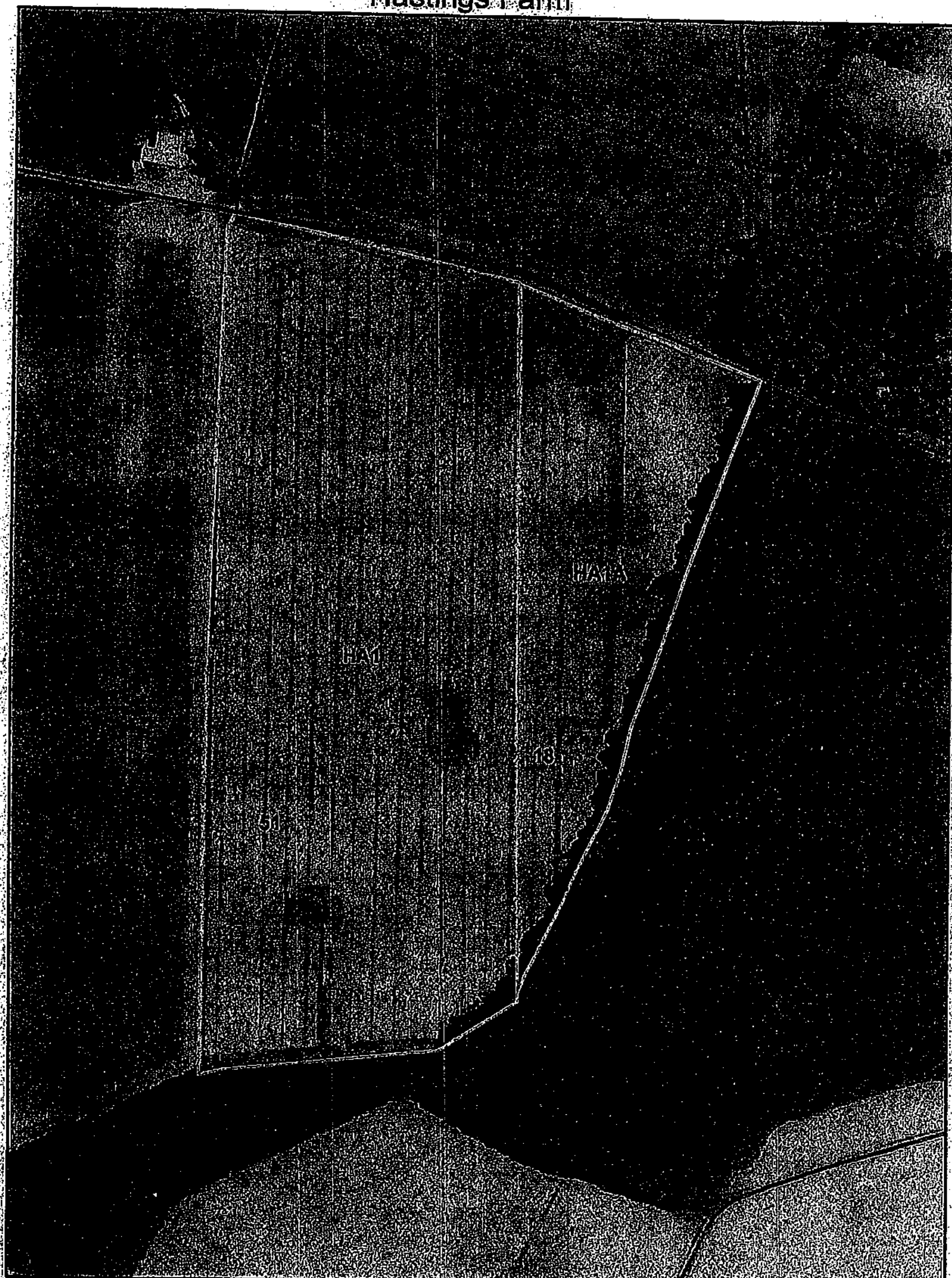
Applicator: Denali Water Solutions, LLC.

This nutrient management plan (NMP) supplement was developed as an addendum to the original NMP to specifically address the application of food residuals as a nutrient source on the farm(s) listed above. The plan should be followed accordingly and a copy kept with your current nutrient management plan should the Maryland Department of Agriculture schedule a nutrient management review for your farm.

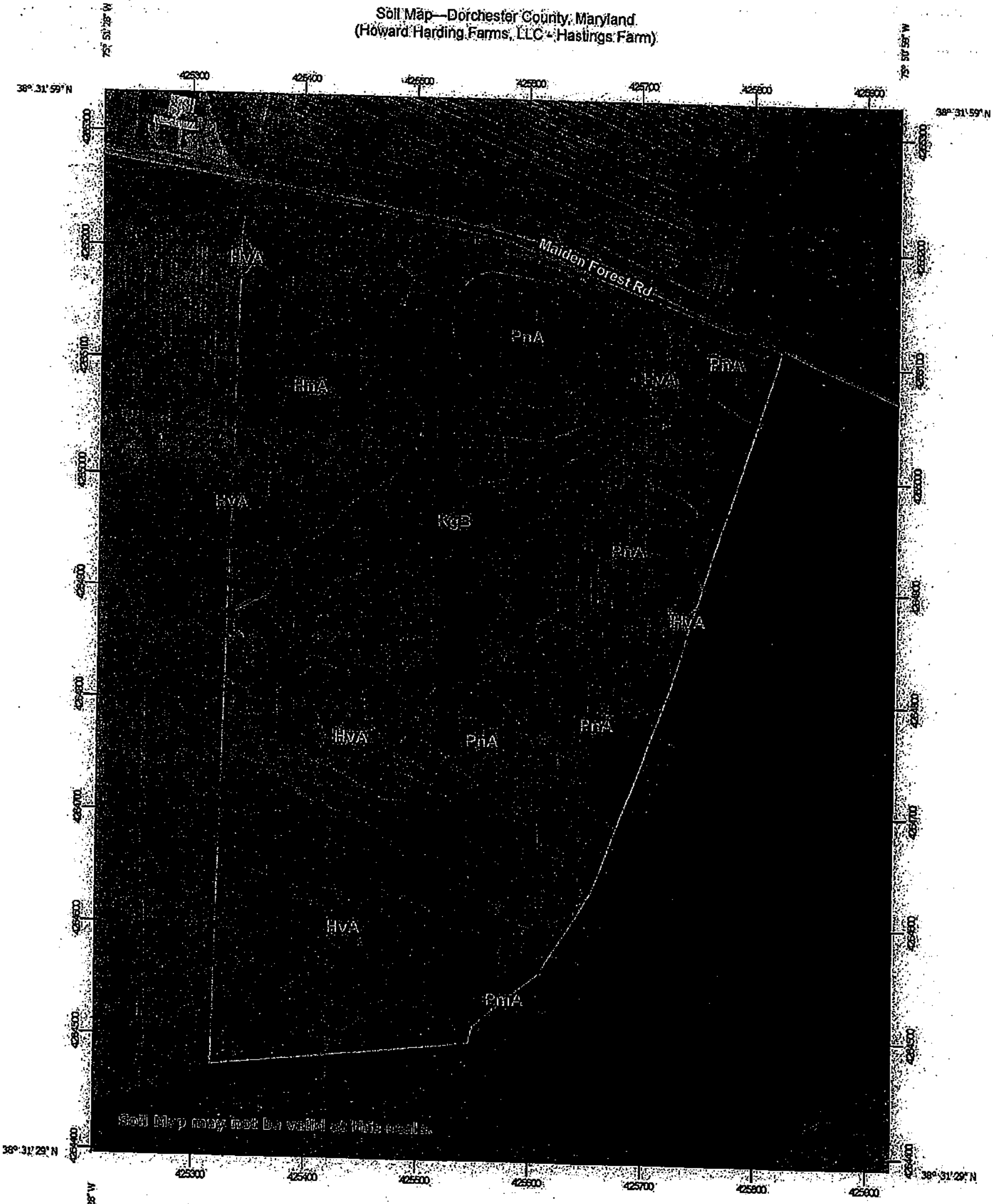
Original 2022 NMP Developed by: McConnell Agronomics, Inc.
Luke McConnell
(Certification #1045, License #2078)

Original 2022 NMP Plan Valid Dates: 05/17/2022 – 03/01/2023
Supplement 2022 NM Plan Valid Dates: 08/23/2022 – 12/15/2022

Howard Harding Farms, LLC.
Hastings Farm



Soil Map—Dorchester County, Maryland
(Howard Harding Farms, LLC - Hastings Farm)



Map Scale: 1:4,580 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters

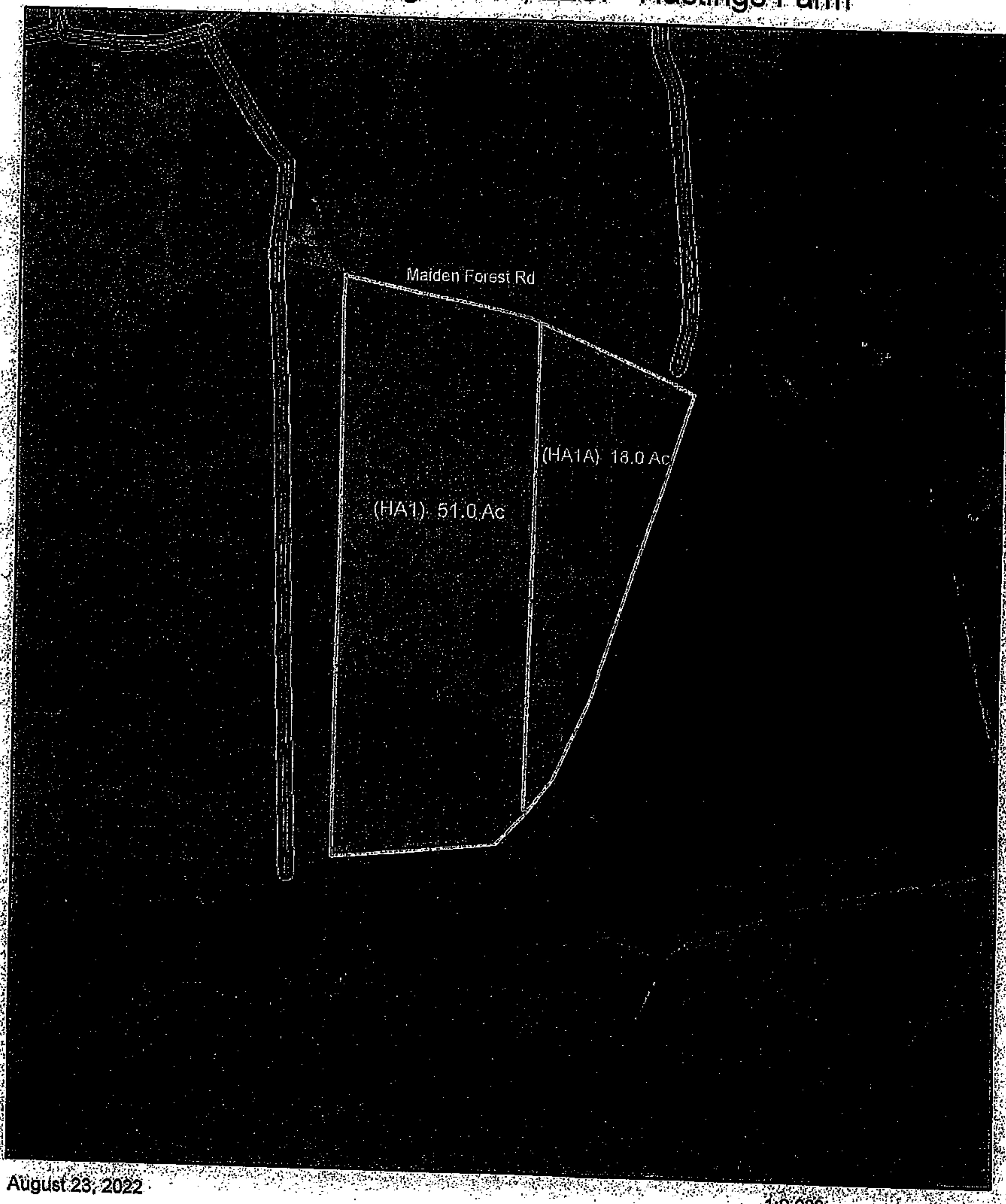
0 200 400 800 1200 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HnA	Hammonton sandy loam, 0 to 2 percent slopes	11.2	16.2%
HvA	Hurlock sandy loam, 0 to 2 percent slopes	22.4	32.2%
KgB	Kiel-Galloway complex, 0 to 5 percent slopes	23.7	34.2%
PmA	Pone mucky loam, 0 to 2 percent slopes	0.0	0.0%
PnA	Pone mucky sandy loam, 0 to 2 percent slopes	12.0	17.4%
Totals for Area of Interest		69.4	100.0%

Howard Harding Farms, LLC. - Hastings Farm



August 23, 2022

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0 0.07 0.15 0.3 km

Rivers Streams and Ditches

Rivers Streams and Ditches 10 Foot Buffer

Rivers Streams and Ditches 35 Foot Buffer

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP

Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP | Maxar | VITA, Esri, HERE, Garmin, GeoTechnologies, Inc. |

MD iMAP Web App Template

NUTRIENT APPLICATION SETBACKS FROM SURFACE WATER: Howard Harding 2022

Setbacks for Nutrient Application are required in the development of nutrient management plans. Application and livestock setback regulations are contained under the Nutrient Application Requirements, Maryland Department of Agriculture 2012, COMAR 15.20.07.02, Maryland Nutrient Management Manual, I-D1.

A minimum of a 10' vegetative setback must be in place next to surface water. The chart below indicates if surface water is present that requires a setback on any farm/operation and identifies the fields that are required to have a nutrient application setback. **An application of crop nutrients using a broadcast method either with or without incorporation requires a 35' setback. A directed spray application or the injection of crop nutrients only requires a 10' setback.** Excepting perennial forage crops grown for hay and pasture, vegetation in the 10' setback area may not include plants that would be considered part of the crop grown in the field (i.e. row crops). Pastures and hayfields are subject to a 10' and/or a 35' nutrient application setback depending on application methods. Nutrients may not be applied within the 10' setback.

Livestock on pasture are required to meet the minimum 10' setback by means of fencing unless a Best Management Practice (BMP) is approved by MDA or a Soil Conservation and Water Quality Plan is developed and implemented that prescribes an alternative to fencing animals 10' from surface water. Alternative BMP's may include stream crossings, watering facilities, pasture management, or other practices that are equally protective of water quality. Sacrifice lots for livestock require a 35' setback from surface water.

If nutrients are custom-applied, it is the operator's responsibility to inform the applicator of the setback distance based on the method of application.

Farm Name(s)	Is Surface Water Present on the farm that requires a setback (Yes or No)	Field(s) requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with "Yes" in appropriate column(s).)		
			Livestock on Pasture ≥10 ft.	Directed Application** ≥10 ft.	Broadcast Application or Sacrifice Lots*** ≥35 ft.
Hastings Farm	No	N/A			

***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**

****Directed Application** = Directed Spray Application (Vertical Fan or Drop Nozzle), Air Flow Application, Knifed/Injected application of Nutrients, Planter Applied nutrients

*****Broadcast Application or Sacrifice Lots** = Spinner Spreaders (Manure or Fertilizer), High Volume Horizontal Nozzles, Manure Spreaders (Box type with beaters, Splasher plates for liquid, Side Discharge V-Type)

Nutrient Management Plan Supplement
For Residual Application

Prepared For: Howard Harding Farms, LLC. (Farm Operator)
Home Farm (Account ID [redacted]

Indian Town Rd, Dorchester County, MD

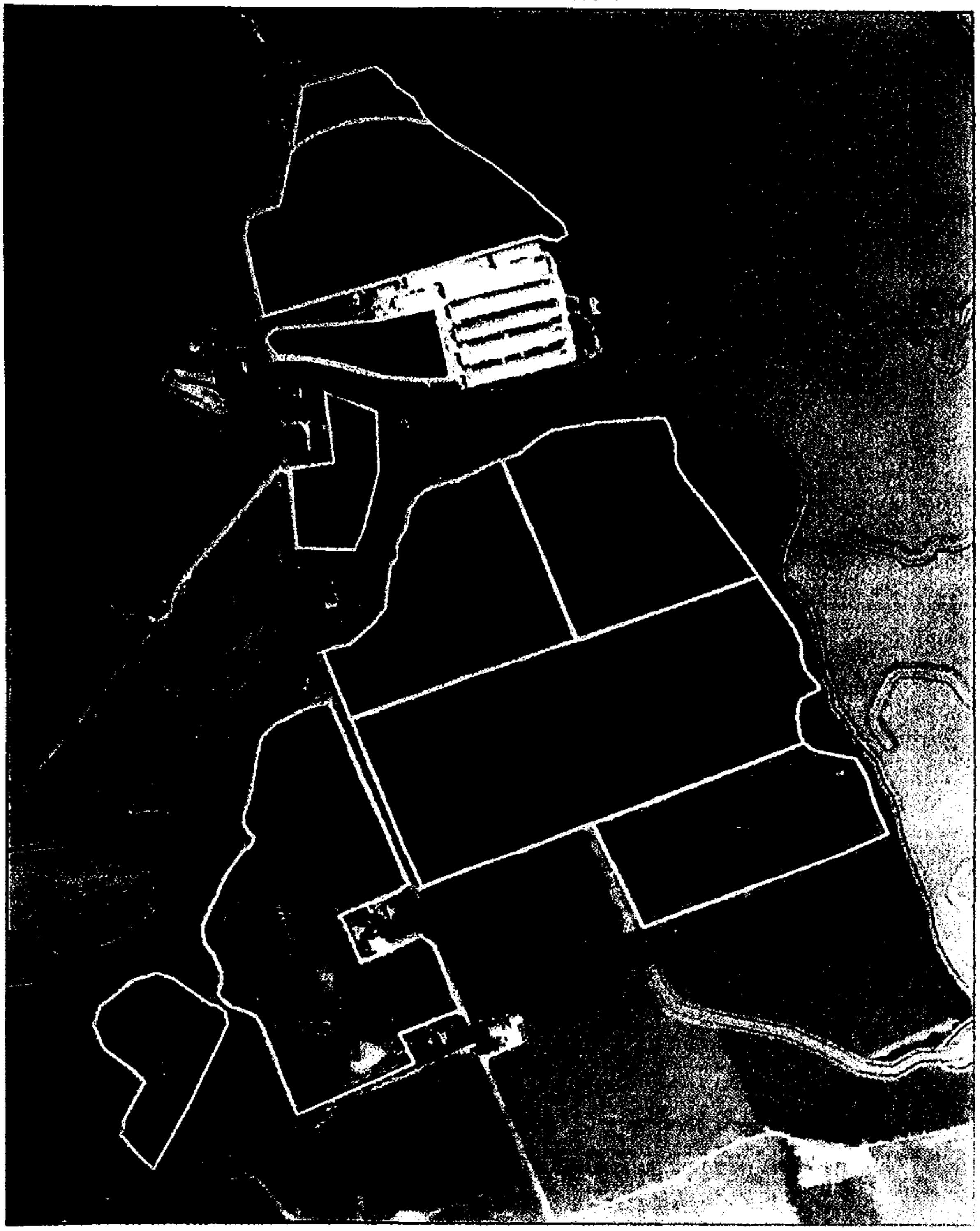
Prepared by: Tim Pilkowski (Certification #1110, License #2237)

Applicator: Denali Water Solutions, LLC.
This nutrient management plan (NMP) supplement was developed as an addendum to the original NMP to specifically address the application of food residuals as a nutrient source on the farm(s) listed above. The plan should be followed accordingly and a copy kept with your current nutrient management plan should the Maryland Department of Agriculture schedule a nutrient management review for your farm.

Original 2023 NMP Developed by: McConnell Agronomics, Inc.
Luke McConnell
(Certification #1045, License #2078)

Original 2023 NMP Plan Valid Dates: 03/01/2023 – 03/01/2024
Supplement 2023 NM Plan Valid Dates: 11/05/2023 – 12/15/2023

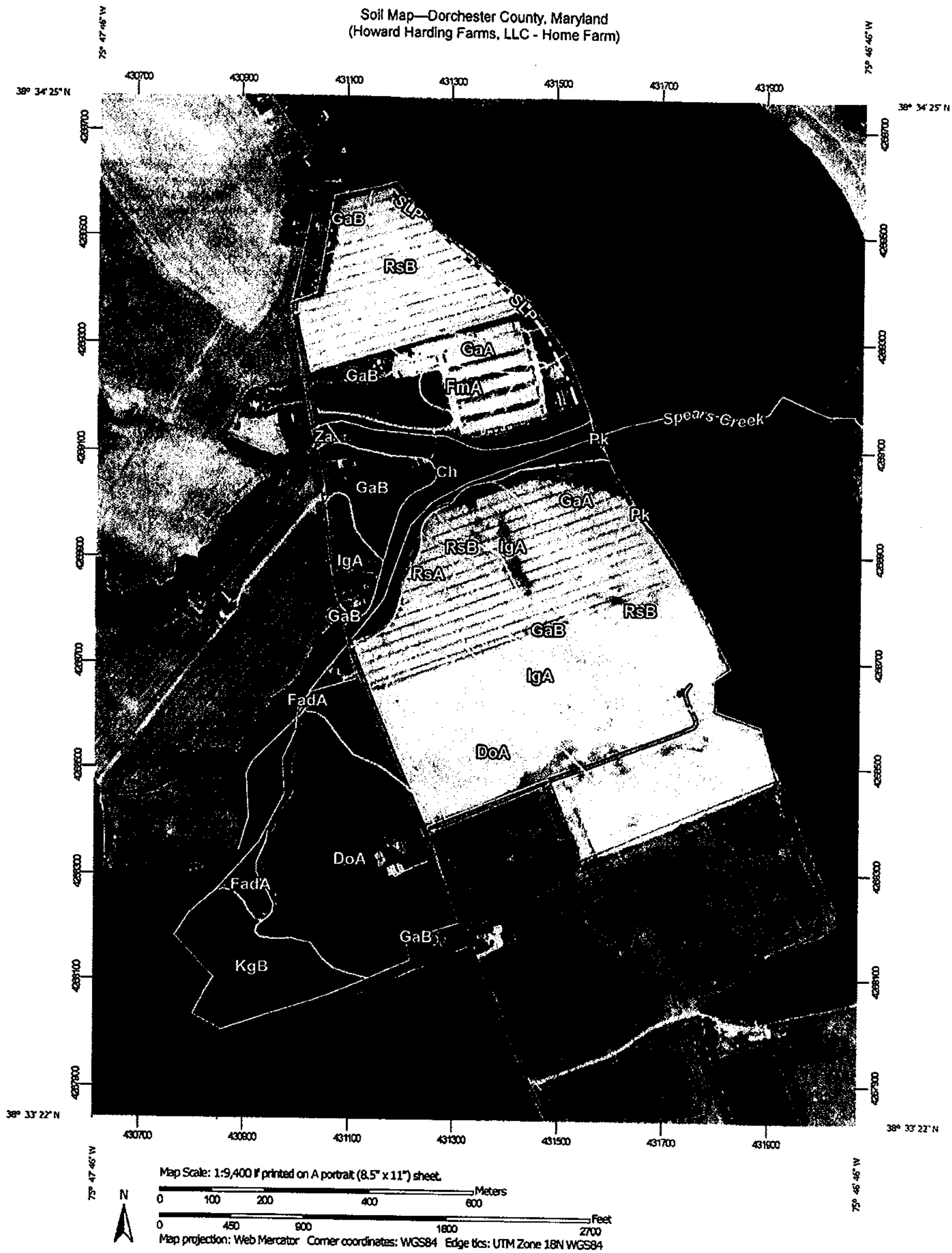
Howard Harding Farms, LLC.
Home Farm Setback



1/22 **Legend**

Rivers Streams Ditches
Stream Setback 35 Ft
Stream Setback 10 Ft

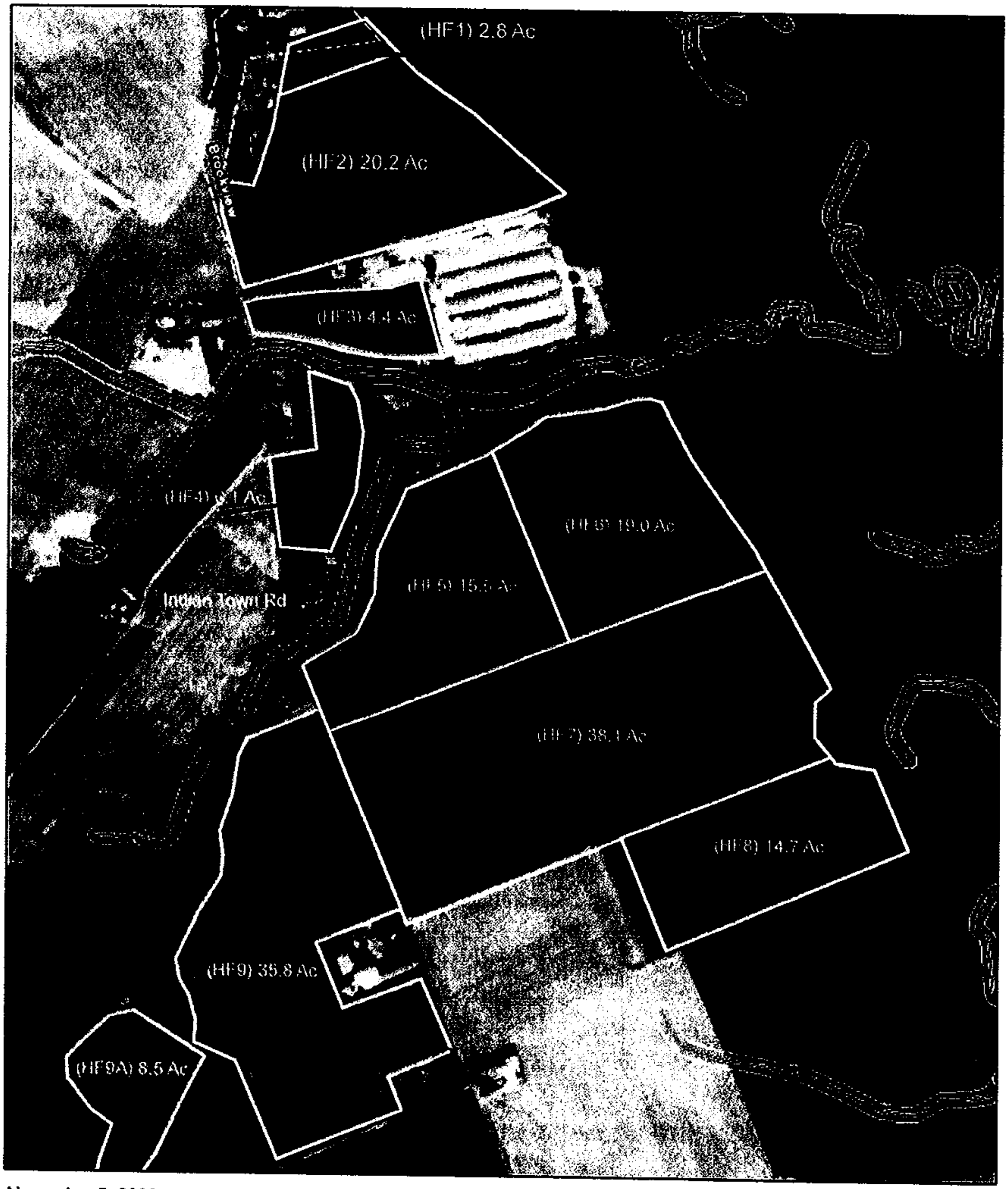
Soil Map—Dorchester County, Maryland
(Howard Harding Farms, LLC - Home Farm)



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ch	Chicone mucky silt loam, frequently flooded	11.9	5.7%
DoA	Downer sandy loam, 0 to 2 percent slopes, Northern Tidewater Area	51.3	24.5%
FadA	Fallsington sandy loams, 0 to 2 percent slopes, Northern Tidewater Area	1.8	0.9%
FmA	Fort Mott loamy sand, 0 to 2 percent slopes	2.9	1.4%
GaA	Galestown loamy sand, 0 to 2 percent slopes	11.5	5.5%
GaB	Galestown loamy sand, 2 to 5 percent slopes	67.1	32.0%
IgA	Ingleside sandy loam, 0 to 2 percent slopes	17.0	8.1%
KgB	Klej-Galloway complex, 0 to 5 percent slopes	11.6	5.5%
Pk	Puckum muck, frequently flooded	0.2	0.1%
RsA	Runclint sand, 0 to 2 percent slopes	2.0	1.0%
RsB	Runclint sand, 2 to 5 percent slopes	32.0	15.3%
Za	Zekiah sandy loam, frequently flooded	0.4	0.2%
Totals for Area of Interest		**209.7**	**100.0%**

Howard Harding Farms, LLC. Home Farm



November 5, 2023

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0 0.07 0.15 0.3 km

Rivers Streams and Ditches

Rivers Streams and Ditches 10 Foot Buffer

Rivers Streams and Ditches 35 Foot Buffer

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP

MD iMAP Web App Template
Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP | Maxar | VITA, Esri, HERE, Garmin, iPC |

NUTRIENT APPLICATION SETBACKS FROM SURFACE WATER: **Howard Harding** **2023**

Setbacks for Nutrient Application are required in the development of nutrient management plans. Application and livestock setback regulations are contained under the Nutrient Application Requirements, Maryland Department of Agriculture 2012, COMAR 15.20.07.02, Maryland Nutrient Management Manual, 1-D1.

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If nutrients are custom-applied, it is the operator's responsibility to inform the applicator of the setback distance based on the method of application.

Farm Name(s)	Is Surface Water Present on the farm that requires a setback (Yes or No)	Field(s) requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with "Yes" in appropriate column(s).)		
			Livestock on Pasture ≥ 10 ft.	Directed Application** ≥ 10 ft.	Broadcast Application or Sacrifice Lots*** ≥ 35 ft.
Home Farm	Yes	HF4		Yes	

***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**

****Directed Application** = Directed Spray Application (Vertical Fan or Drop Nozzle), Air Flow Application, Knifed/Injected application of Nutrients, Planter Applied nutrients
*****Broadcast Application or Sacrifice Lots** = Spinner Spreaders (Manure or Fertilizer), High Volume Horizontal Nozzles, Manure Spreaders (Box type with beaters, Splasher plates for liquid, Side Discharge V-Type)

Notes

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	11-5-2023

3. For conventional tillage, ag-lime recommendations are based upon the amount of oxides required for the surface 8" of soil. Lime should be thoroughly mixed with the soil by plowing and disking. If recommended amount of oxides exceeds 1.5 tons of lime per acre (assuming 50% total oxides), Â½ should be plowed down and the remainder applied after plowing and disked in thoroughly.

4. If topdressing ag-lime without tillage, reduce the total amount of oxides recommended by 50 percent. When topdressing ag-lime, and soil mixing is not possible, do not apply more than 1500 lbs per acre of oxides in any one application. The balance can be applied the next year. It would be best to do a soil test before making the second application.

7. Magnesium will be recommended when the soil test indicates a low or very low level. Use dolomitic lime as a liming material when magnesium is recommended AND when lime is needed to correct soil acidity. The magnesium (Mg) recommendation is expressed as elemental Mg when lime is not required.

28. Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are absorbed by plants quickly and not allowed to runoff into surface water or leach into ground water.

29. When applying liquid wastes, application rate should not exceed the soil's infiltration rate.

Important Notes for Utilization of Cover Crops

- Cover Crop is being utilized for the fall 2023 application of Organic Residuals. Expected crop to be grown for Spring 2024 Corn. Please note that the amounts of Nitrogen, Phosphorus and Potash supplied by the application of residuals shall be credited to your 2024 Nutrient Management Plan.

- Cover Crops must be planted as soon as possible but no later than November 15th according to the Maryland Department of Agriculture (MDA) Nutrient Management Regulations.

- Annual Implementation Report. The amounts of organic nutrient sources (Residuals) including Nitrogen, Phosphorus and Potash applied in the fall for next calendar years warm season crop, with a cover crop planted, must be credited separately within your MDA Annual Implementation Report. Any questions, speak to your Nutrient Management Consultant.

Maryland
Department of Agriculture

Office of Plant Industries and Pest Management

Wes Moore, Governor
Aruna Miller, Lt. Governor
Kevin M. Atticks, Secretary
Steven A. Connelly, Deputy Secretary

State Chemist Section

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mda.maryland.gov

The Wayne A. Cawley, Jr. Building
50 Harry S Truman Parkway
Annapolis, Maryland 21401

410-841-2721 Baltimore/Washington
410-841-2740 Fax

120820	DWS RRWP	WATER RESIDUAL ROCK RUN WATER PLANT 2.3% SOLI	BK
120448	DWS LBVAWD LEESBURG	WATER RESIDUAL	BK
154935	DWS BNR		BK
162721	DWS PATUXENT	WATER TREATMENT RESIDUAL	L
120823	DWS TBC FLOWERS BAKING COMPANY	LIQUID - 3.6% SOLIDS	BK
120824	DWS CPC LASSONDE PAPPAS	FOOD PROCESSING RESIDUAL LIQUID	BK
120450	DWS CONSUMERS AQUA	WATER RESIDUAL NJPOTTABLE WATER	BK
120827	DWS BVI	FOOD PROCESSING RESIDUAL	BK
120828	DWS RLMA	WATER TREATMENT PLANT RESIDUAL	BK
120478	DWS VALLEY PROTEIN CAKE	RENDERING WASH & MEAT TRIMMINGS FROM POULTRY	BK
120453	DWS BERRYVILLE	WATER RESIDUAL-BERRYVILLE,VA	BK
120831	DWS BAWP BELAIR	WATER RESIDUAL	BK
120454	DWS WESTERN BERKS	WATER RESIDUAL - READING, PA	BK
120832	DWS DRWP DEIRAN CAKE		BK
120480	DWS PET POULTRY	RESIDUAL GENERATED FROM MANUFACTURING ANIMAL	BK
120833	DWS MFWP NJ AMERI MANSFIELD		BK
120455	DWS CHELTON	FOOD RESIDUAL CHELTON HOUSE,BRIDGEPORT, NJ	BK

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50 Harry S Truman Parkway
Annapolis, Maryland 21401

410-841-2721 Baltimore/Washington
410-841-2740 Fax

120834	DWS HSWP NJ AERI HOMESTEAD		BK
120481	DWS TYSON TEMP		BK
158134	DWS OATLY	FOOD PROCESSING RESIDUAL	BK
120456	DWS COC CAMDEN	WATER RESIDUAL- CAMDEN,NJWAT.DEPT	BK
120458	DWS WINVA WINCHESTER	WATER RESIDUAL WINCHESTER,VA	BK
142898	DWS TRAP ROCK WTP	WTP residuals	BK
158147	DWS YARDLEY	WATER TREATMENT PLANT RESIDUALS	BK
120844	DWS L WTR 001 DOWNINGTON LIQUID		BK
152137	DWS MOUNTAIREPRIMARY	POULTRY PROCESSING WASTE	BK
120486	DWS MOUNTAIRE MILLSBORO		BK
120845	DWS L FPR 001 AUNT KITTYS		BK
144873	DWS EMMITSBURG WTP		BK
120460	DWS PERDUEBWC	POULTRY PROCESING WASTEWATERDAF BRIDGEWATERVA	BK
120487	DWS FREDERICK WATER		BK
146509	DWS LINKWOOD VALLEY PROTEIN	particles from poultry processing	BK
164122	DWS ARTDAGSBORO	WATER TREATMENT RESIDUAL	BK
120462	DWS FREEDOM DISTRICT WTP	WATER TREATMENT PLANT PROCESSING RESIDUAL	BK

Maryland
Department of Agriculture

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50 Harry S Truman Parkway
Annapolis, Maryland 21401

410-841-2721 Baltimore/Washington
410-841-2740 Fax

160595	DWS POTOMAC WTP	WATER TREATMENT PLANT RESIDUALS	BK
157840	DWS VPAWAS	WASTE ACTIVATED POULTRY PROCESSING SLUDGE	BK
120463	DWS CLAYTON NJ	WELL WATER TREATMENT FACILITY	BK
142899	DWS MOUNTAIRE SELBYVILLE	Poultry Processing Waste	BK
120465	DWS MANTUA		BK
162722	DWS PINNACLE	FOOD PROCESSING RESIDUAL	L
146459	DWS MOUNTAIRECAKE	particles from poultry processing	BK
121468	DWS MOUNTAIRE DAF		BK
121470	DWS AMICK HURLOCK		BK
162175	DWS HARBESON WAS	POULTRY PROCESSING	BK
114687	DWS ALLEN HARIM HARBESON		BK
158146	DWS SHADYLN	WATER TREATMENT PLANT RESIDUALS	BK
114690	DWS VA GROWERS		BK
120809	DWS NWP NORRISTOWN CAKE	WATER RESIDUAL NORRIS.WATER PLANT 32.2% SOLID	BK
120440	DWS ENVIRO PWD PENNSVILLE	WATER RESIDUALS(PENNSVILLE DR.WATER 3-4%SOLID	BK
120441	DWS CWR CUMBERLAND	WATER RESIDUAL(CUMBERLAND DR.WATER 2-4%SOLID	BK
165273	DWS VPLPOND1	RENDERING WASTE	BK

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50 Harry S Truman Parkway
Annapolis, Maryland 21401

410-841-2721 Baltimore/Washington
410-841-2740 Fax

165274	DWS VPLPOND2	RENDERING WASTE	BK
168452	DWS ALLENDAGSBORO	EGG, WASH WATER	BK

Nutrient Management Plan Supplement For Residual Application

Prepared For: Howard Harding Farms, LLC. (Farm Operator)

Hubbard Farm (Account ID .)

Dorchester County, MD

Prepared By: Samantha Pope (Certification #4414, License #2395)

Applicator: Denali Water Solutions, LLC.

This nutrient management plan (NMP) supplement was developed as an addendum to the original NMP to specifically address the application of food residuals as a nutrient source on the farm(s) listed above. The plan should be followed accordingly and a copy kept with your current nutrient management plan should the Maryland Department of Agriculture schedule a nutrient management review for your farm.

Original 2023 NMP Developed By: McConnell Agronomics

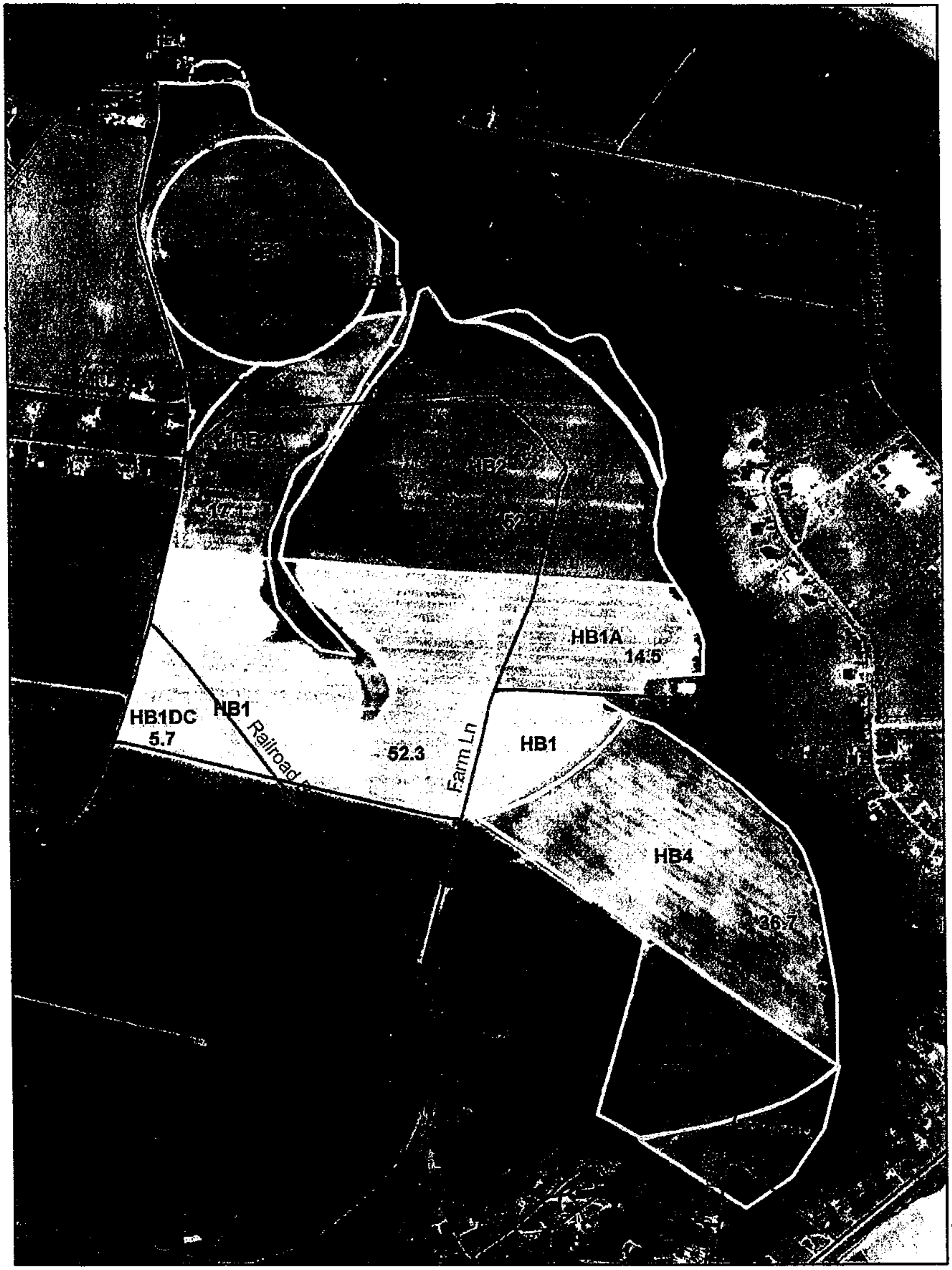
Luke McConnell

(Certification #1045, License #2078)

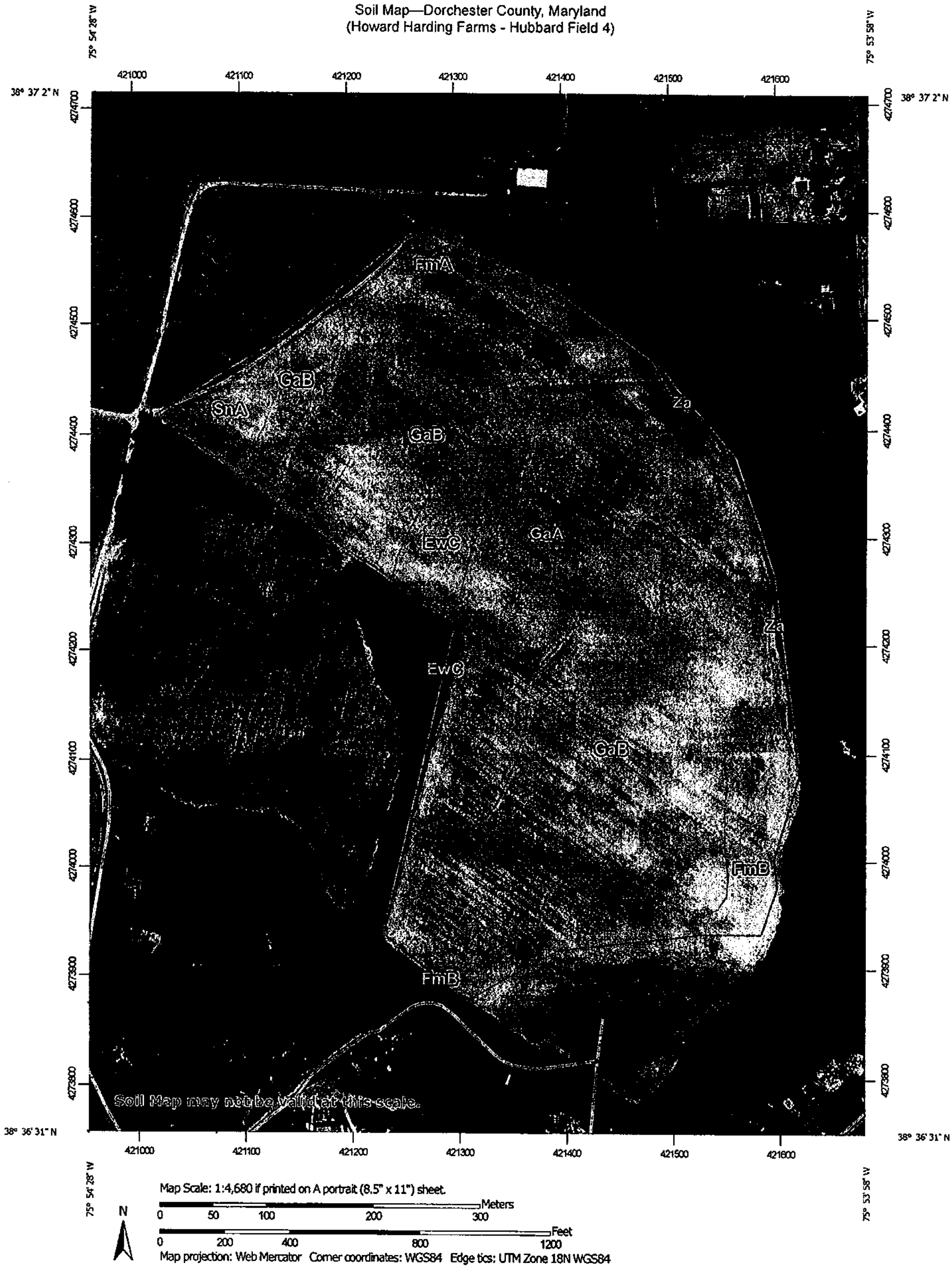
Original 2023 NMP Plan Valid Dates: 03/01/2023 – 03/01/2024

Supplement 2023 NMP Plan Valid Dates: 12/11/23 – 12/15/2023

Howard Harding Farms, LLC.
Hubbard Farm



Soil Map—Dorchester County, Maryland
(Howard Harding Farms - Hubbard Field 4)



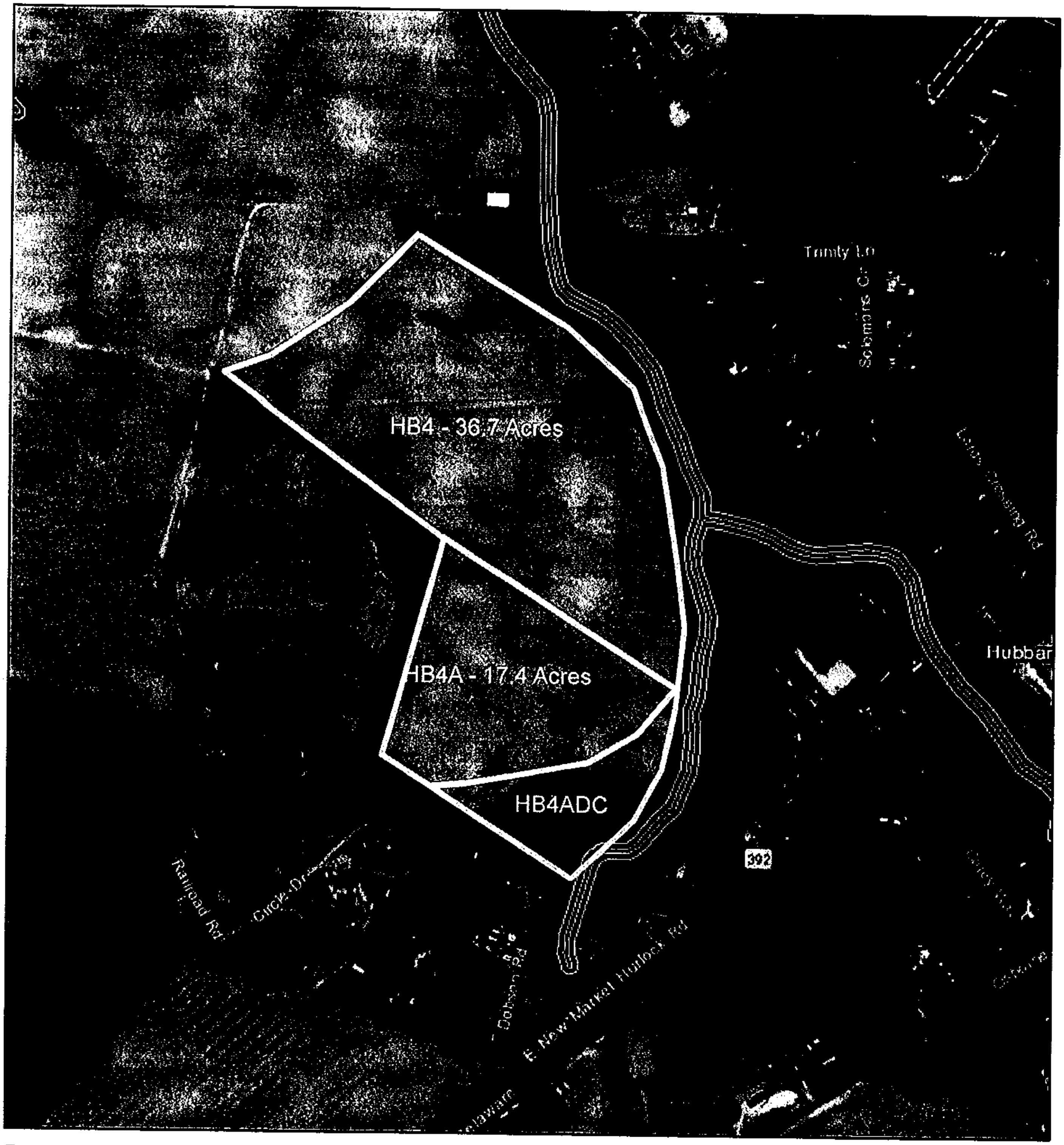
Map Scale: 1:4,680 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EwC	Evesboro sand, 5 to 10 percent slopes	1.8	3.1%
FmA	Fort Mott loamy sand, 0 to 2 percent slopes	6.1	10.6%
FmB	Fort Mott loamy sand, 2 to 5 percent slopes	4.5	7.9%
GaA	Galestown loamy sand, 0 to 2 percent slopes	12.3	21.3%
GaB	Galestown loamy sand, 2 to 5 percent slopes	30.6	53.0%
SnA	Sassafras loam, 0 to 2 percent slopes	1.6	2.8%
Za	Zekiah sandy loam, frequently flooded	0.8	1.4%
Totals for Area of Interest		**57.7**	**100.0%**

Howard Harding - Hubbard Farm Field 4 Setback



December 12, 2023

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Rivers Streams and Ditches

Rivers Streams and Ditches 10 Foot Buffer

Rivers Streams and Ditches 35 Foot Buffer

Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP

MD iMAP Web App Template

Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP | Maxar | VITA, Esri, HERE, iPC | VITA, Esri, HERE, Garmin, iPC |

NUTRIENT APPLICATION SETBACKS FROM SURFACE WATER: **Howard Harding Farms** **2023**

Setbacks for Nutrient Application are required in the development of nutrient management plans. Application and livestock setback regulations are contained under the Nutrient Application Requirements, Maryland Department of Agriculture 2012, COMAR 15.20.07.02, Maryland Nutrient Management Manual, 1-D1.

A minimum of a 10' vegetative setback must be in place next to surface water. The chart below indicates if surface water is present that requires a setback on any farm/operation and identifies the fields that are required to have a nutrient application setback. **An application of crop nutrients using a broadcast method either with or without incorporation requires a 35'setback. A directed spray application or the injection of crop nutrients only requires a 10'setback.** Excepting perennial forage crops grown for hay and pasture, vegetation in the 10' setback area may not include plants that would be considered part of the crop grown in the field (i.e. row crops). Pastures and hayfields are subject to a 10' and/or a 35' nutrient application setback depending on application methods. Nutrients may not be applied within the 10' setback.

Livestock on pasture are required to meet the minimum 10' setback by means of fencing unless a Best Management Practice (BMP) is approved by MDA or a Soil Conservation and Water Quality Plan is developed and implemented that prescribes an alternative to fencing animals 10' from surface water. Alternative BMP's may include stream crossings, watering facilities, pasture management, or other practices that are equally protective of water quality. Sacrifice lots for livestock require a 35' setback from surface water.

If nutrients are custom-applied, it is the operator's responsibility to inform the applicator of the setback distance based on the method of application.

Farm Name(s)	Is Surface Water Present on the farm that requires a setback (Yes or No)	Field(s) requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with "Yes" in appropriate column(s).)		
			Livestock on Pasture ≥ 10 ft.	Directed Application** ≥ 10 ft.	Broadcast Application or Sacrifice Lots*** ≥ 35 ft.
Hubbard	Yes	HB4ADC		Yes	

***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**
****Directed Application** = Directed Spray Application (Vertical Fan or Drop Nozzle), Air Flow Application, Knifed/Injected application of Nutrients, Planter Applied nutrients
*****Broadcast Application or Sacrifice Lots** = Spinner Spreaders (Manure or Fertilizer), High Volume Horizontal Nozzles, Manure Spreaders (Box type with beaters, Splasher plates for liquid, Side Discharge V-Type)

Notes

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-12-2023

3. For conventional tillage, ag-lime recommendations are based upon the amount of oxides required for the surface 8" of soil. Lime should be thoroughly mixed with the soil by plowing and disking. If recommended amount of oxides exceeds 1.5 tons of lime per acre (assuming 50% total oxides), Â½ should be plowed down and the remainder applied after plowing and disked in thoroughly.

4. If topdressing ag-lime without tillage, reduce the total amount of oxides recommended by 50 percent. When topdressing ag-lime, and soil mixing is not possible, do not apply more than 1500 lbs per acre of oxides in any one application. The balance can be applied the next year. It would be best to do a soil test before making the second application.

7. Magnesium will be recommended when the soil test indicates a low or very low level. Use dolomitic lime as a liming material when magnesium is recommended AND when lime is needed to correct soil acidity. The magnesium (Mg) recommendation is expressed as elemental Mg when lime is not required.

28. Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are absorbed by plants quickly and not allowed to runoff into surface water or leach into ground water.

29. When applying liquid wastes, application rate should not exceed the soil's infiltration rate.

Organic Analysis

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-12-2023

#	*	Lab #	County	Type	Source	N %	NH4-N %	NO3-N%	P2O5 %	K2O %	Moist %	Lbs/100 gal
1	E			Meat Processing Residuals	Burns Residual Blend	0.410	0.051	0.000	0.120	0.024	93.11	835.00

Nutrient Management Plan Supplement For Residual Application

Prepared For: Howard Harding Farms, LLC. (Farm Operator)

Henry Young Farm (Account ID [redacted]

Dorchester County, MD

Prepared By: Samantha Pope (Certification #4414, License #2395)

Applicator: Denali Water Solutions, LLC.

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Original 2023 NMP Developed By: McConnell Agronomics

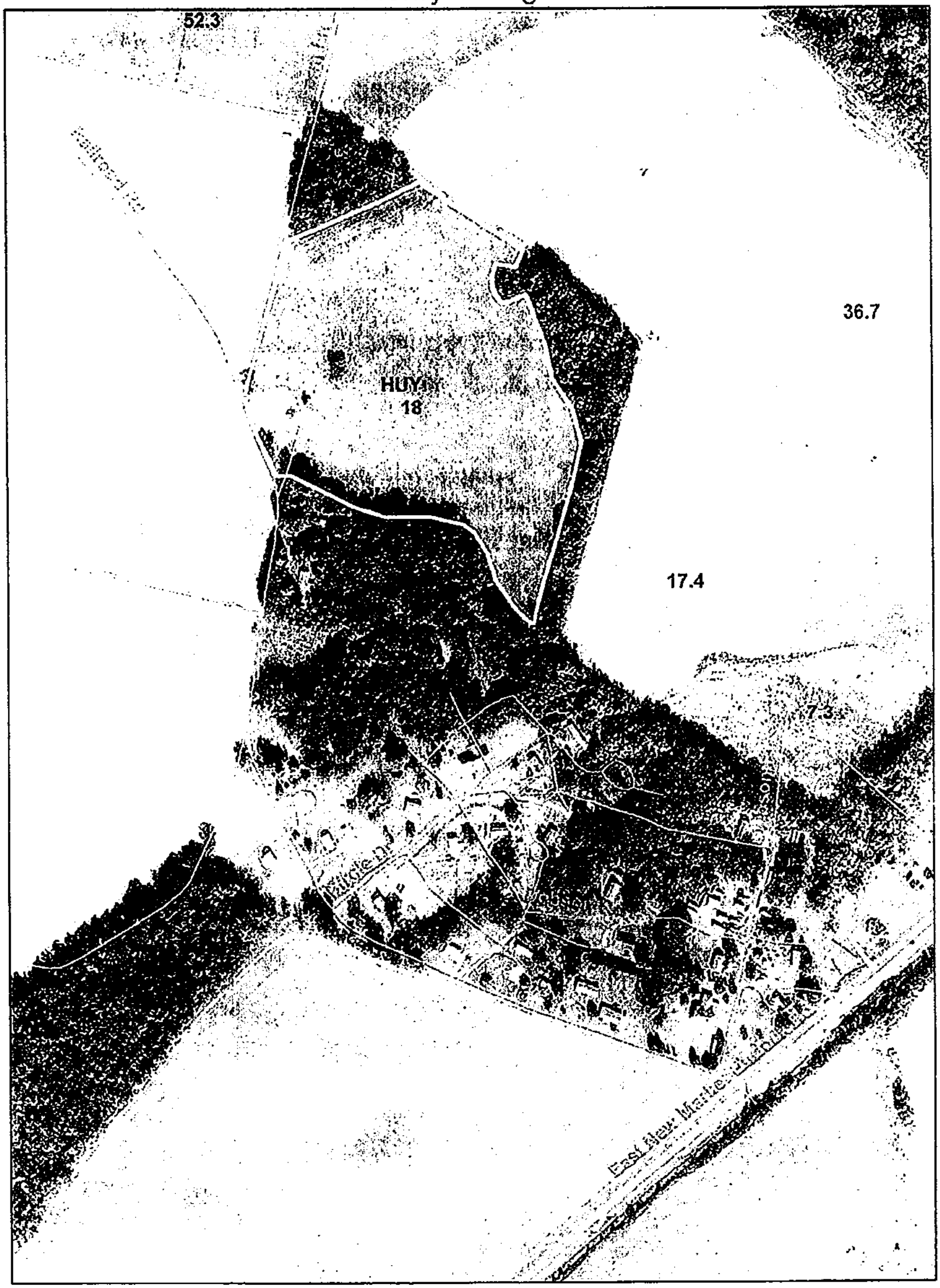
Luke McConnell

(Certification #1045, License #2078)

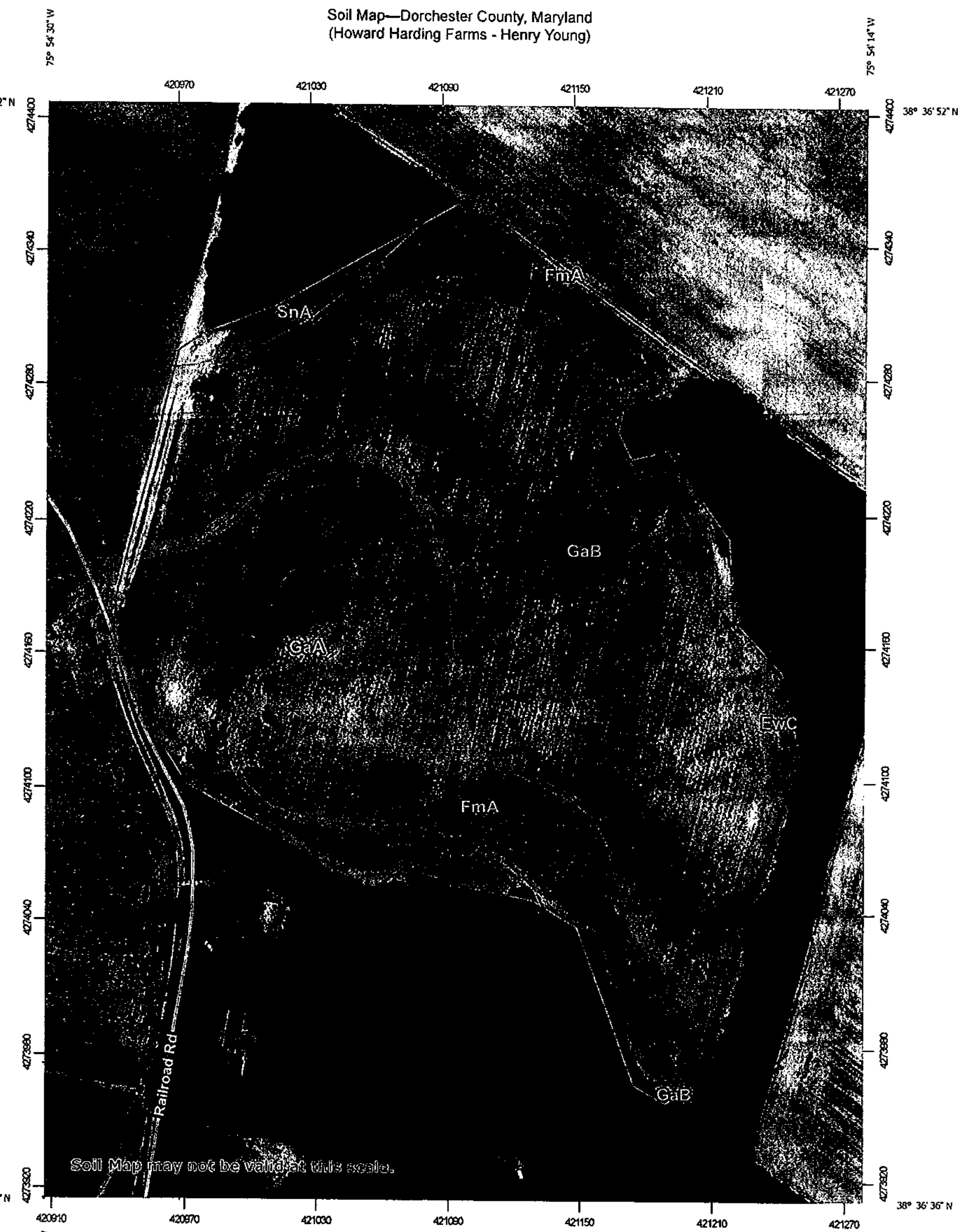
Original 2023 NMP Plan Valid Dates: 03/01/2023 – 03/01/2024

Supplement 2023 NMP Plan Valid Dates: 12/14/2023 – 12/15/2023

Howard Harding Estate
Henry Young



Soil Map—Dorchester County, Maryland
(Howard Harding Farms - Henry Young)



Map Scale: 1:2,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 35, 70, 140, 210

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EwC	Evesboro sand, 5 to 10 percent slopes	0.1	0.5%
FmA	Fort Mott loamy sand, 0 to 2 percent slopes	2.5	13.5%
GaA	Galestown loamy sand, 0 to 2 percent slopes	4.6	25.3%
GaB	Galestown loamy sand, 2 to 5 percent slopes	10.7	59.0%
SnA	Sassafras loam, 0 to 2 percent slopes	0.3	1.7%
Totals for Area of Interest		**18.2**	**100.0%**

Howard Harding Farms - Henry Young Setback

December 14, 2023

Rivers Streams and Ditches

Rivers Streams and Ditches 10 Foot Buffer

Rivers Streams and Ditches 35 Foot Buffer

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Nutrient Management Program, Maryland Department of Agriculture (MDA), MD iMAP

NUTRIENT APPLICATION SETBACKS FROM SURFACE WATER: **Howard Harding Farms** **2023**

Setbacks for Nutrient Application are required in the development of nutrient management plans. Application and livestock setback regulations are contained under the Nutrient Application Requirements, Maryland Department of Agriculture 2012, COMAR 15.20.07.02, Maryland Nutrient Management Manual, 1-D1.

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If nutrients are custom-applied, it is the operator's responsibility to inform the applicator of the setback distance based on the method of application.

Farm Name(s)	Is Surface Water Present on the farm that requires a setback (Yes or No)	Field(s) requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with "Yes" in appropriate column(s).)		
			Livestock on Pasture ≥ 10 ft.	Directed Application** ≥ 10 ft.	Broadcast Application or Sacrifice Lots*** ≥ 35 ft.
Henry Young	No				

***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**

****Directed Application** = Directed Spray Application (Vertical Fan or Drop Nozzle), Air Flow Application, Knifed/Injected application of Nutrients, Planter Applied nutrients

*****Broadcast Application or Sacrifice Lots** = Spinner Spreaders (Manure or Fertilizer), High Volume Horizontal Nozzles, Manure Spreaders (Box type with beaters, Splasher plates for liquid, Side Discharge V-Type)

Notes

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-14-2023

3. For conventional tillage, ag-lime recommendations are based upon the amount of oxides required for the surface 8" of soil. Lime should be thoroughly mixed with the soil by plowing and disking. If recommended amount of oxides exceeds 1.5 tons of lime per acre (assuming 50% total oxides), Â½ should be plowed down and the remainder applied after plowing and disked in thoroughly.

4. If topdressing ag-lime without tillage, reduce the total amount of oxides recommended by 50 percent. When topdressing ag-lime, and soil mixing is not possible, do not apply more than 1500 lbs per acre of oxides in any one application. The balance can be applied the next year. It would be best to do a soil test before making the second application.

28. Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are absorbed by plants quickly and not allowed to runoff into surface water or leach into ground water.

29. When applying liquid wastes, application rate should not exceed the soil's infiltration rate.

Important Notes for Utilization of Cover Crops

- Cover Crop is being utilized for the fall 2023 application of Organic Residuals. Expected crop to be grown for 2024 is Watermelons. Please note that the amounts of Nitrogen, Phosphorus and Potash supplied by the application of residuals shall be credited to your 2023/2024 Nutrient Management Plan.

- Cover Crops must be plated as soon as possible but no later than November 15th according to the Maryland Department of Agriculture Nutrient Management Regulations.

- Annual Implementation Report: The amounts of organic nutrient sources (Residuals) including Nitrogen, Phosphorus, and Potash applied in the fall for the next calendar year's warm season crop, with a cover crop planted, must be credited separately within your MDA Annual Implementation Report. Any questions, speak to your Nutrient Management Consultant.

Organic Analysis

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-14-2023

#	*	Lab #	County	Type	Source	N %	NH4-N %	NO3-N%	P2O5 %	K2O %	Moist %	Lbs/100 gal
1	E			Meat Processing Residuals	Burns Residual Blend	0.410	0.051	0.000	0.120	0.024	93.11	835.00

DENALI WATER SOLUTIONS, LLC.
Professional Beneficial Use & Recycling Services
1221 Bruceville Road, Unit B, Keymar, MD 21757
410-339-1754

FIELD NUTRIENT BALANCE SUMMARY REPORT

(Note: This Field Nutrient Balance Summary Report has been developed to inform you of the amount of Nitrogen, Phosphorus, Potassium and/or Lime was applied to the farm/field(s) below as a result of residual application. Should you have any questions regarding this report, please contact Tim Pilkowski @ 410-339-1754.)

Report Date: 1/19/2024 **Consultant: Samantha Pope MDA License # 2395 Certification # 4414**

Farm Operator: **Howard Harding Farms**
Farm Name: **Home Farm**
Operator Address: **29564 Penny Ln. Easton, MD**

Residual Source: Residual Blend Burns (2023) **Method of Application: Injection**

Field #	Field Acres	Acres Applied	Expected Crop	Expected Yield (bu/ac or tons/ac)	Residual N Credits (lbs./ac)	Summary of Nitrogen, Phosphorus, Potassium and/or Lime Applied											
						Date(s) of application	Rate (gallons/ac)	Total gallons applied	Plant Requirements			Actual Applied			Additional Nutrients Needed		
									N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
HF2	20.2	19.5	Cover Crop	0	0	12/11/23-12/13/23	3,700	72,000	50	0	0	49	37	8	0	0	0
HF5	15.5	15.4	Cover Crop	0	0	11/18/23-12/5/23	3,700	57,000	50	0	0	49	37	8	0	0	0
HF6	19.0	18.6	Cover Crop	0	0	11/18/23-12/5/23	3,700	69,000	50	0	0	49	37	8	0	0	0
HF7	38.1	37.3	Cover Crop	0	0	11/16/23-11/21/23	3,700	138,000	50	0	0	49	37	8	0	0	0
HF8	14.7	14.6	Cover Crop	0	0	11/15/23-11/18/23	3,700	54,000	50	0	0	49	37	8	0	0	0
HF9	35.8	35.7	Cover Crop	0	0	11/20/23-12/5/23	3,700	132,000	50	0	0	49	37	8	0	0	0
HF9A	8.5	8.1	Cover Crop	0	0	11/20/23-12/5/23	3,700	30,000	50	0	0	49	37	8	0	0	0

Field HF2, HF5-HF9A - P Assessment – Medium (Not to exceed two crops P removal) 67 – 37 = 30 lbs. P remaining

Important!! Not all of the Organic Nitrogen applied from biosolids will be available for the 2023/2024 crop season. DWS highly recommends you to have a Pre-Sidedress Nitrate Test (PSNT), Tissue or Chlorophyll test depending on crop to be grown. Contact your Crop Consultant or local Extension Agent to obtain additional information and to have this test done.

Note: There is significant nutrient value based on the application of residuals. The amounts of Nitrogen, Phosphorus and Potash supplied by the application of residuals should be credited to your Nutrient Management Plan Farm/Field nutrient recommendations.

Animal Mortality Disposal Method

Poultry
Composted

Manure Storage

Poultry
Manure shed as much as possible.

Manure Stored Outside: Manure is piled in a conical pile at least 6 feet high, at least 100 feet from ditches and waterways, 100 feet from any public road, and 200 feet from any residence not located on the landowner's property.

Staging of manure outside is allowed in Delaware for 90 days.

For all CAFO operations in Maryland staging or piling of any manure outside the manure storage building is only allowed for 14 days, unless properly covered.

PESTICIDE STORAGE & USAGE

Pesticides are stored in protected areas so as to not impact any waters of the state. Pesticides are properly handled according to regulations.

Howard Harding 2022 Nutrient & Application Rate Estimations (weighted average)

Loads Per Week	% Loads Per Week	PAN/dt	% solids	PAN/wt	PAN/ 1000 gal	P2O5/ 1000 gal	K2O/ 1000 gal	%PAN /1000 gal	%P2O5 /1000 gal	%K2O /1000 gal
9	6.4%	37.6	9.55	3.60	15.00	25.7	3.1	0.957	1.640	0.198
28	19.9%	11.6	9.76	1.10	4.70	7.1	1.1	0.933	1.410	0.218
25	17.7%	20	12.55	2.50	10.50	5.5	1	1.862	0.975	0.177
1	0.7%	15.4	20.85	3.20	13.40	8.1	1	0.095	0.057	0.007
34	24.1%	34.7	11.77	4.10	17.00	20.4	1.8	4.099	4.919	0.434
26	18.4%	29.8	14.26	4.20	17.70	9.4	1.2	3.264	1.733	0.221
15	10.6%	153.7	2.44	3.70	15.60	10.2	2.4	1.660	1.085	0.255
3	2.1%	74.3	3.08	2.30	9.50	16.9	5.4	0.202	0.360	0.115
Total Loads								**Weighted PAN**	**P2O5**	**K2O**
141	**100.00%**		10.5325					**9.88**	**12.18**	**1.63**

% P2O5	% K2O	Organic	Total N	NH4	Moisture	Source	Date	Lab #
0.31	0.04	0.562	0.575	0.012	90.45	Allen Harbeson DAF	11/19/2021	1488
0.086	0.013	0.118	0.14	0.021	90.24	Valley Protien DAF (Primary)	11/19/2021	1493
0.065	0.012	0.373	0.387	0.014	87.45	CES Mountaire Millsboro (Stick)	11/19/2021	1496
0.098	0.011	0.522	0.527	0.005	79.15	Millsboro DAF	1/4/2022	1574
0.247	0.021	0.593	0.621	0.027	88.23	Amick Hurlock DAF	12/13/2021	1515
0.114	0.014	0.652	0.671	0.018	85.74	Mountaire Selbyville DAF (Primary	12/13/2021	1516
0.122	0.028	0.175	0.312	0.136	97.56	Mountaire Selbyville WAS (Second	1/4/2022	1572
0.204	0.064	0.266	0.302	0.034	96.92	Pet Poultry	12/8/2021	1506

NuManPro Values

% P2O5	% K2O	Organic	Total N	NH4	Moisture	Source
0.02	0.003	0.04	0.04	0.001	5.77	Allen Harbeson DAF
0.02	0.003	0.02	0.03	0.004	17.92	Valley Protien DAF (Primary)
0.01	0.002	0.07	0.07	0.002	15.51	CES Mountaire Millsboro (Stick)
0.00	0.000	0.00	0.00	0.000	0.56	Millsboro DAF
0.06	0.005	0.14	0.15	0.007	21.28	Amick Hurlock DAF
0.02	0.003	0.12	0.12	0.003	15.81	Mountaire Selbyville DAF (Primary)
0.01	0.003	0.02	0.03	0.014	10.38	Mountaire Selbyville WAS (Secondary)
0.00	0.001	0.01	0.01	0.001	2.06	Pet Poultry
Weighted						
0.12	**0.019**	**0.42**	**0.45**	**0.032**	89.29	

Organic Analysis

Farmer/Operator: Howard Harding
Street Address: 29564 Penny Lane
City, State, Zip, County: Easton MD 21601 Dorchester

Plan Year: 2022
Tier - Phase: N/A - N/A
Date Plan Prepared: 8-23-2022

#	*	Lab #	County	Type	Source	N %	NH4-N %	NO3-N %	P2O5 %	K2O %	Moist %	Lbs/100 gal
1	E	N/A		Meat Processing Residuals	Burns/Hareum Blend	0.450	0.032	0.000	0.120	0.019	89.29	835.00

Howard Harding 2023 Nutrient & Application Rate Estimations (weighted average)

Loads Per Week	% Loads Per Week	PAN/dt	% solids	PAN/wt	PAN/ 1000 gal	P2O5/ 1000 gal	K2O/ 1000 gal	%PAN /1000 gal	%P2O5 /1000 gal	%K2O /1000 gal	% P2O5	% K2O	Organic	Total N	NH4	Moisture	Source	Date	Lab #
6	10.5%	43.1	4.77	2.10	8.60	6.3	1.9	0.905	0.663	0.200	0.075	0.023	0.226	0.261	0.035	95.23	Valley Protien BNR	1/6/2023	1979
12	21.1%	27.9	11.42	3.20	13.30	4.8	1.4	2.800	1.011	0.295	0.058	0.017	0.479	0.495	0.015	88.58	Mountaire Millsboro Stick	12/22/2022	1946
1	1.8%	24.8	12.5	3.10	12.90	5	1.6	0.226	0.088	0.028	0.059	0.019	0.369	0.414	0.044	87.5	Millsboro DAF	1/23/2023	2004
3	5.3%	132.1	3.75	5.00	20.70	18.2	5.3	1.089	0.958	0.279	0.219	0.064	0.221	0.402	0.181	96.25	Pet Poultry	1/6/2023	1982
20	35.1%	41.1	6.8	2.80	11.70	16.2	1.9	4.105	5.684	0.667	0.194	0.023	0.426	0.438	0.012	93.2	Amick Hurlock DAF	12/29/2022	1951
5	8.8%	43.9	10.18	4.50	18.60	7.3	1	1.632	0.640	0.088	0.086	0.012	0.356	0.472	0.117	89.85	Mountaire Selbyville DAF	11/30/2022	1914
10	17.5%	205.8	1.67	3.40	14.30	6.9	2.4	2.509	1.211	0.421	0.082	0.029	0.202	0.314	0.111	98.33	Mountaire Selbyville WAS (Sec)	1/23/2023	2003
Total Loads								Weighted PAN	P205	K20									
57			7.298571					13.27	10.25	1.98									

NuManPro Values

% P2O5	% K2O	Organic	Total N	NH4	Moisture	Source
0.01	0.002	0.02	0.03	0.004	10.02	Valley Protien BNR
0.01	0.004	0.10	0.10	0.003	18.65	Mountaire Millsboro Stick
0.00	0.000	0.01	0.01	0.001	1.54	Millsboro DAF
0.01	0.003	0.01	0.02	0.010	5.07	Pet Poultry
0.07	0.008	0.15	0.15	0.004	32.70	Amick Hurlock DAF
0.01	0.001	0.03	0.04	0.010	7.88	Mountaire Selbyville DAF
0.01	0.005	0.04	0.06	0.019	17.25	Mountaire Selbyville WAS (Sec)
Weighted						

Organic Analysis

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	11-5-2023

#	*	Lab #	County	Type	Source	N %	NH4-N %	NO3-N%	P2O5 %	K2O %	Moist %	Lbs/100 gal
1	E	N/A		Meat Processing Residuals	Burns Residual Blend	0.410	0.051	0.000	0.120	0.024	93.11	835.00

HARDING LLC - HASTINGS - BURNS/HARCUM DAF LIQUID
LIQUID NUTRIENT AVAILABILITY

2023

Total N	NH_4	P_2O_5	K_2O
37.575	3.1	10.02	1.5865

Availabile Nutrient lbs per 1000 gallons

	N	(not incorporated)	P_2O_5	K_2O
1st Year	13	17	10	2
2nd Year	5			
3rd Year	3			
4th Year	1			

Availabile Nutrient lbs per 2200 gallons

	N	(not incorporated)	P_2O_5	K_2O
1st Year	30	38	22	3
2nd Year	11			
3rd Year	6			
4th Year	3			

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HARDING - RESIDUAL BLEND BURNS
LIQUID NUTRIENT AVAILABILITY

2024

Total N	NH_4	P_2O_5	K_2O
34.2	4.3	10	2

Availabile Nutrient lbs per 1000 gallons

	N	(not incorporated)	P_2O_5	K_2O
1st Year	13	15	10	2
2nd Year	4			
3rd Year	2			
4th Year	1			

Availabile Nutrient lbs per 3700 gallons

	N	(not incorporated)	P_2O_5	K_2O
1st Year	49	55	37	7
2nd Year	17			
3rd Year	9			
4th Year	4			

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HARDING LLC - HOME POULTRY
MANURE NUTRIENT AVAILABILITY

2023

Total N	NH_4	P_2O_5	K_2O
56.2	6.6	53.8	71

Available Nutrient 1 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	31	25	54	71
2nd Year	7			
3rd Year	4			
4th Year	2			

Available Nutrient 2 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	63	50	108	142
2nd Year	15			
3rd Year	8			
4th Year	4			

Available Nutrient 2.5 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	79	62	135	178
2nd Year	19			
3rd Year	10			
4th Year	5			

Available Nutrient 3 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	94	74	161	213
2nd Year	22			
3rd Year	12			
4th Year	6			

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HOWARD HARDING FARMS, LLC - HOME SHED POULTRY MANURE NUTRIENT AVAILABILITY

2024

Total N	NH_4	P_2O_5	K_2O
38.8	6.3	42.1	64.1

Available Nutrient 1 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	23	16	42	64
2nd Year	5			
3rd Year	3			
4th Year	1			

Available Nutrient 2 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	45	33	84	128
2nd Year	10			
3rd Year	5			
4th Year	3			

Available Nutrient 2.5 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	56	41	105	160
2nd Year	12			
3rd Year	7			
4th Year	3			

Available Nutrient 3 tons per acre

	N	(Not incorporated)	P_2O_5	K_2O
1st Year	68	49	126	192
2nd Year	15			
3rd Year	8			
4th Year	4			

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Denton, MD 21629
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HOWARD HARDING FARMS, LLC
MANURE APPLICATIONS

Farm/Field	Acres	2024 Tons/Acre	2024 Total Tons	21,22,23 N credits	2023 Tons/Acre	2022 Tons/Acre	2021 Tons/Acre
Hubbard							
HB1	52.3	--	--	34	3	3	--
HB1A	14.5	--	--	34	3	3	--
HB1DC	5.7	--	--	34	3	3	--
HB2	52.3	--	--	22	3	--	--
HB2A	17.1	--	--	28	3	--	3
HB3	27.1	--	--	28	3	--	3
HB3DC	10.6	--	--	22	3	--	--
HB4	36.7	3,700 Gal	135,790 Gal	28	3	--	3
HB4A	17.4	3,700 Gal	64,380 Gal	22	3	--	--
HB4ADC	7.3	--	--	22	3	--	--
Wilson, Kenny							
KW1	6.6	--	--	--	--	--	--
KW2	7.5	--	--	--	--	--	--
KW3	14.7	--	--	12	--	3	--
KW4	12.1	--	--	--	--	--	--
KW5	29.1	--	--	--	--	--	--
KW6	21.1	--	--	--	--	--	--
KW7	29.2	--	--	--	--	--	--
KW8	16.9	--	--	--	--	--	--
Young, Henry							
HUY	18	3,700 Gal	66,600 Gal	--	--	--	--
Za Thang							
Z1	12.5	--	--	22	3	--	--
Z2	4	--	--	22	3	--	--
			828,430	**Total Gallons Denali**			
	- Additional manure will be transferred to:				Andy Barnett		
					Rhodesdale, MD		

HOWARD HARDING FARMS, LLC
MANURE APPLICATIONS

Farm/Field	Acres	2024 Tons/Acre	2024 Total Tons	21,22,23 N credits	2023 Tons/Acre	2022 Tons/Acre	2021 Tons/Acre
Barnes							
BN1	19.7	--	--	6	--	--	3
BN2	6.9	--	--	--	--	--	--
BN3	10.4	--	--	--	--	--	--
Cokesbury							
CO1	29.2	--	--	28	3	--	3
CODC	20.4	--	--	28	3	--	3
Faulkner							
FA1	21.3	--	--	--	--	--	--
Granruth							
GR1	5.3	--	--	--	--	--	--
GR2	1.1	--	--	--	--	--	--
Greenhawk, Ed							
EG1	15	--	--	--	--	--	--
EG2	23.2	--	--	--	--	--	--
EG3-4	7.1	--	--	--	--	--	--
Hastings Farm							
HA1	51	--	--	21	2,200 Gal	2.5	--
HA1A	18	--	--	11	2,200 Gal	--	--
Home Farm							
HF1	2.8	--	--	--	--	--	--
HF2	20.2	3,700 Gal	74,740 Gal	--	--	--	--
HF3	4.4	--	--	--	--	--	--
HF4	6.1	--	--	--	--	--	--
HF5	15.5	3,700 Gal	57,350 Gal	--	--	--	--
HF6	19	3,700 Gal	70,300 Gal	--	--	--	--
HF7	38.1	3,700 Gal	140,970 Gal	--	--	--	--
HF8	14.7	3,700 Gal	54,390 Gal	--	--	--	--
HF9	35.8	3,700 Gal	132,460 Gal	--	--	--	--
HF9A	8.5	3,700 Gal	31,450 Gal	--	--	--	--

HOWARD HARDING FARMS, LLC.
2024 FERTILITY RECOMMENDATIONS ADJUSTED FOR MANURE APPLICATIONS

FULL SEASON SOYBEANS

Home		
HF9A	3,700 Gallons per acre Denali (0-0-90)	Injected Fall 2023 Broadcast

3,700 Gallons Per Acre Denali: (49-37-7)

HOWARD HARDING FARMS, LLC.
2024 FERTILITY RECOMMENDATIONS ADJUSTED FOR MANURE APPLICATIONS

WATERMELONS

Home HF9	3,700 Gallons per acre Denali (0-0-130)	Injected Fall 2023 Broadcast
Young, Henry HUY	3,700 Gallons per acre Denali (0-0-140)	Injected Fall 2023 Broadcast

3,700 Gallons Per Acre Denali: (49-37-7)

All Fields:

70-0-0-30-1.0-4.0-1.0 S Zn Mn B	Broadcast and incorporated just
20-0-0	Injected when vines begin to run
20-0-0	Injected between vines running off plastic and first bloom

Additional nutrient may be needed if a large crop is harvested and vines continue to be healthy.

*If potash and sulfur are not going to be applied later in growing season it should be added to the original broadcast application.

HOWARD HARDING FARMS, LLC.
2024 FERTILITY RECOMMENDATIONS ADJUSTED FOR MANURE APPLICATIONS

IRRIGATED FIELD CORN (Continued)

All Fields:

	40-0-0-1.0 zinc	Planter

Recommend a Presidedress Nitrogen Test be done prior to sidedress nitrogen application.

15 lbs. Sulfur and 0.75 lb. Of Boron should be added to sidedress Nitrogen.

Estimated sidedress (allows for nitrogen credits from previously applied manure and 15 lbs per acre from last year's soybeans):

Home HF2:	156 lbs per acre
HF5-HF8:	171 lbs per acre
Hubbard HB4:	128 lbs per acre
HB4A:	134 lbs per acre

HOWARD HARDING FARMS, LLC.
2024 FERTILITY RECOMMENDATIONS ADJUSTED FOR MANURE APPLICATIONS

IRRIGATED FIELD CORN

Home		
HF2	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
HF5	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
HF6	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
HF7	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
HF8	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
Hubbard		
HB4	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast
HB4A	3,700 Gallons per acre Denali (0-0-150)	Injected Fall 2023 Broadcast

3,700 Gallons Per Acre Denali: (49-37-7)

WATERMELONS (continued)

NO MANURE

All Fields:

20-0-0	Injected when vines begin to run
20-0-0	Injected between vines running off plastic and first bloom
20-0-10	Injected at first fruit
20-0-10	Injected at first large picking

Additional nutrient may be needed if a large crop is harvested and vines continue to be healthy.

*If potash and sulfur are not going to be applied later in growing season it should be added to the original broadcast application.

A 15 lb per acre nitrogen credit should be given in 2024 for all fields where soybeans were grown in 2023.

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

WATERMELONS

NO MANURE

Barnes		
BN2	0-0-140	Early broadcast and incorporated
BN3	0-0-140	Early broadcast and incorporated
Cokesbury		
CO1	0-0-140	Early broadcast and incorporated
CODC	0-0-130	Early broadcast and incorporated
Home		
HF9 (see manure recommendations)	0-0-140	Early broadcast and incorporated
Young, Henry		
HUY (see manure recommendations)	0-0-150	Early broadcast and incorporated

Barnes BN2, BN3
Cokesbury CO1, CODC
Home HF9:

	70-0-0-30-1.0-4.0-1.0 S Zn Mn B	Broadcast and incorporated just prior to laying plastic

Henry Young:

	70-20-0-30-1.0-4.0-1.0 S Zn Mn B	Broadcast and incorporated just prior to laying plastic

FULL SEASON SOYBEANS (continued)

NO MANURE

Za Thang		
Z1	0-0-110-15 sulfur-2 Mn**	Broadcast
Z2	0-0-90-25 sulfur-2 Mn**	Broadcast

**** Manganese could be applied as a foliar application with post emergent herbicide using EDTA Manganese.**

Where Full Season Soybeans are being grown under irrigation, a minimum of 90 lbs per acre Potash is recommended to achieve maximum yield potential.

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

FULL SEASON SOYBEANS **NO MANURE**

Barnes		
BN1	0-0-120-15 sulfur	Broadcast
Faulkner		
FA1	0-0-100-15 sulfur-4 Mn**	Broadcast
Granruth		
GR1	0-0-100-15 sulfur-2 Mn**	Broadcast
GR2	0-0-90-15 sulfur-2 Mn**	Broadcast
Greenhawk, Ed		
EG1	0-0-80-15 sulfur-4 Mn**	Broadcast
EG2	0-0-100-15 sulfur-4 Mn**	Broadcast
EG3-4	0-20-90-15 sulfur-4 Mn**	Broadcast
Home		
HF9A (see manure recommendations)	0-0-100-15 sulfur-4 Mn**	Broadcast
Wilson, Kenny		
KW1	0-0-90-15 sulfur-4 Mn**	Broadcast
KW2	0-0-70-15 sulfur-4 Mn**	Broadcast
KW3	0-20-90-15 sulfur-4 Mn**	Broadcast
KW4	0-0-90-15 sulfur-4 Mn**	Broadcast
KW5	0-0-70-15 sulfur-4 Mn**	Broadcast
KW6	0-0-60-15 sulfur-4 Mn**	Broadcast
KW7	0-0-80-15 sulfur-4 Mn**	Broadcast
KW8	0-20-70-15 sulfur-4 Mn**	Broadcast

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

FULL SEASON LIMA BEANS

Greenhawk, Ed

EG1	30-0-90-25 sulfur-4 Mn**	Broadcast
EG2	30-20-100-25 sulfur-4 Mn**	Broadcast
EG3-4	30-30-90-25 sulfur-4 Mn**	Broadcast

All Fields:

	40-0-0	Sidedress or topdress at early bud

Additional nutrient may be required to maintain color and quality as required by the buyer and dependent on variety, crop and weather conditions.

* Sulfur could be applied at Planting/Early Topdress, Sidedress, or split applied.

****Recommend that manganese be applied as 3 lbs per acre Manganese Sulfate, or 2 quarts per acre 5% Chelate or 1.5 lbs per acre EDTA or equivalent.**

***** Fordhook Lima Beans should have the full amount of nitrogen at planting and not sidedressed.**

A 15 lb per acre nitrogen credit should be given in 2024 for all fields where soybeans were grown in 2023.

DRY LAND FIELD CORN (continued)

Hubbard HB4ADC:		
	40-50-0-1.0 zinc	Planter
Hubbard HB3DC Wilson, Kenny KW3, KW8:		
	40-30-0-1.0 zinc	Planter
All Other Fields:		
	40-20-0-1.0 zinc	Planter
All Fields:		
	50-0-0-25 sulfur*	Early topdress or at planting
	80-0-0-0.75 boron	Sidedress

*Sulfur could be applied at planting/early topdress, at sidedress or split applied.

**** Manganese could be applied as a foliar application with post emergent herbicide using EDTA Manganese.**

Allow for the following nitrogen credits from previously applied manure

Hastings HA1A:	11 lbs per acre
Hubbard HB1DC:	34 lbs per acre
HB3DC, HB4ADC:	22 lbs per acre
Wilson, Kenny KW3:	12 lbs per acre

A 15 lb per acre nitrogen credit should be given in 2024 for all fields where soybeans were grown in 2023.

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

DRY LAND FIELD CORN

Granruth		
GR1	0-0-130-2 Mn**	Broadcast
GR2	0-0-120-2 Mn**	Broadcast
Hastings		
HA1A	0-0-100-4 Mn**	Broadcast
Home		
HF1	0-0-130	Broadcast
HF3	0-0-140	Broadcast
HF4	0-0-130	Broadcast
Hubbard		
HB1DC	0-0-120	Broadcast
HB3DC	0-0-140-2 Mn**	Broadcast
HB4ADC	0-0-140	Broadcast
Wilson, Kenny		
KW1	0-0-120-4 Mn**	Broadcast
KW2	0-0-110-4 Mn**	Broadcast
KW3	0-0-120-4 Mn**	Broadcast
KW4	0-0-120-4 Mn**	Broadcast
KW5	0-0-100-4 Mn**	Broadcast
KW6	0-0-100-4 Mn**	Broadcast
KW7	0-0-120-4 Mn**	Broadcast
KW8	0-0-100-4 Mn**	Broadcast

IRRIGATED FIELD CORN (Continued)

NO MANURE

Allow for the following nitrogen credits from previously applied manure

Hubbard HB1, HB1A:	34 lbs per acre
HB2, HB4A:	22 lbs per acre
HB2A, HB3, HB4:	28 lbs per acre

A 15 lb per acre nitrogen credit should be given in 2024 for all fields where soybeans were grown in 2023.

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

IRRIGATED FIELD CORN (continued)

NO MANURE

Hubbard HB3, HB4:		
	40-50-0-1.5 zinc	Planter
Hubbard HB1, HB4A:		
	40-40-0-1.5 zinc	Planter
Hubbard HB1A, HB2, HB2A:		
	40-30-0-1.5 zinc	Planter
All Other Fields:		
	40-20-0-1.5 zinc	Planter
All Fields:		
	50-0-0-30-0.5 S* B	Early topdress or at planting
	130-0-0-1.0 boron	Sidedress
	40-0-0	Total injected through irrigation
	15-0-0 at tassel development 15-0-0 just prior to tassel emergence 10-0-0 just after pollination	

* Sulfur could be applied at Planting/Early topdress or at Sidedress

**** Manganese could be applied as a foliar application using EDTA Manganese.**

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

IRRIGATED FIELD CORN

	NO MANURE	
Hastings		
HA1	0-0-160-4 Mn**	Broadcast
HA1A	0-0-150-4 Mn**	Broadcast
Home		
HF2 (see manure recommendations)	0-0-160	Broadcast
HF5 (see manure recommendations)	0-0-160	Broadcast
HF6 (see manure recommendations)	0-0-160	Broadcast
HF7 (see manure recommendations)	0-0-160	Broadcast
HF8 (see manure recommendations)	0-0-160	Broadcast
Hubbard		
HB1	0-0-160-2 Mn**	Broadcast
HB1A	0-0-160	Broadcast
HB2	0-0-160-2 Mn**	Broadcast
HB2A	0-0-160	Broadcast
HB3	0-0-160-2 Mn**	Broadcast
HB4 (see manure recommendations)	0-0-160-4 Mn**	Broadcast
HB4A (see manure recommendations)	0-0-160-2 Mn**	Broadcast

IRRIGATED FIELD CORN

This is an addendum to your Nutrient Management Plan.

Total Nitrogen applied should not exceed 250 lbs. per acre for irrigated corn.

The State of Maryland regulations do not allow application of more than 250 lbs. of Nitrogen per acre for corn, regardless of your proven yields.

This 250 lbs. per acre regulation was developed from data and professional judgement approximately twenty years ago.

HOWARD HARDING FARMS, LLC
2024 RECOMMENDATIONS BASED ON CROP NUTRIENT REQUIREMENTS

GREEN BEAN/SOYBEANS

Hastings

HA1	0-0-110-4 Mn**	Broadcast
HA1A	0-0-90-4 Mn**	Broadcast

All Fields:

	40-0-0	Planter or at planting
	30-0-0-25 sulfur	Topdress at early bud stage

****Recommend that manganese be applied as 3 lbs per acre Manganese Sulfate, or 2 quarts per acre 5% Chelate or 1.5 lbs per acre EDTA or equivalent.**

Allow for the following nitrogen from previously applied manure

Hasting Farm HA1: 21 lbs per acre

Hasting Farm HA1A: 11 lbs per acre

SOYBEANS AFTER GREEN BEANS

-No additional fertilizer needed.

A 15 lb per acre nitrogen credit should be given in 2024 for all fields where soybeans were grown in 2023.

HOWARD HARDING FARMS, LLC
2024 LIME RECOMMENDATIONS

Farm	22/23 pH	Tons/Acre	Type of Lime	23/24 pH	Tons/Acre	Type of Lime
Hubbard						
HB1	5.6	1.0	High Magnesium *	6.2	--	--
HB1A	5.8	1.0	High Magnesium *	6.0	--	--
HB1DC	6.1	--	--	6.3	--	--
HB2	5.5	1.0	High Magnesium *	5.9	--	--
HB2A	5.5	1.0	High Magnesium *	5.4	1.0	High Magnesium
HB3	5.6	1.0	High Magnesium *	5.8	1.0	High Magnesium
HB3DC	5.8	1.0	High Magnesium *	5.9	1.0	High Magnesium
HB4	5.7	1.0	High Magnesium *	5.7	1.0	High Magnesium
HB4A	6.0	--	--	not sampled - sludge applied		
HB4ADC	6.2	--	--	not sampled - sludge applied		
Jackson						
J1	--	--	--	6.7	--	--
Wilson, Kenny						
KW1	5.4	1.25	High Magnesium	5.8	1.0	High Magnesium
KW2	5.8	1.0	High Magnesium	5.9	0.75	High Magnesium
KW3	6.1	--	--	6.0	--	--
KW4	5.9	0.75	High Magnesium	5.7	1.0	High Magnesium*
KW5	5.8	1.0	High Magnesium	5.9	0.75	High Magnesium*
KW6	5.9	0.75	High Magnesium	5.8	1.0	High Magnesium*
KW7	5.8	1.0	High Magnesium	5.7	1.0	High Magnesium*
KW8	5.9	0.75	High Magnesium	5.9	0.75	High Magnesium*
Young, Henry						
HUY	--	--	--	not sampled - sludge applied		
Za Thang						
Z1	6.7	--	--	6.2	--	--
Z2	6.9	--	--	6.2	--	--

* Where there is a lime recommendation and the field was limed within the last year additional lime may not be needed. If limed within the last year and the pH is still below 5.8 additional soil sampling may be needed. There may be a need for lime for certain vegetable crops even with 6.0 pH or higher.

** Depends on what crop is to be grown.

HOWARD HARDING FARMS, LLC
2024 LIME RECOMMENDATIONS

Farm	22/23 pH	Tons/Acre	Type of Lime	23/24 pH	Tons/Acre	Type of Lime
Barnes						
BN1	5.9	--	*	6.2	--	--
BN2	6.8	--	--	6.6	--	--
BN3	6.8	--	--	6.4	--	--
Cokesbury						
CO1	6.0	--	--	5.9	0.75	High Magnesium
CODC	5.8	1.0	High Magnesium	5.7	1.0	High Magnesium
Faulkner						
FA1	5.6	1.0	High Magnesium	5.7	1.0	High Magnesium
Granruth						
GR1	6.1	--	--	5.9	--	--
GR2	6.5	--	--	6.1	--	--
Greenhawk, Ed						
EG1	--	--	--	6.4	--	--
EG2	--	--	--	5.7	1.0	High Magnesium
EG3-4	--	--	--	6.1	--	--
Hastings						
HA1	6.0	--	--	6.2	--	--
HA1A	5.9	0.75	High Magnesium *	5.9	--	*
Home						
HF1	6.3	--	--	not sampled - sludge applied		
HF2	6.0	--	--	not sampled - sludge applied		
HF3	6.2	--	--	6.8	--	--
HF4	6.5	--	--	6.8	--	--
HF5	6.0	--	--	not sampled - sludge applied		
HF6	5.8	1.0	High Magnesium *	not sampled - sludge applied		
HF7	5.6	1.0	High Magnesium *	5.3	1.25	High Magnesium
HF8	5.3	1.0	High Magnesium *	not sampled - sludge applied		
HF9	5.7	1.0	High Magnesium *	not sampled - sludge applied		
HF9A	5.7	1.0	High Magnesium *	not sampled - sludge applied		

AgroLab
Serving Agriculture and Soil Fertility Professionals

Account No. : 7

Poultry Manure Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1148078
Date Received : 01/25/2024
Date Analyzed: 01/26/2024

Lab No. : 233

Results For : HARDING
Sample ID : HOMESHED

	Analysis Dry Basis	Analysis As Is Basis	Lbs / Ton Dry Basis	Lbs / Ton As Is Basis	Lbs / Ton Available First Year
Organic N, % N	3.25	1.63	65.1	32.5	17.2
Ammonium, % N	0.629	0.3150	12.6	6.3	6.0
Nitrate, % N	< 0.001	0.0000	0.0	0.0	0.0
Total N, % N	3.88	1.94	77.6	38.8	23.2
Phosphorus, % P_2O_5	4.21	2.11	84.3	42.1	37.9
Potassium, % K_2O	6.41	3.21	128.3	64.1	60.9
Sulfur, % S	1.40	0.70	28.0	14.0	5.6
Calcium, % Ca	3.03	1.52	60.6	30.3	21.2
Magnesium, % Mg	0.90	0.45	17.9	9.0	6.3
Sodium, % Na	1.27	0.64	25.4	12.7	12.7
Zinc, ppm Zn	691.3	345.7	1.4	0.7	0.5
Iron, ppm Fe	1495.5	747.8	3.0	1.5	1.0
Manganese, ppm Mn	720.0	360.0	1.4	0.7	0.5
Copper, ppm Cu	788.4	394.2	1.6	0.6	0.8
Aluminum, ppm Al	767.5	383.8	1.5	0.8	0.5
Boron, ppm B	85.1	42.6	0.2	0.1	0.1
pH		8.9			
Moisture, %	50.00				
Dry Matter (TS), %	50.00				

"<" - Not Detected / Below Detection Limit

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Account No. : 47

Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC -- 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. :	1139256
Date Received :	01/05/2023
Date Analyzed:	01/06/2023
Lab No. :	1979

Results For : DENALI WATER SOLUTIONS LLC -- 47
Sample ID : BNR

				Available First Year	
	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Lbs per Acre Inch	Lbs per 1000 gal
Organic N, ppm N	2263.3	513.0	19.0	179.6	6.7
Ammonium, ppm N	349.2	79.2	2.9	75.2	2.8
Nitrate, ppm N	0.5	0.1	0.0	0.1	0.0
Total N, ppm N	2613.0	592.3	21.9	254.9	9.4
Phosphorus, ppm P_2O_5	757.7	171.8	6.4	120.2	4.5
Potassium, ppm K_2O	232.2	52.6	1.9	47.4	1.8
Sulfur, ppm S	293.1	66.4	2.5	26.6	1.0
Calcium, ppm Ca	488.9	110.8	4.1	77.6	2.9
Magnesium, ppm Mg	980.1	222.2	8.2	155.5	5.8
Sodium, ppm Na	241.6	54.8	2.0	54.8	2.0
Sodium Adsorption Ratio (SAR)	2.04				
Zinc, ppm Zn	2.6	0.6	0.0	0.4	0.0
Iron, ppm Fe	110.4	25.0	0.9	17.5	0.6
Manganese, ppm Mn	2.0	0.4	0.0	0.3	0.0
Copper, ppm Cu	3.1	0.7	0.0	0.5	0.0
Aluminum, ppm Al	990.0	224.4	8.3	157.1	5.8
Boron, ppm B	1.1	0.2	0.0	0.2	0.0
pH	7.3				
Dry Matter (TS), %	4.77				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC -- 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. :	**1139010**
Date Received :	**12/21/2022**
Date Analyzed:	**12/22/2022**
Lab No. :	**1946**

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : MOUNTAIRE MILLSBORO

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	4797.0	1087.3	40.3	543.7	20.1
Ammonium, ppm N	151.2	34.3	1.3	32.6	1.2
Nitrate, ppm N	2.9	0.6	0.0	0.6	0.0
Total N, ppm N	4951.0	1122.2	41.6	576.9	21.4
Phosphorus, ppm P_2O_5	577.9	131.0	4.9	104.8	3.9
Potassium, ppm K_2O	167.0	37.9	1.4	34.1	1.3
Sulfur, ppm S	327.5	74.2	2.7	29.7	1.1
Calcium, ppm Ca	433.3	98.2	3.6	68.7	2.5
Magnesium, ppm Mg	64.0	14.5	0.5	10.2	0.4
Sodium, ppm Na	257.0	58.2	2.2	58.2	2.2
Sodium Adsorption Ratio (SAR)	4.30				
Zinc, ppm Zn	11.0	2.5	0.1	1.7	0.1
Iron, ppm Fe	47.9	10.9	0.4	7.6	0.3
Manganese, ppm Mn	3.5	0.8	0.0	0.6	0.0
Copper, ppm Cu	4.1	0.9	0.0	0.7	0.0
Aluminum, ppm Al	7.3	1.7	0.1	1.2	0.0
Boron, ppm B	1.9	0.4	0.0	0.4	0.0
pH	5.1				
Dry Matter (TS), %	11.42				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC -- 47
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Invoice No. :	1139545
Date Received :	01/20/2023
Date Analyzed:	01/23/2023
Lab No. :	2004

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : PRIMARY MOUNTAIRE

				Available First Year	
	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Lbs per Acre Inch	Lbs per 1000 gal
Organic N, ppm N	3692.6	837.0	31.0	418.5	15.5
Ammonium, ppm N	444.3	100.7	3.7	95.7	3.5
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	4137.0	937.7	34.7	514.2	19.0
Phosphorus, ppm P_2O_5	594.3	134.7	5.0	107.8	4.0
Potassium, ppm K_2O	187.5	42.5	1.6	38.3	1.4
Sulfur, ppm S	182.3	41.3	1.5	16.5	0.6
Calcium, ppm Ca	463.2	105.0	3.9	73.5	2.7
Magnesium, ppm Mg	55.8	12.7	0.5	8.9	0.3
Sodium, ppm Na	320.0	72.5	2.7	72.5	2.7
Sodium Adsorption Ratio (SAR)	5.28				
Zinc, ppm Zn	6.4	1.4	0.1	1.0	0.0
Iron, ppm Fe	29.8	6.8	0.3	4.7	0.2
Manganese, ppm Mn	1.9	0.4	0.0	0.3	0.0
Copper, ppm Cu	1.9	0.4	0.0	0.3	0.0
Aluminum, ppm Al	6.9	1.6	0.1	1.1	0.0
Boron, ppm B	0.0	0.0	0.0	0.0	0.0
pH	4.9				
Dry Matter (TS), %	12.50				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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1221 BRUCEVILLE RD
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Invoice No. : 1139256
Date Received : 01/05/2023
Date Analyzed: 01/06/2023

Lab No. : 1982

Results For : DENALI WATER SOLUTIONS LLC -- 47
Sample ID : PET POULTRY

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	2206.8	500.2	18.5	175.1	6.5
Ammonium, ppm N	1810.7	410.4	15.2	389.9	14.4
Nitrate, ppm N	3.5	0.8	0.0	0.8	0.0
Total N, ppm N	4021.0	911.4	33.8	565.8	21.0
Phosphorus, ppm P_2O_5	2187.3	495.8	18.4	347.1	12.9
Potassium, ppm K_2O	638.1	144.6	5.4	130.2	4.8
Sulfur, ppm S	325.8	73.8	2.7	29.5	1.1
Calcium, ppm Ca	784.0	177.7	6.6	124.4	4.6
Magnesium, ppm Mg	195.3	44.3	1.6	31.0	1.1
Sodium, ppm Na	545.2	123.6	4.6	123.6	4.6
Sodium Adsorption Ratio (SAR)	6.37				
Zinc, ppm Zn	19.3	4.4	0.2	3.1	0.1
Iron, ppm Fe	88.2	20.0	0.7	14.0	0.5
Manganese, ppm Mn	1.6	0.4	0.0	0.3	0.0
Copper, ppm Cu	2.1	0.5	0.0	0.3	0.0
Aluminum, ppm Al	466.1	105.6	3.9	74.0	2.7
Boron, ppm B	1.3	0.3	0.0	0.3	0.0
pH	6.3				
Dry Matter (TS), %	3.75				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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1221 BRUCEVILLE RD
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Invoice No. : 1139133
Date Received : 12/28/2022
Date Analyzed: 12/29/2022

Lab No. : 1951

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : HURLOCK AMICK

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	4261.3	965.9	35.8	483.0	17.9
Ammonium, ppm N	118.6	26.9	1.0	25.5	0.9
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	4380.0	992.8	36.8	508.5	18.8
Phosphorus, ppm P_2O_5	1940.7	439.9	16.3	351.9	13.0
Potassium, ppm K_2O	226.0	51.2	1.9	46.1	1.7
Sulfur, ppm S	360.4	81.7	3.0	32.7	1.2
Calcium, ppm Ca	442.9	100.4	3.7	70.3	2.6
Magnesium, ppm Mg	84.9	19.2	0.7	13.5	0.5
Sodium, ppm Na	289.5	65.6	2.4	65.6	2.4
Sodium Adsorption Ratio (SAR)	4.66				
Zinc, ppm Zn	13.9	3.2	0.1	2.2	0.1
Iron, ppm Fe	3200.4	725.4	26.9	507.8	18.8
Manganese, ppm Mn	7.7	1.7	0.1	1.2	0.0
Copper, ppm Cu	8.1	1.8	0.1	1.3	0.0
Aluminum, ppm Al	21.6	4.9	0.2	3.4	0.1
Boron, ppm B	20.9	4.7	0.2	4.7	0.2
pH	5.8				
Dry Matter (TS), %	6.80				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
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1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1138529
Date Received : 11/29/2022
Date Analyzed: 11/30/2022

Lab No. : 1914

Results For : DENALI WATER SOLUTIONS LLC -- 47
Sample ID : SELBYVILLE DAF

				Available First Year	
	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Lbs per Acre Inch	Lbs per 1000 gal
Organic N, ppm N	3555.9	806.0	29.9	403.0	14.9
Ammonium, ppm N	1167.0	264.5	9.8	251.3	9.3
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	4723.0	1070.6	39.7	654.3	24.2
Phosphorus, ppm P_2O_5	869.4	197.1	7.3	157.7	5.8
Potassium, ppm K_2O	118.7	26.9	1.0	24.2	0.9
Sulfur, ppm S	301.9	68.4	2.5	27.4	1.0
Calcium, ppm Ca	204.0	46.2	1.7	32.4	1.2
Magnesium, ppm Mg	50.5	11.4	0.4	8.0	0.3
Sodium, ppm Na	177.7	40.3	1.5	40.3	1.5
Sodium Adsorption Ratio (SAR)	4.07				
Zinc, ppm Zn	13.3	3.0	0.1	2.1	0.1
Iron, ppm Fe	137.1	31.1	1.2	21.8	0.8
Manganese, ppm Mn	1.8	0.4	0.0	0.3	0.0
Copper, ppm Cu	8.0	1.8	0.1	1.3	0.0
Aluminum, ppm Al	164.8	37.4	1.4	26.1	1.0
Boron, ppm B	0.4	0.1	0.0	0.1	0.0
pH	5.8				
Dry Matter (TS), %	10.15				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC -- 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1139545
Date Received : 01/20/2023
Date Analyzed: 01/23/2023

Lab No. : 2003

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : SELBYVILLE MOUNTAIRE

				Available First Year	
	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Lbs per Acre Inch	Lbs per 1000 gal
Organic N, ppm N	2024.9	459.0	17.0	229.5	8.5
Ammonium, ppm N	1108.3	251.2	9.3	238.7	8.8
Nitrate, ppm N	2.8	0.6	0.0	0.6	0.0
Total N, ppm N	3136.0	710.8	26.3	468.8	17.4
Phosphorus, ppm P_2O_5	823.1	186.6	6.9	149.3	5.5
Potassium, ppm K_2O	288.3	65.4	2.4	58.8	2.2
Sulfur, ppm S	92.7	21.0	0.8	8.4	0.3
Calcium, ppm Ca	206.2	46.7	1.7	32.7	1.2
Magnesium, ppm Mg	76.6	17.4	0.6	12.2	0.5
Sodium, ppm Na	303.6	68.8	2.5	68.8	2.5
Sodium Adsorption Ratio (SAR)	6.46				
Zinc, ppm Zn	4.1	0.9	0.0	0.6	0.0
Iron, ppm Fe	63.6	14.4	0.5	10.1	0.4
Manganese, ppm Mn	1.2	0.3	0.0	0.2	0.0
Copper, ppm Cu	2.6	0.6	0.0	0.4	0.0
Aluminum, ppm Al	2.4	0.5	0.0	0.4	0.0
Boron, ppm B	0.3	0.1	0.0	0.1	0.0
pH	6.4				
Dry Matter (TS), %	1.67				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Annapolis, Maryland 21401

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REGISTERED SOIL CONDITONERS
February 1, 2023 to January 31, 2024

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1221 BRUCEVILLE ROAD UNIT B
KEYMAR, MD 21757

Registered By:
708199
DENALI WATER SOLUTIONS LLC
1221 BRUCEVILLE ROAD UNIT B KEYMAR, MD
21757 US

Contact Name: LAUREN MILLER
Telephone [redacted]

Product Number	Product Name	Composition	Pkg. Size
120812	DWS NWP LIQUID NORRISTOWN LIQUID	WATER RESIDUAL NORRISTOWN WATER PLANT 5% SOLI	BK
146460	DWS BGFOODS	product of food processing	BK
120814	DWS CDDAF	FOOD PROCESSING RESIDUAL	BK
120815	DWS CDOFF	FOOD PROCESSING RESIDUAL	BK
120816	DWS WW	FOOD PROCESSING RESIDUAL	BK
120445	DWS ARTESIAN	WATER RESIDUAL-WELLS- ARTESIAN WAT.NEWARK,DE	BK
146549	DWS ALLEN HARBESONCAKE	POULTRY PROCESSING WASTE	BK
120818	DWS BBP B&B POULTRY	FOOD PROCESSING RESIDUAL	BK
120819	DWS GMA GETTYSBURG	WATER RESIDUAL GETTYS.MUNICIPAL AUTHOR.2.6%	BK
120447	DWS LWP LANCASTER	WATER RESIDUAL (LANCASTER)	BK

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1130296
Date Received : 11/18/2021
Date Analyzed: 11/19/2021

Lab No. : 1488

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : ALLEN
HARBESON DAF

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	5579.5	1264.7	46.8	632.3	23.4
Ammonium, ppm N	121.4	27.5	1.0	26.1	1.0
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	5701.0	1292.2	47.9	658.5	24.4
Phosphorus, ppm P_2O_5	3086.5	699.6	25.9	559.7	20.7
Potassium, ppm K_2O	366.8	83.1	3.1	74.8	2.8
Sulfur, ppm S	396.7	89.9	3.3	36.0	1.3
Calcium, ppm Ca	563.8	127.8	4.7	89.5	3.3
Magnesium, ppm Mg	150.5	34.1	1.3	23.9	0.9
Sodium, ppm Na	144.1	32.7	1.2	32.7	1.2
Sodium Adsorption Ratio (SAR)	1.96				
Zinc, ppm Zn	20.5	4.7	0.2	3.3	0.1
Iron, ppm Fe	115.9	26.3	1.0	18.4	0.7
Manganese, ppm Mn	5.6	1.3	0.0	0.9	0.0
Copper, ppm Cu	6.5	1.5	0.1	1.0	0.0
Aluminum, ppm Al	1657.8	375.8	13.9	263.0	9.7
Boron, ppm B	0.6	0.1	0.0	0.1	0.0
pH	5.7				
Dry Matter (TS), %	9.55				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Account No.: 47

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KEYMAR MD 21757

Invoice No.: 1130296
Date Received: 11/18/2021
Date Analyzed: 11/19/2021

Lab No.: 1493

Results For: DENALI WATER SOLUTIONS LLC
Sample ID: VALLEY PROTEINS
PRIMARY DAF

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	1176.0	266.6	9.9	133.3	4.9
Ammonium, ppm N	214.9	48.7	1.8	46.3	1.7
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	1391.0	315.3	11.7	179.6	6.7
Phosphorus, ppm P_2O_5	854.0	193.6	7.2	154.9	5.7
Potassium, ppm K_2O	134.4	30.5	1.1	27.4	1.0
Sulfur, ppm S	207.7	47.1	1.7	18.8	0.7
Calcium, ppm Ca	478.6	108.5	4.0	75.9	2.8
Magnesium, ppm Mg	130.0	29.5	1.1	20.6	0.8
Sodium, ppm Na	216.7	49.1	1.8	49.1	1.8
Sodium Adsorption Ratio (SAR)	3.20				
Zinc, ppm Zn	3.7	0.8	0.0	0.6	0.0
Iron, ppm Fe	34.7	7.9	0.3	5.5	0.2
Manganese, ppm Mn	1.1	0.2	0.0	0.2	0.0
Copper, ppm Cu	0.3	0.1	0.0	0.0	0.0
Aluminum, ppm Al	626.0	141.9	5.3	99.3	3.7
Boron, ppm B	0.7	0.2	0.0	0.2	0.0
pH	5.1				
Dry Matter (TS), %	9.76				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Invoice No. : 1130296
Date Received : 11/18/2021
Date Analyzed: 11/19/2021

Lab No. : 1496

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : MOUNTAIRE MILLSBORO

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	3698.5	838.3	31.0	419.2	15.5
Ammonium, ppm N	143.4	32.5	1.2	30.9	1.1
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	3842.0	870.9	32.3	450.1	16.7
Phosphorus, ppm P_2O_5	653.8	148.2	5.5	118.6	4.4
Potassium, ppm K_2O	121.0	27.4	1.0	24.7	0.9
Sulfur, ppm S	335.5	76.0	2.8	30.4	1.1
Calcium, ppm Ca	223.7	50.7	1.9	35.6	1.3
Magnesium, ppm Mg	44.9	10.2	0.4	7.1	0.3
Sodium, ppm Na	239.8	54.3	2.0	54.3	2.0
Sodium Adsorption Ratio (SAR)	5.40				
Zinc, ppm Zn	10.0	2.3	0.4	1.6	0.1
Iron, ppm Fe	60.4	13.7	0.5	9.6	0.4
Manganese, ppm Mn	1.9	0.4	0.0	0.3	0.0
Copper, ppm Cu	3.2	0.7	0.0	0.5	0.0
Aluminum, ppm Al	5.4	1.2	0.0	0.9	0.0
Boron, ppm B	0.7	0.2	0.0	0.2	0.0
pH	5.2				
Dry Matter (TS), %	12.55				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1131039
Date Received : 12/30/2021
Date Analyzed: 01/04/2022

Lab No. : 1574

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : MOUNTAIRE
MILLSBORO PRIMARY

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	5179.3	1174.0	43.5	587.0	21.7
Ammonium, ppm N	54.6	12.4	0.5	11.8	0.4
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	5234.0	1186.4	43.9	598.8	22.2
Phosphorus, ppm P_2O_5	973.5	220.7	8.2	176.5	6.5
Potassium, ppm K_2O	116.8	26.5	1.0	23.8	0.9
Sulfur, ppm S	464.2	105.2	3.9	42.1	1.6
Calcium, ppm Ca	226.5	51.3	1.9	35.9	1.3
Magnesium, ppm Mg	34.3	7.8	0.3	5.4	0.2
Sodium, ppm Na	218.5	49.5	1.8	49.5	1.8
Sodium Adsorption Ratio (SAR)	5.05				
Zinc, ppm Zn	8.5	1.9	0.1	1.3	0.0
Iron, ppm Fe	81.7	18.5	0.7	13.0	0.5
Manganese, ppm Mn	1.1	0.2	0.0	0.2	0.0
Copper, ppm Cu	3.3	0.8	0.0	0.5	0.0
Aluminum, ppm Al	5.4	1.2	0.0	0.9	0.0
Boron, ppm B	0.3	0.1	0.0	0.1	0.0
pH	5.4				
Dry Matter (TS), %	20.85				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

MILLER, LAUREN
DENALI WATER SOLUTIONS LLC 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1130717
Date Received : 12/10/2021
Date Analyzed: 12/13/2021

Lab No. : 1515

Results For : DENALI WATER SOLUTIONS LLC 47
Sample ID : AMICK
HURLOCK

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	5886.8	1334.4	49.4	667.2	24.7
Ammonium, ppm N	271.4	61.5	2.3	58.5	2.2
Nitrate, ppm N	4.8	1.1	0.0	1.1	0.0
Total N, ppm N	6163.0	1397.0	51.7	726.7	26.9
Phosphorus, ppm P_2O_5	2449.3	555.2	20.6	444.1	16.4
Potassium, ppm K_2O	216.4	49.1	1.8	44.1	1.6
Sulfur, ppm S	440.3	99.8	3.7	39.9	1.5
Calcium, ppm Ca	819.2	185.7	6.9	130.0	4.8
Magnesium, ppm Mg	121.8	27.6	1.0	19.3	0.7
Sodium, ppm Na	304.1	68.9	2.6	68.9	2.6
Sodium Adsorption Ratio (SAR)	3.70				
Zinc, ppm Zn	19.0	4.3	0.2	3.0	0.1
Iron, ppm Fe	3116.5	706.9	26.2	494.8	18.3
Manganese, ppm Mn	11.3	2.6	0.1	1.8	0.1
Copper, ppm Cu	12.1	2.7	0.1	1.9	0.1
Aluminum, ppm Al	45.3	10.3	0.4	7.2	0.3
Boron, ppm B	5.9	1.3	0.0	1.3	0.0
pH	5.8				
Dry Matter (TS), %	11.77				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Invoice No. : 1130717
Date Received : 12/10/2021
Date Analyzed: 12/13/2021

Lab No. : 1516

Results For : DENALI WATER SOLUTIONS LLC 47
Sample ID : MOUNTAIRE SELBYVILLE DAF

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	6471.9	1467.0	54.3	733.5	27.2
Ammonium, ppm N	179.8	40.8	1.5	38.7	1.4
Nitrate, ppm N	3.3	0.7	0.0	0.7	0.0
Total N, ppm N	6655.0	1508.5	55.9	773.0	28.6
Phosphorus, ppm P_2O_5	1132.0	256.6	9.5	205.3	7.6
Potassium, ppm K_2O	148.3	33.6	1.2	30.3	1.1
Sulfur, ppm S	399.6	90.6	3.4	36.2	1.3
Calcium, ppm Ca	420.0	95.2	3.5	66.6	2.5
Magnesium, ppm Mg	68.8	15.6	0.6	10.9	0.4
Sodium, ppm Na	219.3	49.7	1.8	49.7	1.8
Sodium Adsorption Ratio (SAR)	3.69				
Zinc, ppm Zn	21.1	4.8	0.2	3.3	0.1
Iron, ppm Fe	110.7	25.1	0.9	17.6	0.7
Manganese, ppm Mn	5.0	1.1	0.0	0.8	0.0
Copper, ppm Cu	8.3	1.9	0.1	1.3	0.0
Aluminum, ppm Al	9.2	2.1	0.1	1.5	0.1
Boron, ppm B	0.2	0.0	0.0	0.0	0.0
pH	5.7				
Dry Matter (TS), %	14.26				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1131039
Date Received : 12/30/2021
Date Analyzed: 01/04/2022

Lab No. : 1572

Results For : DENALI WATER SOLUTIONS LLC
Sample ID : MOUNTAIRE
SELBYVILLE WAS

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	1741.9	394.8	14.6	197.4	7.3
Ammonium, ppm N	1352.0	306.5	11.4	291.1	10.8
Nitrate, ppm N	0.1	0.0	0.0	0.0	0.0
Total N, ppm N	3094.0	701.3	26.0	488.6	18.1
Phosphorus, ppm P_2O_5	1218.4	276.2	10.2	220.9	8.2
Potassium, ppm K_2O	287.4	65.1	2.4	58.6	2.2
Sulfur, ppm S	236.2	53.5	2.0	21.4	0.8
Calcium, ppm Ca	248.2	56.2	2.1	39.4	1.5
Magnesium, ppm Mg	89.9	20.4	0.8	14.3	0.5
Sodium, ppm Na	417.2	94.6	3.5	94.6	3.5
Sodium Adsorption Ratio (SAR)	8.13				
Zinc, ppm Zn	13.9	3.1	0.1	2.2	0.1
Iron, ppm Fe	83.0	18.8	0.7	13.2	0.5
Manganese, ppm Mn	3.8	0.9	0.0	0.8	0.0
Copper, ppm Cu	5.5	1.3	0.0	0.9	0.0
Aluminum, ppm Al	8.2	1.9	0.1	1.3	0.0
Boron, ppm B	0.5	0.1	0.0	0.1	0.0
pH	6.3				
Dry Matter (TS), %	2.44				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Slurry Analysis Report

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DENALI WATER SOLUTIONS LLC 47
1221 BRUCEVILLE RD
KEYMAR MD 21757

Invoice No. : 1130612
Date Received : 12/07/2021
Date Analyzed: 12/08/2021

Lab No. : 1506

Results For : DENALI WATER SOLUTIONS LLC 47

Sample ID :

PET POULTRY

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year Lbs per Acre Inch	Available First Year Lbs per 1000 gal
Organic N, ppm N	2643.8	599.3	22.2	299.6	11.1
Ammonium, ppm N	341.9	77.5	2.9	73.6	2.7
Nitrate, ppm N	9.4	2.1	0.1	2.1	0.1
Total N, ppm N	2995.0	678.9	25.1	375.4	13.9
Phosphorus, ppm P_2O_5	2021.5	458.2	17.0	366.6	13.6
Potassium, ppm K_2O	641.5	145.4	5.4	130.9	4.8
Sulfur, ppm S	390.8	88.6	3.3	35.4	1.3
Calcium, ppm Ca	774.0	175.4	6.5	122.8	4.5
Magnesium, ppm Mg	208.2	47.2	1.7	33.0	1.2
Sodium, ppm Na	582.8	132.1	4.9	132.1	4.9
Sodium Adsorption Ratio (SAR)	6.77				
Zinc, ppm Zn	10.2	2.3	0.1	1.6	0.1
Iron, ppm Fe	67.0	15.2	0.6	10.6	0.4
Manganese, ppm Mn	0.9	0.2	0.0	0.1	0.0
Copper, ppm Cu	6.9	1.6	0.1	1.1	0.0
Aluminum, ppm Al	679.8	154.1	5.7	107.9	4.0
Boron, ppm B	1.2	0.3	0.0	0.3	0.0
pH	6.4				
Dry Matter (TS), %	3.08				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Account No.: 7

Poultry Manure Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No.: 1139528
Date Received: 01/19/2023
Date Analyzed: 01/20/2023

Lab No.: 2711

Results For: HARDINGLLC
Sample ID: HOME

	Analysis Dry Basis	Analysis As is Basis	Lbs / Ton Dry Basis	Lbs / Ton As is Basis	Lbs / Ton Available First Year
Organic N, % N	3.16	2.47	63.3	49.4	26.2
Ammonium, % N	0.423	0.3300	8.5	6.6	6.3
Nitrate, % N	0.014	0.0110	0.3	0.2	0.2
Total N, % N	3.60	2.81	72.0	56.2	32.6
Phosphorus, % P_2O_5	3.45	2.69	68.9	53.8	48.4
Potassium, % K_2O	4.55	3.55	91.0	71.0	67.5
Sulfur, % S	1.17	0.91	23.3	18.2	7.3
Calcium, % Ca	2.71	2.11	54.2	42.2	29.6
Magnesium, % Mg	0.67	0.52	13.4	10.5	7.3
Sodium, % Na	0.88	0.69	17.6	13.8	13.8
Zinc, ppm Zn	620.2	483.8	1.2	1.0	0.7
Iron, ppm Fe	939.4	732.8	1.9	1.5	1.0
Manganese, ppm Mn	665.8	519.4	1.3	1.0	0.7
Copper, ppm Cu	720.7	562.2	1.4	0.8	1.1
Aluminum, ppm Al	985.3	768.6	2.0	1.5	1.1
Boron, ppm B	44.0	34.3	0.1	0.1	0.1
pH		8.5			
Moisture, %	21.99				
Dry Matter (TS), %	78.01				

Note: The available first year Ammonium-N is calculated based on maximum availability, or incorporation within 24 hours. Advise a nutrient consultant for adjustments beyond 24 hr incorporation.

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1149253
Date Received : 03/14/2024
Date Analyzed : 03/15/2024

Results For : HARDING LLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
EG1						0 - 8 in		0 - 8 in																			
7487	6.4	6.89		1.85					39	146	161	84	618	82		11	2.37		6.6		0.34	4.3	8	5	71	16	0
EG2						0 - 8 in		0 - 8 in																			
7488	5.7	6.77		2.21					23	85	95	61	526	39		10	1.60		4.7		0.29	3.9	21	4	67	8	0
EG3 4						0 - 8 in		0 - 8 in																			
7489	6.1	6.84		1.90					30	78	87	75	612	46		9	1.87		8.4		0.39	4.2	13	5	73	9	0

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MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Soil Analysis Report

Invoice No.: 1137719
Date Received: 10/18/2022
Date Analyzed: 10/19/2022

Results For: HARDINGLLC
Location:

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HF1						0 - 8 in		0 - 8 in																			
22856	6.3	6.9		1.4					118	355	389	69	560	66		8	18.40		25.0		0.44	4.0	11	4	71	14	0
HF2						0 - 8 in		0 - 8 in																			
22857	6.0	6.9		1.3					105	312	342	67	430	61		10	12.30		20.2		0.46	3.3	14	5	65	15	0
HF5						0 - 8 in		0 - 8 in																			
22858	6.0	6.9		1.4					78	257	282	65	420	66		10	8.49		19.4		0.50	3.3	14	5	64	17	0
HF6						0 - 8 in		0 - 8 in																			
22859	5.8	6.8		1.3					77	236	259	56	370	57		10	9.68		23.2		0.43	3.0	18	5	61	16	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1146468
Date Received : 10/27/2023
Date Analyzed : 10/30/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
BN2						0 - 8 in		0 - 8 in																			
28006	6.6	6.86		1.66					107	405	443	55	1073	40		13	13.66		22.7		0.67	6.3	7	2	86	5	0
BN3						0 - 8 in		0 - 8 in																			
28007	6.4	6.83		1.56					96	439	480	58	962	28		14	11.09		15.5		0.65	5.7	9	3	84	4	0
Z1						0 - 8 in		0 - 8 in																			
28008	6.2	6.78		2.36					62	303	333	56	1019	31		15	7.11		12.5		0.66	6.2	11	2	83	4	0
Z2						0 - 8 in		0 - 8 in																			
28009	6.2	6.78		1.99					64	285	313	74	933	34		13	7.59		14.1		0.60	5.8	12	3	80	5	0

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MCCONNELL AGRONOMICS
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Soil Analysis Report

Invoice No. : 1146127
Date Received : 10/12/2023
Date Analyzed : 10/13/2023

Results For : HARDING~~EST~~ LLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HF7						0 - 8 in		0 - 8 in																			
23533	5.3	6.73		1.35					65	237	260	66	333	29		20	14.06		33.1		0.48	3.1	33	5	54	8	0

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MCCONNELL AGRONOMICS
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Soil Analysis Report

Invoice No. : 1147796
Date Received : 01/08/2024
Date Analyzed : 01/10/2024

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HB3						0 - 8 in		0 - 8 in																			
877	5.8	6.93		1.60					18	44	50	45	166	35		6	4.83		11.2		0.24	1.5	18	8	55	19	0
HB3DC						0 - 8 in		0 - 8 in																			
878	5.9	6.94		1.39					31	78	87	43	155	27		5	2.29		11.0		0.20	1.3	17	8	58	17	0
HB4						0 - 8 in		0 - 8 in																			
879	5.7	6.93		1.31					24	49	55	35	132	38		4	2.71		5.4		0.27	1.3	20	7	49	24	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1124025
Date Received : 01/15/2021
Date Analyzed : 01/18/2021

Results For : HARDINGEST
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
RT3						0 - 8 in		0 - 8 in																			
3090	6.5	6.9		1.2					46	133	147	54	326	72		6	3.64		18.0		0.34	2.6	8	5	63	23	0
CO1						0 - 8 in		0 - 8 in																			
3091	5.6	6.9		1.8					43	155	171	53	244	31		11	6.61		20.0		0.51	2.1	24	6	58	12	0
CODC						0 - 8 in		0 - 8 in																			
3093	5.7	6.9		2.1					49	196	216	95	256	30		15	6.46		26.0		0.54	2.3	22	11	56	11	0
FA1						0 - 8 in		0 - 8 in																			
3094	6.0	6.9		1.8					37	119	132	73	357	67		15	4.36		9.6		0.42	3.0	14	6	60	19	0
HU1						0 - 8 in		0 - 8 in																			
3095	6.4	6.9		1.4					41	103	114	75	376	50		7	8.08		17.0		0.36	2.7	9	7	69	15	0
HU1DC						0 - 8 in		0 - 8 in																			
3096	6.8	6.9		1.9					23	57	64	73	413	106		6	3.68		6.3		0.37	3.3	5	6	62	27	0
HU2						0 - 8 in		0 - 8 in																			
3097	6.4	6.9		1.5					46	142	157	65	426	52		8	6.29		14.0		0.36	3.0	9	6	70	15	0
HU3						0 - 8 in		0 - 8 in																			
3098	6.4	6.9		1.2					42	118	131	72	326	55		7	3.76		13.0		0.33	2.5	9	7	65	18	0
HUY						0 - 8 in		0 - 8 in																			
3099	6.7	6.9		1.4					47	106	118	67	392	46		7	3.28		8.6		0.37	2.7	6	6	73	14	0
HF1						0 - 8 in		0 - 8 in																			
3100	6.1	6.8		1.8					109	373	409	60	560	26		9	16.90		16.0		0.38	3.7	14	4	76	6	0
HF2						0 - 8 in		0 - 8 in																			
3101	5.8	6.8		1.7					102	347	380	53	482	29		10	17.90		17.0		0.41	3.4	18	4	71	7	0
HF3						0 - 8 in		0 - 8 in																			
3102	5.9	6.8		1.6					115	401	439	61	540	50		10	19.90		22.0		0.37	3.9	16	4	69	11	0
HF4						0 - 8 in		0 - 8 in																			
3103	6.3	6.9		1.6					95	297	326	71	489	70		9	20.90		19.0		0.36	3.6	10	5	68	16	0
HF5						0 - 8 in		0 - 8 in																			
3104	5.8	6.8		1.7					71	243	267	74	340	60		10	10.50		17.0		0.42	2.9	19	6	58	17	0

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Field Information Sheet

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-14-2023

Tract No. / Farm Name	Field No.	Area	Crops	Yield Goal	Tillage Method	Past Legume N Credit	Nutrient Source Manure/Sludge Field History: Last Year		2 Years Ago	
							Type	Rate	Type	Rate
Henry Young	HUY	18.00 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No.: 1137719
Date Received: 10/18/2022
Date Analyzed: 10/19/2022

Results For: HARDINGLLC
Location:

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HF1						0 - 8 in		0 - 8 in																			
22856	6.3	6.9		1.4					118	355	389	69	560	66		8	18.40		25.0		0.44	4.0	11	4	71	14	0
HF2						0 - 8 in		0 - 8 in																			
22857	6.0	6.8		1.3					105	312	342	67	430	61		10	12.30		20.2		0.46	3.3	14	5	65	15	0
HF5						0 - 8 in		0 - 8 in																			
22858	6.0	6.9		1.4					78	257	282	65	420	66		10	8.49		19.4		0.50	3.3	14	5	64	17	0
HF6						0 - 8 in		0 - 8 in																			
22859	5.8	6.8		1.3					77	236	259	56	370	57		10	9.68		23.2		0.43	3.0	18	5	61	16	0

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Field Information Sheet

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	11-5-2023

Tract No. / Farm Name	Field No.	Area	Crops	Yield Goal	Tillage Method	Past Legume N Credit	Nutrient Source Manure/Sludge Field History: Last Year Type	Last Year Rate	2 Years Ago Type	2 Years Ago Rate
Home	HF1	2.80 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF2	20.20 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF3	4.40 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF4	6.10 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF5	15.50 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF6	19.00 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF7	38.10 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF8	14.70 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF9	35.80 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Home	HF9A	8.50 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				

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Soil Analysis Report

Invoice No. : 1147254
Date Received : 12/04/2023
Date Analyzed : 12/05/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
KW3 / 40731	6.0	6.88		1.73		0 - 8 in		0 - 8 in	23	77	86	73	349	74		8	3.32		5.8		0.22	3.0	14	6	59	21	0
KW4 / 40732	5.7	6.82		1.93		0 - 8 in		0 - 8 in	42	195	215	74	346	50		11	4.47		7.5		0.26	3.0	22	6	58	14	0
KW5 / 40733	5.9	6.84		2.16		0 - 8 in		0 - 8 in	26	106	117	104	433	69		11	3.90		5.7		0.25	3.6	17	7	60	16	0
KW6 / 40734	5.8	6.81		2.20		0 - 8 in		0 - 8 in	33	156	172	121	458	63		14	4.84		8.6		0.21	3.8	19	8	59	14	0
KW7 / 40736	5.7	6.85		2.09		0 - 8 in		0 - 8 in	26	102	113	84	316	43		10	4.17		9.0		0.17	2.7	21	8	58	13	0
KW8 / 40737	5.9	6.83		2.82		0 - 8 in		0 - 8 in	19	73	81	108	482	65		9	3.99		6.1		0.22	3.9	16	7	62	14	0

Reviewed By: B.T. Scott - AgroLab/Matrix Sciences Inc

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1147796
Date Received : 01/08/2024
Date Analyzed : 01/10/2024

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
KW1						0 - 8 in		0 - 8 in																			
922	5.8	6.86		1.80					84	395	433	74	375	32		7	9.69		8.1		0.30	2.8	18	7	66	9	0
KW2						0 - 8 in		0 - 8 in																			
923	5.9	6.86		1.83					57	215	236	91	394	41		6	7.75		9.3		0.30	3.1	16	8	65	11	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1147584
Date Received : 12/25/2023
Date Analyzed : 12/26/2023

Results For : HARDING LLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
GR1						0 - 8 in		0 - 8 in																			
48384	5.9	6.88		1.68					28	90	100	65	320	55		7	2.78		13.4		0.33	2.7	16	6	60	17	0
GR2						0 - 8 in		0 - 8 in																			
48385	6.1	6.91		1.58					36	92	102	71	309	52		5	2.67		14.7		0.30	2.5	14	7	62	17	0
FA1						0 - 8 in		0 - 8 in																			
48386	5.7	6.89		1.87					26	90	100	64	237	34		8	3.16		5.8		0.24	2.1	21	8	57	14	0
HF3						0 - 8 in		0 - 8 in																			
48387	6.8	6.92		1.66					106	323	354	49	727	69		7	19.02		22.1		0.30	4.6	6	3	78	13	0
HF4						0 - 8 in		0 - 8 in																			
48388	6.6	6.93		1.54					84	225	247	62	481	48		6	10.46		19.2		0.30	3.2	7	5	75	12	0

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DENTON MD 21629

Soil Analysis Report

Invoice No. : 1147584
Date Received : 12/25/2023
Date Analyzed : 12/26/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HA1						0 - 8 in		0 - 8 in																			
48452	6.2	6.87		1.99					60	264	290	73	509	74		8	8.95		9.4		0.54	3.8	12	5	67	16	0
HA1A						0 - 8 in		0 - 8 in																			
48453	5.9	6.82		2.65					55	263	289	116	470	56		8	7.78		6.5		0.37	3.8	17	8	62	12	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1146802
Date Received : 11/13/2023
Date Analyzed : 11/14/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P / FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
BN1						0 - 8 in		0 - 8 in																		
34222	6.2	6.85		1.57					81	303 : 332	35	613	39		10	8.98		16.9		0.39	4.0	12	2	78	8	0
CO1						0 - 8 in		0 - 8 in																		
34223	5.9	6.85		1.68					50	185 : 204	54	383	48		10	6.49		16.1		0.31	3.0	17	5	64	13	0
CODC						0 - 8 in		0 - 8 in																		
34224	5.7	6.81		1.86					60	239 : 262	71	385	47		13	6.72		15.4		0.33	3.2	21	6	60	12	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1130374
Date Received : 11/24/2021
Date Analyzed : 11/26/2021

Results For : HARDINGEST
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HB2						0 - 8 in		0 - 8 in																			
46022	5.4	6.9		1.4					26	73	81	51	160	25		9	4.59		8.8		0.29	1.6	30	8	49	13	0
HB2A						0 - 8 in		0 - 8 in																			
46023	5.2	6.9		1.4					32	95	106	42	120	18		9	5.27		15.3		0.29	1.3	35	8	45	11	0
HB3DC						0 - 8 in		0 - 8 in																			
46024	5.5	6.9		1.1					19	46	52	82	160	29		11	3.50		7.8		0.27	1.7	25	12	48	14	0
HB4ADC						0 - 8 in		0 - 8 in																			
46025	6.1	6.9		1.5					14	27	32	29	400	50		8	3.22		17.7		0.36	2.9	14	3	69	14	0
HUY						0 - 8 in		0 - 8 in																			
46026	6.4	6.9		1.1					46	109	121	43	360	25		8	2.35		7.6		0.31	2.3	9	5	77	9	0

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1129533
Date Received : 10/07/2021
Date Analyzed : 10/08/2021

Results For : HARDING
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq/100g	% Base Saturation H	K	Ca	Mg	Na
HF1						0-8 in		0-8 in																			
29303	5.7	6.7		1.8					103	378	412	67	590	56		14	18.00		22.6		0.49	4.5	20	4	66	10	0
HF2						0-8 in		0-8 in																			
29304	5.8	6.8		1.7					94	295	324	57	450	51		12	13.80		20.5		0.48	3.5	19	4	65	12	0
HF5						0-8 in		0-8 in																			
29305	5.7	6.8		1.7					61	205	225	67	310	67		13	7.93		15.4		0.48	2.9	21	6	53	19	0
HF6						0-8 in		0-8 in																			
29306	5.8	6.9		1.7					69	246	270	66	330	64		11	9.41		16.7		0.47	2.9	19	6	56	19	0
HF7						0-8 in		0-8 in																			
29307	5.7	6.8		1.8					87	218	240	77	410	57		11	12.80		30.9		0.51	3.4	20	6	60	14	0
HF8						0-8 in		0-8 in																			
29309	5.4	6.8		1.9					54	166	183	68	330	47		12	13.20		24.0		0.46	3.1	28	5	54	13	0
HA1						0-8 in		0-8 in																			
29310	5.7	6.7		2.1					57	283	310	129	540	93		25	10.30		12.7		0.59	4.9	22	7	55	16	0

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Field Information Sheet

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	8-23-2022

Tract No./Farm Name	Field No.	Area	Crops	Yield Goal	Tillage Method	Past Legume N Credit	Nutrient Source Manure/Sludge Field History Last Year Type	Last Year Rate	2 Years Ago Type	2 Years Ago Rate
Hastings	HA1	51.00 Acres	Wheat/Barley; fall org. util; low FSNT	90	Cons tillage; res 30-70%	0				
Hastings	HA1A	18.00 Acres	Wheat/Barley; fall org. util; low FSNT	90	Cons tillage; res 30-70%	0				

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Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1138895
Date Received : 12/14/2022
Date Analyzed : 12/15/2022

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P / FIV		K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HF8						0 - 8 in		0 - 8 in																			
42448	5.3	6.8		1.6					60	160	176	39	234	25		9	10.60		25.0		0.43	2.2	32	5	53	10	0
HF9						0 - 8 in		0 - 8 in																			
42449	5.7	6.9		1.2					63	218	240	50	260	34		10	5.88		26.0		0.39	2.2	22	6	59	13	0
HF9A						0 - 8 in		0 - 8 in																			
42450	5.7	6.8		1.8					49	238	261	60	341	30		14	7.40		9.7		0.54	2.6	20	6	64	10	0

Reviewed By: W.R. Rohrer - AgroLab Inc. Copy : 1 12/16/2022

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Account No. : 7

Soil Analysis Report

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Invoice No. : 1147471
Date Received : 12/05/2023
Date Analyzed : 12/19/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:1 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HB1						0 - 8 in		0 - 8 in																			
46473	6.2	6.92		1.35					28	72	80	68	286	52		7	4.42		8.9		0.21	2.3	12	7	62	19	0
HB1A						0 - 8 in		0 - 8 in																			
46474	6.0	6.92		1.35					38	100	111	78	233	42		7	5.83		15.6		0.29	2.0	15	10	58	17	0
HB1DC						0 - 8 in		0 - 8 in																			
46475	6.3	6.95		1.40					38	104	115	70	234	58		6	3.38		18.1		0.34	2.0	10	9	57	24	0
HB2						0 - 8 in		0 - 8 in																			
46476	5.9	6.91		1.34					27	72	80	70	212	45		7	4.21		9.5		0.25	1.9	17	9	55	19	0
HB2A						0 - 8 in		0 - 8 in																			
46477	5.4	6.90		1.50					36	115	128	47	145	30		9	5.31		20.2		0.30	1.5	27	8	48	16	0

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USDA NRCS

Rusle Program Version:
Rusle Science Version:
Data Base:

RUSLE2 Erosion Calculation Record

File: plans\Howard Harding_Home
Access Group: R2_NRCS_Fld_Office

Inputs:

Owner name	*Location*	*Info*
Howard Harding - Home Farm	**USA\Maryland\Dorchester County**	

Field name	*Soil*	*Slope T Value*	*Slope length, ft*	*Slope steepness, %*
HF1	soils\Dorchester, MD\14B Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 100%	5.0	150	2.0
HF2	soils\Dorchester, MD\31B Runclint sand, 2 to 5 percent slopes\Runclint sand 100%	5.0	150	2.0
HF3	soils\Dorchester, MD\14B Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 100%	5.0	150	2.5
HF4	soils\Dorchester, MD\14B Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 100%	5.0	150	2.0
HF5	soils\Dorchester, MD\14B Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 100%	5.0	150	2.0
HF6	soils\Dorchester, MD\31B Runclint sand, 2 to 5 percent slopes\Runclint sand 100%	5.0	150	3.0
HF7	soils\Dorchester, MD\5A Downer sandy loam, 0 to 2 percent slopes\Downer sandy loam 100%	5.0	180	1.0
HF8	soils\Dorchester, MD\14B Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 100%	5.0	150	2.0
HF9	soils\Dorchester, MD\5A Downer sandy loam, 0 to 2 percent slopes\Downer sandy loam 100%	5.0	180	1.0
HF9A	soils\Dorchester, MD\21 Klej-Hammonton complex\Hammonton loamy sand 30%	5.0	180	1.0

Results:

Soil Test Results

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	11-5-2023

Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Home	HF9A	AGL	12/15/22	LS	42450	5.70	1.80	238	60	30	341		
					Conversion to FIV	**5.70**	**1.80**	**261 (E)**	**37 (M)**	**26 (M)**	**16 (L)**		

Soil Test Results

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-14-2023

Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Henry Young	HUY	AGL	1/18/21	LS	3099	6.70	1.40	106	67	46	392		
					Conversion to FIV	**6.70**	**1.40**	**118 (E)**	**42 (M)**	**38 (M)**	**23 (L)**		

Recommendations using Organic Nutrient Sources

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-14-2023

Tract No. / Farm Name	Field No.	Area	Crops & Note Numbers	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Nutrient Sources to be Applied						
						Leg.	Man.	Slu.	Organic Nutrient Sources					Commercial Fertilizer N-P2O5-K2O	Lime
									Type / Source	Min. Rate	Applic. Rate [Time Inc.]	Organic Waste Applic- Basis	Available N-P2O5-K2O		
Henry Young	HUY 2023 [*]	18.00 Acres	32 Fall cover for organic utilization 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.0 t/A

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Account No. : 7

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Soil Analysis Report

Invoice No. : 1138895
Date Received : 12/14/2022
Date Analyzed : 12/15/2022

Results For : HARDINGLLC
Location :

Sample ID	Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HF3	42445	6.2	6.9		1.4		0 - 8 in		0 - 8 in	109	367	402	55	534	54		10	17.60		23.0		0.42	3.7	12	4	72	12	0
HF4	42446	6.5	6.9		1.4		0 - 8 in		0 - 8 in	98	296	325	57	537	70		8	13.80		21.0		0.37	3.7	8	4	72	16	0
HF7	42447	5.6	6.8		1.4		0 - 8 in		0 - 8 in	66	207	228	52	312	38		9	9.68		30.0		0.45	2.6	23	5	60	12	0
HF8	42448	5.3	6.8		1.6		0 - 8 in		0 - 8 in	60	160	176	39	234	25		9	10.60		25.0		0.43	2.2	32	5	53	10	0
HF9	42449	5.7	6.9		1.2		0 - 8 in		0 - 8 in	63	218	240	50	260	34		10	5.88		28.0		0.39	2.2	22	6	59	13	0
HF8A	42450	5.7	6.8		1.8		0 - 8 in		0 - 8 in	49	238	261	60	341	30		14	7.40		9.7		0.54	2.6	20	6	64	10	0

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Soil Test Results

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	11-5-2023

Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Home	HF1	AGL	10/19/22	LS	22856	6.30	1.40	355	69	66	560		
					Conversion to FIV	**6.30**	**1.40**	**388 (E)**	**43 (M)**	**53 (O)**	**44 (M)**		
Home	HF2	AGL	10/19/22	LS	22857	6.00	1.30	312	67	61	430		
					Conversion to FIV	**6.00**	**1.30**	**341 (E)**	**42 (M)**	**49 (M)**	**28 (M)**		
Home	HF3	AGL	12/15/22	LS	42445	6.90	1.40	367	55	54	534		
					Conversion to FIV	**6.90**	**1.40**	**401 (E)**	**34 (M)**	**44 (M)**	**41 (M)**		
Home	HF4	AGL	12/15/22	LS	42446	6.50	1.40	296	57	70	537		
					Conversion to FIV	**6.50**	**1.40**	**324 (E)**	**35 (M)**	**56 (O)**	**41 (M)**		
Home	HF5	AGL	10/19/22	LS	22858	6.00	1.40	257	65	66	420		
					Conversion to FIV	**6.00**	**1.40**	**282 (E)**	**40 (M)**	**53 (O)**	**26 (M)**		
Home	HF6	AGL	10/19/22	LS	22859	5.80	1.30	236	56	57	370		
					Conversion to FIV	**5.80**	**1.30**	**259 (E)**	**34 (M)**	**46 (M)**	**20 (L)**		
Home	HF7	AGL	12/15/22	LS	42447	5.60	1.40	207	52	36	312		
					Conversion to FIV	**5.60**	**1.40**	**227 (E)**	**32 (M)**	**30 (M)**	**13 (L)**		
Home	HF8	AGL	12/15/22	LS	42448	5.30	1.60	160	39	25	234		
					Conversion to FIV	**5.30**	**1.60**	**176 (E)**	**23 (L)**	**22 (L)**	**3 (L)**		
Home	HF9	AGL	12/15/22	LS	42449	5.70	1.20	218	50	34	260		
					Conversion to FIV	**5.70**	**1.20**	**239 (E)**	**31 (M)**	**29 (M)**	**6 (L)**		

Field Information Sheet

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-12-2023

Tract No. / Farm Name	Field No.	Area	Crops	Yield Goal	Tillage Method	Past Legume N Credit	Nutrient Source Manure/Sludge Field History: Last Year Type	Last Year Rate	2 Years Ago Type	2 Years Ago Rate
Hubbard	HB4	36.70 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				
Hubbard	HB4A	17.40 Acres	Fall cover for organic utilization	0.00	Cons tillage, res 30-70%	0				

Soil Test Results

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-12-2023

Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Hubbard	HB4	AGL	1/6/23	LS	856	5.70	1.50	58	45	50	171		
					Conversion to FIV	**5.70**	**1.50**	**65 (O)**	**27 (M)**	**41 (M)**	**0 (L)**		
Hubbard	HB4A	AGL	1/6/23	LS	857	6.00	1.80	69	59	33	352		
					Conversion to FIV	**6.00**	**1.80**	**77 (O)**	**36 (M)**	**28 (M)**	**18 (L)**		

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Account No. : 7

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Soil Analysis Report

Invoice No. : 1130741
Date Received : 12/13/2021
Date Analyzed : 12/15/2021

Results For : HARDINGEST
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
FA1 / 52627	5.8	6.8		1.7		0-8 in		0-8 in	26	105	116	78	368	65		13	2.77		8.8		0.45	3.2	19	6	58	17	0
HA1A / 52628	5.8	6.8		2.7		0-8 in		0-8 in	41	229	252	172	614	71		13	4.87		6.5		0.47	5.0	17	8	62	12	0

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Harrington, DE 19952

Soil Test Results

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	8-23-2022

Tract No	Field No	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Hastings	HA1	AGL	10/08/21	LS	29310	5.70	2.10	283	129	93	540		
					Conversion to FIV	**5.70**	**2.10**	**310 (E)**	**82 (O)**	**74 (O)**	**41 (M)**		
Hastings	HA1A	AGL	12/15/21	LS	52628	5.90	2.70	229	172	71	614		
					Conversion to FIV	**5.90**	**2.70**	**251 (E)**	**110 (E)**	**57 (O)**	**51 (O)**		

Recommendations using Organic Nutrient Sources

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County:	Easton MD 21601 Dorchester	Date Plan Prepared	11-15-2023

Tract No. / Farm Name	Field No.	Area	Crops & Note Numbers	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits: Leg.	Nitrogen Credits: Man.	Nitrogen Credits: Slu.	Organic Nutrient Sources: Type / Source	Min. Rate	Applic. Rate [Time Inc.]	Organic Waste Applic- Basis	Available N-P2O5-K2O	Commercial Fertilizer N-P2O5-K2O	Lime
Home	HF2 2023 [*]	20.20 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.4 t/A
Home	HF5 2023 [*]	15.50 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.4 t/A
Home	HF6 2023 [*]	19.00 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.6 t/A
Home	HF7 2023 [*]	38.10 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.8 t/A
Home	HF8 2023 [*]	14.70 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	1.2 t/A
Home	HF9 2023 [*]	35.80 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.7 t/A
Home	HF9A 2023 [*]	8.50 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.7 t/A

UM Phosphorus Management Tool (PMT) Report

<table>
<tr><th>Farmer Name</th><th colspan="3">Howard Harding</th><th>Year - - - Phase</th><th>2022 - N/A - N/A</th></tr>
<tr><td></td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr>
<tr><td>Account ID</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr>
<tr><td>County</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td></tr>
<tr><td>Tract or Farm ID</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td></tr>
<tr><td>Field ID</td><td>HF6</td><td>HF7</td><td>HF8</td><td>HF9</td><td>HF9A</td></tr>
<tr><td>MUSYM</td><td>DoA</td><td>DoA</td><td>GaB</td><td>DoA</td><td>KgB</td></tr>
<tr><td>Area | Crop</td><td>19.00 Acres | 32</td><td>38.10 Acres | 32</td><td>14.70 Acres | 32</td><td>35.80 Acres | 32</td><td>8.50 Acres | 32</td></tr>
<tr><td>Organics</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td></tr>
<tr><td>R Factor</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Adj. K Factor | LS Factor</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>C | P Factors</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>RUSLE A</td><td>0.75</td><td>0.58</td><td>0.52</td><td>0.58</td><td>0.44</td></tr>
<tr><td colspan="6">Transport Risk Factors</td></tr>
<tr><td>SED Value</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Soil Permeability Class</td><td>Moderately Rapid</td><td>Moderately Rapid</td><td>Rapid</td><td>Moderately Rapid</td><td>Moderately Rapid</td></tr>
<tr><td>Field slope | Concave? | SR Factor</td><td>1.00 | No | 4.9</td><td>2.00 | No | 4.9</td><td>2.00 | No | 4.9</td><td>2.00 | No | 4.9</td><td>2.00 | No | 4.9</td></tr>
<tr><td>Soil Drainage Class</td><td>well</td><td>well</td><td>somewhat excessively</td><td>well</td><td>somewhat poorly</td></tr>
<tr><td>HSG | Artificial Drainage? | SD Factor</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A/D | No | 0.0</td></tr>
<tr><td colspan="6">Management Factors</td></tr>
<tr><td>Distance to Water (DF)</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td><td>100-199 ft | 0.8</td></tr>
<tr><td>Buffer Width & Type (BF)</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 35' veg. | 0.9</td><td>> 50' veg. | 0.8</td><td>> 35' veg. | 0.9</td></tr>
<tr><td>Soil Test P Fertility Index Value</td><td>259</td><td>227</td><td>176</td><td>239</td><td>261</td></tr>
<tr><td>Degree of P Saturation (DPS M3)</td><td>61.1 (est.)</td><td>66.0</td><td>60.0</td><td>63.0</td><td>49.0</td></tr>
<tr><td>Fert. P appl. rates, lb/A | FP * PSC</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td></tr>
<tr><td>Org. P appl. rates, lb/A | OP * PSC</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td></tr>
<tr><td>Runoff Fert. P appl. methods | AMr(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Runoff Org. P appl. methods | AMr(o)</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td></tr>
<tr><td>Subsurface Fert. P appl. methods | AMsub(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Subsurface Org. P appl. methods | AMsub(o)</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td></tr>
<tr><td>P particulate | P runoff | P subsurface</td><td>41 | 50 | 0 |</td><td>36 | 54 | 0 |</td><td>32 | 55 | 0 |</td><td>38 | 51 | 0 |</td><td>38 | 36 | 0 |</td></tr>
<tr><td>P Loss Rating Score</td><td>91 (M)</td><td>90 (M)</td><td>87 (M)</td><td>89 (M)</td><td>74 (M)</td></tr>
</table>

Recommendations using Organic Nutrient Sources

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	8-23-2022

Tract No / Farm Name	Field No	Area	Crops & Note Numbers	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits: Leg.	Nitrogen Credits: Man.	Nitrogen Credits: Slu.	Organic Nutrient Source: Type / Source	Min. Rate	Applic. Rate [Time Inc.]	Organic Waste Applic. Basis	Available N-P2O5-K2O	Commercial Fertilizer N-P2O5-K2O	Lime
Hastings	HA1 2022 [*]	51.00 Acres	21 Wheat/Barley, fall org. util. low FSNT 7 28 29 3 4 30 41	90 Bu/A	30- 0- 42 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	2283 gal/A [inject]	Nitrogen	30- 23- 4 #/A	0- 0- 38 #/A	0.7 t/A
Hastings	HA1 2022	51.00 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3804 gal/A [inject]	Nitrogen	50- 38- 6 #/A	0- 0- 0 #/A	0.7 t/A
Hastings	HA1A 2022 [*]	18.00 Acres	21 Wheat/Barley, fall org. util. low FSNT 7 28 29 3 4 30 41	90 Bu/A	30- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	2283 gal/A [inject]	Nitrogen	30- 23- 4 #/A	0- 0- 0 #/A	0.5 t/A
Hastings	HA1A 2022	18.00 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3804 gal/A [inject]	Nitrogen	50- 38- 6 #/A	0- 0- 0 #/A	0.5 t/A

Notes

Farmer/Operator	Howard Harding	Plan Year	2022
Street Address	29564 Penny Lane	Tier - Phase	N/A - N/A
City, State, Zip	Easton MD 21601 Dorchester	Date Plan Prepared	8-23-2022

3. For conventional tillage, ag-lime recommendations are based upon the amount of oxides required for the surface 8" of soil. Lime should be thoroughly mixed with the soil by plowing and disking. If recommended amount of oxides exceeds 1.5 tons of lime per acre (assuming 50% total oxides), Â½ should be plowed down and the remainder applied after plowing and disked in thoroughly.

4. If topdressing ag-lime without tillage, reduce the total amount of oxides recommended by 50 percent. When topdressing ag-lime, and soil mixing is not possible, do not apply more than 1500 lbs per acre of oxides in any one application. The balance can be applied the next year. It would be best to do a soil test before making the second application.

7. Magnesium will be recommended when the soil test indicates a low or very low level. Use dolomitic lime as a liming material when magnesium is recommended AND when lime is needed to correct soil acidity. The magnesium (Mg) recommendation is expressed as elemental Mg when lime is not required.

28. Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are absorbed by plants quickly and not allowed to runoff into surface water or leach into ground water.

29. When applying liquid wastes, application rate should not exceed the soil's infiltration rate.

30. For small grains, and small grains double cropped with soybeans, the total phosphate and potash recommendations are shown with both the fall and spring recommendations for the crop, depending on when the operator prefers to apply. Subtract any P2O5 or K2O applied in the fall from what is recommended in the spring, to prevent over-application of phosphorus and potassium.

41. For wheat, barley, including malting barley; and wheat and barley double cropped with soybeans, the fall nitrogen rate depends on the residual soil nitrate concentration. Consult University of Maryland Extension Brief, EBR-15 for more details. If the Fall Soil Nitrate Test indicates nitrogen insufficiency, up to 30 pounds of nitrogen may be applied.

Recommendations using Organic Nutrient Sources

Farmer/Operator	Howard Harding Farms, LLC	Plan Year	2023
Street Address	29564 Penny Lane	MDA operator no.	
City, State, Zip, County	Easton MD 21601 Dorchester	Date Plan Prepared	12-12-2023

Tract No. / Farm Name	Field No.	Area	Crops & Note Numbers	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Nutrient Sources to be Applied						
						Leg.	Man.	Slu.	Organic Nutrient Sources					Commercial Fertilizer N-P2O5-K2O	Lime
									Type / Source	Min. Rate	Applic. Rate [Time Inc.]	Organic Waste Applic- Basis	Available N-P2O5-K2O		
Hubbard	HB4 2023 [*]	36.70 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.7 t/A
Hubbard	HB4A 2023 [*]	17.40 Acres	32 Fall cover for organic utilization 7 28 29 3 4	0.00 T/A	50- 0- 0 #/A	0 #/A	0 #/A	0 #/A	(1) Meat Pr L	0.30	3773 gal/A [inject]	Nitrogen	50- 38- 8 #/A	0- 0- 0 #/A	0.4 t/A

Account No. : 7

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Soil Analysis Report

Invoice No. : 1139242
Date Received : 01/05/2023
Date Analyzed : 01/06/2023

Results For : HARDINGLLC
Location :

Sample ID	Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	Mehlich 3 Phosphorus FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
KTE	845	5.8	6.9		1.7		0 - 8 in		0 - 8 in	17	46	52	62	280	34		10	1.59		8.2		0.38	2.3	19	7	62	12	0
KTW	846	6.0	6.9		1.6		0 - 8 in		0 - 8 in	16	38	43	64	346	38		10	2.09		6.8		0.46	2.8	18	6	66	12	0
Z1	847	6.7	6.9		2.8		0 - 8 in		0 - 8 in	62	293	321	49	1133	38		11	5.73		9.0		0.81	6.5	6	2	87	5	0
Z2	848	6.9	6.9		2.3		0 - 8 in		0 - 8 in	89	358	392	58	1400	52		11	8.73		11.0		0.86	7.9	4	2	88	5	0
HB1	849	5.6	6.9		1.8		0 - 8 in		0 - 8 in	26	74	83	91	248	53		12	6.47		15.0		0.74	2.5	22	9	50	18	0
HB1A	850	5.8	6.9		1.5		0 - 8 in		0 - 8 in	34	90	100	81	221	36		8	6.83		16.0		0.59	2.0	19	11	55	15	0
HB1DC	851	6.1	6.9		1.7		0 - 8 in		0 - 8 in	40	127	140	84	228	67		10	3.70		19.0		0.57	2.2	13	10	52	25	0
HB2	852	5.5	6.9		1.8		0 - 8 in		0 - 8 in	31	85	95	58	191	40		10	6.62		12.0		0.46	2.0	27	7	48	17	0
HB2A	853	5.5	6.9		1.7		0 - 8 in		0 - 8 in	40	122	135	94	186	40		11	8.14		19.0		0.52	2.0	25	12	46	17	0
HB3	854	5.6	6.9		1.5		0 - 8 in		0 - 8 in	22	65	73	68	178	34		12	3.93		14.0		0.53	1.8	25	10	49	16	0
HB3DC	855	5.8	6.9		1.6		0 - 8 in		0 - 8 in	33	100	111	82	245	43		11	4.50		17.0		0.53	2.2	20	9	55	16	0
HB4	856	5.7	6.9		1.5		0 - 8 in		0 - 8 in	24	58	65	45	171	50		8	3.13		9.1		0.48	1.8	21	7	48	24	0
HB4A	857	6.0	6.9		1.8		0 - 8 in		0 - 8 in	27	69	77	59	352	33		8	7.34		11.0		0.63	2.6	16	6	67	11	0
HB4DC	858	6.2	6.9		1.9		0 - 8 in		0 - 8 in	12	22	26	39	415	51		7	4.43		23.0		0.72	3.0	12	3	70	14	0

Reviewed By: L.D. Severson - AgroLab Inc

Copy : 1

1/6/2023

Bus: 302/566-6094
Email: admin@agrolab.us

admin@agrolab.us
www.agrolab.us

101 Clukey Dr.
Harrington, DE 19952

UM Phosphorus Management Tool (PMT) Report

<table>
<tr><th>Farmer Name</th><th colspan="3">Howard Harding</th><th>Year - - - Phase</th><th>2022 - N/A - N/A</th></tr>
<tr><td></td><td>3</td><td>4</td><td>12</td><td>5</td><td>6</td></tr>
<tr><td>Account ID</td><td colspan="5">[redacted]</td></tr>
<tr><td>County</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Tract or Farm ID</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td></tr>
<tr><td>Field ID</td><td>HF1</td><td>HF2</td><td>HF3</td><td>HF4</td><td>HF5</td></tr>
<tr><td>MUSYM</td><td>GaB</td><td>RsB</td><td>GaB</td><td>IgA</td><td>GaA</td></tr>
<tr><td>Area | Crop</td><td>2.80 Acres | 32</td><td>20.20 Acres | 32</td><td>4.40 Acres | 32</td><td>6.10 Acres | 32</td><td>15.50 Acres | 32</td></tr>
<tr><td>Organics</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td><td>Meat Pr L |</td></tr>
<tr><td>R Factor</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Adj. K Factor | LS Factor</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>C | P Factors</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>RUSLE A</td><td>0.26</td><td>0.53</td><td>0.63</td><td>0.52</td><td>0.10</td></tr>
<tr><td></td><td colspan="5">Transport Risk Factors</td></tr>
<tr><td>SED Value</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Soil Permeability Class</td><td>Rapid</td><td>Rapid</td><td>Rapid</td><td>Moderate</td><td>Rapid</td></tr>
<tr><td>Field slope | Concave? | SR Factor</td><td>2.00 | No | 4.9</td><td>2.00 | No | 4.9</td><td>2.00 | No | 4.9</td><td>1.00 | No | 5.6</td><td>2.00 | No | 4.9</td></tr>
<tr><td>Soil Drainage Class</td><td>somewhat excessively</td><td>excessively</td><td>somewhat excessively</td><td>well</td><td>somewhat excessively</td></tr>
<tr><td>HSG | Artificial Drainage? | SD Factor</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td></tr>
<tr><td></td><td colspan="5">Management Factors</td></tr>
<tr><td>Distance to Water (DF)</td><td>< 100 ft | 1.0</td><td>100-199 ft | 0.8</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td></tr>
<tr><td>Buffer Width & Type (BF)</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td></tr>
<tr><td>Soil Test P Fertility Index Value</td><td>388</td><td>341</td><td>401</td><td>324</td><td>282</td></tr>
<tr><td>Degree of P Saturation (DPS M3)</td><td>118.0</td><td>75.2 (est.)</td><td>109.0</td><td>72.2 (est.)</td><td>65.0 (est.)</td></tr>
<tr><td>Fert. P appl. rates, lb/A | FP * PSC</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td></tr>
<tr><td>Org. P appl. rates, lb/A | OP * PSC</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td><td>| 38 | - | - | 23</td></tr>
<tr><td>Runoff Fert. P appl. methods | AMr(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Runoff Org. P appl. methods | AMr(o)</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td></tr>
<tr><td>Subsurface Fert. P appl. methods | AMsub(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Subsurface Org. P appl. methods | AMsub(o)</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td><td>| M3 | - | - | 0.64</td></tr>
<tr><td>P particulate | P runoff | P subsurface</td><td>62 | 94 | 0 |</td><td>44 | 49 | 0 |</td><td>64 | 87 | 0 |</td><td>52 | 67 | 0 |</td><td>45 | 53 | 0 |</td></tr>
<tr><td>P Loss Rating Score</td><td>156 (H)</td><td>92 (M)</td><td>151 (H)</td><td>119 (H)</td><td>98 (M)</td></tr>
</table>

Howard Harding 2023

Phosphorus Removal values used in PMT Calculations

(Home Farm)

Crop Year	Crop	Yield	lbs P2O5 Removed per yield unit	Total lbs. P2O5 removed
Spring Yr 1	S. Corn	120	0.14	17
Fall Yr 1	Wheat	90	0.56	50
Summer Yr 2	DC Beans	50	1.00	50
Fall Yr 2	SG Cover	0	0.00	0
Spring Yr 3	Watermelon	25T	0.47	12
Fall Yr 3	Wheat	90	0.56	50
Value used in PMT Calculation = 179 total lbs. P2O5				

(Cokesbury Farm)

Crop Year	Crop	Yield	lbs P2O5 Removed per yield unit	Total lbs. P2O5 removed
Spring Yr 1	S. Corn	120	0.14	17
Fall Yr 1	Wheat	90	0.56	50
Summer Yr 2	DC Beans	50	1.00	50
Fall Yr 2	SG Cover	0	0.00	0
Spring Yr 3	S. Corn	120	0.14	17
Summer Yr 3	Lima Beans	25	0.34	9
Value used in PMT Calculation = 143 total lbs. P2O5				

UM Phosphorus Management Tool (PMT) Report

Farmer Name	Howard Harding			Year - - Phase	2022 - N/A - N/A
	1	2			
Account ID	[redacted]	[redacted]			
County	[illegible]	[illegible]			
Tract or Farm ID	Hastings	Hastings			
Field ID	HA1	HA1A			
MUSYM	KgB	2s96z			
Area | Crop	51.00 Acres | 21	18.00 Acres | 21			
Organics	Meat Pr L |	Meat Pr L |			
R Factor					
Adj. K Factor | LS Factor					
C | P Factors					
RUSLE A	0.22	0.23			
Transport Risk Factors					
SED Value	2	2			
Soil Permeability Class	Moderately Rapid	Very Slow			
Field slope | Concave? | SR Factor	0.50 | No | 1.4	0.50 | No | 2.0			
Soil Drainage Class	somewhat poorly	poorly			
HSG | Artificial Drainage? | SD Factor	A/D | No | 0.0	C/D | No | 0.0			
Management Factors					
Distance to Water (DF)	< 100 ft | 1.0	< 100 ft | 1.0			
Buffer Width & Type (BF)	< 35' veg. | 1.0	< 35' veg. | 1.0			
Soil Test P Fertility Index Value	310	251			
Degree of P Saturation (DPS M3)	57.0	41.0			
Fert. P appl. rates, lb/A | FP * PSC	| - | - | - | 0	| - | - | - | 0			
Org. P appl. rates, lb/A | OP * PSC	| 23 | - | - | 14	| 23 | - | - | 14			
Runoff Fert. P appl. methods | AMr(f)	| - | - | - | 0.00	| - | - | - | 0.00			
Runoff Org. P appl. methods | AMr(o)	| M1 | - | - | 0.20	| M1 | - | - | 0.20			
Subsurface Fert. P appl. methods | AMsub(f)	| - | - | - | 0.00	| - | - | - | 0.00			
Subsurface Org. P appl. methods | AMsub(o)	| M3 | - | - | 0.64	| M3 | - | - | 0.64			
P particulate | P runoff | P subsurface	62 | 16 | 0 |	50 | 17 | 0 |			
P Loss Rating Score	78 (M)	67 (M)			

Howard Harding 2022

Phosphorus Removal values used in PMT Calculations

Irrigated crops

Crop Year	Crop	Yield	lbs P_2O_5 Removed per yield unit	Total lbs. P_2O_5 removed
Spring Yr 1	Corn	200	0.40	80
Fall Yr 1	SG Cover	0	0.00	0
Spring Yr 2	Watermelon	25 T	.47	12
Fall Yr 2	SG Harvest	90	0.56	50
Spring Yr 3	Corn	200	0.40	80
Fall Yr 3	SG Cover	0	0.00	0
Value used in PMT Calculation = 222 total lbs. P_2O_5				

UM Phosphorus Management Tool (PMT) Report

<table>
<tr><th>Farmer Name</th><th></th><th>Harding</th><th></th><th>Year</th><th>2021</th></tr>
<tr><td></td><td>7 (prim)</td><td>10 (prim)</td><td>11 (prim)</td><td>12 (prim)</td><td>35 (prim)</td></tr>
<tr><td>Account ID</td><td>0000000000000000</td><td>0000000000000000</td><td>0000000000000000</td><td>0000000000000000</td><td>0000000000000000</td></tr>
<tr><td>County</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td><td>Dorchester</td></tr>
<tr><td>Tract or Farm ID</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td><td>Home</td></tr>
<tr><td>Field ID</td><td>HF2</td><td>HF5</td><td>HF6</td><td>HF7</td><td>HF8</td></tr>
<tr><td>MUSYM</td><td>RsB</td><td>GaB</td><td>RsB</td><td>GaB</td><td>GaB</td></tr>
<tr><td>Area | Crop</td><td>0.0 Acres</td><td>0.0 Acres</td><td>0.0 Acres</td><td>0.0 Acres</td><td>0.0 Acres</td></tr>
<tr><td>Organics</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>R Factor</td><td>195</td><td>195</td><td>195</td><td>195</td><td>195</td></tr>
<tr><td>Adj. K Factor | LS Factor</td><td>0.05 | 0.15</td><td>0.05 | 0.10</td><td>0.05 | 0.15</td><td>0.05 | 0.10</td><td>0.05 | 0.10</td></tr>
<tr><td>C | P Factors</td><td>0.15 | 0.92</td><td>0.15 | 0.92</td><td>0.15 | 0.92</td><td>0.15 | 0.92</td><td>0.15 | 0.92</td></tr>
<tr><td>RUSLE A</td><td>0.20</td><td>0.13</td><td>0.20</td><td>0.13</td><td>0.13</td></tr>
<tr><td colspan="6">Transport Risk Factors</td></tr>
<tr><td>SED Value</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Soil Permeability Class</td><td>Rapid</td><td>Rapid</td><td>Rapid</td><td>Rapid</td><td>Rapid</td></tr>
<tr><td>Field slope | Concave? | SR Factor</td><td>1.00 | No | 4.9</td><td>0.50 | No | 1.4</td><td>1.00 | No | 4.9</td><td>0.50 | No | 1.4</td><td>0.50 | No | 1.4</td></tr>
<tr><td>Soil Drainage Class</td><td>excessively</td><td>somewhat excessively</td><td>excessively</td><td>somewhat excessively</td><td>somewhat excessively</td></tr>
<tr><td>HSG | Artificial Drainage? | SD Factor</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td>A | No | 0.0</td></tr>
<tr><td colspan="6">Management Factors</td></tr>
<tr><td>Distance to Water (DF)</td><td>> 500 ft | 0.2</td><td>< 100 ft | 1.0</td><td>< 100 ft | 1.0</td><td>> 500 ft | 0.2</td><td>> 500 ft | 0.2</td></tr>
<tr><td>Buffer Width & Type (BF)</td><td>> 35' veg. | 0.9</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td></tr>
<tr><td>Soil Test P Fertility Index Value</td><td>341</td><td>282</td><td>259</td><td>260</td><td>176</td></tr>
<tr><td>Degree of P Saturation (DPS M3)</td><td>75.2 (est.)</td><td>65.0 (est.)</td><td>61.1 (est.)</td><td>61.3 (est.)</td><td>47.0 (est.)</td></tr>
<tr><td>Fert. P appl. rates, lb/A | FP * PSC</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td></tr>
<tr><td>Org. P appl. rates, lb/A | OP * PSC</td><td>| 37 | - | - | 7</td><td>| 37 | - | - | 7</td><td>| 37 | - | - | 7</td><td>| 37 | - | - | 7</td><td>| 37 | - | - | 7</td></tr>
<tr><td>Runoff Fert. P appl. methods | AMr(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Runoff Org. P appl. methods | AMr(o)</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td></tr>
<tr><td>Subsurface Fert. P appl. methods | AMsub(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td></tr>
<tr><td>Subsurface Org. P appl. methods | AMsub(o)</td><td>| M4 | - | - | 0.80</td><td>| M4 | - | - | 0.80</td><td>| M4 | - | - | 0.80</td><td>| M4 | - | - | 0.80</td><td>| M4 | - | - | 0.80</td></tr>
<tr><td>P particulate | P runoff | P subsurface</td><td>12 | 13 | 0 |</td><td>45 | 15 | 0 |</td><td>41 | 48 | 0 |</td><td>8 | 3 | 0 |</td><td>6 | 2 | 0 |</td></tr>
<tr><td>P Loss Rating Score</td><td>26 (L)</td><td>60 (M)</td><td>90 (M)</td><td>11 (L)</td><td>8 (L)</td></tr>
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UM Phosphorus Management Tool (PMT) Report

<table>
<tr><th>Farmer Name</th><th></th><th>Harding</th><th>Year</th><th>2016</th></tr>
<tr><td></td><td>13 (prim)</td><td>14 (prim)</td><td></td><td></td></tr>
<tr><td>Account ID</td><td>0000000000000000</td><td>0000000000000000</td><td></td><td></td></tr>
<tr><td>County</td><td>Dorchester</td><td>Dorchester</td><td></td><td></td></tr>
<tr><td>Tract or Farm ID</td><td>Home</td><td>Home</td><td></td><td></td></tr>
<tr><td>Field ID</td><td>HF9</td><td>HF9A</td><td></td><td></td></tr>
<tr><td>MUSYM</td><td>DoA</td><td>DoA</td><td></td><td></td></tr>
<tr><td>Area | Crop</td><td>0.0 Acres</td><td>0.0 Acres</td><td></td><td></td></tr>
<tr><td>Organics</td><td></td><td></td><td></td><td></td></tr>
<tr><td>R Factor</td><td>195</td><td>195</td><td></td><td></td></tr>
<tr><td>Adj. K Factor | LS Factor</td><td>0.12 | 0.10</td><td>0.12 | 0.10</td><td></td><td></td></tr>
<tr><td>C | P Factors</td><td>0.08 | 0.87</td><td>0.08 | 0.87</td><td></td><td></td></tr>
<tr><td>RUSLE A</td><td>0.16</td><td>0.16</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Transport Risk Factors</td><td></td><td></td></tr>
<tr><td>SED Value</td><td>2</td><td>2</td><td></td><td></td></tr>
<tr><td>Soil Permeability Class</td><td>Moderately Rapid</td><td>Moderately Rapid</td><td></td><td></td></tr>
<tr><td>Field slope | Concave? | SR Factor</td><td>0.50 | No | 1.4</td><td>0.50 | No | 1.4</td><td></td><td></td></tr>
<tr><td>Soil Drainage Class</td><td>well</td><td>well</td><td></td><td></td></tr>
<tr><td>HSG | Artificial Drainage? | SD Factor</td><td>A | No | 0.0</td><td>A | No | 0.0</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Management Factors</td><td></td><td></td></tr>
<tr><td>Distance to Water (DF)</td><td>100-199 ft | 0.8</td><td>> 500 ft | 0.2</td><td></td><td></td></tr>
<tr><td>Buffer Width & Type (BF)</td><td>> 50' veg. | 0.8</td><td>> 50' veg. | 0.8</td><td></td><td></td></tr>
<tr><td>Soil Test P Fertility Index Value</td><td>239</td><td>261</td><td></td><td></td></tr>
<tr><td>Degree of P Saturation (DPS M3)</td><td>57.7 (est.)</td><td>61.5 (est.)</td><td></td><td></td></tr>
<tr><td>Fert. P appl. rates, lb/A | FP * PSC</td><td>| - | - | - | 0</td><td>| - | - | - | 0</td><td></td><td></td></tr>
<tr><td>Org. P appl. rates, lb/A | OP * PSC</td><td>| 37 | - | - | 7</td><td>| 37 | - | - | 7</td><td></td><td></td></tr>
<tr><td>Runoff Fert. P appl. methods | AMr(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td></td><td></td></tr>
<tr><td>Runoff Org. P appl. methods | AMr(o)</td><td>| M1 | - | - | 0.20</td><td>| M1 | - | - | 0.20</td><td></td><td></td></tr>
<tr><td>Subsurface Fert. P appl. methods | AMsub(f)</td><td>| - | - | - | 0.00</td><td>| - | - | - | 0.00</td><td></td><td></td></tr>
<tr><td>Subsurface Org. P appl. methods | AMsub(o)</td><td>| M4 | - | - | 0.80</td><td>| M4 | - | - | 0.80</td><td></td><td></td></tr>
<tr><td>P particulate | P runoff | P subsurface</td><td>31 | 10 | 0 |</td><td>8 | 3 | 0 |</td><td></td><td></td></tr>
<tr><td>P Loss Rating Score</td><td>41 (L)</td><td>11 (L)</td><td></td><td></td></tr>
</table>

UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community

POULTRY LITTER QUANTITY ESTIMATE

Name: **Harding** Tract / Farm: Date:

Houses included:

	Bird type:	**Roaster**
	Average Bird Market Weight (lbs):	**8.5**
A.	Years between total cleanouts: Yr. next total cleanout:	**2025**
	- Yr. last total cleanout:	**2015**
	= Years in cleanout cycle:	10
B.	Total # of birds per flock (for all houses on this cleanout cycle):	**80,000**
C.	Flocks per year	**4.5**
D.	Number of flocks per cleanout cycle (A x C):	45
E.	Estimated tons of cake/crust per 1000 birds per flock: *	**0.2**
F.	Estimated tons of litter + cake/crust per 1000 birds per flock: *	**1.67855**
G.	Tons cake/crust produced per flock (B x E/1000):	16
H.	Tons cake/crust produced per cycle (G x D)	720
I.	Tons litter + cake/crust produced per cycle (B x D x F/1000):	6,043
J.	Tons of litter produced per cycle (less cakeout/crustout) (I - H):	5,323
K.	Tons of litter produced per year (less cakeout/crustout) (J/A):	532
L	Tons of litter + cake/crust produced per year (I/A)	604

* 2007 Delmarva Poultry Litter Production Estimates, George W. Malone, University of Delaware, Georgetown Delaware.

Quantity of Poultry Litter, Cake/Crust Available per Year

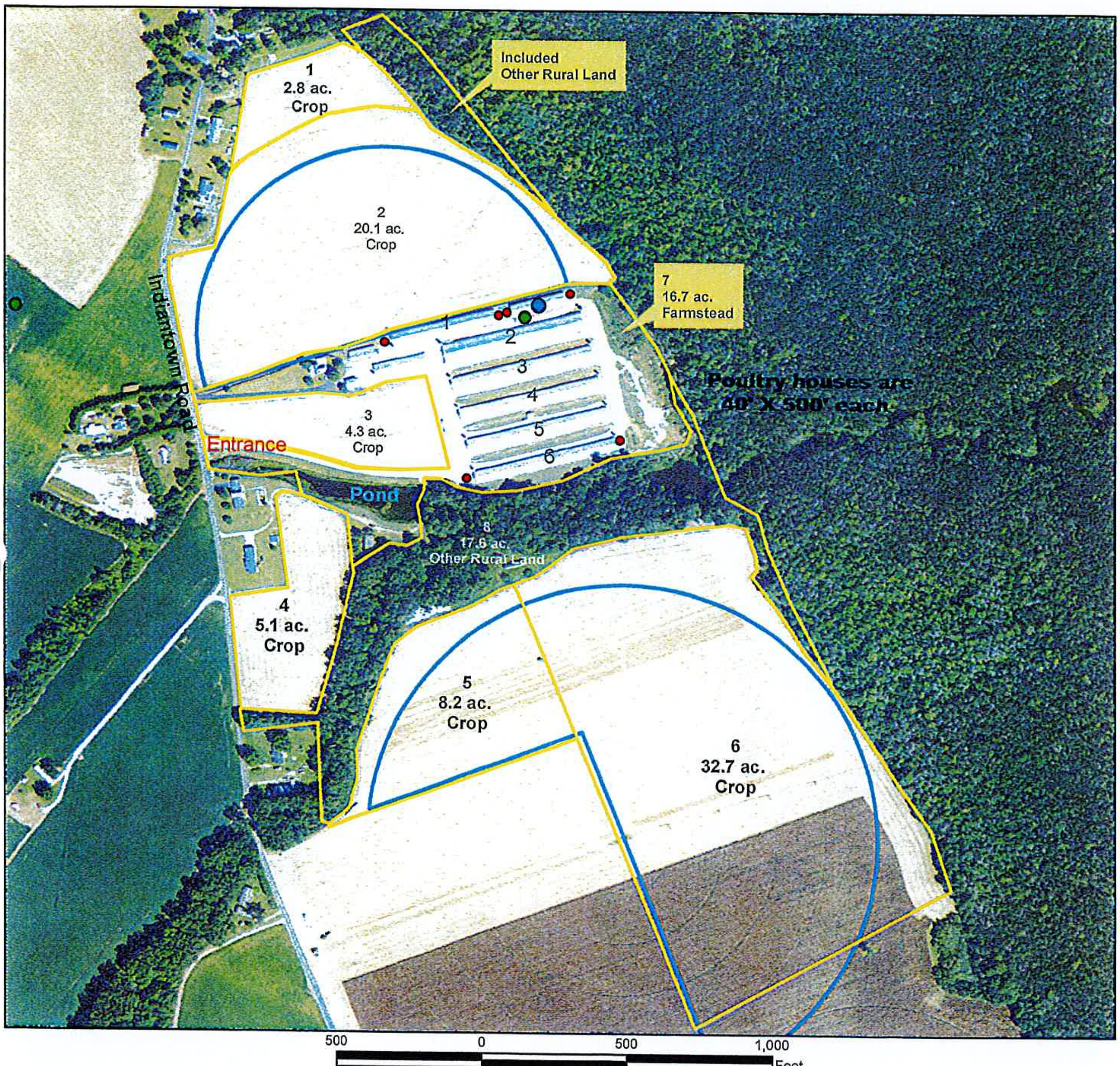
	M	N	O	P	Q	R	S	T
Year	Tons of litter remaining in the house from last year (N-P) + (R-S) (previous year)	Total tons of litter present in the house this year (K) + (M, this year)	% of partial or total litter to be removed this year in excess of cakeout/crustout (enter % of N removed)	Tons of litter removed this year (N x O)/100	Flocks this Year	*** Tons Cake/Crust Produced this Year (Q x G)	Tons Cake/Crust removed this Year	Tons litter + cake/crust removed this year (P + S)
2016	0	532	**20**	106	4	64		106
2017	490	1,022	**55**	562	5	80		562
2018	540	1,072	**60**	643	4	64		643
2019	493	1,025	**50**	513	5	80		513
2020	593	1,125	**60**	675	4	64		675
2021	514	1,046	**50**	523	5	80		523
2022	603	1,135	**60**	681	4	64		681
2023	518	1,050	**50**	525	5	80		525
2024	605	1,137	**60**	682	4	64		682
2025	519	1,051	**100**	1,051	5	80		1,051
				5,963	45	720	0	5,963

*** Cake/Crust not removed due to windrowing, is added with the litter remaining in the house the following year. Windrowing may likely result in actual quantities of litter being less than the estimates shown here. The actual amount of Cake/Crust removed may also be less than the estimated amounts produced due to improved drinker systems, ventilation, etc.

Conservation Map

Customer: HOWARD HARDING FARMS, LLC
Farm Name: BROOKVIEW FARM
OPID: 3307260
Farm: 2804 Tract: 1317

Assisted By: CATHY SCOTT
Field Office: DORCHESTER SCD
Date: AUGUST 5, 2021
Acres: 103.73 (Parcel)



Planned Land Units

Irrigation Pivot

HUA

Animal Mortality Facility

Waste Storage Structure

Houses 1 & 2 CLOSED

Houses 3 thru 6 Brookview Farm

Drainage Map

Customer: HOWARD HARDING FARMS, LLC
Farm Name: BROOKVIEW FARM
OPID: 3307260
Farm: 3648 Tract: 1317

Assisted By: CATHY SCOTT
Field Office: DORCHESTER SCD
Date: AUGUST 5, 2021
Acres: 103.73 (Parcel)

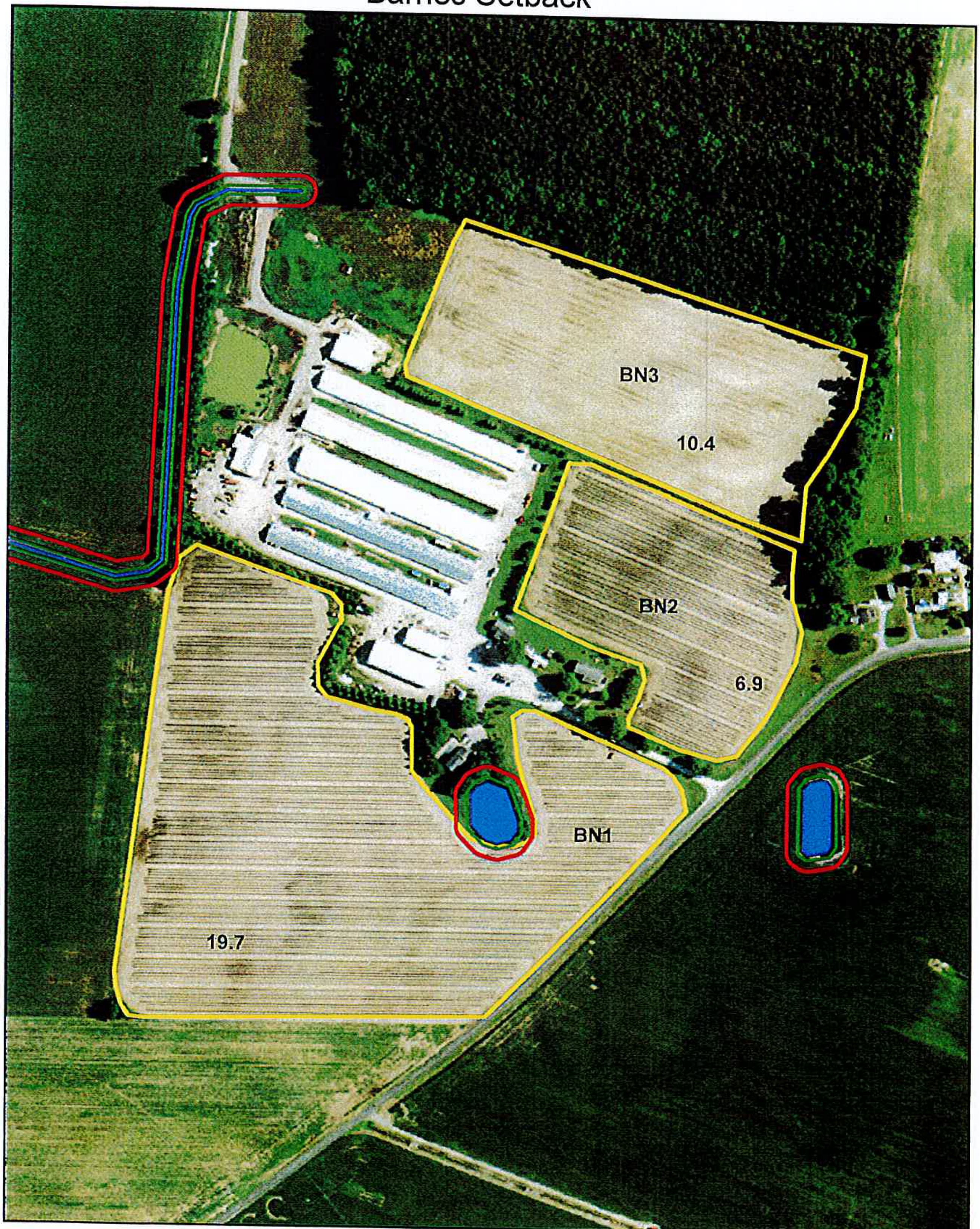
Drainage

Houses 1 & 2 CLOSED

Houses 3 thru 6 Brookview Farm

N

Howard Harding Farms, LLC.
Barnes Setback

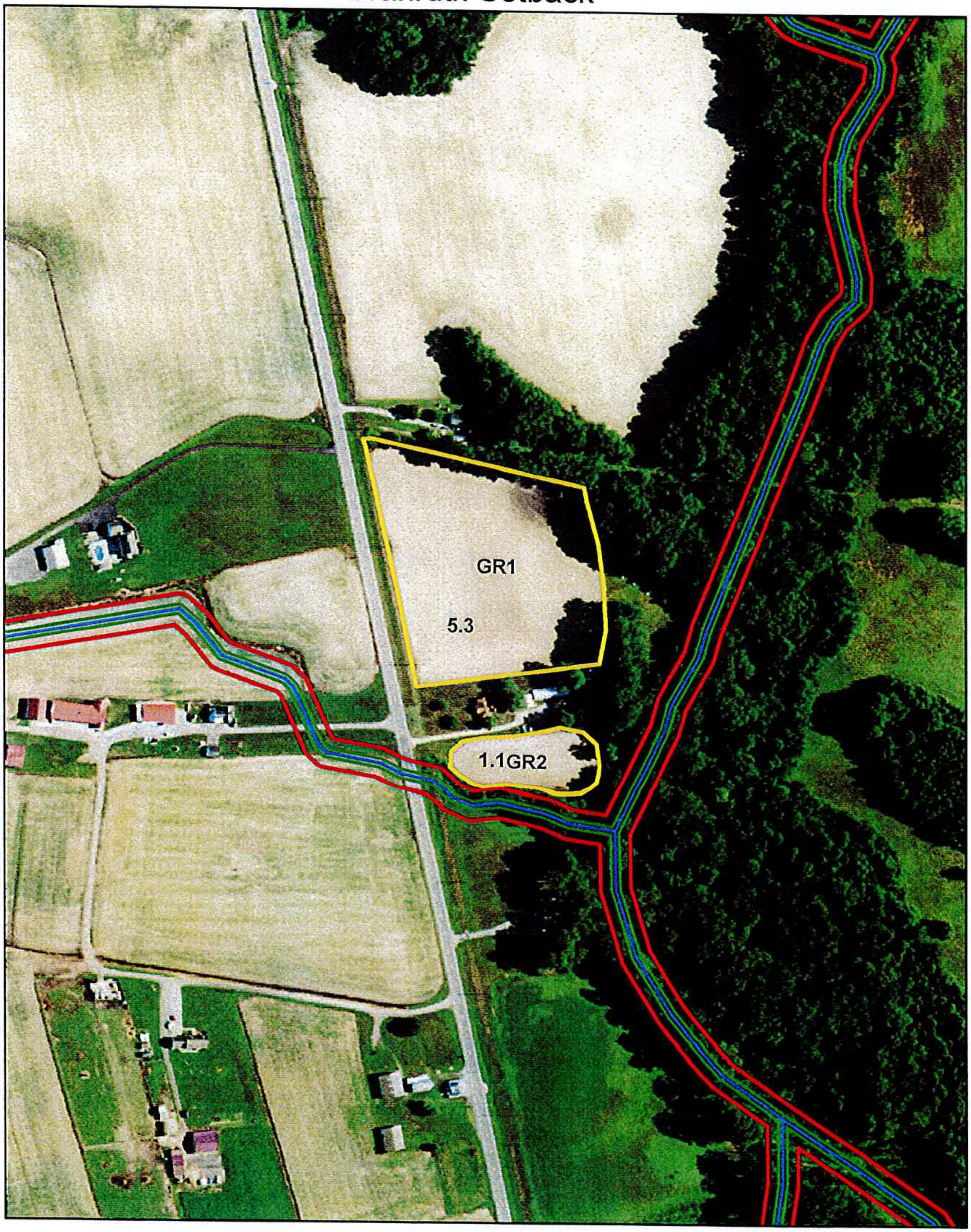


2/22 **Legend**

McConnell Agronomics

Rivers Streams Ditches
Stream Setback 35 Ft
Stream Setback 10 Ft
Lakes ponds Setback 35 Ft
Lakes ponds Setback 10 Ft
Rivers Lakes Ponds

Howard Harding Farms, LLC.
Granruth Setback

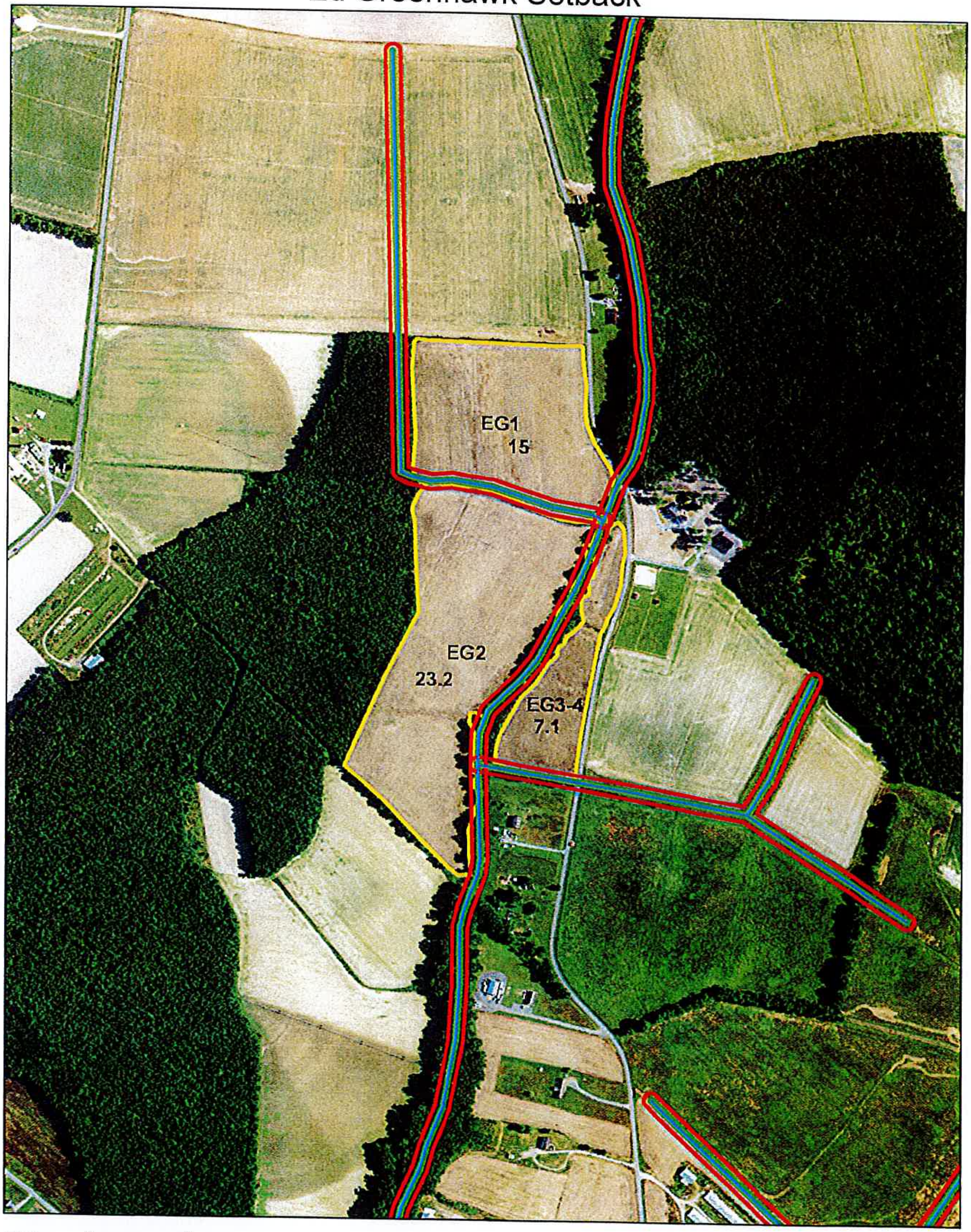


2/22 **Legend**

McConnell Agronomics

- Rivers Streams Ditches
- Stream Setback 35 Ft
- Stream Setback 10 Ft
- Lakes ponds Setback 35 Ft
- Lakes ponds Setback 10 Ft
- Rivers Lakes Ponds

Howard Harding Farms, LLC.
Ed Greenhawk Setback



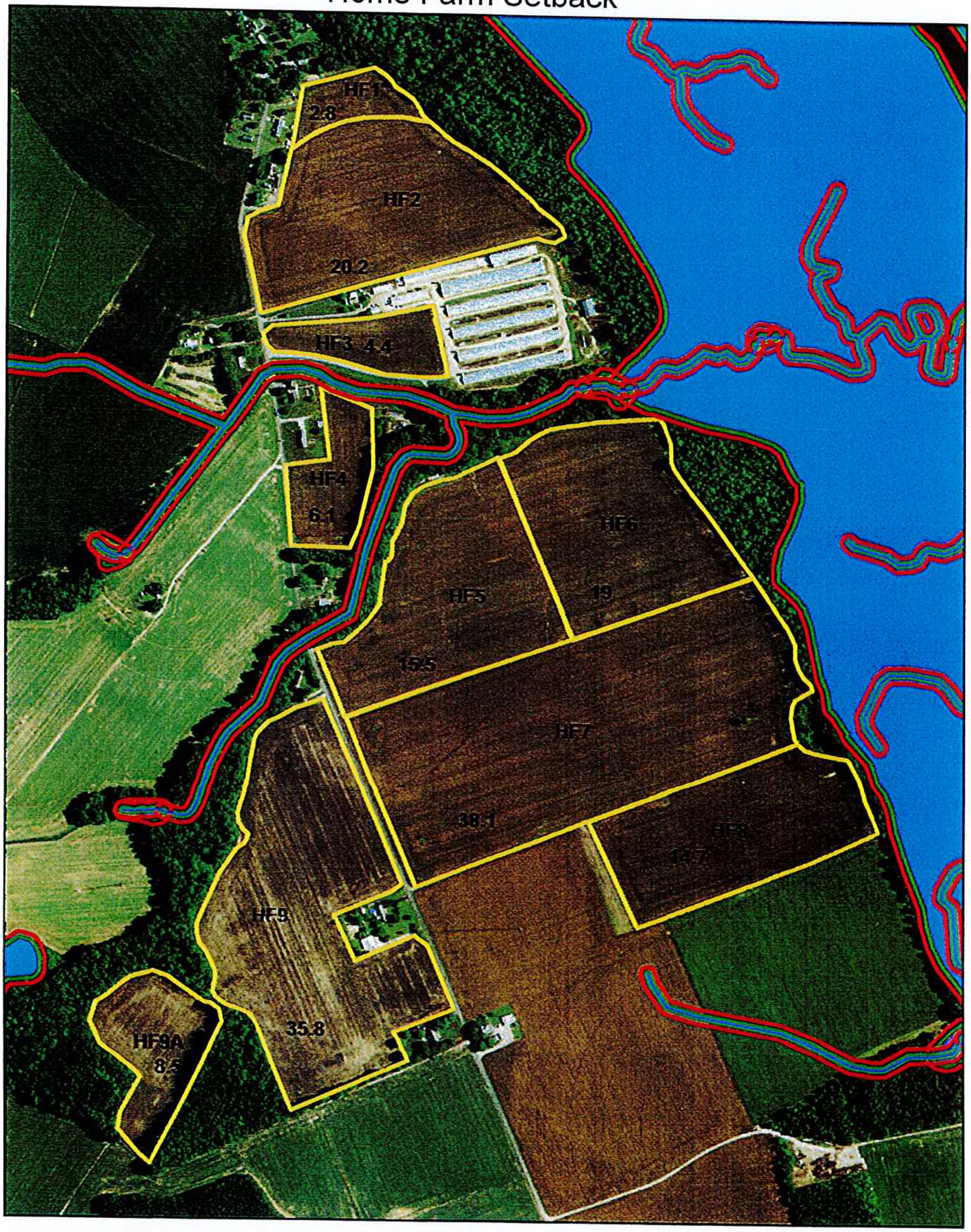
3/24

McConnell Agronomics

Legend

Rivers Streams Ditches
Stream Setback 35 Ft
Stream Setback 10 Ft
Lakes ponds Setback 35 Ft
Lakes ponds Setback 10 Ft
Rivers Lakes Ponds

Howard Harding Farms, LLC.
Home Farm Setback

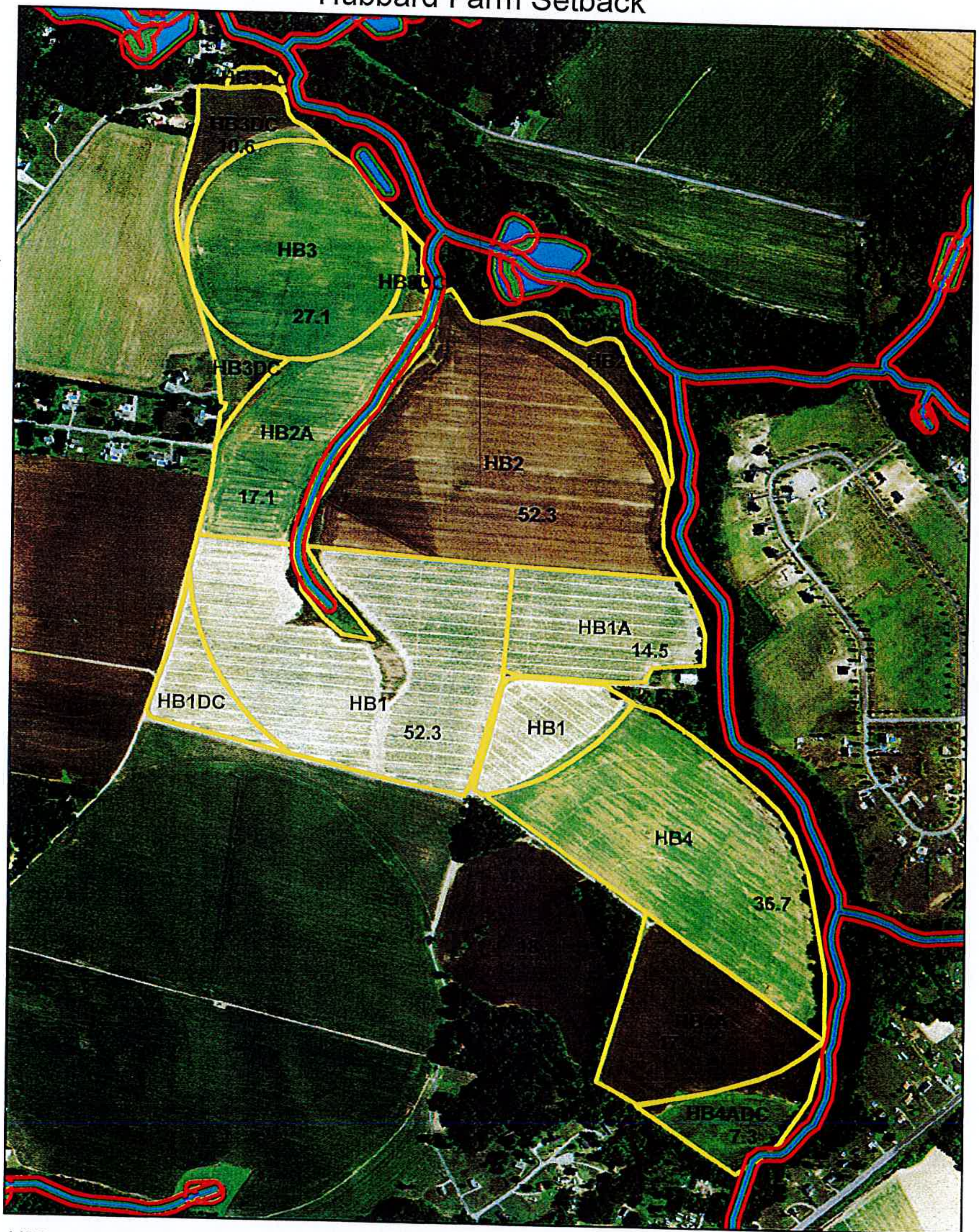


1/22 **Legend**

McConnell Agronomics

Rivers Streams Ditches	Lakes ponds Setback 35 Ft
Stream Setback 35 Ft	Lakes ponds Setback 10 Ft
Stream Setback 10 Ft	Rivers Lakes Ponds

Howard Harding Farms, LLC.
Hubbard Farm Setback

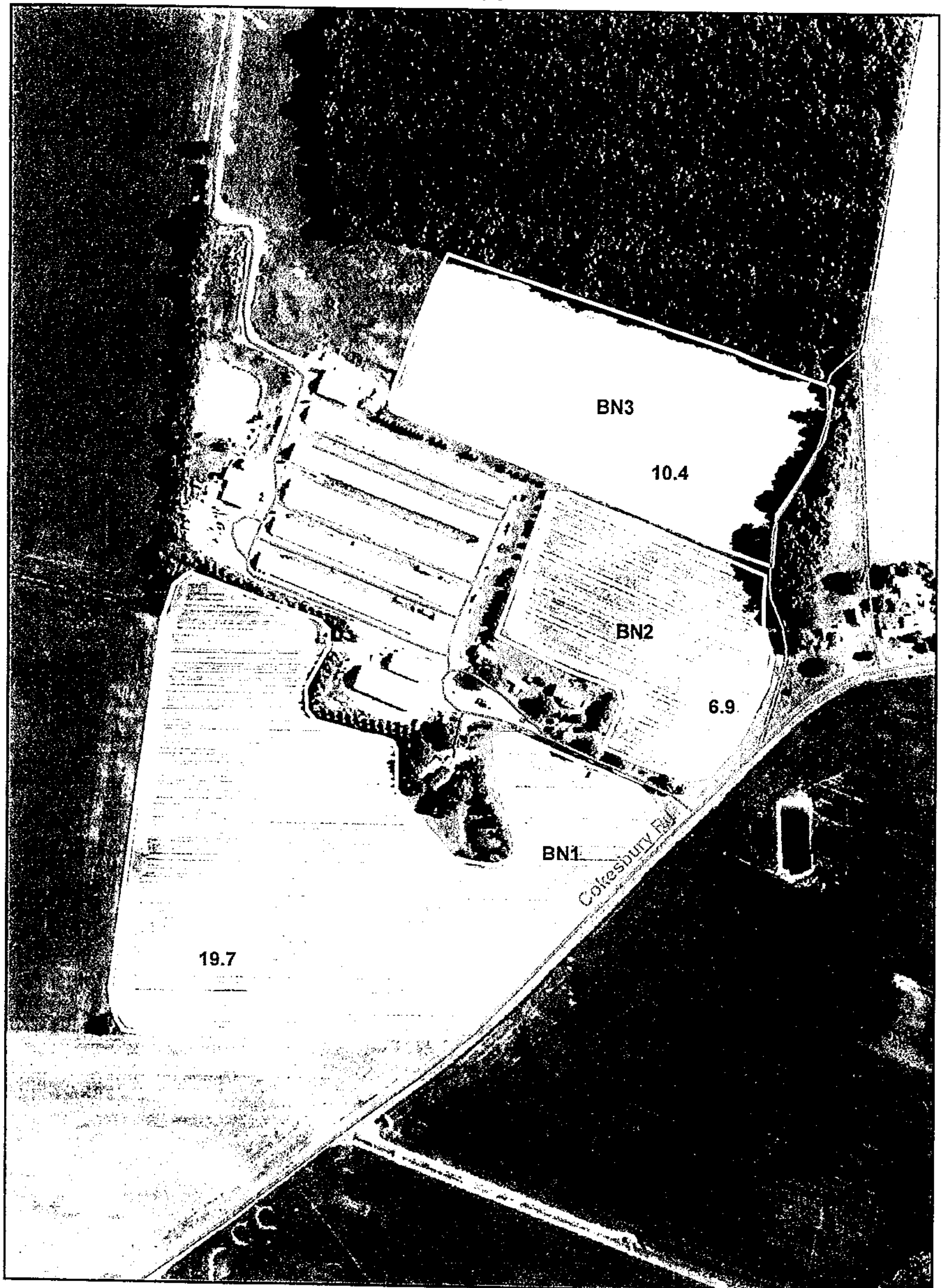


1/22 **Legend**

McConnell Agronomics

- Rivers Streams Ditches
- Stream Setback 35 Ft
- Stream Setback 10 Ft
- Lakes ponds Setback 35 Ft
- Lakes ponds Setback 10 Ft
- Rivers Lakes Ponds

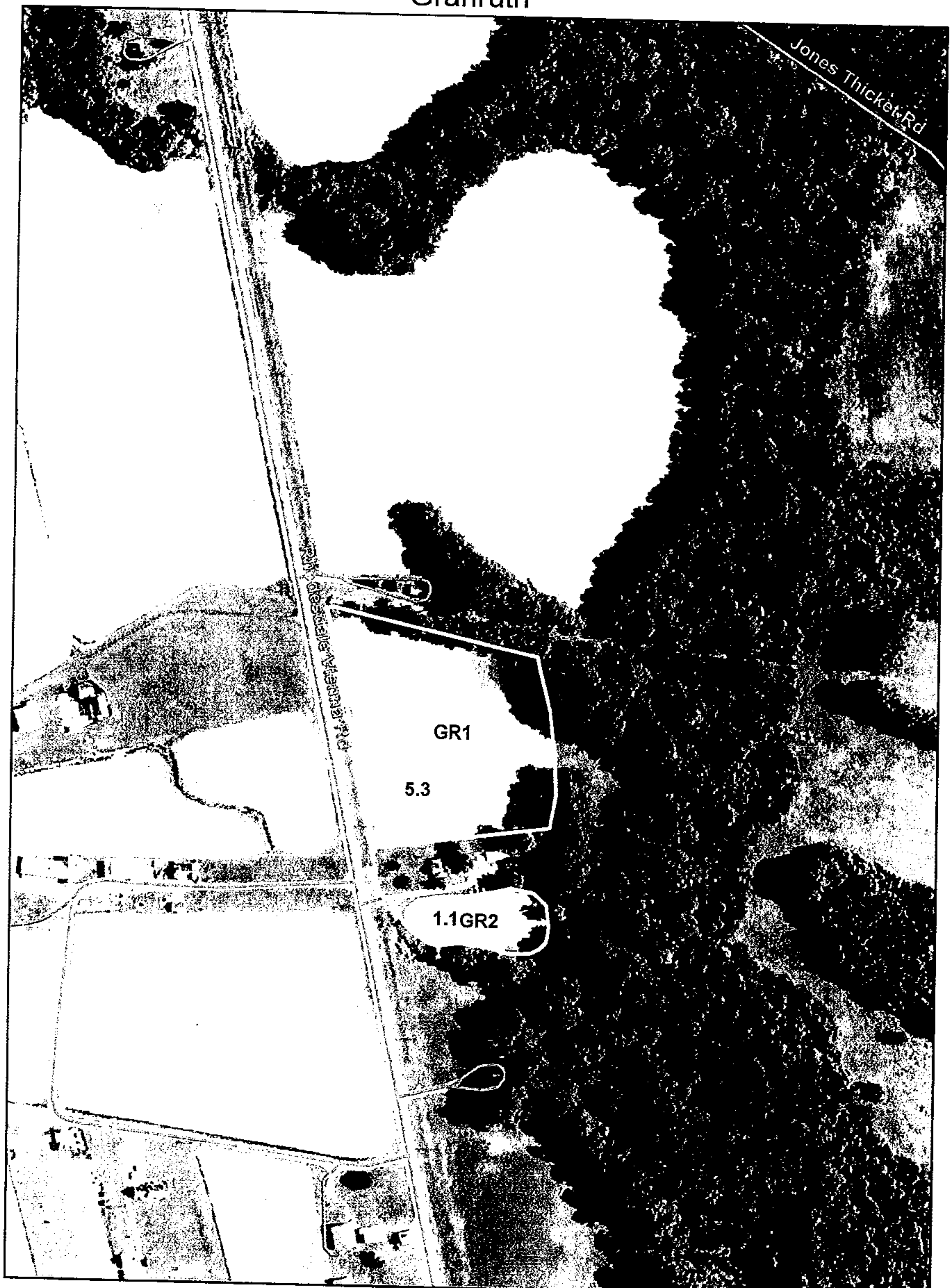
Howard Harding Farms, LLC.
Barnes



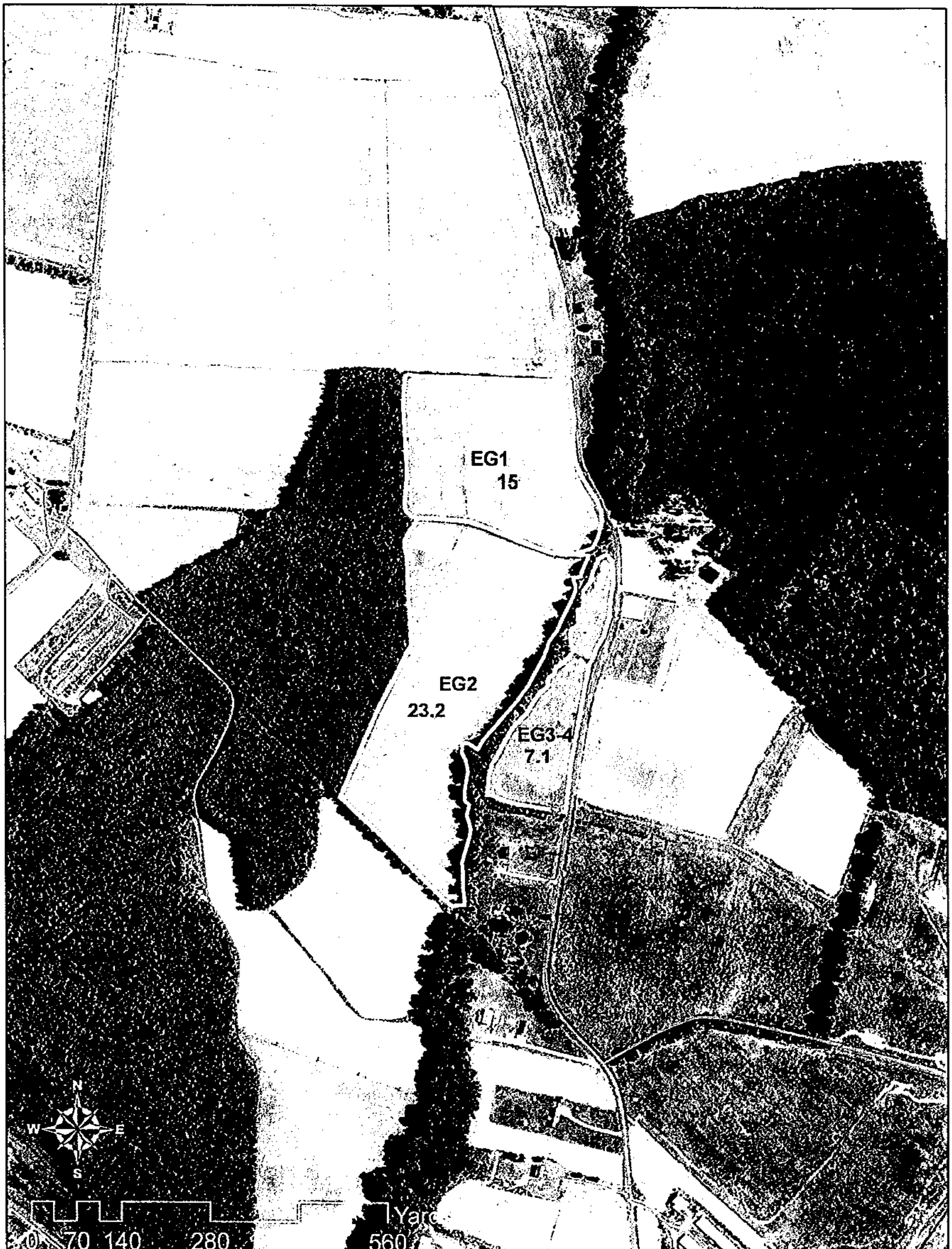
Howard Harding Farms, LLC.
Cokesbury Farm

Howard Harding Farms, LLC.
Faulkner Farm

Howard Harding Farms, LLC.
Granruth



Howard Harding Farms, LLC.
Ed Greenhawk



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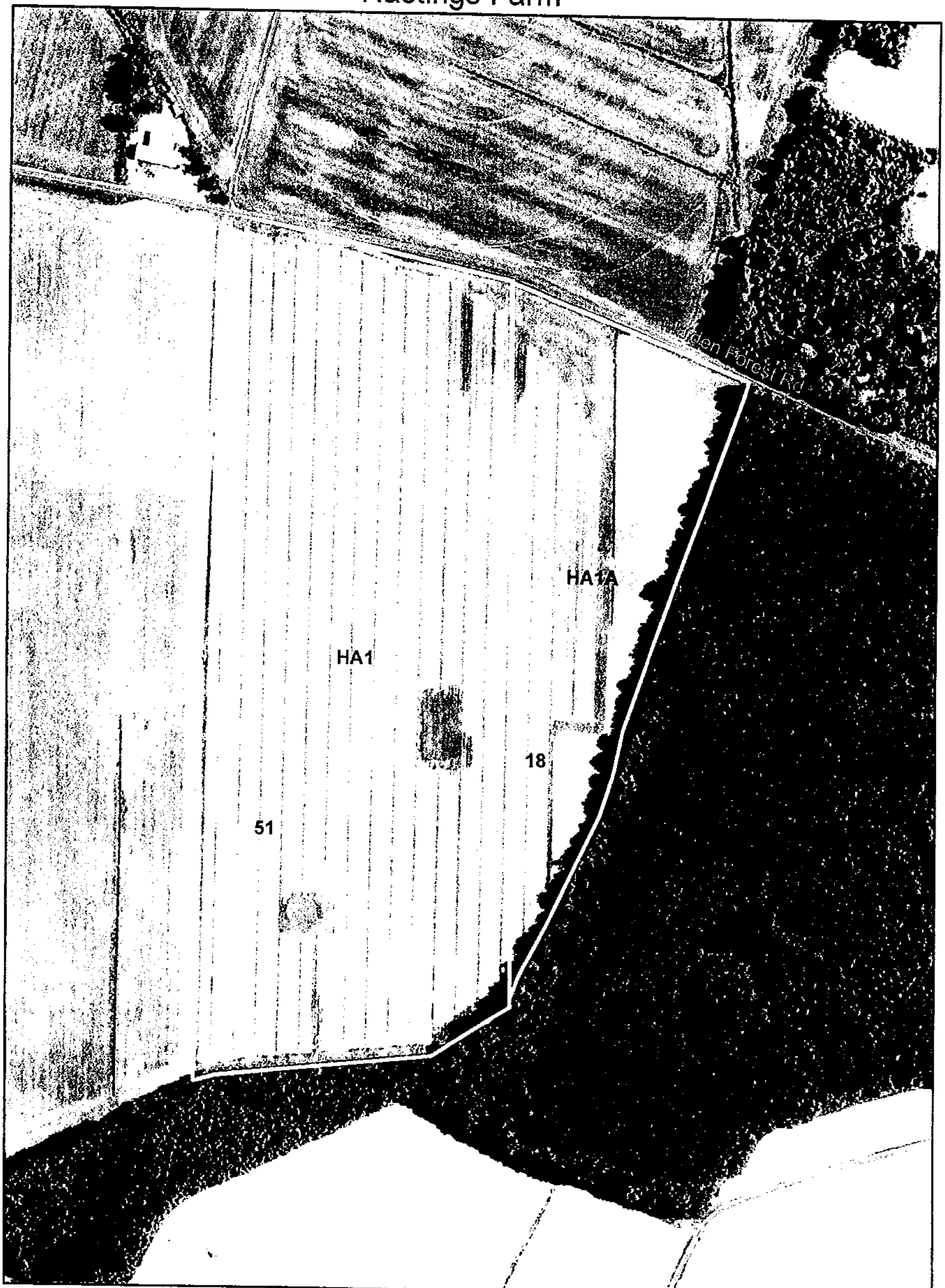
Hastings Farm

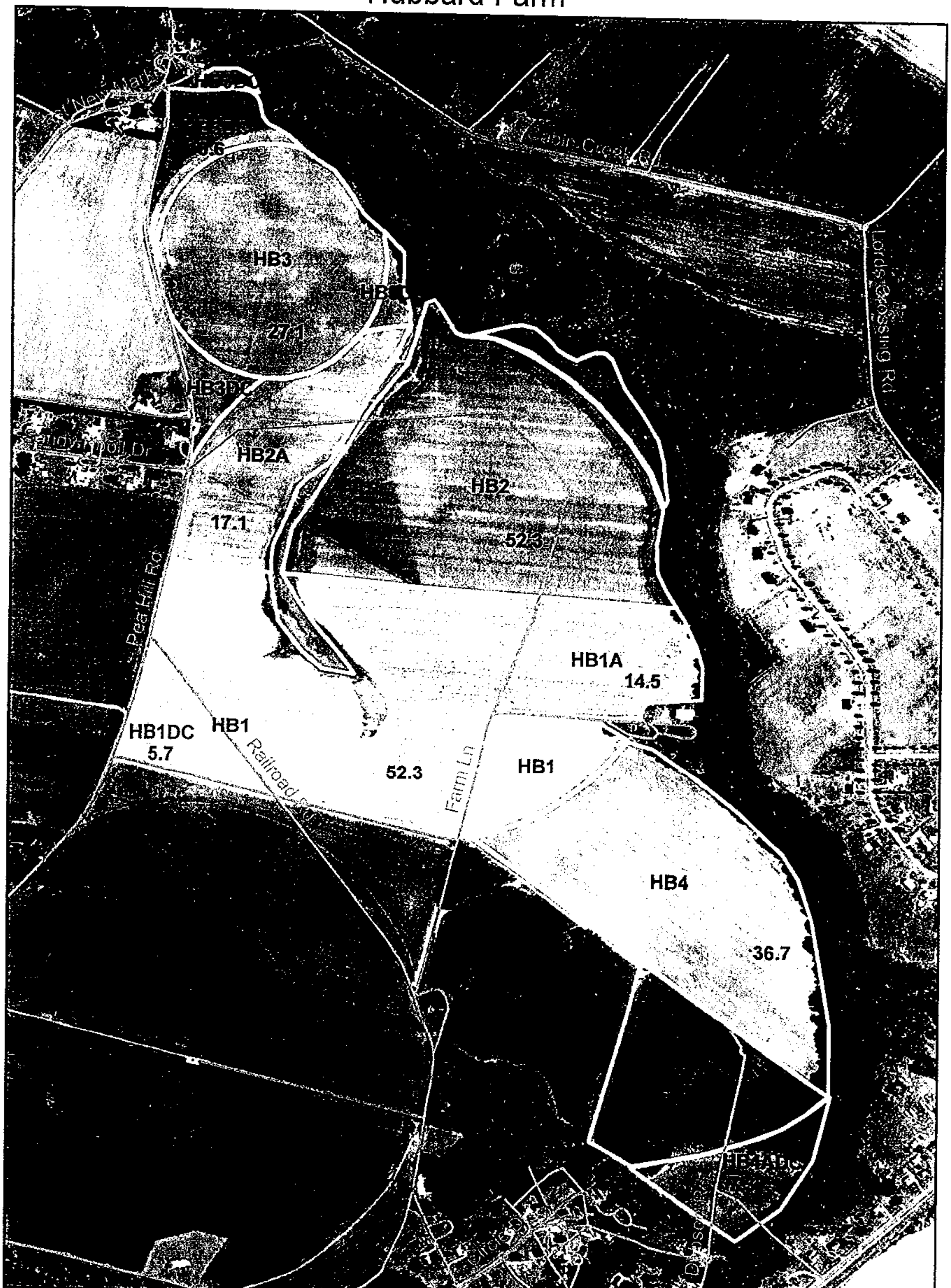


McConnell Agronomics

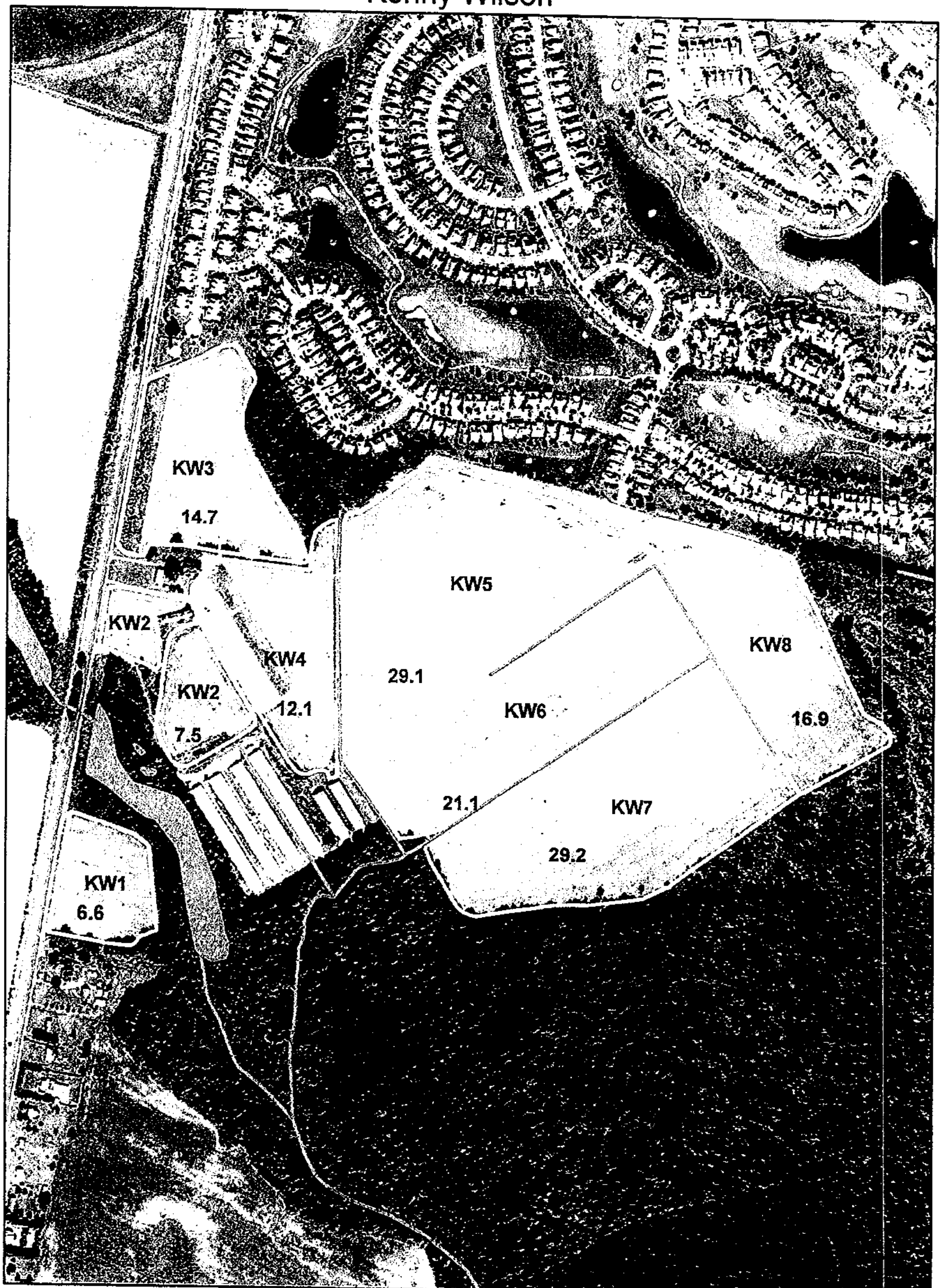
Howard Harding Farms, LLC.
Home Farm

McConnell Agronomics

Howard Harding Farms, LLC.
Hubbard Farm



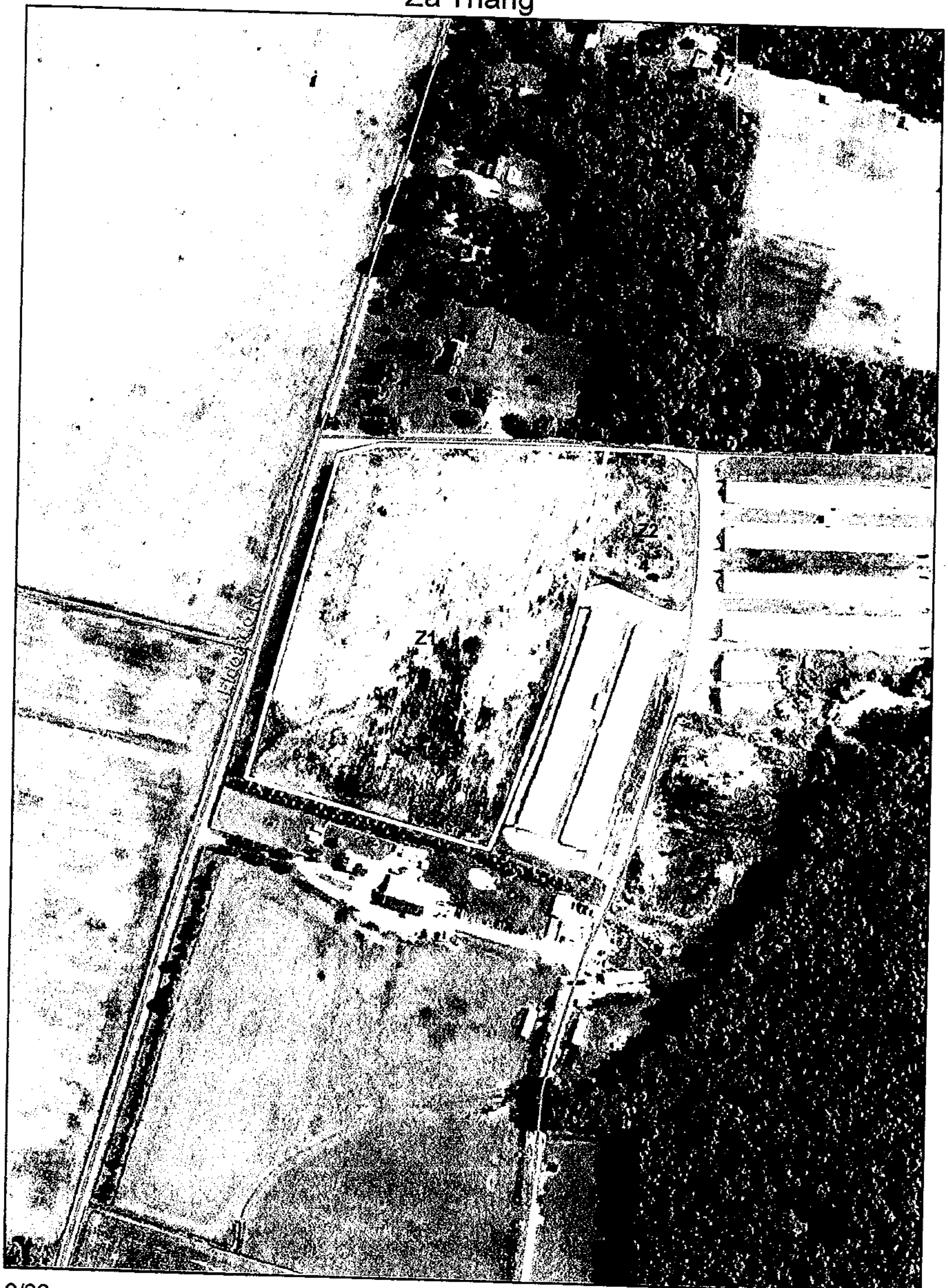
Howard Harding Farms, LLC.
Kenny Wilson



2/22

Howard Harding Farms, LLC.
Henry Young

Howard Harding Farms, LLC.
Za Thang



AgroLab

Serving Agriculture and Soil Fertility Professionals

Account No. : 7

MCCONNELL, LUKE
MCCONNELL AGRONOMICS
7735 DYER RD
DENTON MD 21629

Soil Analysis Report

Invoice No. : 1139242
Date Received : 01/05/2023
Date Analyzed : 01/06/2023

Results For : HARDINGLLC
Location :

Sample ID / Lab No.	Soil pH 1:1	Buffer pH	Soluble Salts 1:2 mmho/c	Organic Matter %	NH4-N ppm	Depth NH4-N Lbs N/A	NO3-N ppm	Depth Nitrate Lbs N/A	Phos Sat Ratio	Mehlich 3 Phosphorus ppm P	FIV	K ppm	Ca ppm	Mg ppm	Na ppm	SO4-S ppm	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	C.E.C. meq / 100g	% Base Saturation H	K	Ca	Mg	Na
HB4						0 - 8 in		0 - 8 in																			
856	5.7	6.9		1.5					24	58	65	45	171	50		6	3.13		9.1		0.48	1.8	21	7	48	24	0
HB4A						0 - 8 in		0 - 8 in																			
857	6.0	6.9		1.8					27	69	77	59	352	33		8	7.34		11.0		0.63	2.6	16	6	67	11	0
HB4DC						0 - 8 in		0 - 8 in																			
858	6.2	6.9		1.9					12	22	26	39	415	51		7	4.43		23.0		0.72	3.0	12	3	70	14	0

Reviewed By: L.D. Severson - AgroLab Inc Copy : 1 1/6/2023

Bus: 302/566-6094
Email: admin@agrolab.us

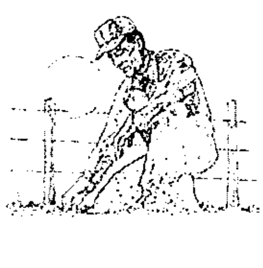
admin@agrolab.us
www.agrolab.us

101 Clukey Dr.
Harrington, DE 19952

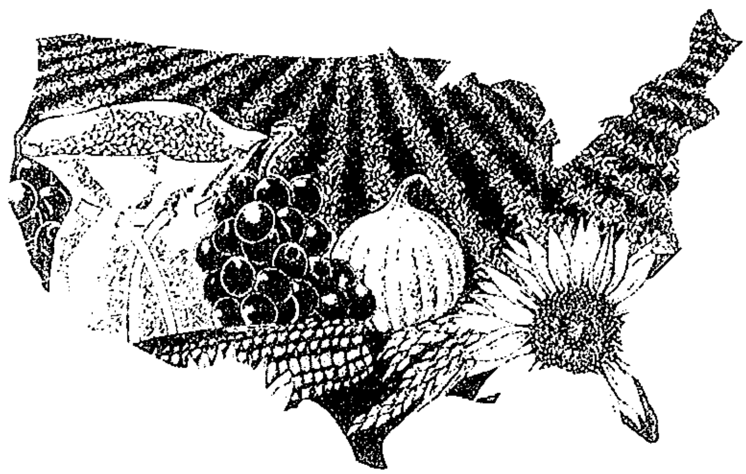
Best Management Practices

Today's Agriculture:

A Responsible Legacy



Nutrient Best Management Practices



Creation of the Nutrient Best Management Practices booklet is credited to and acknowledges the following:
Photos courtesy of USDA website and Delaware Nutrient Management Program
Delaware Nutrient Management Commission
Delaware Department of Agriculture
USDA Natural Resources Conservation Service
Delaware Department of Natural Resources and Environmental Control
University of Delaware Cooperative Extension
Delaware Conservation Districts

Approved and paid by the Delaware Nutrient Management Commission

Doc. No. 65-01-25/05/05/05

TABLE OF CONTENTS

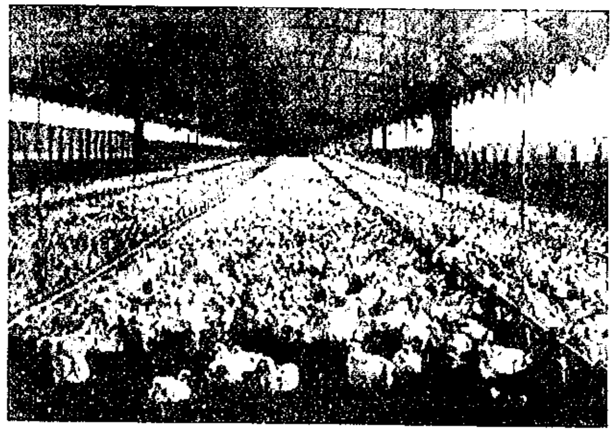
Table of Contents (cont.)

BMP IDENTIFICATION FOR TRADITIONAL AGRICULTURE:

1. Feed Related Amendments

Feeding strategies to reduce nutrient excretion in poultry litter and other manure have great potential today and into the future. With the addition of phytase to commercial broiler diets and the refinement of phosphorus requirements, excretion of phosphorus in litter is expected to decrease by more than 30%. As other cost-effective technologies are refined, such as vitamin D derivatives, the reduction of phosphorus in litter may well exceed 50% of today's values in the near future. Combined with more long-term strategies such as the inclusion of feed grains with higher available phosphorus content, the reduction in phosphorus may well be 70% less than litter just a few years ago.

2. Poultry Litter Amendments



Poultry litter amendments are one of several management strategies employed to reduce ammonia and odor emissions from poultry houses. These products can be added to litter, feed or water to chemically or biologically reduce the ammonia volatilization rate from litter. By reducing the ammonia losses from litter, the nitrogen content and value of the litter may be increased. Although the most common acidifying chemical litter amendments offer effective immediate ammonia control, they have limited longevity. Some aluminum, iron and calcium base acidic compounds have the added benefit, when used at rates above that typically required for ammonia control, of binding soluble phosphorus in litter. These products may be particularly beneficial for operations that must limit litter application due to high soil-test phosphorus or where the risk of soluble phosphorus losses from fields are high.

3. Roof Runoff Management in Feedlots

NRCS Practice Code: 588

Roof runoff management in feedlots is a system of components for collecting, controlling and disposing of runoff from roofs that would otherwise enter a feedlot and become contaminated. Components may include, but are not limited to, erosion-resistant channels, subsurface drains with rock filled trenches along building foundations below eves, underground outlets, roof gutters, downspouts and appurtenances.

4. Stormwater Control in Feedlots

Stormwater control in feedlots is a system of components for controlling runoff generated from a feedlot operation. Clean water from roofs and non-contaminated areas of the feedlot operation is kept separate from contaminated runoff leaving the feedlot. Contaminated runoff is to be captured, stored and safely disposed of as outlined in the nutrient management plan. Components may include, but are not limited to, underground outlets, diversions, grassed waterways, waste storage structures, and spray irrigation systems.

MANURE STORAGE

5. Temporary Storage

The most efficient method of handling and storing poultry litter results from handling the poultry litter as few times as possible. Ideally, total cleanouts and crust outs are immediately land applied, transported to an alternative use or to a storage structure. However, timing considerations may require temporary outdoor storage of the litter before use, which must be conducted while implementing best management practices.

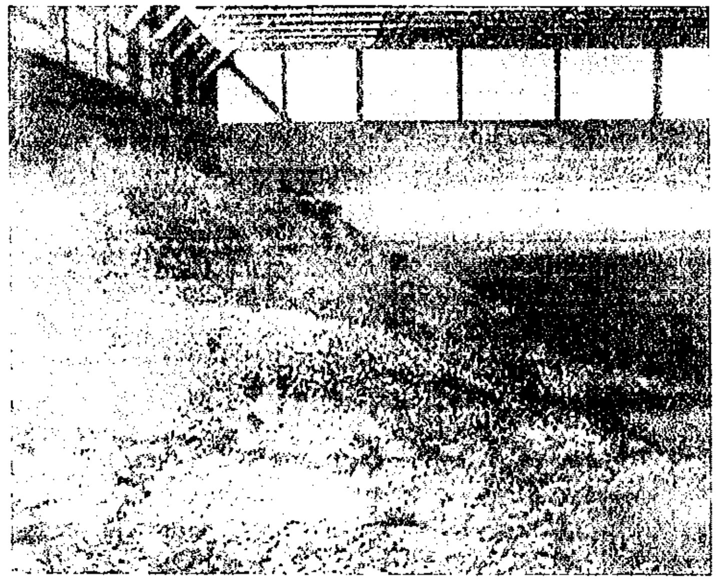
In situations where temporary storage is needed litter may be stored temporarily to preserve litter quality and prevent application at the wrong time of the year. Temporary storage is the least preferred storage practice, but may be conducted according to the standards outlined below:

Production Area Storage	Non-Production Area Storage Up to 90 Days	Non-Production Area Storage Over 90 Days to 150 Days
"Production Area" means that part of an Animal Feeding Operation that includes the animal confinement area, the manure storage area, the raw materials storage area and the waste containment areas, also includes egg washing or processing facility and any area used in the storage, handling, treatment or disposal of mortalities The Production Area should be defined in the operation's Nutrient Management Plan. Temporary storage within the "Production Area" (as defined above) is limited to 14 days without the use of an impervious cover.	Temporary Storage away from the "Production Area" can be staged for land application and is limited to 90 days without the use of an impervious cover.	For conditions that require temporary storage of litter beyond 90 days, individual or general authorization may be granted by the DNMC or Delaware Department of Agriculture for storage up to 150 days. For any storage greater than 150 days, an impervious cover is required.
The following BMP(s) are required for Production Area Storage 1. The stockpile must be separated from any channeled runoff, standing water and other drainage systems such as roof runoff and down spouts. These following additional BMP's are required for Production Area Storage of 2-14 days: 2. The stockpile must be at least 6 feet high; and 3. The stockpile site must meet Natural Resources Conservation Service (NRCS) standard or other containment area lining (standards) approved by the DNMC.	The following BMPs are required for Non-Production Area Storage Up to 90 days: 1. The pile must be at least 6 feet high and in a conical cross section shape; and 2. Litter shall not consist of more than 5% crust out material; and 3. The selection of the temporary storage site must consider the highest, most practical site possible and shall not use the same site more than once every two years without a storage site that meets NRCS standards or other containment lining standards approved by the DNMC; and 4. The temporary storage sites must be identified in the nutrient management plan; and 5. The site must be located at least 100 feet from a public road, 100 hundred feet from any surface water and 200 feet from any residence not located on the property; and 6. The site must be at least 200 feet from a domestic well and 300 feet from a public water supply well, and 7. Post litter removal treatment must include the removal of all litter and the top 1-2 inches of topsoil if the topsoil is co-mingled with the litter to prevent nutrient loads, and 8. A production crop or cover crop must be established and maintained at the site as soon as practical following post removal treatment. 9. For temporary storage sites on soils classified as located within 1 ½ feet of the depth to the seasonal high water table, any one of the following practices must be implemented: a. The establishment of a storage site that meets NRCS standards or other containment lining standards approved by the DNMC; or b. The use of high carbon (content) material (straw, wood shavings, fodder) as the base of the pile at least 8 inches thick to serve as a barrier and easy post storage removal; or c. The use of powdered bentonite or similar material that will seal the area under the pile.	The following BMPs are required for Non-Production Area Storage Over 90 days: 1. The pile is to be constructed as large as possible and be at least 10 feet high and in a conical cross section shape; and 2. Litter shall not consist of more than 5% crust out material; and 3. The selection of the temporary storage site must consider the highest, most practical site possible and shall not use the same site more than once every two years without a storage site that meets NRCS standards or other containment lining standards approved by the DNMC; and 4. The temporary storage sites must be identified in the nutrient management plan; and 5. The site must be located at least 100 feet from a public road, 100 hundred feet from any surface water and 200 feet from any residence not located on the property; and 6. The site must be at least 200 feet from a domestic well and 300 feet from a public water supply well; and 7. Post litter removal treatment must include the removal of all litter and the top 1-2 inches of topsoil if the topsoil is co-mingled with the litter to prevent nutrient loads; and 8. A production crop or cover crop must be established and maintained at the site as soon as practical following post removal treatment; and 9. The establishment and maintenance of a 25-foot vegetative buffer surrounding the pile site. 10. For temporary storage sites on soils classified as located within 1 ½ feet of the depth to the seasonal high water table, any one of the following practices must be implemented: a. The establishment of a storage site that meets NRCS standards or other containment lining standards approved by the DNMC; or b. The use of high carbon (content) material (straw, wood shavings, fodder) as the base of the pile at least 8 inches thick to serve as a barrier and easy post storage removal; or c. The use of powdered bentonite or similar material that will seal the area under the pile.

6. **Pasture Stream Fencing**
NRCS Practice Code: 382

Pasture stream fencing is the installation of a suitable permanent structure that acts as a barrier between pastureland and a watercourse with the purpose of excluding livestock from the ditch or stream. The type of livestock using the pasture will determine the type of barrier used. Sheep and hogs may require woven wire fence, horses may require a wooden or non-injurious type of fence, while cattle can be controlled with barbed wire or electric fence. If the livestock depend on the watercourse for their water supply, a new watering facility may be required.

7. **Manure Sheds** - NRCS Practice Code: 313



A manure shed is a roofed building for stacking dry manure and protecting it from precipitation during the storage period. The shed needs to be large enough to accommodate the equipment delivering and removing the waste. The volume contained within the shed is based on the anticipated volume of manure plus bedding generated during the storage period as defined in the nutrient management plan. Spontaneous combustion of the manure in a shed can be a problem unless the precautions listed in the nutrient management plan are followed.

8. **Dry Straw Based Manure Storage**
NRCS Practice Code: 313

A dry straw-based storage structure is often called a stacking facility. It may be roofed or unroofed, and usually has sidewalls (or a curb), and a concrete floor. If runoff from the facility will occur, a cover or a system to filter (treat) the runoff or a system to collect and store the runoff will be required. The facility needs to be large enough to accommodate the equipment delivering and removing the waste. The volume contained within the facility is based on the anticipated volume of manure plus bedding generated during the storage period as defined in the nutrient management plan. The manure must contain enough straw to make the mixture stackable, and adsorb excess moisture.

9. **Bunkers**
NRCS Practice Code: 313

A bunker, while generally not preferred, is a waste stacking facility with a curb or walls, an impervious floor, and typically has no roof. This type of facility is used where the waste material has a large amount of cellulose bedding in it, such as straw, wood chips, or saw dust. This type of facility is not suitable for waste material that has sand bedding, or little or no cellulose bedding. The size of the bunker is based on the anticipated volume of manure plus bedding generated during the storage period as defined in the nutrient management plan. If runoff from the facility will occur, a cover or a system to filter (treat) the runoff or a system to collect and store the runoff will be required.

10. **Liquid Manure Handling Systems**
NRCS Practice Code: 312

A liquid manure handling system is a planned system in which all the necessary components are in place for collection, transporting, storing and disposing of liquid manure and contaminated runoff in a manner, which does not degrade air, soil, or water resources. Components may include, but are not limited to: debris basins, dikes, diversions, fencing, grassed waterways, spray irrigation systems, pond sealing or lining, subsurface drains, surface drains, waste storage ponds, waste storage structures, and waste treatment lagoons.

11. Lagoons and Tank Systems

NRCS Practice Code: 359 (lagoon) and 313 (tank)

A lagoon is a waste treatment impoundment made by construction of an embankment and/or excavating a pit or dugout. The purpose of a lagoon is to treat manure and wastewater and thereby reduce pollution potential. An impermeable liner is an essential component of a lagoon. A lagoon can be either aerobic or anaerobic in process, and will have an established minimum and maximum operating level. The size of the lagoon is based on the selected process and the number and type of animals in the operation.

A tank is a storage structure for liquid manure and wastewater. The volume of the tank is based on the anticipated volume of manure and bedding plus wastewater generated during the storage period as defined in the nutrient management plan. Tanks must be impervious and provide for agitation of its contents before emptying because the liquid and solid portions of the waste will separate during the storage period. Remixing of the contents is necessary for the proper removal of the waste material. Sand bedding can be very difficult to remix with the liquid portion of the waste, and will reduce available storage volume when it accumulates in the bottom of the tank.

12. Slurry De-watering Systems

A slurry de-watering system is a planned system with all the components in place for collection, transporting, storing and separating the liquid portion of the waste from the solid portion. Components may include but are not limited to settling tanks, greenhouse type drying facilities, mechanical solids separators, storage sheds, storage tanks, spray irrigation systems and composting facilities.

13. Fertilizer Storage

Various State laws govern the safe handling and storage of inorganic nutrients, or fertilizers. For example, storing large quantities of liquid fertilizers may require construction of a permanent storage facility. The Department of Natural Resources and Environmental Control should be consulted regarding the laws in your area. In general, when storing fertilizers on the farm you should consider proximity to animals or feed storage areas, proximity to water supplies, location and construction of the mixing area, adequate labeling, and security (doors, locks, etc.). Storage areas should be routinely examined for leaks or spills, and to check the function of washing and first aid equipment. Potential problems can be minimized by storing only as much fertilizer as absolutely necessary in secured indoor facilities.

14. Nutrient Management Relocation

Animal Feeding Operations (AFOs) with inadequate land to apply animal waste or farms with high phosphorus, as determined by soil tests from an approved soil laboratory, should relocate nutrients to farms in need of nutrients or to alternative use projects. Receiving farms need a Nutrient Management Plan to ensure proper application rates and methods. Alternative use projects are active in Delaware and are defined as the use of animal manure other than the application of raw material on land. These projects generally provide a renewable or recyclable product for alternative market places. Cost share funds may be available to assist in the transportation cost of relocating manure.

ANIMAL MORTALITY HANDLING

Daily Mortality:

15. Composters

NRCS Practice Code: 317

A composter is a facility for the biological treatment of the normal daily accumulation of dead animals from an animal feeding operation. The facility usually includes bins in which the carcasses are placed in layers with a carbon source (typically straw, corn cobs, or saw dust), poultry manure (which provides nitrogen and deters scavengers) and a small amount of water in accordance to a recipe which is established in the nutrient management plan. The facility typically includes a roof and a concrete floor. The biological activity that breaks down the organic material generates heat that will sterilize the final product. The material being composted requires one turning during the composting process to assure that contents initially placed near the edge of the bin are moved to the center for proper heating. The size of the composter is based on the number and type of animals to be composted.

16. Rendering for Large Animals

Animal mortality should be disposed of in a way that prevents contamination of surface and ground waters. Burial of large animal mortality should not be considered due to the potential for surface and ground water contamination. While composting is the typical and the preferred process of dealing with non-catastrophic animal mortalities, composting of large animal mortality, such as dairy cows or horses can be difficult due to animal weight and size. In the event of large animal mortality, rendering companies provide pick-up and delivery for a fee.

17. Composting of Large Animals

Composting is an efficient alternative for large animal carcass disposal. During composting, microorganisms create a "slow cook" process that causes the carcass to degrade. For microorganisms to do their job, a proper balance of water, nutrients, carbon, and air will allow the compost process to start and to continue at a rate that produces enough heat to kill pathogens in the compost mix. Sawdust and woodchips are the preferred carbon source because they provide an excellent contact surface for the animal carcass. The carcass should contain enough water to meet the 40- to 60-percent moisture required for composting. A dairy animal buried in sawdust 15 to 18 inches deep on all sides will enable microbes to begin their work. If the Carbon/Nitrogen ratio, moisture, and oxygen are at the proper levels, microorganisms will cause the compost mix to heat to temperatures ranging from 135 to 150°F, a good composting temperature. The compost mix won't heat properly if it is too dry or too wet. It takes up to six months for composting to degrade a mature dairy cow.

18. Freezer

A freezer is a unit capable of freezing and storing animal carcasses until such time as they can be removed offsite for recycling or rendering. The capacity of the freezer is based on the maximum daily weight of animal carcasses produced during a typical growing cycle and the estimated time between emptying events.

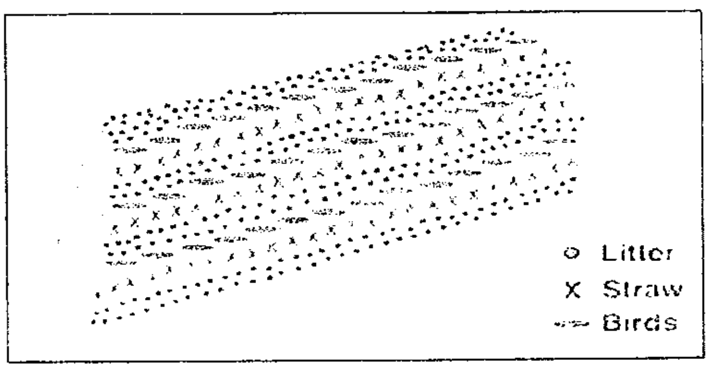
19. Incinerators (Ash disposal plan required)

NRCS Practice Code: 769

An incinerator is a device used to dispose of mortalities from a poultry-feeding operation by combustion. An incinerator requires an ash disposal plan. The ash disposal plan typically requires the use of an ash collection box or bucket, and disposal by land application on cropland or through a community trash disposal system. The capacity of an incinerator is based on the maximum daily weight of animal carcasses produced during a typical growing cycle. All incinerators must be registered with DNREC. Under current DNREC policy, only double-chambered incinerators with a burner in each chamber are approved for use in Delaware.

Catastrophic Animal Mortality:

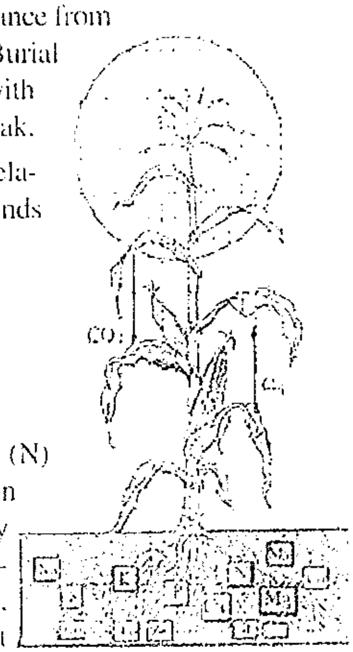
20. Composting Catastrophic Mortality of Poultry



The Delaware Nutrient Management Commission has identified composting as the preferred method of disposing of catastrophic mortality of poultry and other animals. Composting occurs when organic materials, such as dead birds, go through rapid decomposition in the presence of oxygen, water, and an adequate carbon source. Constructing a "wind row" composting pile can accommodate large quantities of poultry mortality. These piles are approximately 12 feet wide and 6 feet high. In these dimensions, the piles contain approximately 300 pounds of mortality per linear foot. Specific guidelines for constructing wind-row composting piles are available at http://www.agnr.umd.edu/MCE/Publications/PDFS/FS717.pdf

Alternatives to composting may be disposal of dead animals in a sanitary landfill. Additionally, in the event of a very serious, extremely communicable disease, mass burial on the infected premise may be conducted as agreed upon by State Agricultural and Environmental officials. In general, burial setbacks include distance from a well, stream, dwelling, animal facilities, roadways and seasonable ground-water table. Burial for catastrophic events is the least preferred method for disposal and must be conducted with the highest biosecure methods available in order to prevent a communicable disease outbreak.

For dead animals of several hundred pounds, the pathogenic incinerator at the Delaware Department of Agriculture may be used. Capacity of this incinerator is 200-300 pounds per hour.



ANALYSIS AND TESTING:

21. Pre Side-dress Soil Nitrate Test (PSNT)

The PSNT is an in-season tool to help corn producers optimize their nitrogen (N) management. The idea of the PSNT is that a soil test, taken at the appropriate time, can provide information on the N status of a cornfield and allow the farmer to make necessary side-dress applications of N if necessary. Soil samples are collected when corn plants are 6-12 inches tall (ideally 10-12 inches) at the whorl. A "sample" is a collection of at least 15, 12-inch cores and should represent an area of similar soil type and management history not to exceed 20 acres. Laboratory analysis of the soil sample will reveal the amounts of readily available nitrate-N (NO_3^-) in the soil, and tables provided by Delaware Cooperative Extension can then be used to calculate necessary additions of N.

22. Soil Test

Soil testing is an integral part of any nutrient management program because it is the only way to reliably assess the soil's contribution to plant nutrient requirements. Two of the most important elements of soil testing are determining the size of the area to be sampled and the number of samples to be collected. Samples should be collected to represent an area no larger than 20 acres, if possible. Each soil sample should consist of a minimum of 15 cores to minimize the impact of a single abnormal core. Samples should be collected from the appropriate depth, for most elements this depth is 6-8 inches. Soil testing involves not only the collection of samples, but also interpretation of laboratory results. University of Delaware Cooperative Extension has information available to aid operators in making management decisions based on soil test results for phosphorus (P), potassium (K), and many other nutrients. Although the Nutrient Management Law requires soil samples used with a nutrient management plan to be no older than three (3) years, more frequent testing will promote better nutrient management.

23. Phosphorus Site Index

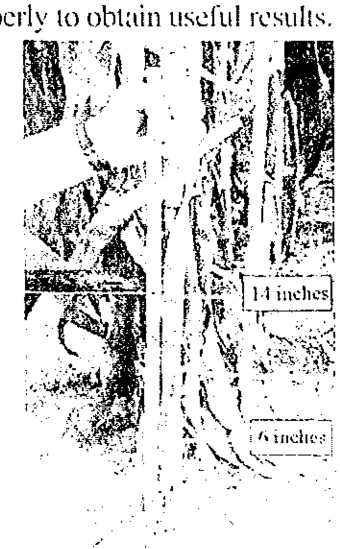
The Phosphorus Site Index (PSI) s a field-rating system designed to assess the relative risk of phosphorus movement from fields to ground or surface waters. The PSI assesses this risk by considering site-specific information such as soil types, landforms, and management practices. This information allows managers to focus Best Management Practices (BMPs) in areas of highest environment concern. Environmental concerns with phosphorus center around eutrophication, defined as "*an increase in the fertility status of natural waters that causes accelerated growth of algae or water plants*".

24. Phosphorus Saturation Ratio

The Phosphorus Saturation Ratio (PSR) is an indicator of the ability of the soil to retain phosphorus (P). This ability is measured by the ratio of extractable P to iron and aluminum available to tie up that P. As the ratio increases (soils become more saturated with P), the quantity of P that can be lost from the soil by erosion, surface runoff, and leaching increases. Research has shown that an increase in P loss occurs at PSR levels above approximately 20%. The PSR is included in soil test reports generated by the University of Delaware soil testing lab.

25. Tissue Analysis

Tissue testing is a valuable tool for in-season assessment of the availability of a number of essential plant elements. Such assessments are an important part of any nutrient management program. Some common elements determined in routine plant analysis include nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg), and sulfur (S). As with soil testing, the collection, handling, and analysis of plant samples must be done properly to obtain useful results. University of Delaware Cooperative Extension has information available to aid operators in making management decisions based on tissue test results.



26. Stalk Nitrate Test on Corn

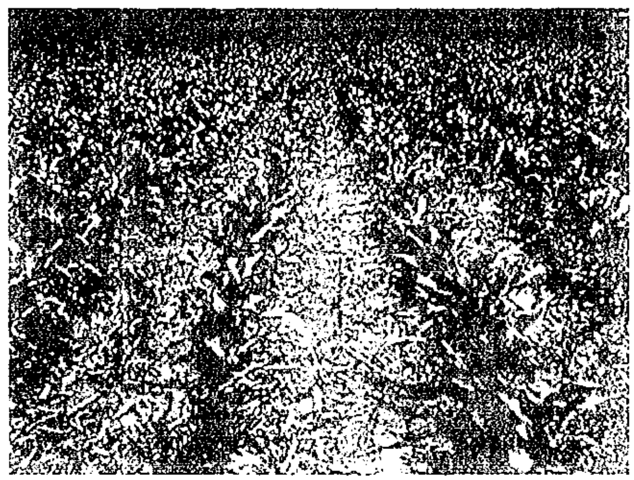
The end-of-season corn stalk nitrate test is a simple, inexpensive tool that can be used to assess the nitrogen (N) status of a corn crop at the end of the growing season. This test makes use of the fact that corn plants either remove N from, or accumulate N in, the lower stalk based on soil N availability. Studies over a wide range of conditions have found remarkably similar relationships between the amount of N found in the lower stalks late in the growing seasons and the likelihood that corn had been under or over-fertilized. Plant samples are collected after the corn is mature, usually 2 weeks after "black layering." University of Delaware Cooperative Extension has a publication: "End-of-Season Corn Stalk Nitrate Testing to Optimize Nitrogen Management" to aid operators in interpreting the results of their cornstalk tests.

27. Manure Testing

Manure testing is an integral part of any nutrient management program because animal manures vary widely in their nutrient composition. The four most common elements of manure testing are determining moisture, nitrogen (N), phosphorus (P) and potassium (K) content. There may also be situations where micronutrient or metal contents are critical. Delaware Cooperative Extension recommends that manure samples be collected for the smallest "unit" practical because of potential for enormous variability between different loads, manure types, etc. University of Delaware Cooperative Extension has information available to aid operators in collection and handling of manure samples. When sampling in the poultry house, take about 15 cores with a probe or shovel from random locations throughout the house making sure you sample the full depth of the litter and avoid the dirt floor. When sampling a stockpile, take about 10 scoops from the pile making sure that you penetrate as deep as possible into the pile. Do NOT include the wet, crusted outside layer of the pile in your sample. Place all 10 to 15 scoops or cores into a bucket and mix them thoroughly and then take a subsample and place in a one-gallon ziplock bag and seal. Leave space in the ziplock bag for gas expansion. Keep samples cool until delivery to the laboratory.

ADDITIONAL BMPs

28. Vegetable Waste (non permitted) Disposal



Vegetable production generates waste by-products that have the potential to contribute nutrients. These by-products should be managed in a manner that prevents nutrient contamination to surface and ground waters. Consideration should be given to the amount of raw waste generated, the nutrient content of the waste product, and recognition that nutrient loading depends on the way in which the waste is handled after harvest. Most vegetable waste, such as sweet corn fodder, cull ears and husks should be provided as a green manure recycled and applied to production fields. In the case of interim storage in any location other than a roofed and permanent structure, set back and time limits (14 days) associated with manure storage will also pertain to storing vegetable waste. Proper management of vegetable waste represents an efficient use of nutrients that are available for capture by future crops or cover crops.

29. Soil Structure Management

Soil "structure" refers to the way soil particles such as sand, silt, clay, and organic matter are arranged or "held together." Maintaining good soil structure is extremely important, and the single biggest threat to structure is compaction. Compaction is most commonly caused by animals or equipment and is essentially a "crushing" of the soil. This crushing eliminates pore spaces that are critical for water infiltration, water-holding capacity, and proper root development; each of which can severely limit yields. Compaction can be controlled by following some basic guidelines: avoiding wet fields, using rotational grazing, reduced tillage, deep tillage or ripping, and using certain crop rotations. (Refer to extension, etc. for more information.)

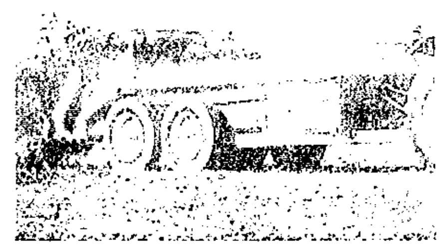
30. Manure Incorporation

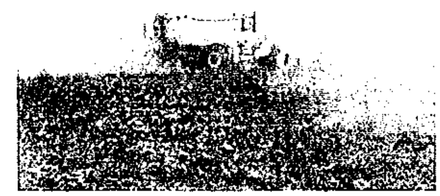
Incorporation of surface-applied animal manures is an important practice for both economic and environmental reasons. Manure spread on the surface and not worked into the soil may lose most of the volatile nitrogen compounds as ammonia gas to the atmosphere. This lost nitrogen is not available for plant growth, and has been identified as a possible air quality contaminant contributing to acid rain. Whenever manure is spread, it should be incorporated within two days after spreading.

31. Daily Spreading of Animal Manures

Daily spreading of animal manures is generally not recommended. However, in situations where the operation MUST haul on a daily or very frequent basis, the following guidelines should be considered to minimize odors and environmental threats, and maximize the utilization of manure nutrients. Spreading during cooler, less-humid portions of the day, considering wind speed and direction in relation to neighboring farms or homes, and establishing buffer or "no-apply" zones near roads and residences, will help to minimize odor problems. Immediate incorporation will reduce odors, prevent physical movement of manure to waterways, and conserve valuable nitrogen.

The application method and timing is critical to proper nutrient management.





32. Timing of Manure Application

Applying manure at the correct time is important to ensure efficient and cost effective use of nutrients. Timely application of manures is also important to avoid adding nutrients to the waterways of the state. Applications of manure at times when crops will not be available to utilize the nutrients should be avoided. Application of manures should be done as close as possible to the time when the crop is seeded. Spreading manure on frozen ground, snow covered ground or saturated soil should be avoided.

Application of nutrients during favorable weather conditions can reduce the potential for nutrient losses from runoff and leaching. In order to allow for timely incorporation of manures, spreading of manure should not be done if a heavy rain is forecast for the following two days. The efficient use of nutrients means selecting the appropriate rate of each nutrient and applying each in a uniform and timely manner.

33. Nutrient Application Equipment Calibration and Adjustment

The efficient use of nutrients means selecting the appropriate rate of each nutrient and applying each in a uniform and timely manner. Application of nutrients during favorable weather conditions can reduce the potential for nutrient losses from runoff or leaching.

34. Calibrating Poultry Litter Spreaders

To be an effective source of crop nutrients, poultry litter should be applied evenly and at known rates. Dry litter is commonly applied with a spinner-type spreader. This equipment allows for both even application and a considerable range in application rates. Wet manure, such as that found in breeder or layer operations, is more commonly applied with "flail-type" spreaders. For all types of application equipment the basic procedure for calibrating is to collect litter on tarps that can be weighed in the field. When used properly, this method provides information on both the rate of application and the uniformity of coverage. An excellent step-by-step reference for calibrating manure spreaders can be found at *http://www.usr.sonet.net/usr/ke4rop/litter/index.htm*.

35. Precision Farming

Precision farming or site-specific management utilizes several technologies with a goal of increasing operating efficiencies such as boosting yields, reducing input costs, and improving profit margins. Technologies such as geographic information systems (GIS), automated machine guidance, in-field remote sensing, mobile computing, telecommunications, and advanced information processing when linked with the Global Positioning System (GPS) provide potential improvements to farm practices.

36. Residue Management

Residue Management is the management of the amount, orientation, and distribution of crop and other plant residue on the ground surface year round. Residue management improves water quality, while reducing soil erosion, increasing infiltration, increasing organic matter, improving soil structure, and reducing compaction and crusting.

37. No-till and Strip Till

NRCS Practice Code: 329A

The uniformly distributed crop residues are left undisturbed from harvest to planting. Planting or drilling is accomplished in a narrow seedbed or slot created by coulters, row cleaners, disc openers, in-row chisels or roto-tillers. Weed control is accomplished primarily with herbicides. Cultivation may be used for emergency weed control.

38. Mulch Tillage

NRCS Practice Code: 329B

The soil is disturbed prior to planting. Tillage tools such as chisels, field cultivators, discs, sweeps or blades are used. Weed control is accomplished with herbicides and/or cultivation.

39. Ridge Tillage

NRCS Practice Code: 329C

The crop residues are left undisturbed from harvest to planting. Planting is completed in a seed bed prepared on ridges with sweeps, disc openers, coulters, or row cleaners. Residue is left on the surface between ridges. Weed control is accomplished with herbicides and/or cultivation. Ridges are rebuilt during cultivation.

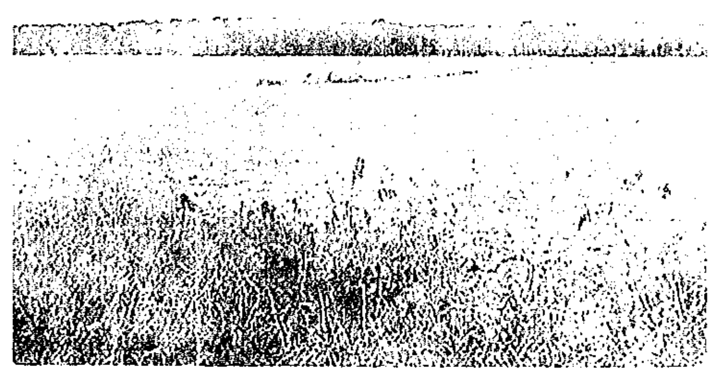
40. Seasonal

NRCS Practice Code: 344

The practice of managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during part of the year, while growing crops in a clean tilled seedbed reduces erosion and improves water quality.

41. Cover Crops

A cover crop is any crop planted in a field to provide protection to the soil during a period when row crops are not being grown. Cover crops reduce erosion, scavenge nitrogen that can be utilized by subsequent crops and minimize nitrate leaching into the ground water. Because manures contain nutrient compounds that break down slowly, cover crops should be utilized for all fields where manure has been applied. This period of utilization can be a relatively short time such as a couple of months between spring and fall crops, or a longer time such as six months between fall harvest and spring planting. Which type of cover crop is best depends on many factors including crop rotation and management goals. For example, is the goal simply to reduce erosion, scavenge nitrogen, put nitrogen back into the soil (i.e., legumes), or a combination of these and other objectives? During winter, recommended grass species include cereal rye, wheat, and barley although any winter-hardy annual species can be



used. Broadleaf species that can be used include winter rape and other leafy Brassica crops. Legume cover crops such as hairy vetch and annual or perennial clovers can be grown to reduce erosion. However, these species are not efficient for scavenging nitrogen from previous crops. During summer, grasses such a sudangrass, sorghum-sudangrass hybrids and others can be effective in protecting soil and trapping nutrients. Non-grasses such as buckwheat also can be effective cover crops. To maximize cover crop benefit, plant as early as possible, optimize soil-to-seed contact, and plant at the upper end of the suggested seeding rate range. The cover crop should be maintained as late into the spring as practical without running the risk that it will deplete sub- and topsoil moisture levels to the point of being injurious to the next crop.

42. Vetch Cover Crop

Hairy vetch is the most efficient nitrogen-fixing legume often fixing 50 to 100 or more pounds N/acre, dependant upon planting date and plant life. Nitrogen is released to the next crop rapidly.

43. Scarlet Clover Cover Crop

Scarlet clover, also referred to as crimson clover, is not as effective as hairy vetch at fixing N but will fix 60 to 90 or more lbs N/A plus increase availability to the next crop of other nutrients such as P and the micronutrients. Nitrogen release is also rapid.

44. Cereal Grain Cover Crop

Cereal grains planted solely as cover crops and other crops used as cover should be monitored closely in the spring to prevent excessive soil moisture loss in seasons with below average winter or spring rainfall. If adequate rainfall is received, time the destruction of the cover crop by tillage, herbicide, or other mechanical crop injury and destruction with the cover crop's growth stage and the subsequent crop's growth so nitrogen and other nutrients will be mobilized at a time suitable for crop uptake.

45. Legume Cover Crop

Many legume cover crops release nitrogen very rapidly after incorporation or destruction. To slow this release, include cereal rye, winter oats, or other high carbon winter crop when seeding the legume.

Legumes are appropriate cover crops for fixing atmospheric nitrogen for subsequent grass crops. Legumes can help make phosphorus and micronutrients more available to subsequent grain crops.

46. Conservation Buffer

Conservation buffers are areas or strips of land maintained in permanent vegetation to help improve water quality. The vegetation can be cool season grasses, warm season grasses, and/or trees and shrubs. Buffers can trap sediments, take up nutrients, provide valuable wildlife habitat, and provide shading of the stream. The size of the buffer depends on the intended use of the buffer. The minimum width should be 10 feet for limited sediment entrapment with a preferred minimum width of 24 feet, while the minimum width for a wildlife buffer is 35 feet.

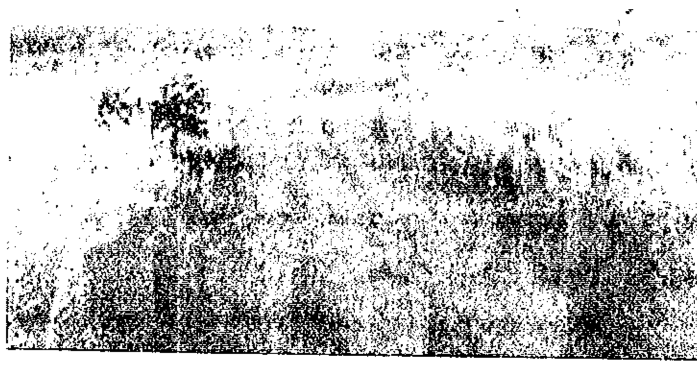
47. Riparian Forest Buffer

NRCS Practice Code: 391

Riparian forest buffers are an area of trees and/or shrubs located adjacent to and up gradient from water bodies.

48. **Vegetative Filter Strips**
NRCS Practice Code: 393

A filter strip is a strip or area of herbaceous vegetation situated between cropland, grazing land or disturbed land (including forestland), and environmentally sensitive areas.



49. **Water Control Structure**
NRCS Practice Code: 587

A water control structure is a device that conveys water, controls the direction or rate of flow or maintains a desired water surface elevation. These are typically used to control the depth and discharge of water in open channels, ponds, and wetlands. They can also be used for water quality control, such as sediment reduction and temperature regulation.

50. **Drainage Ditch Maintenance**

Well managed and adequately vegetated drainage ditches are important to ensure the productivity of agricultural land as well as their potential for environmental impact. The unintended direct application of manure or nutrients into or in proximity to drainage ditches can greatly affect Stormwater discharges of those nutrients into Waters of the State. Nutrient applications should not be conducted along ditches, ditch side-slopes, maintenance right of ways, tilled land or any other land immediately adjacent to the ditch. The potential to discharge nutrient-bearing stormwater into ditches must be prevented by employing protective nutrient application setbacks or incorporation into cultivated land. Other BMPs such as vegetative filter strips, planted riparian buffers, constructed wetlands that collect runoff, are important in filtering nutrient runoff before it enters ditches and other water bodies.

Filters such as vegetative buffers are effective along ditch edges and within the ditch and can be planted with approved warm and cool season grasses or lay fallow. Vegetative areas should be maintained through the usage of mowing according to a conservation plan and or a "weed wiper bar" system to control woody plants while preserving the vegetative ground cover. This ground cover is ideal for nutrient uptake and promotes a diverse wildlife habitat. One sided ditch maintenance is common and provides shade for the ditch which decreases water temperature and provides water quality improvements as well as valuable wildlife habitat. Dipping out a channel to remove accumulated sediment should be considered when appropriate. Strategically placing sediment traps within channels can prolong the over-all dip-out frequency. Your County Conservation District may provide programs to assist in managing drainage ditches for effective drainage and water quality.

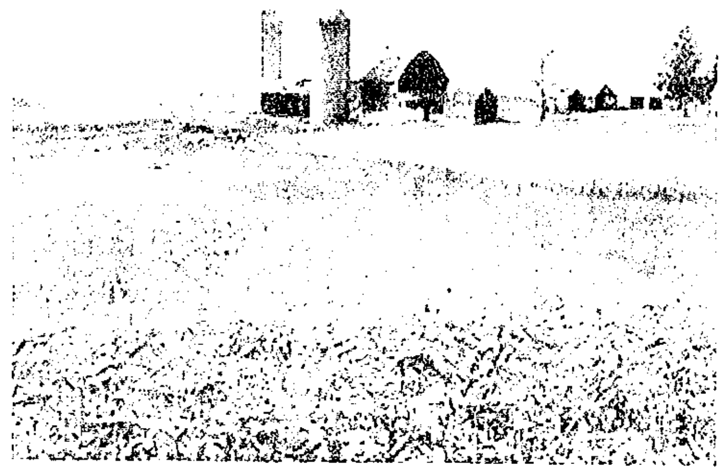
51. **Strategically Placed Wetland**
NRCS Practice Code: 656

A strategically placed wetland is a constructed shallow water ecosystem designed to simulate natural wetlands, and placed in a location that will receive runoff from farmsteads and crop fields. It is designed to control storm water runoff and is effective in utilizing excess nitrogen. This practice is not intended to treat animal waste or runoff from feedlots. Strategically placed wetlands shall be located outside the limits of wetlands of any classification. Components may include inlet screening device to prevent debris from entering the wetland; embankments; overflow structure to maintain proper water level, and control flow from the wetland; and wetland plants. The wetland must be sized to contain the design storm and bypass larger events, while providing the needed detention time for treatment of the target contaminant. All federal, state, and local laws, rules and regulations governing the discharge to waters of the state must be complied with.

52. Strategically Placed Sediment Removal
NRCS Practice Code: 638 (Water and Sediment Control Basin)

Strategically placed sediment removal is a short embankment or a combination ridge and channel typically constructed across the slope and minor watercourses. They are used to trap and collect sediment, reduce on-site erosion, reduce the sediment content of runoff, reduce peak rate of flow at down-slope locations, reduce flooding and reduce gully erosion.

53. Grass Waterways
NRCS Practice Code: 412



A grassed waterway is a natural or constructed swale, shaped or graded and established in suitable vegetation for the safe conveyance of runoff. Grassed waterways are used to transport surface runoff from terraces, diversions, or natural concentrations without causing erosion or flooding and thereby protecting or improving water quality. The size and shape of the grassed waterway will be based on the anticipated flow rate and the slope of the waterway and the type and height of the vegetation.

54. General Erosion Controls
NRCS Practice Codes: 350, 362, 393, 561, 600

Erosion controls are a combination of practices that are constructed or installed with the purpose of preventing or minimizing the loss of soil from a farmstead and cropland. Components may include sediment basins (350); diversions (362), filter strips (393), heavy use area protection (361), and terraces (600). Diversions are used to divert clean runoff away from areas that are susceptible to erosion. Terraces are used to shorten the slope length in a crop field. Filter strips are grassed areas placed across the slope below cropland or farmsteads for the purpose of catching and trapping soil particles in the runoff as it passes through. Heavy use area protection consists of covering the soil in an area that gets heavy use, such as farmsteads and farm lanes with a surface that will protect the underlying soil from erosion. Typically gravel, concrete or asphalt is used. Sediment basins are used to trap sediment once erosion has occurred, and prevent its transport offsite.

55. Field Windbreak for Erosion and Odor Control
NRCS Practice Code: 394

A strip of trees or shrubs established adjacent to a building, feedlot, or field to reduce erosion, conserve energy, control snow deposition, prevent wind damage, provide shelter for livestock, improve water quality, reduce noise pollution, provide wildlife habitat, and improve landscaping.

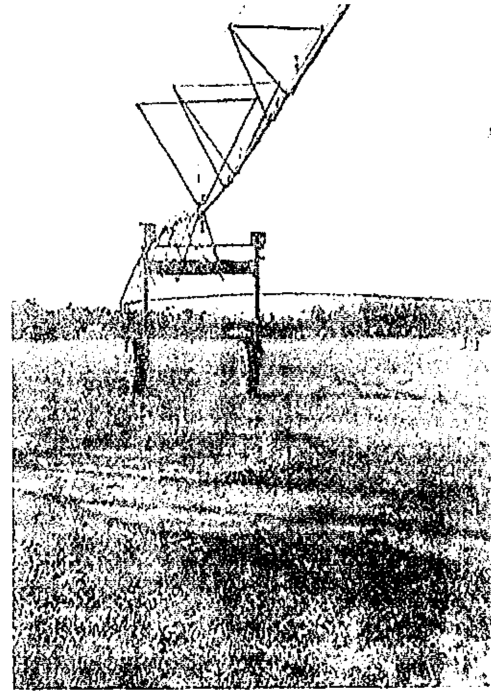
The major benefits of trees around the perimeters of buildings include increasing production efficiency, demonstrating proactive environmental stewardship and fostering good neighbor relations. Properly established windbreaks can reduce heating and cooling costs, minimize structural damages from wind and prevent air-borne diseases from entering and exiting your farm. Planting trees around farms also offers environmental benefits and represents good stewardship. Another important aspect of trees is their ability to filter odor and noise, thus decreasing the likelihood of odor and noise-related complaints from neighbors.

56. Irrigation Systems and Education

Irrigation can be a great benefit to nutrient management planning. It helps normalize yields during periods of dry weather. When a consistent supply of water is provided, plants can utilize the nutrients that are available.

This in turn reduces the amount of residual nutrients and lessens the likelihood of leaching into the ground water.

Your local conservation district, the state nutrient management office, and Delaware Cooperative Extension provide additional nutrient management information.



MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Suite 605 • Baltimore, Maryland 21230-1719
410-537-3375 • 800-633-6101 x3375 • http://www.mde.state.md.us
Land Management Administration • Solid Waste Program

Maryland Setback Standards and Approved Alternatives Consistent with CAFO/MAFO Requirements

Introduction:

The Maryland Department of the Environment (MDE) current Regulations Governing the Control of Water Pollution to address permit requirements for Concentrated Animal Feeding Operations (CAFOs) and Maryland Animal Feeding Operations (MAFO) include options for manure application setback standards in the Code of Maryland Regulations (COMAR) 26.08.03.09b(1). These setbacks for CAFOs are also included in 40 CFR Part 412.4(c)(5).

As written in Part IVB8 of the General Discharge (GD) Permit for Animal Feeding Operations (NPDES Permit No. MDG01, Maryland Permit No 09AF), the current "Protocols for the Land Application of Manure and Wastewater" include, for both CAFOs and MAFOs, the following setback provisions:

a. A **setback** of at least 100' from waters of the State, including field ditches, other conduits, intermittent streams, and drinking water wells, shall be maintained; or an **approved alternative** may be substituted for the 100' setback.
b. A setback of at least 100' from property lines shall be maintained, unless an approved alternative setback for property lines is established with the consent of the adjacent property owner.

I. Alternative Setback Option Applicable to Poultry MAFOs ONLY which is included in the GD Permit:

For slopes of 2% or less, a MAFO may satisfy the land application setback and buffer requirements of this permit by maintaining: 1) a vegetated filter strip at least 10 feet wide along field ditches and in the final 35 feet of the field ditches (applicable to ditch embankments and, to the maximum extent practicable, the channel) adjoining the receiving waters or the facility boundary, whichever occurs first, 2) a 35' vegetated filter strip or 3) a 50' setback from all other surface waters of the State.

II. Approved Alternative Setback Options to the Requirement in COMAR 26.08.03.09B(1)(a) for all CAFOs and MAFOs.

The following are the approved alternatives to the 100-foot setback, which have been established by MDE in consultation with the Maryland Department of Agriculture (MDA), Natural Resources Conservation Service (NRCS) and the University of Maryland Extension (UME).

Option 1: A 35-foot vegetative buffer strip established in accordance with the NRCS Practice Standards 390, 391, or 393, or systems as approved by MDE in coordination with the MDA, NRCS and UME which is included in the GD Permit.

The buffer strip shall consist of a permanent vegetative planting that is not part of a cropland or pasture rotation. The location, layout, and density of the buffer strip shall reflect the intended purpose of the practice, conditions of the site, and the objectives of the land user. Site preparation and planting to establish the buffer strip shall be done at a time and manner to insure survival and growth of the selected species. Select plant species that are native to Maryland, or are introduced and are non-invasive (i.e., not likely to spread beyond the planted area and displace native species). See Maryland NRCS 390, 391, and 393 Conservation Practice Standards for more details. Existing naturally vegetated areas may also qualify as buffers if they meet the criteria in the applicable standard.

DORCHESTER COUNTY SERVICE CENTER
204 CEDAR STREET, SUITE 201
CAMBRIDGE, MD 21613
(410) 228-5640

TERESA KAMPMEYER
DISTRICT CONSERVATIONIST

Conservation Plan

HOWARD HARDING FARMS, LLC
29654 PENNY LANE
EASTON, MD 21601

OBJECTIVE(S)

This Conservation Plan covers an approximately 73 acres tilled cropland, most of the farmland is under pivot irrigations. There are 2 poultry operations covered under this Conservation Plan. Houses 1&2 have been closed down for poultry use. Houses 3 through 6 are known as Brookview Farms and have a total capacity of 80,000 large birds. Mr. Harding raises birds for Mountaire Farms.

NO manure is utilized on the cropping operation of this tract due to high Phosphorous levels. There are two irrigation pivots located on the farm in fields 2 and 5&6. Minimum tillage practices are utilized during most crop years with a rotation of field corn, wheat, double crop soybeans and the occasional vegetable/watermelon crop. Conventional tillage may be utilized when needed and during watermelon cropping. Cover Crop is utilized depending on crop rotation and weather conditions. Mr. Harding has participated in the Maryland Cover Crop program in the past, this farm may be included depending on crop rotation and weather conditions. There is one Blue Line Ditch that runs from Indiantown Road between fields 3 and 4. Critical area is located across the eastern side of the farm. There is a wetland area within the Other Rural Land area of the property.
Current conservation objectives include: good stewardship and crop production.

Crop

Tract: 1317

Conservation Crop Rotation(328)

Grow crops in a planned rotation to protect the soil from erosion; help control weeds, insects, and diseases; and improve the physical condition of the soil. Noxious weeds (Johnsongrass, shattercane, Canada thistle, plumeless thistle, musk thistle, bull thistle) must be controlled as required by State Law and not allowed to go to seed.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	2.8 ac	3	2021	2.8 ac	3/18/2021'
2	20.1 ac	3	2021	20.1 ac	3/18/2021'
3	4.3 ac	3	2021	4.3 ac	3/18/2021'
4	5.1 ac	3	2021	5.1 ac	3/18/2021'
5	8.2 ac	3	2021	8.2 ac	3/18/2021'
6	32.7 ac	3	2021	32.7 ac	3/18/2021'
Total:	73.2 ac			73.2 ac	

Nutrient Management(590)

Manage the amount, form, placement and timing of plant nutrient application to protect surface and groundwater from runoff and/or leaching of nutrients. A Nutrient Management Plan (NMP) will be developed and followed for each crop to be grown on each field. This NMP will be developed by a consultant licensed and certified by the Maryland Department of Agriculture. The Maryland Water Quality Improvement Act of 1998 requires all nutrient management plans to address both nitrogen and phosphorus as the limiting nutrients. The NMP will account for all sources and forms of plant nutrients applied for plant growth and production. The amount of all nutrients applied must be based on a current analysis of the soil's potential to produce a realistic yield. All fields will have current soil test analysis of not more than 3 years old. Plans should be implemented as written, and updated at least every 3 years or whenever there is a major change in the farming operation. Records will be kept which document, at a minimum; crops & crop acres, animal type and number, sources of nutrients applied including pounds/tons of commercial fertilizer and/or animal manure applied and how nutrients may have been incorporated. Records will note when the crops were planted, harvested, and the yields were obtained for each individual field or management unit.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	32.7 ac	3	2021	2.8 ac	3/18/2021'
2	20.1 ac	3	2021	20.1 ac	3/18/2021'
3	4.3 ac	3	2021	4.3 ac	3/18/2021'
4	5.1 ac	3	2021	5.1 ac	3/18/2021'
5	8.2 ac	3	2021	8.2 ac	3/18/2021'
6	32.7 ac	3	2021	32.7 ac	3/18/2021'
Total:	103.1 ac			73.2 ac	

Residue and Tillage Management, Reduced Till(345)

Implement a reduced-tillage system to maintain at least 30% surface residue after planting for all crops grown on these fields. Mulch-tillage will help to control erosion, improve water quality, and improve soil organic matter.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	2.8 ac	8	2021		
2	20.1 ac	8	2021		
3	4.3 ac	8	2021		
4	5.1 ac	8	2021		
5	8.2 ac	8	2021		
6	32.7 ac	8	2021		
Total:	73.2 ac				

Farmstead

Tract: 1317

Composting Facility(317)

A facility for biological stabilization of organic waste material had been constructed, attached to the PWSS. See the Composting Engineering plan for construction specifications. See the "Composting Operation and Maintenance Plan" for the planned management of the facility and maintenance. The composted material will be utilized per the operator's "Nutrient Management" or "Other Utilization Options Plan". 6 Bin 1 Channel Composter completed 5-26-1998

Field	Planned Amount	Month	Year	Applied Amount	Date
7	1. no	3	1997	1 no	5/11/1998
Total:	1. no			1. no	

Comprehensive Nutrient Management Plan - Written(102)

Obtain a comprehensive nutrient management plan (CNMP) that describes and documents a conservation system within a conservation plan that is unique to animal feeding operations. The CNMP addresses all aspects of the Animal Feeding Operation including manure handling, nutrient management, feed management, and other conservation practices. Maryland Department of the Environment requires that a CNMP that is developed to meet EPA/MDE CAFO regulatory requirements to control soil erosion and protect water quality must be implemented as scheduled.

Field	Planned Amount	Month	Year	Applied Amount	Date
7	1. no	8	2021		
Total:	1. no				

Heavy Use Area Protection(561)

Heavy Use Area (HUA) pads were constucted at the load-out doors of poultry houses 1 & 6 and both ends of the PWSS. The Heavy Use Area reduces erosion and improves water quality by providing a stable area for handling manure during partial or total cleanout.

(6) HUA pads were completed on 10/20/2010 under State of Maryland MACS program. NW-2010-1854B Maintenance contract expires November 10, 2020 7,770.54 sq ft

Field	Planned Amount	Month	Year	Applied Amount	Date
7	0.6 ac	12	2009	0.6 ac	10/20/2010
Total:	0.6 ac			0.6 ac	

Pond(378)

Maintain existing pond. Inspect regularly for pipe blockages, especially after heavy rains. Immediately repair any damage or eroding areas. Mow the dam and emergency spillway (if applicable) at least twice annually and remove any woody growth. Lime and fertilize grass areas according to soil test results. Contact NRCS (as needed) for assistance.

Field	Planned Amount	Month	Year	Applied Amount	Date
7	1. no	1	1983	1 no	8/15/1983
Total:	1. no			1. no	

Waste Storage Facility(313)

A manure storage structure has been constructed at the location shown on the plan map. The structure was built according to NRCS design, it should be operated and maintained in accordance with a Comprehensive Nutrient Management Plan or a Waste Management System plan developed for this operation. All necessary permits and notifications were obtained before construction. 40 ft X 188 ft Waste Storage Facility completed 5-26-1998

Field	Planned Amount	Month	Year	Applied Amount	Date
7	1. no	3	1997	1 no	5/11/1998
Total:	1. no			1. no	

CERTIFICATION OF PARTICIPANTS

For Mary Harding 10/29/21
HOWARD HARDING FARMS, LLC DATE

CERTIFICATION OF:

DORCHESTER SCD
Karen Houtman 10/14/2021
KAREN HOUTMAN DATE

CERTIFIED CONSERVATION PLANNER III
Cathy Scott 10-14-2021
CATHY SCOTT DATE

PUBLIC BURDEN STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0578-0013. The time required to complete this information collection is estimated to average 45/0.75 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection information.

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The above statements are made in accordance with the Privacy Act of 1974 (5 U.S.C 522a). Furnishing this information is voluntary; however failure to furnish correct, complete information will result in the withholding or withdrawal of such technical or financial assistance. The information may be furnished to other USDA agencies, the Internal Revenue Service, the Department of Justice, or other state or federal law enforcement agencies, or in response to orders of a court, magistrate, or administrative tribunal.

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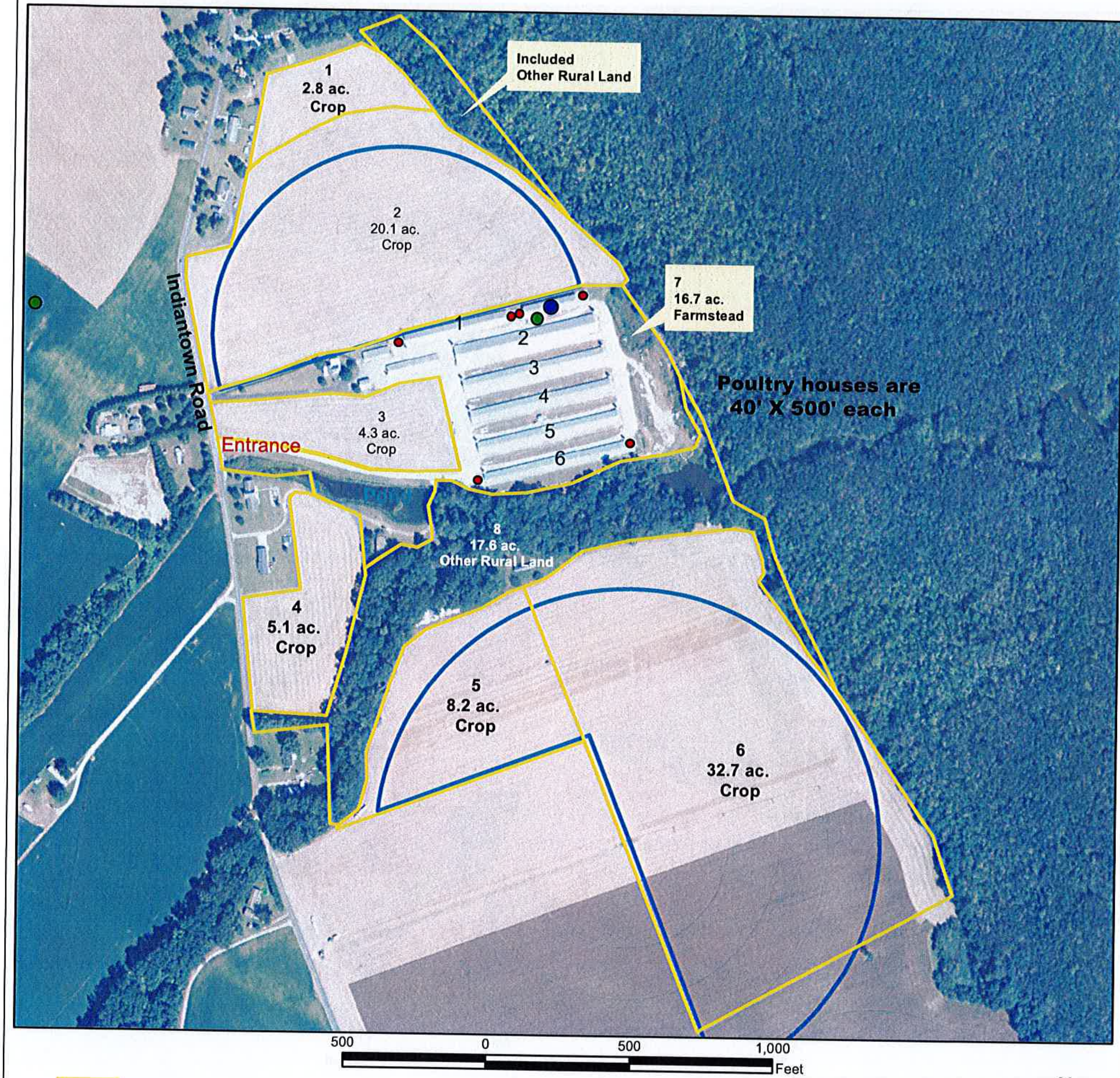
1400 Independence Avenue, SW.
Washington, DC 20250-9410

Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of hearing, or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer, and lender. Persons with disabilities who require alternative means for communication of program information (e.g., Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Conservation Map

Customer: HOWARD HARDING FARMS, LLC
Farm Name: BROOKVIEW FARM
OPID: 3307260
Farm: 2804 Tract: 1317

Assisted By: CATHY SCOTT
Field Office: DORCHESTER SCD
Date: AUGUST 5, 2021
Acres: 103.73 (Parcel)



Planned Land Units
Irrigation Pivot
HUA
Animal Mortality Facility
Waste Storage Structure

N

Houses 1 & 2 CLOSED
Houses 3 thru 6 Brookview Farm

USDA

Soil Map

Customer: HOWARD HARDING FARMS, LLC
Farm Name: BROOKVIEW FARM
OPID: 3307260
Farm: 3648 Tract: 1317

Assisted By: CATHY SCOTT
Field Office: DORCHESTER SCD
Date: AUGUST 5, 2021
Acres: 103.73 (Parcel)

Ch Chicone mucky silt loam, frequently flooded	Pk Puckum muck, frequently flooded
FmA Fort Mott loamy sand, 0 to 2 percent slopes	RsA Runclint sand, 0 to 2 percent slopes
GaA Galestown loamy sand, 0 to 2 percent slopes	RsB Runclint sand, 2 to 5 percent slopes
GaB Galestown loamy sand, 2 to 5 percent slopes	Za Zekiah sandy loam, frequently flooded
IgA Ingleside sandy loam, 0 to 2 percent slopes	

Map Unit Description (Brief, Generated)

Dorchester County, Maryland

[Minor map unit components are excluded from this report]

Map unit: Ch - Chicone mucky silt loam, frequently flooded

Component: Chicone (75%)

The Chicone component makes up 75 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains, coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 14 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map unit: FmA - Fort Mott loamy sand, 0 to 2 percent slopes

Component: Fort Mott (80%)

The Fort Mott component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats. The parent material consists of Sandy eolian deposits over fluviomarine sediments fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map unit: GaA - Galestown loamy sand, 0 to 2 percent slopes

Component: Galestown (80%)

The Galestown component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 3s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map unit: GaB - Galestown loamy sand, 2 to 5 percent slopes

Component: Galestown (80%)

The Galestown component makes up 80 percent of the map unit. Slopes are 2 to 5 percent. This component is on uplands, flats. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 3s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map Unit Description (Brief, Generated)

Dorchester County, Maryland

Map unit: IgA - Ingleside sandy loam, 0 to 2 percent slopes

Component: Ingleside (75%)

The Ingleside component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats. The parent material consists of loamy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during January. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 1. Irrigated land capability classification is 1 This soil does not meet hydric criteria.

Map unit: Pk - Puckum muck, frequently flooded

Component: Puckum (85%)

The Puckum component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on coastal plains, swamps. The parent material consists of woody organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 2 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 75 percent. Nonirrigated land capability classification is 7w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map unit: RsA - Runclint sand, 0 to 2 percent slopes

Component: Runclint (75%)

The Runclint component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during January. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4s. Irrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map unit: RsB - Runclint sand, 2 to 5 percent slopes

Component: Runclint (75%)

The Runclint component makes up 75 percent of the map unit. Slopes are 2 to 5 percent. This component is on uplands, knolls. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during January. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4s. Irrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map Unit Description (Brief, Generated)

Dorchester County, Maryland

Map unit: Za - Zekiah sandy loam, frequently flooded

Component: Zekiah (75%)

The Zekiah component makes up 75 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains, coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

AFO RESOURCE CONCERNS EVALUATION WORKSHEET

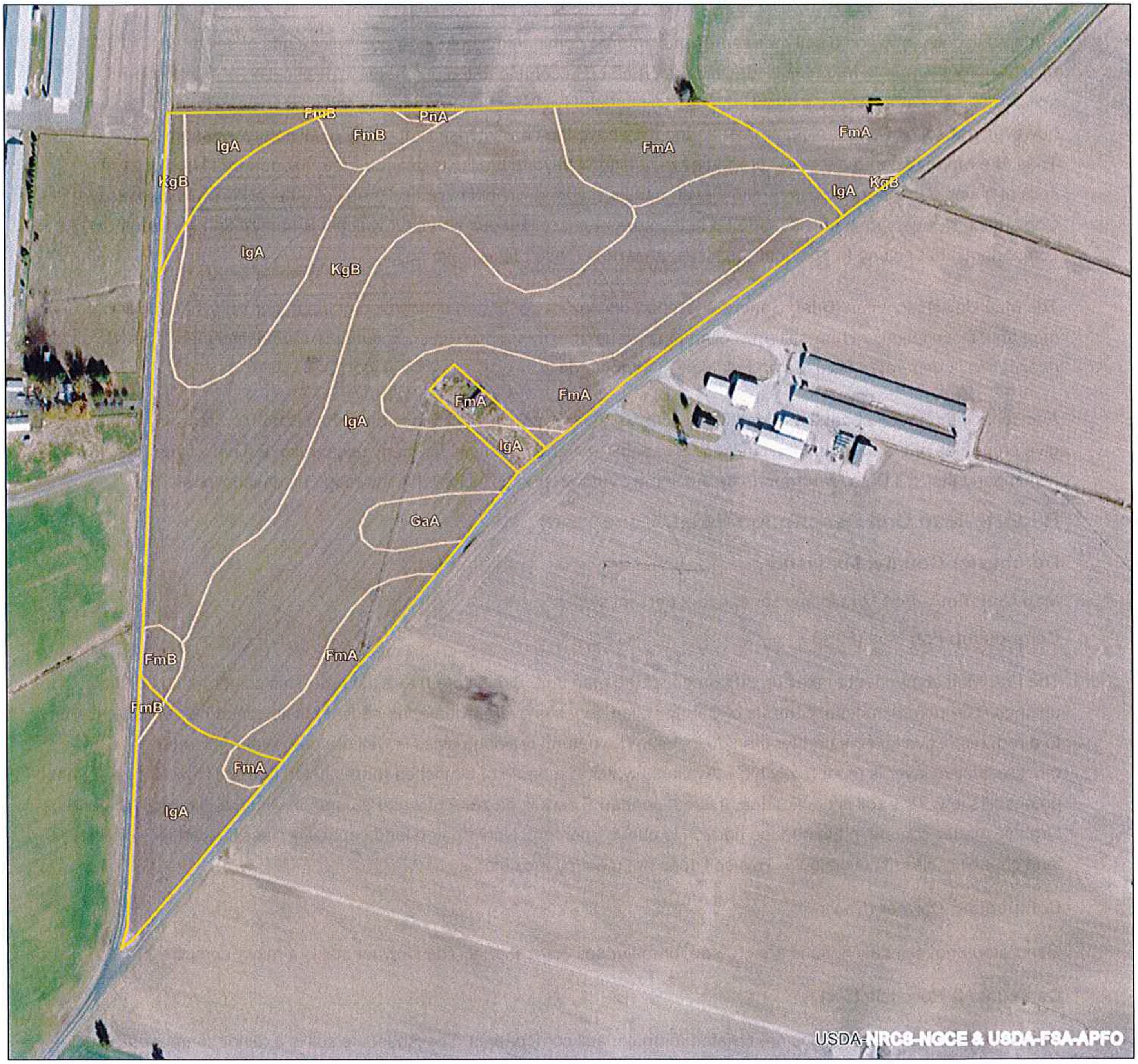
Name:		Howard Harding Farms, LLC		**Agency Interest #:**	67961
Planner:		Cathy Scott		**Farm # / Tract #:**	2804 / 1317
Site Visit Date:		9-10-2021		**Total Acres:**	103.73
County:		Dorchester		**Production Area Acres:**	16.7 acres Farmstead
RESOURCE CONCERN		**YES**	**NO**	**Assessment**	
a.	Biosecurity measures	☐	☑	The operator is following biosecurity measures as outlined by the integrator and MDA Animal Health.	
b.	Chemical handling	☐	☑	Chemicals related to poultry production are stored in the appropriate designated storage area.	
c.	Cultural resources	☐	☑	The production area is established and there are no proposed ground disturbance activities scheduled for the area.	
d.	Feedlot area	☐	☑	Not Applicable - no feedlot area.	
e.	Floodplains	☐	☑	This is an existing operation and the production area is not located in the FEMA-100 Year Floodplain as per the on-line resources available.	
f.	Gully erosion	☐	☑	No gully erosion was identified in the production area or associated water conveyances.	
g.	Livestock travel lanes	☐	☑	Not Applicable.	
h.	Nutrient discharge	☑	☐	The potential for discharge was observed. Manure is outside and within close proximity of outlet waters.	
i.	Objectionable odors	☐	☑	Normal poultry or livestock odors associated with this the type of operation or facility were noted.	
j.	Particulate matter emissions	☐	☑	Normal particulate emissions associated with a facility of this size.	
k.	Ponding, flooding, seasonal high water table	☐	☑	No abnormal ponding, flooding or high water table issues were identified.	
l.	Sediment	☐	☑	No obvious and observable sediment discharges are occurring from the production area.	
m.	Streambank/shoreline erosion	☐	☑	No streambank or shoreline areas are present in the production area.	
n.	Threatened/endangered species	☐	☑	No geospatial indicators have been identified on the production area.	
o.	Waste storage	☐	☑	There are no resource concerns identified for waste storage. Existing waste storage facilities are adequately sized for the operation and are consistent with the waste management system plan.	
p.	Waterways	☐	☑	Maryland regulated waterways have been identified on the property and are greater than 100 feet from the production facilities. This is an existing facility with all required BMPs. No further action is required.	
q.	Wetlands	☑	☐	This is an existing operation and Maryland regulated wetlands have been identified on the property and are within 100 feet from the production facilities. The location of the regulated wetland is ..... management practices are in place to protect the wetlands.)	

Date: 9/3/2021

Soils Map

Client(s): HOWARD HARDING FARMS, LLC
OPID: 331400
Farm: 3650 Tract 2538
Approximate Acres: 50.83

Assisted By: Catherine Scott
DORCHESTER COUNTY SERVICE CENTER
DORCHESTER SCD



Prepared with assistance from USDA-Natural Resources Conservation Service

0 400 Feet

Practice Schedule PLUs

Soils

Soil Mapunit

N

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Dorchester County, Maryland

Map Unit: FmA--Fort Mott loamy sand, 0 to 2 percent slopes

Component: Fort Mott (80%)

The Fort Mott component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of Sandy eolian deposits over fluviomarine sediments fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria.

Component: Downer (5%)

Generated brief soil descriptions are created for major soil components. The Downer soil is a minor component.

Component: Rosedale (5%)

Generated brief soil descriptions are created for major soil components. The Rosedale soil is a minor component.

Component: Ingleside (5%)

Generated brief soil descriptions are created for major soil components. The Ingleside soil is a minor component.

Component: Runclint (5%)

Generated brief soil descriptions are created for major soil components. The Runclint soil is a minor component.

Map Unit: FmB--Fort Mott loamy sand, 2 to 5 percent slopes

Component: Fort Mott (80%)

The Fort Mott component makes up 80 percent of the map unit. Slopes are 2 to 5 percent. This component is on flats, uplands. The parent material consists of Sandy eolian deposits over fluviomarine sediments fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Downer (5%)

Generated brief soil descriptions are created for major soil components. The Downer soil is a minor component.

Component: Ingleside (5%)

Generated brief soil descriptions are created for major soil components. The Ingleside soil is a minor component.

Component: Rosedale (5%)

Generated brief soil descriptions are created for major soil components. The Rosedale soil is a minor component.

Component: Runclint (5%)

Generated brief soil descriptions are created for major soil components. The Runclint soil is a minor component.

Map Unit: GaA--Galestown loamy sand, 0 to 2 percent slopes

Component: Galestown (80%)

The Galestown component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 3s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria.

Component: Fort Mott (5%)

Generated brief soil descriptions are created for major soil components. The Fort Mott soil is a minor component.

Component: Ingleside (5%)

Generated brief soil descriptions are created for major soil components. The Ingleside soil is a minor component.

Component: Cedartown (5%)

Generated brief soil descriptions are created for major soil components. The Cedartown soil is a minor component.

Component: Runclint (5%)

Generated brief soil descriptions are created for major soil components. The Runclint soil is a minor component.

Map Unit: IgA--Ingleside sandy loam, 0 to 2 percent slopes

Component: Ingleside (75%)

The Ingleside component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of loamy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during January. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 1. Irrigated land capability classification is 1 This soil does not meet hydric criteria.

Component: Cedartown (5%)

Generated brief soil descriptions are created for major soil components. The Cedartown soil is a minor component.

Component: Downer (5%)

Generated brief soil descriptions are created for major soil components. The Downer soil is a minor component.

Component: Woodstown (5%)

Generated brief soil descriptions are created for major soil components. The Woodstown soil is a minor component.

Component: Rosedale (5%)

Generated brief soil descriptions are created for major soil components. The Rosedale soil is a minor component.

Component: Hammonton (5%)

Generated brief soil descriptions are created for major soil components. The Hammonton soil is a minor component.

Map Unit: KgB--Klej-Galloway complex, 0 to 5 percent slopes

Component: Klej (45%)

The Klej component makes up 45 percent of the map unit. Slopes are 0 to 5 percent. This component is on flats, uplands. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during February. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Galloway (35%)

The Galloway component makes up 35 percent of the map unit. Slopes are 0 to 5 percent. This component is on flats, uplands. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during February. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Hurlock, drained (5%)

Generated brief soil descriptions are created for major soil components. The Hurlock, drained soil is a minor component.

Component: Berryland, drained (5%)

Generated brief soil descriptions are created for major soil components. The Berryland, drained soil is a minor component.

Component: Runclint (5%)

Generated brief soil descriptions are created for major soil components. The Runclint soil is a minor component.

Component: Askecksy, drained (5%)

Generated brief soil descriptions are created for major soil components. The Askecksy, drained soil is a minor component.

Map Unit: PnA--Pone mucky sandy loam, 0 to 2 percent slopes

Component: Pone, drained (50%)

The Pone, drained component makes up 50 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of sandy and loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is rarely ponded. A seasonal zone of water saturation is at 5 inches during January, February, March. Organic matter content in the surface horizon is about 11 percent. Nonirrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil meets hydric criteria.

Component: Pone, undrained (30%)

The Pone, undrained component makes up 30 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of sandy and loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is rarely ponded. A seasonal zone of water saturation is at 5 inches (depth from the mineral surface is 3 inches) during January, February, March. Organic matter content in the surface horizon is about 68 percent. Below this thin organic horizon the organic matter content is about 11 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Component: Hammonton (5%)

Generated brief soil descriptions are created for major soil components. The Hammonton soil is a minor component.

Component: Hurlock, drained (5%)

Generated brief soil descriptions are created for major soil components. The Hurlock, drained soil is a minor component.

Component: Klej (5%)

Generated brief soil descriptions are created for major soil components. The Klej soil is a minor component.

Component: Fallsington, drained (5%)

Generated brief soil descriptions are created for major soil components. The Fallsington, drained soil is a minor component.

Data Source Information

Soil Survey Area: Dorchester County, Maryland

Survey Area Data: Version 20, Jun 11, 2020

Conservation Plan Map

Date: 7/22/2014

Customer(s): LINDA HUBBARD (LANDOWNER)
WEBB HUBBARD (OPERATOR T2751)
GARY HUBBARD SR. (OPERATOR T2750)

District: DORCHESTER SCD

Approximate Acres: 434

Field Office: DORCHESTER COUNTY SERVICE CENTER

Tracts: 2750 & 2751

Assisted By: Brittni Rideout

N

1,320 0 1,320 2,640 Feet

Legend

Linda Hubbard T2750 & T2751

USDA NRCS Natural Resources Conservation Service

Rusle Program Version:
Rusle Science Version:
Data Base:

RUSLE2 Erosion Calculation Record

File: plans\Harding_H_t2538
Access Group: R2_NRCS_Fld_Office

Inputs:

Owner name	*Location*	*Info*
Howard Harding	**USA\Maryland\Dorchester County**	**Basic Rotation Corn manure Wheat Soybeans vegetables**

Field name	*Soil*	*Slope T Value*	*Slope length, ft*	*Slope steepness, %*
CO 1	soils\Dorchester County, Maryland\IgA Ingleside sandy loam, 0 to 2 percent slopes\Ingleside sandy loam 75%	5.0	150	2.0
CODC	soils\Dorchester County, Maryland\GaB Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 80%	5.0	150	2.0

Results:

Field name	*Description*	*Contouring system*	*Support practices*	*Terrace/diversion system*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI*	*Fuel cost*
CO 1	Field #2, irrigated, 4 year crop rotation	contour-systems\b. absolute row grade 1 percent	-- none --	-- none --	1.5	1.5	0.42	31	0	0
CODC	Field #3, non-irrigated, 4 year crop rotation	contour-systems\b. absolute row grade 1 percent	-- none --	-- none --	0.73	0.73	0.41	31	0	0

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

Soils Map

Date: 7/22/2014

Customer(s): LINDA HUBBARD
WEBB HUBBARD

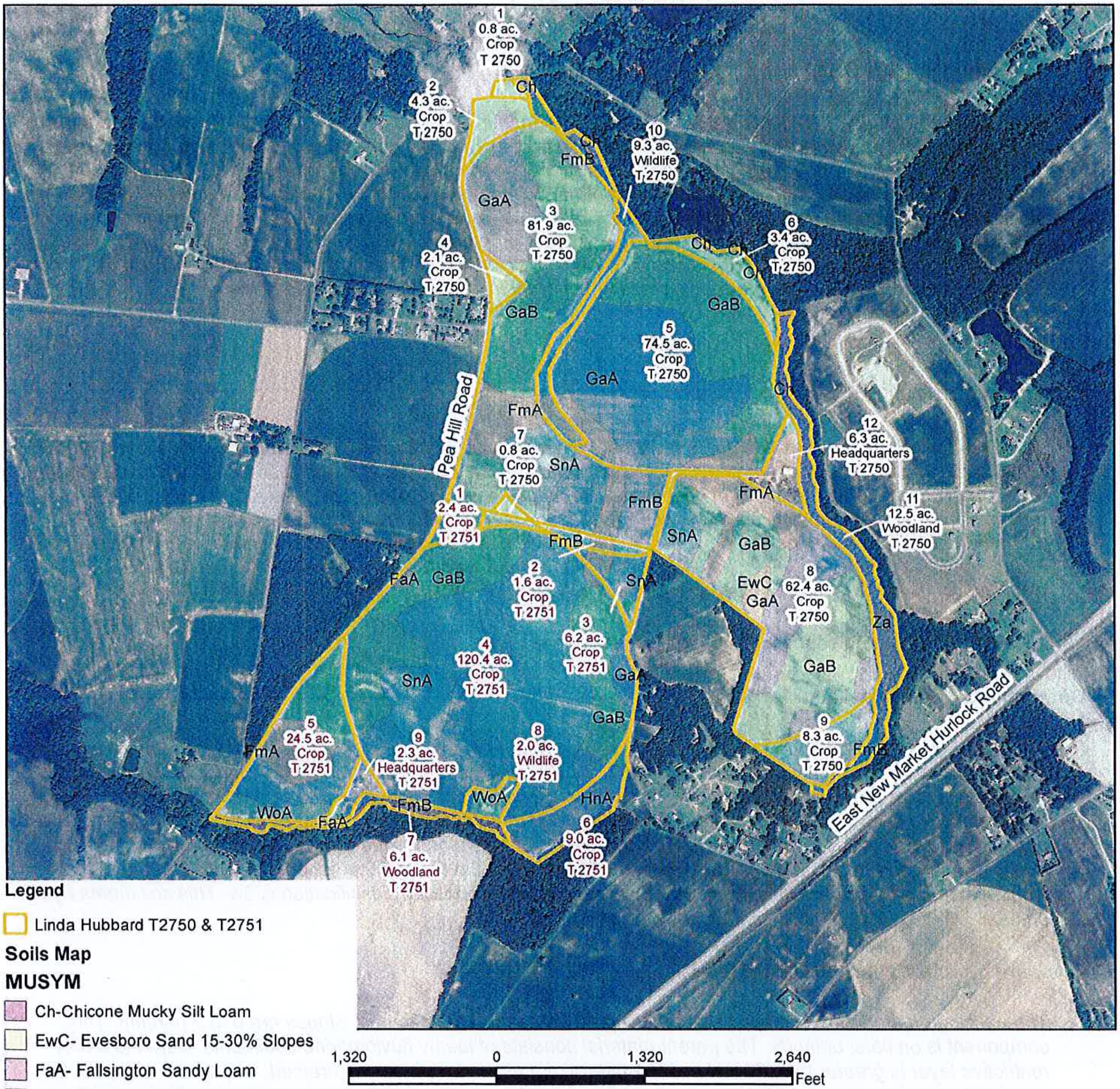
District: DORCHESTER SCD

Approximate Acres: 434

Field Office: DORCHESTER COUNTY SERVICE CENTER

Tracts: 2750 & 2751

Assisted By: Brittni Rideout



Legend

Linda Hubbard T2750 & T2751

Soils Map

MUSYM

- Ch-Chicone Mucky Silt Loam
- EwC- Evesboro Sand 15-30% Slopes
- FaA- Fallsington Sandy Loam
- FmA-Fort Mott Loamy Sand 0-2% Slopes
- FmB-Fort Mott Loamy Sand 2-5% Slopes
- GaA- Galestown Loamy Sand 0-2% Slopes
- GaB-Galestown Loamy Sand 2-5% Slopes
- HnA- Hammonton Sandy Loam
- SnA- Sassafras Loam
- WoA- Woodstown Loam
- Za- Zekiah Sandy Loam

Map Unit Description (Brief, Generated)

Dorchester County, Maryland

[Minor map unit components are excluded from this report]

Map unit: Ch - Chicone mucky silt loam, frequently flooded

Component: Chicone (75%)

The Chicone component makes up 75 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains, coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 14 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map unit: EwC - Evesboro sand, 5 to 10 percent slopes

Component: Evesboro (75%)

The Evesboro component makes up 75 percent of the map unit. Slopes are 5 to 10 percent. This component is on uplands, knolls. The parent material consists of sandy eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria.

Map unit: FaA - Fallsington sandy loam, 0 to 2 percent slopes

Component: Fallsington, drained (40%)

The Fallsington, drained component makes up 40 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is rarely ponded. A seasonal zone of water saturation is at 14 inches during January, February, March, April. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil meets hydric criteria.

Component: Fallsington, undrained (40%)

The Fallsington, undrained component makes up 40 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is occasionally ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April. Organic matter content in the surface horizon is about 68 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Map Unit Description (Brief, Generated)

Dorchester County, Maryland

Map unit: HnA - Hammonton sandy loam, 0 to 2 percent slopes

Component: Hammonton (80%)

The Hammonton component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats, shallow depressions. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during February. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: SnA - Sassafras loam, 0 to 2 percent slopes

Component: Sassafras (80%)

The Sassafras component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 1. Irrigated land capability classification is 1 This soil does not meet hydric criteria.

Map unit: WoA - Woodstown loam, 0 to 2 percent slopes

Component: Woodstown (80%)

The Woodstown component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during February. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. Irrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: Za - Zekiah sandy loam, frequently flooded

Component: Zekiah (75%)

The Zekiah component makes up 75 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains, coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

USDA NRCS Natural Resources Conservation Service

Rusle Program Version:
Rusle Science Version:
Data Base:

RUSLE2 Erosion Calculation Record

File: plans\Hubbard_t2750
Access Group: R2_NRCS_Fld_Office

Inputs:

Owner name	*Location*	*Info*
Linda Hubbard	**Maryland\Dorchester County**	

Field name	*Soil*	*Slope T Value*	*Slope length, ft*	*Slope steepness, %*
1-4,6-8	Dorchester County, Maryland\GaB Galestown loamy sand, 2 to 5 percent slopes\Galestown loamy sand 80%	5.0	150	1.0
5	Dorchester County, Maryland\GaA Galestown loamy sand, 0 to 2 percent slopes\Galestown loamy sand 80%	5.0	150	1.0
9	Dorchester County, Maryland\FmB Fort Mott loamy sand, 2 to 5 percent slopes\Fort Mott loamy sand 80%	5.0	150	1.0

Results:

Field name	*Description*	*Contouring system*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI*	*Fuel cost*
1-4,6-8	Basic Crop Rotation	b. absolute row grade 0.1 percent	0.17	0.17	0.56	23	0	18.9
5	Basic Crop Rotation	b. absolute row grade 0.1 percent	0.17	0.17	0.56	23	0	18.9
9	Basic Crop Rotation	b. absolute row grade 0.1 percent	0.25	0.25	0.56	23	0	18.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

HF6	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.75	0.75	0.39	28	0	30.99
HF7	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.58	0.58	0.46	28	0	30.39
HF8	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.52	0.52	0.41	28	0	30.68
HF9	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.58	0.58	0.46	28	0	30.39
HF9A	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.44	0.44	0.42	28	0	30.68

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

Field name	*Description*	*Contouring system*	*Support practices*	*Terrace/diversion system*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI*	*Fuel cost*
HF1	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.26	0.26	0.43	28	0	30.68
HF2	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.53	0.53	0.41	28	0	30.99
HF3	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.63	0.63	0.40	28	0	30.68
HF4	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.52	0.52	0.41	28	0	30.68
HF5	Residuals/Sweet Corn/Wheat - DC Beans/SG Cover/Watermelon Hi Prod/SG Harvest/conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.52	0.52	0.41	28	0	30.68

between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

USDA NRCS Natural Resources Conservation Service

Rusle Program Version:
Rusle Science Version:
Data Base:

RUSLE2 Erosion Calculation Record

File: plans\Howard Harding_Hastings
Access Group: R2_NRCS_Fld_Office

Inputs:

Owner name	*Location*	*Info*
Howard Harding - Hasting Farm	**USA\Maryland\Dorchester County**	

Field name	*Soil*	*Slope T Value*	*Slope length, ft*	*Slope steepness, %*
HA1	soils\Wicomico County, Maryland\KgB Klej-Galloway complex, 0 to 5 percent slopes\Klej Loamy sand 45%	5.0	180	0.50
HA1A	soils\Wicomico County, Maryland\KgB Klej-Galloway complex, 0 to 5 percent slopes\Klej Loamy sand 45%	5.0	180	0.50

Results:

Field name	*Description*	*Contouring system*	*Support practices*	*Terrace/diversion system*	*Cons. plan. soil loss, t/ac/yr*	*Sed. delivery, t/ac/yr*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI*	*Fuel cost*
HA1	Residuals/Corn/SG Cover/Watermelon Hi Prod/SG Harvest/Corn/SG Cover/ conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.22	0.22	0.43	28	0	30.68
HA1A	Residuals/Corn/SG Cover/Watermelon Hi Prod/SG Harvest/Corn/SG Cover/ conservation till	contour-systems\b. absolute row grade 2 percent	-- none --	-- none --	0.23	0.23	0.40	28	0	30.68

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance