



APPENDIX A

Nutrient Management Plan For

Wulf Cattle Depot
Corson County, SD

Prepared by DeHaan, Grabs & Associates, LLC,
Mandan, ND

October 2020

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Section A: Narrative

1. Introduction for Wulf Cattle Depot Nutrient Management Plan

This Nutrient Management Plan was developed for Wulf Cattle Depot, which was Corson County Feeders and the relevant parts of the Corson County Feeders CNMP plan have been used in this NMP. The site is located on the east side of McLaughlin, South Dakota, from the intersection of US Highway 12 & State Highway 63, go 1/2 mile north & 1/2 mile east. The feedlot is located on the south side of the road. The facility is an open lot beef feedlot that has a maximum capacity of 12,400 head of livestock. This Nutrient Management Plan was developed as a joint effort between Wulf Cattle Depot, the Natural Resources Conservation Service (Items from old CNMP plan were used), and DeHaan, Grabs & Associates, LLC.

The total available for crop uptake of N (231,426 lbs) and available P₂O₅ (735,475 lbs) produced annually by the livestock was determined by DeHaan, Grabs & Associates, LLC using SD-CPA-63A. The Holding Ponds have capacity of 22,763,595 gallons (this includes a small portion of the basins) within the freeboard level. The Holding Ponds have capacity at the Maximum Operating Elevation of 11,218,511 gallons. The volume between the Freeboard and the Maximum Operating Elevation is 11,545,084 gallons. This will be applied through center pivot irrigation. The rate will be calculated in accordance to the crop needs using the SD-CPA-63. The NMP includes 7,551.9 acres of agricultural land, most of which is available for manure application. After excluded acres the land available on a nitrogen basis is approximately 7,312.3 acres. The typical crops grown will be rotated in various sequences to complete a sound agronomic rotation. It is important to remember that the rotation will be adjusted based off of market forces, weather, feed requirements, economic influences, etc. When calculating projected land base requirements and RUSLE 2 calculations, Corson County average yields x 110% was used. When calculating annual nutrient application needs, actual yields on a per field basis will be used. P₂O₅ is in excess of removal. At this rate, it will take approximately 8 years to build all listed fields up to 50 ppm P₂O₅ (Olsen).

The record keeping section is important for the proper application of nutrients from the facility. Records of commercial fertilizer will also be maintained. The facility will maintain the following documentation from each application of manure or wastewater: current soil sample analysis, current manure or wastewater analysis, records showing equipment calibration, a Water Quality Risk Assessment (WQRA) map showing actual area application, and a completed SD-CPA 63 summary showing calculated application rate based on South Dakota State University (SDSU) recommendations.

Comprehensive Nutrient Management Plan

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

Farm contact information: Wulf Cattle Depot, (Lucas Sutherland) 605-823-4467
PO Box 560
McLaughlin, SD 57642

Latitude/Longitude: 45.816N & 100.8069W

Plan Period: 2020-2024

Animal Type: Beef **Animal Units:** 12,400

Owner/Operator

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

Signature: Daryl Jager
Name: Riverview, LLP, Dba Wulf Cattle Depot

Date: 10/3/2020

Conservation Planner

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

Signature: Nathan Pesta
Name: Nathan A. Pesta, P.E.
Title: Senior Project Engineer

Date: 10/3/2020

Manure and Wastewater Handling and Storage

Signature: Nathan Pesta
Name: Nathan A. Pesta, P.E.
Title: Senior Project Engineer

Date: 10/3/2020

Nutrient Management

The Nutrient Management component of this plan meets the SD Nutrient Management 590 Practice Standard.

Signature: Nathan Pesta
Name: Nathan A. Pesta, P.E.
Title: Senior Project Engineer

Date: 10/3/2020

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

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Nutrient Management Plan Contact Information

- a. Facility:**
NAME: Wulf Cattle Depot
ADDRESS: PO Box 659
400 Sale Barn Road
McLaughlin, SD 57642
PHONE NUMBER: (605) 823-4467
EMAIL: lucas@wulflimousin.com
MANAGER: Lucas Sutherland
- b. Owners:**
NAME: Riverview LLP, Dba Wulf Cattle Depot
ADDRESS: 26406 470th Ave
Morris, MN 56267
PHONE NUMBER: (320) 392-5319
- c. NMP Developed by:**
NAME: DeHaan, Grabs & Associates, LLC
Nathan A. Pesta
ADDRESS: 4200 21st St SE #101
Mandan, ND 58554
PHONE NUMBER: (701) 663-1116
CELL NUMBER: (701) 400-3950
- d. Legal Location of Facility**
NE-1/2, Section 5, T-21-N, R-27-E, Corson County, SD

e. NUTRIENT MANAGEMENT PLAN INFORMATION

Type of Livestock:..... Beef
Number of head: 12,400
Average Weight:.....650 lbs

Total Number of
Acres Included in NMP after excluded acres:.....7,312.3 acres
Is this Permitted:.....Permitted by EPA

References

The nutrient management plan was developed based on compliance criteria described in the following documents:

- ☒ **South Dakota State General Water Pollution Control Permit for concentrated animal feeding operations dated October 20, 2003**

- ☒ **USDA, Natural Resources Conservation Service (NRCS) conservation practice standard Nutrient Management ("590") dated December 2007**

- ☒ **Fertilizer Recommendations Guide, EC750, September 2005 Fertilizer Recommendations Guide, using SD-CPA-63**

- ☒ **Interpreting a Soil Test Report, AGF-514-12 Determining the Nutrient Balance**

Land Base

The nutrient management plan includes a sufficient land base to meet the Nitrogen (N)-based and/or Phosphorus (P)-based manure application requirements. P-based levels for spreading manure generally requires a significantly greater land base the N-based. When necessary, fields targeted for phosphorus-based manure application are identified in the **Manure Application Planning** section of this plan.

5. Site Specific Information

a) Operation Description

Wulf Cattle Depot is a typical open lot feedlot that has been in operation for many years. The facility currently consists of approximately 98.5 acres of open lots for the confined feeding of 12,400 head of cattle weighing greater an average of 650 lbs. There are four separate drainage areas which include a combination of sediment basins, diversions and holding ponds. The feed storage area is also contained in Area 3. The Irrigation center pivot is located to the southeast of the facility. The Holding Ponds are connected by 8” crossover pipes that are un-gated.

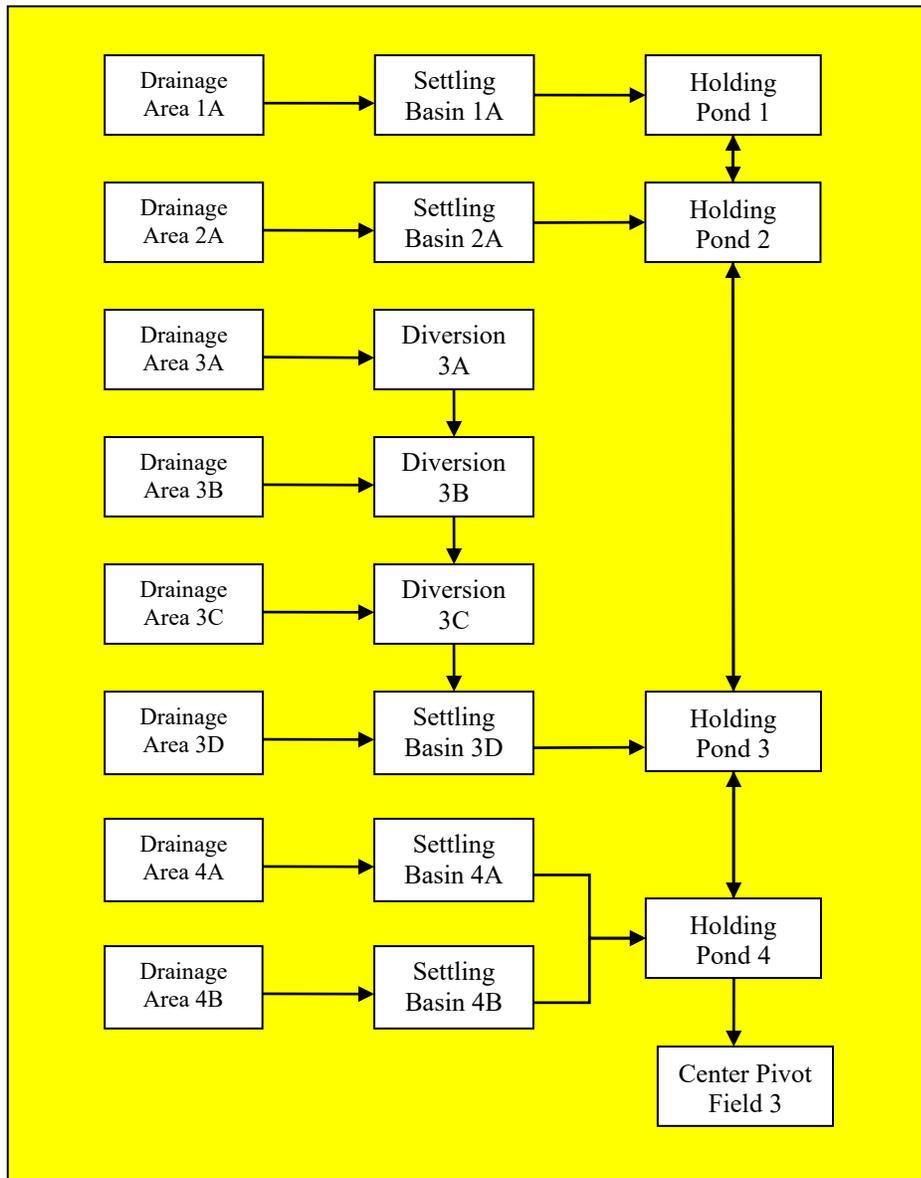
Area 1 utilizes one pen diversion to direct the flow to Settling Basin 1A before discharging into Holding Pond 1. Settling Basin 1 is designed with a perforated riser to slow down the runoff, store the annual amount of solids and pass the 25-year, 24-hour storm into the holding pond. The basin outlet utilizes concrete splash-pads to discharge the runoff into the pond. An 8” crossover pipe connects the effluent from Holding Pond 1 into Holding Pond 2 through gravity.

Area 2 will utilize three pen diversions and two basins (Basin 2A and Basin 2B) to direct the flow before discharging into Holding Pond 2. Settling Basin 2 is designed with a perforated riser to slow down the runoff, store the annual amount of solids and pass the 25-year, 24-hour storm into the holding pond. The basin outlet utilizes concrete splash-pads to discharge the runoff into the pond. An 8” crossover pipe connects the effluent from Holding Pond 2 into Holding Pond 3 through gravity.

Area 3 will utilize four diversions to direct the flow to Settling Basin 3D before discharging into Holding Pond 3. Included in this area is the working facility and half of the feed storage area. Settling Basin 3 is designed with a perforated riser to slow down the runoff, store the annual amount of solids and pass the 25-year, 24-hour storm into the holding pond. The basin outlet utilizes concrete splash-pads to discharge the runoff into the pond. An 8” crossover pipe connects the effluent from Holding Pond 3 into Holding Pond 4 through gravity.

Area 4 will utilize two diversions direct the flow to Settling Basin 4B, before discharging into Holding Pond 4. In addition Settling Basin 4A collects the runoff from pen 100 before discharging into Holding Pond 4. The settling basins are designed with perforated risers to slow down the runoff, store the annual amount of solids and pass the 25-year, 24-hour storm into the holding pond. A floating pump is used to pump the effluent to a center pivot on Field 3.

The following is a drainage flow description for the feedlot:



The facility operates within the *Lake Oahe* watershed. The Hydrologic Unit Code(s) and corresponding Water Quality Impairment(s) for the production area and land application fields include: *Huc8 – 10130102. Impairment type is 303D.*

b) Manure Management Description

The storage period as shown below is 365 days.

c) Estimated Solid Manure:

Estimates of solid waste was used based off historical data from the feedyard.

$$12,400 \text{ hd beef cattle} \times 8.4 \text{ lbs/hd/day} \div 2,000 \text{ lbs/ton} \times 365 \text{ days/year} = 19,000 \text{ tons/year}$$

d) Estimated Liquid Manure:

Wastewater estimates were determined by developing hydrologic balances using expected annual rainfall, evaporation, and runoff values from The Climatology of the US no 81, 1971-2000, NRCS Figure 10C-8, and AWM Database, McLaughlin Station).

Total Area

Total Area (153.3 acres) X Annual Runoff (CN 86) (2.7”) + Annual Rainfall on Pond (17.4”) X Area of Pond @FB (375,222 ft²) –Evaporation (33.7”) X Average Evaporation Area (219,917 ft²) = **10,688,702 gallons = 1,428,971 ft³**

Estimated Annual Manure Generation for Land Application (based on records for solids)

Type	Amount
Solid Manure	19,000 Tons
Liquid Manure	10,688,702 Gallons

e) Manure Management

100% of the waste generated at the facility will be land applied. Wulf Cattle Depot owns, leases or has manure application agreements of land of 7,551.9 acres for manure solids application. Wulf Cattle Depot has a lease or owns land for 223.6 acres for application of liquid from the runoff holding ponds. (Manure Easements in Section H) Please refer to the facility maps to see exact location of these fields and their descriptions. The solid waste will be land applied to include the sludge from the runoff holding ponds.

The liquid will be applied through two center pivot systems on crop land. Liquid will be pumped to these fields using an existing underground pipeline going to Field 3, 12B and 47B. A floating electrical pump is located in Holding Pond 4. All effluent can gravity drain to Holding Pond 4 with crossover pipes.

f) Equipment Available

Equipment Description (55 hp tractor, pto driven pump, honey wagon, center pivot, traveling gun, etc.)	Equipment Purpose (transport, collection, land application, agitate manure in basin, etc.)	Capacity (gallons per minute, gallons, bushels, acres, cubic yards, etc.)	Owned (O), Leased (L), or Contracted (C)
Holding Pond 4 Pump	Transport to Pivot on Field 3, 12B & 47B	450 GPM	(L)
Side Dump	Transport to Field	16 Cubic Yards	(O)
Pay Loader	Transport to Side Dump & Spreader	6.5 Cubic Yards	(O)
Manure Spreader	Land Applied to field	16.5 Ton Spreader	(C)

6. Land Application Rate Methodology

This facility chooses the “narrative” rate approach for expressing nutrient application rates. Thus, the methodology outlined in this Section will be adhered to each year for determining nutrient application rates, as a term of the permit. Intended crop rotations are listed for each field in Section C. SD-CPA-63; however, any crop may be planted, if necessary.

Limitations on application rates, as determined in accordance with the Nutrient Management Code 590, Table 1 and are shown in Section D, Table D.1. Maximum nutrient application rates are determined based on the following assumptions:

- The amount of N and P in the manure that will be plant available is determined based on manure nutrient sampling results.
- Nitrogen application rates (commercial fertilizer + plant available manure N) will not exceed crop N requirements minus N credits:

$$\begin{array}{r} \text{Crop N Uptake} \\ - \text{Organic Matter N Mineralization} \\ - \text{Past Year Legume N Credit} \\ - \text{Past Year Manure N Credit} \\ - \text{Soil Residual N} \\ \hline \text{Total N Application} \\ \text{(Manure + Commercial Fertilizer)} \end{array}$$

Nitrogen credits include organic matter mineralization, past year legume credits, past year manure credits, and soil residual N, are based on South Dakota State University) (SDSU) recommendations, using the SDSU EC 750 “Fertilizer Recommendations Guide” that is established in the SD-CPA 63 program. If allowable application rates are P based, P application rates from both commercial fertilizer and plant available manure P will be based on the crop P uptake listed in SD-CPA 63.

Examples of the above calculations are included in SD-CPA-63, Section C. Included in SD-CPA-63 are maximum application rates of manure per field. Also included are projections of manure applications and field nutrient balances for the next five years.

7. Nine Minimum Standards

a) Adequate Storage Verification

Manure, litter, and process wastewater storage structures shall be designed, operated, and maintained as described in Sections A and B of the permit to ensure no discharges to waters of the State.

All of the control structures were designed and built to control the runoff from a 25-year, 24-

hour storm event (3.9 inches) and annual rainfall and runoff as shown in the Appendix for Calculations. The maximum volume that was calculated was 2,942,090 ft³ and the volume provided as shown in Section M.2 is 3,043,261 ft³

b) Management of Mortalities

Mortalities shall not be disposed of in any liquid manure, storm water, or process wastewater system and shall be handled in such a way as to prevent the discharge of pollutants to surface or groundwater.

Mortalities will not be disposed of in any liquid manure, store water or process wastewater system and will be handled in such a way as to prevent the discharge of pollutants to surface or groundwater. The method for disposing of routine mortalities is cremation. Prior to disposal to the cremator these animals will be hauled to and kept in a specified area, within the facility footprint, that is easily accessible to the truck used for transport to the cremator and is not open to public view. In the case of the cremator not working, burial is the secondary method. The burial site will have soils that shall provide an adequate clay liner to protect groundwater, ensure biosecurity, and avoid creating nuisance conditions. Burial location is shown in Section R.1.

Catastrophic mortalities due to natural disasters may be handled differently than catastrophic mortalities due to foreign animal disease. In either case, the EPA Region 8 will be contacted for assistance prior to any disposal at 303-312-6312. In case of a catastrophic mortality event, Wulf Cattle Depot will contact EPA to help select a proper burial site. This site will have soils that shall provide an adequate clay liner to protect groundwater, ensure biosecurity, and avoid creating nuisance conditions. The incineration location is shown in Burial location is shown in the Burial location is shown in Section R.2.

c) Diversion of Clean Water from Production Area

Clean water shall be diverted, as appropriate, from the production area.

Freshwater runoff is diverted from the production by natural topography, diversion berms, channels, and/or waterways. Any runoff that is not diverted is retained by retention structures.

Various inspections will be conducted by the facility operator in order to ensure compliance. Storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage and containment structure will be inspected weekly. Water lines, including drinking and water or cooling lines will be visually inspected daily. These inspections will be documented on the Monthly Operations Reports. Corrective action taken during any inspections will be documented on the Monthly Operations and Annual Report as well. Natural topography and Diversion locations are shown in Section R.1.

d) Prevention of Direct Contact between Livestock and Surface Waters

Confined animals shall be prevented from having direct contact with waters of the United States.

Wulf Cattle Depot will limit the potential for contact of livestock with surface water by making

sure all livestock are kept fenced in. The facility does not have any surface water flowing through any of the pens where livestock are kept.

e) Chemical Handling

Chemicals and other contaminants shall not be disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.

Wulf Cattle Depot will ensure that chemicals (including but not limited to herbicides, insecticides, pharmaceuticals, petroleum products, and cleaners) handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system. The facility will also work towards minimizing the use of potentially harmful chemicals/contaminants and ensure these products are used according to their labels and disposed of properly. Chemicals are stored in the shop as shown R.1.

f) Conservation Practices to Reduce Nutrient Loss

Site-specific conservation practices shall be implemented to control runoff of pollutants to waters of the United States.

Liquid livestock wastes will not be land applied during a precipitation event, or when the ground is frozen, snow covered, or saturated. Manure, litter, and process wastewater will not be applied closer than 100 feet to any down-gradient surface water, open tile line intake structure, sinkhole, agricultural well head or other conduits to surface water unless an approved compliance alternative is in place. Table D.1 identifies site-specific setbacks, buffers, and/or other waste application limitations for each field. Maps included in Section F, identify the locations of all setbacks. Section I includes all conservation practices in detail.

g) Protocols for Manure and Soil Testing

Manure, litter, process wastewater, and soils shall be tested following protocols as shown in Section O: Manure Application Planning.

Soil samples will be collected and prepared according to the FS 935, "Recommended Soil Sampling Methods for South Dakota". Testing will be conducted by an Agvise Laboratories using analytical procedures. Agvise Laboratories is located at 902 13 Street North, P.O. Box 187, Benson, MN 56215. Soil sampling areas will be taken from uniform areas. A certification of the location and number of representative cores collected from the field will be submitted with each soil test. A representative number of cores will be taken from each area by either of the following methods:

- Soil sample cores will be taken to a depth of 24 inches. The top 6 to 8 inches of each core will be combined to obtain a surface sample. The remaining portions of each core will be combined to obtain a profile sample. The surface sample will be tested for organic matter, pH, phosphorus, potassium, and nitrate-N. The profile sample will be tested for nitrate-N.

- Surface and profile samples will be obtained from separate cores. Surface sample cores will be taken to a depth of 6 to 8 inches and will be tested for organic matter, pH, phosphorus, and potassium. Profile soil sample cores will be taken to a depth of 24 inches and will be tested for nitrate-N.

Each field will have a surface soil test taken within 12 months prior to the first year of a new plan, and thereafter a minimum of every three years, when used for land application of manure, litter, or process wastewater. Annual testing will be conducted during the permit cycle if manure, litter, or process wastewater is applied two or more consecutive years. Profile soil samples will be taken within 12 months prior to any land application of manure, litter, or process wastewater.

Manure, litter, compost, and process wastewater will be analyzed a minimum of once annually for total nitrogen, organic nitrogen, ammonium-nitrogen, phosphorus, and moisture content. Manure samples will be collected, prepared, stored and shipped in accordance with Fact Sheet SD-NRCS-FS-36, "Sampling Manure for Nutrient Management"; this can be found in Section O. Testing will be conducted by either "Minnesota Valley Testing Laboratories, Inc, South Dakota State University testing lab or Dairyland Laboratories, Inc. A form for the SDSU testing lab is located in Section O.

H) Protocols for Land Application of Manure and Wastewater

Manure, litter, and process wastewater shall be land applied at agronomic rates, in accordance with the South Dakota State University,(SDSU) recommendations, using the SDSU EC 750, on fields specified in the approved Nutrient Management Plan as calculated and shown in the SD-CPA-63 planner. It is to note that SD-CPA-63 planner, mineralization and legume rates were planned by Ron Gelderman, soil testing program manager SDSU Plant science Department

Table D.1 lists fields under control of the facility that may potentially receive livestock waste applications during the course of the five-year NMP period. The spreadable acres listed for each field take into account any setbacks or buffers that would reduce the field acres. The Nitrate Index assesses the potential risk for loss of N from the field.

All waste application equipment will be calibrated annually to ensure that application rates are accurate. All equipment and components of the waste management systems will be checked on a regular basis. Certain items such as holding pond operating levels will be monitored weekly. Other items such as pipelines and application equipment will be monitored during application periods.

I) Recordkeeping

Records shall be maintained which document the implementation and management of this NMP. Guidelines are shown in Section N of this plan and are documented Section C. SD CPA 63 planner.

C. <input type="checkbox"/> TOPOGRAPHIC MAP		
D. TYPE OF CONTAINMENT, STORAGE AND CAPACITY		
1. Type of Containment	Total Capacity (in gallons)	
<input type="checkbox"/> Lagoon		
<input type="checkbox"/> Holding Pond		
<input type="checkbox"/> Evaporation Pond		
<input type="checkbox"/> Other: Specify _____		
2. Report the total number of acres contributing drainage: <u>153.3</u> _____ acres		
3. Type of Storage	Total Number of Days	Total Capacity (gallons/tons)
<input type="checkbox"/> Anaerobic Lagoon		
<input type="checkbox"/> Storage Lagoon		
<input type="checkbox"/> Evaporation Pond		
<input type="checkbox"/> Aboveground Storage Tanks		
<input type="checkbox"/> Belowground Storage Tanks		
<input type="checkbox"/> Roofed Storage Shed		
<input type="checkbox"/> Concrete Pad		
<input type="checkbox"/> Impervious Soil Pad		
<input type="checkbox"/> Other: Specify _____		
E. NUTRIENT MANAGEMENT PLAN		
Note: Effective February 27, 2009, a permit application is not complete until a nutrient management plan is submitted to the Permitting Authority.		
1. Please indicate whether a nutrient management plan has been included with this permit application. <input type="checkbox"/> Yes <input type="checkbox"/> No		
2. If no, please explain:		
3. Is a nutrient management plan being implemented for the facility? <input type="checkbox"/> Yes <input type="checkbox"/> No		
4. The date of the last review or revision of the nutrient management plan. Date: _____		
5. If not land applying, describe alternative use(s) of manure, litter, and/or wastewater:		
F. LAND APPLICATION BEST MANAGEMENT PRACTICES		
Please check any of the following best management practices that are being implemented at the facility to control runoff and protect water quality:		
<input type="checkbox"/> Buffers <input type="checkbox"/> Setbacks <input type="checkbox"/> Conservation tillage <input type="checkbox"/> Constructed wetlands <input type="checkbox"/> Infiltration field <input type="checkbox"/> Grass filter <input type="checkbox"/> Terrace		

III. CONCENTRATED AQUATIC ANIMAL PRODUCTION FACILITY CHARACTERISTICS						
A. For each outfall give the maximum daily flow, maximum 30-day flow, and the long-term average flow.			B. Indicate the total number of ponds, raceways, and similar structures in your facility.			
1. Outfall No.	2. Flow (gallons per day)			1. Ponds	2. Raceways	3. Other
	a. Maximum Daily	b. Maximum 30 Day	c. Long Term Average	C. Provide the name of the receiving water and the source of water used by your facility.		
				1. Receiving Water	2. Water Source	
D. List the species of fish or aquatic animals held and fed at your facility. For each species, give the total weight produced by your facility per year in pounds of harvestable weight, and also give the maximum weight present at any one time.						
1. Cold Water Species			2. Warm Water Species			
a. Species	b. Harvestable Weight (pounds)		a. Species	b. Harvestable Weight (pounds)		
	(1) Total Yearly	(2) Maximum		(1) Total Yearly	(2) Maximum	
E. Report the total pounds of food during the calendar month of maximum feeding.			1. Month	2. Pounds of Food		
IV. CERTIFICATION						
<i>I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.</i>						
A. Name and Official Title (print or type) Brady Janzen			B. Telephone (<u>320</u>) <u>392-6764</u>			
C. Signature 			D. Date Signed 10/2/2020			

FORM 1 GENERAL	U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION Consolidated Permits Program <i>(Read the "General Instructions" before starting.)</i>	I. EPA I.D. NUMBER <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:5%;">S</td> <td style="width:85%;"></td> <td style="width:5%;">T/A</td> <td style="width:5%;">C</td> </tr> <tr> <td>F</td> <td></td> <td></td> <td>D</td> </tr> <tr> <td>1</td> <td>2</td> <td>13</td> <td>14 15</td> </tr> </table>	S		T/A	C	F			D	1	2	13	14 15
S		T/A	C											
F			D											
1	2	13	14 15											
LABEL ITEMS	PLEASE PLACE LABEL IN THIS SPACE	GENERAL INSTRUCTIONS If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (<i>the area to the left of the label space lists the information that should appear</i>), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (<i>except VI-B which must be completed regardless</i>). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.												
I. EPA I.D. NUMBER														
III. FACILITY NAME														
V. FACILITY MAILING ADDRESS														
VI. FACILITY LOCATION														
II. POLLUTANT CHARACTERISTICS														
INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms .														
SPECIFIC QUESTIONS	Mark "X" YES NO FORM ATTACHED	Mark "X" YES NO FORM ATTACHED												
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)	16 17 18	B. Does or will this facility (<i>either existing or proposed</i>) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)												
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	22 23 24	D. Is this a proposed facility (<i>other than those described in A or B above</i>) which will result in a discharge to waters of the U.S.? (FORM 2D)												
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	28 29 30	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)												
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34 35 36	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)												
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	40 41 42	J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)												
III. NAME OF FACILITY														
C 1	SKIP													
15	16 - 29	30												
IV. FACILITY CONTACT														
A. NAME & TITLE (<i>last, first, & title</i>)		B. PHONE (<i>area code & no.</i>)												
C 2														
15	16	45 46 48 49 51 52 55												
V. FACILITY MAILING ADDRESS														
A. STREET OR P.O. BOX														
C 3														
15	16	45												
B. CITY OR TOWN		C. STATE												
C 4														
15	16	40 41 42 47 51												
VI. FACILITY LOCATION														
A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER														
C 5														
15	16	45												
B. COUNTY NAME														
C 6														
15	16	46 70												
C. CITY OR TOWN		D. STATE												
C 6														
15	16	40 41 42 47 51 52 -54												

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)			
A. FIRST		B. SECOND	
C 7	(specify)	C 7	(specify)
15 16	19	15 16	19
C. THIRD		D. FOURTH	
C 7	(specify)	C 7	(specify)
15 16	19	15 16	19

VIII. OPERATOR INFORMATION			
A. NAME			B. Is the name listed in Item VIII-A also the owner?
C 8	Lucas Sutherland		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15 16			55 56
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other," specify.)			D. PHONE (area code & no.)
F = FEDERAL	M = PUBLIC (other than federal or state)	P (specify)	C
S = STATE	O = OTHER (specify)		A (605) 823-4467
P = PRIVATE			15 16 18 19 21 22 26

E. STREET OR P.O. BOX	
PO Box 659, 400 Sale Barn Road	
26	55

F. CITY OR TOWN		G. STATE	H. ZIP CODE	IX. INDIAN LAND
C B	McLaughlin	SD	57642	Is the facility located on Indian lands?
15 16	40 41	42 47	51	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
				52

X. EXISTING ENVIRONMENTAL PERMITS			
A. NPDES (Discharges to Surface Water)		D. PSD (Air Emissions from Proposed Sources)	
C 9	N SD-0034606	C 9	P
15 16 17 18	30	15 16 17 18	30
B. UIC (Underground Injection of Fluids)		E. OTHER (specify)	
C 9	U	C 9	
15 16 17 18	30	15 16 17 18	30
C. RCRA (Hazardous Wastes)		E. OTHER (specify)	
C 9	R	C 9	
15 16 17 18	30	15 16 17 18	30

XI. MAP
 Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)
 This is a 12,400 head beef feedlot. The runoff from the feedlot is contained within four lined holding ponds. Nutrients generated from the site both liquid and solids are land applied in accordance with the Nutrient Management Plan.

XIII. CERTIFICATION (see instructions)		
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.		
A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Brady Janzen, Part Owner limited liability partner	<i>Brady Janzen</i>	10/31/2020

COMMENTS FOR OFFICIAL USE ONLY	
C	
15 16	55

Section B: Initial Nutrient Management
Plan

INITIAL NUTRIENT MANAGEMENT PLAN

FOR SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

SD-CPA-63A
4/08

1. Operator: <u>Wulf Cattle Depot</u>		2. County: <u>Corson</u>		3. Prepared By: <u>Nathan Pesta</u>		4. Date: <u>27-Dec-11</u>								
Total Nitrogen And Phosphorus Produced From Livestock Operation(s)														
5. Animal Type:	6. No. of animals	7. Avg. weight (lbs.)	8. Days of Confinement	9. Total Manure as Excreted (lbs.)		11. Total N available for application (lbs.)	12. Time of application	13. N Retained		14. Total N retained in field (lbs.)	15. 3-Yr. Mineralization Rate		16. N Available for the crop (lbs.)	
				N	P ₂ O ₅			Application Method	%		Manure Handling	%		
Beef	12,400	650	365	911,989	735,475	474,234	Spring/Fall/Summer	Broadcast (no incorp.)	80	379,387	Solid without bedding	61	231,426	735,475
Other Animals														
				Total Manure as Excreted: <u>475,540</u>		OR		Total lbs. of N and P ₂ O ₅ available for the crop: <u>173,572,100</u> lbs/year						

Section C: SD-CPA-63, Nutrient
Management Planning Tool

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 1: Field Information																									Part 2: Estimated Nutrient Requirement																																		
Operator: Wulf Cattle Depot															County: Corson										Date: 11/14/12										Operator: Wulf Cattle Depot															County: Corson									
Line #	Field ID (Include maps to illustrate location)	Field #	Date added to Plan	Beginning acres in field	County	Soil map unit symbol	Field Location (1/4 Section, Township, Range)	Predicted soil loss - RUSLE2 (T/ac/yr)	Control of Land	Excluded acres	Irrigated	No-Till	Current Soil Test Levels				Previous Year					Year 1					Year 2					Year 3					Year 4					Year 5																	
													N lb/ac	Phosphorus (ppm)	K (ppm)	Soil Sample Date	Crop	County Yield	Actual Yield	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal																									
1	T1631 F1	1	3/10/10	67.1	Corson	DaA	NW 1/4 Sec 3 T 21N R 26E	0.6	Owned	X	3.1	X	67	26	Olsen	492	09/19/11	Wheat, Sp (bu)	55	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	55	Oats (bu)	65																														
2	T1631 F2	2	3/10/10	89.0	Corson	RnB	NW 1/4 Sec 3 T 21N R 26E	1.1	Owned	X		X	67	26	Olsen	492	09/19/11	Wheat, Sp (bu)	55	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	55	Oats (bu)	65																														
3	T1198 F8	3	3/10/10	103.0	Corson	ShB	SW 1/4 Sec 4 T 21N R 27E	0.1	Owned			X	38	10	Olsen	318	02/15/11	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147																												
4	T1637 F2	4	3/10/10	228.0	Corson	RcC	E 1/2 Sec 5 T 21N R 26E	0.1	Owned	X	20.0	X	25	9	Olsen	288	01/23/12	Corn (bu)	120	Oats (bu)	61	Barley, Maltng (bu)	34	Sunflowers (lbs)	1,822	Corn (bu)	75	Oats (bu)	65																														
5	T11199 F3	5	3/10/10	61.0	Corson	An	NW 1/4 Sec 5 T 21N R 27E	0.1	Owned	X	5.3	X	29	9	Olsen	348	02/15/10	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
6	T11199 F6	6	3/10/10	125.0	Corson	RaB	SE 1/4 Sec 5 T 21N R 27E	0.1	Leased	X	5.1	X	29	9	Olsen	373	02/15/10	Wheat, Sp (bu)	55	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Corn (bu)	65																																
7	T1764 F1	7	3/10/10	129.4	Corson	ShB	NW 1/4 Sec 6 T 21N R 27E	0.1	Leased	X	6.5	X	17	14	Olsen	350	01/17/12	Corn (bu)	120	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,492																														
8	T11329 F1	8	3/10/10	72.4	Corson	ShB	SE 1/4 Sec 6 T 21N R 27E	0.1	Owned	X	12.2	X	17	13	Olsen	357	07/15/11	Barley (bu)	68	Oats (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Barley (bu)	34	Corn (bu)	65																														
9	T11329 F2	9	3/10/10	295.6	Corson	ShB	W 1/2 Sec 7 T 21N R 27E	0.1	Owned	X	16.2	X	28	17	Olsen	289	09/08/11	Wheat, Sp (bu)	55	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Corn (bu)	65																																
10	T1898 F1	10	3/10/10	139.8	Corson	ShB	NW 1/4 Sec 8 T 21N R 27E	0.5	Leased	X		X	60	19	Olsen	342	02/15/10	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
11	T1426 F1	11	3/10/10	147.7	Corson	An	NE 1/4 Sec 8 T 21N R 27E	0.1	Owned	X	2.0	X	60	19	Olsen	342	02/15/10	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
12	T1930 F1	12A	6/5/13	80.9	Corson	ShB	NE 1/4 Sec 9 T 21N R 27E	1.5	Owned	X		X	65	11	Olsen	248	09/08/11	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
13	T1929 F1	13	3/10/10	89.0	Corson	ShB	NW 1/4 Sec 9 T 21N R 27E	0.1	Leased	X	2.0	X	65	11	Olsen	248	09/08/11	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
14	T11460 F1	14	3/10/10	150.0	Corson	RaB	SE 1/4 Sec 9 T 22 R 27E	0.2	Owned	X	18.0	X	36	8	Olsen	381	12/12/11	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	28																																
15	T1894 F3	15	3/10/10	135.0	Corson	RaA	SE 1/4 Sec 9 T 22 R 27E	0.1	Leased	X		X	36	8	Olsen	381	12/12/11	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	28																																
16	T1900 F1	16	3/10/10	315.0	Corson	RaB	E 1/2 Sec 10 T 22N R 27E	0.2	Leased	X		X	68	42	Olsen	600	02/24/10	Corn (bu)	120	Corn (bu)	29	Wheat, Sp (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	65																																
17	T1763 F1	17	3/10/10	155.5	Corson	RaB	SE 1/4 Sec 13 T 21N R 26E	1.0	Leased	X	6.5	X	60	20	Olsen	376	02/15/10	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
18	T1892 F2	18	3/10/10	176.7	Corson	DaA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	30	14	Olsen	294	02/24/10	Corn (bu)	120	Corn (bu)	29	Wheat, Sp (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	65																																
19	T1892 F3	19	3/10/10	143.0	Corson	SgA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	30	14	Olsen	294	02/24/10	Corn (bu)	120	Corn (bu)	29	Wheat, Sp (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	65																																
20	T1901 F1	20	3/10/10	292.0	Corson	RaB	E 1/2 Sec 16 T 22N R 27E	0.5	Leased	X	3.5	X	44	22	Olsen	389	02/24/10	Corn (bu)	120	Corn (bu)	29	Wheat, Sp (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	65																																
21	T10091 F4	21	3/10/10	131.5	Corson	StA	N 1/2 Sec 19 T 22N R 27E	0.1	Leased	X		X	28	9	Olsen	296	02/15/10	Corn (bu)	120	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	28																																
22	T1767 F2	22	3/10/10	120.0	Corson	StA	E 1/2 Sec 30 T 22N R 27E	0.1	Leased	X	10.7	X	28	19	Olsen	347	07/21/11	Oats (bu)	80	Barley, Maltng (bu)	34	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	61	Barley, Maltng (bu)																															
23	T1767 F5	23	3/10/10	105.1	Corson	Gr	N 1/2 Sec 31 T 22N R 27E	1.0	Leased	X	15.8	X	24	24	Olsen	332	07/21/11	Oats (bu)	80	Barley, Maltng (bu)	34	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	61	Barley, Maltng (bu)																															
24	T1767 F6	24	3/10/10	61.0	Corson	ShA	SE 1/4 Sec 51 T 22N R 27E	0.1	Leased	X	3.6	X	85	38	Olsen	332	02/19/10	Oats (bu)	80	Barley, Maltng (bu)	34	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	61	Barley, Maltng (bu)																															
25	T1638 F1A	25	3/10/10	156.4	Corson	RaB	S 1/2 Sec 34 T 22N R 26E	0.3	Owned	X	7.0	X	28	7	Olsen	395	01/19/12	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65																														
26	T1638 F1B	26	3/10/10	154.0	Corson	DaA	S 1/2 Sec 34 T 22N R 26E	0.1	Owned	X	4.0	X	28	7	Olsen	395	01/19/12	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65																														
27	T1770 F1	27	3/10/10	155.5	Corson	ShA	NW 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	7.4	X	25	8	Olsen	274	07/25/11	Oats (bu)	80	Barley, Maltng (bu)	34	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	61	Barley, Maltng (bu)																															
28	T1766 F1	28	3/10/10	99.2	Corson	An	NE 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	0.0	X	51	32	Olsen	572	09/08/11	Oats (bu)	80	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,492																																
29		29	12/29/11	229.4	Corson	VhB	N 1/2 Sec 4 T 20R R 25E	0.3	Leased	X		X	20	12	Olsen	280	12/14/11	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	28																														
30		30	12/29/11	155.7	Corson	RaC	NW 1/4 Sec 4 T 21N R 26E	0.1	Owned	X	5.7	X	32	7	Olsen	333	09/19/11	Wheat, Sp (bu)	55	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Oats (bu)	65																														
31		31	12/29/11	68.4	Corson	RnB	N 1/2 Sec 4 T 21N R 26E	0.0	Owned	X	4.3	X	32	7	Olsen	333	09/19/11	Wheat, Sp (bu)	55	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Oats (bu)	65																														
32		32	12/29/11	70.4	Corson	RpC	NE 1/4 Sec 4 T 21N R 26E	0.4	Owned	X	5.3	X	32	7	Olsen	333	09/19/11	Wheat, Sp (bu)	55	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Oats (bu)	65																														
33		33	12/29/11	183.0	Corson	RaB	N 1/2 Sec 7 T 21N R 26E	0.1	Leased	X	24.7	X	85	10	Olsen	339	09/19/11	Wheat, Sp (bu)	55	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,492																																
34		34	12/29/11	58.0	Corson	RcB	NE 1/4 Sec 7 T 21N R 26E	0.2	Leased	X		X	85	10	Olsen	339	09/19/11	Wheat, Sp (bu)	55	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,492																																
35		35	12/29/11	317.7	Corson	RnB	W 1/2 Sec 10 T 21N R 25E	0.3	Leased	X		X	63	8	Olsen	424	09/19/11	Wheat, Sp (bu)	55	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,492																																
36		36	12/29/11	159.1	Corson	VeB	SE 1/4 Sec 10 T 21N R 25E	0.2	Leased	X	6.1	X	14	23	Olsen	576	01/19/12	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65																														
37		37	12/29/11	157.0	Corson	Gr	S 1/2 Sec 11 T 21N R 25E	0.1	Leased	X		X	56	13	Olsen	516	09/19/11	Wheat, Sp (bu)	55	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,492																																
38		38	12/29/11	67.0	Corson	RnB	W 1/2 Sec 12 T 21N R 25E	0.1	Leased	X		X	12	8	Olsen	334	10/21/10	Wheat, Sp (bu)	55	Wheat, Sp (bu)	29	Barley, Maltng (bu)	34	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Wheat, Sp (bu)	28																														
39		39	12/29/11	254.2	Corson	RnB	E 1/2 Sec 14 T 21N R 25E	0.1	Leased	X	3.1	X	16	13	Olsen	376	12/14/11	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Sunflowers (lbs)	1,492																														
40		40	12/29/11	156.5	Corson	SgB	NE 1/4 Sec 23 T 21N R 25E	0.1	Leased	X		X	16	13	Olsen	376	12/14/11	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Sunflowers (lbs)	1,492																														
41		41	12/29/11	85.1	Corson	An	SE 1/4 Sec 24 T 21N R 26E	0.0	Leased	X		X	39	17	Olsen	257	09/08/11	Wheat, Sp (bu)	55	Corn (bu)	75	Sunflowers (lbs)																																					

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 3: Planned Nutrient Application																	Part 4: Nutrient Application																	
Date:		11/14/12		Operator:		Wulf Cattle Depot		County:		Corson		Date:		11/14/12		Operator:		Wulf Cattle Depot		County:		Corson		Date:		11/14/12								
Line #	Field ID (Include maps to illustrate location)		Initial Nutrient Mgt. Plan - N based fields (acres)	Nutrient Recommendation - SDSU Extension Service EC-750			Manure application based on:	Manure Application and Incorporation		Manure Test				Available N (First crop year)	Maximum Manure Application Rate		Acres of Actual Nutrient Application	Manure Application			Nutrients Applied						Estimated years to reapplication based on P ₂ O ₅ rate							
	Name or Tract	Field #		Yield Goal	N	P ₂ O ₅		K ₂ O	Type of Manure (Year of Application)	Type of Application (Time of incorporation)	Total N	Inorganic N	Total P ₂ O ₅		Total K ₂ O	Date Tested		To meet N needs	Quantity of Manure per Field	Actual Manure Rate Applied	Date Manure Applied	Time Period When Manure Applied	N	P ₂ O ₅	K ₂ O	N		P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O		
1	T1631 F1	1	61	64.0	42	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	320 Tons	64.0	5	Tons/ac	October	Fall	20			20	42	65	40	42	65	N/A
2	T1631 F2	2	61	89.0	42	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	445 Tons	89.0	5	Tons/ac	October	Fall	20			20	42	65	40	42	65	N/A
3	T1198 F8	3	147	103.0	168	38	0	Nitrogen need	Livestock (1st Year)	Liquid	Sprinkling	2.0	1.3	0.5	6.0	06/06/11	1.1	96,700 Gal/ac	9,960,100 Gal	78.0	96,700	Gal/ac	July	Summer	58			110	48	580	168	48	580	N/A
4	T1637 F2	4	61	208.0	84	17	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	2,288 Tons	208.0	11	Tons/ac	October	Fall	40			45	92	143	85	92	143	N/A
5	T1199 F3	5	29	55.5	74	70	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	500 Tons	55.5	9	Tons/ac	October	Fall	37			37	76	117	74	76	117	N/A
6	T1199 F6	6	75	119.9	91	23	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,319 Tons	119.9	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
7	T1764 F1	7	1,822	122.9	104	11	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	13 Tons/ac	1,598 Tons	122.9	13	Tons/ac	October	Fall	50			53	109	169	103	109	169	N/A
8	T11329 F1	8	75	60.2	103	10	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	13 Tons/ac	783 Tons	60.2	13	Tons/ac	October	Fall	50			53	109	169	103	109	169	N/A
9	T11329 F2	9	75	279.4	92	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	3,073 Tons	279.4	11	Tons/ac	October	Fall	46			45	92	143	91	92	143	N/A
10	T1898 F1	10	29	139.8	42	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	699 Tons	139.8	5	Tons/ac	October	Fall	20			20	42	65	40	42	65	N/A
11	T1426 F1	11	29	145.7	42	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	729 Tons	145.7	5	Tons/ac	October	Fall	20			20	42	65	40	42	65	N/A
12	T1930 F1	12A	29	80.9	38	50	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	405 Tons	80.9	5	Tons/ac	October	Fall	18			20	42	65	38	42	65	N/A
13	T1929 F1	13	29	87.0	38	50	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	435 Tons	87.0	5	Tons/ac	October	Fall	18			20	42	65	38	42	65	N/A
14	T11460 F1	14	29	132.0	66	75	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	8 Tons/ac	1,056 Tons	132.0	8	Tons/ac	October	Fall	33			33	67	104	66	67	104	N/A
15	T1894 F3	15	29	133.0	66	75	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	8 Tons/ac	1,064 Tons	133.0	8	Tons/ac	October	Fall	33			33	67	104	66	67	104	N/A
16	T1900 F1	16	75	315.0	52	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	7 Tons/ac	2,205 Tons	315.0	7	Tons/ac	October	Fall	25			28	59	91	53	59	91	N/A
17	T1763 F1	17	29	149.0	42	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	745 Tons	149.0	5	Tons/ac	October	Fall	20			20	42	65	40	42	65	N/A
18	T1892 F2	18	75	176.7	90	6	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,944 Tons	176.7	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
19	T1892 F3	19	75	143.0	90	6	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,573 Tons	143.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
20	T1901 F1	20	75	288.5	76	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	2,597 Tons	288.5	9	Tons/ac	October	Fall	38			37	76	117	75	76	117	N/A
21	T10091 F4	21	29	131.5	74	70	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	1,184 Tons	131.5	9	Tons/ac	October	Fall	36			37	76	117	73	76	117	N/A
22	T1767 F2	22	34	109.3	53	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	7 Tons/ac	765 Tons	109.3	7	Tons/ac	October	Fall	25			28	59	91	53	59	91	N/A
23	T1767 F5	23	34	89.3	57	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	7 Tons/ac	625 Tons	89.3	7	Tons/ac	October	Fall	28			28	59	91	56	59	91	N/A
24	T1767 F4	24	34	57.4	0	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	57.4			October	Fall	0			0			0			N/A
25	T1638 F1A	25	61	149.4	81	22	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,494 Tons	149.4	10	Tons/ac	October	Fall	40			41	84	130	81	84	130	N/A
26	T1638 F1B	26	61	150.0	81	22	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,500 Tons	150.0	10	Tons/ac	October	Fall	40			41	84	130	81	84	130	N/A
27	T1770 F1	27	34	148.1	56	13	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	7 Tons/ac	1,037 Tons	148.1	7	Tons/ac	October	Fall	27			28	59	91	55	59	91	N/A
28	T1766 F1	28	1,822	99.2	70	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	893 Tons	99.2	9	Tons/ac	October	Fall	35			37	76	117	72	76	117	N/A
29		29	29	229.4	82	40	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	2,294 Tons	229.4	10	Tons/ac	October	Fall	41			41	84	130	82	84	130	N/A
30		30	61	150.0	77	22	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,500 Tons	150.0	10	Tons/ac	October	Fall	38			41	84	130	79	84	130	N/A
31		31	61	64.1	77	22	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	641 Tons	64.1	10	Tons/ac	October	Fall	38			41	84	130	79	84	130	N/A
32		32	61	65.1	77	22	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	651 Tons	65.1	10	Tons/ac	October	Fall	38			41	84	130	79	84	130	N/A
33		33	1,822	158.3	18	60	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	2 Tons/ac	317 Tons	158.3	2	Tons/ac	October	Fall	9	43		8	17	26	17	60	26	N/A
34		34	1,822	38.0	18	60	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	2 Tons/ac	76 Tons	38.0	2	Tons/ac	October	Fall	9	43		8	17	26	17	60	26	N/A
35		35	1,822	317.7	40	75	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	1,589 Tons	317.7	5	Tons/ac	October	Fall	20	42		20	42	65	40	84	65	N/A
36		36	61	153.0	95	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	153.0			October	Fall	95	0				95	0			N/A
37		37	1,822	157.0	46	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	157.0			October	Fall	46	30				46	30			N/A
38		38	29	67.0	90	75	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	67.0			October	Fall	90	75				90	75			N/A
39		39	1,822	251.1	105	13	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	251.1			October	Fall	105	13				105	13			N/A
40		40	1,822	156.5	105	13	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	156.5			October	Fall	105	13				105	13			N/A
41		41	75	85.1	81	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	85.1			October	Fall	81	0				81	0			N/A
42		42	75	73.7	81	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	73.7			October	Fall	81	0				81	0			N/A
43		43	29	309.5	84	40	0	Nitrogen need	Livestock (1st Year)	Solid																								

Plan Year: 2013

Part 5: Nutrient Balance

41. Nutrient Balance						
Field #	Crop Yield, lb, bu, ton	Estimated Crop N Removal lb/ac	Estimated Crop P ₂ O ₅ removal lb/ac	Nitrogen Balance lb/ac	P ₂ O ₅ Balance ppm	Legume Credit (Table 2 of EC750)
1	61	79.3	15.3	28	29	
2	61	79.3	15.3	28	29	
3	147	176.4	31.9	30	11	
4	61	79.3	15.3	31	15	
5	29	72.5	16.2	31	14	
6	75	90.0	26.3	29	15	
7	1822	91.1	20.0	32	21	
8	75	90.0	26.3	29	20	
9	75	90.0	26.3	32	23	
10	29	72.5	16.2	29	22	
11	29	72.5	16.2	29	22	
12A	29	72.5	16.2	30	14	
13	29	72.5	16.2	30	14	
14	29	72.5	16.2	29	13	
15	29	72.5	16.2	29	13	
16	75	90.0	26.3	31	45	
17	29	72.5	16.2	29	23	
18	75	90.0	26.3	30	20	
19	75	90.0	26.3	30	21	
20	75	90.0	26.3	30	27	
21	29	72.5	16.2	30	18	
22	34	51.0	13.9	30	20	
23	34	51.0	13.9	30	23	
24	34	51.0	13.9	34	37	
25	61	79.3	15.3	30	7	
26	61	79.3	15.3	30	7	
27	34	51.0	8.5	30	8	
28	1822	91.1	20.0	30	31	
29	29	72.5	16.2	30	13	
30	61	79.3	15.3	30	7	
31	61	79.3	15.3	30	7	
32	61	79.3	15.3	30	7	
33	29	72.5	16.2	31	12	
34	29	72.5	16.2	31	12	
35	29	72.5	16.2	31	11	
36	61	79.3	15.3	30	22	
37	29	72.5	16.2	30	14	
38	29	72.5	16.2	30	11	
39	1822	91.1	20.0	30	13	
40	1822	91.1	20.0	30	13	
41	75	90.0	26.3	30	16	
42	75	90.0	26.3	30	16	
43	29	72.5	16.2	30	13	
44	29	72.5	16.2	30	13	
45	2	110.0	24.0	14	2	
46	29	72.5	16.2	30	13	
12B	29	72.5	16.2	31	11	
47A	29	72.5	16.2	30	9	
47B	29	72.5	16.2	30	10	
48	29	72.5	16.2	30	5	

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 1: Field Information																												Part 2: Estimated Nutrient Requirement																																									
Operator: Wulf Cattle Depot														County: Corson														Date: 12/27/11														Operator: Wulf Cattle Depot														County: Corson													
Line #	Field ID (Include maps to illustrate location)	Field #	Date added to Plan	Beginning acres in field	County	Soil map unit symbol	Field Location (1/4 Section, Township, Range)	Predicted soil loss - RUSLE2 (T/ae/yr)	Control of Land	100' Vegetated Buffer	Excluded acres	Irrigated	No-Till	Current Soil Test Levels				Crops in Rotation and Average Yield: Additional 10% is added to yields for nutrient management purposes.																																																			
														N lb/ac	Phosphorus (ppm)	K (ppm)	Soil Sample Date	Previous Year			Year 1			Year 2			Year 3			Year 4			Year 5																																				
														Actual or Yield Goal			Crops in Rotation and Average Yield: Additional 10% is added to yields for nutrient management purposes.																																																				
														Yields indexed by soil productivity (Productivity Index)																																																							
														County Average Yields (SD Agricultural Statistics Service)																																																							
														Crop			County Yield			Actual Yield			Crop			County Yield			Yield Goal			Crop			County Yield			Yield Goal			Crop			County Yield			Yield Goal																						
1	T1631 F1	1	3/10/10	67.1	Corson	DaA	NW 1/4 Sec 3 T 21N R 26E	0.6	Owned	X	3.1				28	29	Olsen	492	10/01/13	Oats (bu)		61	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		55	Oats (bu)		65																																
2	T1631 F2	2	3/10/10	89.0	Corson	RnB	NW 1/4 Sec 4 T 21N R 26E	1.1	Owned	X					28	29	Olsen	492	10/01/13	Oats (bu)		61	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		55	Oats (bu)		65																																
3	T1198 F8	3	3/10/10	103.0	Corson	ShB	SW 1/4 Sec 4 T 21N R 27E	0.1	Owned			X	X		30	11	Olsen	318	10/01/13	Wheat, Sp (bu)		57	Corn (bu)		147	Corn (bu)		147	Sunflowers (lbs)		2,915	Corn (bu)		147	Wheat, Sp (bu)		28																																
4	T1637 F2	4	3/10/10	228.0	Corson	ReC	E 1/2 Sec 5 T 21 N R 26 E	0.1	Owned	X	20.0				31	15	Olsen	288	10/01/13	Oats (bu)		61	Barley, Maltng (bu)		34	Barley, Maltng (bu)		34	Sunflowers (lbs)		1,822	Corn (bu)		75	Oats (bu)		65																																
5	T1199 F3	5	3/10/10	61.0	Corson	An	SW 1/4 Sec 5 T 21N R 27E	0.1	Owned	X	5.5				31	14	Olsen	348	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
6	T1199 F6	6	3/10/10	125.0	Corson	RaB	SE 1/4 Sec 5 T 21N R 27E	0.1	Leased	X	5.1				29	15	Olsen	373	10/01/13	Corn (bu)		75	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		29	Corn (bu)		63																																
7	T1764 F1	7	3/10/10	129.4	Corson	ShB	NW 1/4 Sec 6 T 21N R 27E	0.1	Leased	X	6.5				32	21	Olsen	350	10/01/13	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Corn (bu)		1492																																
8	T11329 F1	8	3/10/10	72.4	Corson	ShB	SE 1/4 Sec 6 T 21N R 27E	0.1	Owned	X	12.2				29	20	Olsen	357	10/01/13	Corn (bu)		75	Oats (bu)		61	Oats (bu)		61	Wheat, Sp (bu)		29	Barley (bu)		34	Corn (bu)		63																																
9	T11329 F2	9	3/10/10	295.6	Corson	ShB	W 1/2 Sec 7 T 21N R 27E	0.1	Owned	X	16.2				32	23	Olsen	289	10/01/13	Corn (bu)		75	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Corn (bu)		63																																
10	T1898 F1	10	3/10/10	159.8	Corson	ShB	NW 1/4 Sec 8 T 21N R 27E	0.5	Leased	X					29	22	Olsen	342	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Corn (bu)		63																																
11	T1426 F1	11	3/10/10	147.7	Corson	An	NE 1/4 Sec 8 T 21N R 27E	0.1	Owned	X	2.0				29	22	Olsen	342	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
12	T1930 F1	12A	3/10/10	80.9	Corson	ShB	NE 1/4 Sec 9 T 21N R 27E	0.1	Leased	X					30	14	Olsen	248	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
13	T1929 F1	13	3/10/10	89.0	Corson	ShB	SW 1/4 Sec 9 T 21N R 27E	0.1	Leased	X	2.0				30	14	Olsen	248	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
14	T1460 F1	14	3/10/10	150.0	Corson	RsB	NE 1/4 Sec 9 T 22 R 27E	0.2	Owned	X	18.0				29	13	Olsen	381	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
15	T1894 F3	15	3/10/10	133.0	Corson	RaA	SE 1/4 Sec 9 T 22 R 27E	0.1	Leased	X					29	13	Olsen	381	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
16	T1900 F1	16	3/10/10	315.0	Corson	RsB	E 1/2 Sec 10 T 22N R 27E	0.2	Leased	X					31	45	Olsen	600	10/01/13	Corn (bu)		75	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Corn (bu)		63																																
17	T1763 F1	17	3/10/10	155.5	Corson	RaB	SE 1/4 Sec 13 T 21N R 26E	1.0	Leased	X	6.5				29	23	Olsen	376	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
18	T1892 F2	18	3/10/10	176.7	Corson	DaA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X					30	20	Olsen	294	10/01/13	Corn (bu)		75	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		147	Corn (bu)		63																																
19	T1892 F3	19	3/10/10	143.0	Corson	SgA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X					30	21	Olsen	294	10/01/13	Corn (bu)		75	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Corn (bu)		63																																
20	T1901 F1	20	3/10/10	292.0	Corson	RsB	E 1/2 Sec 16 T 22N R 27E	0.5	Leased	X	3.5				30	27	Olsen	389	10/01/13	Corn (bu)		75	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Corn (bu)		63																																
21	T10091 F4	21	3/10/10	131.5	Corson	StA	N 1/2 Sec 19 T 22N R 27E	0.1	Leased	X					30	18	Olsen	296	10/01/13	Wheat, Sp (bu)		29	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Wheat, Sp (bu)		28																																
22	T1767 F2	22	3/10/10	120.0	Corson	StA	E 1/2 Sec 30 T 22N R 27E	0.1	Leased	X	10.7				30	20	Olsen	347	10/01/13	Barley, Maltng (bu)		34	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Barley, Maltng (bu)		28																																
23	T1767 F5	23	3/10/10	105.1	Corson	Gr	N 1/2 Sec 31 T 22N R 27E	1.0	Leased	X	15.8				30	23	Olsen	332	10/01/13	Barley, Maltng (bu)		34	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Oats (bu)		61																																
24	T1767 F6	24	3/10/10	61.0	Corson	ShA	SE 1/4 Sec 31 T 22N R 27E	0.1	Leased	X	3.6				34	37	Olsen	332	10/01/13	Barley, Maltng (bu)		34	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Barley, Maltng (bu)		28																																
25	T1638 F1A	25	3/10/10	156.4	Corson	RsB	S 1/2 Sec 34 T 22N R 26E	0.3	Owned	X	7.0				30	7	Olsen	395	10/01/13	Oats (bu)		61	Barley, Maltng (bu)		34	Barley, Maltng (bu)		34	Sunflowers (lbs)		1,822	Oats (bu)		61	Barley, Maltng (bu)		65																																
26	T1638 F1B	26	3/10/10	154.0	Corson	DaA	S 1/2 Sec 34 T 22N R 26E	0.1	Owned	X	4.0				30	7	Olsen	395	10/01/13	Oats (bu)		61	Barley, Maltng (bu)		34	Barley, Maltng (bu)		34	Sunflowers (lbs)		1,822	Oats (bu)		61	Barley, Maltng (bu)		65																																
27	T1770 F1	27	3/10/10	155.5	Corson	ShA	NW 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	7.4				30	8	Olsen	274	10/01/13	Barley, Maltng (bu)		34	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Corn (bu)		75	Oats (bu)		61																																
28	T1766 F1	28	3/10/10	99.2	Corson	An	NE 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	0.0				30	31	Olsen	572	10/01/13	Sunflowers (lbs)		1,822	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Sunflowers (lbs)		1492																																
29		29	12/29/11	229.4	Corson	VhB	N 1/2 Sec 4 T 20N R 23E	0.3	Leased	X					30	13	Olsen	280	10/01/13	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Sunflowers (lbs)		28																																
30		30	12/29/11	155.7	Corson	RaC	NW 1/4 Sec 4 T 21N R 26E	0.1	Owned	X	5.7				30	7	Olsen	333	10/01/13	Oats (bu)		61	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Oats (bu)		65																																
31		31	12/29/11	68.4	Corson	RnB	N 1/2 Sec 4 T 21N R 26E	0.0	Owned	X	4.3				30	7	Olsen	333	10/01/13	Oats (bu)		61	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Corn (bu)		75	Oats (bu)		65																																
32		32	12/29/11	70.4	Corson	RpC	NE 1/4 Sec 4 T 21N R 26E	0.4	Owned	X	5.3				30	7	Olsen	333	10/01/13	Oats (bu)		61	Corn (bu)		75	Corn (bu)		75	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Oats (bu)		65																																
33		33	12/29/11	183.0	Corson	RaB	N 1/2 Sec 7 T 21N R 26E	0.1	Leased	X	24.7				31	12	Olsen	339	10/01/13	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1492																																
34		34	12/29/11	38.0	Corson	ReB	NE 1/4 Sec 7 T 21N R 26E	0.2	Leased	X					31	12	Olsen	339	10/01/13	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1492																																
35		35	12/29/11	317.7	Corson	RnB	W 1/2 Sec 10 T 21N R 25E	0.3	Leased	X					31	11	Olsen	424	10/01/13	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1492																																
36		36	12/29/11	159.1	Corson	VcB	SE 1/4 Sec 10 T 21N R 25E	0.2	Leased	X	6.1				30	22	Olsen	576	10/01/13	Oats (bu)		61	Barley, Maltng (bu)		34	Barley, Maltng (bu)		34	Sunflowers (lbs)		1,822	Corn (bu)		75	Sunflowers (lbs)		1492																																
37		37	12/29/11	157.0	Corson	Gr	S 1/2 Sec 11 T 21N R 25E	0.1	Leased	X					30	14	Olsen	516	10/01/13	Wheat, Sp (bu)		29	Sunflowers (lbs)		1,822	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		29	Sunflowers (lbs)		1492																																
38		38	12/29/11	67.0	Corson	RnB	W 1/2 Sec 12 T 21N R 25E	0.1	Leased	X					30	11	Olsen	334	10/01/13	Wheat, Sp (bu)		29	Barley, Maltng (bu)		34	Barley, Maltng (bu)		34	Sunflowers (lbs)		1,822	Wheat, Sp (bu)		29	Wheat, Sp (bu)		28																																
39		39	12/29/11	254.2	Corson	RnB	E 1/2 Sec 14 T 21N R 25E	0.1	Leased	X	3.1				30	13	Olsen</																																																				

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 3: Planned Nutrient Application																	Part 4: Nutrient Application																	
Date: 12/27/11 Operator: Wulf Cattle Depot County: Corson																	Date: 12/27/11 Operator: Wulf Cattle Depot County: Corson																	
Line #	Field ID (Include maps to illustrate location)		Initial Nutrient Mgt Plan - N based fields (acres)	Nutrient Recommendation - SDSU Extension Service EC-750			Manure application based on:	Manure Application and Incorporation		Manure Test				Yield Goal (lbs/1,000 gal)	Maximum Manure Application Rate by soil productivity (Productivity Index)	Acres of Actual Nutrient Application	Manure Application			Nutrients Applied						Estimated years to reapplication based on P ₂ O ₅ rate								
	Name or Tract	Field #		Yield Goal	N	P ₂ O ₅		K ₂ O	Type of Manure (Year of Application)	Type of Application (Time of incorporation)	Total N	Inorganic N	Total P ₂ O ₅				Total K ₂ O	Date Tested	Actual Manure Rate Applied	Date Manure Applied	Time Period When Manure Applied	Commercial lbs/acre			Manure lbs/acre			Total lbs/acre						
																		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O								
1	T1631 F1	1	61	64.0	92	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	12 Tons/ac	768 Tons	64.0	12	Tons/ac	October	Fall	43	0	0	49	101	156	92	101	156	N/A
2	T1631 F2	2	61	89.0	92	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	12 Tons/ac	1,068 Tons	89.0	12	Tons/ac	October	Fall	43	0	0	49	101	156	92	101	156	N/A
3	T11198 F8	3	57	103.0	176	32	0	Nitrogen need	Livestock (1st Year)	Liquid	Sprinkling	2.0	1.3	0.5	6.0	06/06/11	1.1	96,700 Gal/ac	9,960,100 Gal	78.0	96,700	Gal/ac	July	Summer	66	0	0	110	48	580	176	48	580	N/A
4	T1637 F2	4	61	208.0	50	1	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	1,248 Tons	208.0	6	Tons/ac	October	Fall	26	0	0	24	50	78	50	50	78	N/A
5	T11199 F3	5	29	55.5	89	6	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	611 Tons	55.5	11	Tons/ac	October	Fall	44	0	0	45	92	143	89	92	143	N/A
6	T11199 F6	6	75	119.9	92	9	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,319 Tons	119.9	11	Tons/ac	October	Fall	47	0	0	45	92	143	88	92	143	N/A
7	T1764 F1	7	1,822	122.9	89	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,352 Tons	122.9	11	Tons/ac	October	Fall	44	0	0	45	92	143	89	92	143	N/A
8	T11329 F1	8	75	60.2	80	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	602 Tons	60.2	10	Tons/ac	October	Fall	39	0	0	41	84	130	80	84	130	N/A
9	T11329 F2	9	75	279.4	88	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	3,073 Tons	279.4	11	Tons/ac	October	Fall	43	0	0	45	92	143	88	92	143	N/A
10	T1898 F1	10	29	139.8	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,538 Tons	139.8	11	Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143	N/A
11	T1426 F1	11	29	145.7	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,603 Tons	145.7	11	Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143	N/A
12	T1930 F1	12A	29	80.9	90	6	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	890 Tons	80.9	11	Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143	N/A
13	T1929 F1	13	29	87.0	90	6	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	957 Tons	87.0	11	Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143	N/A
14	T1460 F1	14	29	132.0	91	10	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,452 Tons	132.0	11	Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143	N/A
15	T1894 F3	15	29	133.0	91	10	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,463 Tons	133.0	11	Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143	N/A
16	T1900 F1	16	75	315.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	7 Tons/ac	2,205 Tons	315.0	7	Tons/ac			44	0	0	28	59	91	72	59	91	N/A
17	T1763 F1	17	29	149.0	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	149.0		Tons/ac			91	0	0				91	0		N/A
18	T1892 F2	18	75	176.7	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	176.7		Tons/ac			72	0	0				72	0		N/A
19	T1892 F3	19	75	143.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	143.0		Tons/ac			72	0	0				72	0		N/A
20	T1901 F1	20	75	288.5	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	288.5		Tons/ac			72	0	0				72	0		N/A
21	T10091 F4	21	29	131.5	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	131.5		Tons/ac			90	0	0				90	0		N/A
22	T1767 F2	22	34	109.3	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	109.3		Tons/ac			72	0	0				72	0		N/A
23	T1767 F5	23	34	89.3	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	89.3		Tons/ac			72	0	0				72	0		N/A
24	T1767 F6	24	34	57.4	68	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	57.4		Tons/ac			72	0	0				72	0		N/A
25	T1638 F1A	25	61	149.4	51	15	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	149.4		Tons/ac			51	15	0				51	15		N/A
26	T1638 F1B	26	61	150.0	51	15	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	150.0		Tons/ac			51	15	0				51	15		N/A
27	T1770 F1	27	34	148.1	72	75	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	148.1		Tons/ac			72	75	0				72	75		N/A
28	T1766 F1	28	1,822	99.2	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	99.2		Tons/ac			90	0	0				90	0		N/A
29		29	29	229.4	72	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	229.4		Tons/ac			72	30	0				72	30		N/A
30		30	61	150.0	90	29	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	150.0		Tons/ac			90	29	0				90	29		N/A
31		31	61	64.1	90	29	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	64.1		Tons/ac			90	29	0				90	29		N/A
32		32	61	65.1	90	29	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	65.1		Tons/ac			90	29	0				90	29		N/A
33		33	1,822	158.3	90	15	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	158.3		Tons/ac			90	15	0				90	15		N/A
34		34	1,822	38.0	90	15	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	38.0		Tons/ac			90	15	0				90	15		N/A
35		35	1,822	317.7	90	16	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	317.7		Tons/ac			90	16	0				90	16		N/A
36		36	61	153.0	51	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	918 Tons	153.0	6	Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78	N/A
37		37	1,822	157.0	91	11	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,727 Tons	157.0	11	Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143	N/A
38		38	29	67.0	51	8	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	402 Tons	67.0	6	Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78	N/A
39		39	1,822	251.1	72	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	2,260 Tons	251.1	9	Tons/ac	October	Fall	35	0	0	37	76	117	72	76	117	N/A
40		40	1,822	156.5	72	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	1,409 Tons	156.5	9	Tons/ac	October	Fall	35	0	0	37	76	117	72	76	117	N/A
41		41	75	85.1	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	936 Tons	85.1	11	Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143	N/A
42		42	75	73.7	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	811 Tons	73.7	11	Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143	N/A
43		43	29	309.5	72	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac																

Plan Year: 2014

Part 5: Nutrient Balance

41. Nutrient Balance						
Field #	Crop Yield, lb, bu, ton	Estimated Crop N Removal lb/ac	Estimated Crop P ₂ O ₅ removal lb/ac	Nitrogen Balance lb/ac	*P ₂ O ₅ Balance ppm	Legume Credit (Table 2 of EC750)
1	75	90.0	26.3	32	33	
2	75	90.0	26.3	32	31	
3	147	176.4	51.5	30	14	
4	34	51.0	13.9	29	16	
5	75	90.0	26.3	29	18	
6	1822	91.1	20.0	31	19	
7	1822	91.1	20.0	28	25	
8	61	79.3	15.3	31	23	
9	75	90.0	26.3	28	26	
10	75	90.0	26.3	30	25	
11	75	90.0	26.3	30	25	
12A	75	90.0	26.3	30	17	
13	75	90.0	26.3	30	17	
14	75	90.0	26.3	30	16	
15	75	90.0	26.3	30	17	
16	29	72.5	16.2	31	47	
17	75	90.0	26.3	30	22	
18	29	72.5	16.2	30	19	
19	29	72.5	16.2	30	20	
20	29	72.5	16.2	30	26	
21	75	90.0	26.3	30	17	
22	29	72.5	16.2	30	19	
23	29	72.5	16.2	30	22	
24	29	72.5	16.2	30	36	
25	34	51.0	13.9	30	7	
26	34	51.0	13.9	30	7	
27	29	72.5	16.2	30	10	
28	75	90.0	26.3	30	30	
29	29	72.5	16.2	30	13	
30	75	90.0	26.3	30	7	
31	75	90.0	26.3	30	7	
32	75	90.0	26.3	30	7	
33	1822	91.1	20.0	30	12	
34	1822	91.1	20.0	30	12	
35	1822	91.1	20.0	30	11	
36	34	51.0	13.9	30	23	
37	1822	91.1	20.0	30	18	
38	34	51.0	13.9	30	13	
39	29	72.5	16.2	30	16	
40	29	72.5	16.2	30	15	
41	75	90.0	26.3	30	19	
42	75	90.0	26.3	30	20	
43	29	72.5	16.2	30	16	
44	29	72.5	16.2	30	16	
45	29	72.5	16.2	32	5	25
46	29	72.5	16.2	32	15	
12B	75	90.0	26.3	30	10	
47A	75	90.0	26.3	30	8	
47B	75	90.0	26.3	30	10	
48	61	79.3	15.3	30	5	

*(Total Land Application of P₂O₅ in lb/acre - Total Crop Removal of P₂O₅ in lb/acre)/20 + Soil P₂O₅ in PPM

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 1: Field Information																	Part 2: Estimated Nutrient Requirement																		
Operator: Wulf Cattle Depot																	County: Corson																		
Date: 12/27/11																	Operator: Wulf Cattle Depot																		
County: Corson																	County: Corson																		
Field #	Field ID (Include maps to illustrate location)	Date added to Plan	Beginning acres in field	County	Soil map unit symbol	Field Location: (1/4 Section, Township, Range)	Predicted soil loss - RUSLE2 (T/ac/yr)	Control of Land	100' Vegetated Buffer	Excluded acres	Irrigated	No-Till	Current Soil Test Levels				Soil Sample Date	Crops in Rotation and Average Yield: Additional 10% is added to yields for nutrient management purposes.																	
													N lb/ac	Phosphorus (ppm)	K (ppm)	P Test		Previous Year	Year 1			Year 2			Year 3			Year 4			Year 5				
Name or Tract	Field #											0-2'	2-4'	0-6"	P Test		Crop	County Yield	Actual Yield	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	
1	T1631 F1	1	3/10/10	67.1	Corson	DaA NW 1/4 Sec 3 T 21N R 26E	0.6	Owned	X	3.1	X	32	33	Olsen	492	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	55	55	Oats (bu)	65	65			
2	T1631 F2	2	3/10/10	89.0	Corson	RnB NW 1/4 Sec 3 T 21N R 26E	1.1	Owned	X		X	32	31	Olsen	492	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	55	55	Oats (bu)	65	65			
3	T11198 F8	3	3/10/10	103.0	Corson	ShB SW 1/4 Sec 4 T 21N R 27E	0.1	Owned			X	30	14	Olsen	318	10/01/14	Corn (bu)	147	147	Corn (bu)	147	147	Corn (bu)	147	147	2,915	Corn (bu)	147	147	Wheat, Sp (bu)	28	28			
4	T1637 F2	4	3/10/10	228.0	Corson	RcC E 1/2 Sec 5 T 21 N R 26	0.1	Owned	X	20.0	X	29	16	Olsen	288	10/01/14	Barley, Malting (bu)	34	34	Sunflowers (lbs)	1,822	1,822	Barley, Malting (bu)	34	34	1,822	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75			
5	T11199 F3	5	3/10/10	61.0	Corson	An SW 1/4 Sec 5 T 21N R 27E	0.1	Owned	X	5.5	X	29	18	Olsen	348	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Corn (bu)	63	63			
6	T11199 F6	6	3/10/10	125.0	Corson	RaB SE 1/4 Sec 5 T 21N R 27E	0.1	Leased	X	5.1	X	31	19	Olsen	373	10/01/14	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	Corn (bu)	63	63	
7	T1764 F1	7	3/10/10	129.4	Corson	ShB NW 1/4 Sec 6 T 21N R 27E	0.1	Leased	X	6.5	X	28	25	Olsen	350	10/01/14	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	29	29	Corn (bu)	63	63	
8	T11329 F1	8	3/10/10	72.4	Corson	ShB SE 1/4 Sec 6 T 21N R 27E	0.1	Owned	X	12.2	X	31	23	Olsen	357	10/01/14	Oats (bu)	61	61	Wheat, Sp (bu)	29	29	Oats (bu)	61	61	1,822	Wheat, Sp (bu)	29	29	Barley (bu)	34	34	Corn (bu)	63	63
9	T11329 F2	9	3/10/10	295.6	Corson	ShB W 1/2 Sec 7 T 21N R 27E	0.1	Owned	X	16.2	X	28	26	Olsen	289	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Corn (bu)	63	63			
10	T1898 F1	10	3/10/10	139.8	Corson	ShB NW 1/4 Sec 8 T 21N R 27E	0.5	Leased	X		X	30	25	Olsen	342	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
11	T1426 F1	11	3/10/10	147.7	Corson	An NE 1/4 Sec 8 T 21N R 27E	0.1	Owned	X	2.0	X	30	25	Olsen	342	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
12	T1930 F1	12A	3/10/10	80.9	Corson	ShB NE 1/4 Sec 9 T 21N R 27E	0.1	Owned	X		X	30	17	Olsen	248	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
13	T1929 F1	13	3/10/10	89.0	Corson	ShB SW 1/4 Sec 9 T 21N R 27E	0.1	Leased	X	2.0	X	30	17	Olsen	248	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
14	T11460 F1	14	3/10/10	150.0	Corson	RsB NE 1/4 Sec 9 T 22 R 27E	0.2	Owned	X	18.0	X	30	16	Olsen	381	10/01/14	Corn (bu)	75	75	Oats (bu)	61	61	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
15	T1894 F3	15	3/10/10	133.0	Corson	RaA SE 1/4 Sec 9 T 22 R 27E	0.1	Leased	X		X	30	17	Olsen	381	10/01/14	Corn (bu)	75	75	Oats (bu)	61	61	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
16	T1900 F1	16	3/10/10	315.0	Corson	RsB E 1/2 Sec 10 T 22N R 27E	0.2	Leased	X		X	31	47	Olsen	600	10/01/14	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	1,822	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	28	28			
17	T1763 F1	17	3/10/10	155.5	Corson	RaB SE 1/4 Sec 13 T 21N R 26E	1.0	Leased	X	6.5	X	30	22	Olsen	376	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
18	T1892 F2	18	3/10/10	176.7	Corson	DaA N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	30	19	Olsen	294	10/01/14	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	147	147	Corn (bu)	63	63			
19	T1892 F3	19	3/10/10	143.0	Corson	SgA N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	30	20	Olsen	294	10/01/14	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Corn (bu)	63	63			
20	T1901 F1	20	3/10/10	292.0	Corson	RsB E 1/2 Sec 16 T 22N R 27E	0.5	Leased	X	3.5	X	30	26	Olsen	389	10/01/14	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Corn (bu)	63	63			
21	T10091 F4	21	3/10/10	131.5	Corson	StA N 1/2 Sec 19 T 22N R 27E	0.1	Leased	X		X	30	17	Olsen	296	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	28	28			
22	T1767 F2	22	3/10/10	120.0	Corson	StA E 1/2 Sec 30 T 22N R 27E	0.1	Leased	X	10.7	X	30	19	Olsen	347	10/01/14	Wheat, Sp (bu)	29	29	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Barley, Malting (bu)	34	34			
23	T1767 F5	23	3/10/10	105.1	Corson	Gr N 1/2 Sec 31 T 22N R 27E	1.0	Leased	X	15.8	X	30	22	Olsen	332	10/01/14	Wheat, Sp (bu)	29	29	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Barley, Malting (bu)	34	34			
24	T1767 F6	24	3/10/10	61.0	Corson	ShA SE 1/4 Sec 31 T 22N R 27E	0.1	Leased	X	3.6	X	30	36	Olsen	332	10/01/14	Wheat, Sp (bu)	29	29	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Barley, Malting (bu)	34	34			
25	T1638 F1A	25	3/10/10	156.4	Corson	RsB S 1/2 Sec 34 T 22N R 26E	0.3	Owned	X	7.0	X	30	7	Olsen	395	10/01/14	Barley, Malting (bu)	34	34	Corn (bu)	75	75	Barley, Malting (bu)	34	34	1,822	Corn (bu)	75	75	Oats (bu)	65	65			
26	T1638 F1B	26	3/10/10	154.0	Corson	DaA S 1/2 Sec 34 T 22N R 26E	0.1	Owned	X	4.0	X	30	7	Olsen	395	10/01/14	Barley, Malting (bu)	34	34	Corn (bu)	75	75	Barley, Malting (bu)	34	34	1,822	Corn (bu)	75	75	Oats (bu)	65	65			
27	T1770 F1	27	3/10/10	155.5	Corson	ShA NW 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	7.4	X	30	10	Olsen	274	10/01/14	Wheat, Sp (bu)	29	29	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	1,822	Corn (bu)	75	75	Barley, Malting (bu)	34	34			
28	T1766 F1	28	3/10/10	99.2	Corson	An NE 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	0.0	X	30	30	Olsen	572	10/01/14	Corn (bu)	75	75	Wheat, Sp (bu)	29	29	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,492	1,492			
29		29	12/29/11	229.4	Corson	VhB N 1/2 Sec 4 T 20N R 25E	0.3	Leased	X		X	30	13	Olsen	280	10/01/14	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	29	29	Wheat, Sp (bu)	29	29	1,822	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	28	28			
30		30	12/29/11	155.7	Corson	RaC NW 1/4 Sec 4 T 21N R 26E	0.1	Owned	X	5.7	X	30	7	Olsen	333	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Oats (bu)	65	65			
31		31	12/29/11	68.4	Corson	RnB N 1/2 Sec 4 T 21N R 26E	0.0	Owned	X	4.3	X	30	7	Olsen	333	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Oats (bu)	65	65			
32		32	12/29/11	70.4	Corson	RpC NE 1/4 Sec 4 T 21N R 26E	0.4	Owned	X	5.3	X	30	7	Olsen	333	10/01/14	Corn (bu)	75	75	Sunflowers (lbs)	1,822	1,822	Corn (bu)	75	75	1,822	Wheat, Sp (bu)	29	29	Oats (bu)	65	65			
33		33	12/29/11	183.0	Corson	RaB N 1/2 Sec 7 T 21N R 26E	0.1	Leased	X	24.7	X	30	12	Olsen	339	10/01/14	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,492	1,492				
34		34	12/29/11	38.0	Corson	RcB NE 1/4 Sec 7 T 21N R 26E	0.2	Leased	X		X	30	12	Olsen	339	10/01/14	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,492	1,492				
35		35	12/29/11	317.7	Corson	RnB W 1/2 Sec 10 T 21N R 25E	0.3	Leased	X		X	30	11	Olsen	424	10/01/14	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,822	1,822	Wheat, Sp (bu)	29	29	Sunflowers (lbs)	1,492	1,492				
36		36	12/29/11	159.1	Corson	VcB SE																													

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 3: Planned Nutrient Application **Part 4: Nutrient Application**

Date: 12/27/11 Operator: Wulf Cattle Depot County: Corson Date: 12/27/11 Operator: Wulf Cattle Depot County: Corson Date: 12/27/11

Line #	Field ID (Include maps to illustrate location)		Initial Nutrient Mgt. Plan - N based fields (acres)	Nutrient Recommendation - SDSU Extension Service EC-750			Manure application based on:	Manure Application and Incorporation		Manure Test				Yield Goal (lbs/1,000 gal)	Maximum Manure Application Rate (Productivity Index)	Acres of Actual Nutrient Application	Manure Application			Nutrients Applied			Estimated years to reapplication based on P ₂ O ₅ rate											
	Name or Tract	Field #		Yield Goal	N	P ₂ O ₅		K ₂ O	Type of Manure (Year of Application)	Type of Application (Time of incorporation)	Total N	Inorganic N	Total P ₂ O ₅				Total K ₂ O	Date Tested	Actual Manure Rate Applied	Date Manure Applied	Time Period When Manure Applied	N		P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O						
1	T1631 F1	1	61	64.0	89	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	64.0	0	Tons/ac			89	0	0	89	0	0	N/A			
2	T1631 F2	2	61	89.0	89	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	89.0	0	Tons/ac			89	0	0	89	0	0	N/A			
3	T1198 F8	3	57	103.0	176	12	0	Nitrogen need	Livestock (1st Year)	Liquid	Sprinkling	2.0	1.3	0.5	6.0	06/06/11	1.1	87,000 Gal/ac	8,961,000 Gal	78.0	86,780	Gal/ac	July	Summer	77	7	0	99	43	521	176	43	521	N/A
4	T1637 F2	4	61	208.0	92	7	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	208.0	0	Tons/ac			92	4	0	92	4	0	92	4	0	N/A
5	T11199 F3	5	29	55.5	92	4	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	55.5	0	Tons/ac			92	4	0	92	4	0	92	4	0	N/A
6	T11199 F6	6	75	119.9	89	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	119.9	0	Tons/ac			89	0	0	89	0	0	89	0	0	N/A
7	T1764 F1	7	1,822	122.9	74	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	122.9	0	Tons/ac			74	0	0	74	0	0	74	0	0	N/A
8	T11329 F1	8	75	60.2	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	60.2	0	Tons/ac			72	0	0	72	0	0	72	0	0	N/A
9	T11329 F2	9	75	279.4	93	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	279.4	0	Tons/ac			93	0	0	93	0	0	93	0	0	N/A
10	T1898 F1	10	29	139.8	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	139.8	0	Tons/ac			91	0	0	91	0	0	91	0	0	N/A
11	T1426 F1	11	29	145.7	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	145.7	0	Tons/ac			91	0	0	91	0	0	91	0	0	N/A
12	T1930 F1	12A	29	80.9	91	5	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	80.9	0	Tons/ac			91	5	0	91	5	0	91	5	0	N/A
13	T1929 F1	13	29	87.0	91	5	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	87.0	0	Tons/ac			91	5	0	91	5	0	91	5	0	N/A
14	T11460 F1	14	29	132.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	132.0	0	Tons/ac			79	0	0	79	0	0	79	0	0	N/A
15	T1894 F3	15	29	133.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	133.0	0	Tons/ac			79	0	0	79	0	0	79	0	0	N/A
16	T1900 F1	16	75	315.0	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	315.0	0	Tons/ac			90	0	0	90	0	0	90	0	0	N/A
17	T1763 F1	17	29	149.0	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,639 Tons	149.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
18	T1892 F2	18	75	176.7	91	2	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,944 Tons	176.7	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
19	T1892 F3	19	75	143.0	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,573 Tons	143.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
20	T1901 F1	20	75	288.5	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	3,174 Tons	288.5	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
21	T10091 F4	21	29	131.5	91	5	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,447 Tons	131.5	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
22	T1767 F2	22	34	109.3	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,202 Tons	109.3	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
23	T1767 F5	23	34	89.3	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	982 Tons	89.3	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
24	T1767 F6	24	34	57.4	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	631 Tons	57.4	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
25	T1638 F1A	25	61	149.4	90	29	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,643 Tons	149.4	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
26	T1638 F1B	26	61	150.0	90	29	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,650 Tons	150.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
27	T1770 F1	27	34	148.1	90	20	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,629 Tons	148.1	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
28	T1766 F1	28	1,822	99.2	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	893 Tons	99.2	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
29		29	29	229.4	72	30	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	2,065 Tons	229.4	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
30		30	61	150.0	91	24	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,650 Tons	150.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
31		31	61	64.1	91	24	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	705 Tons	64.1	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
32		32	61	65.1	91	24	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	716 Tons	65.1	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
33		33	1,822	158.3	72	40	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	1,425 Tons	158.3	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
34		34	1,822	38.0	72	40	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	342 Tons	38.0	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
35		35	1,822	317.7	72	50	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	2,859 Tons	317.7	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
36		36	61	153.0	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,683 Tons	153.0	11	Tons/ac	October	Fall	45			45	92	143	90	92	143	N/A
37		37	1,822	157.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	1,413 Tons	157.0	9	Tons/ac	October	Fall	36			36	76	117	73	76	117	N/A
38		38	29	67.0	91	13	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4																	

Plan Year: 2015

Part 5: Nutrient Balance

41. Nutrient Balance						
Field #	Crop Yield, lb, bu, ton	Estimated Crop N Removal lb/ac	Estimated Crop P ₂ O ₅ removal lb/ac	Nitrogen Balance lb/ac	*P ₂ O ₅ Balance ppm	Legume Credit (Table 2 of EC750)
1	1822	91.1	20.0	28	32	
2	1822	91.1	20.0	28	28	
3	147	176.4	51.5	30	16	
4	1822	91.1	20.0	31	15	
5	1822	91.1	20.0	31	17	
6	75	90.0	26.3	29	18	
7	29	72.5	16.2	32	24	
8	29	72.5	16.2	30	22	
9	1822	91.1	20.0	32	25	
10	1822	91.1	20.0	30	24	
11	1822	91.1	20.0	30	24	
12A	1822	91.1	20.0	30	16	
13	1822	91.1	20.0	30	16	
14	61	79.3	15.3	30	15	
15	61	79.3	15.3	30	16	
16	1822	91.1	20.0	30	46	
17	1822	91.1	20.0	29	26	
18	1822	91.1	20.0	29	23	
19	1822	91.1	20.0	29	24	
20	1822	91.1	20.0	29	30	
21	1822	91.1	20.0	29	20	
22	75	90.0	26.3	30	22	
23	75	90.0	26.3	30	25	
24	75	90.0	26.3	30	39	
25	75	90.0	26.3	30	10	
26	75	90.0	26.3	30	10	
27	75	90.0	26.3	30	14	
28	29	72.5	16.2	31	33	
29	29	72.5	16.2	31	16	
30	1822	91.1	20.0	29	11	
31	1822	91.1	20.0	29	11	
32	1822	91.1	20.0	29	11	
33	29	72.5	16.2	31	15	
34	29	72.5	16.2	31	15	
35	29	72.5	16.2	31	13	
36	75	90.0	26.3	30	27	
37	29	72.5	16.2	31	21	
38	1822	91.1	20.0	29	17	
39	1822	91.1	20.0	29	20	
40	1822	91.1	20.0	30	17	
41	1822	91.1	20.0	30	19	
42	1822	91.1	0.0	30	19	
43	29	72.5	16.2	30	15	
44	29	72.5	16.2	30	15	
45	75	90.0	26.3	32	11	
46	29	72.5	16.2	32	16	
12B	1822	91.1	20.0	30	10	
47A	1822	91.1	20.0	30	7	
47B	1822	91.1	20.0	30	9	
48	75	90.0	26.3	30	5	

*(Total Land Application of P₂O₅ in lb/acre - Total Crop Removal of P₂O₅ in lb/acre)/20 + Soil P₂O₅ in PPM

Plan Year: 2016

Part 5: Nutrient Balance

41. Nutrient Balance						
Field #	Crop Yield, lb, bu, ton	Estimated Crop N Removal lb/ac	Estimated Crop P ₂ O ₅ removal lb/ac	Nitrogen Balance lb/ac	*P ₂ O ₅ Balance ppm	Legume Credit (Table 2 of EC750)
1	29	72.5	16.2	30	35	
2	29	72.5	16.2	30	29	
3	147	176.4	51.5	30	17	
4	75	90.0	26.3	30	18	
5	75	90.0	26.3	30	21	
6	29	72.5	16.2	31	20	
7	75	90.0	26.3	30	28	
8	34	51.0	13.9	30	24	
9	29	72.5	0.0	30	27	
10	75	90.0	26.3	30	27	
11	75	90.0	26.3	30	27	
12A	75	90.0	26.3	30	20	
13	75	90.0	26.3	30	20	
14	1822	91.1	20.0	29	19	
15	1822	91.1	20.0	29	20	
16	75	90.0	26.3	30	45	
17	75	90.0	26.3	30	29	
18	75	90.0	26.3	30	26	
19	75	90.0	26.3	30	27	
20	75	90.0	26.3	30	32	
21	75	90.0	26.3	30	19	
22	61	79.3	15.3	30	21	
23	61	79.3	15.3	30	24	
24	61	79.3	15.3	30	38	
25	1822	91.1	20.0	30	9	
26	1822	91.1	20.0	30	9	
27	61	79.3	15.3	30	13	
28	61	79.3	15.3	30	32	
29	1822	91.1	20.0	30	15	
30	29	72.5	16.2	31	10	
31	29	72.5	16.2	31	10	
32	29	72.5	16.2	31	10	
33	29	72.5	16.2	31	14	
34	29	72.5	16.2	31	14	
35	29	72.5	16.2	31	12	
36	1822	91.1	20.0	30	26	
37	29	72.5	16.2	31	20	
38	29	72.5	16.2	31	16	
39	75	90.0	26.3	30	19	
40	75	90.0	26.3	30	16	
41	29	72.5	16.2	30	22	
42	29	72.5	16.2	30	22	
43	1822	91.1	20.0	30	19	
44	1822	91.1	20.0	30	18	
45	2	110.0	24.0	32	14	
46	1822	91.1	20.0	32	19	
12B	75	90.0	26.3	30	10	
47A	75	90.0	26.3	30	9	
47B	75	90.0	26.3	30	9	
48	1822	91.1	20.0	30	5	

*(Total Land Application of P₂O₅ in lb/acre - Total Crop Removal of P₂O₅ in lb/acre)/20 + Soil P₂O₅ in PPM

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 1: Field Information **Part 2: Estimated Nutrient Requirement**

Operator: Wulf Cattle Depot County: Corson Date: 11/14/12 Operator: Wulf Cattle Depot County: Corson

Line #	Field ID (Include maps to illustrate location)	Date added to Plan	Beginning acres in field	County	Soil map unit symbol	Field Location: (1/4 Section, Township, Range)	Predicted soil loss - RUSLE2 (T/ac/yr)	Control of Land	100' Vegetated Buffer	Excluded areas	Irrigated	No-Till	Current Soil Test Levels				Crops in Rotation and Average Yield:																			
													N (lb/ac)		Phosphorus (ppm)		K (ppm)	Soil Sample Date	Previous Year			Year 1			Year 2			Year 3			Year 4			Year 5		
													0-2'	2-4'	0-6"	P Test			Crop	County Yield	Actual Yield	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal	Crop	County Yield	Yield Goal

1	T1631 F1	1	3/10/10	67.1	Corson	DaA	NW 1/4 Sec 3 T 21N R 26E	0.6	Owned	X	3.1	X	X	30	35	Olsen	492	10/01/16	Wheat, Sp. (bu)	29	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	55	Oats (bu)	65
2	T1631 F2	2	3/10/10	89.0	Corson	RnB	NW 1/4 Sec 3 T 21N R 26E	1.1	Owned	X		X	X	30	29	Olsen	492	10/01/16	Wheat, Sp. (bu)	29	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	55	Oats (bu)	65
3	T1198 F8	3	3/10/10	103.0	Corson	ShB	SW 1/4 Sec 4 T 21N R 27E	0.1	Owned			X	X	30	17	Olsen	318	10/01/16	Corn (bu)	147	Corn (bu)	147	Corn (bu)	147	Sunflowers (lbs)	2,915	Corn (bu)	147	Wheat, Sp. (bu)	28
4	T1637 F2	4	3/10/10	228.0	Corson	RcC	E 1/2 Sec 5 T 21 R 26E	0.1	Owned	X	20.0	X	X	30	18	Olsen	288	10/01/16	Corn (bu)	75	Oats (bu)	61	Barley, Maltng (bu)	34	Sunflowers (lbs)	1,822	Corn (bu)	75	Oats (bu)	65
5	T1199 F3	5	3/10/10	61.0	Corson	An	SW 1/4 Sec 5 T 21N R 27E	0.1	Owned	X	5.5	X	X	30	21	Olsen	348	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	29	Wheat, Sp. (bu)	29	Corn (bu)	63
6	T1199 F6	6	3/10/10	125.0	Corson	RaB	SE 1/4 Sec 5 T 21N R 27E	0.1	Leased	X	5.1	X	X	31	20	Olsen	373	10/01/16	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Sunflowers (lbs)	1,492	Corn (bu)	1492
7	T1764 F1	7	3/10/10	129.4	Corson	ShB	NW 1/4 Sec 6 T 21N R 27E	0.1	Leased	X	6.5	X	X	30	28	Olsen	350	10/01/16	Corn (bu)	75	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Barley (bu)	34	Corn (bu)	65
8	T11329 F1	8	3/10/10	72.4	Corson	ShB	SE 1/4 Sec 6 T 21N R 27E	0.1	Owned	X	12.2	X	X	30	24	Olsen	357	10/01/16	Barley (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Oats (bu)	29	Corn (bu)	65
9	T11329 F2	9	3/10/10	295.6	Corson	ShB	W 1/2 Sec 7 T 21N R 27E	0.1	Owned	X	16.2	X	X	30	27	Olsen	289	10/01/16	Wheat, Sp. (bu)	29	Corn (bu)	75	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	28
10	T1898 F1	10	3/10/10	139.8	Corson	ShB	NW 1/4 Sec 8 T 21N R 27E	0.5	Leased	X		X	X	30	27	Olsen	342	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	28
11	T1426 F1	11	3/10/10	147.7	Corson	An	NE 1/4 Sec 8 T 21N R 27E	0.1	Owned	X	2.0	X	X	30	27	Olsen	342	10/01/16	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	28
12	T1930 F1	12A	3/10/10	80.9	Corson	ShB	NE 1/4 Sec 9 T 21N R 27E	0.1	Owned	X		X	X	30	20	Olsen	248	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	28
13	T1929 F1	13	3/10/10	89.0	Corson	ShB	SW 1/4 Sec 9 T 21N R 27E	0.1	Leased	X	2.0	X	X	30	20	Olsen	248	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	28
14	T11460 F1	14	3/10/10	150.0	Corson	RaB	NE 1/4 Sec 9 T 22 R 27E	0.2	Owned	X	18.0	X	X	29	19	Olsen	381	10/01/16	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	28
15	T1894 F3	15	3/10/10	133.0	Corson	RaA	SE 1/4 Sec 9 T 22 R 27E	0.1	Leased	X		X	X	29	20	Olsen	381	10/01/16	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Sunflowers (lbs)	1,822	Corn (bu)	63
16	T1900 F1	16	3/10/10	315.0	Corson	RaB	E 1/2 Sec 10 T 22N R 27E	0.2	Leased	X		X	X	30	45	Olsen	600	10/01/16	Corn (bu)	75	Corn (bu)	75	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	28	Wheat, Sp. (bu)	28
17	T1763 F1	17	3/10/10	155.5	Corson	RaB	SE 1/4 Sec 13 T 21N R 27E	1.0	Leased	X	6.5	X	X	30	29	Olsen	376	10/01/16	Corn (bu)	75	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	147	Corn (bu)	63
18	T1892 F2	18	3/10/10	176.7	Corson	DaA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	X	30	26	Olsen	294	10/01/16	Corn (bu)	75	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Corn (bu)	65
19	T1892 F3	19	3/10/10	143.0	Corson	SgA	N 1/2 Sec 15 T 22N R 27E	1.0	Leased	X		X	X	30	27	Olsen	294	10/01/16	Corn (bu)	75	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Corn (bu)	63
20	T1901 F1	20	3/10/10	292.0	Corson	RaB	E 1/2 Sec 16 T 22N R 27E	0.5	Leased	X	3.5	X	X	30	32	Olsen	389	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	28	Wheat, Sp. (bu)	28
21	T10091 F4	21	3/10/10	131.5	Corson	SiA	N 1/2 Sec 19 T 22N R 27E	0.1	Leased	X		X	X	30	19	Olsen	296	10/01/16	Corn (bu)	75	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Corn (bu)	61	Barley, Maltng (bu)	
22	T1767 F2	22	3/10/10	120.0	Corson	SiA	E 1/2 Sec 30 T 22N R 27E	0.1	Leased	X	10.7	X	X	30	21	Olsen	347	10/01/16	Oats (bu)	61	Barley, Maltng (bu)	34	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Barley, Maltng (bu)	
23	T1767 F5	23	3/10/10	105.1	Corson	Gr	N 1/2 Sec 31 T 22N R 27E	1.0	Leased	X	15.8	X	X	30	24	Olsen	332	10/01/16	Oats (bu)	61	Barley, Maltng (bu)	34	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Barley, Maltng (bu)	
24	T1767 F6	24	3/10/10	61.0	Corson	ShA	SE 1/4 Sec 31 T 22N R 27E	0.1	Leased	X	3.6	X	X	30	38	Olsen	332	10/01/16	Oats (bu)	61	Barley, Maltng (bu)	34	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Barley, Maltng (bu)	
25	T1638 F1A	25	3/10/10	156.4	Corson	RaB	S 1/2 Sec 34 T 22N R 26E	0.3	Owned	X	7.0	X	X	30	9	Olsen	395	10/01/16	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65
26	T1638 F1B	26	3/10/10	154.0	Corson	DaA	S 1/2 Sec 34 T 22N R 26E	0.1	Owned	X	4.0	X	X	30	9	Olsen	395	10/01/16	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65
27	T1770 F1	27	3/10/10	155.5	Corson	ShA	NW 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	7.4	X	X	30	13	Olsen	274	10/01/16	Oats (bu)	61	Barley, Maltng (bu)	34	Wheat, Sp. (bu)	29	Corn (bu)	75	Oats (bu)	61	Sunflowers (lbs)	1492
28	T1766 F1	28	3/10/10	99.2	Corson	An	NE 1/4 Sec 34 T 22N R 27E	0.1	Leased	X	0.0	X	X	30	32	Olsen	572	10/01/16	Oats (bu)	61	Sunflowers (lbs)	1,822	Corn (bu)	75	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	28
29		29	12/29/11	229.4	Corson	VhB	N 1/2 Sec 4 T 20N R 27E	0.5	Leased	X		X	X	30	15	Olsen	280	10/01/16	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Oats (bu)	65
30		30	12/29/11	155.7	Corson	RaC	NW 1/4 Sec 4 T 21N R 26E	0.1	Owned	X	5.7	X	X	31	10	Olsen	333	10/01/16	Wheat, Sp. (bu)	29	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Oats (bu)	65
31		31	12/29/11	68.4	Corson	RnB	N 1/2 Sec 4 T 21N R 26E	0.0	Owned	X	4.3	X	X	31	10	Olsen	333	10/01/16	Wheat, Sp. (bu)	29	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Oats (bu)	65
32		32	12/29/11	70.4	Corson	RpC	NE 1/4 Sec 4 T 21N R 26E	0.4	Owned	X	5.3	X	X	31	10	Olsen	333	10/01/16	Wheat, Sp. (bu)	29	Oats (bu)	61	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Oats (bu)	65
33		33	12/29/11	183.0	Corson	RaB	N 1/2 Sec 7 T 21N R 26E	0.1	Leased	X	24.7	X	X	31	14	Olsen	339	10/01/16	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,492	Wheat, Sp. (bu)	1492
34		34	12/29/11	38.0	Corson	RcB	NE 1/4 Sec 7 T 21N R 26E	0.2	Leased	X		X	X	31	14	Olsen	339	10/01/16	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,492	Wheat, Sp. (bu)	1492
35		35	12/29/11	317.7	Corson	RnB	W 1/2 Sec 10 T 21N R 25E	0.3	Leased	X		X	X	31	12	Olsen	424	10/01/16	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,492	Wheat, Sp. (bu)	1492
36		36	12/29/11	159.1	Corson	VoB	SE 1/4 Sec 10 T 21N R 25E	0.2	Leased	X	6.1	X	X	30	26	Olsen	576	10/01/16	Sunflowers (lbs)	1,822	Oats (bu)	61	Barley, Maltng (bu)	34	Corn (bu)	75	Sunflowers (lbs)	1,822	Oats (bu)	65
37		37	12/29/11	157.0	Corson	Gr	S 1/2 Sec 11 T 21N R 25E	0.1	Leased	X		X	X	31	20	Olsen	516	10/01/16	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	28	Wheat, Sp. (bu)	28
38		38	12/29/11	67.0	Corson	RnB	W 1/2 Sec 12 T 21N R 25E	0.1	Leased	X		X	X	31	16	Olsen	334	10/01/16	Wheat, Sp. (bu)	29	Barley, Maltng (bu)	34	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Wheat, Sp. (bu)	28	Wheat, Sp. (bu)	28
39		39	12/29/11	254.2	Corson	RnB	E 1/2 Sec 14 T 21N R 25E	0.1	Leased	X	3.1	X	X	30	19	Olsen	376	10/01/16	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Corn (bu)	75	Sunflowers (lbs)	1492
40		40	12/29/11	156.5	Corson	SgB	NE 1/4 Sec 23 T 21N R 25E	0.1	Leased	X		X	X	30	16	Olsen	376	10/01/16	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Corn (bu)	63
41		41	12/29/11	85.1	Corson	An	SE 1/4 Sec 24 T 21N R 26E	0.0	Leased	X		X	X	30	22	Olsen	257	10/01/16	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Corn (bu)	63	Corn (bu)	63
42		42	12/29/11	75.7	Corson	ShB	SE 1/4 Sec 24 T 21N R 26E	0.1	Leased	X		X	X	30	22	Olsen	257	10/01/16	Wheat, Sp. (bu)	29	Corn (bu)	75	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	29	Sunflowers (lbs)	1,822	Wheat, Sp. (bu)	

NUTRIENT MANAGEMENT PLAN
FOR
SOUTH DAKOTA ANIMAL FEEDING OPERATIONS

Part 3: Planned Nutrient Application																	Part 4: Nutrient Application																		
Date: 11/14/12 Operator: Wulf Cattle Depot County: Corson																	Date: 11/14/12 Operator: Wulf Cattle Depot County: Corson																		
Line #	Field ID (Include maps to illustrate location)		Initial Nutrient Mgt. Plan - N based fields (acres)	Nutrient Recommendation - SDSU Extension Service EC-750			Manure application based on:	Manure Application and Incorporation		Manure Test				Date Tested	Yield Goal (bushels/acre)	Maximum Manure Application Rate (Tons/acre)	Acres of Actual Nutrient Application	Manure Application			Nutrients Applied						Estimated years to reapplication based on P ₂ O ₅ rate								
	Name or Tract	Field #		Yield Goal	N	P ₂ O ₅		K ₂ O	Type of Manure (Year of Application)	Type of Application (Time of incorporation)	Total N	Inorganic N	Total P ₂ O ₅					Total K ₂ O	Actual Manure Rate Applied	Date Manure Applied	Time Period When Manure Applied	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅		K ₂ O	N	P ₂ O ₅	K ₂ O				
1	T1631 F1	1	61	64.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	5 Tons/ac	320 Tons	64.0	5	Tons/ac	October	Fall	59	0	0	20	42	65	79	42	65	N/A	
2	T1631 F2	2	61	89.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	89.0	5	Tons/ac	October	Fall	79	0	0	20	42	65	79	42	65	N/A	
3	T1198 F8	3	57	103.0	176	0	0	Nitrogen need	Livestock (1st Year)	Liquid	Sprinkling	2.0	1.3	0.5	6.0	06/06/11	1.1	87,900 Gal/ac	9,053,700 Gal	78.0	88,100	Gal/ac	July	Summer	76	0	0	100	44	529	176	44	529	N/A	
4	T1637 F2	4	61	208.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	208.0		Tons/ac				72	0	0				72	0		N/A
5	T11199 F3	5	29	55.5	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	55.5		Tons/ac				72	0	0				89	0		N/A
6	T11199 F6	6	75	119.9	89	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	119.9		Tons/ac				89	0	0				91	0		N/A
7	T1764 F1	7	1,822	122.9	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	122.9		Tons/ac				90	0	0				90	0		N/A
8	T11329 F1	8	75	60.2	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	60.2		Tons/ac				90	0	0				90	0		N/A
9	T11329 F2	9	75	279.4	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	279.4		Tons/ac				90	0	0				90	0		N/A
10	T1898 F1	10	29	139.8	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	139.8		Tons/ac				72	0	0				72	0		N/A
11	T1426 F1	11	29	145.7	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	145.7		Tons/ac				72	0	0				72	0		N/A
12	T1930 F1	12A	29	80.9	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	80.9		Tons/ac				72	0	0				72	0		N/A
13	T1929 F1	13	29	87.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	87.0		Tons/ac				72	0	0				72	0		N/A
14	T11460 F1	14	29	132.0	74	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	132.0		Tons/ac				74	0	0				74	10		N/A
15	T1894 F3	15	29	133.0	74	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	133.0		Tons/ac				74	10	0				90	0		N/A
16	T1900 F1	16	75	315.0	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	315.0		Tons/ac				72	0	0				72	0		N/A
17	T1763 F1	17	29	149.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	149.0		Tons/ac				90	0	0				90	0		N/A
18	T1892 F2	18	75	176.7	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	176.7		Tons/ac				90	0	0				90	0		N/A
19	T1892 F3	19	75	143.0	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	143.0		Tons/ac				90	0	0				90	0		N/A
20	T1901 F1	20	75	288.5	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	0 Tons/ac	0 Tons	288.5		Tons/ac				90	0	0				90	0		N/A
21	T10091 F4	21	29	131.5	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	1,184 Tons	131.5		Tons/ac	October	Fall	35	0	0	37	76	117	72	76	117		N/A
22	T1767 F2	22	34	109.3	51	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	656 Tons	109.3		Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78		N/A
23	T1767 F5	23	34	89.3	51	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	536 Tons	89.3		Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78		N/A
24	T1767 F6	24	34	57.4	51	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	344 Tons	57.4		Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78		N/A
25	T1638 F1A	25	61	149.4	79	17	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,494 Tons	149.4		Tons/ac	October	Fall	38	0	0	41	84	130	79	84	130		N/A
26	T1638 F1B	26	61	150.0	79	17	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,500 Tons	150.0		Tons/ac	October	Fall	38	0	0	41	84	130	79	84	130		N/A
27	T1770 F1	27	34	148.1	51	5	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	6 Tons/ac	889 Tons	148.1		Tons/ac	October	Fall	27	0	0	24	50	78	51	50	78		N/A
28	T1766 F1	28	1,822	99.2	91	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,091 Tons	99.2		Tons/ac	October	Fall	46	0	0	45	92	143	91	92	143		N/A
29		29	29	229.4	72	10	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	9 Tons/ac	2,065 Tons	229.4		Tons/ac	October	Fall	35	0	0	37	76	117	72	76	117		N/A
30		30	61	150.0	78	14	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,500 Tons	150.0		Tons/ac	October	Fall	37	0	0	41	84	130	78	84	130		N/A
31		31	61	64.1	78	14	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	641 Tons	64.1		Tons/ac	October	Fall	37	0	0	41	84	130	78	84	130		N/A
32		32	61	65.1	78	14	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	651 Tons	65.1		Tons/ac	October	Fall	37	0	0	41	84	130	78	84	130		N/A
33		33	1,822	158.3	90	11	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,741 Tons	158.3		Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143		N/A
34		34	1,822	38.0	90	11	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	418 Tons	38.0		Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143		N/A
35		35	1,822	317.7	90	15	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	3,495 Tons	317.7		Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143		N/A
36		36	61	153.0	79	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	10 Tons/ac	1,530 Tons	153.0		Tons/ac	October	Fall	38	0	0	41	84	130	79	84	130		N/A
37		37	1,822	157.0	90	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1	11 Tons/ac	1,727 Tons	157.0		Tons/ac	October	Fall	45	0	0	45	92	143	90	92	143		N/A
38		38	29	67.0	72	0	0	Nitrogen need	Livestock (1st Year)	Solid	Broadcast (None)	12.2	1.0	8.4	13.0	05/25/11	4.1</																		

Plan Year: 2017

Part 5: Nutrient Balance

41. Nutrient Balance						
Field #	Crop Yield, lb, bu, ton	Estimated Crop N Removal lb/ac	Estimated Crop P ₂ O ₅ removal lb/ac	Nitrogen Balance lb/ac	*P ₂ O ₅ Balance ppm	Legume Credit (Table 2 of EC750)
1	61	79.3	15.3	30	36	
2	61	79.3	15.3	30	26	
3	147	176.4	51.5	30	18	
4	61	79.3	15.3	30	17	
5	29	72.5	16.2	30	20	
6	75	90.0	26.3	30	19	
7	1822	91.1	20.0	30	27	
8	75	90.0	26.3	30	24	
9	75	90.0	0.0	30	26	
10	29	72.5	16.2	30	26	
11	29	72.5	16.2	30	26	
12A	29	72.5	16.2	30	19	
13	29	72.5	16.2	30	19	
14	29	72.5	16.2	31	18	
15	29	72.5	16.2	31	19	
16	75	90.0	26.3	30	44	
17	29	72.5	16.2	30	28	
18	75	90.0	26.3	30	25	
19	75	90.0	26.3	30	26	
20	75	90.0	26.3	30	31	
21	29	72.5	16.2	30	22	
22	34	51.0	13.9	30	23	
23	34	51.0	13.9	30	26	
24	34	51.0	13.9	30	40	
25	61	79.3	15.3	30	12	
26	61	79.3	15.3	30	13	
27	34	51.0	13.9	30	14	
28	1822	91.1	20.0	30	36	
29	29	72.5	16.2	30	18	
30	61	79.3	15.3	30	13	
31	61	79.3	15.3	30	13	
32	61	79.3	15.3	30	13	
33	1822	91.1	20.0	30	18	
34	1822	91.1	20.0	30	18	
35	1822	91.1	20.0	30	16	
36	61	79.3	15.3	30	29	
37	1822	91.1	20.0	30	24	
38	29	72.5	16.2	31	19	
39	1822	91.1	20.0	30	23	
40	1822	91.1	20.0	30	19	
41	75	90.0	26.3	30	25	
42	75	90.0	26.3	30	26	
43	29	72.5	16.2	30	22	
44	29	72.5	16.2	30	21	
45	2	110.0	24.0	30	17	
46	29	72.5	16.2	30	22	
12B	29	72.5	16.2	30	11	
47A	29	72.5	16.2	30	9	
47B	29	72.5	16.2	30	10	
48	29	72.5	16.2	30	5	

*(Total Land Application of P₂O₅ in lb/acre - Total Crop Removal of P₂O₅ in lb/acre)/20 + Soil P₂O₅ in PPM

Section D: Application Site Summary & Best
Management Practices

Application Site Summary & Best Management Practices

Wulf Cattle Depot

Field Id Area	Useable Acreage(Acres)	Land Use	Quarter	S	T	R	Owner of Land	Easements	*Nitrogen Risk Assessment	#Runoff Setbacks	Application Rate Limitations	^Best Management Practices
1	64.0	Cropland	NW 1/4	3	21 N	26 E	Wulf Cattle	Owned	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
2	89.0	Cropland	NW 1/4	3	21 N	26 E	Wulf Cattle	Owned	Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
3	103.0	Irrigated Cropland	SW 1/4	4	21 N	27 E	Sharon Walker	Yes	High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling, and no application when ground has potential for runoff
4	208.0	Cropland	E 1/2	5	21 N	26 E	Wulf Cattle	Owned	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
5	55.5	Cropland	SW 1/4	5	21 N	27 E	Sharon Walker	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
6	119.9	Cropland	SE 1/4	5	21 N	27 E	Sharon Walker	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
7	122.9	Cropland	NW 1/4	6	21 N	27 E	Bonnie Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
8	60.2	Cropland	SE 1/4	6	21 N	27 E	Dallas & Dee Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
9	279.4	Cropland	W 1/2	7	21 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
10	139.8	Cropland	NW 1/4	8	21 N	27 E	Dallas & Dee Schott	Yes	High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
11	145.7	Cropland	NE 1/4	8	21 N	27E	Dallas & Dee Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
12A	80.9	Cropland	NE 1/4	9	21 N	27 E	Wulf Cattle	Owned	Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
13	87.0	Cropland	SW 1/4	9	21 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
14	132.0	Cropland	NE 1/4	9	22 N	27 E	Dallas & Dee Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
15	133.0	Cropland	SE 1/4	9	22 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
16	315.0	Cropland	E 1/2	10	22 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
17	149.0	Cropland	SE 1/4	13	21 N	26 E	Bonnie Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
18	176.7	Cropland	N 1/2	15	22 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
19	143.0	Cropland	N 1/2	15	22 N	27 E	Dallas & Dee Schott	Yes	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
20	288.5	Cropland	E 1/2	16	22 N	27 E	Dallas & Dee Schott	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
21	131.5	Cropland	N 1/2	19	22 N	27 E	Gary Rau	Yes	High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
22	109.3	Cropland	E 1/2	30	22 N	27 E	Gary Rau	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
23	89.3	Cropland	NE 1/4	31	22 N	27 E	Gary Rau	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
24	57.4	Cropland	SE 1/4	31	22 N	27 E	Gary Rau	Yes	High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
25	149.4	Cropland	S 1/2	34	22 N	26 E	Wulf Cattle	Owned	Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling

Field Id	Useable Area	Acreage(Acres)	Land Use	Quarter	S	T	R	Owner of Land	Easements	*Nitrogen Risk Assessment	#Runoff Setbacks	Application Rate Limitations	^Best Management Practices
26	150.0	Cropland	S 1/2	34	22 N	26 E	Wulf Cattle	Owned		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
27	148.1	Cropland	NW 1/4	34	22 N	27 E	Gary Rau	Yes		High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
28	99.2	Cropland	NE 1/4	34	22 N	27 E	Gary Rau	Yes		High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
29	229.4	Cropland	N 1/2	4	20 N	25 E	Dallas & Dee Schott	Yes		High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
30	150.0	Cropland	NW 1/4	4	21 N	26 E	Wulf Cattle	Owned		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
31	64.1	Cropland	N 1/2	4	21 N	26 E	Wulf Cattle	Owned		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
32	65.1	Cropland	NE 1/4	4	21 N	26 E	Wulf Cattle	Owned		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
33	158.3	Cropland	N 1/2	7	21 N	26 E	Golden Hills LLP	Yes		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
34	38.0	Cropland	NE 1/4	7	21 N	26 E	Golden Hills LLP	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
35	317.7	Cropland	W 1/2,	10	21 N	25 E	Golden Hills LLP	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
36	153.0	Cropland	SE 1/4	10	21 N	25 E	Golden Hills LLP	Yes		High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
37	157.0	Cropland	S 1/2	11	21 N	25 E	Golden Hills LLP	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
38	67.0	Cropland	W 1/2	12	21 N	25 E	Golden Hills LLP	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
39	251.1	Cropland	E 1/2	14	21 N	25 E	Dallas & Dee Schott	Yes		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
40	156.5	Cropland	NE 1/4	23	21 N	25 E	Dallas & Dee Schott	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
41	85.1	Cropland	SE 1/4	24	21 N	26 E	Bonnie Schott	Yes		High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
42	73.7	Cropland	SE 1/4	24	21 N	26E	Bonnie Schott	Yes		High	No	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
43	309.5	Cropland	W 1/2	26	21 N	25 E	Dallas & Dee Schott	Yes		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
44	307.9	Cropland	S 1/2	32	21 N	25 E	Dallas & Dee Schott	Yes		High	Yes	Crop N Removal	Delay Fall manure applications until soil temperatures drop below 50 degrees F, No Till, Soil Test prior to application of nitrogen, manure sampling
45	142.6	Cropland	NE 1/4	32	22 N	26 E	Wulf Cattle	Owned		Low	Yes	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
46	317.1	Cropland	W 1/2	35	21 N	25 E	Dallas & Dee Schott	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
12B	44.7	Irrigated Cropland	NE 1/4	9	21 N	27 E	Dallas & Dee Schott	Yes		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
47A	44.5	Irrigated Cropland	NW 1/4	9	21 N	27 E	Wulf Cattle	Owned		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
47B	75.9	Cropland	NW 1/4	9	21 N	27 E	Wulf Cattle	Owned		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
48	277.4	Cropland	E 1/2	16	21 N	27 E	Wulf Cattle	Owned		Low	No	Crop N Removal	No Till, Soil Test prior to application of nitrogen, manure sampling
Total Land	7,312.3												

*Using SD bulletin no SD 190-7-1 for groundwater leaching. Assessments based on a soils "Saturated hydraulic conductivity" Soil maps units that have a Ksat value of 10 micrometers/sec or greater will be considered to have a high leaching risk."
As shown on the Water Quality Risk Assessment map 100' setback distances will practiced.
^Best mangagement practices are shown in section O

Section E: Inventory of Water Wells

Inventory of Water Wells

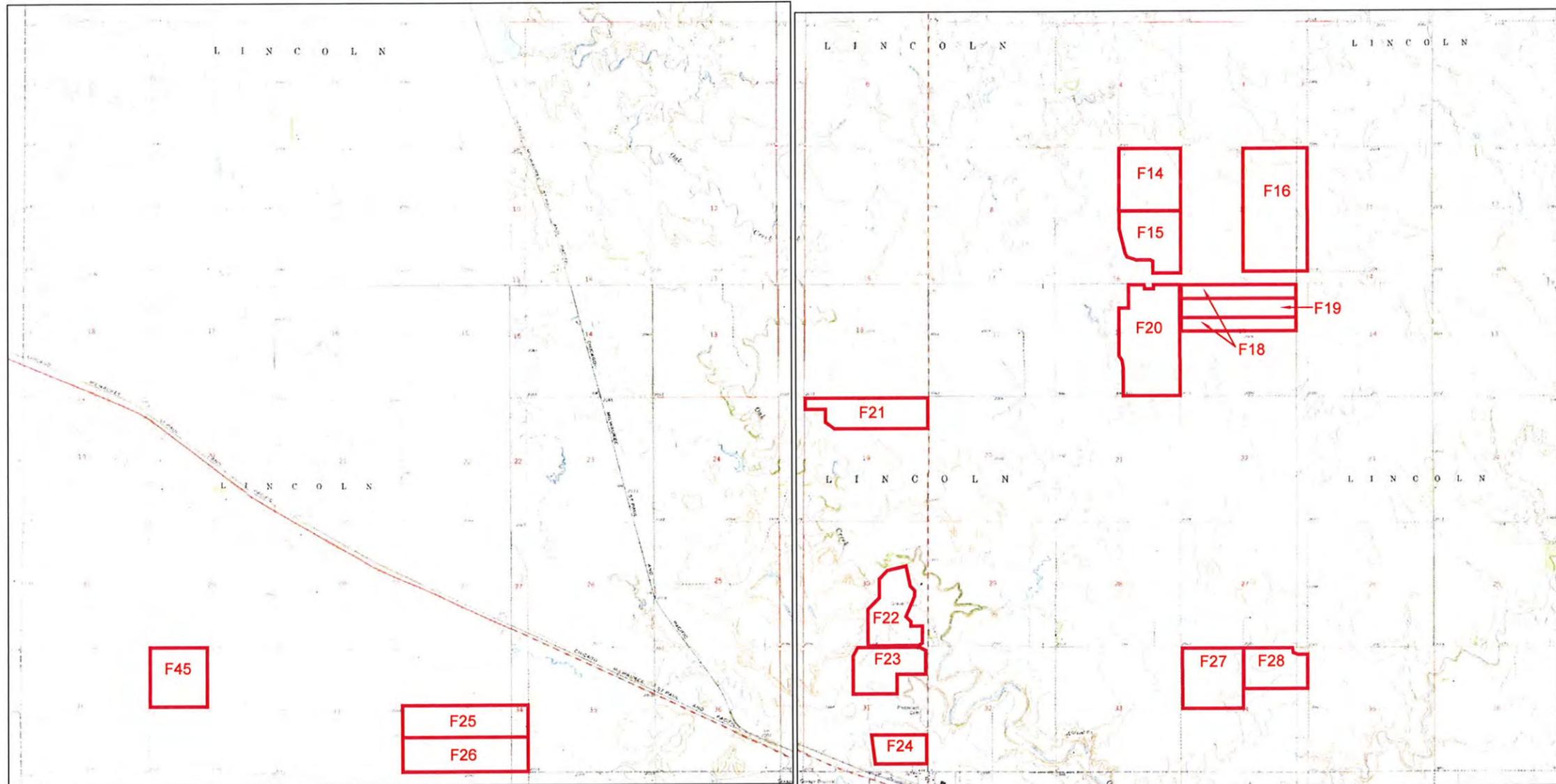
Field ID	Location (Legal)	Well Depth (Ft.)	Use of Well <u>1/</u>	Required Setback Distance From Well For Manure Application (Ft.)	
				County Rule	State Rule
5	NW/4 of SE/4, Sec 5, T 21N, R 27 E	115	Private	NA	250
6	SW/4 of NE/4, Sec 5 T 21 N, R 27 E	125	Producer Owned	NA	150
7	NW/4 of NW/4, Sec 6, T 21 N, R 27 E	116	Private	NA	250
Near 14	SE/4 of NW/4, Sec 22, T 22N, R 27 E	220	Private	NA	250
37	NE/4 of SE/4, Sec 11 T 21N, R 25 E	180	Private	NA	250

- 1/ Well Use Categories:
- Producer (Owned)
 - Private
 - Public
 - Irrigation

Section F: Field Maps

22N - 26E

22N - 27E



GENERAL NOTES

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
 Consulting Engineers
 PO Box 522, Mandan, ND 58554
 (701) 663-1116, FAX: (701) 667-1356
 www.dgaengineering.com

WULF CATTLE DEPOT

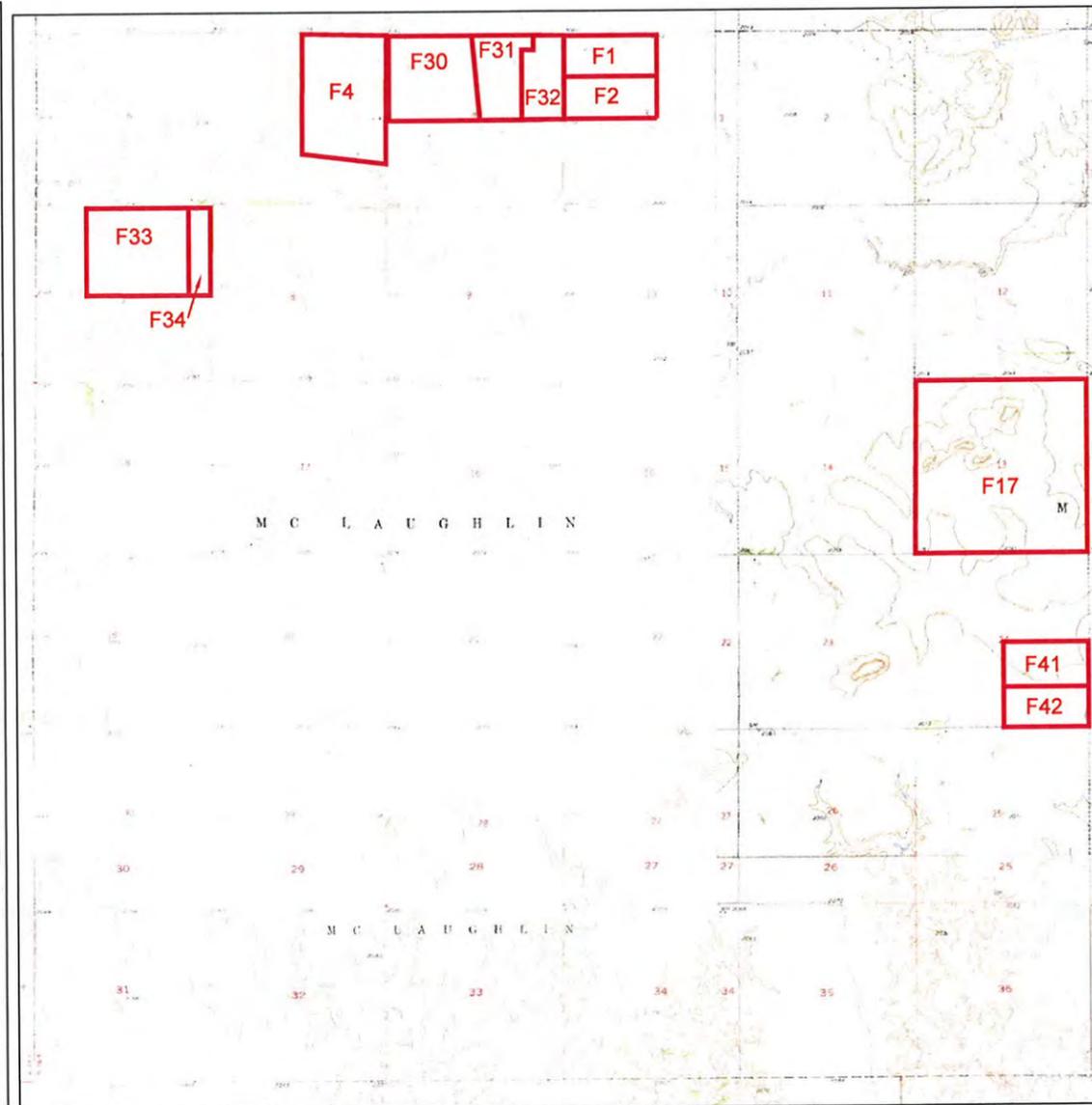
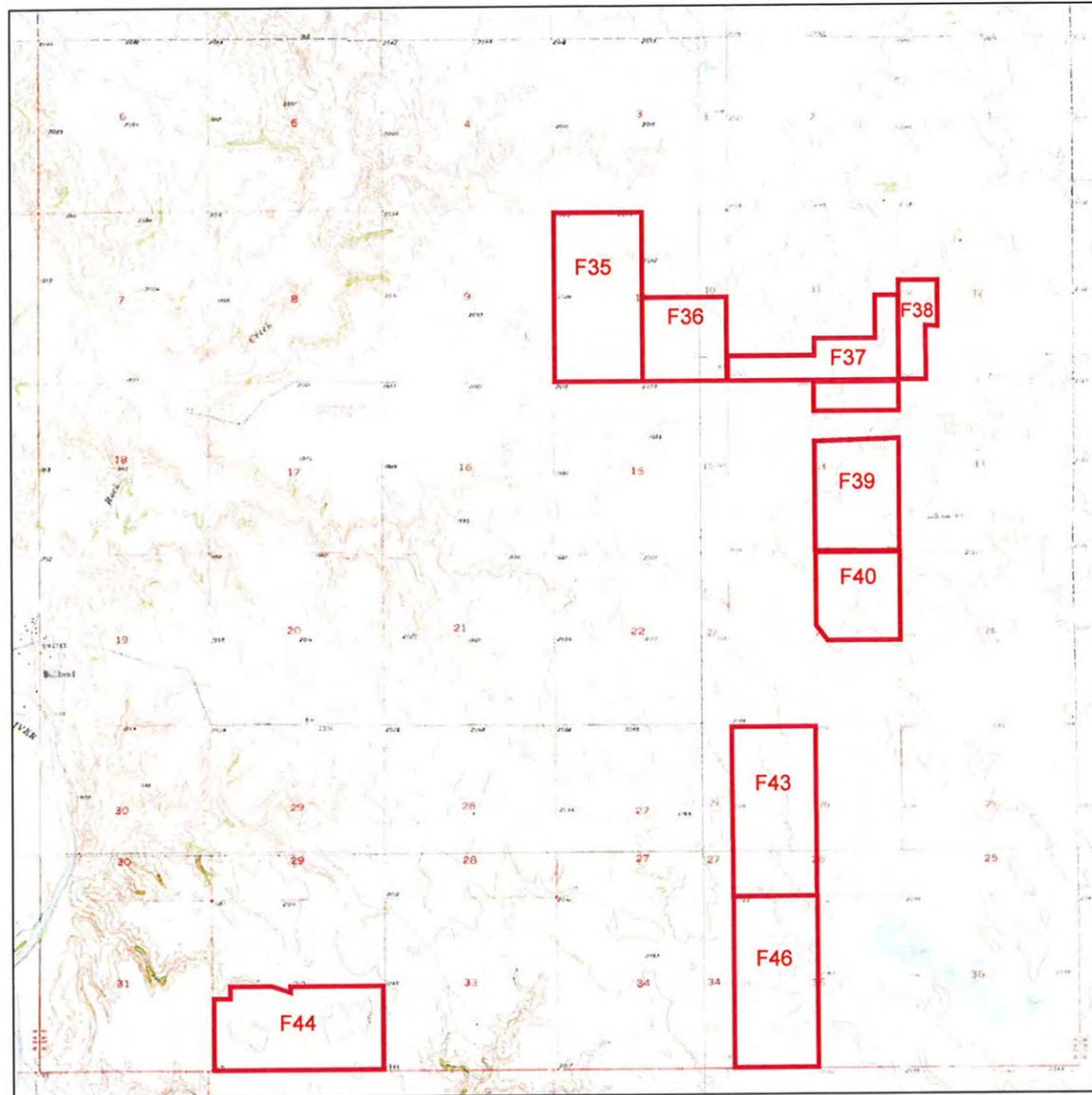
NW 1/4 SECTION 19, T 24 N, R 2 W
MADISON COUNTY, NE

OVERALL LAND APPLICATION MAP

DATE: JAN 12, 2012	SHEET: 1
SCALE: NONE	
DRAWN BY: CAS	
CHECKED BY: GGG	

21N - 25E

21N - 26E



GENERAL NOTES

No.	Revision/Issue	Date

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WULF CATTLE DEPOT

NW 1/4 SECTION 19, T 24 N, R 2 W
MADISON COUNTY, NE

OVERALL LAND APPLICATION MAP

DATE:
JAN 12, 2012

SCALE:
NONE

DRAWN BY:
CAS

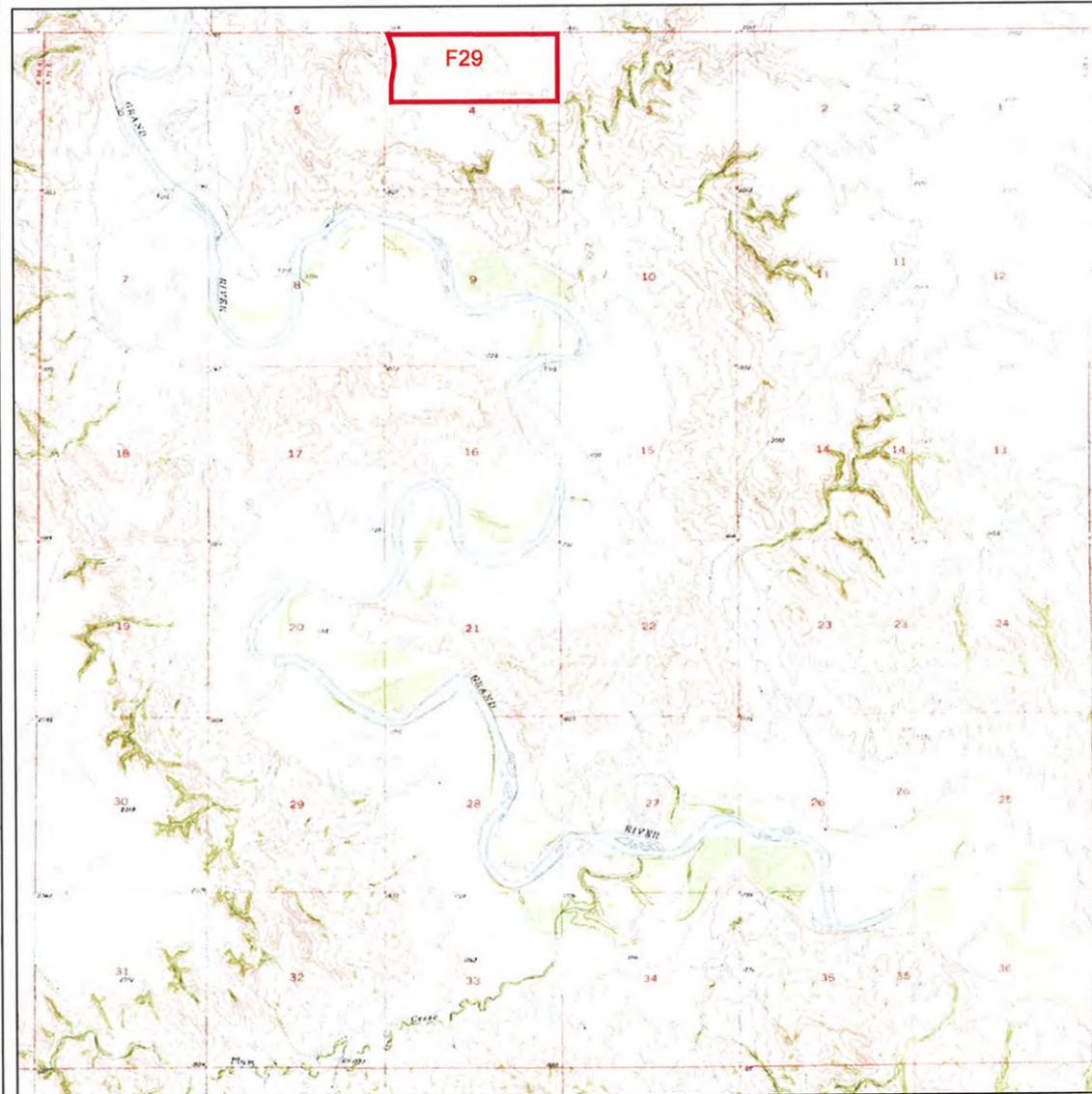
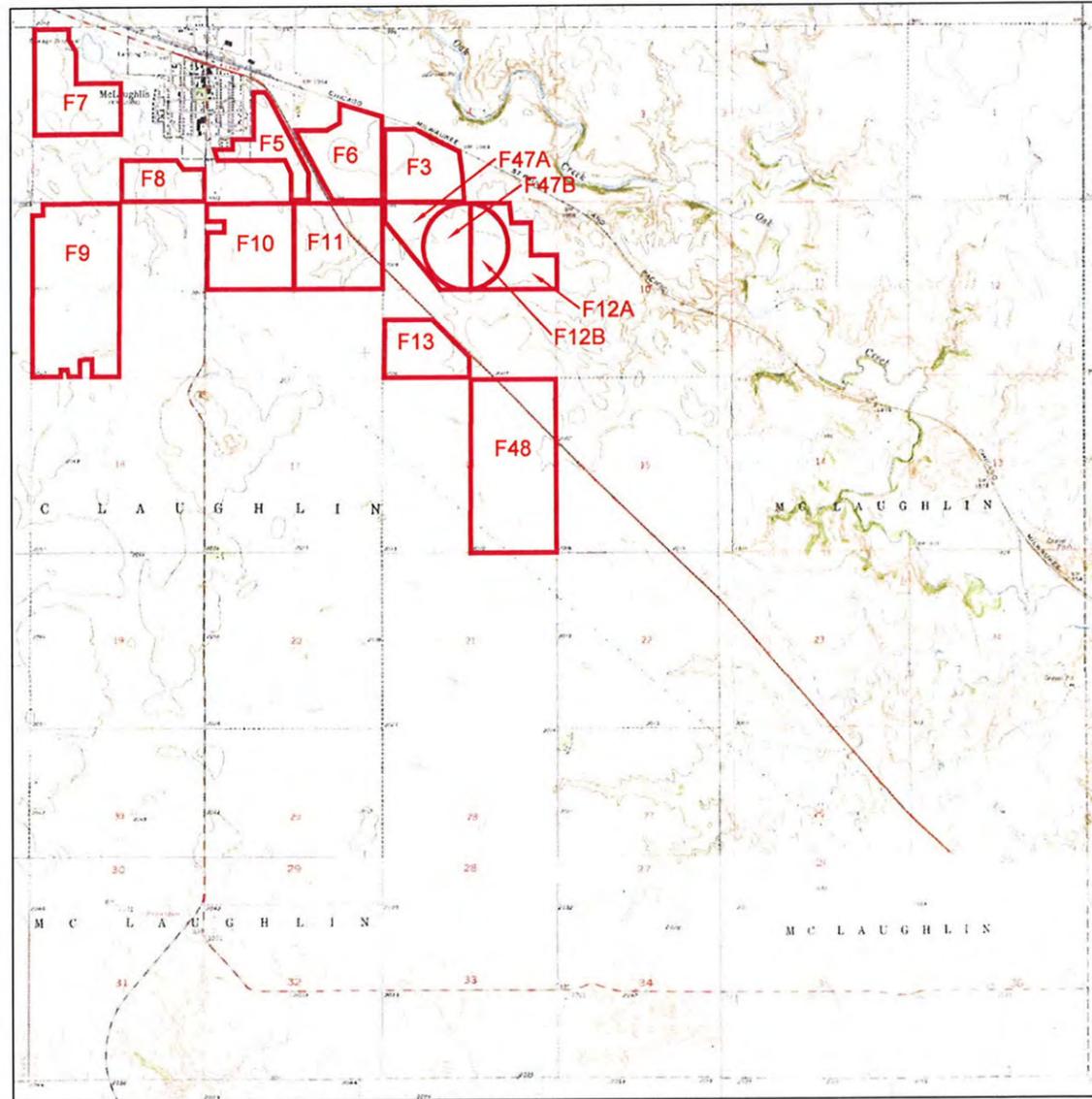
CHECKED BY:
GGG

SHEET:

2

21N - 27E

20N - 25E



GENERAL NOTES

No.	Revision/Issue	Date
1	Field Addition	5/23/13

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WULF CATTLE DEPOT

NW 1/4 SECTION 19, T 24 N, R 2 W
MADISON COUNTY, NE

OVERALL LAND APPLICATION MAP

DATE: JAN 12, 2012	SHEET: 3
SCALE: NONE	
DRAWN BY: CAS	
CHECKED BY: GGG	

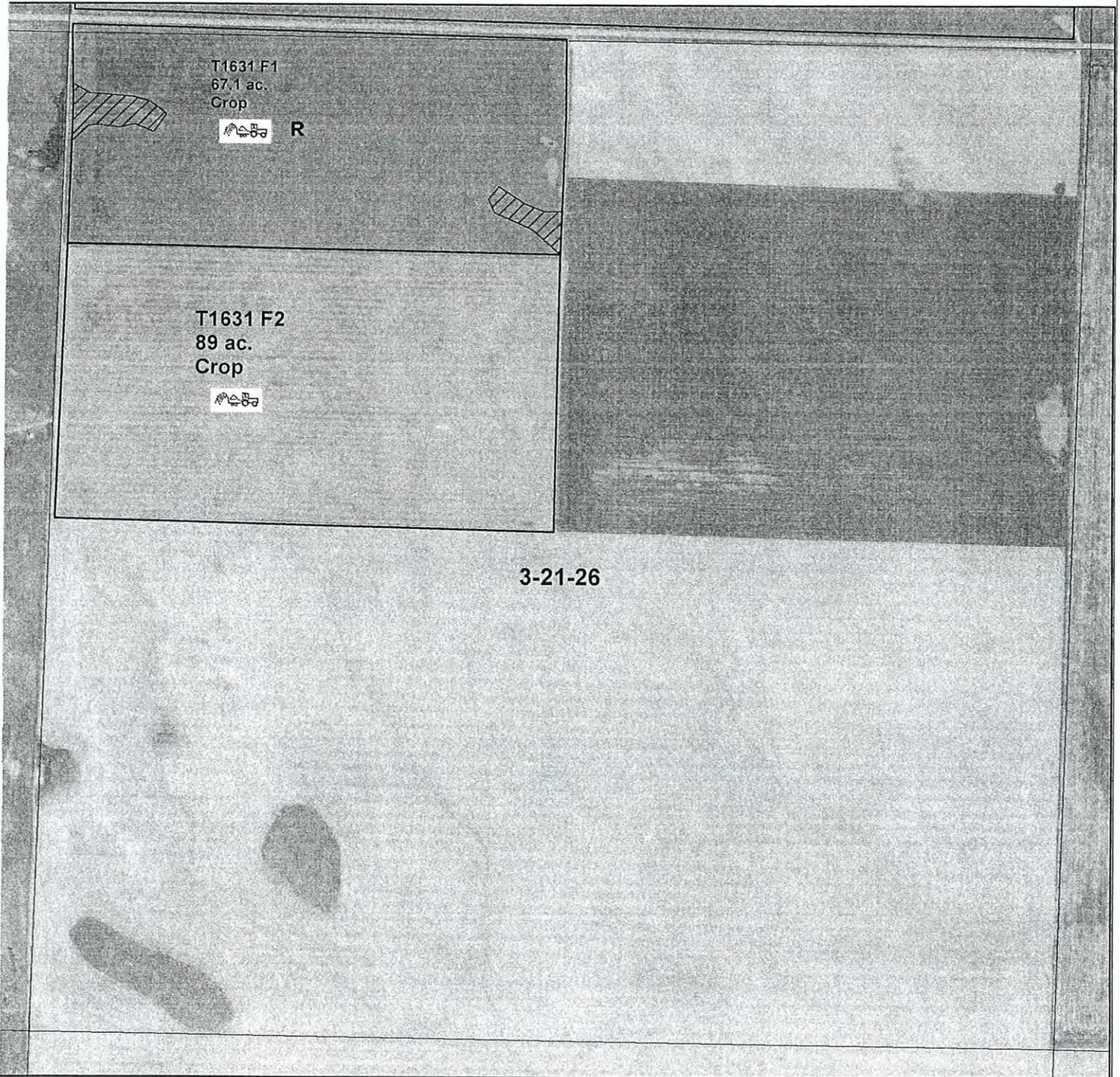
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 3-21-26



Legend

 CNMP_2010

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk

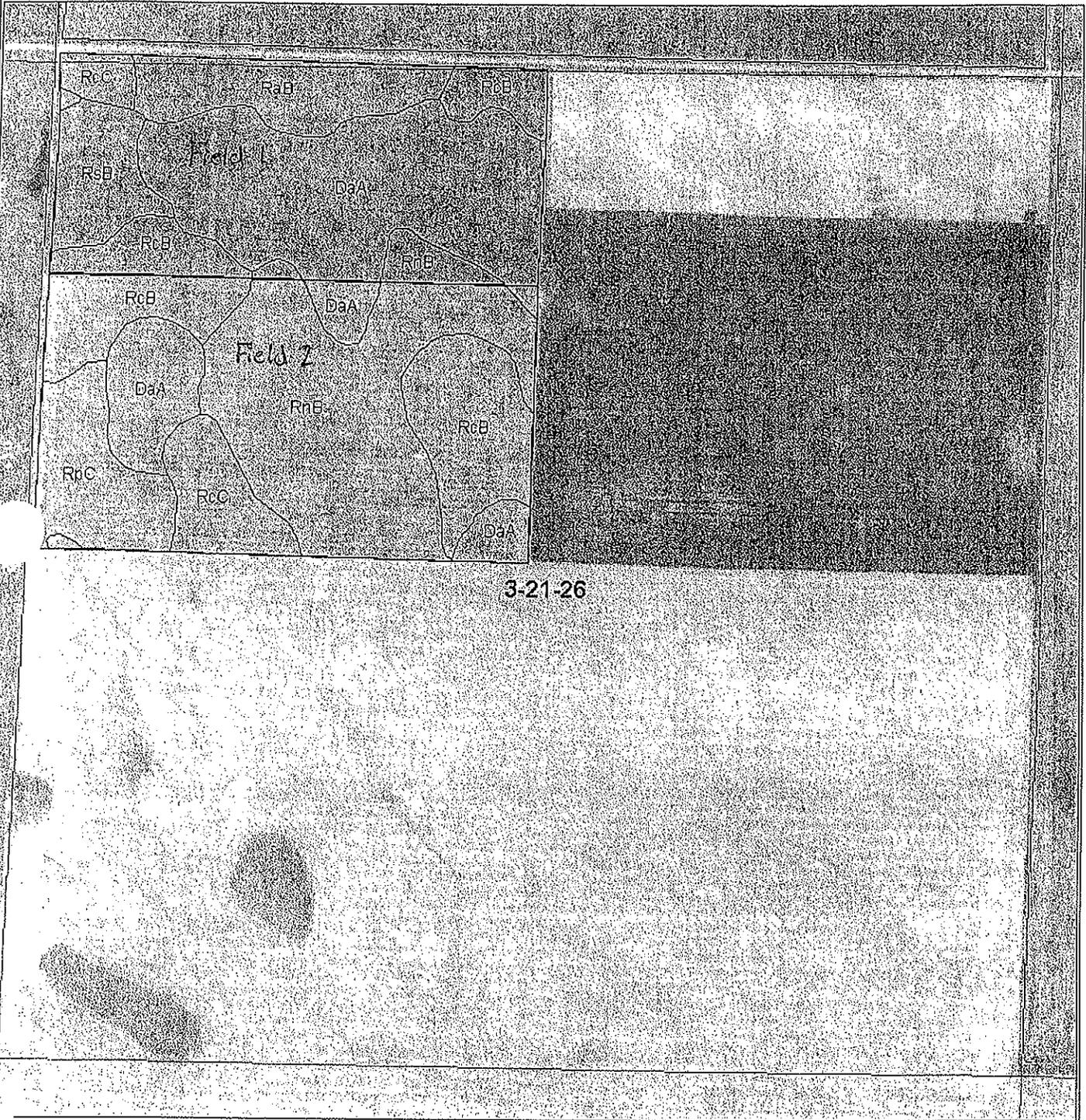


Soils Map

Owner(s): DALLAS SCHOTT

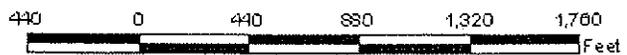
Field Office: Mitchell - ANMT
Agency: USDA - NRCS

Legal Description: 3-21-26



Legend

-  Soils Map
-  CNMP_2010
-  Sections



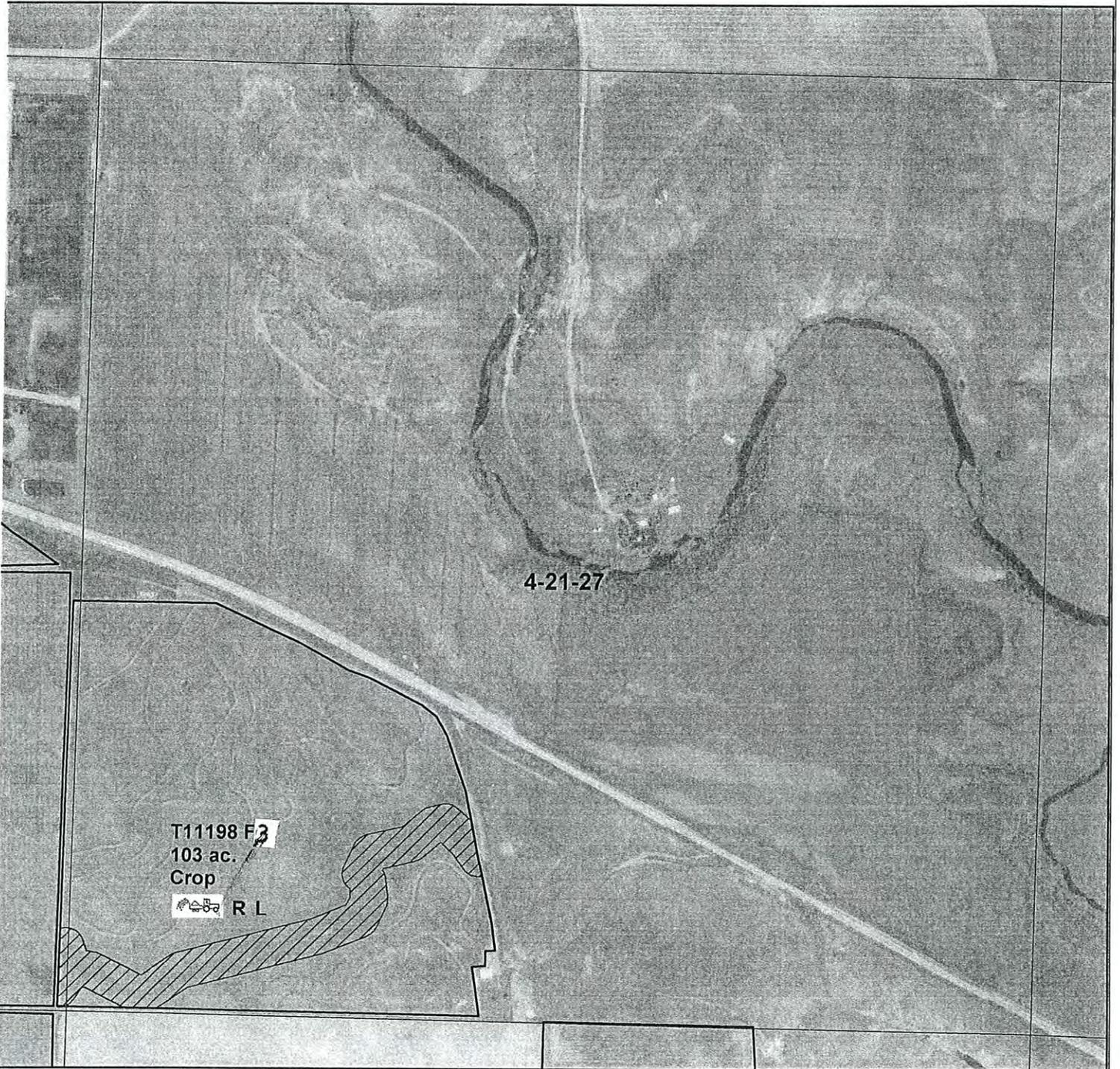
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 4-21-27



Legend

 CNMP

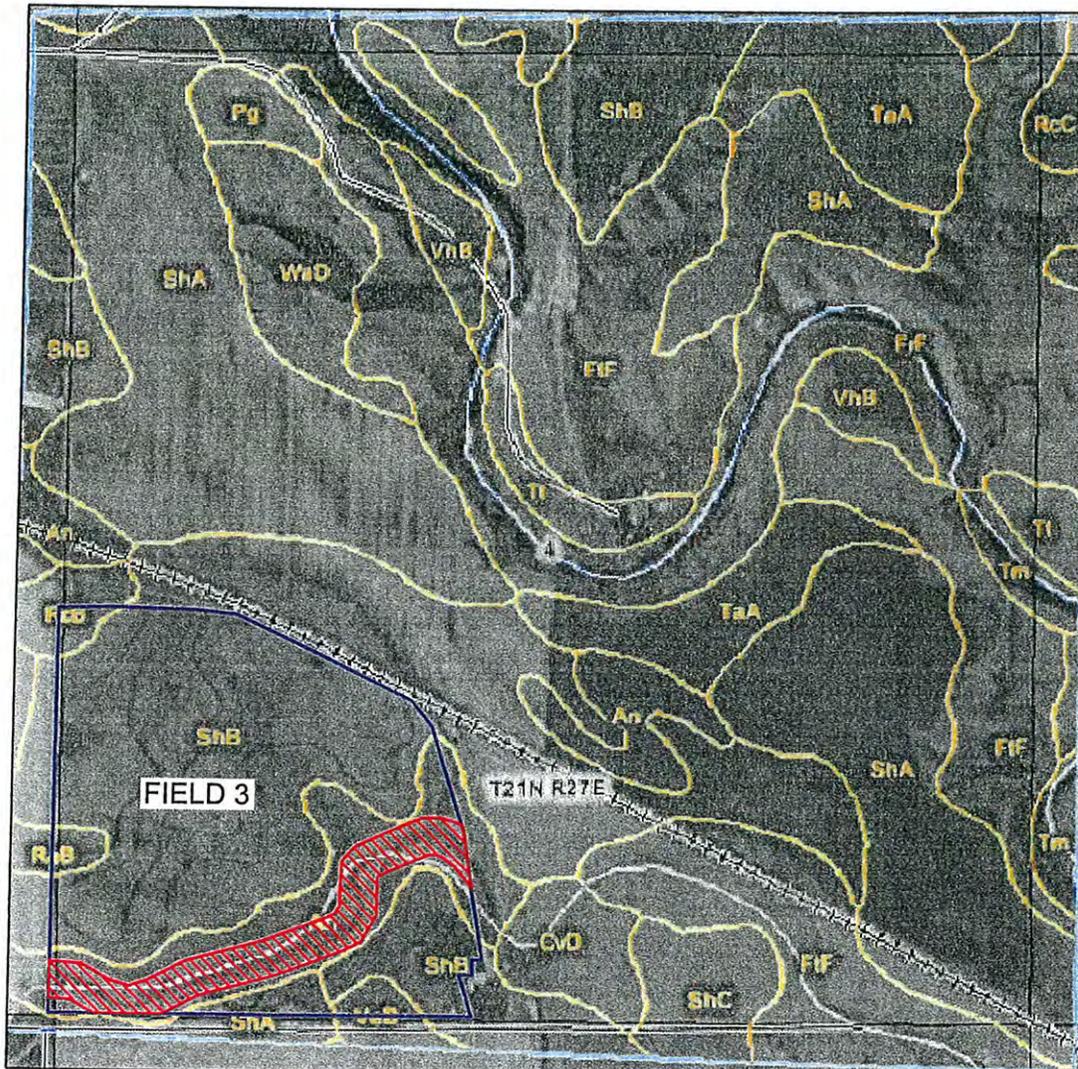
 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk





Legend:

- An Arnegard loam
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- FrF Flasher-Rock outcrop complex, 30 to 60 percent slopes
- FtF Flasher-Telfer complex, 15 to 40 percent slopes
- Pg Pits, gravel
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- ShC Shambo loam, 6 to 9 percent slopes
- TaA Tally fine sandy loam, 0 to 6 percent slopes
- Tm Trembles fine sandy loam, channeled
- Tt Trembles fine sandy loam, terrace
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes
- WdD Wabek gravelly sandy loam, 2 to 35 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

4 - 21N - 27E
CORSON COUNTY, SD



**DeHaan, Grabs
& Associates, LLC**
Consulting Engineers

PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356

		Revision
Date: 12/28/11		Date:
Scale: 1" = 1000'		Scale:
Drawn By: CAS		Drawn By:
Checked By: GGG		Checked By:
Page:		Page:

Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 5-21-26



Legend

 CNMP_2010

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



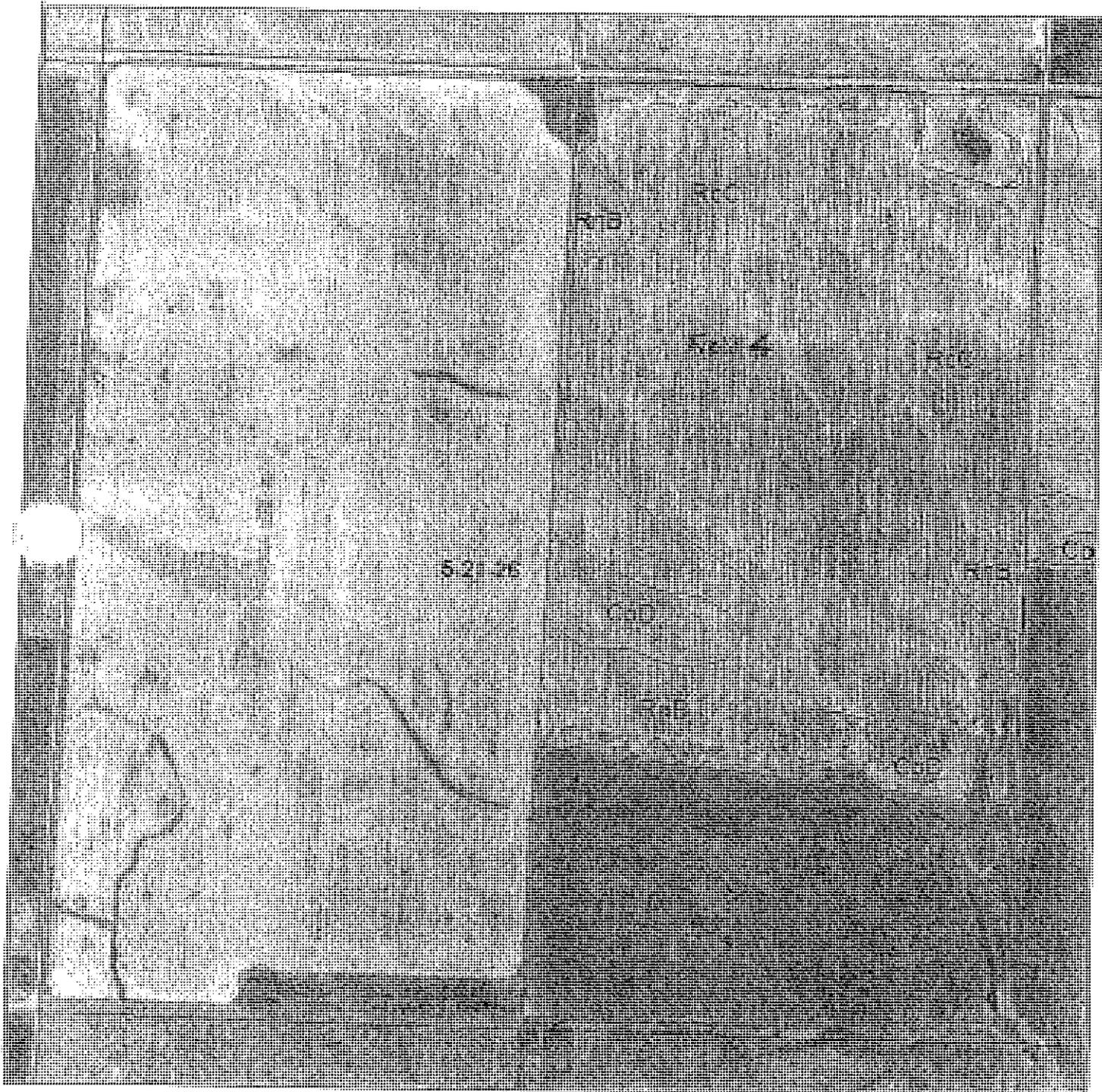
Soils Map

Owner(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Legal Description: S-31-36

Agency: USDA - NRCS



Legend

- Soils Map
- CNP
- Sections



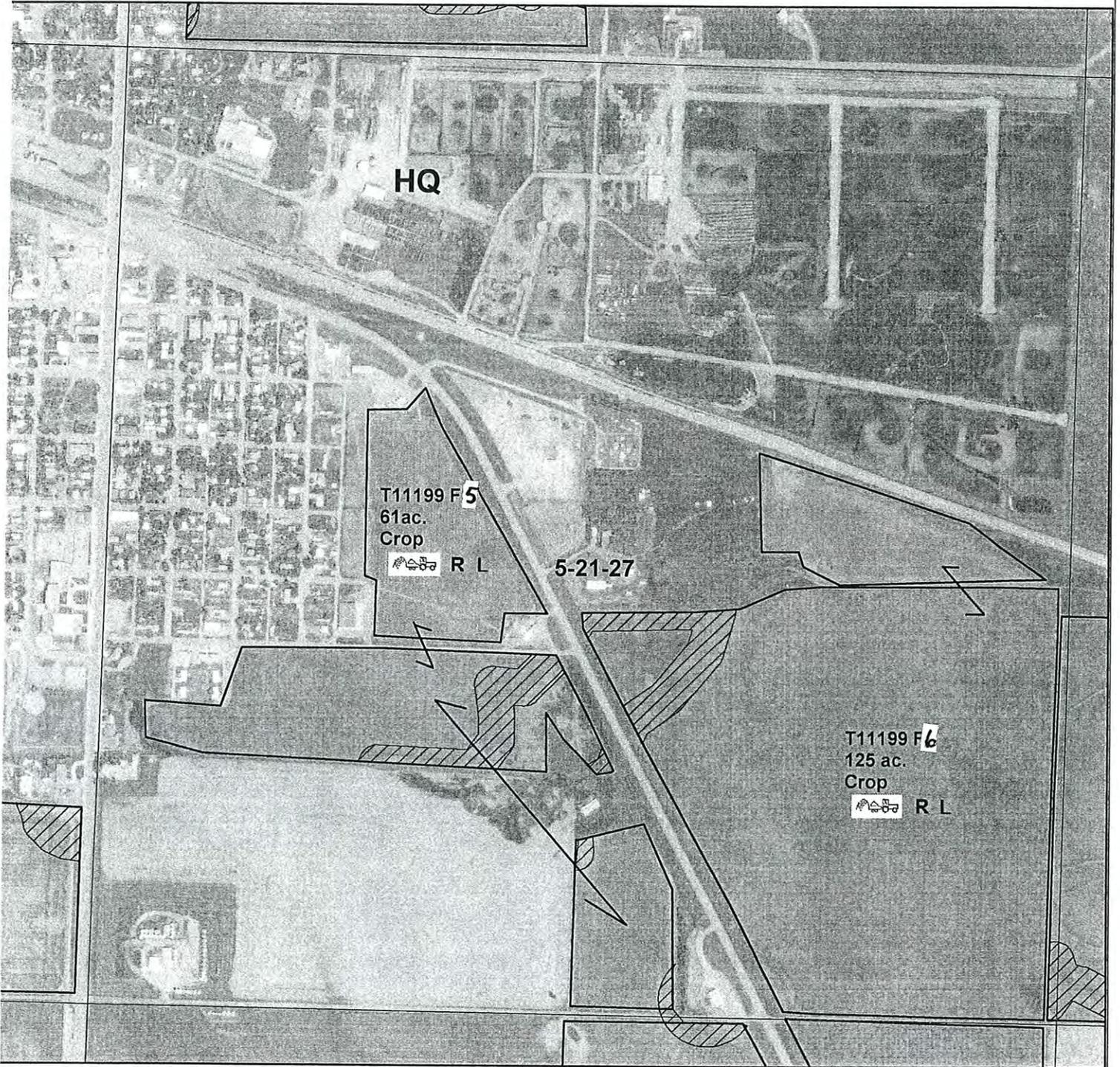
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 5-21-27



Legend

CNMP

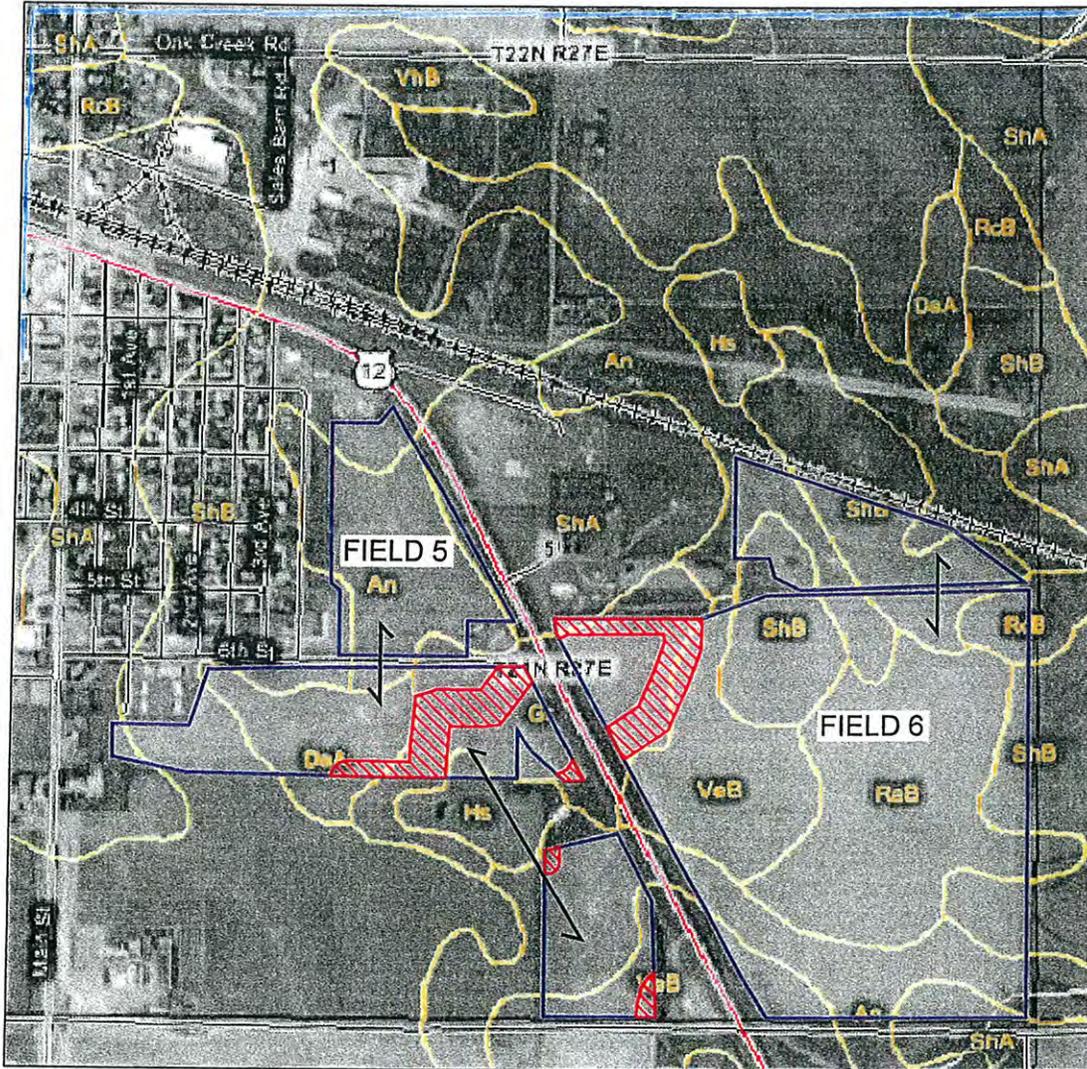
Manure Application Fields

Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk





Legend:

- An Arnegard loam
- DaA Daglum loam, 0 to 3 percent slopes
- FtF Flasher-Telfer complex, 15 to 40 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

5 - 21N - 27E
CORSON COUNTY, SD



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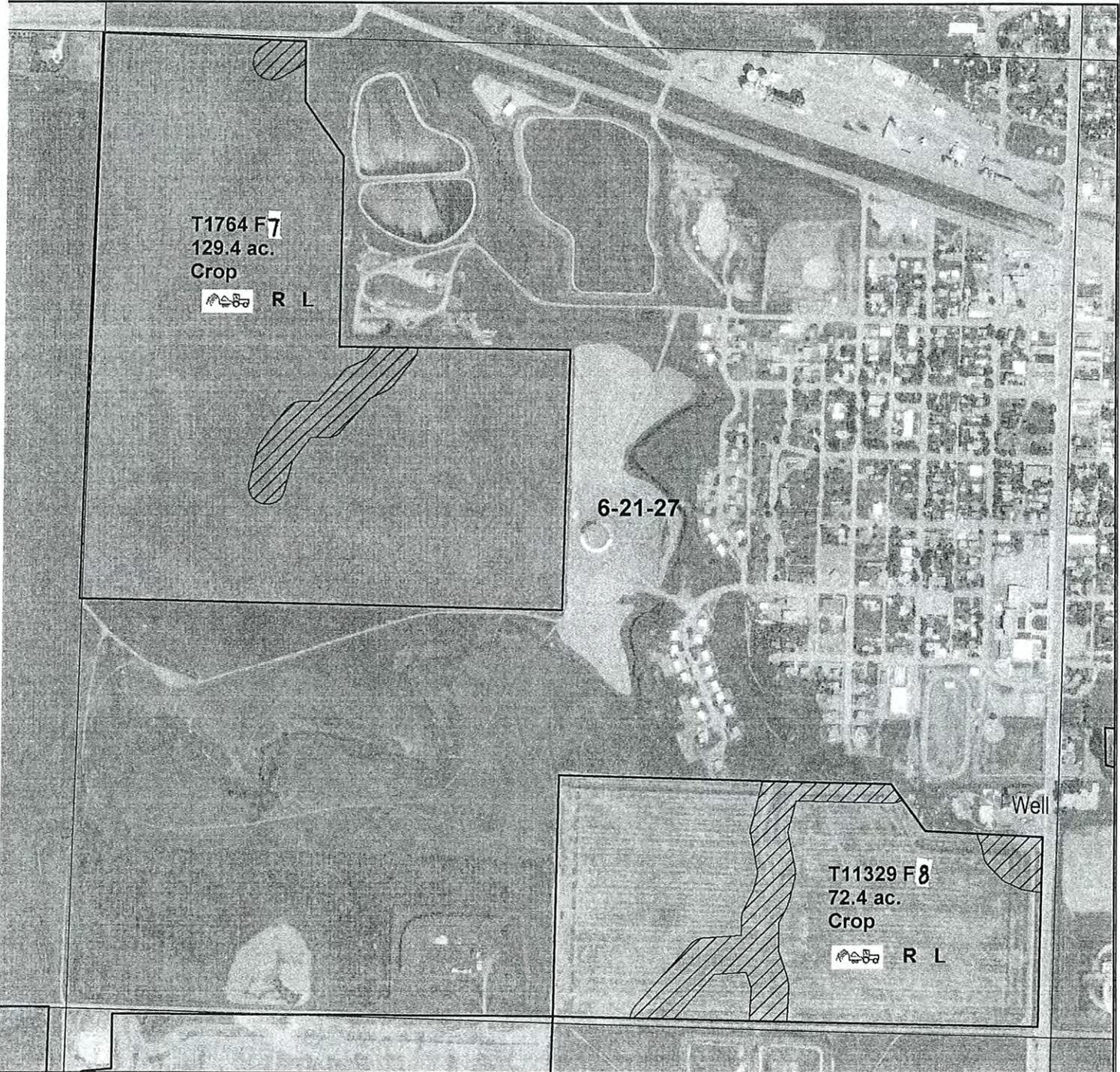
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 6-21-27



Legend

 CNMP

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



Soils Map

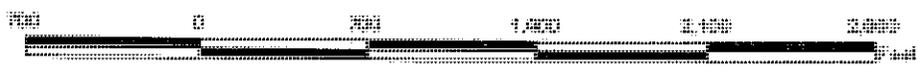
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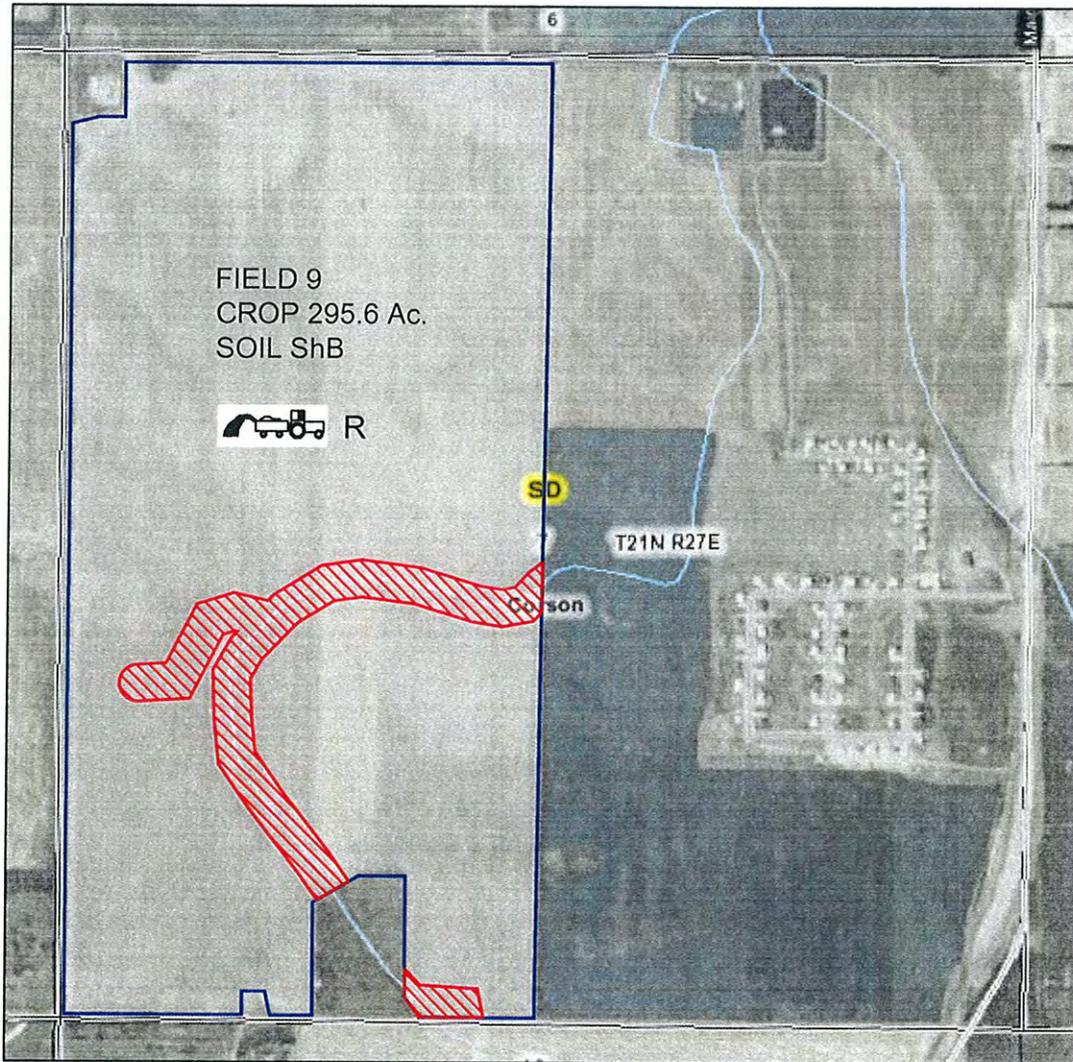
Field Office: Mitchell - ARMT
Agency: USDA - NRCS

Legal Description: S-21-37



- Legend**
- Soils Map
 - CNMP
 - Sections





Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

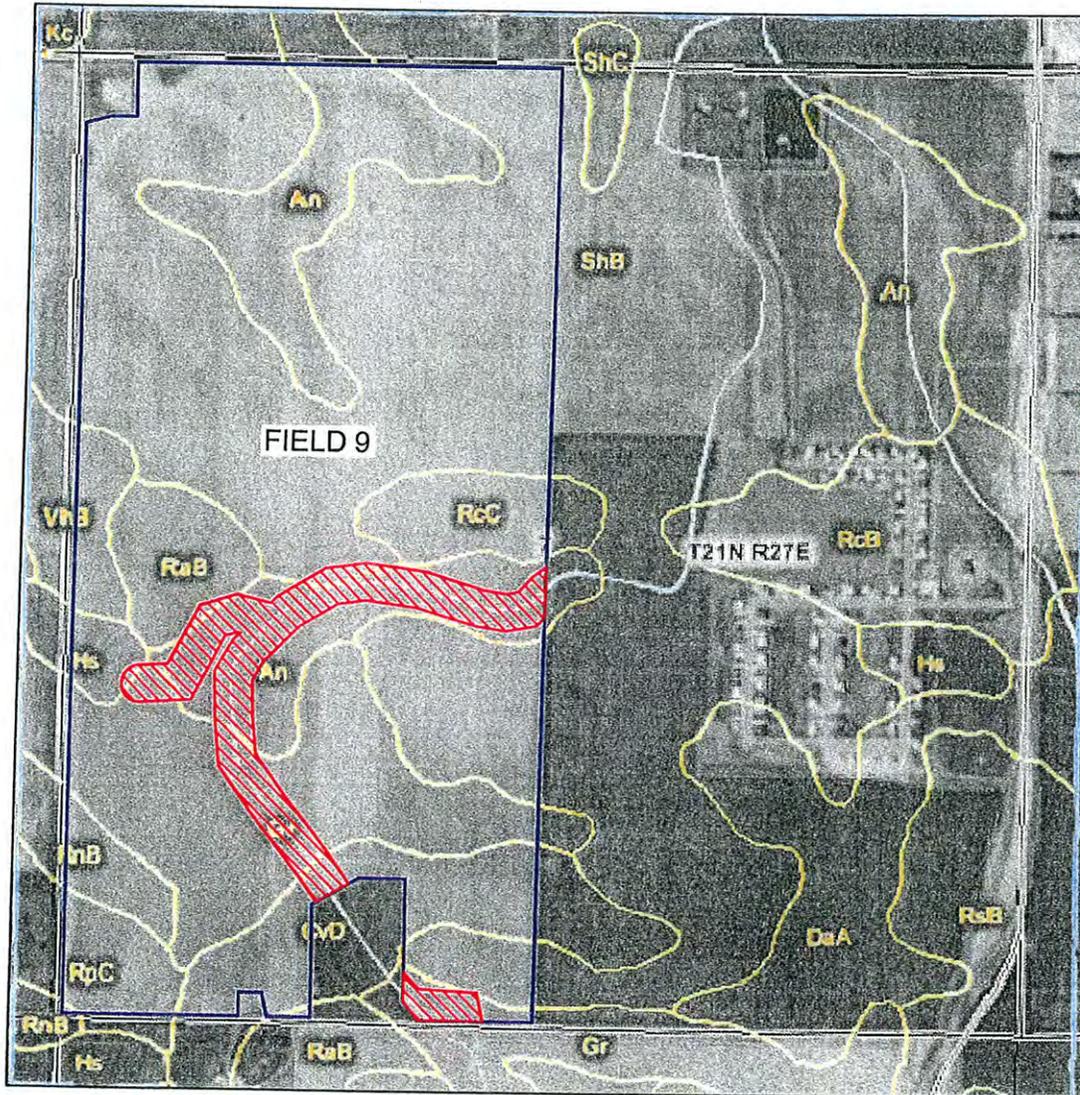
7 - 21N - 27E
CORSON COUNTY, SD



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SCALE, FEET



Legend:

- An Arnegard loam
- CaF Cabba-Amor loams, 15 to 60 percent slopes
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- Kc Korchea loam, channeled
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- SgA Savage silt loam, 0 to 3 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- ShC Shambo loam, 6 to 9 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

7 - 21N - 27E
CORSON COUNTY, SD



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Page:		Page:

Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 8-21-27



Legend

 CNMP_2010

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



Soils Map

Owner: DALLAS SCHOTT

Field Office: Mitchell - ARMT

Agency: USDA - NRCS

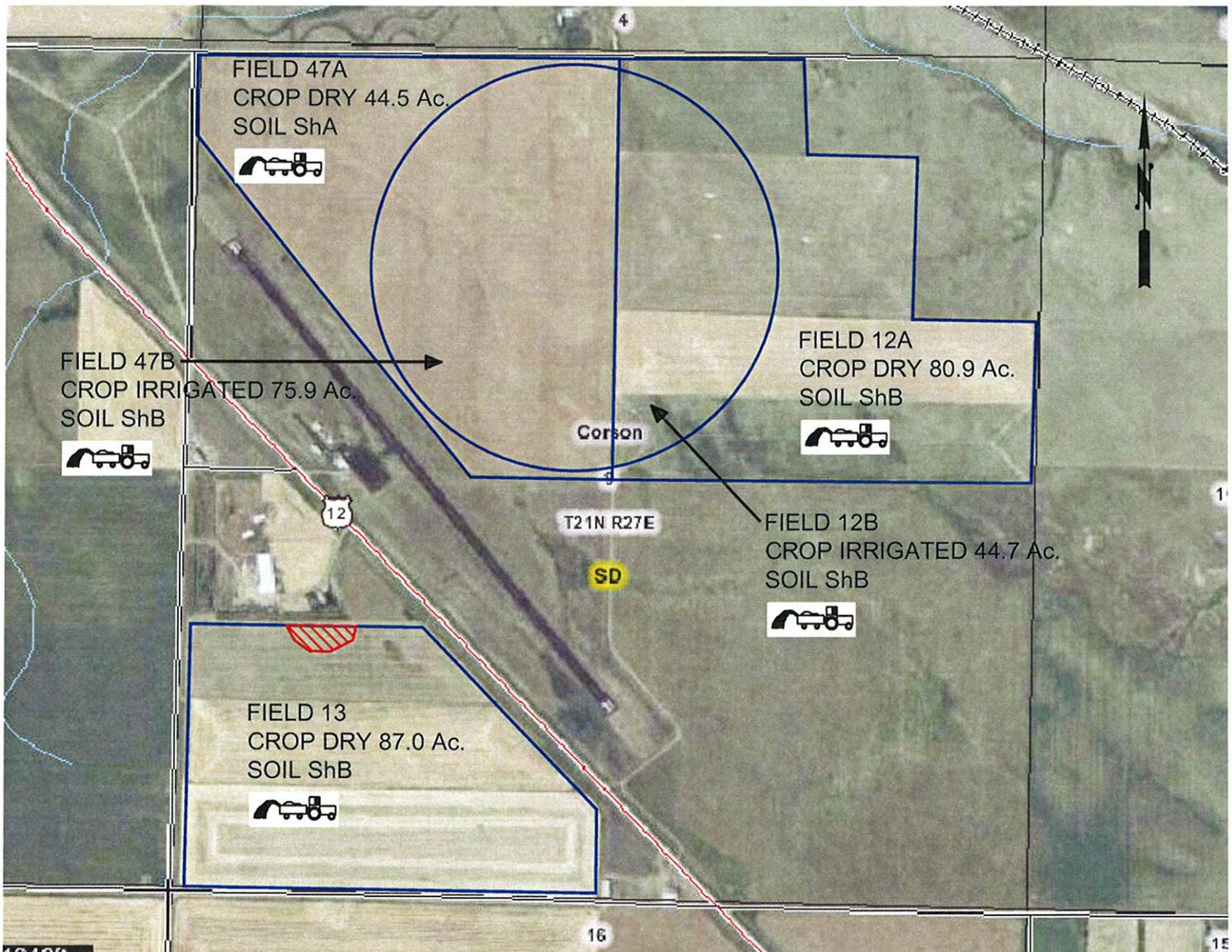
Legal Description: S-21-2E



Legend

-  Soils Map
-  CNMP_2010





SCALE, FEET



Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF' CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

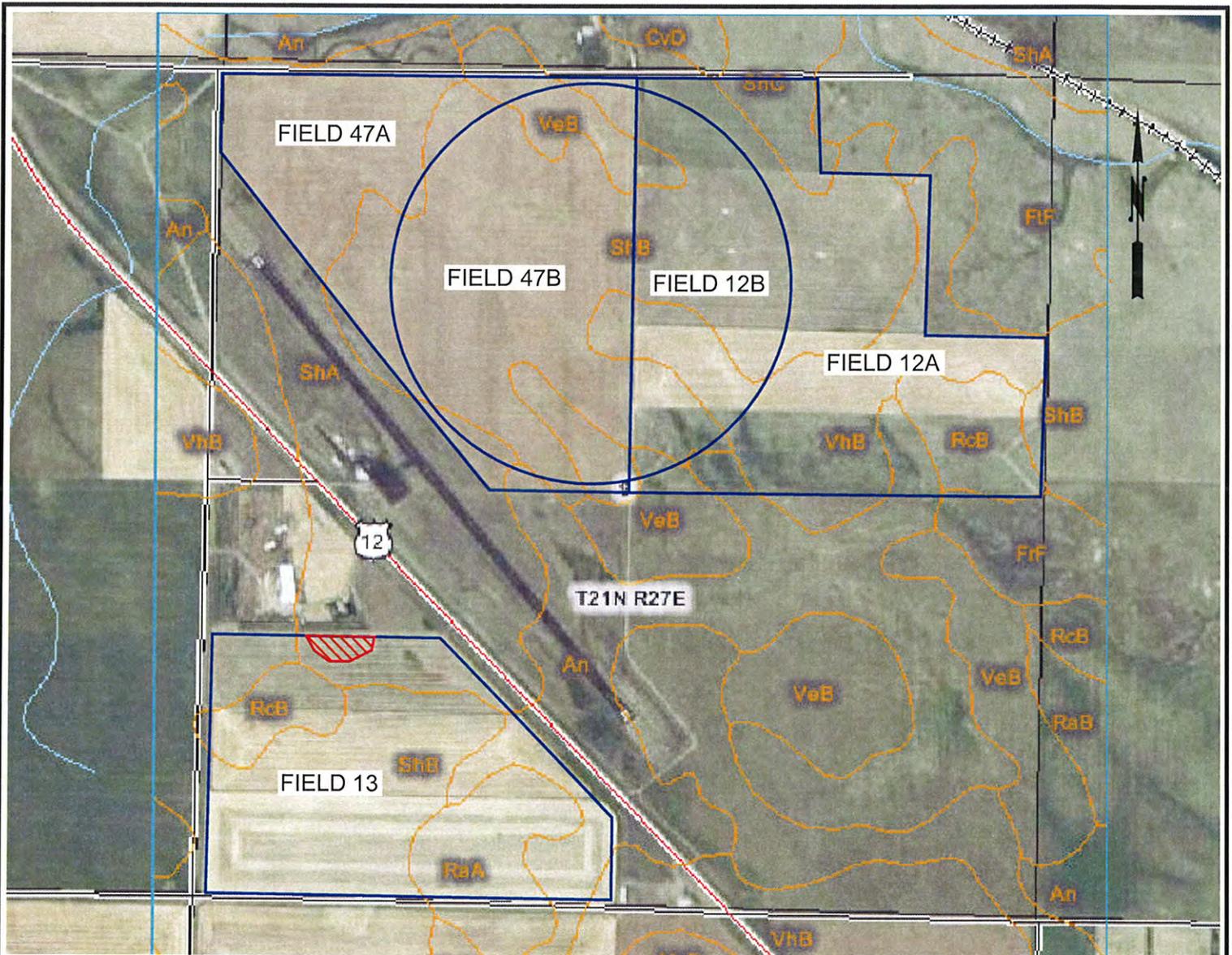
9 - 21N - 27E
CORSON COUNTY, SD



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Legend:

- An Arnegard loam
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- FrF Flasher-Rock outcrop complex, 30 to 60 percent slopes
- FtF Flasher-Telfer complex, 15 to 40 percent slopes
- RaA Reeder loam, 0 to 2 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- ShC Shambo loam, 6 to 9 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

9 - 21N - 27E
CORSON COUNTY, SD



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Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 9-22-27



Legend

 CNMP

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



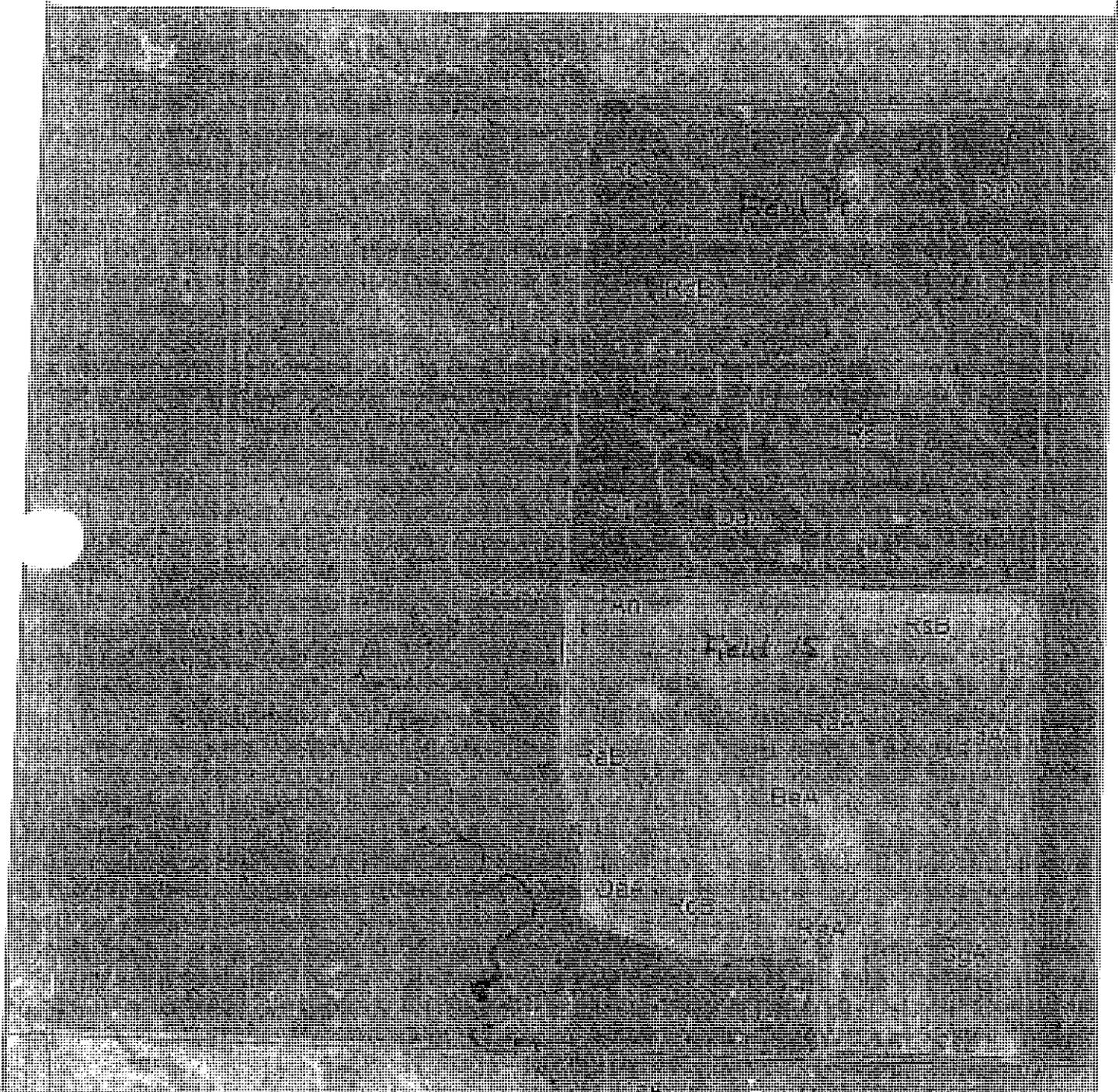
Soils Map

Owner(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 9-23-27



Legend

- Soils Map
- CNMP
- Sections



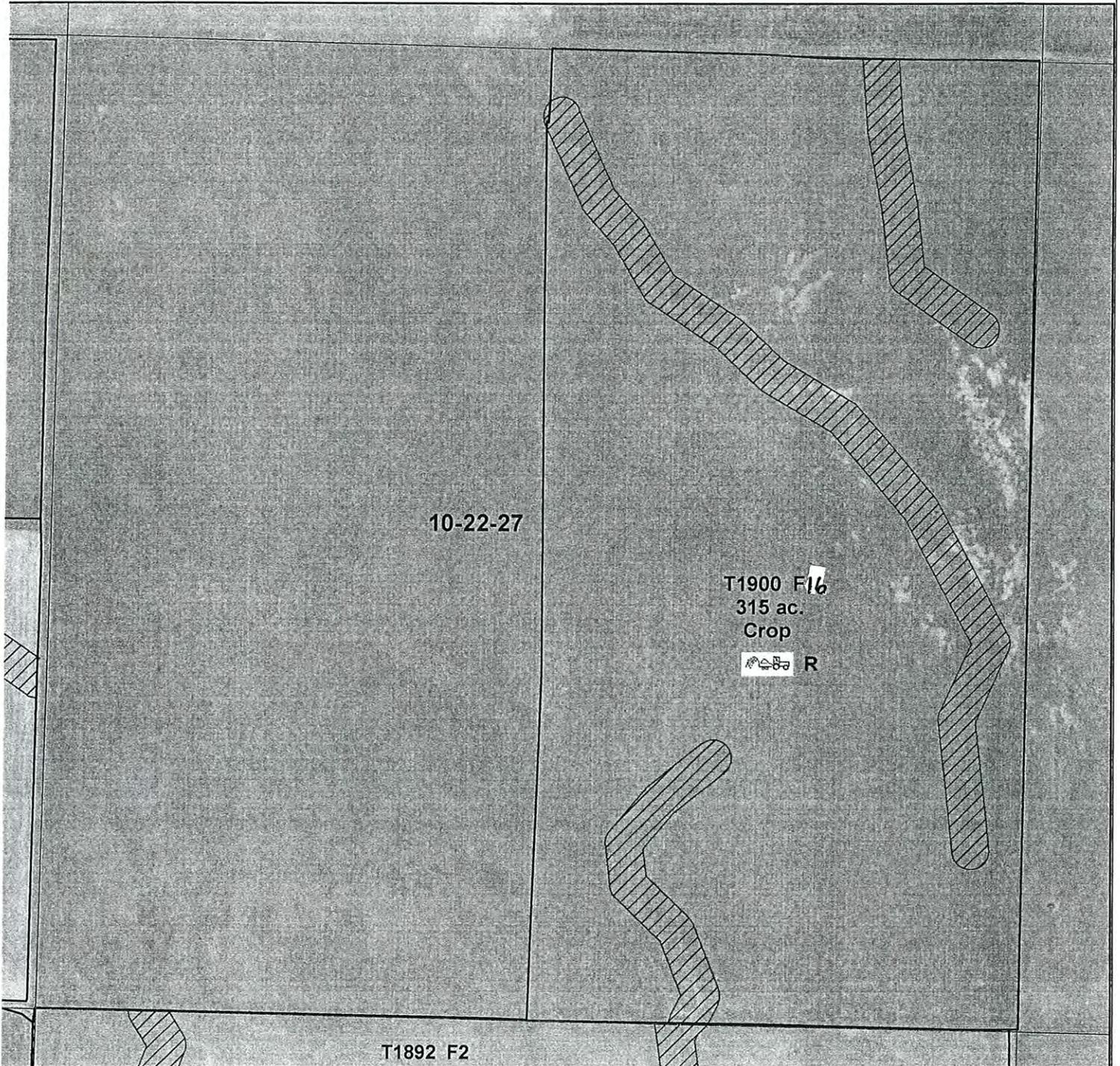
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 10-22-27



Legend

 CNMP

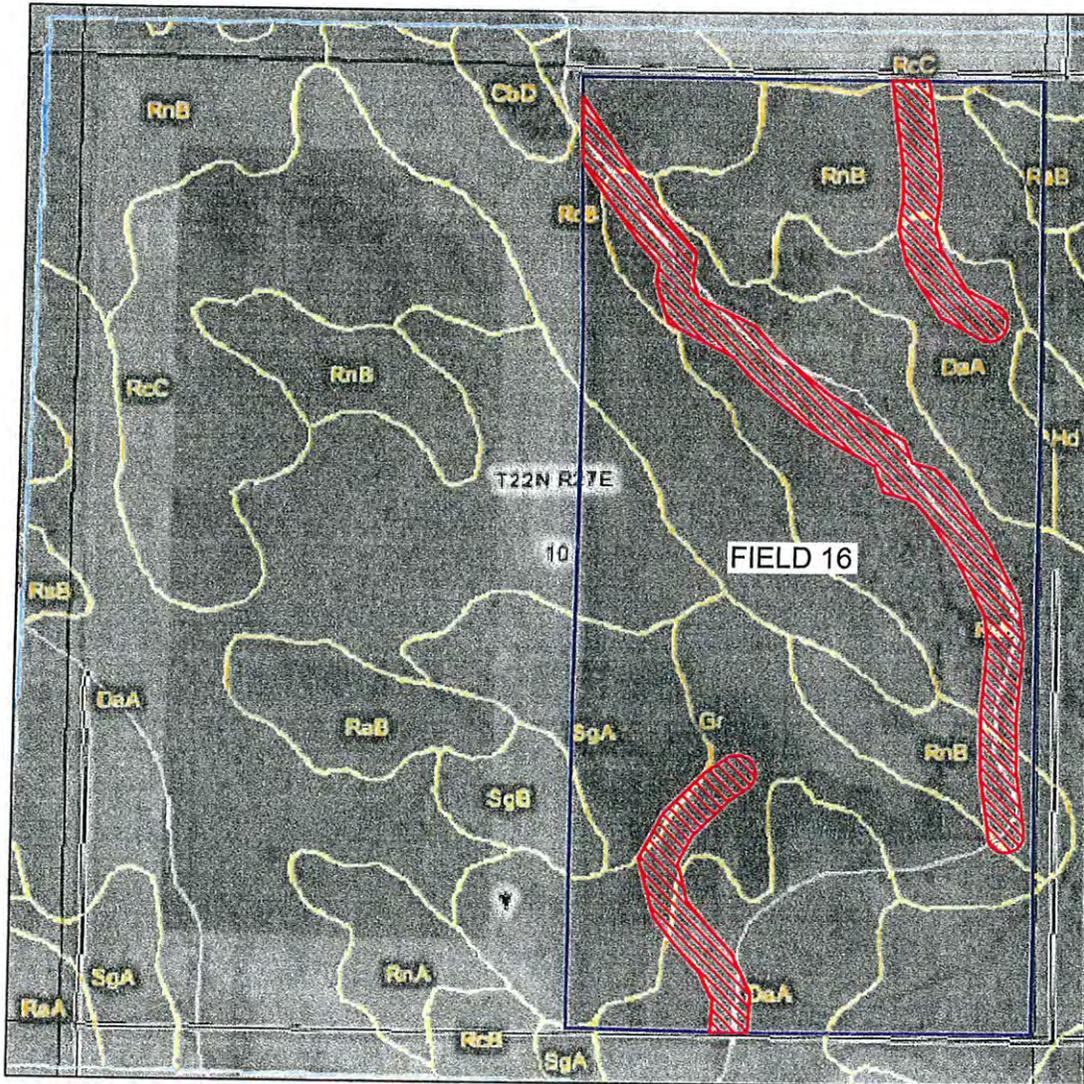
 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk





Legend:

- BeA Belfield-Daglum complex, 0 to 3 percent slopes
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hd Harriet loam
- RaA Reeder loam, 0 to 2 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnA Regent silty clay loam, 0 to 2 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- SgA Savage silt loam, 0 to 3 percent slopes
- SgB Savage silt loam, 3 to 6 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

10 - 22N - 27E
CORSON COUNTY, SD



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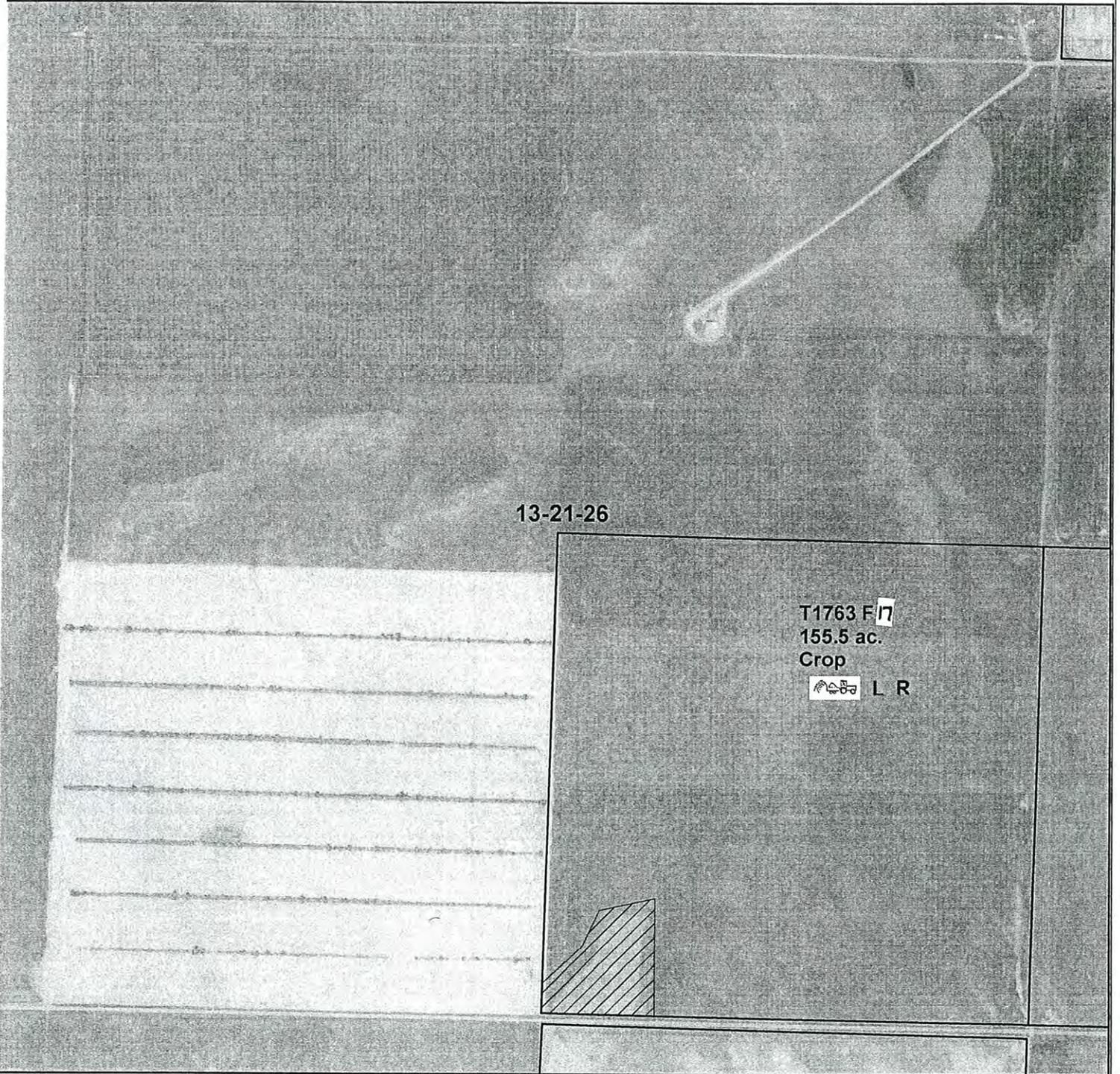
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 13-21-26



Legend

 CNMP_2010

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



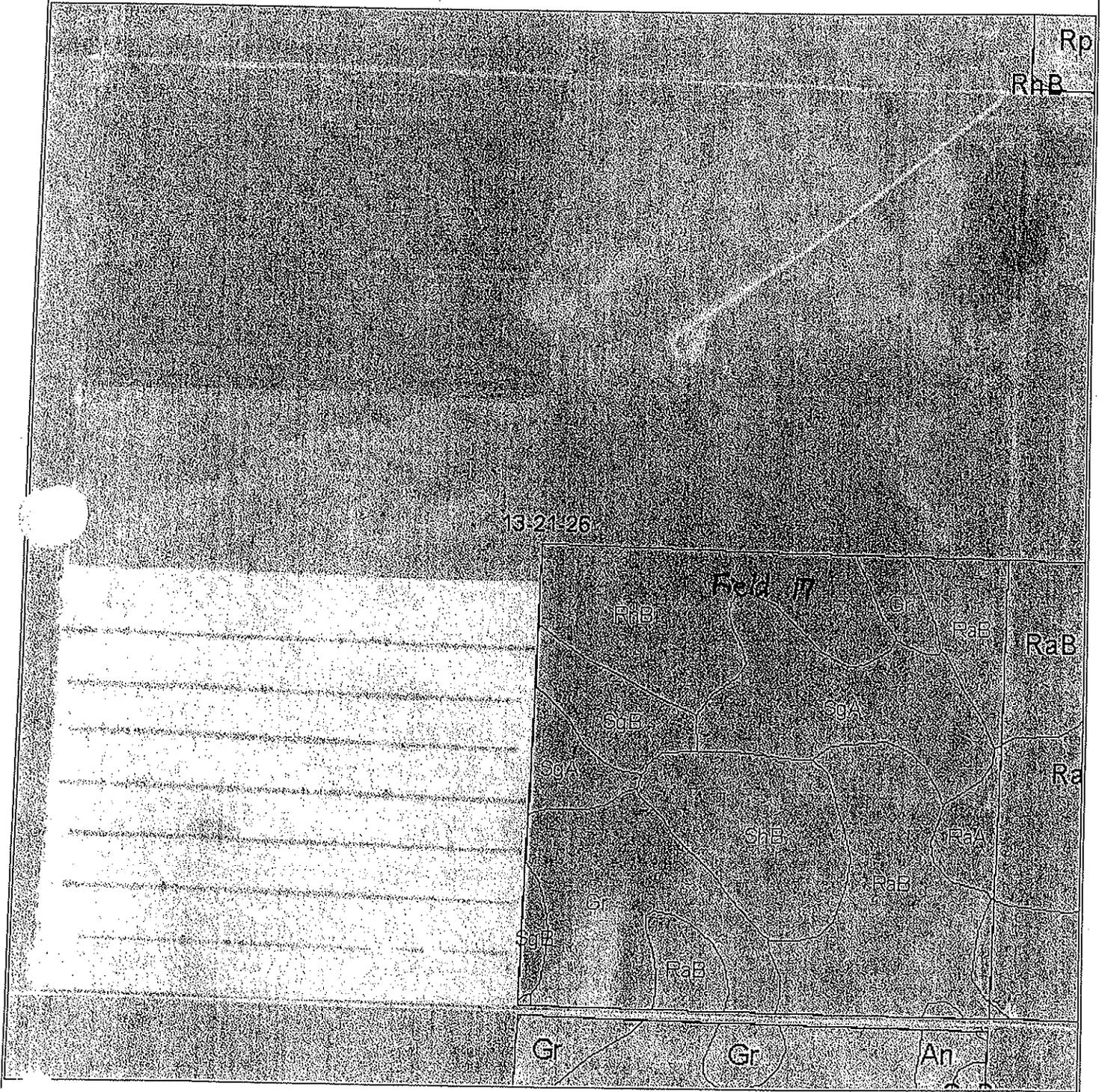
Soils Map

Owner(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Legal Description: 13-21-26

Agency: USDA - NRCS



Legend

-  Soils Map
-  CNMP_2010



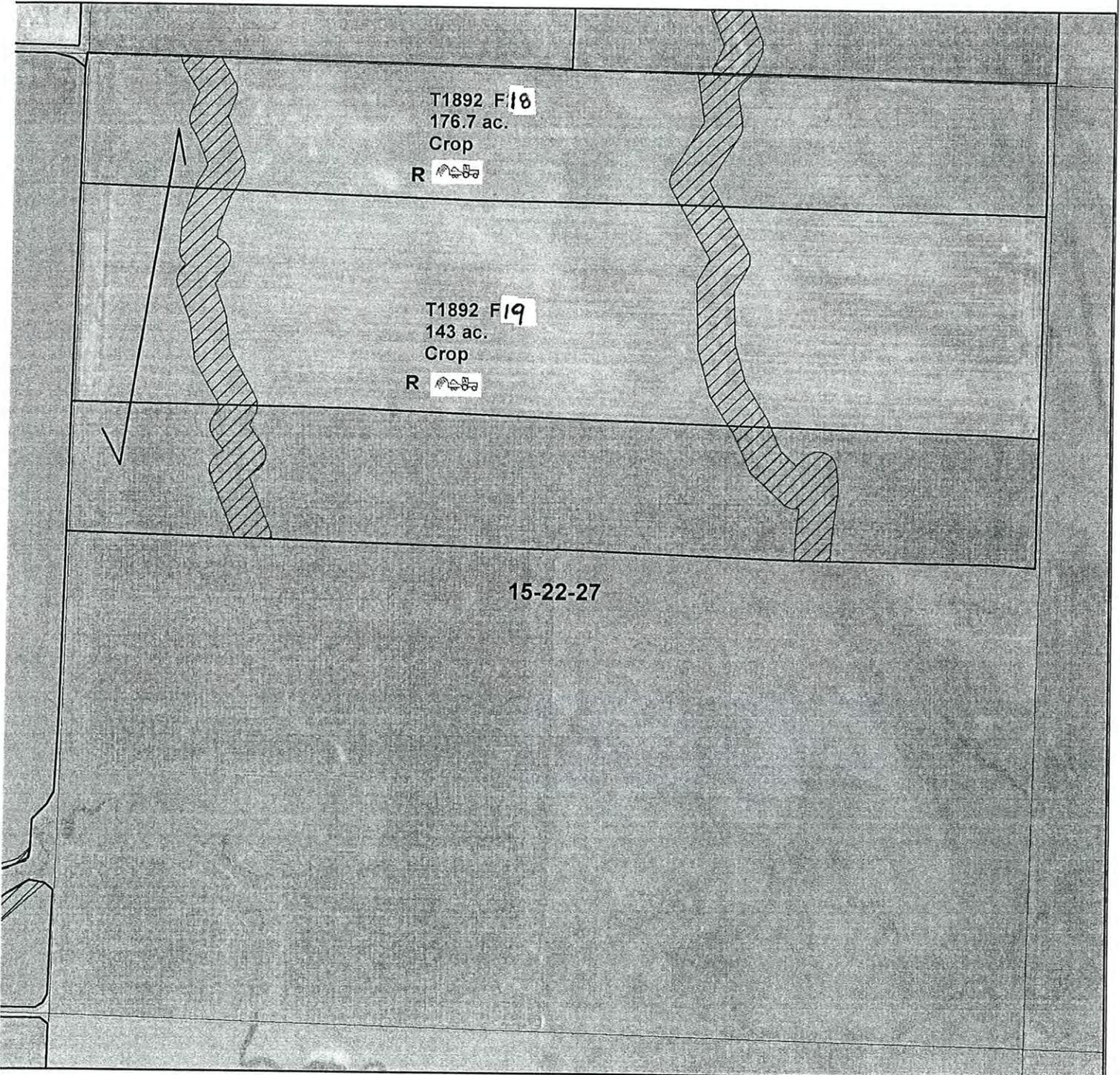
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 15-22-27



Legend

 CNMP_2010

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk

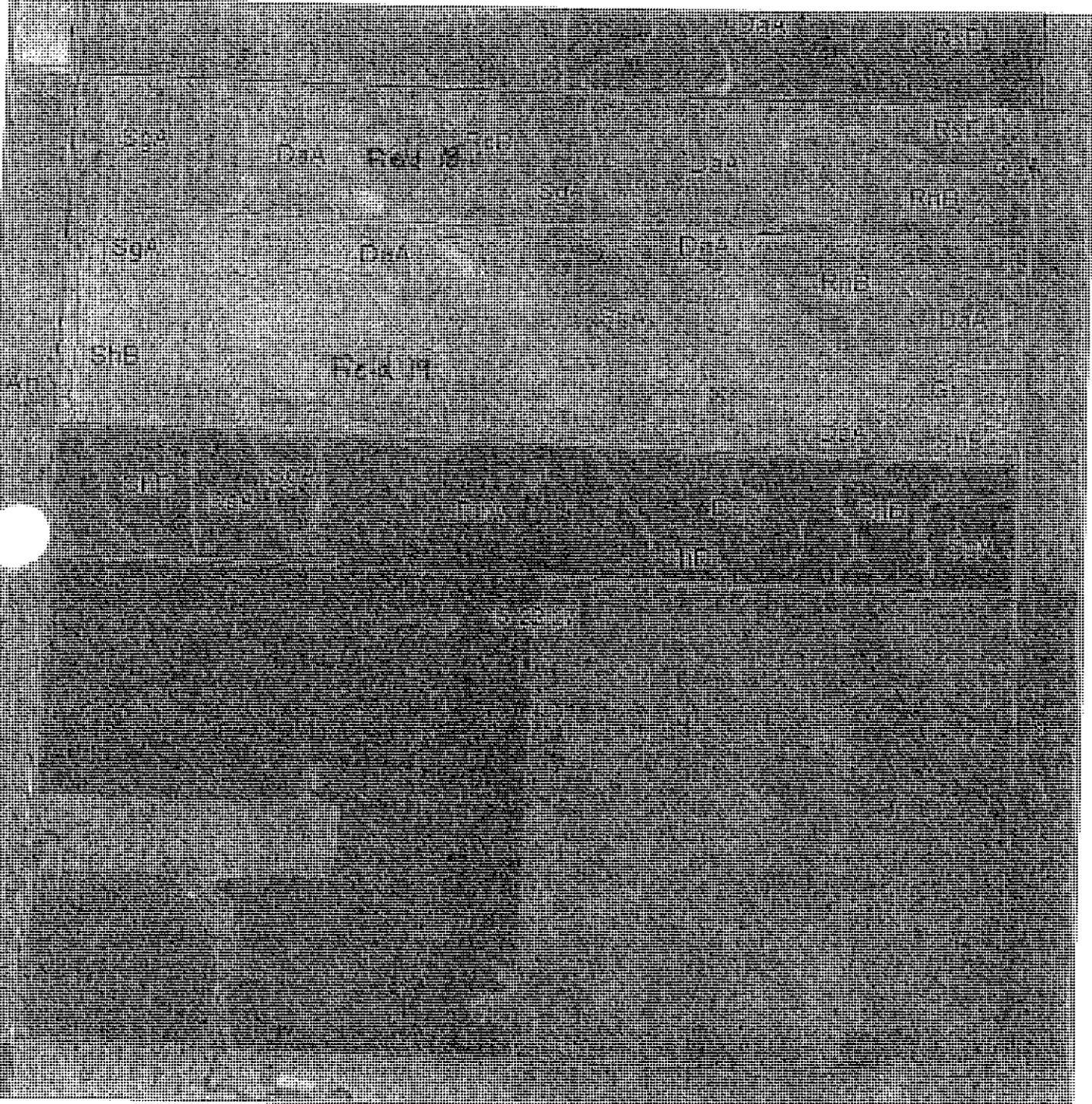


Soils Map

Owner: DALLAS SCHOTT

Field Office: Michoud - ANMT
Agency: USDA - NRCS

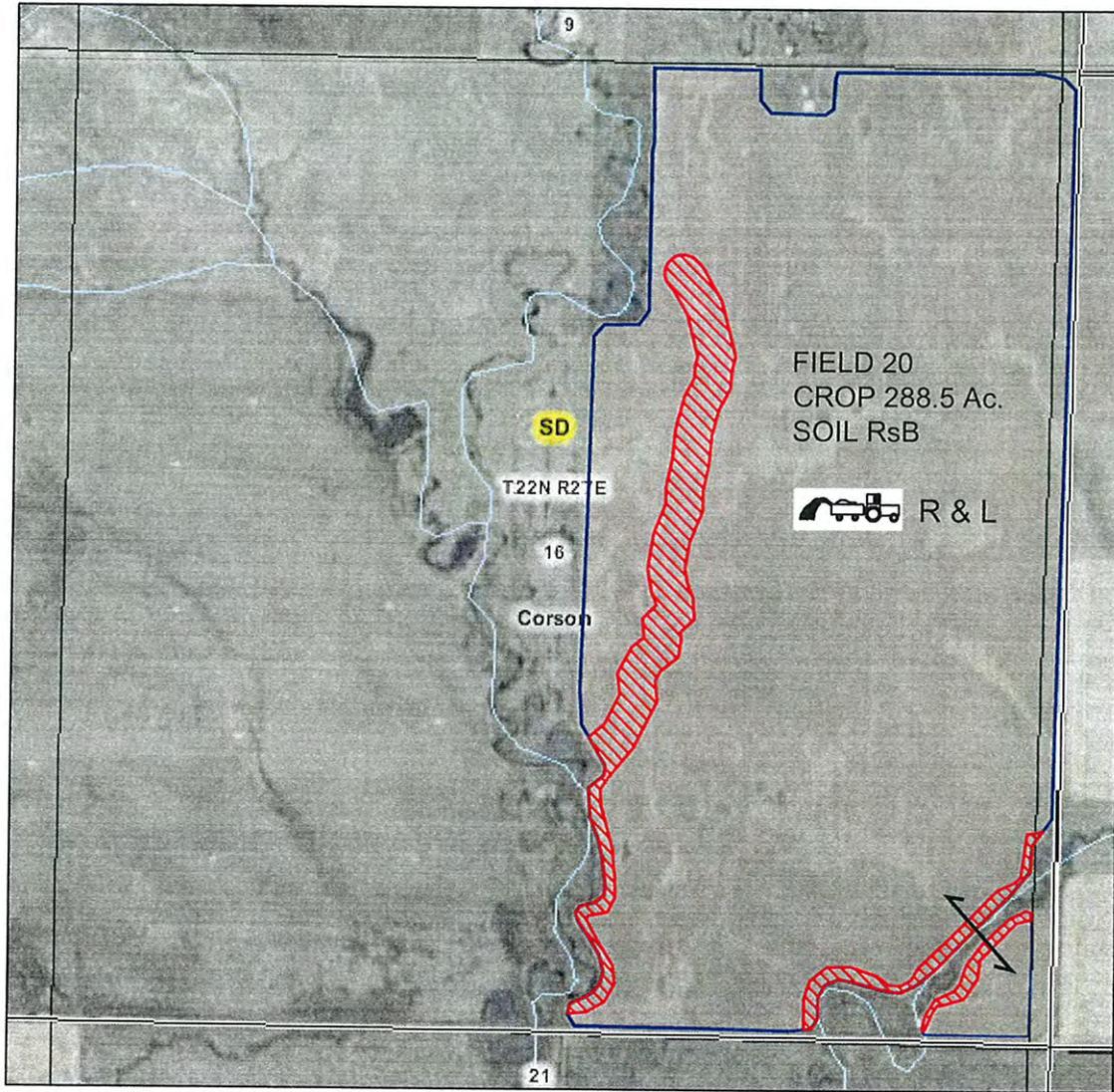
Legal Description: 15-23-27



Legend

- Soils Map
- CNMP
- Sections





FIELD 20
CROP 288.5 Ac.
SOIL RsB



Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

16 - 22N - 27E
CORSON COUNTY, SD



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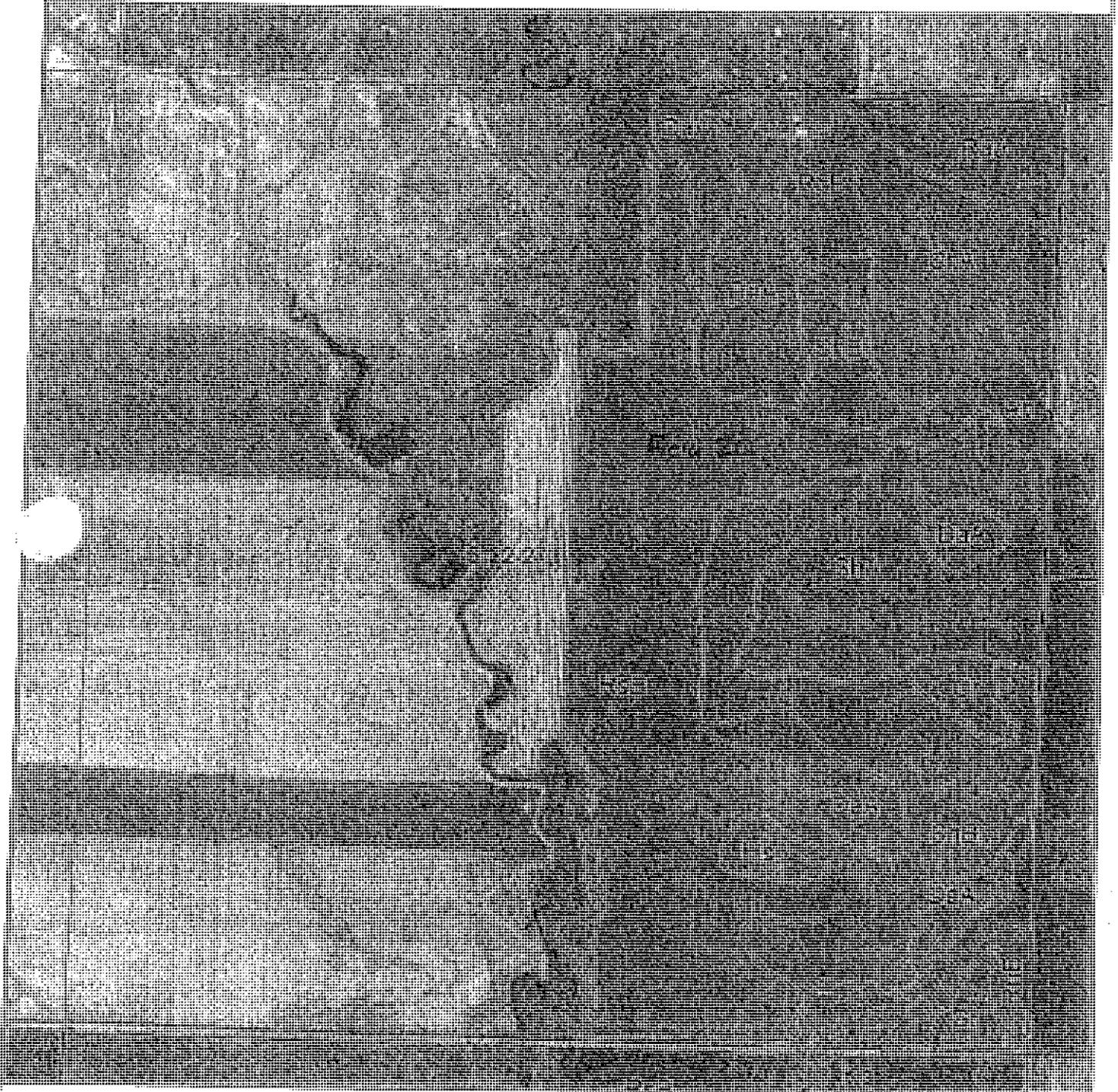
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Soils Map

Operator: DALLAS SCHOTT

Field Office: Mitchell - ANNT
Agency: USDA - NRCS

Legal Description: 16-23-27



Legend

- Soils Map
- CNMP
- Easement



Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 19-22-27



Legend

-  CNMP
-  Manure Application Fields
-  Setback and/or Exclusion Area
- R** RUNOFF - High Risk
- L** LEACHING - High Risk

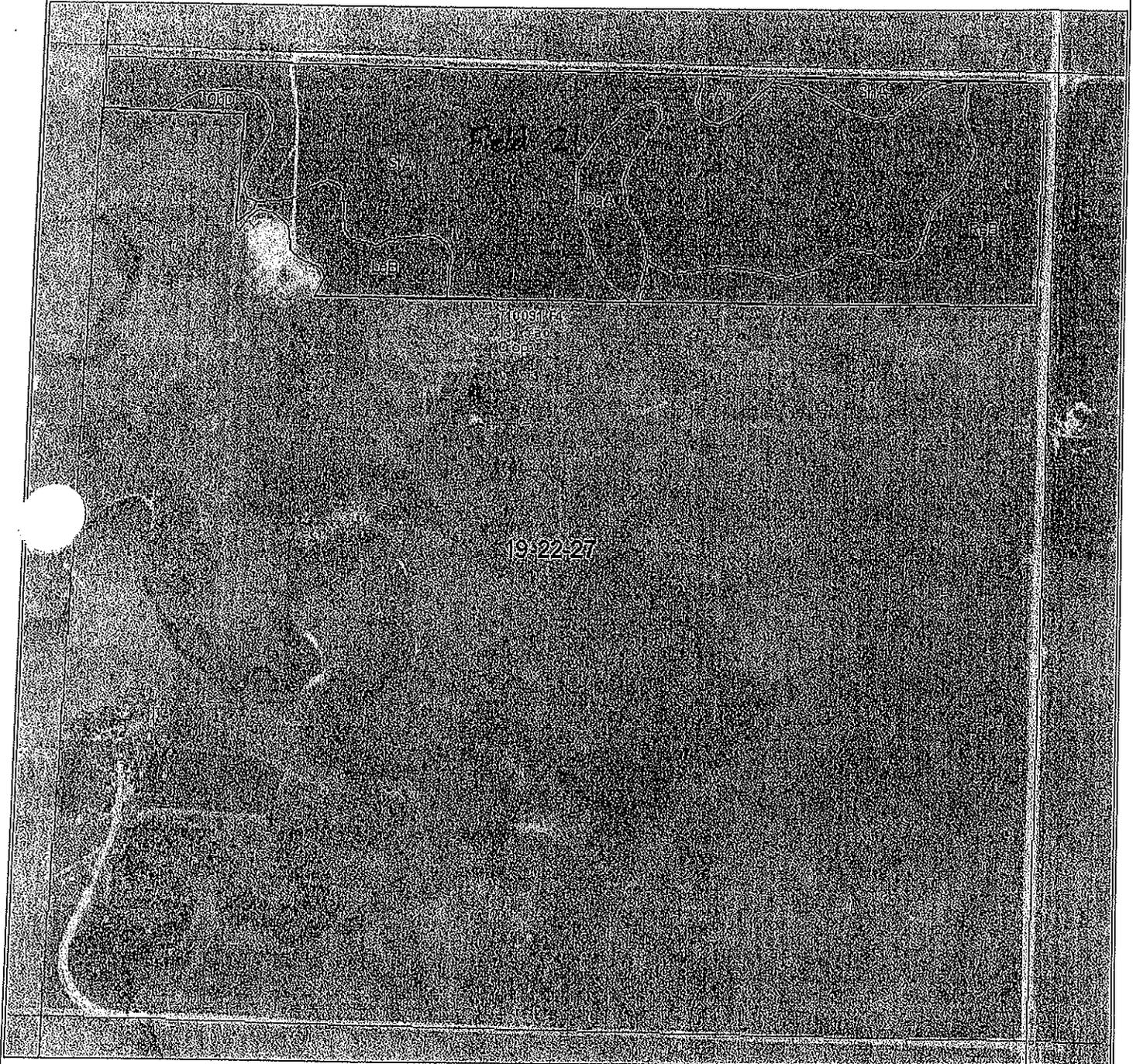


Soils Map

Stowner(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT
Agency: USDA - NRCS

Legal Description: 19-22-27



Legend

-  CNMP
-  Soils Map

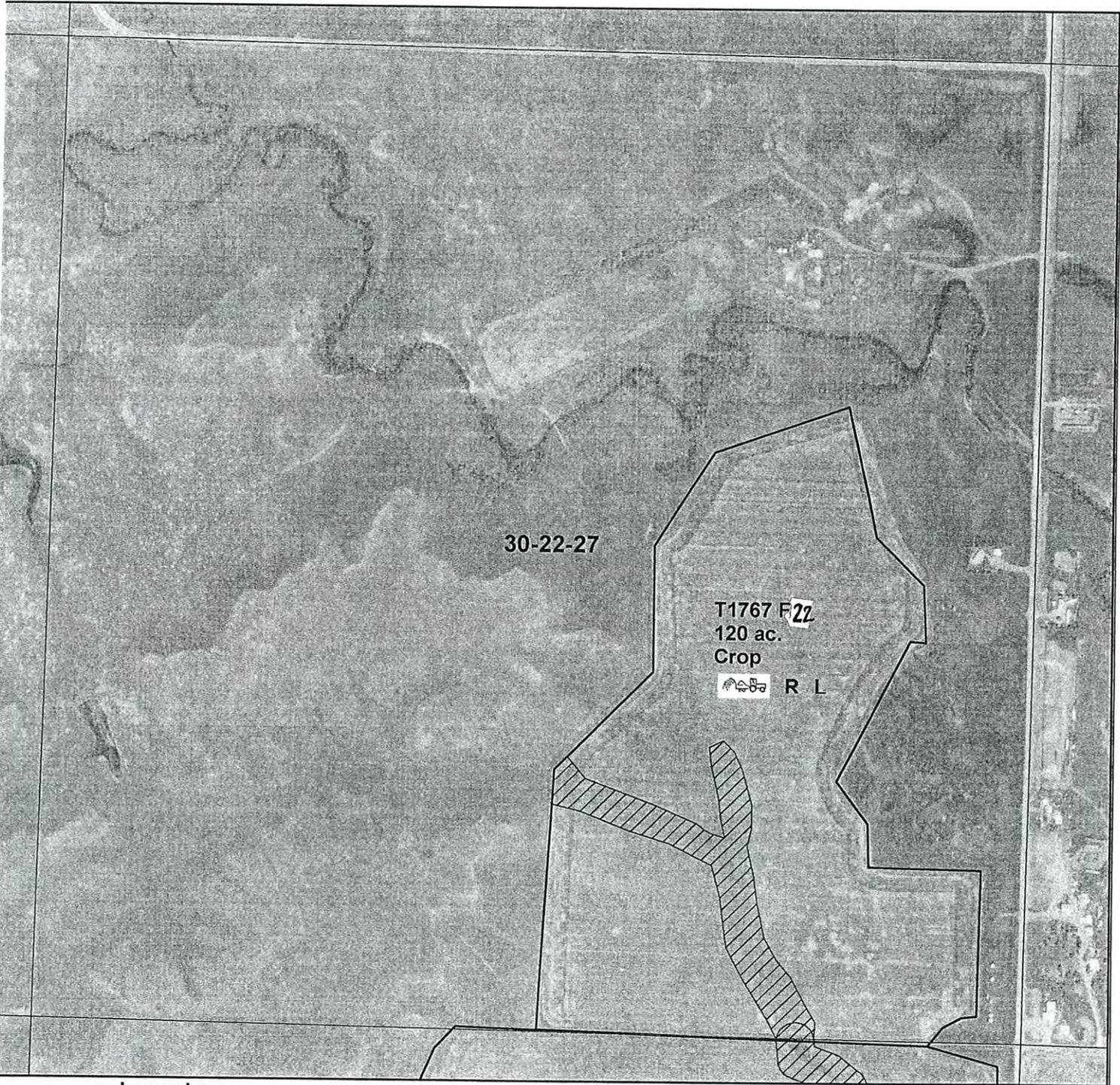


Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT
Agency: USDA - NRCS

Legal Description: 30-22-27



Legend

 CNMP

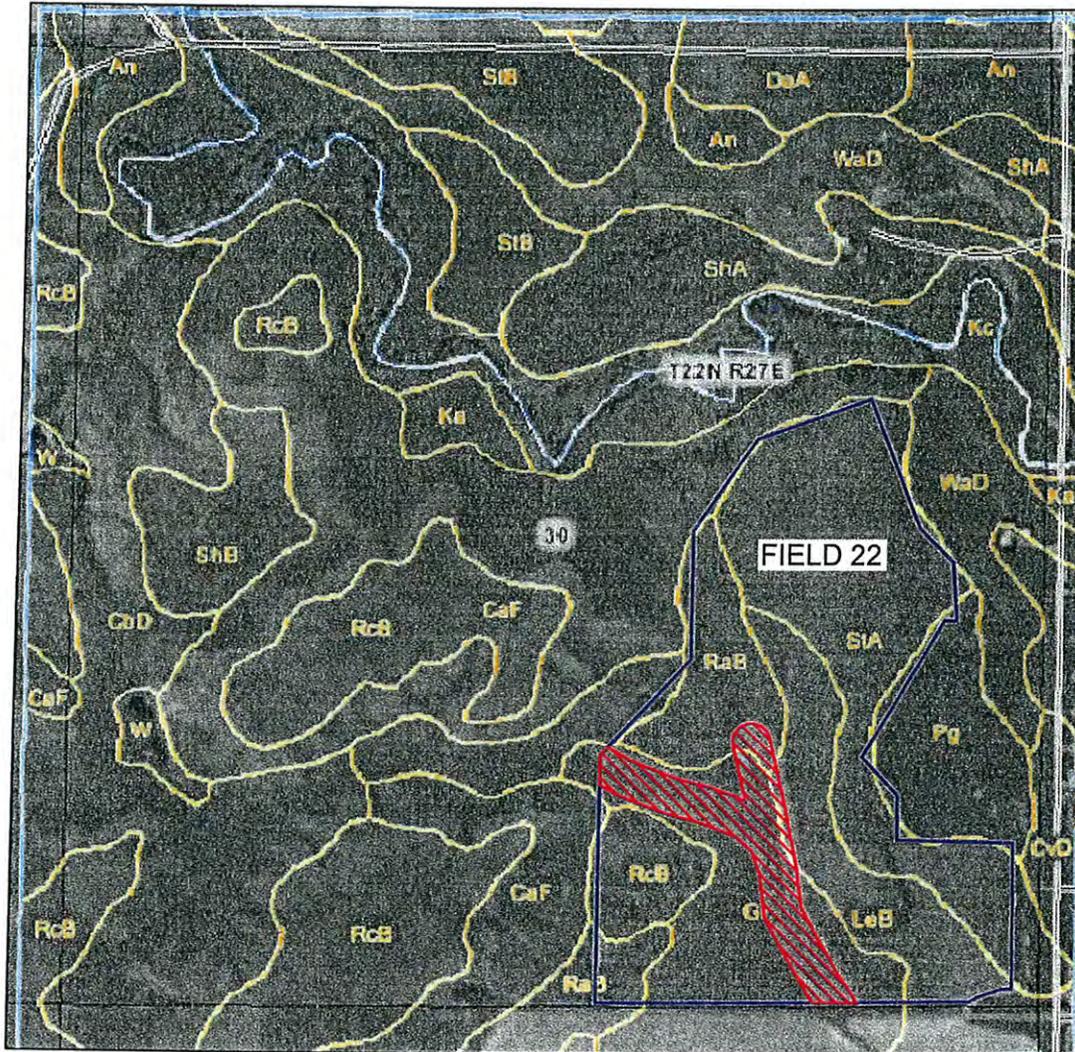
 Manure Application Fields

 Setback and/or Exclusion Area

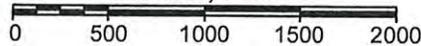
R RUNOFF - High Risk

L LEACHING - High Risk





SCALE, FEET



Legend:

- An Arnegard loam
- CaF Cabba-Amor loams, 15 to 60 percent slopes
- CdD Cabba-Reeder loams, 6 to 25 percent slopes
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Ka Korchea loam
- Kc Korchea loam, channeled
- LeB Lehr loam, 2 to 6 percent slopes
- Pg Pits, gravel
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- StA Stady loam, 0 to 2 percent slopes
- StB Stady loam, 2 to 6 percent slopes
- WaD Wabek gravelly sandy loam, 2 to 35 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

30 - 22N - 27E
CORSON COUNTY, SD



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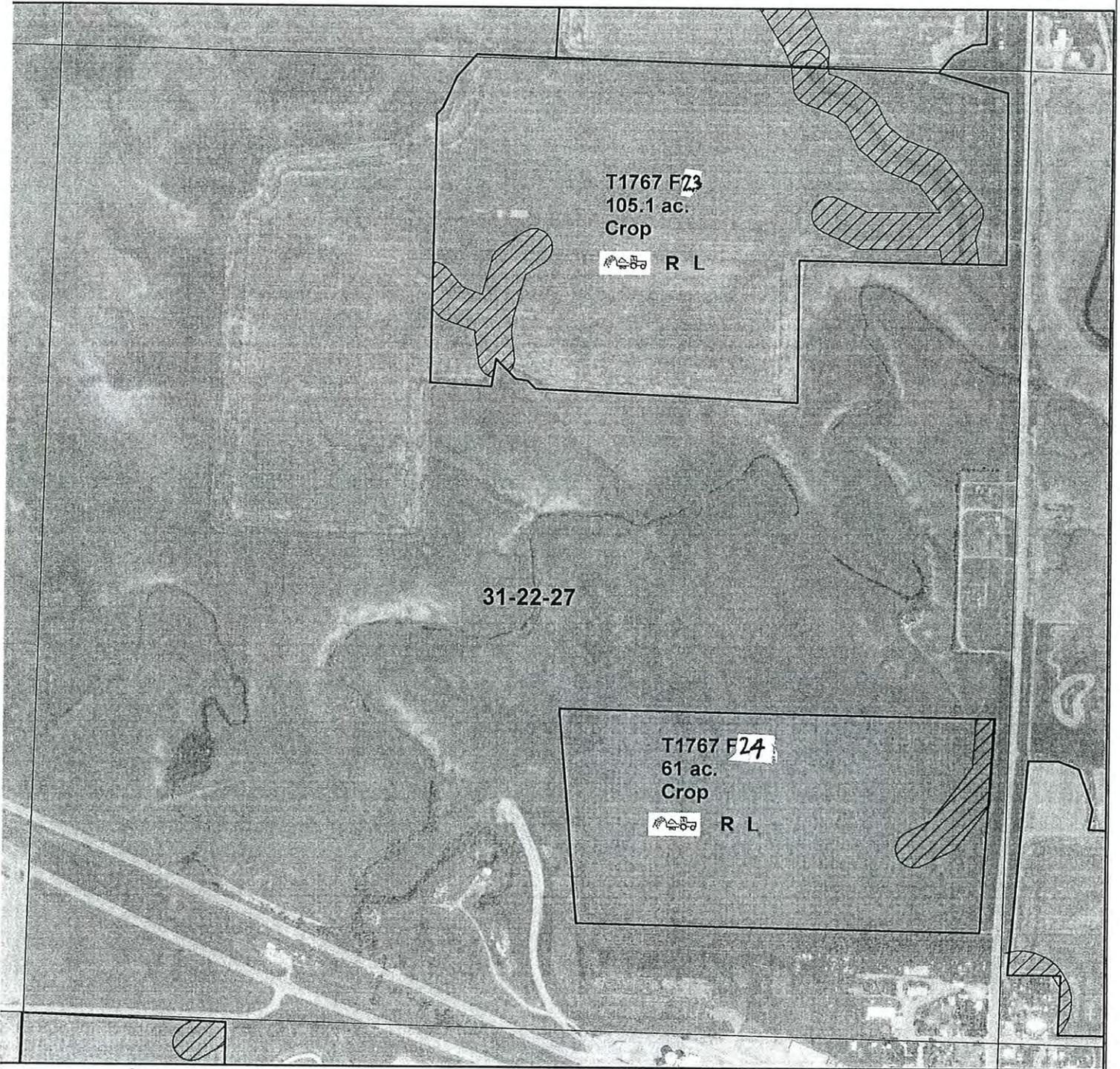
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 31-22-27



Legend

 CNMP

 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



Soils Map

County: DALLAS SCHOTT

Field Office: Mitchell - ANMT

Legal Description: 31-13-37

Agency: USDA - NRCS



Legend

-  Soils Map
-  CMAAP
-  Sections



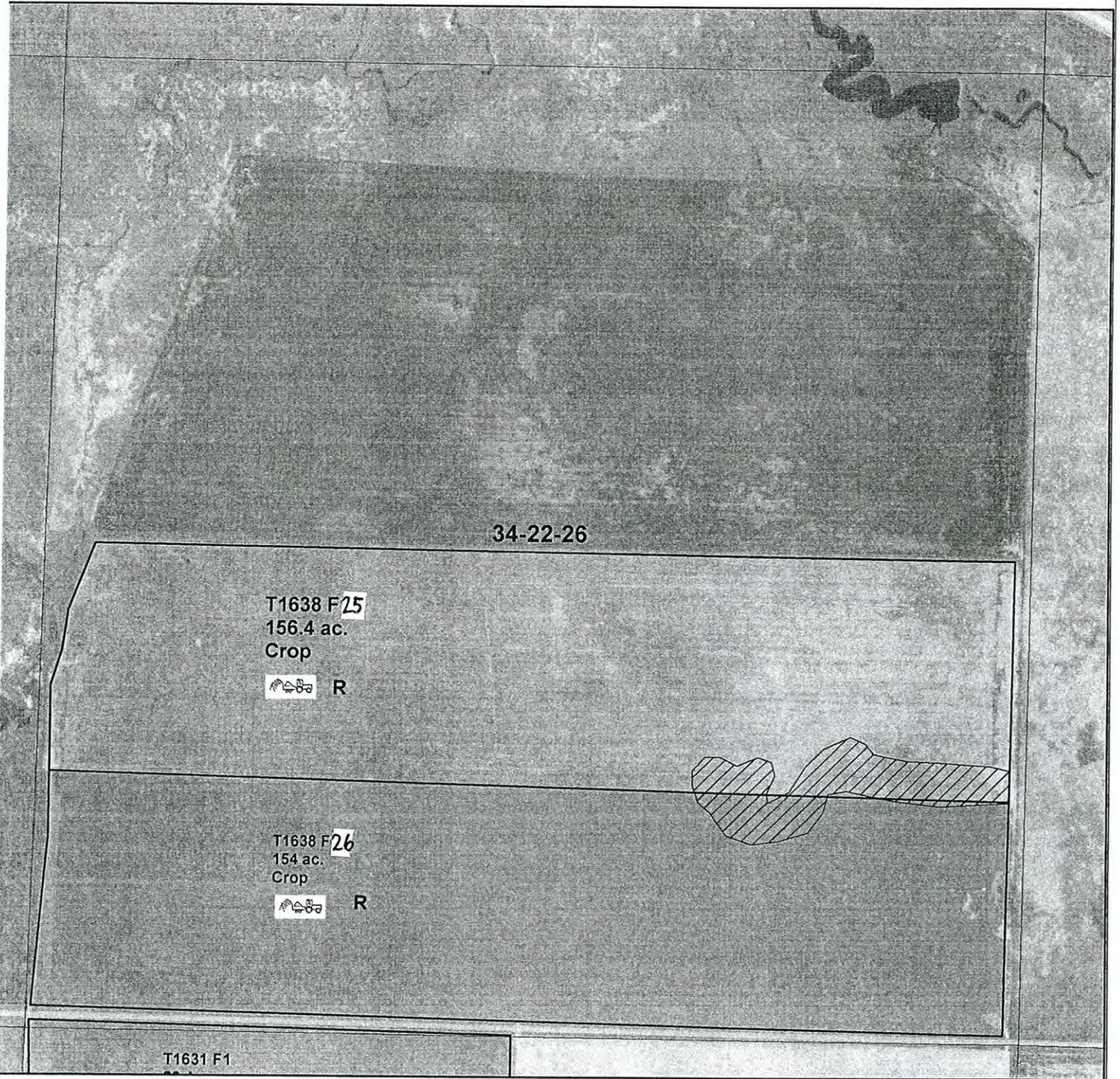
Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 34-22-26



Legend

CNMP_2010

Manure Application Fields

Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk



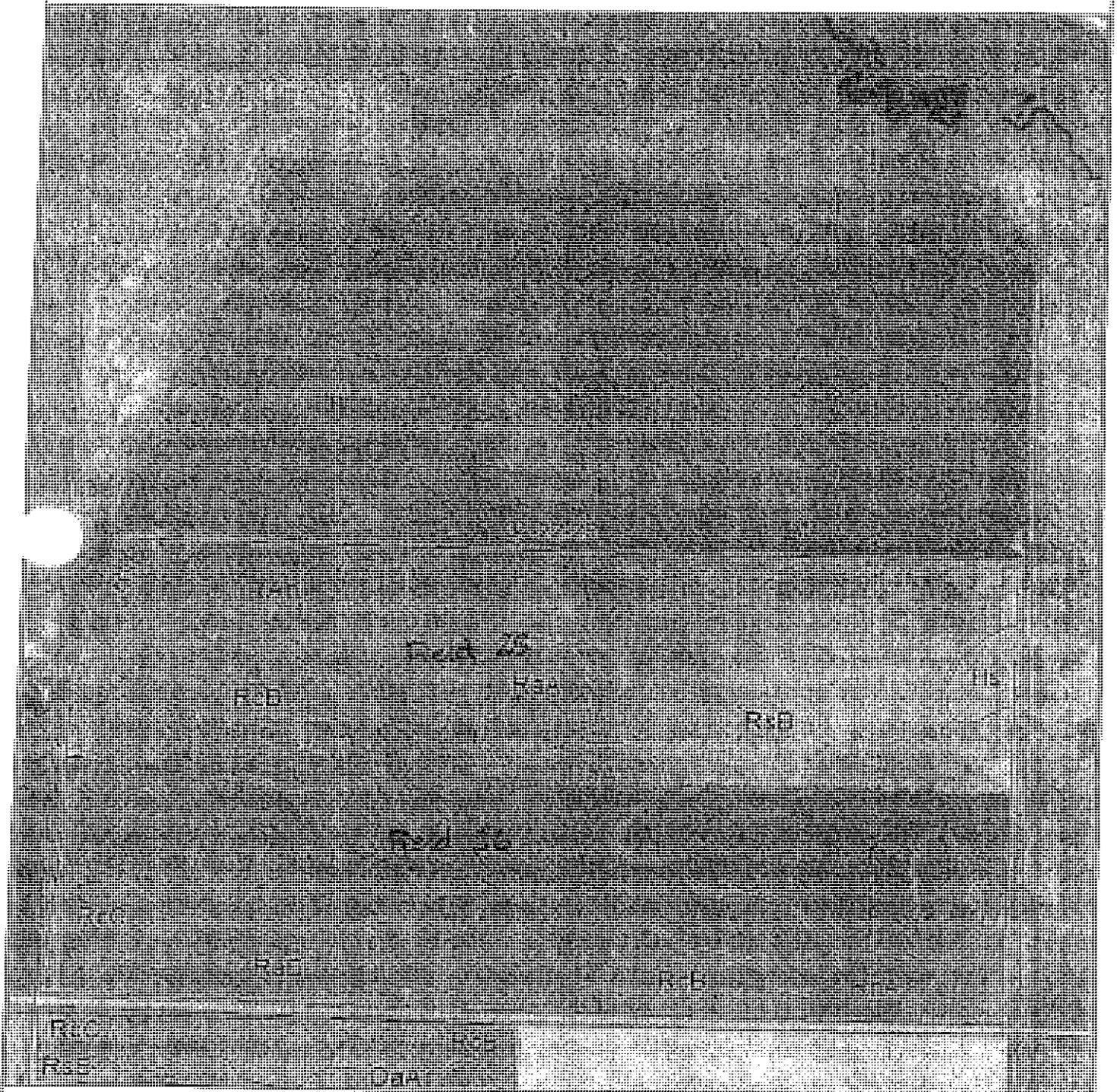
Soils Map

Owner: DALLAS SCHOTT

Field Office: Mitchell - ARMT

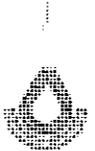
Legal Description: 34-23-08

Agency: USDA - NRCS



Legend

- Soils Map
- CNMP
- Sections



Water Quality Risk Assessment Map

Customer(s): DALLAS SCHOTT

Field Office: Mitchell - ANMT

Agency: USDA - NRCS

Legal Description: 34-22-27



Legend

 CNMP

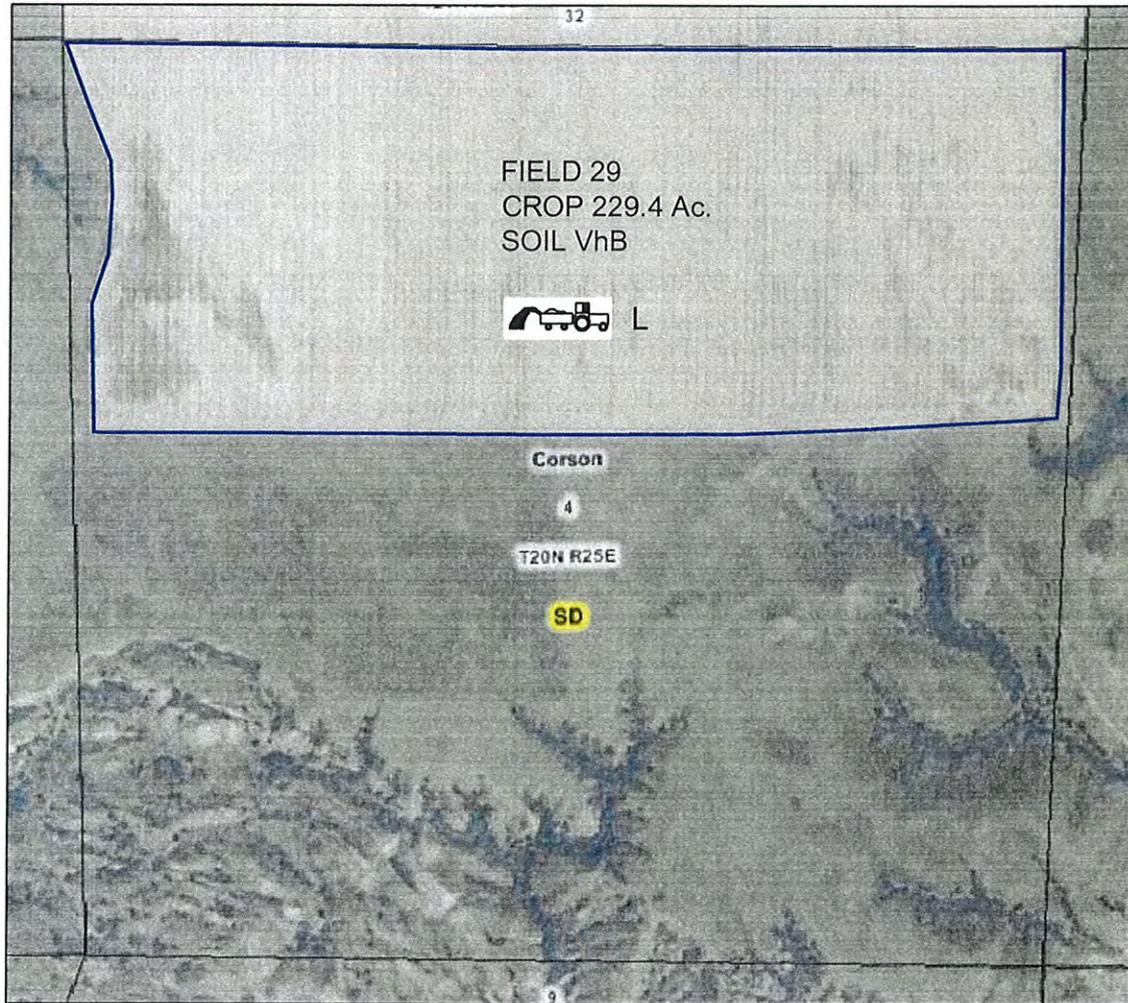
 Manure Application Fields

 Setback and/or Exclusion Area

R RUNOFF - High Risk

L LEACHING - High Risk





 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

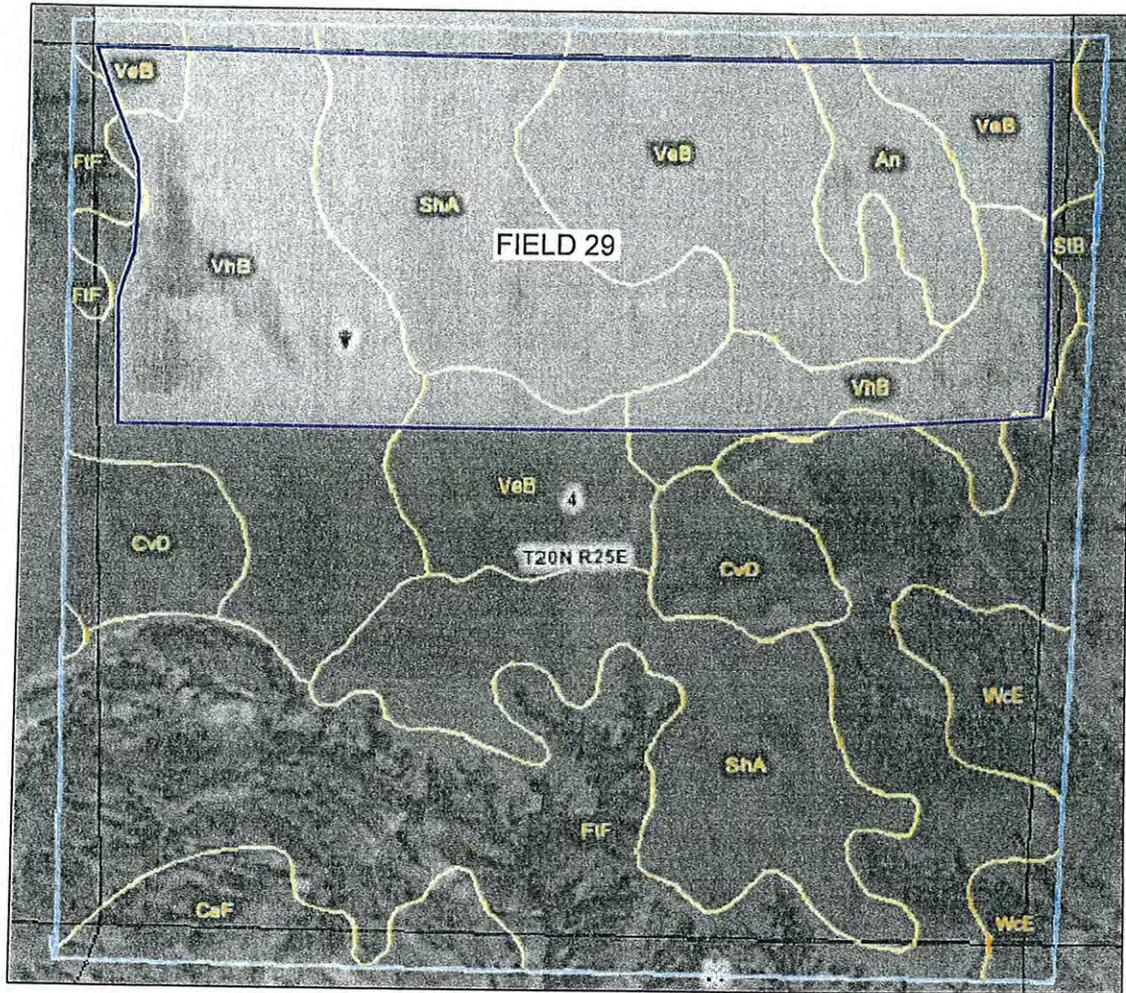
4 - 20N - 25E
CORSON COUNTY, SD



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Consulting Engineers

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Revision	
Date: 12/28/11	Date:
Scale: 1" = 1000'	Scale:
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Page:	Page:



Legend:

- An Arnegard loam
- CaF Cabba-Amor loams, 15 to 60 percent slopes
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- FtF Flasher-Telfer complex, 15 to 40 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- StB Stady loam, 2 to 6 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes
- WcE Wayden-Cabba complex, 9 to 40 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

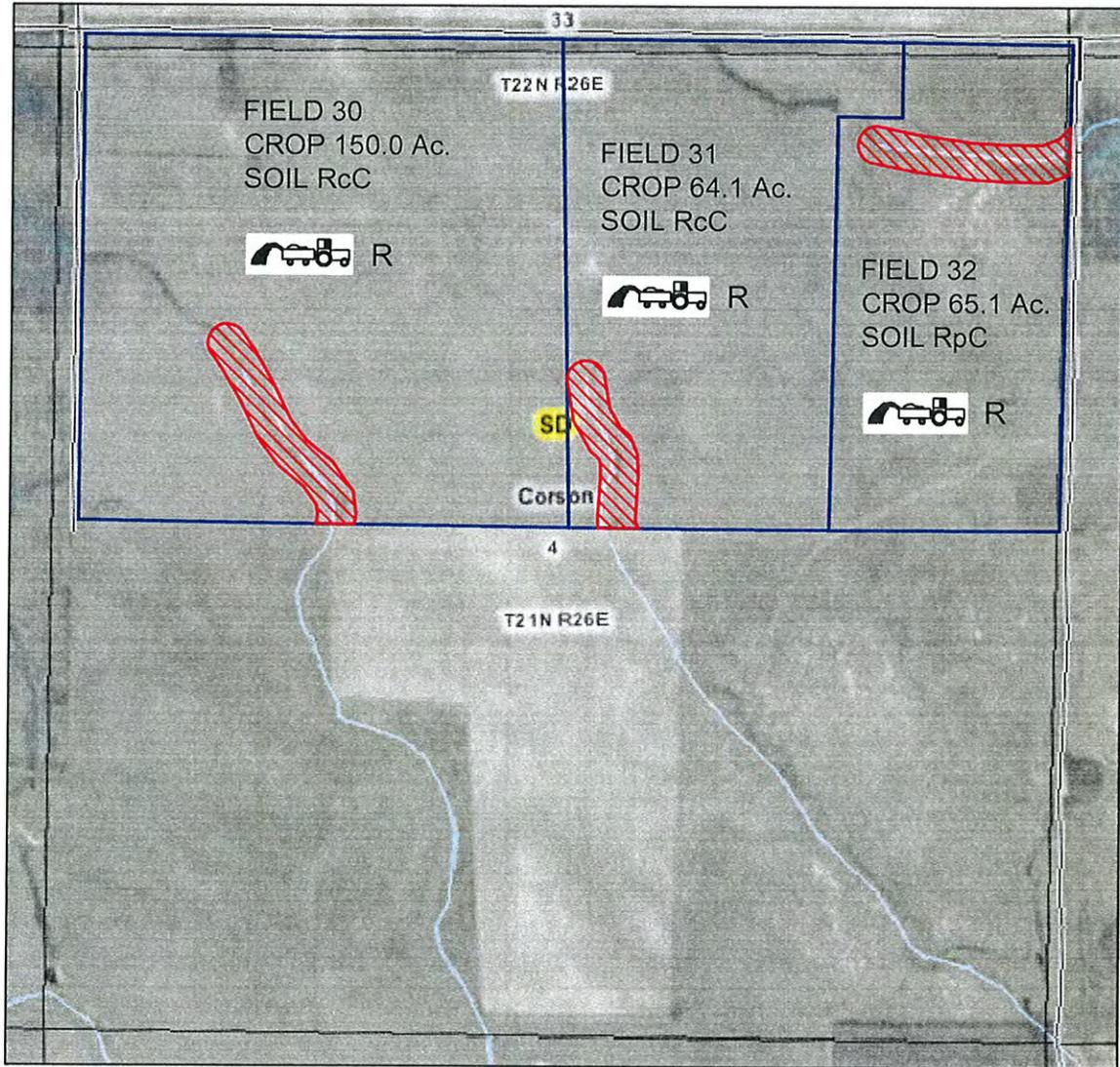
4 - 20N - 25E
CORSON COUNTY, SD



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Checked By:	GGG	Checked By:
Page:		Page:



Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

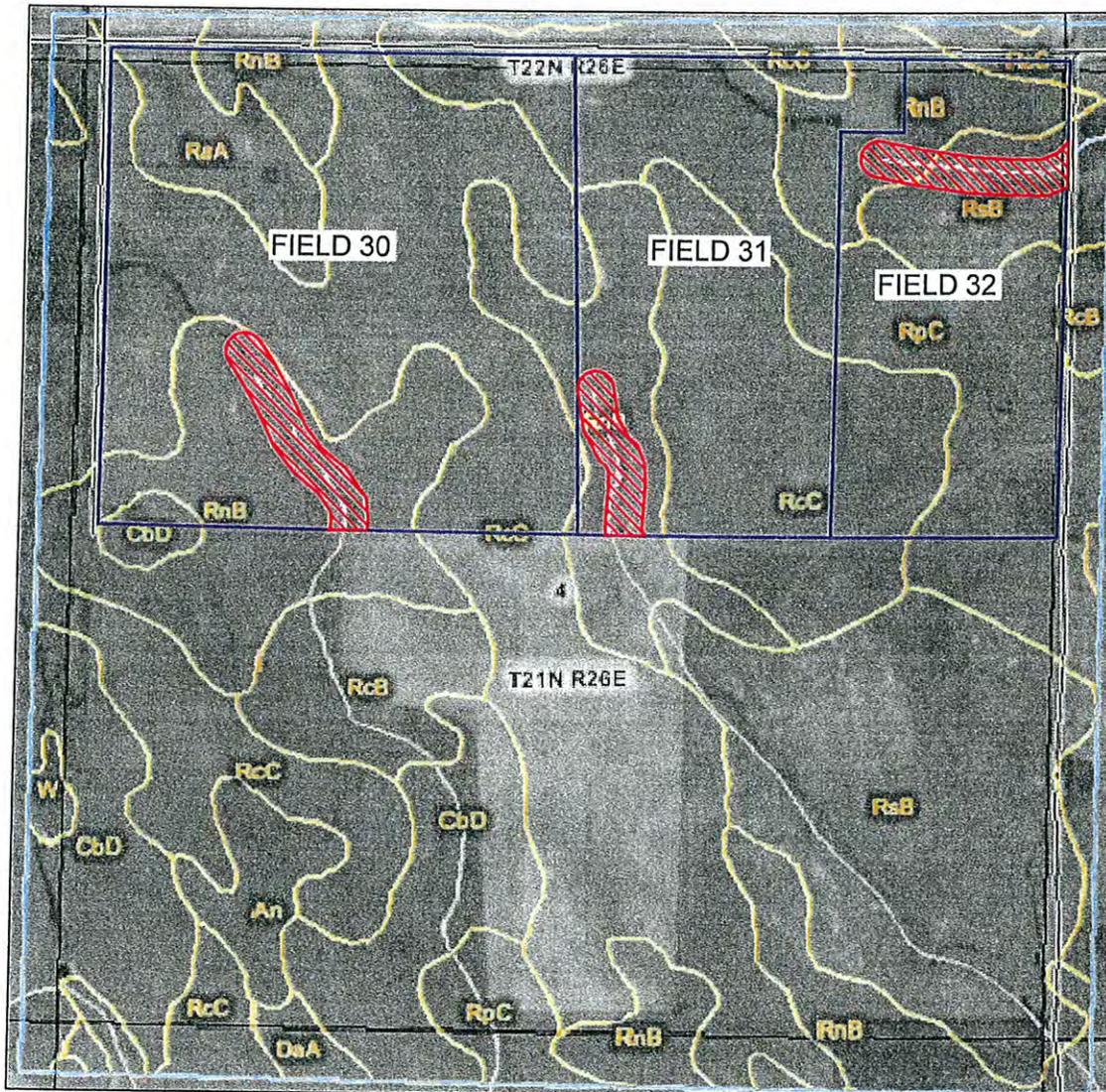
4 - 21N - 26E
CORSON COUNTY, SD



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Page:	Page:



Legend:

- An Arnegard loam
- CaF Cabba-Amor loams, 15 to 60 percent slopes
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Hs Heil silt loam
- RaA Reeder loam, 0 to 2 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes

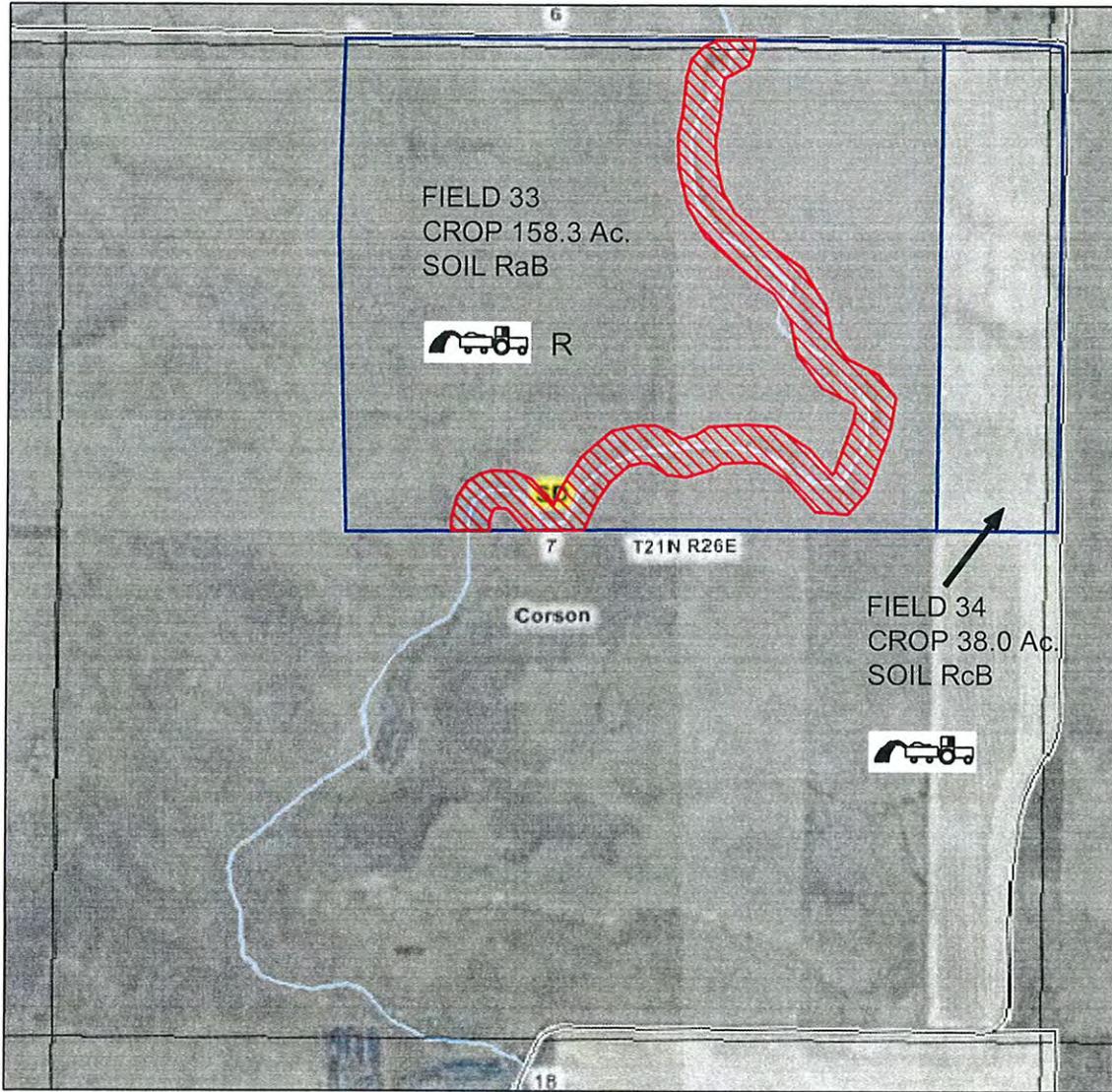
Land Application Area

WULF CATTLE DEPOT SOILS MAP

4 - 21N - 26E
CORSON COUNTY, SD

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Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

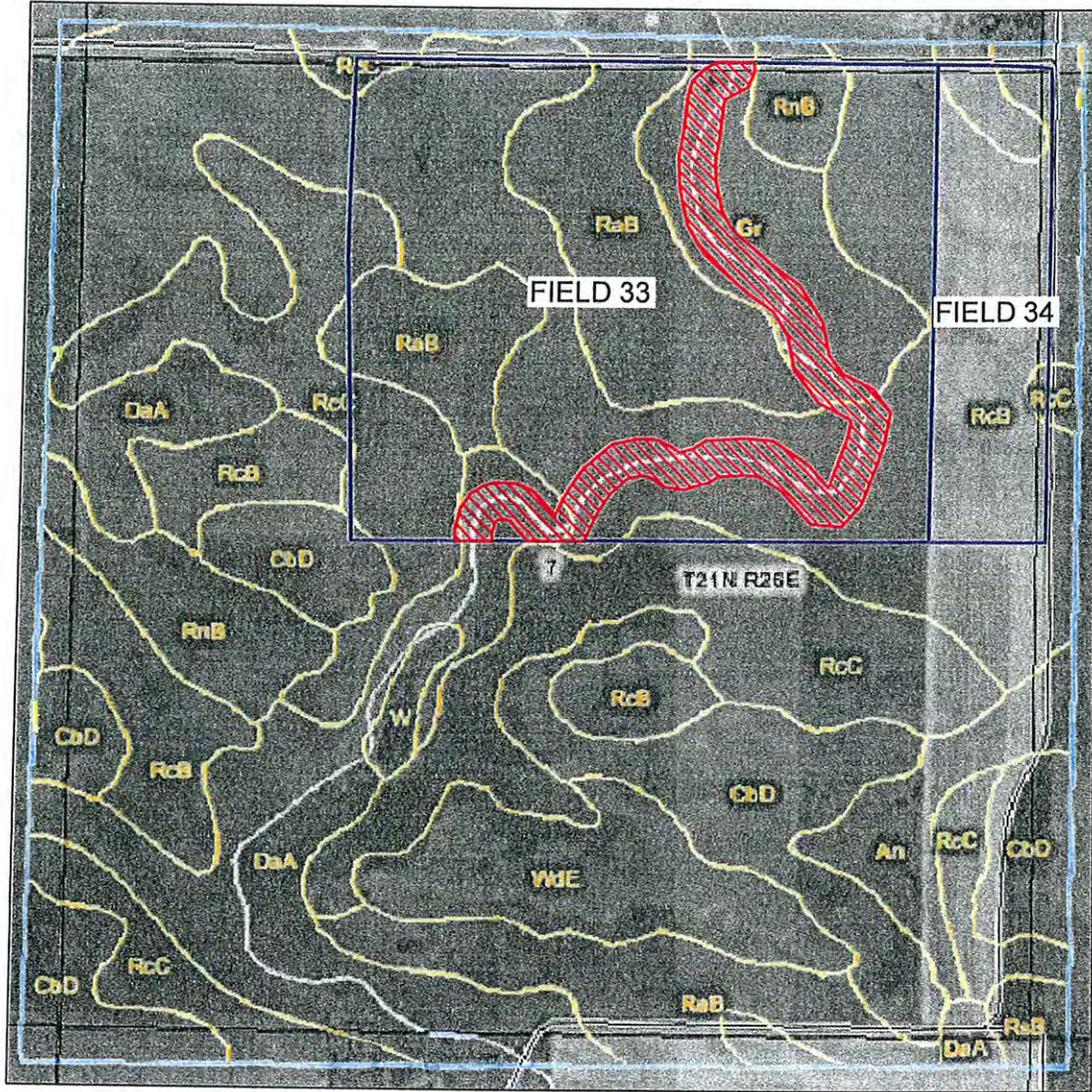
WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

7 - 21N - 26E
CORSON COUNTY, SD

		Revision
Date:	12/28/11	Date:
Scale:	1" = 1000'	Scale:
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Checked By:	GGG	Checked By:
Page:		Page:



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Legend:

- An Arnegard loam
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- WdE Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony

Land Application Area

WULF CATTLE DEPOT SOILS MAP

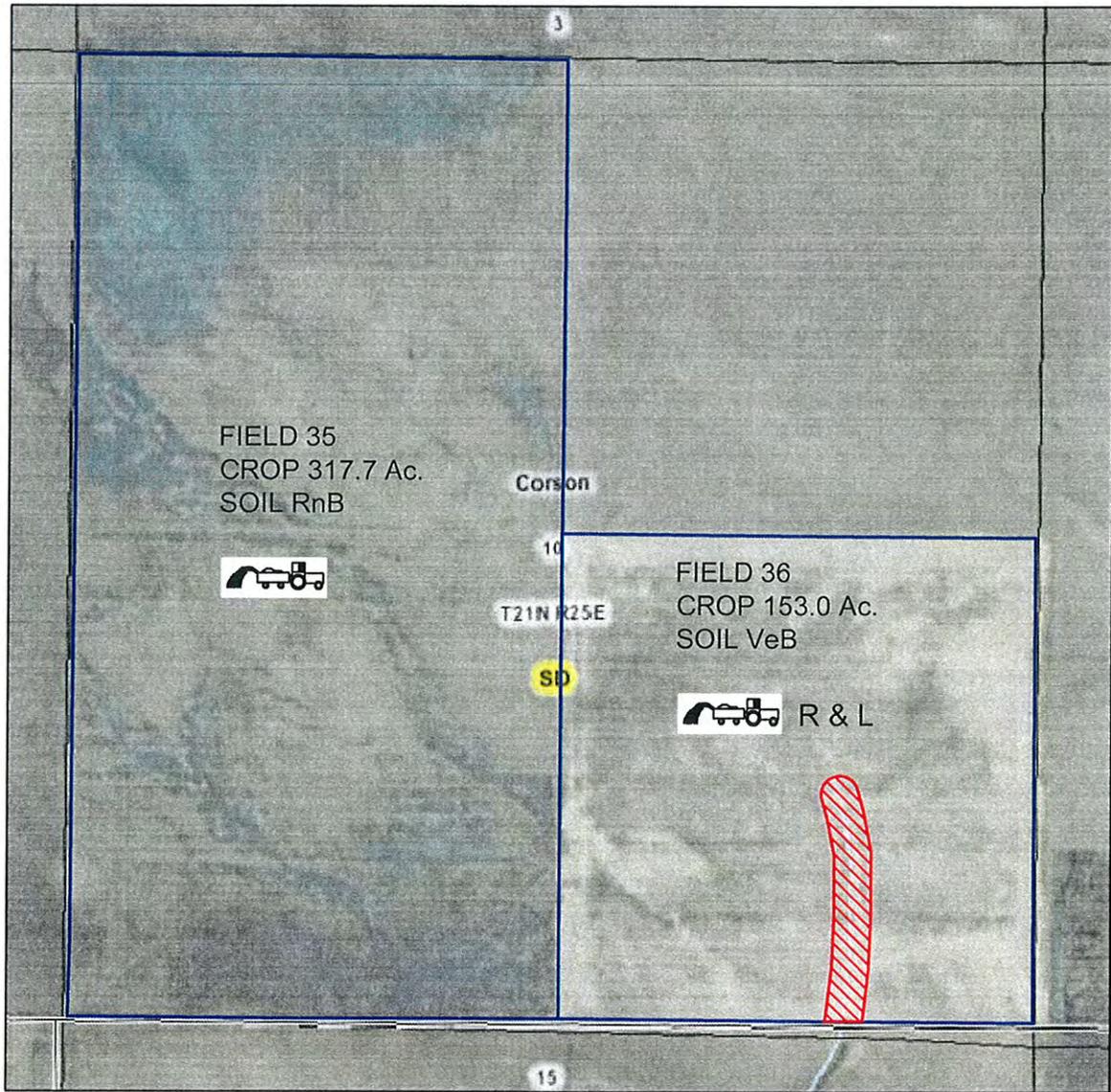
7 - 21N - 26E
CORSON COUNTY, SD



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Consulting Engineers

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Setback and/or Exclusion Area

- Manure Application
- Manure Application Fields
 - Land Application Area
 - R RUNOFF - High Risk
 - L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

10 - 21N - 25E
CORSON COUNTY, SD

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Legend:

- An Arnegard loam
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- DaA Dagleum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaB Reeder loam, 2 to 6 percent slopes
- RaC Reeder loam, 6 to 9 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnA Regent silty clay loam, 0 to 2 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Dagleum loams, 0 to 9 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VnB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

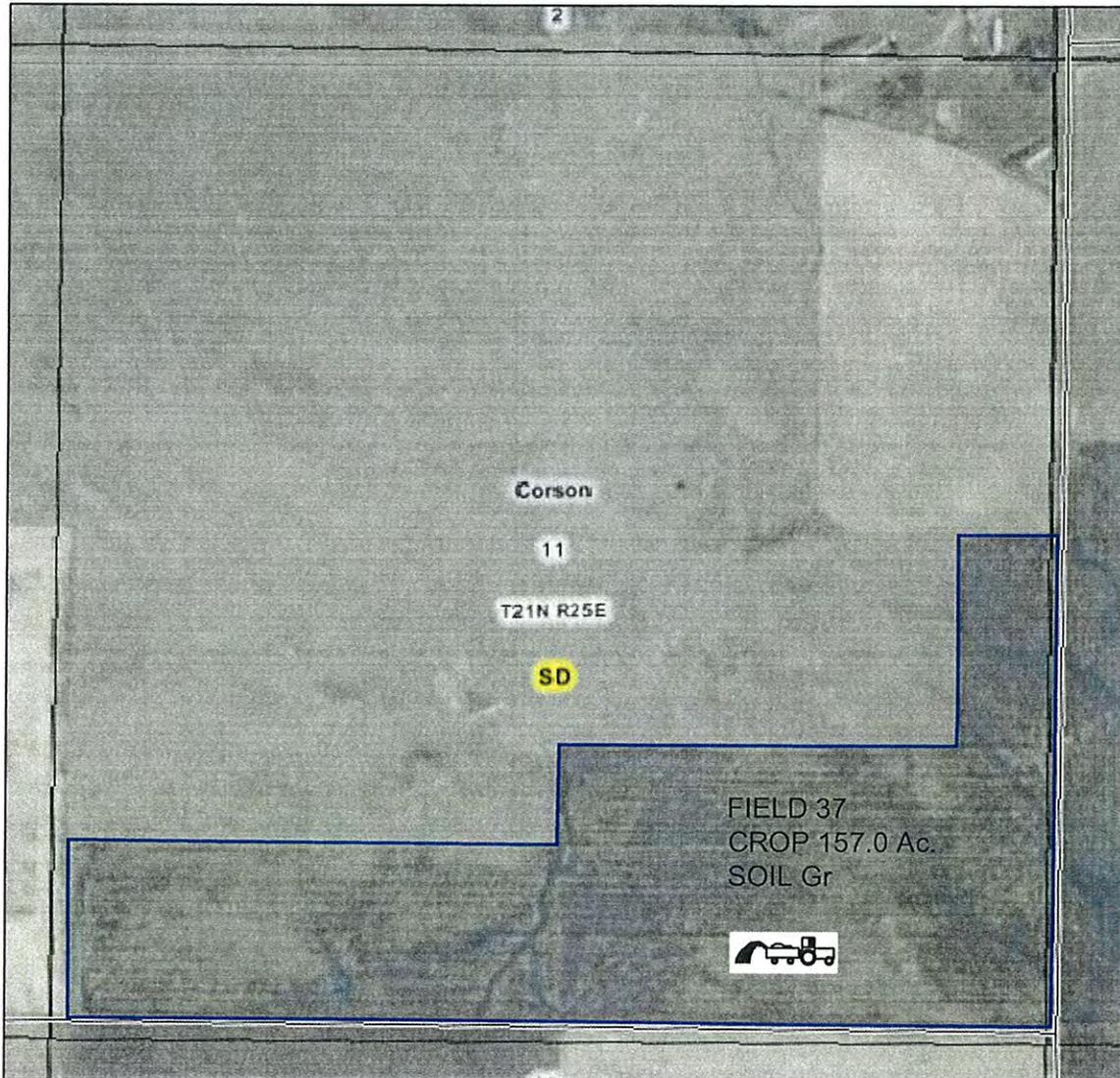
10 - 21N - 25E
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 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

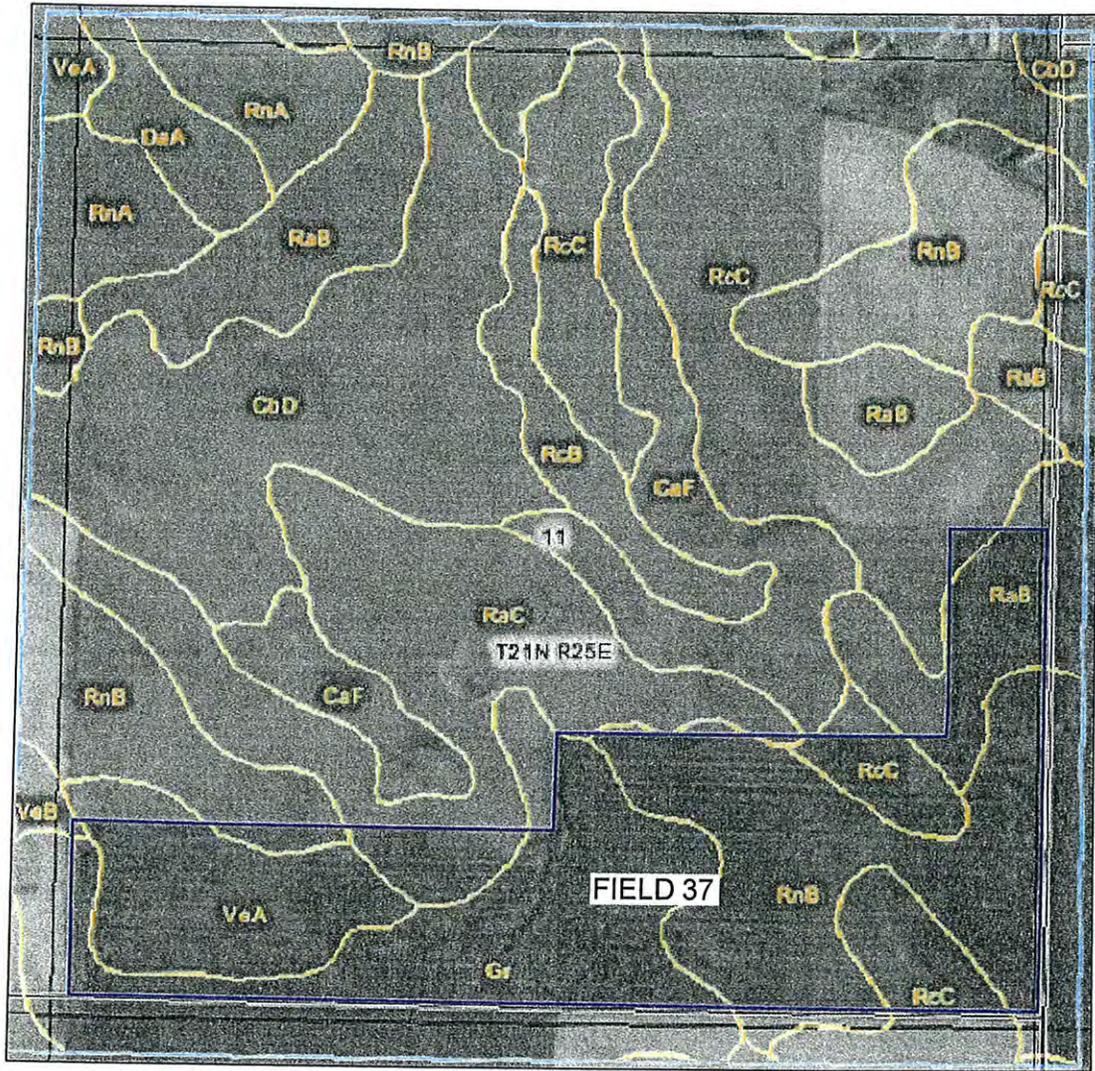
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Checked By:	GGG	Checked By:
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Legend:

- CaF Cabba-Amor loams, 15 to 60 percent slopes
- CaD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- RaB Reeder loam, 2 to 6 percent slopes
- RaC Reeder loam, 6 to 9 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnA Regent silty clay loam, 0 to 2 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

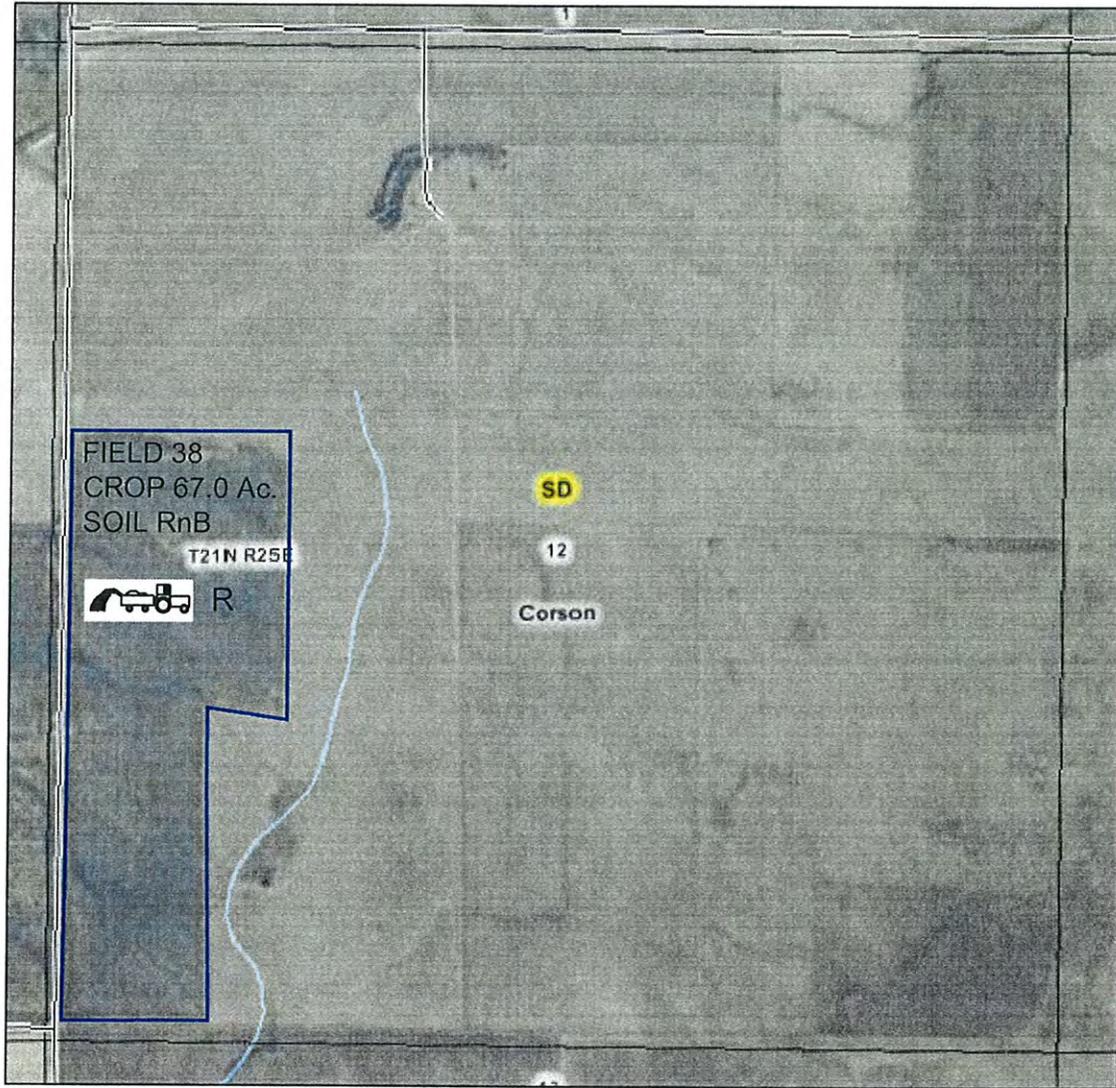
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 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

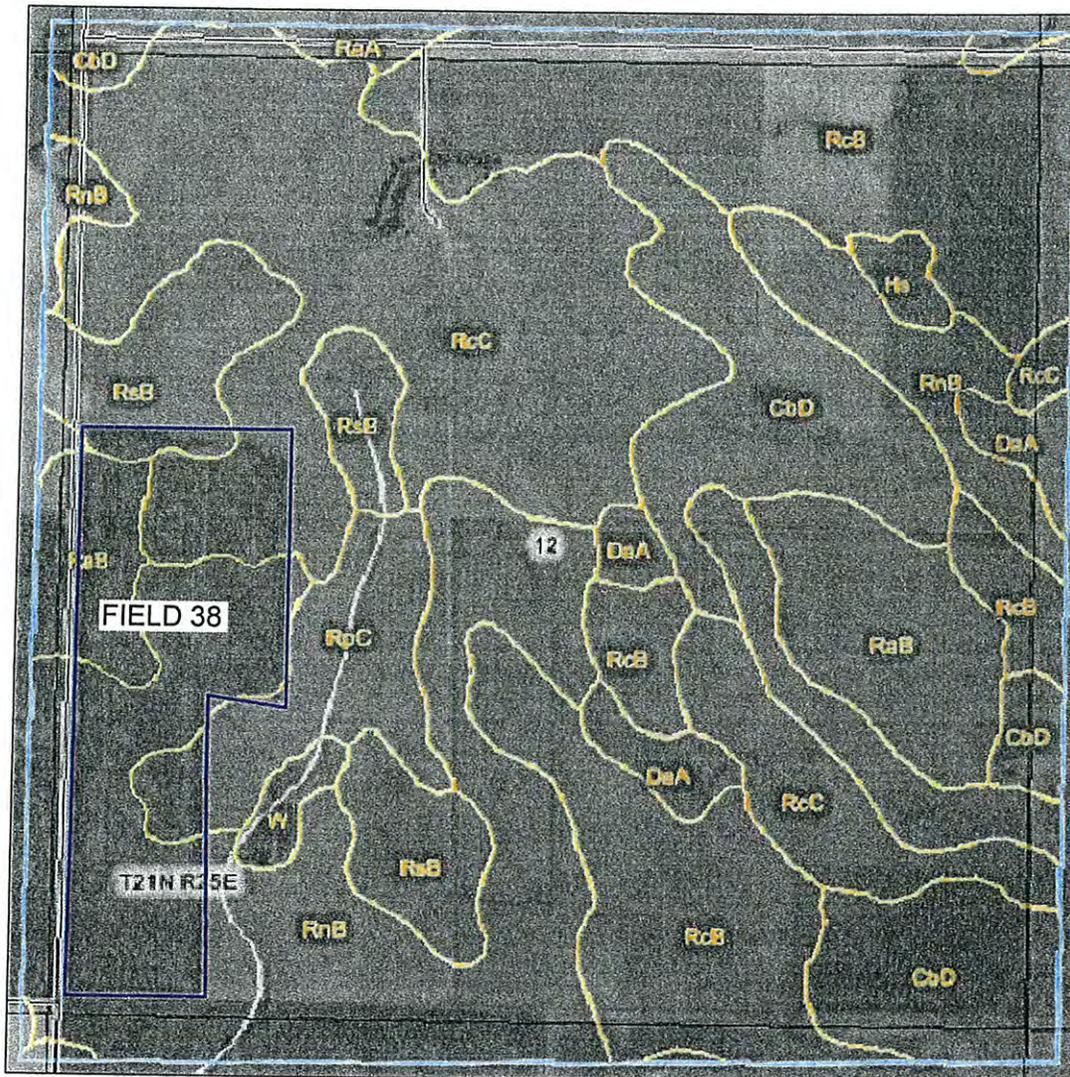
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Legend:

- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaA Reeder loam, 0 to 2 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- WdE Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

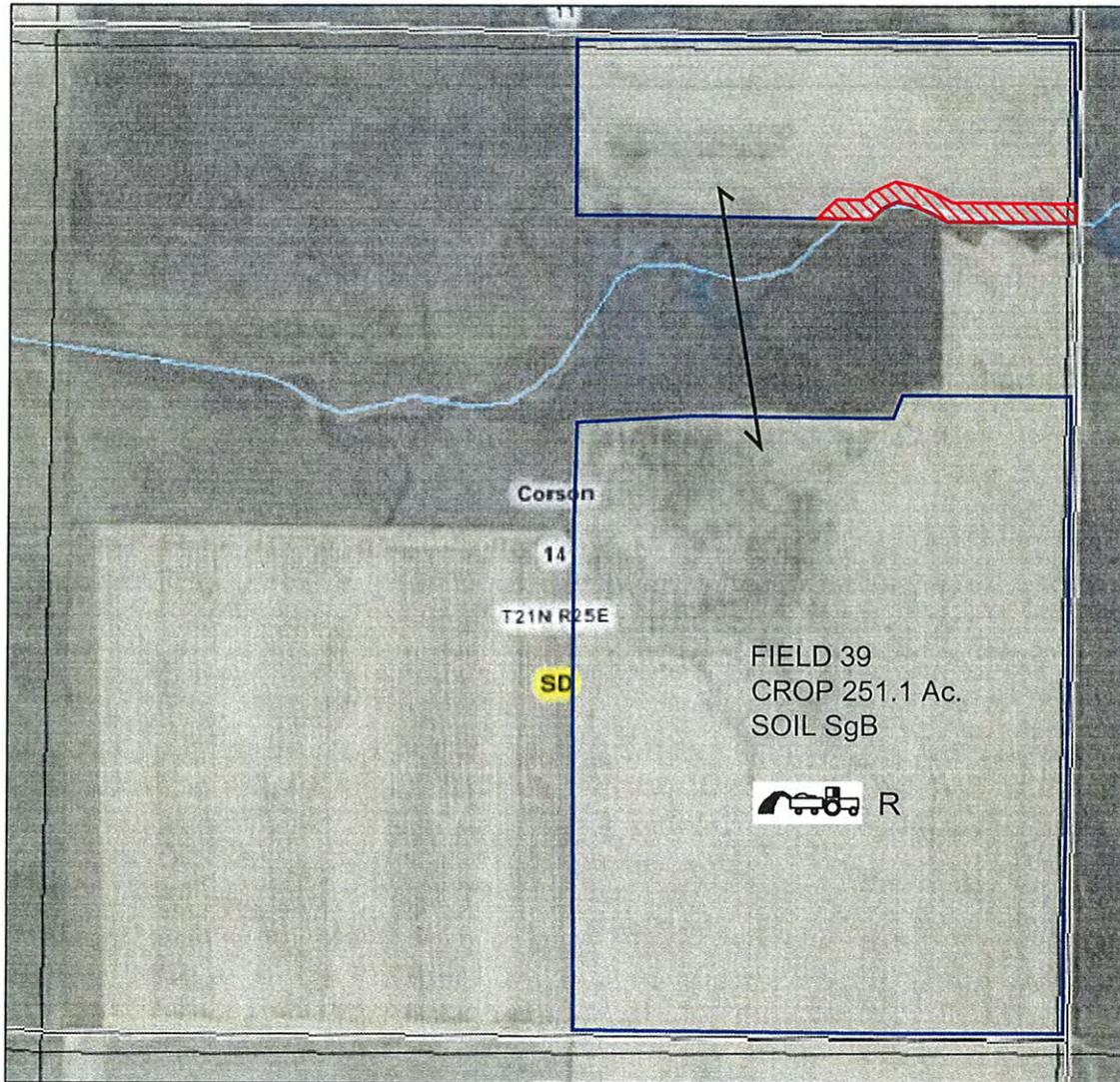
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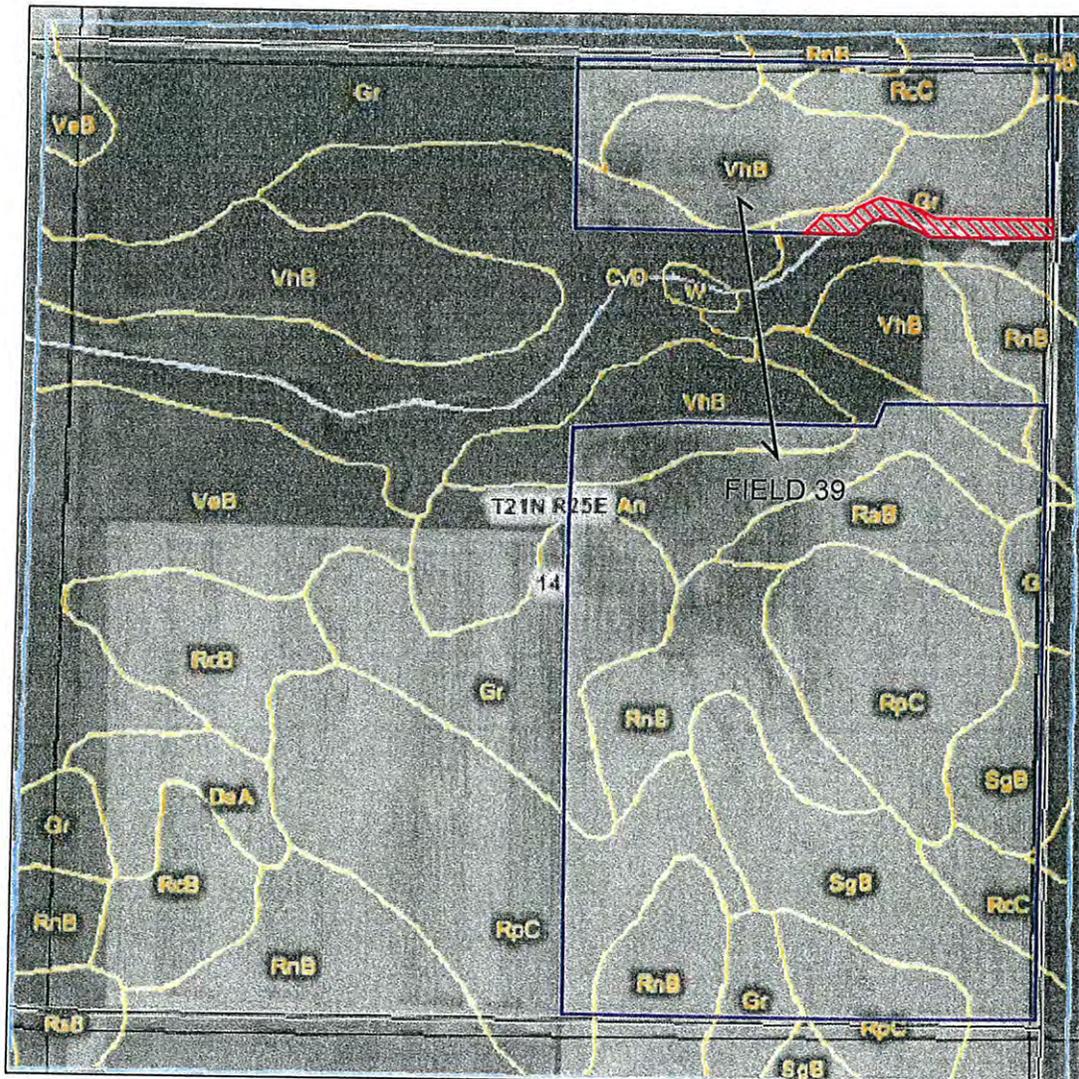
- Setback and/or Exclusion Area
- Manure Application**
- Manure Application Fields
- Land Application Area
- R RUNOFF - High Risk
- L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

14 - 21N - 25E
CORSON COUNTY, SD

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Legend:

- An Arnegard loam
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- SgB Savage silt loam, 3 to 6 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

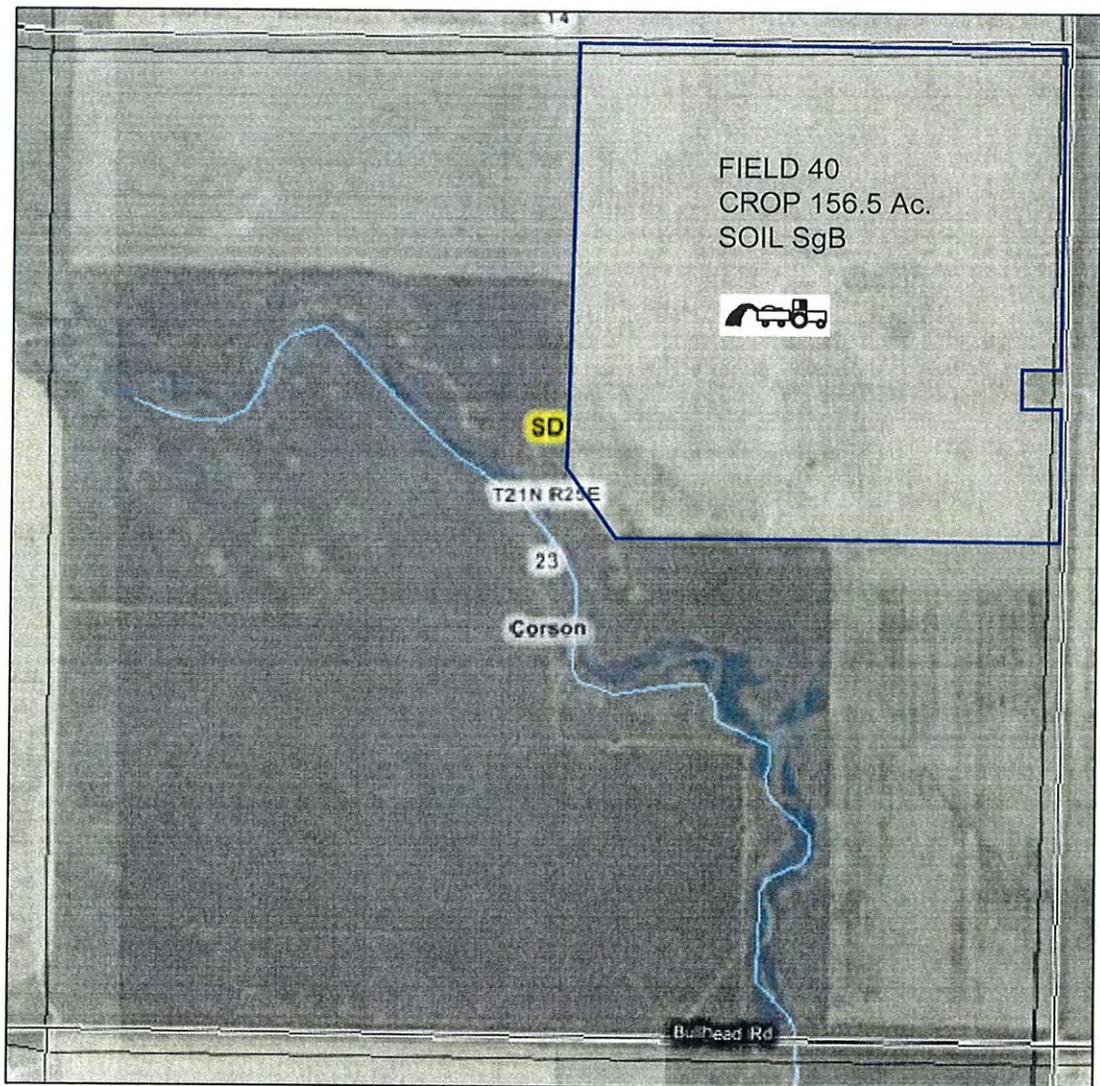
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 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

23 - 21N - 25E
CORSON COUNTY, SD



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Scale: 1" = 1000'	Scale:
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Page:	Page:



Legend:

- An Arnegard loam
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- CvD Cohagen-vebar fine sandy loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- Rsb Rhoades-Daglum loams, 0 to 9 percent slopes
- SgB Savage silt loam, 3 to 6 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

23 - 21N - 25E
CORSON COUNTY, SD

	Revision
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Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT

WATER QUALITY RISK ASSESSMENT MAP

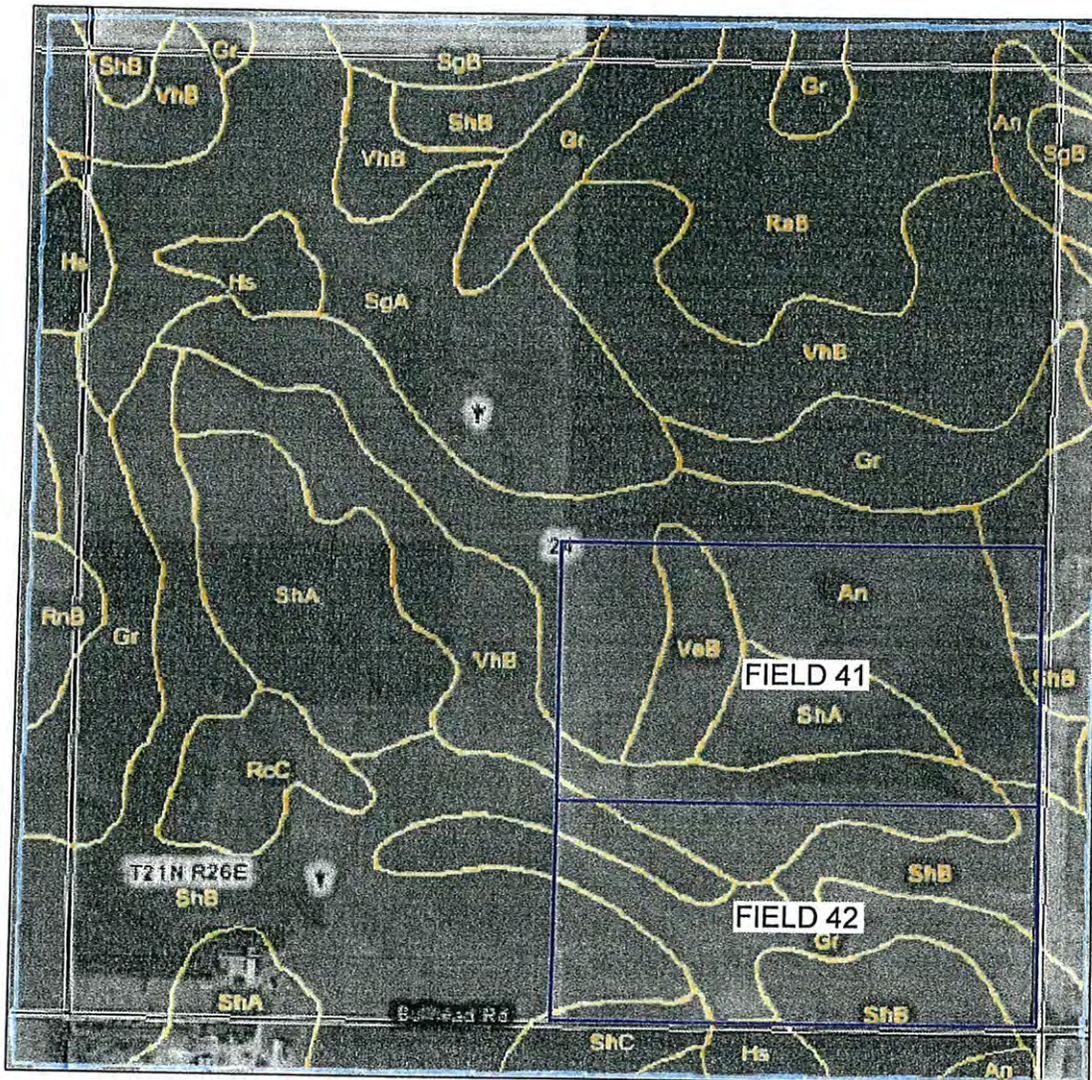
24 - 21N - 26E
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Drawn By:	CAS	Drawn By:
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Legend:

- An Arnegard loam
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaB Reeder loam, 2 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- SgA Savage silt loam, 0 to 3 percent slopes
- SgB Savage silt loam, 3 to 6 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- ShC Shambo loam, 6 to 9 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

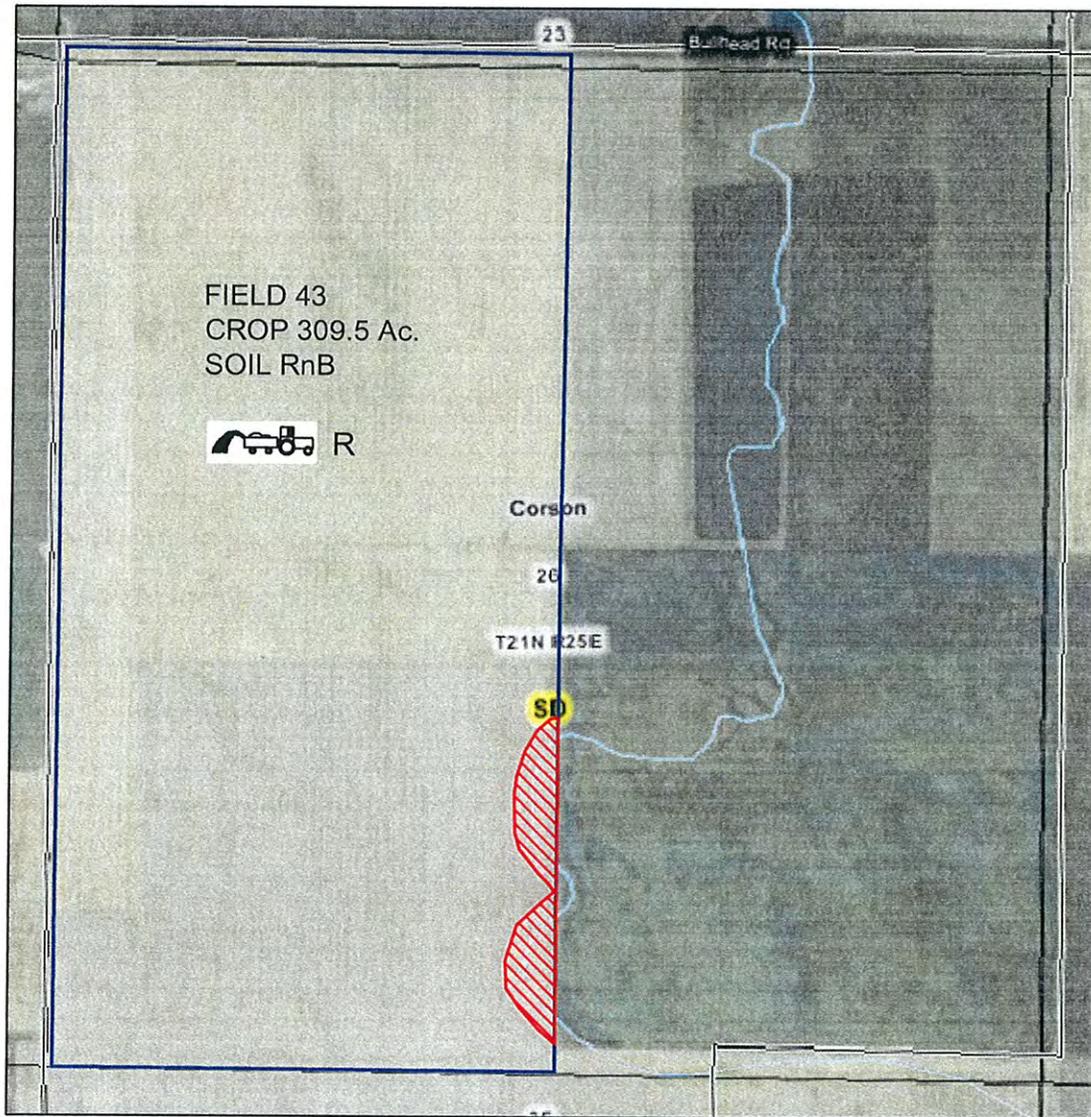
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 Setback and/or Exclusion Area

Manure Application

-  Manure Application Fields
-  Land Application Area
- R RUNOFF - High Risk
- L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

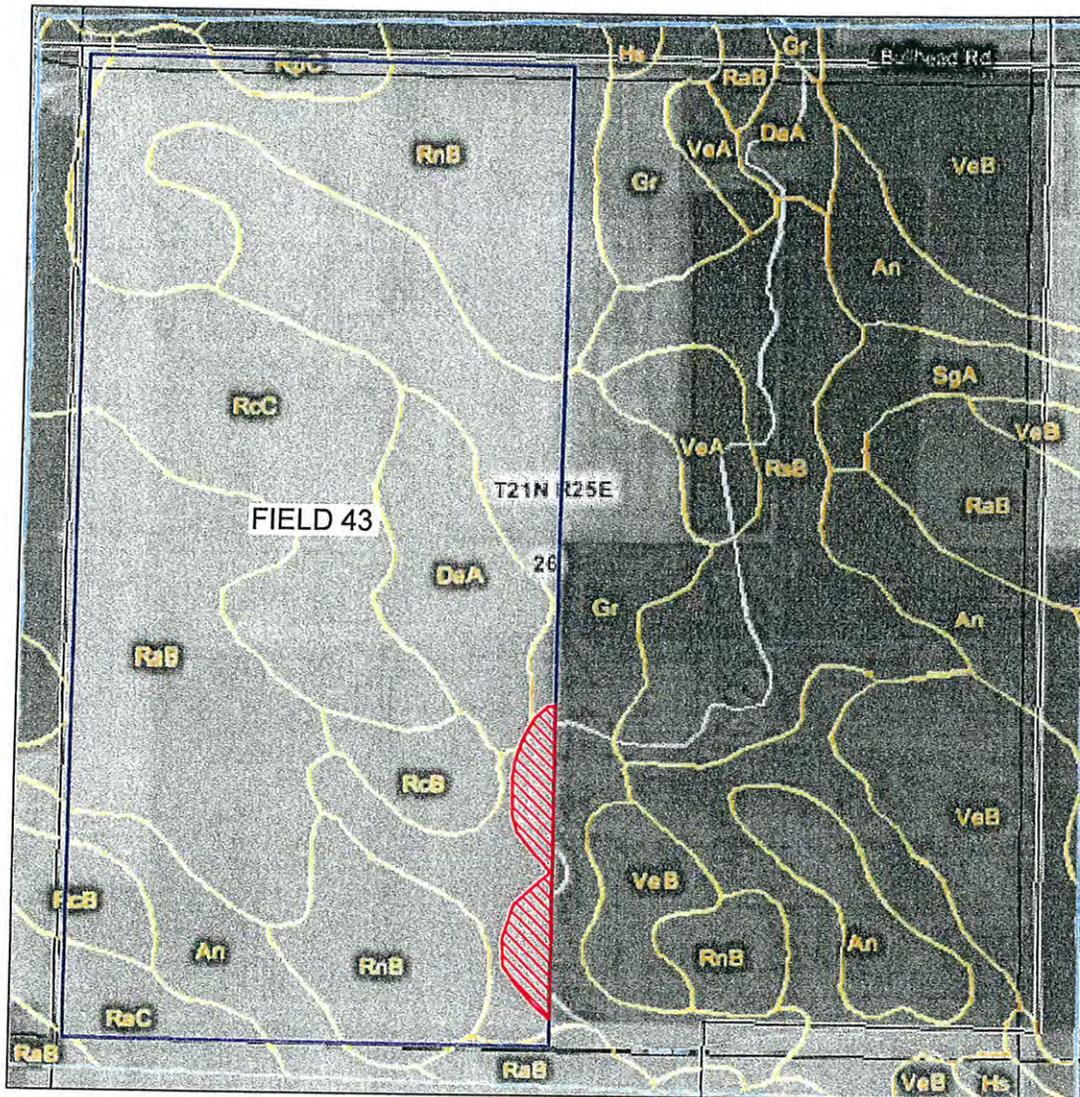
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Legend:

- An Arnegard loam
- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hg Havreton loam, channeled
- Hs Heil silt loam
- RaB Reeder loam, 2 to 6 percent slopes
- RaC Reeder loam, 6 to 9 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- SgA Savage silt loam, 0 to 3 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

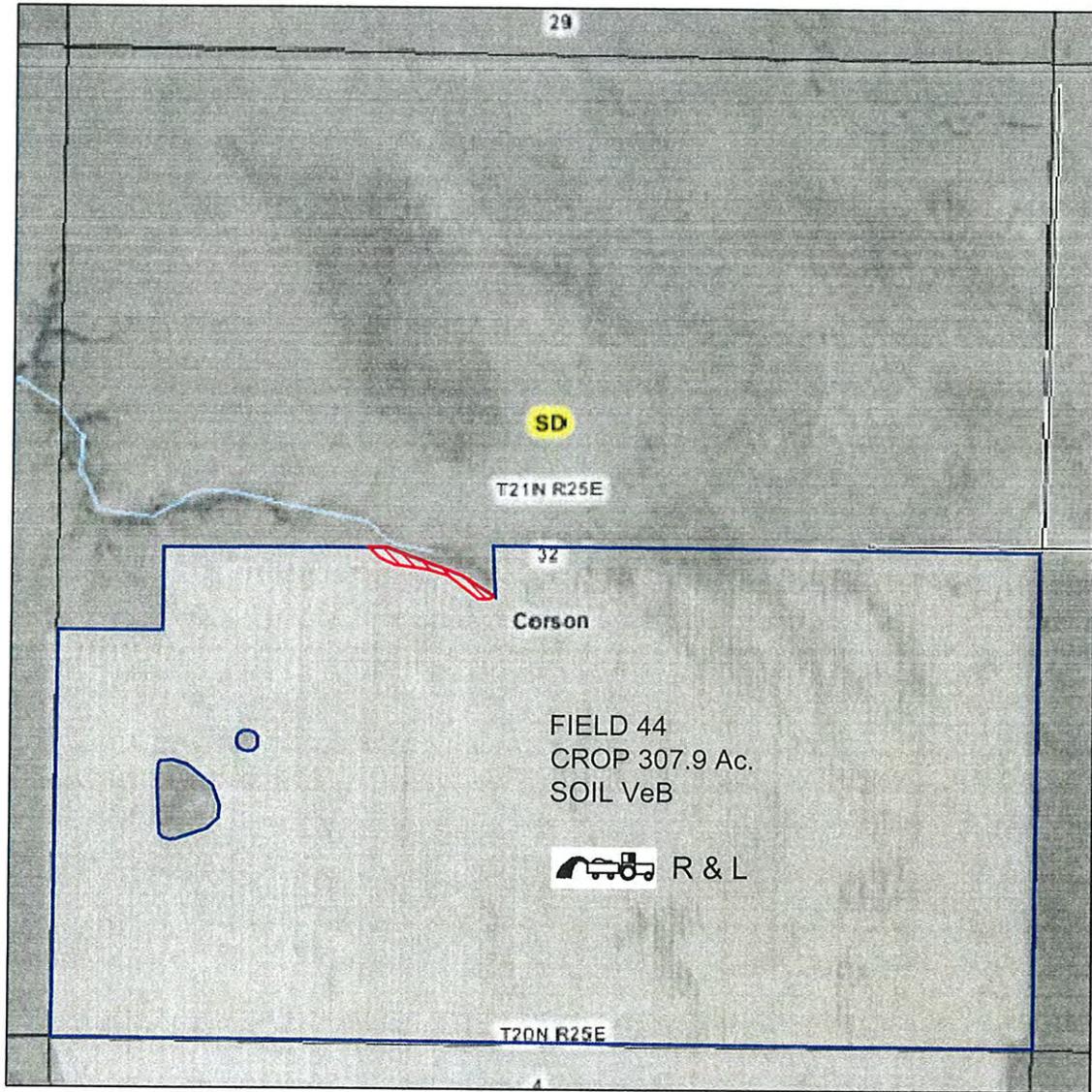
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Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

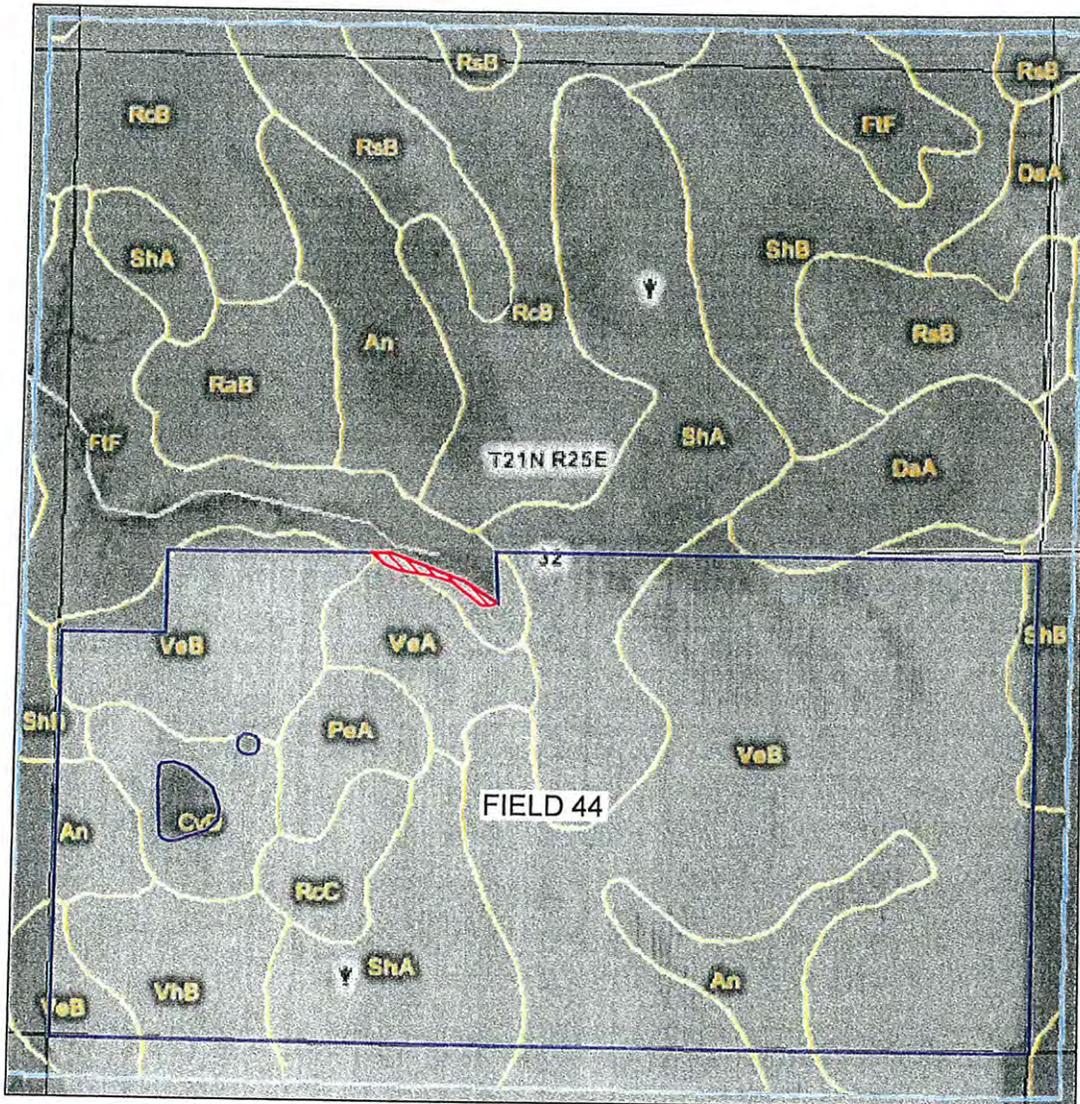
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Legend:

- An Arnegard loam
- CvD Cohagen-vebar fine sandy loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- FtF Flasher-Telfer complex, 15 to 40 percent slopes
- PeA Parshall fine sandy loam, 0 to 6 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- ShA Shambo loam, 0 to 2 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- VeA Vebar fine sandy loam, 0 to 2 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

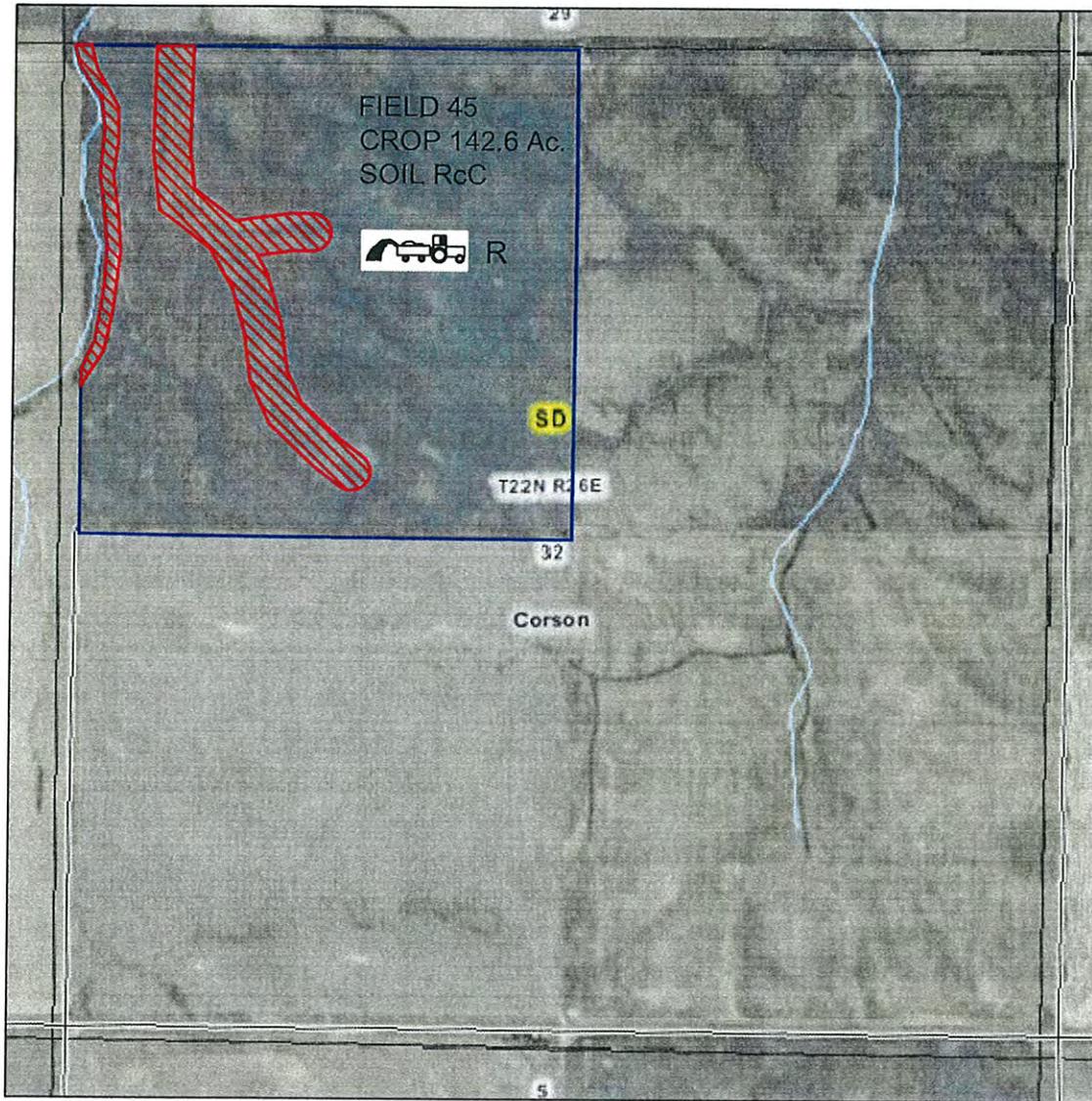
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 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

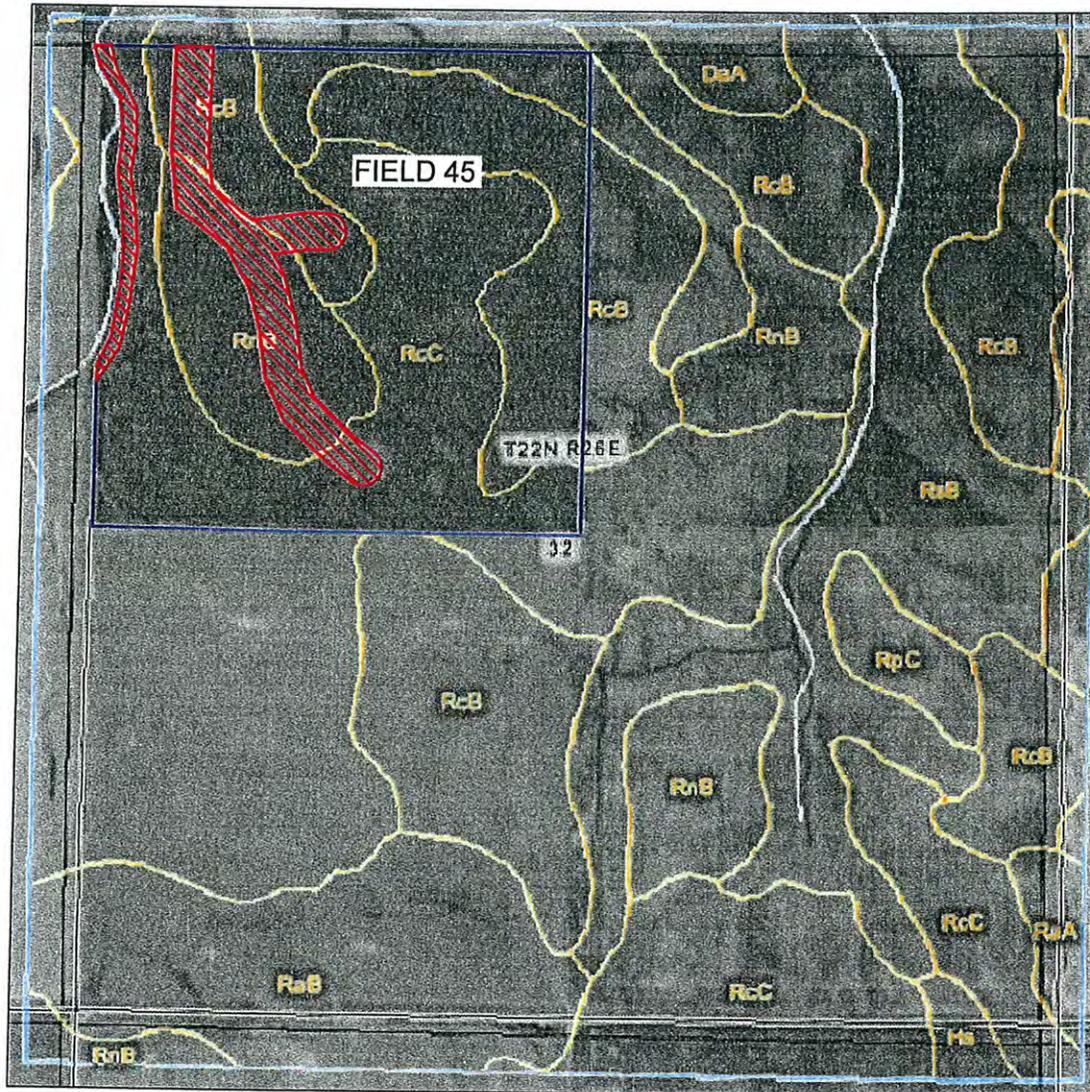
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Legend:

- CbD Cabba-Reeder loams, 6 to 25 percent slopes
- DaA Daglum loam, 0 to 3 percent slopes
- Hs Heil silt loam
- RaA Reeder loam, 0 to 2 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RpC Regent-Wayden silty clay loams, 6 to 15 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

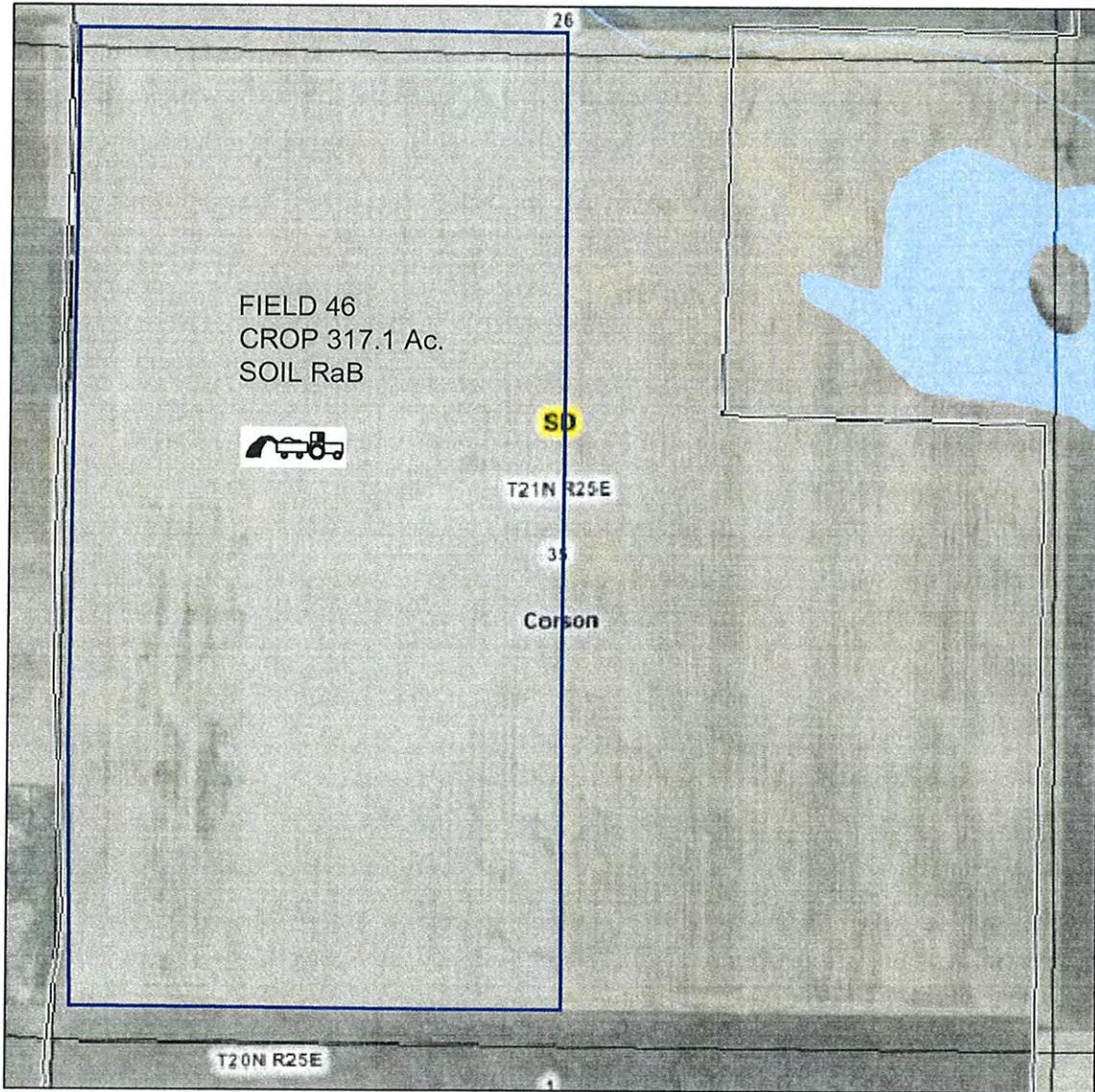
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 Setback and/or Exclusion Area

Manure Application

 Manure Application Fields

 Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

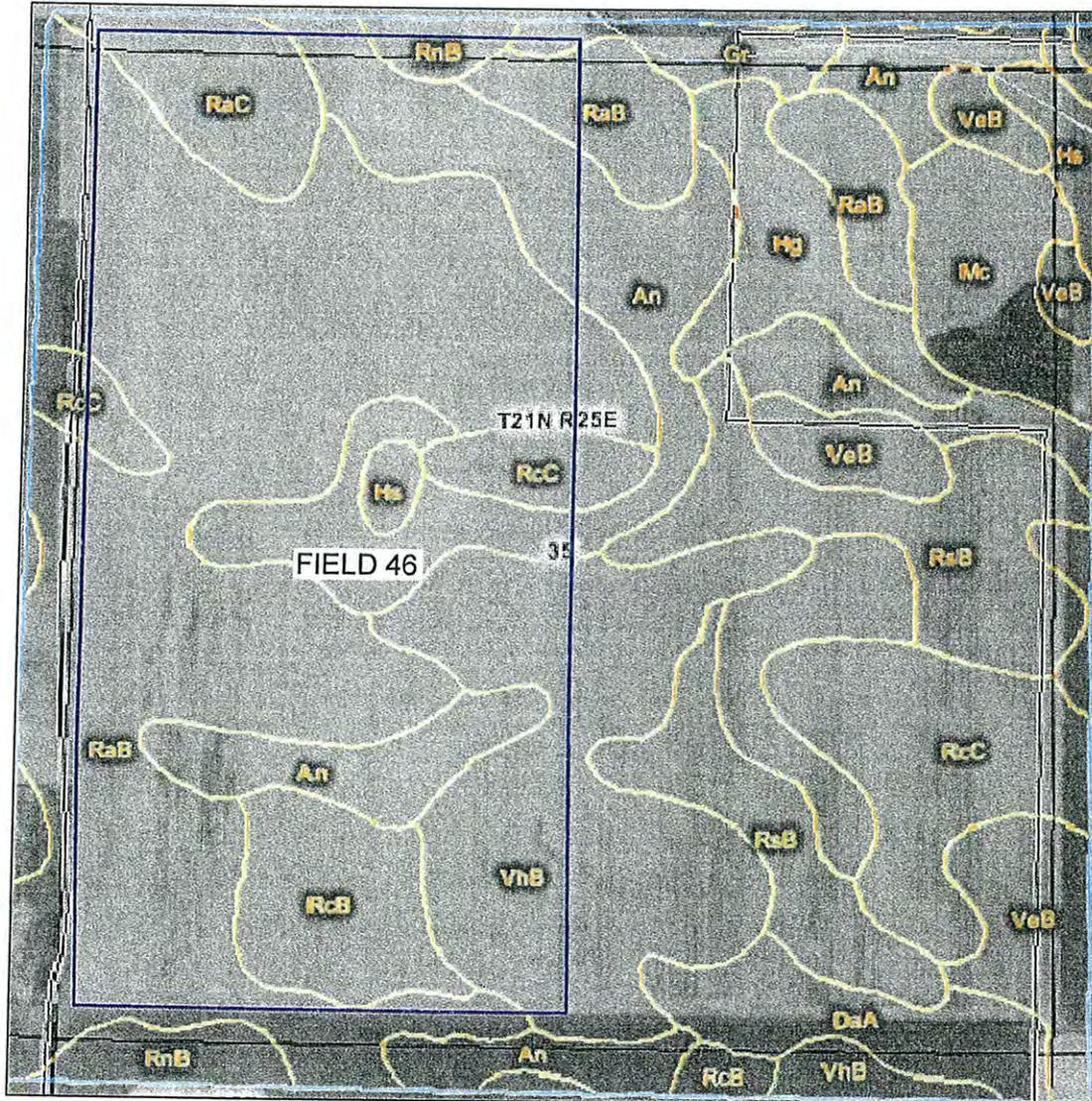
35 - 21N - 25E
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Legend:

- An Arnegard loam
- DaA Daglum loam, 0 to 3 percent slopes
- Gr Grail silty clay loam
- Hg Havrelon loam, channeled
- Hs Heil silt loam
- Mc McKenzie clay
- RaB Reeder loam, 2 to 6 percent slopes
- RaC Reeder loam, 6 to 9 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- RnB Regent silty clay loam, 2 to 6 percent slopes
- RsB Rhoades-Daglum loams, 0 to 9 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Land Application Area

WULF CATTLE DEPOT SOILS MAP

35 - 21N - 25E
CORSON COUNTY, SD



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SCALE, FEET



Setback and/or Exclusion Area

Manure Application

Manure Application Fields

Land Application Area

R RUNOFF - High Risk

L LEACHING - High Risk

WULF CATTLE DEPOT WATER QUALITY RISK ASSESSMENT MAP

16 - 21N - 27E
CORSON COUNTY, SD



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Checked By:	GGG	Checked By:	GGG
Page:		Page:	



SCALE, FEET



Legend:

- An Arnegard loam
- CvD Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes
- FaB Farnuf loam, 2 to 6 percent slopes
- Gr Grail silty clay loam
- Hs Heil silt loam
- RaA Reeder loam, 0 to 2 percent slopes
- RaB Reeder loam, 2 to 6 percent slopes
- RcB Reeder-Cabba loams, 3 to 6 percent slopes
- RcC Reeder-Cabba loams, 6 to 9 percent slopes
- ShB Shambo loam, 2 to 6 percent slopes
- VeB Vebar fine sandy loam, 2 to 6 percent slopes
- VhB Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

— Land Application Area

WULF CATTLE DEPOT SOILS MAP

16 - 21N - 27E
CORSON COUNTY, SD



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Section G: Crop Yield Documentation

Corson County Crop Yields

For Nutrient Management Planning, add 10% to yield goals.

Map Unit	Soil Description	Prod Index	Corn - Grain		Corn Silage		Soy-beans	Grain Sorghum	Spring Wheat	Winter Wheat	Oats	Barley	Sun flowers	Hay	Alfalfa
			Dry	Irr	Dry	Irr									
Crop yields based on 2005 - 09 South Dakota Agricultural Statistics:															
County Average Crop Soil Map Unit Productivity Index = 57.3															
An	ARNEGARD LOAM	94	111	220	11	24	30	52	42	59	91	50	2,716	2.4	2.2
Bb	BADLAND	1	1	2	0	0	0	1	0	1	1	1	29	0.0	0.0
Bd	BANKS FINE SAND	25	30	58	3	6	8	14	11	16	24	13	722	0.6	0.6
BeA	BELFIELD-DAGLUM COMPLEX, 0 TO 3 PERCENT SLOPES	62	73	145	7	16	20	34	28	39	60	33	1,791	1.6	1.4
BfA	BRYANT SILT LOAM, 0 TO 2 PERCENT SLOPES	93	110	217	11	24	29	51	41	58	90	50	2,687	2.4	2.1
BfB	BRYANT SILT LOAM, 2 TO 6 PERCENT SLOPES	86	102	201	10	22	27	47	38	54	83	46	2,485	2.2	2.0
BgB	BRYANT-SUTLEY SILT LOAMS, 2 TO 6 PERCENT SLOPES	77	91	180	9	20	24	42	34	48	74	41	2,225	2.0	1.8
BgC	BRYANT-SUTLEY SILT LOAMS, 6 TO 9 PERCENT SLOPES	67	79	157	8	17	21	37	30	42	65	36	1,936	1.7	1.5
BjA	BULLCREEK CLAY, 0 TO 4 PERCENT SLOPES	8	9	19	1	2	3	4	4	5	8	4	231	0.2	0.2
BmA	BULLCREEK-SLICKSPOTS COMPLEX, 0 TO 4 PERCENT SLOPES	7	8	16	1	2	2	4	3	4	7	4	202	0.2	0.2
BnA	BULLOCK FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	10	12	23	1	3	3	6	4	6	10	5	289	0.3	0.2
BfB	BULLOCK-PARCHIN FINE SANDY LOAMS, 0 TO 9 PERCENT SLOPES	20	24	47	2	5	6	11	9	13	19	11	578	0.5	0.5
BsB	BULLOCK-PARCHIN-SLICKSPOTS COMPLEX, 0 TO 9 PERCENT SLOPES	18	21	42	2	5	6	10	8	11	17	10	520	0.5	0.4
BuB	BULLOCK-SLICKSPOTS COMPLEX, 0 TO 6 PERCENT SLOPES	8	9	19	1	2	3	4	4	5	8	4	231	0.2	0.2
BvE	BULLOCK-SLICKSPOTS-ROCK OUTCROP COMPLEX, 0 TO 40 PERCENT SLOP	5	6	12	1	1	2	3	2	3	5	3	144	0.1	0.1
BzB	BULLOCK-TELFER-PARCHIN COMPLEX, 0 TO 9 PERCENT SLOPES	19	23	44	2	5	6	10	8	12	18	10	549	0.5	0.4
CaF	CABBA-AMOR LOAMS, 15 TO 60 PERCENT SLOPES	17	20	40	2	4	5	9	8	11	16	9	491	0.4	0.4
CbD	CABBA-REEDER LOAMS, 6 TO 25 PERCENT SLOPES	22	26	51	3	6	7	12	10	14	21	12	636	0.6	0.5
CeE	CABBA-SHAMBO LOAMS, 6 TO 40 PERCENT SLOPES	13	15	30	2	3	4	7	6	8	13	7	376	0.3	0.3
CgF	COHAGEN-CABBA-ROCK OUTCROP COMPLEX, 6 TO 70 PERCENT SLOPES	7	8	16	1	2	2	4	3	4	7	4	202	0.2	0.2
CvD	COHAGEN-VEBAR FINE SANDY LOAMS, 6 TO 25 PERCENT SLOPES	24	28	56	3	6	8	13	11	15	23	13	693	0.6	0.6
DaA	DAGLUM LOAM, 0 TO 3 PERCENT SLOPES	39	46	91	5	10	12	21	17	24	38	21	1,127	1.0	0.9
DuD	DUPREE-ROCK OUTCROP COMPLEX, 6 TO 30 PERCENT SLOPES	4	5	9	0	1	1	2	2	3	4	2	116	0.1	0.1
EKA	EKALAKA VERY FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	31	37	72	4	8	10	17	14	19	30	17	896	0.8	0.7
EpB	EKALAKA-PARSHALL COMPLEX, 0 TO 6 PERCENT SLOPES	36	43	84	4	9	11	20	16	23	35	19	1,040	0.9	0.8
EVB	EVRIIDGE FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	27	32	63	3	7	9	15	12	17	26	14	780	0.7	0.6
EwB	EVRIIDGE-BULLOCK FINE SANDY LOAMS, 0 TO 6 PERCENT SLOPES	20	24	47	2	5	6	11	9	13	19	11	578	0.5	0.5
ExB	EVRIIDGE-PARCHIN FINE SANDY LOAMS, 0 TO 6 PERCENT SLOPES	26	31	61	3	7	8	14	12	16	25	14	751	0.7	0.6
FaA	FARNUIF LOAM, 0 TO 2 PERCENT SLOPES	84	100	196	10	22	26	46	37	53	81	45	2,427	2.2	1.9
FaB	FARNUIF LOAM, 2 TO 6 PERCENT SLOPES	79	94	185	9	20	25	43	35	49	76	42	2,282	2.0	1.8
FfF	FLASHER-ROCK OUTCROP COMPLEX, 30 TO 60 PERCENT SLOPES	2	2	5	0	1	1	1	1	1	2	1	58	0.1	0.0
FfF	FLASHER-TELFER COMPLEX, 15 TO 40 PERCENT SLOPES	5	6	12	1	1	2	3	2	3	5	3	144	0.1	0.1
Ge	GLENROSS FINE SANDY LOAM	30	36	70	4	8	9	17	13	19	29	16	867	0.8	0.7
Gk	GLENROSS-EKALAKA FINE SANDY LOAMS	33	39	77	4	8	10	18	15	21	32	18	953	0.9	0.8
Gr	GRAIL SILTY CLAY LOAM	92	109	215	11	24	29	51	41	58	89	49	2,658	2.4	2.1
Gs	GRASSNA SILT LOAM	97	115	227	12	25	31	53	43	61	94	52	2,803	2.5	2.2
Hd	HARRIET LOAM	7	8	16	1	2	2	4	3	4	7	4	202	0.2	0.2
Hf	HAVRELON LOAM	73	87	171	9	19	23	40	33	46	71	39	2,109	1.9	1.7

Corson County Crop Yields

For Nutrient Management Planning, add 10% to yield goals.

Map Unit	SoilDescription	Prod Index	Corn - Grain		Corn Silage		Soy-beans	Grain Sorghum	Spring Wheat	Winter Wheat	Oats	Barley	Sun flowers	Hay	Alfalfa
			Dry	Irr	Dry	Irr									
Hg	HAVRELOM LOAM, CHANNIELED	29	34	68	3	7	9	16	13	18	28	15	838	0.7	0.7
Hh	HAVRELOM LOAM, TERRACE	76	90	178	9	19	24	42	34	48	73	41	2,196	2.0	1.8
HfA	HAVRELOM-RHOADES LOAMS, 0 TO 4 PERCENT SLOPES	49	58	115	6	13	15	27	22	31	47	26	1,416	1.3	1.1
Hs	HEIL SILT LOAM	15	18	35	2	4	5	8	7	9	15	8	433	0.4	0.3
HuB	HURLEY SILT LOAM, 0 TO 9 PERCENT SLOPES	10	12	23	1	3	3	6	4	6	10	5	289	0.3	0.2
HwA	HURLEY-SLICKSPOTS COMPLEX, 0 TO 6 PERCENT SLOPES	15	18	35	2	4	5	8	7	9	15	8	433	0.4	0.3
JrF	JANESBURG-REGENT-CABBA COMPLEX, 9 TO 35 PERCENT SLOPES	26	31	61	3	7	8	14	12	16	25	14	751	0.7	0.6
Ka	KORCHEA LOAM	73	87	171	9	19	23	40	33	46	71	39	2,109	1.9	1.7
Kc	KORCHEA LOAM, CHANNIELED	30	36	70	4	8	9	17	13	19	29	16	867	0.8	0.7
La	LALLIE SILTY CLAY LOAM	23	27	54	3	6	7	13	10	14	22	12	665	0.6	0.5
LeA	LEHR LOAM, 0 TO 2 PERCENT SLOPES	43	51	100	5	11	14	24	19	27	42	23	1,242	1.1	1.0
LeB	LEHR LOAM, 2 TO 6 PERCENT SLOPES	40	47	93	5	10	13	22	18	25	39	21	1,156	1.0	0.9
Mc	MCKENZIE CLAY	27	32	63	3	7	9	15	12	17	26	14	780	0.7	0.6
M-W	MISCELLANEOUS WATER	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
OaB	OPAL CLAY, 2 TO 6 PERCENT SLOPES	56	66	131	7	14	18	31	25	35	54	30	1,618	1.4	1.3
OaC	OPAL CLAY, 6 TO 9 PERCENT SLOPES	48	57	112	6	12	15	26	21	30	46	26	1,387	1.2	1.1
OdC	OPAL-DUPREE CLAYS, 2 TO 9 PERCENT SLOPES	32	38	75	4	8	10	18	14	20	31	17	925	0.8	0.7
OhB	OPAL-HURLEY COMPLEX, 0 TO 9 PERCENT SLOPES	39	46	91	5	10	12	21	17	24	38	21	1,127	1.0	0.9
Osc	OPAL-SANSARC CLAYS, 6 TO 15 PERCENT SLOPES	27	32	63	3	7	9	15	12	17	26	14	780	0.7	0.6
PaB	PARCHIN FINE SANDY LOAM, 0 TO 9 PERCENT SLOPES	28	33	65	3	7	9	15	12	18	27	15	809	0.7	0.6
PdD	PARCHIN-BULLOCK-CABBA COMPLEX, 6 TO 30 PERCENT SLOPES	10	12	23	1	3	3	6	4	6	10	5	289	0.3	0.2
PeA	PARCHIN FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	61	72	143	7	16	19	34	27	38	59	33	1,762	1.6	1.4
Pg	PITS, GRAVEL	1	1	2	0	0	0	1	0	1	1	1	29	0.0	0.0
PrA	PROMISE CLAY, 0 TO 2 PERCENT SLOPES	72	85	168	9	18	23	40	32	45	70	38	2,080	1.9	1.7
PrB	PROMISE CLAY, 2 TO 6 PERCENT SLOPES	64	76	150	8	16	20	35	29	40	62	34	1,849	1.6	1.5
RaA	REEDER LOAM, 0 TO 2 PERCENT SLOPES	84	100	196	10	22	26	46	37	53	81	45	2,427	2.2	1.9
RaB	REEDER LOAM, 2 TO 6 PERCENT SLOPES	79	94	185	9	20	25	43	35	49	76	42	2,282	2.0	1.8
RaC	REEDER LOAM, 6 TO 9 PERCENT SLOPES	60	71	140	7	15	19	33	27	38	58	32	1,734	1.5	1.4
RcB	REEDER-CABBA LOAMS, 3 TO 6 PERCENT SLOPES	64	76	150	8	16	20	35	29	40	62	34	1,849	1.6	1.5
RcC	REEDER-CABBA LOAMS, 6 TO 9 PERCENT SLOPES	50	59	117	6	13	16	28	22	31	48	27	1,445	1.3	1.2
RhB	REEDER-RHOADES LOAMS, 2 TO 9 PERCENT SLOPES	48	57	112	6	12	15	26	21	30	46	26	1,387	1.2	1.1
RnA	REGENT SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	65	77	152	8	17	20	36	29	41	63	35	1,878	1.7	1.5
RnB	REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES	60	71	140	7	15	19	33	27	38	58	32	1,734	1.5	1.4
RpC	REGENT-WAYDEN SILTY CLAY LOAMS, 6 TO 15 PERCENT SLOPES	35	41	82	4	9	11	19	16	22	34	19	1,011	0.9	0.8
RrA	RHOADES LOAM, 0 TO 6 PERCENT SLOPES	12	14	28	1	3	4	7	5	8	12	6	347	0.3	0.3
RsB	RHOADES-DAGLUM LOAMS, 0 TO 9 PERCENT SLOPES	22	26	51	3	6	7	12	10	14	21	12	636	0.6	0.5
RtB	RHOADES-DAGLUM-SLICKSPOTS COMPLEX, 0 TO 9 PERCENT SLOPES	20	24	47	2	5	6	11	9	13	19	11	578	0.5	0.5
RuB	RHOADES-SLICKSPOTS COMPLEX, 0 TO 6 PERCENT SLOPES	15	18	35	2	4	5	8	7	9	15	8	433	0.4	0.3
RvE	RHOADES-SLICKSPOTS-ROCK OUTCROP COMPLEX, 0 TO 40 PERCENT SLOP	6	7	14	1	2	2	3	3	4	6	3	173	0.2	0.1
RzF	ROCK OUTCROP-CABBA COMPLEX, 6 TO 40 PERCENT SLOPES	4	5	9	0	1	1	2	2	3	4	2	116	0.1	0.1

Corson County Crop Yields

For Nutrient Management Planning, add 10% to yield goals.

Map Unit	Soil Description	Prod Index	Corn - Grain		Corn Silage		Soy-beans	Grain Sorghum	Spring Wheat	Winter Wheat	Oats	Barley	Sun flowers	Hay	Alfalfa
			Dry	Irr	Dry	Irr									
SbE	SANSARC-OPAL CLAYS, 15 TO 40 PERCENT SLOPES	8	9	19	1	2	3	4	4	5	8	4	231	0.2	0.2
SdD	SANSARC-OPAL-DUPREE CLAYS, 9 TO 25 PERCENT SLOPES	11	13	26	1	3	3	6	5	7	11	6	318	0.3	0.3
SeE	SANSARC-WABEK COMPLEX, 15 TO 40 PERCENT SLOPES	6	7	14	1	2	2	3	3	4	6	3	173	0.2	0.1
SgA	SAVAGE SILT LOAM, 0 TO 3 PERCENT SLOPES	85	101	199	10	22	27	47	38	53	82	45	2,456	2.2	2.0
SgB	SAVAGE SILT LOAM, 3 TO 6 PERCENT SLOPES	80	95	187	10	20	25	44	36	50	77	43	2,311	2.1	1.8
ShA	SHAMBO LOAM, 0 TO 2 PERCENT SLOPES	83	98	194	10	21	26	46	37	52	80	44	2,398	2.1	1.9
ShB	SHAMBO LOAM, 2 TO 6 PERCENT SLOPES	78	92	182	9	20	25	43	35	49	75	42	2,254	2.0	1.8
ShC	SHAMBO LOAM, 6 TO 9 PERCENT SLOPES	62	73	145	7	16	20	34	28	39	60	33	1,791	1.6	1.4
SiA	STADY LOAM, 0 TO 2 PERCENT SLOPES	55	65	129	7	14	17	30	25	34	53	29	1,589	1.4	1.3
SiB	STADY LOAM, 2 TO 6 PERCENT SLOPES	49	58	115	6	13	15	27	22	31	47	26	1,416	1.3	1.1
TaA	TALLY FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	54	64	126	6	14	17	30	24	34	52	29	1,560	1.4	1.2
TaB	Telfer LOAMY SAND, 0 TO 6 PERCENT SLOPES	30	36	70	4	8	9	17	13	19	29	16	867	0.8	0.7
TaB	Telfer-EKALAKA COMPLEX, 0 TO 6 PERCENT SLOPES	26	31	61	3	7	8	14	12	16	25	14	751	0.7	0.6
Th	TREMBLES FINE SANDY LOAM	43	51	100	5	11	14	24	19	27	42	23	1,242	1.1	1.0
Tm	TREMBLES FINE SANDY LOAM, CHANNELED	32	38	75	4	8	10	18	14	20	31	17	925	0.8	0.7
Tt	TREMBLES FINE SANDY LOAM, TERRACE	46	55	108	5	12	15	25	21	29	44	25	1,329	1.2	1.1
VeA	VEBAR FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES	58	69	136	7	15	18	32	26	36	56	31	1,676	1.5	1.3
VeB	VEBAR FINE SANDY LOAM, 2 TO 6 PERCENT SLOPES	51	60	119	6	13	16	28	23	32	49	27	1,473	1.3	1.2
VnB	VEBAR-COHAGEN FINE SANDY LOAMS, 2 TO 9 PERCENT SLOPES	43	51	100	5	11	14	24	19	27	42	23	1,242	1.1	1.0
W	WATER	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Wd	WABEK GRAVELLY SANDY LOAM, 2 TO 35 PERCENT SLOPES	3	4	7	0	1	1	2	1	2	3	2	87	0.1	0.1
WcE	WAYDEN-CABBA COMPLEX, 9 TO 40 PERCENT SLOPES	8	9	19	1	2	3	4	4	5	8	4	231	0.2	0.2
WdE	WAYDEN AND CABBA SOILS, 6 TO 40 PERCENT SLOPES, EXTREMELY STONY	6	7	14	1	2	2	3	3	4	6	3	173	0.2	0.1
Wt	WENDTE SILTY CLAY, CHANNELED	29	34	68	3	7	9	16	13	18	28	15	838	0.7	0.7
ZeB	ZEONA LOAMY FINE SAND, 0 TO 6 PERCENT SLOPES	28	33	65	3	7	9	15	12	18	27	15	809	0.7	0.6
ZsD	ZEONA-SLICKSPOTS-ROCK OUTCROP COMPLEX, 0 TO 30 PERCENT SLOPES	16	19	37	2	4	5	9	7	10	15	9	462	0.4	0.4

Section H: Signed Manure Application Lease
Agreements

MANURE EASEMENT AGREEMENT

THIS AGREEMENT is made December 30, 2010, by and between Golden Hills, LLP (Land Owners hereinafter "Grantor") and Wulf Cattle Co., LLP (Borrowers hereinafter "Grantee")

WHEREAS, Grantor is the fee owner of real estate legally described as follows ("Property"):

E1/2NW1/4 and NE1/4 Sec. 7 T21N R26E of Black Hills Meridian	Field 33, 34
SW1/4 Sec. 12 T21N R25E of Black Hills Meridian	Field 38
W1/2 and SE1/4 Sec. 10 T21N R25E of Black Hills Meridian	Field 35, 36
S1/2 Sec. 11 T21N R25E of Black Hills Meridian	Field 37

Corson County, SD

WHEREAS, Grantee is the fee owner of real estate legally described as follows ("Facility Site"):

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: All of that part of the S1/2NE1/4
Lying North of the railroad right of way.

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: Lots 1 and 2;

Outlot A, Tract R3 and Tract R5 located in the
NW1/4 of Section 5, Township 21 North, Range 27 East of
Black Hills Meridian, LESS Tract 1 McLaughlin Livestock Addition.
Together with an easement of right of way on, over and across Tract 1
McLaughlin Livestock Addition.

All in Corson County, SD.

WHEREAS, Grantee desires to enter into an agreement with Grantor to haul and apply over the Property manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.

WHEREAS, Grantor will receive the benefit of reduced costs and expenses with regard to fertilizer application on account of such manure application and other related benefits.

WHEREAS, Grantor and Grantee have had mutual discussions with regard to entering into such an agreement and wish to reduce the agreement to writing.

NOW, THEREFORE, in consideration of the premises and under the mutual covenants, promises and conditions set forth herein. Grantor and Grantee hereby agree as follows:

- Easement To Apply Livestock Bio-Solids: Grantor hereby grants to Grantee an easement over the Property for purposes of hauling and applying manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.
- Term of Agreement: This Agreement and the easements connected herewith shall become effective on the date first above written and shall remain in effect for a period of 15 years unless terminated earlier by mutual agreement

between the parties.

- Application of Manure and Other Livestock Bio-solids: The parties hereto agree that Grantee shall be solely responsible for application of the manure and other livestock bio-solids to the Property, and the parties covenant and agree that:
 - A. Any and all application of manure and other livestock bio-solids shall be done in a good and husband like manner, taking into account weather conditions, soil conditions and time of year, all so as to reduce any odor that might emanate from such manure application.
 - B. That the application of manure and other livestock bio-solids shall be done in conformance with state rules and local county zoning ordinances and in accordance with all other applicable permits, statutes, rules and regulations relating to such acts and practices.
 - C. At all times during the term of this agreement, Grantee will, so far as reasonably practicable, honor all requests and directions made by Grantor with respect to the timing, location and manner of any application of manure and other livestock bio-solids to the soil, and such application shall in no event be done in any way that would interfere with any other right to use, possession and quiet enjoyment of the premises currently owned by Grantor. However, Grantor shall not have the right to prohibit Grantee's application of manure and other livestock bio-solids to the Property. In any calendar year, Grantee shall have the right to apply manure and other livestock bio-solids to the Property in the minimum quantity specified in any applicable manure management plan or, if no such plan exists, at applicable agronomic rates.
 - D. Grantee is responsible for any claims, causes of action, demands or damages for property loss arising from or on account of its manure and other livestock bio-solids application and agrees to fully indemnify and hold harmless Grantor of and from all such claims. Grantor waives any claims, causes of action, demands or damages for property loss if Grantee's application of manure and other livestock bio-solids is equal to or less than the minimum quantity specified in C above. Any claim by Grantor for property loss will be limited to the value of the crops growing on the Property allegedly damaged by Grantee's action. Grantee shall have no responsibility for any claims, causes of action, demands or damages for personal injury and Grantor waives any claims for personal injury.
 - E. Nothing in this agreement shall require Grantee to apply manure and other livestock bio-solids to the Property.
 - F. Other than at the express written consent of Grantee, Grantor will not grant to any other individuals or entities an easement or right to apply manure and other livestock bio-solids to the Property. Other than this easement, Grantor has not granted any other individual or entity an easement or right to apply manure and other livestock bio-solids to the Property.
 - G. The benefits conferred on the parties described herein constitute reasonably equivalent consideration.
- Successors and Assigns: This Agreement shall inure to the benefit of and be binding upon heirs, successors and assigns of the parties hereto. It is understood by the parties that rights of the Grantee under the terms of this Agreement are fully assignable without the consent of Grantor.
- Execution of Documents: All parties agree to execute any and all additional documents that may be necessary to implement the full terms and conditions of this Agreement, including, but not limited to, any additional state or county permit forms that may be required.
- Termination [Optional]: If Grantor requests cancellation of this Agreement prior to the end of its term, Grantee will exercise reasonable efforts to find replacement property to which Grantee may apply manure and other livestock bio-solids. If replacement property is located and Grantee obtains a manure easement with respect to the same, this Agreement will be terminated.
- Entire Agreement: The foregoing constitutes the entire agreement between the parties.
- Severability: If one provision of this Agreement is held invalid, that shall not affect any other provision of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed on the day and year first above written.

GRANTORS:

X Dennis Wulf
 Dennis Wulf, as Trustee of the Dennis & Judy Wulf Living Trust dated April 3, 2003, General Partner

X Jeral L. Wulf
 Jeral L. Wulf, as Trustee of the Jeral L. and Linda L. Wulf Living Trust dated April 22, 2003, General Partner

X _____

X _____

X _____

X _____

GRANTEES:

X Jeral Wulf
 Jeral L. Wulf, Operations Management Partner

X Dennis Wulf
 Dennis Wulf, Financial Matters Partner

MANURE EASEMENT AGREEMENT

THIS AGREEMENT is made December 30, 2010, by and between Dallas Schott and Dee Schott (Land Owners hereinafter "Grantor") and Wulf Cattle Co., LLP (Borrowers hereinafter "Grantee")

WHEREAS, Grantor is the fee owner of real estate legally described as follows ("Property"):

- S1/2SE1/4 Sec. 6 T21N R27E of Black Hills Meridian Field 7-8
- W1/2 Sec. 7 T21N R27E of Black Hills Meridian Field 9
- NW1/4 Sec. 8 T21N R27E of Black Hills Meridian Field 10
- NE1/4 Sec. 8 T21N R27E of Black Hills Meridian Field 11
- SE1/4 Sec. 9 T22N R27E of Black Hills Meridian Field 13
- NE1/4 Sec. 9 T22N R27E of Black Hills Meridian Field 14
- E1/2 Sec. 10 T22N R27E of Black Hills Meridian Field 16
- N1/2 Sec. 15 T22N R27E of Black Hills Meridian Field 18-19
- E1/2 Sec. 16 T22N R27E of Black Hills Meridian Field 20
- NE1/4 Sec. 9 T21N R27E of Black Hills Meridian Field 12
- SW1/4 Sec. 9 T21N R27E of Black Hills Meridian Field 13
- E1/2 Sec. 14 T21N R25E of Black Hills Meridian Field 39
- NE1/4 Sec. 23 T21N R25E of Black Hills Meridian Field 40
- S1/2 Sec. 32 T21N R25E of Black Hills Meridian Field 44
- N1/2 Sec. 4 T20N R25E of Black Hills Meridian Field 29
- W1/2 Sec. 26 T21N R25E of Black Hills Meridian Field 43
- W1/2 Sec. 35 T21N R25E of Black Hills Meridian Field 46

All in Corson County, SD

WHEREAS, Grantee is the fee owner of real estate legally described as follows ("Facility Site"):

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: All of that part of the S1/2NE1/4
Lying North of the railroad right of way.

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: Lots 1 and 2;

Outlot A, Tract R3 and Tract R5 located in the
NW1/4 of Section 5, Township 21 North, Range 27 East of
Black Hills Meridian, LESS Tract 1 McLaughlin Livestock Addition.
Together with an easement of right of way on, over and across Tract 1
McLaughlin Livestock Addition.

All in Corson County, SD.

WHEREAS, Grantee desires to enter into an agreement with Grantor to haul and apply over the Property manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.

WHEREAS, Grantor will receive the benefit of reduced costs and expenses with regard to fertilizer application on account of such

Grantor and Grantee hereby agree as follows:

- **Easement To Apply Livestock Bio-Solids:** Grantor hereby grants to Grantee an easement over the Property for purposes of hauling and applying manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.
- **Term of Agreement:** This Agreement and the easements connected herewith shall become effective on the date first above written and shall remain in effect for a period of 15 years unless terminated earlier by mutual agreement between the parties.
- **Application of Manure and Other Livestock Bio-solids:** The parties hereto agree that Grantee shall be solely responsible for application of the manure and other livestock bio-solids to the Property, and the parties covenant and agree that:
 - A. Any and all application of manure and other livestock bio-solids shall be done in a good and husband like manner, taking into account weather conditions, soil conditions and time of year, all so as to reduce any odor that might emanate from such manure application.
 - B. That the application of manure and other livestock bio-solids shall be done in conformance with state rules and local county zoning ordinances and in accordance with all other applicable permits, statutes, rules and regulations relating to such acts and practices.
 - C. At all times during the term of this agreement, Grantee will, so far as reasonably practicable, honor all requests and directions made by Grantor with respect to the timing, location and manner of any application of manure and other livestock bio-solids to the soil, and such application shall in no event be done in any way that would interfere with any other right to use, possession and quiet enjoyment of the premises currently owned by Grantor. However, Grantor shall not have the right to prohibit Grantee's application of manure and other livestock bio-solids to the Property. In any calendar year, Grantee shall have the right to apply manure and other livestock bio-solids to the Property in the minimum quantity specified in any applicable manure management plan or, if no such plan exists, at applicable agronomic rates.
 - D. Grantee is responsible for any claims, causes of action, demands or damages for property loss arising from or on account of its manure and other livestock bio-solids application and agrees to fully indemnify and hold harmless Grantor of and from all such claims. Grantor waives any claims, causes of action, demands or damages for property loss if Grantee's application of manure and other livestock bio-solids is equal to or less than the minimum quantity specified in C above. Any claim by Grantor for property loss will be limited to the value of the crops growing on the Property allegedly damaged by Grantee's action. Grantee shall have no responsibility for any claims, causes of action, demands or damages for personal injury and Grantor waives any claims for personal injury.
 - E. Nothing in this agreement shall require Grantee to apply manure and other livestock bio-solids to the Property.
 - F. Other than at the express written consent of Grantee, Grantor will not grant to any other individuals or entities an easement or right to apply manure and other livestock bio-solids to the Property. Other than this easement, Grantor has not granted any other individual or entity an easement or right to apply manure and other livestock bio-solids to the Property.
 - G. The benefits conferred on the parties described herein constitutes reasonably equivalent consideration.
- **Successors and Assigns:** This Agreement shall inure to the benefit of and be binding upon heirs, successors and assigns of the parties hereto. It is understood by the parties that rights of the Grantee under the terms of this Agreement are fully assignable without the consent of Grantor.
- **Execution of Documents:** All parties agree to execute any and all additional documents that may be necessary to implement the full terms and conditions of this Agreement, including, but not limited to, any additional state or county permit forms that may be required.
- **Termination (Optional):** If Grantor requests cancellation of this Agreement prior to the end of its term, Grantee will exercise reasonable efforts to find replacement property to which Grantee may apply manure and other livestock bio-solids. If replacement property is located and Grantee obtains a manure easement with respect to the same, this Agreement will be terminated.
- **Entire Agreement:** The foregoing constitutes the entire agreement between the parties.
- **Severability:** If one provision of this Agreement is held invalid, that shall not affect any other provision of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed on the day and year first above written.

GRANTORS:

X Dallas Schott
Dallas Schott

X Dee Schott
Dee Schott

X _____

X _____

X _____

X _____

GRANTEES:

X Jerad Wulf Operations Management Partner X _____
 X Dennis Wulf FMP X _____
 X _____ X _____

ACKNOWLEDGEMENTS

STATE OF South Dakota
 COUNTY OF Corson) ss. (Individual)

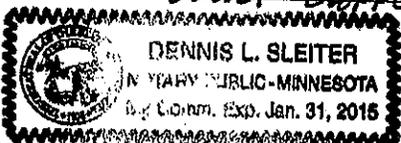


The foregoing instrument was acknowledged before me this 28 day of December, 2010
 by Dallas Schott and Dee Schott

Notary Public: Dallas Schott
 My commission expires: 5-2-13

STATE OF Minnesota)
 COUNTY OF Stearns) ss. (Partnership)

The foregoing instrument was acknowledged before me this 4 day of January, 2011
 by Jerad Wulf & Dennis Wulf partner(s), on
 behalf of Wulf Cattle Co L.P. a partnership.



Notary Public: Dennis L. Sleiter
 My commission expires: 1-31-2015

STATE OF _____)
 COUNTY OF _____) ss. (Corporation)

The foregoing instrument was acknowledged before me this _____ day of _____
 by _____ as _____ of
 _____ corporation, on behalf of the corporation.

Notary Public: _____
 My commission expires: _____

This instrument was drafted by:
 AgCountry Farm Credit Services
 102 S. Atlantic Ave
 Morris, MN 56267

Space Above is for Recording Information

MANURE EASEMENT AGREEMENT

THIS AGREEMENT is made December 30, 2010, by and between Gary Rau (Land Owners hereinafter "Grantor") and Wulf Cattle Co., LLP (Borrowers hereinafter "Grantee")

WHEREAS, Grantor is the fee owner of real estate legally described as follows ("Property"):

N1/2N1/2 Sec. 19 T22N R27E of Black Hills Meridian	Field 21
SE1/4 Sec. 30 T22N R27E of Black Hills Meridian	Field 22
SE1/4 Sec. 31 T22N R27E of Black Hills Meridian	Field 24
NE1/4 Sec. 31 T22N R27E of Black Hills Meridian	Field 23
NW1/4 Sec. 34 T22N R27E of Black Hills Meridian	Field 27
NE1/4 Sec. 34 T22N R27E of Black Hills Meridian	Field 28

All in Corson County, SD

WHEREAS, Grantee is the fee owner of real estate legally described as follows ("Facility Site"):

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: All of that part of the S1/2NE1/4
Lying North of the railroad right of way.

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: Lots 1 and 2;

Outlot A, Tract R3 and Tract R5 located in the
NW1/4 of Section 5, Township 21 North, Range 27 East of
Black Hills Meridian, LESS Tract 1 McLaughlin Livestock Addition.
Together with an easement of right of way on, over and across Tract 1
McLaughlin Livestock Addition.

All in Corson County, SD.

WHEREAS, Grantee desires to enter into an agreement with Grantor to haul and apply over the Property manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.

WHEREAS, Grantor will receive the benefit of reduced costs and expenses with regard to fertilizer application on account of such manure application and other related benefits.

WHEREAS, Grantor and Grantee have had mutual discussions with regard to entering into such an agreement and wish to reduce the agreement to writing.

NOW, THEREFORE, in consideration of the premises and under the mutual covenants, promises and conditions set forth herein. Grantor and Grantee hereby agree as follows:

- Easement To Apply Livestock Bio-Solids: Grantor hereby grants to Grantee an easement over the Property for purposes of hauling and applying manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.
- Term of Agreement: This Agreement and the easements connected herewith shall become effective on the date first

above written and shall remain in effect for a period of 15 years unless terminated earlier by mutual agreement between the parties.

- **Application of Manure and Other Livestock Bio-solids:** The parties hereto agree that Grantee shall be solely responsible for application of the manure and other livestock bio-solids to the Property, and the parties covenant and agree that:
 - A. Any and all application of manure and other livestock bio-solids shall be done in a good and husband like manner, taking into account weather conditions, soil conditions and time of year, all so as to reduce any odor that might emanate from such manure application.
 - B. That the application of manure and other livestock bio-solids shall be done in conformance with state rules and local county zoning ordinances and in accordance with all other applicable permits, statutes, rules and regulations relating to such acts and practices.
 - C. At all times during the term of this agreement, Grantee will, so far as reasonably practicable, honor all requests and directions made by Grantor with respect to the timing, location and manner of any application of manure and other livestock bio-solids to the soil, and such application shall in no event be done in any way that would interfere with any other right to use, possession and quiet enjoyment of the premises currently owned by Grantor. However, Grantor shall not have the right to prohibit Grantee's application of manure and other livestock bio-solids to the Property. In any calendar year, Grantee shall have the right to apply manure and other livestock bio-solids to the Property in the minimum quantity specified in any applicable manure management plan or, if no such plan exists, at applicable agronomic rates.
 - D. Grantee is responsible for any claims, causes of action, demands or damages for property loss arising from or on account of its manure and other livestock bio-solids application and agrees to fully indemnify and hold harmless Grantor of and from all such claims. Grantor waives any claims, causes of action, demands or damages for property loss if Grantee's application of manure and other livestock bio-solids is equal to or less than the minimum quantity specified in C above. Any claim by Grantor for property loss will be limited to the value of the crops growing on the Property allegedly damaged by Grantee's action. Grantee shall have no responsibility for any claims, causes of action, demands or damages for personal injury and Grantor waives any claims for personal injury.
 - E. Nothing in this agreement shall require Grantee to apply manure and other livestock bio-solids to the Property.
 - F. Other than at the express written consent of Grantee, Grantor will not grant to any other individuals or entities an easement or right to apply manure and other livestock bio-solids to the Property. Other than this easement, Grantor has not granted any other individual or entity an easement or right to apply manure and other livestock bio-solids to the Property.
 - G. The benefits conferred on the parties described herein constitute reasonably equivalent consideration.
- **Successors and Assigns:** This Agreement shall inure to the benefit of and be binding upon heirs, successors and assigns of the parties hereto. It is understood by the parties that rights of the Grantee under the terms of this Agreement are fully assignable without the consent of Grantor.
- **Execution of Documents:** All parties agree to execute any and all additional documents that may be necessary to implement the full terms and conditions of this Agreement, including, but not limited to, any additional state or county permit forms that may be required.
- **Termination (Optional):** If Grantor requests cancellation of this Agreement prior to the end of its term, Grantee will exercise reasonable efforts to find replacement property to which Grantee may apply manure and other livestock bio-solids. If replacement property is located and Grantee obtains a manure easement with respect to the same, this Agreement will be terminated.
- **Entire Agreement:** The foregoing constitutes the entire agreement between the parties.
- **Severability:** If one provision of this Agreement is held invalid, that shall not affect any other provision of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed on the day and year first above written.

GRANTORS:

X  X _____
 Gary Red

X _____ X _____

X _____ X _____

GRANTEES:

X  X _____
 Jeral L. Wulf, Operations Management Partner

X Dennis Wolf X _____
Dennis Wolf, Financial Matters Partner
X _____ X _____

ACKNOWLEDGEMENTS

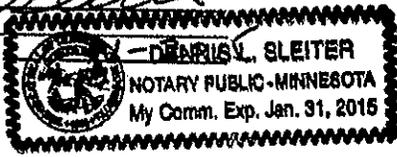
STATE OF South Dakota
COUNTY OF Corson) ss. (Individual)

The foregoing instrument was acknowledged before me this 7 day of February, 2011
by Gary Rau

Notary Public [Signature]
My commission expires: 5-2-13

STATE OF Minnesota)
COUNTY OF Stevens) ss. (Partnership)

The foregoing instrument was acknowledged before me this 22 day of February, 2011
by Dennis Wolf and Terri Wolf partner(s), on behalf of _____ a partnership.

Notary Public [Signature]
My commission expires: _____


STATE OF _____)
COUNTY OF _____) ss. (Corporation)

The foregoing instrument was acknowledged before me this _____ day of _____
by _____ ss _____ of _____
corporation, on behalf of the corporation.

Notary Public _____
My commission expires: _____

This instrument was drafted by:
AgCountry Farm Credit Services
102 S. Atlantic Ave
Morris, MN 56267



Space Above is for Recording Information

MANURE EASEMENT AGREEMENT

THIS AGREEMENT is made December 30, 2010, by and between Bonnie Schott (Land Owners hereinafter "Grantor") and Wulf Cattle Co., LLP (Borrowers hereinafter "Grantee")

WHEREAS, Grantor is the fee owner of real estate legally described as follows ("Property"):

NW1/4 Sec. 6 T21N R27E of Black Hills Meridian Field 7
SE1/4 Sec. 13 T21N R26E of Black Hills Meridian Field 17
SE1/4 Sec. 24 T21N R26E of Black Hills Meridian Field 41, 42

All in Corson County, SD

WHEREAS, Grantee is the fee owner of real estate legally described as follows ("Facility Site"):

**Township 21 North, Range 27 East of Black Hills Meridian
Section 5: All of that part of the S1/2NE1/4
Lying North of the railroad right of way.**

**Township 21 North, Range 27 East of Black Hills Meridian
Section 5: Lots 1 and 2;**

**Outlot A, Tract R3 and Tract R5 located in the
NW1/4 of Section 5, Township 21 North, Range 27 East of
Black Hills Meridian, LESS Tract 1 McLaughlin Livestock Addition.
Together with an easement of right of way on, over and across Tract 1
McLaughlin Livestock Addition.**

All in Corson County, SD.

WHEREAS, Grantee desires to enter into an agreement with Grantor to haul and apply over the Property manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.

WHEREAS, Grantor will receive the benefit of reduced costs and expenses with regard to fertilizer application on account of such manure application and other related benefits.

WHEREAS, Grantor and Grantee have had mutual discussions with regard to entering into such an agreement and wish to reduce the agreement to writing.

NOW, THEREFORE, in consideration of the premises and under the mutual covenants, promises and conditions set forth herein. Grantor and Grantee hereby agree as follows:

- **Easement To Apply Livestock Bio-Solids:** Grantor hereby grants to Grantee an easement over the Property for purposes of hauling and applying manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.
- **Term of Agreement:** This Agreement and the easements connected herewith shall become effective on the date first above written and shall remain in effect for a period of 15 years unless terminated earlier by mutual agreement between the parties.
- **Application of Manure and Other Livestock Bio-solids:** The parties hereto agree that Grantee shall be solely responsible for application of the manure and other livestock bio-solids to the Property, and the parties covenant and

agree that

- A. Any and all application of manure and other livestock bio-solids shall be done in a good and husband like manner, taking into account weather conditions, soil conditions and time of year, all so as to reduce any odor that might emanate from such manure application.
 - B. That the application of manure and other livestock bio-solids shall be done in conformance with state rules and local county zoning ordinances and in accordance with all other applicable permits, statutes, rules and regulations relating to such acts and practices.
 - C. At all times during the term of this agreement, Grantee will, so far as reasonably practicable, honor all requests and directions made by Grantor with respect to the timing, location and manner of any application of manure and other livestock bio-solids to the soil, and such application shall in no event be done in any way that would interfere with any other right to use, possession and quiet enjoyment of the premises currently owned by Grantor. However, Grantor shall not have the right to prohibit Grantee's application of manure and other livestock bio-solids to the Property. In any calendar year, Grantee shall have the right to apply manure and other livestock bio-solids to the Property in the minimum quantity specified in any applicable manure management plan or, if no such plan exists, at applicable agronomic rates.
 - D. Grantee is responsible for any claims, causes of action, demands or damages for property loss arising from or on account of its manure and other livestock bio-solids application and agrees to fully indemnify and hold harmless Grantor of and from all such claims. Grantor waives any claims, causes of action, demands or damages for property loss if Grantee's application of manure and other livestock bio-solids is equal to or less than the minimum quantity specified in C above. Any claim by Grantor for property loss will be limited to the value of the crops growing on the Property allegedly damaged by Grantee's action. Grantee shall have no responsibility for any claims, causes of action, demands or damages for personal injury and Grantor waives any claims for personal injury.
 - E. Nothing in this agreement shall require Grantee to apply manure and other livestock bio-solids to the Property.
 - F. Other than at the express written consent of Grantee, Grantor will not grant to any other individuals or entities an easement or right to apply manure and other livestock bio-solids to the Property. Other than this easement, Grantor has not granted any other individual or entity an easement or right to apply manure and other livestock bio-solids to the Property.
 - G. The benefits conferred on the parties described herein constitute reasonably equivalent consideration.
- **Successors and Assigns:** This Agreement shall inure to the benefit of and be binding upon heirs, successors and assigns of the parties hereto. It is understood by the parties that rights of the Grantee under the terms of this Agreement are fully assignable without the consent of Grantor.
 - **Execution of Documents:** All parties agree to execute any and all additional documents that may be necessary to implement the full terms and conditions of this Agreement, including, but not limited to, any additional state or county permit forms that may be required.
 - **Termination (Optional):** If Grantor requests cancellation of this Agreement prior to the end of its term, Grantee will exercise reasonable efforts to find replacement property to which Grantee may apply manure and other livestock bio-solids. If replacement property is located and Grantee obtains a manure easement with respect to the same, this Agreement will be terminated.
 - **Entire Agreement:** The foregoing constitutes the entire agreement between the parties.
 - **Severability:** If one provision of this Agreement is held invalid, that shall not effect any other provision of this Agreement.

IN WITNESS WHEREOF, this Agreement has been executed on the day and year first above written.

GRANTORS:

x Bonnie Schott X _____
 Bonnie Schott

X _____ X _____

X _____ X _____

GRANTEES:

x Jerry Wolf (Comp.) X _____
 Jerry Wolf, Operations Management Partner

x Dennis Wolf (FMP) X _____
 Dennis Wolf, Financial Matters Partner

X _____ X _____

ACKNOWLEDGEMENTS

STATE OF South Dakota)
COUNTY OF Carson) ss. (Individual)

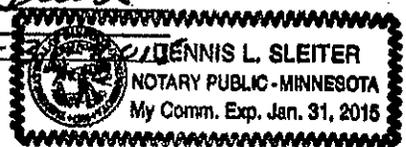
The foregoing instrument was acknowledged before me this 21 day of January, 2011
by Bonnie Schott

Notary Public [Signature]
My commission expires: 5-2-13

STATE OF Minnesota)
COUNTY OF Stearns) ss. (Partnership)

The foregoing instrument was acknowledged before me this 22 day of February, 2011
by Dennis Wulf and Jane Wulf partner(s), or
behalf of _____ a partnership.

Notary Public [Signature]
My commission expires: 1-31-15



STATE OF _____)
COUNTY OF _____) ss. (Corporation)

The foregoing instrument was acknowledged before me this _____ day of _____
by _____ as _____ of _____
corporation, on behalf of the corporation.

Notary Public _____
My commission expires: _____

This instrument was drafted by:
AgCountry Farm Credit Services
102 S. Atlantic Ave
Morris, MN 56267

Space Above is for Recording Information

MANURE EASEMENT AGREEMENT

THIS AGREEMENT is made December 30, 2010, by and between Sharon Walker (Land Owners hereinafter "Grantor") and Wulf Cattle Co., LLP (Borrowers hereinafter "Grantee")

WHEREAS, Grantor is the fee owner of real estate legally described as follows ("Property"):

SW1/4 Sec. 4 T21N R27E of Black Hills Meridian Field 3
SE1/4 Sec. 5 T21N R27E of Black Hills Meridian Field 6
SW1/4 Sec. 5 T21N R27E of Black Hills Meridian Field 5

All in Corson County, SD

WHEREAS, Grantee is the fee owner of real estate legally described as follows ("Facility Site"):

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: All of that part of the S1/2NE1/4
Lying North of the railroad right of way.

Township 21 North, Range 27 East of Black Hills Meridian
Section 5: Lots 1 and 2;

Outlot A, Tract R3 and Tract R5 located in the
NW1/4 of Section 5, Township 21 North, Range 27 East of
Black Hills Meridian, LESS Tract 1 McLaughlin Livestock Addition.
Together with an easement of right of way on, over and across Tract 1
McLaughlin Livestock Addition.

All in Corson County, SD.

WHEREAS, Grantee desires to enter into an agreement with Grantor to haul and apply over the Property manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.

WHEREAS, Grantor will receive the benefit of reduced costs and expenses with regard to fertilizer application on account of such manure application and other related benefits.

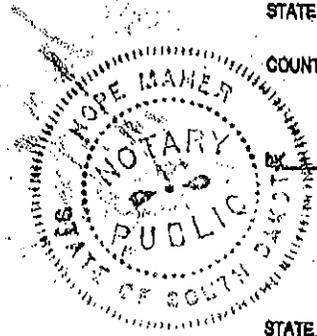
WHEREAS, Grantor and Grantee have had mutual discussions with regard to entering into such an agreement and wish to reduce the agreement to writing.

NOW, THEREFORE, in consideration of the premises and under the mutual covenants, promises and conditions set forth herein, Grantor and Grantee hereby agree as follows:

- Easement To Apply Livestock Bio-Solids: Grantor hereby grants to Grantee an easement over the Property for purposes of hauling and applying manure and other livestock bio-solids generated by the livestock facilities located on the Facility Site.
- Term of Agreement: This Agreement and the easements connected herewith shall become effective on the date first above written and shall remain in effect for a period of 15 years unless terminated earlier by mutual agreement between the parties.
- Application of Manure and Other Livestock Bio-solids: The parties hereto agree that Grantee shall be solely responsible for application of the manure and other livestock bio-solids to the Property, and the parties covenant and

ACKNOWLEDGEMENTS

STATE OF South Dakota)
COUNTY OF Corson) ss. (Individual)

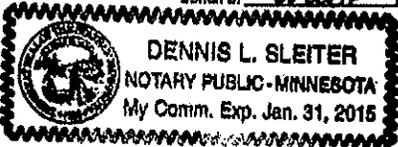


The foregoing instrument was acknowledged before me this 28 day of December, 2010

by Sharon Walker
Notary Public [Signature]
My commission expires: 5-2-13

STATE OF Minnesota)
COUNTY OF Stevens) ss. (Partnership)

The foregoing instrument was acknowledged before me this 4 day of January, 2011
by Toral Wulf & Dennis Wulf partner(s), on behalf of Wulf Cattle Co. LLC a partnership.



[Signature]
Notary Public
My commission expires: 1-31-2015

STATE OF _____)
COUNTY OF _____) ss. (Corporation)

The foregoing instrument was acknowledged before me this _____ day of _____, _____
by _____ as _____ of _____
corporation, on behalf of the corporation.

Notary Public _____
My commission expires: _____

This instrument was drafted by:
AgCountry Farm Credit Services
102 S. Atlantic Ave
Morris, MN 56267

Section I: Sitemap Assessment and Land
Treatment Information

Management Considerations For Nitrogen

Groundwater Concerns

The groundwater concern comes primarily from nitrogen. If not captured by plant roots, it can move down below the root zone and may enter the groundwater. The speed at which nitrate moves depends on the amount of precipitation and soil texture. Water moves through sandy soil much more rapidly than a clay soil.

Because nitrate moves through soil with water, it is extremely important that the rate applied, either as manure or fertilizer, does not exceed that which can be used by crops. Any nitrate remaining in the soil profile at the end of the season is subject to leaching.

Water Quality Risk Assessment Maps will be labeled with the symbol "L" on fields that are Vulnerable to N leaching.

If a field is determined highly vulnerable for nitrate leaching to an aquifer, all of the following management activities will be implemented.

1. Prior to the application of nitrogen above starter application rates, a nitrate nitrogen test (**zero to two foot and two to four foot sample**) will be taken and analyzed. **Or** An acceptable alternative to the zero to four feet sampling method would be to take a **zero to two foot sample every year within four weeks after crop harvest** prior to nitrogen applications above starter rates as recommended by SDSU.
2. Soil samples (zero to six inches) should also be included and analyzed for P and K. Soil samples will be taken as per land grant university recommendations found on the back of the SDSU Soil Testing Laboratory Soil Sample Information Sheet, or SDSU-FS935, "Recommended Soil Sampling Methods for South Dakota."

Nitrogen Best Management Practices

- Match manure nutrient applications to crop needs.
- Apply manure as close to the time of crop utilization as possible. Apply commercial fertilizer nitrogen in a sidedress or split application when fields are located over shallow aquifers or on soils that have a high leaching potential.
- Delay fall manure applications until soil temperatures drop below 50°F to minimize nitrate leaching and ammonia volatilization.
- Avoid applying manure on wet soils to minimize soil compaction, runoff, nitrate leaching and denitrification.
- Inject or incorporate the manure into the soil preferably within 24 hours for maximum nutrient-use efficiency and to reduce odor and runoff problems. Significant volatilization losses will occur when manure is left on the surface for several days.

Nitrogen Recommendations Using Manure

Crops can contain large amounts of nitrogen (Table 4-1). In most cases only the grain is removed and the straw is returned to the soil, supplying nitrogen through mineralization in subsequent years. Because of this and the other sources of N such as nitrate N already in soil, soil organic matter, precipitation and legumes, crop removal alone is not a good estimate of the amount of N to apply.

Table 4-1 Nitrogen Contained in Crops

Crop	Plant Part		
	Grain	Straw	Total
	-----pounds N-----		
Corn (bu)	0.9	0.5	1.4
Soybeans (bu)	3.7	0.8	4.5
Wheat (bu)	1.6	0.8	2.6
Oats (bu)	0.9	0.4	1.3
Barley (bu)	1.1	0.4	1.5
Sunflowers (cwt)	2.8	2.4	5.2
Alfalfa (ton)	----	----	55
Grass (ton)	----	----	30

Table 4-2 Nitrogen Requirements of Crops

Crop	Unit	Nitrogen Required ^{1/}
Wheat	bu	2.5 x yield ^{2/}
Oats	bu	1.3 x yield
Barley		
malting	bu	1.5 x yield
feed	bu	1.7 x yield
Rye	bu	2.5 x yield
Flax	bu	3.0 x yield
Corn (grain)	bu	1.2 x yield
Corn (silage)	ton	10.4 x yield
Sorghum (grain)	bu	1.1 x yield
Sorghum, sudan (hay)	ton	25 x yield
Grass hay	ton	25 x yield
Sunflowers	lb	0.05 x yield
Edible beans	lb	0.05 x yield
Millet	lb	0.035 x yield
Rape	cwt	6.5 x yield
Mustard	cwt	6.5 x yield
Safflower	lb	0.05 x yield
Buckwheat	bu	2.2 x yield
Potatoes	cwt	0.4 x yield

^{1/} Available manure nitrogen or fertilizer nitrogen to apply is equal to the nitrogen requirement minus soil NO₃ - N to a 2-ft depth minus any legume credits.

^{2/} Yield goal

Management Considerations For Phosphorus

Surface Water Concerns

Surface water concerns focus primarily on Phosphorus. Phosphorus acts very differently in soils than nitrogen. It attaches tightly to soils and does not generally move down through the soil profile. This lack of movement through soils results in accumulations of phosphorus in soil if phosphorus rates, either from manure or fertilizer, are greater than crop removal.

Increases in phosphorus concentrations in soil can result in more phosphorus moving off the field either attached to soil particles lost by erosion or dissolved in the runoff water. In some situations phosphorus could move into surface waters with manure itself if the manure is applied in such a manner that it moves directly into waterways.

Water Quality Risk Assessment Maps will be labeled with the symbol "R" on fields that are Vulnerable to Phosphorus runoff.

1. In no case shall manure or organic by product applications (broadcast or incorporated/injected) be made within 100 feet of a surface water or conveyance; 35 feet if a perennial grass filter strip is established and maintained.
2. A minimum of a 35-foot wide perennial grass filter strip is required in all cases on the edges of fields that border a lake, river, or intermittent/perennial stream.
3. In selected cases based on Table 1, depending on soil test phosphorus and estimated soil loss in a field, a perennial grass filter strip maybe required within 100 feet of a surface water or conveyance if manure is applied based on nitrogen needs of a crop and not crop removal of phosphorus (see Table 1).

Phosphorus Based Manure Application

If the manure application is required to be based on phosphorus crop removal, the application rate shall be based on phosphorus removed in the harvested portion of the crop.

Application can be based on multi-year phosphorus crop removal but cannot exceed the one year nitrogen crop need, and no manure may be applied to that field again until the applied phosphorus has been removed from the field via harvest and crop removal.

(See Table 1 for additional information)

Usually fields with High soil test P and/or high runoff potential.

Phosphorus Best Management Practices

- Establish and maintain grass filter strips at the point where water leaves the field to trap sediment and nutrients
- Control sheet and rill erosion by installing conservation practices including conservation tillage, contour farming, strip cropping, terraces and cover crops
- Control ephemeral erosion by installing grassed waterways, diversions and sediment retention structures.
- Incorporate or inject manure and commercial fertilizer where possible while maintaining sufficient crop residue levels for erosion control
- Grow high yielding, high phosphorus removing crops on fields with already high soil test phosphorus to reduce test levels

How Phosphorus affects Soils Tests

Phosphorus rate recommendations are based on the phosphorus soil test. This test is an index of availability of phosphorus to plants. It is not a measure of total available phosphorus or total phosphorus in soil. However, as total phosphorus levels increase in soils, the soil test index usually increases also.

These categories represent a decreasing probability of a yield response to broadcast fertilizer or manure. The probability of response is from about 80 percent at the very low soil test level to less than a 20 percent chance when soil tests are in the very high range.

Table 4-3 Soil Test Calibration Levels Used for Phosphorus and Potassium in SD

Nutrient	Name of Soil Test	Categories				
		Very Low	Low	Medium	High	Very High
-----ppm extractable (0-6 inch sample)-----						
Phosphorus	Bray P-1	0 - 5	6 - 10	11 - 15	16 - 20	21+
Phosphorus	Olsen	0 - 3	4 - 7	8 - 11	12 - 15	16+
Potassium	NH ₄ Ac	0 - 40	41 - 80	81 - 120	121 - 160	161+

If phosphorus is applied at rates greater than crop removal (Table 4-4), phosphorus soil test levels will increase. As a very general rule of thumb, for **every 20 pounds of phosphorus (P₂O₅) applied and not removed by crops, the soil test index will increase by 1 part per million (ppm).**

Following a good nitrogen application plan with manure in South Dakota can often result in a one to three ppm increase per year in the phosphorus soil test.

As the phosphorus soil test index increases, the possibility of moving significant amounts of phosphorus off the field to surface water usually increases. The movement is both phosphorus attached to soil particles lost with erosion and phosphorus dissolved in the runoff water.

From 60 to 80 percent of the phosphorus in most manure is available to plants within the first year of application. After several years of

application, the amount of phosphorus available to plants from manure is equal to that applied with the manure each year.

1/ Source:

Jim Gerwing, Extension Soil Specialist
Ron Gelderman, Director, Soil Testing Lab
South Dakota State University

Table 4-4 Phosphorus Content of the Harvested Portion of Crops

Crop	P ₂ O ₅ (lbs)
Alfalfa (per ton)	12
Buckwheat (per bu)	0.53
Canola (per cwt)	1.5
Corn Grain (per bu)	0.35
Corn Silage (per ton)	4.3
Edible Beans (per cwt)	1.25
Feed Barley (per bu)	0.41
Flax (per bu)	0.7
Forage Sorghum (per ton)	5.8
Grass (per ton)	10
Malting Barley (per bu)	0.41
Millet (per cwt)	0.83
Mustard (per cwt)	1.5
Oats (per bu)	0.25
Potatoes (per cwt)	0.09
Rapeseed (per cwt)	1.5
Rye (per bu)	0.48
Safflower (per cwt)	1.14
Sorghum (per bu)	0.27
Soybean (per bu)	0.77
Sudan Grass (per ton)	5.8
Sunflowers (per cwt)	1.14
Wheat (per bu)	0.56

Manure Application On Frozen Ground

Manure shall not be applied to frozen, snow covered, or saturated soil if the potential risk for runoff exists. In South Dakota (SD), this is interpreted to mean no manure application during periods when the soil surface is frozen (approximately November 15 to March 30). However, care and common sense must always be used to make sure manure applications and potential runoff will not cause environmental degradation to surface water regardless of what time of year it is.

Liquid manure applications to frozen or snow-covered (winter) soil will not be allowed. In situations where a catastrophic system failure is imminent; manure may be applied to soils with slopes less than 4 percent provided that a 1,000-foot setback is maintained to a lakes, rivers, streams and a 300-foot setback to non-cropped wetland or conveyances to lakes, rivers, or streams.

Incidental winter application of solid manure, waste feed materials, snow, and ice will be allowed to facilitate the proper operation of open feedlots by allowing producers to clean along feed bunks, watering areas, and allow removal of snow and ice from open lots.

- 1. Frozen ground manure applications will not exceed the rate calculated in the nutrient budget for the application field based on the current fall soil test results and applications will be no more than 10 percent of the annual manure production.**
- 2. Frozen ground applications will only be allowed on slopes that are four percent or less and will be prioritized using current soil loss calculations based on the water erosion prediction technology as listed in the SD Technical Guide. Fields with the lowest predicted soil loss will have the highest priority for winter applications.**
- 3. No manure application on floodplains (as defined by the Natural Resources Conservation Service (NRCS) in the soil survey as frequently or occasionally flooded).**
- 4. No manure application within a 300-foot setback from conveyances or non-cropped wetlands.**
- 5. No manure application within 1,000 feet of lakes, rivers, and named perennial streams.**

Review and comply with other specific winter application requirements in the current SD General Livestock Permit regulations or your local county zoning ordinance when dealing with state and locally permitted facilities.

Failure to follow this guidelines could lead to United States Department of Agriculture contract violations and may result in monetary penalties due to breach of contract (see your contract appendix or contact your local NRCS office for further clarification).



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RUSLE2 Profile Erosion Calculation Record

Field 1

Info: T1631, F1, NW1/4 3-21-26; C S-WW-O-C-O; DaA Soil; No-Till

Inputs: Rotation: Corn (Silage) – Winter Wheat – Oats – Corn (Grain) – Oats

File: profiles\Corson County

Location: South Dakota\Corson County

Soil: Corson, SD soils\DaA DAGLUM LOAM, 0 TO 3 PERCENT SLOPES\DAGLUM loam 85%

T value: 2.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 3.0 %

Management

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	58.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	58.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.59 t/ac/yr

Net C factor: 0.13

Net K factor: 0.22

Net LS factor: 0.39

Sediment delivery: 0.59 t/ac/yr

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/10/0	Planter, double disk opnr w/fluted coulters	Corn, silage	61
9/1/0	Harvest, residue, forage chopper, complete		8.7
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	15
7/20/1	Harvest, killing crop 50pct standing stubble		75
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	77



RUSLE2 Profile Erosion Calculation Record

Field 2

Info: T1631, F2, NW1/4 3-21-26; CS-WW-O-C-O; RnB Soil; No-Till

Inputs: Rotation: Corn(silage) – Winter Wheat – Oats – Corn (grain) - Oats

Location: South Dakota\Corson County

Soil: Corson, SD soils\RnB REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES\REGENT silty clay loam 85%

T value: 3.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 5.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	42.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	58.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	56.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	58.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 1.1 t/ac/yr

Net C factor: 0.13

Net K factor: 0.26

Net LS factor: 0.64

Sediment delivery: 1.1 t/ac/yr

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/10/0	Planter, double disk opnr w/fluted coulters	Corn, silage	61
9/1/0	Harvest, residue, forage chopper, complete		8.7
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	15
7/20/1	Harvest, killing crop 50pct standing stubble		75
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	77



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RUSLE2 Profile Erosion Calculation Record

Field 3

Info: T11198, F8, SW1/4 of 4-21-27; ShB Soil; C-C-WW-C-O Rotation; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 50 ft
 Avg. slope steepness: 2.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7 in rows	bushels	42.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.081 t/ac/yr Sediment delivery: 0.081 t/ac/yr
 Net C factor: 0.033
 Net K factor: 0.20
 Net LS factor: 0.24

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coultter	Corn, grain	86
10/15/0	Harvest, killing crop 50pct standing stubble		88
5/15/1	Planter, double disk opnr w/fluted coultter	Corn, silage	84
9/1/1	Harvest, silage		75
9/15/1	Drill or airseeder, double disk, w/ fluted coultters	Wheat, winter 7 in rows	70
7/20/2	Harvest, killing crop 50pct standing stubble		85
5/15/3	Planter, double disk opnr w/fluted coultter	Corn, grain	82



RUSLE2 Profile Erosion Calculation Record

Field 4

Info: T1637, F2, E1/2 of 5-21-26; Soil RcC; O-C-WW-C-O; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RcC REEDER-CABBA LOAMS, 6 TO 9 PERCENT SLOPES\REEDER loam 60%
 T value: 3.0 t/ac/yr
 Slope length (horiz): 200 ft
 Avg. slope steepness: 8.0 %

File: profiles\Corson County

Management

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.13 t/ac/yr Sediment delivery: 0.13 t/ac/yr
 Net C factor: 0.015
 Net K factor: 0.17
 Net LS factor: 0.96

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	87
7/15/0	Harvest, killing crop 50pct standing stubble		96
5/10/1	Planter, double disk opnr w/fluted coulters	Corn, silage	94
9/1/1	Harvest, killing crop 50pct standing stubble		97
9/15/1	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	98

RUSLE2 Profile Erosion Calculation Record

Field 5

Info: T11199, F3, SW1/4 of 5-21-27; Soil An; Rotation CS-WW-C-O-C; No-Till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\An ARNEGARD LOAM\ARNEGARD loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 200 ft
 Avg. slope steepness: 1.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7 in rows	bushels	42.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.045 t/ac/yr Sediment delivery: 0.045 t/ac/yr
 Net C factor: 0.036
 Net K factor: 0.17
 Net LS factor: 0.14

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coultter	Corn, silage	84
9/1/0	Harvest, silage		74
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7 in rows	70
7/20/1	Harvest, killing crop 50pct standing stubble		85
5/15/2	Planter, double disk opnr w/fluted coultter	Corn, grain	82
10/15/2	Harvest, killing crop 50pct standing stubble		87
4/15/3	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	85



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RUSLE2 Profile Erosion Calculation Record

Field 6

1/4

Info: T11199, F6, SE1/2 of 5-21-27; Soil RaB; Rotation CS-WW-C-O-C; No-Till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RaB REEDER LOAM, 2 TO 6 PERCENT SLOPES\REEDER loam 90%
 T value: 3.0 t/ac/yr
 Slope length (horiz): 100 ft
 Avg. slope steepness: 4.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.12 t/ac/yr Sediment delivery: 0.12 t/ac/yr
 Net C factor: 0.030
 Net K factor: 0.17
 Net LS factor: 0.47

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	84
9/1/0	Harvest, silage		74
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	70
7/20/1	Harvest, killing crop 50pct standing stubble		85
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, grain	82
10/15/2	Harvest, killing crop 50pct standing stubble		87
4/15/3	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	85



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RUSLE2 Profile Erosion Calculation Record

Field 7

Info: T1764, F1, NW1/4 of 6-21-27; Soil ShB; Rotation CS-WW-C-O-C; No-Till

Inputs:

Location: South Dakota\Corson County File: profiles\default

Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 50 ft

Avg. slope steepness: 2.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.082 t/ac/yr Sediment delivery: 0.082 t/ac/yr

Net C factor: 0.033

Net K factor: 0.20

Net LS factor: 0.24

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	84
9/1/0	Harvest, silage		74
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	70
7/20/1	Harvest, killing crop 50pct standing stubble		85
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, grain	82
10/15/2	Harvest, killing crop 50pct standing stubble		87
4/15/3	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	85



RUSLE2 Profile Erosion Calculation Record

Field 8

Info: T11329, F1, SE1/4 of 6-21-27; Soil ShB; Rotation CS-WW-C-O-C; No-Till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 50 ft
 Avg. slope steepness: 2.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.082 t/ac/yr Sediment delivery: 0.082 t/ac/yr
 Net C factor: 0.033
 Net K factor: 0.20
 Net LS factor: 0.24

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coultter	Corn, silage	84
9/1/0	Harvest, silage		74
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	70
7/20/1	Harvest, killing crop 50pct standing stubble		85
5/15/2	Planter, double disk opnr w/fluted coultter	Corn, grain	82
10/15/2	Harvest, killing crop 50pct standing stubble		87
4/15/3	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	85



RUSLE2 Profile Erosion Calculation Record

Field 9

Info: T11329, F2, W1/2 of 7-21-27; Soil ShB; Rotation C-C-WW-C-O; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 50 ft
 Avg. slope steepness: 2.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Oats, spring	bu	58.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.081 t/ac/yr Sediment delivery: 0.081 t/ac/yr
 Net C factor: 0.033
 Net K factor: 0.20
 Net LS factor: 0.24

Date	Operation	Vegetation	Surf. res. cov. after op. %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, grain	86
10/15/0	Harvest, killing crop 50pct standing stubble		88
5/15/1	Planter, double disk opnr w/fluted coulters	Corn, silage	84
9/1/1	Harvest, silage		75
9/15/1	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	70
7/20/2	Harvest, killing crop 50pct standing stubble		85
5/15/3	Planter, double disk opnr w/fluted coulters	Corn, grain	82



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field #

Info: T1898, F1, NW1/4 8-21-27; CS-WW-C-B-C; ShB Soil; No-Till

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 170 ft

Avg. slope steepness: 5.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Barley, spring	Bushels	39.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.0000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.51 t/ac/yr

Net C factor: 0.073

Net K factor: 0.20

Net LS factor: 0.65

Sediment delivery: 0.51 t/ac/yr

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/10/0	Planter, double disk opnr w/fluted coulter	Corn, silage	62
9/1/0	Harvest, residue, forage chopper, complete		14
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	21
7/20/1	Harvest, killing crop 50pct standing stubble		77
5/15/2	Planter, double disk opnr w/fluted coulter	Corn, grain	77
10/20/2	Harvest, residue, forage chopper, complete		13
4/30/3	Drill or airseeder, double disk, w/ fluted coulters	Barley, spring	15



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field #

Info: T1426, F1, NE1/4 of 8-21-27; Soil An; Rotation CS-WW-C-B-C; No-Till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\An ARNEGARD LOAM\ARNEGARD loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 200 ft
 Avg. slope steepness: 1.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Barley, spring	Bushels	43.0000
CMZ 041c.Other Local Mgt Records\Corn; Wheat; Oats; Corn; NT, Z3	Corn, grain	bushels	56.0000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.048 t/ac/yr Sediment delivery: 0.048 t/ac/yr
 Net C factor: 0.038
 Net K factor: 0.17
 Net LS factor: 0.14

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	82
9/1/0	Harvest, silage		72
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	68
7/20/1	Harvest, killing crop 50pct standing stubble		84
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, grain	82
10/15/2	Harvest, killing crop 50pct standing stubble		86
4/30/3	Drill or airseeder, double disk, w/ fluted coulters	Barley, spring	84



South Dakota

RUSLE2 CSP Record

Info:

Date: June 11, 2013

Name: Wulf Cattle Company

Tract and Field #'s: Field #12A

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%

Slope length (horiz): 200 ft

Avg. slope steepness: 2.0 %

Man.	Management
1	b.Mullti-year Rotation Templates\Continuous crop dryland rotations\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Vegetation	Yield units	Yield (# of units)
Wheat, spring 7in rows	bushels	29.000
Corn, silage	tons	75.000
Sunflower	lbs	1822.0

Adjust res. burial level: Normal res. burial

General yield level: Set by user

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 1.5 t/ac/yr

Soil conditioning index (SCI): 0.08

Avg. annual slope STIR: 10.0

Wind & irrigation-induced erosion for SCI: 0 t/ac/yr

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.
- A positive SCI meets the soil criteria for the Conservation Security Program.

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.



South Dakota

RUSLE2 CSP Record

Info:

Date: June 11, 2013

Name: Wulf Cattle Company

Tract and Field #'s: Field #12B

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%

Slope length (horiz): 600 ft

Avg. slope steepness: 2.0 %

Man.	Management
1	b.Multi-year Rotation Templates\Continuous crop dryland rotations\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Vegetation	Yield units	Yield (# of units)
Wheat, spring 7in rows	bushels	29.000
Corn, silage	tons	75.000
Sunflower	lbs	1822.0

Adjust res. burial level: Normal res. burial

General yield level: Set by user

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 1.9 t/ac/yr

Soil conditioning index (SCI): 0.05

Avg. annual slope STIR: 10.0

Wind & irrigation-induced erosion for SCI: 0 t/ac/yr

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.
- A positive SCI meets the soil criteria for the Conservation Security Program.

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.



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 13

Info: T1929, F1 SW1/4 of 9-21-27; Soil ShB; CS-WW-CS-WW-C; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\SHB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 50 ft
 Avg. slope steepness: 2.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.0000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.076 t/ac/yr Sediment delivery: 0.076 t/ac/yr

Net C factor: 0.031

Net K factor: 0.20

Net LS factor: 0.24

Date	Operation	Vegetation	Surf. res. cov. after op. %
5/15/0	Planter, double disk opnr w/fluted coultter	Corn, silage	86
9/1/0	Harvest, silage		76
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	72
7/20/1	Harvest, killing crop 50pct standing stubble		86
5/15/2	Planter, double disk opnr w/fluted coultter	Corn, silage	83
9/1/2	Harvest, silage		78
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	75



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field #4

Info: T11460, F1, NE1/4 of 9-22-27; Soil RsB; CS-WW-CS-WW-C; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RsB RHOADES-DAGLUM LOAMS, 0 TO 9 PERCENT SLOPES\RHOADES loam 50%
 T value: 2.0 t/ac/yr
 Slope length (horiz): 200 ft
 Avg. slope steepness: 6.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.24 t/ac/yr Sediment delivery: 0.24 t/ac/yr

Net C factor: 0.027

Net K factor: 0.22

Net LS factor: 0.74

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	86
9/1/0	Harvest, silage		76
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	72
7/20/1	Harvest, killing crop 50pct standing stubble		86
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	83
9/1/2	Harvest, silage		78
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	75



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 15

Info: T1894, F3, SE1/4 of 9-22-27; Soil RaA; CS-WW-CS-WW-C; No-till

Inputs:

Location: South Dakota\Corson County File: profiles\default

Soil: Corson, SD soils\RaA REEDER LOAM, 0 TO 2 PERCENT SLOPES\REEDER loam 90%

T value: 3.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 1.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.042 t/ac/yr Sediment delivery: 0.042 t/ac/yr

Net C factor: 0.034

Net K factor: 0.17

Net LS factor: 0.14

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	86
9/1/0	Harvest, silage		76
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	72
7/20/1	Harvest, killing crop 50pct standing stubble		86
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	83
9/1/2	Harvest, silage		78
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	75



RUSLE2 Profile Erosion Calculation Record

Field #

Info: T1900, F1, E1/2 of 10-22-27; Soil RsB; CS-WW-CS-WW-C; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RsB RHOADES-DAGLUM LOAMS, 0 TO 9 PERCENT SLOPES\RHOADES loam 50%
 T value: 2.0 t/ac/yr
 Slope length (horiz): 150 ft
 Avg. slope steepness: 6.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.0000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.22 t/ac/yr Sediment delivery: 0.22 t/ac/yr
 Net C factor: 0.026
 Net K factor: 0.22
 Net LS factor: 0.72

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	86
9/1/0	Harvest, silage		76
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	72
7/20/1	Harvest, killing crop 50pct standing stubble		86
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	83
9/1/2	Harvest, silage		78
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	75



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field #7

Info: T1763, F1, SE1/4 of 13-21-26; Soil RaB; CS-WW-C-SF-SW; No-fill

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RaB REEDER LOAM, 2 TO 6 PERCENT SLOPES\REEDER loam 90%
 T value: 3.0 t/ac/yr
 Slope length (horiz): 200 ft
 Avg. slope steepness: 4.0 %
 File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c-Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 041c-Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 041c-Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 041c-Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Sunflower	lbs	800.00
CMZ 041c-Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, spring 7in rows	bushels	26.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.18 t/ac/yr Sediment delivery: 0.18 t/ac/yr
 Net C factor: 0.042
 Net K factor: 0.17
 Net LS factor: 0.50

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/15/0	Planter, double disk opnr w/fluted coulters	Corn, silage	58
9/1/0	Harvest, silage		55
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	54
7/20/1	Harvest, killing crop 50pct standing stubble		83
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, grain	81
10/15/2	Harvest, killing crop 50pct standing stubble		87
5/25/3	Planter, double disk opnr w/fluted coulters	Sunflower	83



RUSLE2 Profile Erosion Calculation Record

Field 18

Info: T1892, F2, N 1/2 of 15-22-27; Soil DaA; WW-CS-WW-CS-SF; No-till

Inputs:

Location: South Dakota\Corson County **File:** profiles\default

Soil: Corson, SD soils\DaA DAGLUM LOAM, 0 TO 3 PERCENT SLOPESIDAGLUM loam 85%

T value: 2.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 3.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Sunflower	lbs	800.00

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.090 t/ac/yr Sediment delivery: 0.090 t/ac/yr

Net C factor: 0.021

Net K factor: 0.22

Net LS factor: 0.36

Date	Operation	Vegetation	Surf. res. cov. after op, %
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	53
7/20/1	Harvest, killing crop 50pct standing stubble		80
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	79
9/1/2	Harvest, killing crop 50pct standing stubble		91
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	92
7/20/3	Harvest, killing crop 50pct standing stubble		94
5/25/4	Planter, double disk opnr w/fluted coulters	Corn, grain	88



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field #

Info: T1892, F3, N 1/2 of 15-22-27; Soil SgA; WW-CS-WW-CS-SF; No-fill

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\SgA SAVAGE SILT LOAM, 0 TO 3 PERCENT SLOPES\SAVAGE silt loam 85%
 T value: 5.0 t/ac/yr
 Slope length (horiz): 100 ft
 Avg. slope steepness: 2.0 %

File: profiles\default

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, silage	tons	6.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Wheat, winter 7in rows	bushels	42.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Corn, grain	bushels	56.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3	Sunflower	lbs	800.00

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.090 t/ac/yr Sediment delivery: 0.090 t/ac/yr
 Net C factor: 0.021
 Net K factor: 0.22
 Net LS factor: 0.36

Date	Operation	Vegetation	Surf. res. cov. after op, %
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	53
7/20/1	Harvest, killing crop 50pct standing stubble		80
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	79
9/1/2	Harvest, killing crop 50pct standing stubble		91
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	92
7/20/3	Harvest, killing crop 50pct standing stubble		94
5/25/4	Planter, double disk opnr w/fluted coulters	Corn, grain	88



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 2a

Info: T1901, F1, E1/2 of 16-22-27; Soil RsB; CS-WW-CS-WW-CS; No-till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RsB RHOADES-DAGLUM LOAMS, 0 TO 9 PERCENT SLOPES\RHOADES loam 50%
 T value: 2.0 t/ac/yr
 Slope length (horiz): 150 ft
 Avg. slope steepness: 7.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:
 Soil loss for cons. plan: 0.47 t/ac/yr Sediment delivery: 0.47 t/ac/yr
 Net C factor: 0.045
 Net K factor: 0.22
 Net LS factor: 0.87

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/10/0	Planter, double disk opnr w/fluted coulters	Corn, silage	79
9/1/0	Harvest, residue, forage chopper, complete		22
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	28
7/20/1	Harvest, killing crop 50pct standing stubble		78
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	77
9/1/2	Harvest, residue, forage chopper, complete		15
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	22



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field Z1

Info: T10091, F4, N1/2 of 19-22-27; Soil StA; CS-WW-CS-WW-CS; No-till

Inputs:

Location: South Dakota\Corson County File: profiles\Corson County

Soil: Corson, SD soils\StA STADY LOAM, 0 TO 2 PERCENT SLOPES\STADY loam 85%

T value: 4.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 2.0 %

Management

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Wheat, winter 7in rows	bushels	43.0000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, silage	tons	9.0000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.13 t/ac/yr Sediment delivery: 0.13 t/ac/yr
 Net C factor: 0.050
 Net K factor: 0.20
 Net LS factor: 0.26

Date	Operation	Vegetation	Surf. res. cov. after op, %
5/10/0	Planter, double disk opnr w/fluted coulters	Corn, silage	79
9/1/0	Harvest, residue, forage chopper, complete		22
9/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	28
7/20/1	Harvest, killing crop 50pct standing stubble		78
5/15/2	Planter, double disk opnr w/fluted coulters	Corn, silage	77
9/1/2	Harvest, residue, forage chopper, complete		15
9/15/2	Drill or airseeder, double disk, w/ fluted coulters	Wheat, winter 7in rows	22



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 22

Info: T1767, F2, E1/2 of 30-22-27; Soil StA; O-C-O-C-O; No-till

Inputs:

Location: South Dakota\Corson County
 File: profiles\Corson County
 Soil: Corson, SD soils\StA STADY LOAM, 0 TO 2 PERCENT SLOPES\STADY loam 85%
 T value: 4.0 t/ac/yr
 Slope length (horiz): 150 ft
 Avg. slope steepness: 1.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65,000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63,000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65,000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63,000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65,000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.040 t/ac/yr Sediment delivery: 0.040 t/ac/yr
 Net C factor: 0.027
 Net K factor: 0.20
 Net LS factor: 0.14

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	87
7/15/0	Harvest, killing crop 50pct standing stubble		96
5/10/1	Planter, double disk opnr w/fluted coulters	Corn, grain	94
10/20/1	Harvest, killing crop 50pct standing stubble		94
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	92
7/20/2	Harvest, killing crop 50pct standing stubble		95
5/10/3	Planter, double disk opnr w/fluted coulters	Corn, grain	91



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 23

Info: T1767, F5, N1/2 of 31-22-27; Soil Gr; O-C-O-C-O; No-till

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\Gr GRAIL SILTY CLAY LOAM\GRAIL silty clay loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 200 ft

Avg. slope steepness: 1.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.054 t/ac/yr Sediment delivery: 0.054 t/ac/yr

Net C factor: 0.027

Net K factor: 0.26

Net LS factor: 0.14

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	87
7/15/0	Harvest, killing crop 50pct standing stubble		96
5/10/1	Planter, double disk opnr w/fluted coulters	Corn, grain	94
10/20/1	Harvest, killing crop 50pct standing stubble		94
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	92
7/20/2	Harvest, killing crop 50pct standing stubble		95
5/10/3	Planter, double disk opnr w/fluted coulters	Corn, grain	91



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 24

Info: T1767, F6, SE1/4 of 31-22-27; Soil ShA; O-C-O-C-O; No-till

Inputs:

Location: South Dakota\Corson County File: profiles\Corson County

Soil: Corson, SD soils\Sha SHAMBO LOAM, 0 TO 2 PERCENT SLOPES\SHAMBO loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 100 ft

Avg. slope steepness: 2.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\Corn Silage; WW; Corn Silage; WW; Corn Silage; WW; Corn; NT, Z3#2	Oats, spring	bu	65.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.065 t/ac/yr Sediment delivery: 0.065 t/ac/yr

Net C factor: 0.024

Net K factor: 0.20

Net LS factor: 0.25

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	87
7/15/0	Harvest, killing crop 50pct standing stubble		96
5/10/1	Planter, double disk opnr w/fluted coulters	Corn, grain	94
10/20/1	Harvest, killing crop 50pct standing stubble		94
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	92
7/20/2	Harvest, killing crop 50pct standing stubble		95
5/10/3	Planter, double disk opnr w/fluted coulters	Corn, grain	91



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 25

Info: T1638, F1A, S1/2 of 34-22-26; W-C-O-C-B, R_sB Soil; No-Till

Inputs:

Location: South Dakota\Corson County
 Soil: Corson, SD soils\RSB RHOADES-DAGLUM LOAMS, 0 TO 9 PERCENT SLOPES\RHOADES' loam 50%
 T value: 2.0 t/ac/yr
 Slope length (horiz): 150 ft
 Avg. slope steepness: 7.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Wheat, spring 7in rows	bushels	28.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Oats, spring	bu	65.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Barley, spring	Bushels	39.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.30 t/ac/yr Sediment delivery: 0.30 t/ac/yr
 Net C factor: 0.028
 Net K factor: 0.22
 Net LS factor: 0.85

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, spring 7in rows	89
7/20/0	Harvest, killing crop 50pct standing stubble		89
5/15/1	Planter, double disk opnr w/fluted couiter	Corn, grain	82
10/20/1	Harvest, killing crop 60pct standing stubble		83
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	83



SD-CPA-29

RUSLE2 Profile Erosion Calculation Record

Field 26

Info: T1638, F1B, S1/2 of 34-22-26; W-C-O-C-B, DaA Soil; No-Till

Inputs:

Location: South Dakota\Corson County File: profiles\Corson County

Soil: Corson, SD soils\DaA DAGLUM LOAM, 0 TO 3 PERCENT SLOPES\DAGLUM loam 85%

T value: 2.0 t/ac/yr

Slope length (horiz): 200 ft

Avg. slope steepness: 2.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Wheat, spring 7in rows	bushels	28.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Oats, spring	bu	65.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Barley, spring	Bushels	39.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.11 t/ac/yr Sediment delivery: 0.11 t/ac/yr

Net C factor: 0.034

Net K factor: 0.22

Net LS factor: 0.26

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, spring 7in rows	89
7/20/0	Harvest, killing crop 50pct standing stubble		89
5/15/1	Planter, double disk opnr w/fluted coufter	Corn, grain	82
10/20/1	Harvest, killing crop 60pct standing stubble		83
4/15/2	Drill or airseeder, double disk, w/ fluted coulters	Oats, spring	83



RUSLE2 Profile Erosion Calculation Record

Field 27

Info: T1770, F1, NW1/4 of 34-22-27; W-C-W-C-W, ShA Soil; No-Till

Inputs:

Location: South Dakota\Corson County File: profiles\Corson County

Soil: Corson, SD soils\ShA SHAMBO LOAM, 0 TO 2 PERCENT SLOPES\SHAMBO loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 2.0 %

Management	Vegetation	Yield units	Yield (# of units)
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Wheat, spring 7in rows	bushels	28.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Wheat, spring 7in rows	bushels	28.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Corn, grain	bushels	63.000
CMZ 041c.Other Local Mgt Records\SW-C-SW-C-SF-Notill	Wheat, spring 7in rows	bushels	28.000

Contouring: a. rows up-and-down hill
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.13 t/ac/yr Sediment delivery: 0.13 t/ac/yr
 Net C factor: 0.046
 Net K factor: 0.20
 Net LS factor: 0.26

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, spring 7in rows	77
7/20/0	Harvest, killing crop 50pct standing stubble		81
5/15/1	Planter, double disk opnr w/fluted coulters	Corn, grain	74
10/20/1	Harvest, killing crop 60pct standing stubble		79

RUSLE2 Profile Erosion Calculation Record

Field 23

Info: T1766, F1, NE1/4 of 34-22-27; W-C-WC-W, An Soil; No-Till

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\An ARNEGARD LOAMARNEGARD loam 90%

T value: 5.0 t/ac/yr

Slope length (horiz): 100 ft

Avg. slope steepness: 2.0 %

File: profiles\Corson County

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Wheat, spring 7in rows	bushels	28.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Wheat, spring 7in rows	bushels	28.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Corn, grain	bushels	63.000
CMZ 04\c.Other Local Mgt Records\SW-C-SW-C-SF-NoTill	Wheat, spring 7in rows	bushels	28.000

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss for cons. plan: 0.11 t/ac/yr Sediment delivery: 0.11 t/ac/yr

Net C factor: 0.046

Net K factor: 0.17

Net LS factor: 0.25

Date	Operation	Vegetation	Surf. res. cov. after op. %
4/15/0	Drill or airseeder, double disk, w/ fluted coulters	Wheat, spring 7in rows	77
7/20/0	Harvest, killing crop 50pct standing stubble		81
5/15/1	Planter, double disk oprn w/fluted coulters	Corn, grain	74
10/20/1	Harvest, killing crop 60pct standing stubble		79



RUSLE2 Erosion Calculation Record

Info: Field 29, N 1/2, Section 4, T 20 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\SgB SAVAGE SILT LOAM, 3 TO 6 PERCENT SLOPES\SAVAGE silt loam 85%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.5 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b.Mulfti-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 5.0 t/ac/yr
Soil loss for cons. plan: 0.32 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 30, NW 1/4, Section 4, T 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RaC REEDER LOAM, 6 TO 9 PERCENT SLOPES\REEDER loam 85%

Slope length (horiz): 150 ft

Avg. slope steepness: 7.5 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.080 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 31, N 1/2, S 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RN8 REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES\REGENT silty clay loam 85%

Slope length (horiz): 150 ft

Avg. slope steepness: 4.0 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b.Multi-year Rotation Templates\Wheat, spring; Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.047 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 32, NE ¼, S 4, T 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RpC REGENT-WAYDEN SILTY CLAY LOAMS, 6 TO 15 PERCENT SLOPES\REGENT silty clay loam 50%

Slope length (horiz): 150 ft

Avg. slope steepness: 10 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b.Multti-year Rotation Templates\Wheat, spring; Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.39 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 33, N 1/2, S 7, T 21, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\RaB REEDER LOAM, 2 TO 6 PERCENT SLOPES\REEDER loam 90%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr
Soil loss for cons. plan: 0.11 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 34, NE ¼, Section 7, T 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\RcB REEDER-CABBA LOAMS, 3 TO 6 PERCENT SLOPES\REEDER loam 60%
Slope length (horiz): 150 ft
Avg. slope steepness: 5.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b.Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr
Soil loss for cons. plan: 0.21 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 35, W 1/2, S 10, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\RnB REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES\REGENT silty clay loam 85%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr
Soil loss for cons. plan: 0.31 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 36, SE ¼, Section 10, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\VeB VEBAR FINE SANDY LOAM, 2 TO 6 PERCENT SLOPES\VEBAR fine sandy loam 85%
Slope length (horiz): 150 ft

Avg. slope steepness: 4.0 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b.Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.22 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 37, S ½, Section 11, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\Gr GRAIL SILTY CLAY LOAM\GRAIL silty clay loam 90%
Slope length (horiz): 150 ft
Avg. slope steepness: 1.5 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 5.0 t/ac/yr
Soil loss for cons. plan: 0.070 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 38, W 1/2, Section 12, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RnB REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES\REGENT silty clay loam 85%

Slope length (horiz): 150 ft

Avg. slope steepness: 4.0 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.093 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 39, E ½, Section 14, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RN8 REGENT SILTY CLAY LOAM, 2 TO 6 PERCENT SLOPES\REGENT silty clay loam 85%

Slope length (horiz): 150 ft

Avg. slope steepness: 4.0 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring, Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.095 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 40, NE ¼, Section 23, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\SgB SAVAGE SILT LOAM, 3 TO 6 PERCENT SLOPES\SAVAGE silt loam 85%

Slope length (horiz): 150 ft

Avg. slope steepness: 4.5 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 0.079 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 41, SE ¼, Section 24, T 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\An ARNEGARD LOAM\ARNEGARD loam 90%

Slope length (horiz): 150 ft

Avg. slope steepness: 1.5 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b.Muulti-year Rotation Templates\Wheat, spring, Wheat, winter; Corn, grain; Sunflowers; NT, Z3

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 0.011 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 42, SE 1/4, Section 24, T 21 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: a.Single Year/Single Crop Templates\Corn, grain\Corn, grain; NT, Z3

Outputs:

T value: 5.0 t/ac/yr
Soil loss for cons. plan: 0.069 t/ac/yr

RUSLE2 Erosion Calculation Record

Info: Field 43, W 1/2, Section 26, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\RaB REEDER LOAM, 2 TO 6 PERCENT SLOPES\REEDER loam 90%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr
Soil loss for cons. plan: 0.15 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 44, S 1/2, Section 32, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County
Soil: Corson, SD soils\VeB VEBAR FINE SANDY LOAM, 2 TO 6 PERCENT SLOPES\VEBAR fine sandy loam 85%
Slope length (horiz): 150 ft
Avg. slope steepness: 4.0 %
Contouring: a. rows up-and-down hill
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)

Base management: b.Mullti-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr
Soil loss for cons. plan: 0.16 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 45, NE 1/4, Section 32, T 22 N, R 26 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RcC REEDER-CABBA LOAMS, 6 TO 9 PERCENT SLOPES\REEDER loam 60%

Slope length (horiz): 150 ft

Avg. slope steepness: 7.5 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b. Multi-year Rotation Templates\ Forage Rotations\Alfalfa, 1X; 2 additional years, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.48 t/ac/yr



RUSLE2 Erosion Calculation Record

Info: Field 46, W 1/2, Section 35, T 21 N, R 25 E

profiles\Corson Default

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\RaB REEDER LOAM, 2 TO 6 PERCENT SLOPES\REEDER loam 90%

Slope length (horiz): 150 ft

Avg. slope steepness: 4.0 %

Contouring: a. rows up-and-down hill

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Base management: b.Multif-year Rotation Templates\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Outputs:

T value: 3.0 t/ac/yr

Soil loss for cons. plan: 0.17 t/ac/yr



South Dakota

RUSLE2 CSP Record

Info:

Date: June 11, 2013

Name: Wulf Cattle Company

Tract and Field #'s: Field #47A

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\ShB SHAMBO LOAM, 2 TO 6 PERCENT SLOPES\SHAMBO loam 90%

Slope length (horiz): 350 ft

Avg. slope steepness: 2.2 %

Man.	Management
1	b.Mullti-year Rotation Templates\Continuous crop dryland rotations\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Vegetation	Yield units	Yield (# of units)
Wheat, spring 7in rows	bushels	29.000
Corn, silage	tons	75.000
Sunflower	lbs	1822.0

Adjust res. burial level: Normal res. burial

General yield level: Set by user

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 1.9 t/ac/yr

Soil conditioning index (SCI): 0.05

Avg. annual slope STIR: 10.0

Wind & irrigation-induced erosion for SCI: 0 t/ac/yr

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.
- A positive SCI meets the soil criteria for the Conservation Security Program.

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.



South Dakota

RUSLE2 CSP Record

Info:

Date: June 11, 2013

Name: Wulf Cattle Company

Tract and Field #'s: Field #47B

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\ShA SHAMBO LOAM, 0 TO 2 PERCENT SLOPES\SHAMBO loam 90%

Slope length (horiz): 400 ft

Avg. slope steepness: 1.5 %

Man.	Management
1	b.Mullti-year Rotation Templates\Continuous crop dryland rotations\Wheat, spring; Corn, silage; Sunflowers; NT, Z3

Vegetation	Yield units	Yield (# of units)
Wheat, spring 7in rows	bushels	29.000
Corn, silage	tons	75.000
Sunflower	lbs	1822.0

Adjust res. burial level: Normal res. burial

General yield level: Set by user

Outputs:

T value: 5.0 t/ac/yr

Soil loss for cons. plan: 1.3 t/ac/yr

Soil conditioning index (SCI): 0.10

Avg. annual slope STIR: 10.0

Wind & irrigation-induced erosion for SCI: 0 t/ac/yr

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.
- A positive SCI meets the soil criteria for the Conservation Security Program.

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.



South Dakota

RUSLE2 CSP Record

Info:

Date: August 5, 2013

Name: Wulf Cattle Company

Tract and Field #'s: Field #48

Inputs:

Location: South Dakota\Corson County

Soil: Corson, SD soils\WhB VEBAR-COHAGEN FINE SANDY LOAMS, 2 TO 9 PERCENT SLOPES\COHAGEN fine sandy loam 30%

Slope length (horiz): 800 ft

Avg. slope steepness: 2.1 %

Man.	Management
1	a.Single Year/Single Crop Templates\Wheat, spring\Wheat, spring; NT, Z3
2	a.Single Year/Single Crop Templates\Oats\Oats; NT, Z3
3	a.Single Year/Single Crop Templates\Corn, grain\Corn, grain; NT, Z3
4	a.Single Year/Single Crop Templates\Sunflowers\Sunflowers; NT, Z3

Vegetation	Yield units	Yield (# of units)
Wheat, spring 7in rows	bushels	29.000
Oats, spring	bu	61.000
Corn, grain	bushels	75.000
Sunflower	lbs	1822.0

Adjust res. burial level: Normal res. burial

General yield level: Set by user

Outputs:

T value: 2.0 t/ac/yr

Soil loss for cons. plan: 0.35 t/ac/yr

Soil conditioning index (SCI): 0.5

Avg. annual slope STIR: 7.47

Wind & irrigation-induced erosion for SCI: 0 t/ac/yr

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.
- A positive SCI meets the soil criteria for the Conservation Security Program.

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.

Section J: Soil Test Reports



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

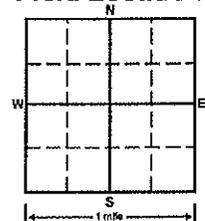
MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **3** SAMPLE 14
 CNTY **CORSON**
 TWP **21-27** SECTION 4
 QTR **ACRES**
 PREV. CROP **Corn-Grain**

SUBMITTED BY: **SO0453**
 SD WHT GROWERS-MCLAUGHLIN
 109 ELEVATOR ROAD
 BOX 640
 MCLAUGHLIN, SD
 57642

Field Location



REF# 8162654
 LAB# 2276
 BOX# 686

Date Sampled: **2/15/2010**

Date Received: **2/18/2010**

Date Reported: **2/19/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE				
		VLow	Low	Med	High	Wheat-Spring		Corn-Grain		Sunflower				
Nitrate	0-6"	11 lb/ac				YIELD GOAL		YIELD GOAL		YIELD GOAL				
	6-24"	27 lb/ac	****	*		40 BU		100 BU		2000 LBS				
	0-24"	38 lb/ac				SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES				
						Band		Band		Band				
						LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION			
Olsen Phosphorus	10 ppm	****	****	***		N	70	N	82	N	62			
Potassium	318 ppm	****	****	****	****	P ₂ O ₅	20 Band *	P ₂ O ₅	30 Band *	P ₂ O ₅	20 Band *			
Chloride	0-24" 8 lb/ac	***				K ₂ O	10 Band(Starter)*	K ₂ O	10 Band (2x2) *	K ₂ O	0			
Sulfur	0-6" 6 lb/ac 6-24" 18 lb/ac	****				Cl	32 Broadcast	Cl	**	Cl	**			
Boron						S	10 Band	S	10 Band	S	10 Band			
Zinc						B		B		B				
Iron						Zn		Zn		Zn				
Manganese						Fe		Fe		Fe				
Copper	0.83 ppm	****	****	****	****	Mn		Mn		Mn				
Magnesium						Cu	0	Cu	0	Cu	0			
Calcium						Mg		Mg		Mg				
Sodium						Lime	0.0	Lime	0.0	Lime	0.0			
Org.Matter						Soil pH		Buffer pH		Cation Exchange Capacity				
Carbonate(CCE)						6.1				% Base Saturation (Typical Range)				
Sol. Salts	0-6" 0.13 mmho/cm 6-24" 0.25 mmho/cm	***								% Ca	% Mg	% K	% Na	% H

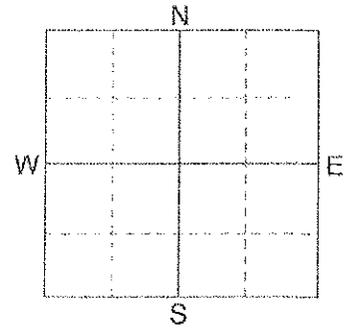
Crop 1: 70 lbs of 0-0-60 = 32 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 70 lbs of 0-0-60 = 32 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 70 lbs of 0-0-60 = 32 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **4**
 SAMPLE ID **2A 2B**
 COUNTY **CORSON**
 TWP **21N-26E**
 SECTION **5** QTR **ACRES 222**
 PREV. CROP **Corn-Grain**



SUBMITTED FOR:
WULF CATTLE COMPANY

SUBMITTED BY: **MZ1154**
MZB-SDWG-MCLAUGHLIN
ZONES ONLY-BRENT
BOX 640
MCLAUGHLIN, SD 57647

REF # **11234894** BOX # **0**
 LAB # **NW3078**

Date Sampled **01/19/2012**

Date Received **01/23/2012**

Date Reported **1/24/2012**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
0-6" 6-24"	16 lb/ac 9 lb/ac			Oats		Barley-Malting		Sunflower
			YIELD GOAL		YIELD GOAL		YIELD GOAL	
0-24"	25 lb/ac		100	BU	50	BU	2000	LBS
Nitrate			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
			Band/Maint		Band/Maint		Band/Maint	
Phosphorus	Olsen 9 ppm		LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Potassium	288 ppm		N	75	N	53	N	75
Chloride	0-24" 8 lb/ac		P ₂ O ₅	25 Band *	P ₂ O ₅	24 Band *	P ₂ O ₅	21 Band *
Sulfur	0-6" 6-24" 12 lb/ac 360 +lb/ac		K ₂ O	10 Band (Starter)*	K ₂ O	10 Band (Starter)*	K ₂ O	0
Boron			Cl	32 Broadcast	Cl	32 Broadcast	Cl	Not Available
Zinc			S	0	S	0	S	0
Iron			B		B		B	
Manganese			Zn		Zn		Zn	
Copper	0.65 ppm		Fe		Fe		Fe	
Magnesium			Mn		Mn		Mn	
Calcium			Cu	1 Band (Trial)	Cu	1 Band (Trial)	Cu	1 Band (Trial)
Sodium			Mg		Mg		Mg	
Org. Matter			Lime	0	Lime	0	Lime	0
Carbonate(CCE)			Soil pH Buffer pH Cation Exchange Capacity			% Base Saturation (Typical Range)		
0-6" 6-24"	0.28 mmho/cm 0.87 mmho/cm		% Ca	% Mg	% K	% Na	% H	
Sol. Salts			6.3					

Crop 1: 70 lbs of 0-0-60 = 32 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 19 A GVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: 70 lbs of 0-0-60 = 32 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 24 K2O = 25 A GVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 3: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 18 K2O = 22 A GVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
Northwood: (701) 587-6010
Benson: (320) 843-4109

SUBMITTED FOR:
CORSON COUNTY
FEEDERS

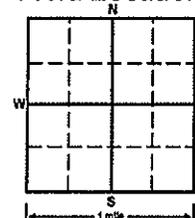
MCLAUGHLIN, SD
57642

SOIL TEST REPORT

FIELD **546** TEASPOONS SAMPLE 10
CNTY CORSON
TWP 21-27 SECTION 5
QTR ACRES
PREV. CROP Corn-Grain

SUBMITTED BY: SO0453
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD
57642

Field Location



REF# 8162650
LAB# 2272
BOX# 620

Date Sampled: 2/15/2010

Date Received: 2/18/2010

Date Reported: 2/19/2010

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE		
		VLow	Low	Med	High	Wheat-Spring		Corn-Grain		Sunflower		
	0-6" 11 lb/ac 6-24" 18 lb/ac 0-24" 29 lb/ac	***				YIELD GOAL		YIELD GOAL		YIELD GOAL		
						40 BU		100 BU		2000 LBS		
						SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		
						Band		Band		Band		
						LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	
Nitrate						N	79	N	91	N	71	
Phosphorus	Olsen 9 ppm	****	****	**		P ₂ O ₅	22 Band *	P ₂ O ₅	32 Band *	P ₂ O ₅	20 Band *	
Potassium	348 ppm	****	****	****	****	K ₂ O	10 Band(Starter)*	K ₂ O	10 Band (2x2) *	K ₂ O	0	
Chloride	0-24" 16 lb/ac	****	*			Cl	Broadcast	Cl	**	Cl	**	
Sulfur	0-6" 10 lb/ac 6-24" 24 lb/ac	****	**			S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)	
Boron						B		B		B		
Zinc						Zn		Zn		Zn		
Iron						Fe		Fe		Fe		
Manganese						Mn		Mn		Mn		
Copper	0.65 ppm	****	****	****	**	Cu	1 Band (Trial)	Cu	0	Cu	1 Band (Trial)	
Magnesium						Mg		Mg		Mg		
Calcium						Lime	0.0	Lime	0.0	Lime	0.0	
Sodium						Soil pH		% Base Saturation (Typical Range)				
Org. Matter						Buffer pH	Cation Exchange Capacity	% Ca	% Mg	% K	% Na	% H
Carbonate(CCE)												
Sol. Salts	0-6" 0.15 mmho/cm 6-24" 0.19 mmho/cm	***				6.0						

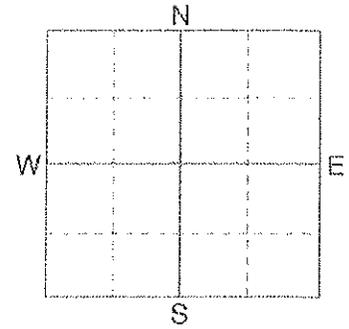
Crop 1: 52 lbs of 0-0-60 = 24 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 52 lbs of 0-0-60 = 24 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 52 lbs of 0-0-60 = 24 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **NW 1/4 : 7**
 SAMPLE ID **BEAR SOLDI**
 COUNTY **CORSON**
 TWP **T 21 R 27**
 SECTION **6** QTR **ACRES 0**
 PREV. CROP **Corn-Grain**



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: **MZ1154**
MZB-SDWG-MCLAUGHLIN
ZONES ONLY-BRENT
BOX 640
MCLAUGHLIN, SD 57647

REF # **11234889** BOX # **0**
 LAB # **NW2572**

Date Sampled **01/12/2012**

Date Received **01/17/2012**

Date Reported **1/24/2012**

Nutrient In The Soil		Interpretation Very Low Low Med High	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
				Sunflower		Sunflower		Wheat-Spring
			YIELD GOAL		YIELD GOAL		YIELD GOAL	
			1800	LBS	2000	LBS	40	BU
			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
			Band		Band		Band	
			LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
			N	73	N	83	N	91
			P ₂ O ₅	15 Band *	P ₂ O ₅	17 Band *	P ₂ O ₅	16 Band *
			K ₂ O	0	K ₂ O	0	K ₂ O	10 Band (Starter) *
			Cl		Cl		Cl	
			S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)
			B		B		B	
			Zn	2 Band (Trial)	Zn	2 Band (Trial)	Zn	0
			Fe		Fe		Fe	
			Mn		Mn		Mn	
			Cu		Cu		Cu	
			Mg		Mg		Mg	
			Lime		Lime		Lime	
			Soil pH Buffer pH Cation Exchange Capacity			% Base Saturation (Typical Range)		
			% Ca	% Mg	% K	% Na	% H	
			5.8					
0-6"	8 lb/ac							
6-24"	9 lb/ac							
0-24"	17 lb/ac							
Nitrate								
Olsen Phosphorus	14 ppm							
Potassium	350 ppm							
Chloride								
0-6"	10 lb/ac							
6-24"	24 lb/ac							
Sulfur								
Boron								
Zinc	0.67 ppm							
Iron								
Manganese								
Copper								
Magnesium								
Calcium								
Sodium								
Org. Matter	3.1 %							
Carbonate(CCE)								
0-6"	0.17 mmho/cm							
6-24"	0.29 mmho/cm							
Soil Salts								

Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 16 K20 = 20 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 18 K20 = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K20 = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



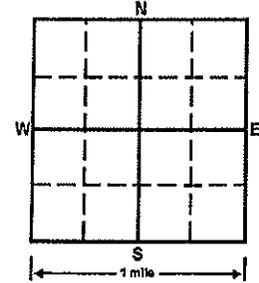
Soil Analysis by: Agvise Laboratories
Northwood: (701) 587-6010
Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **8** C-STORE
SAMPLE
CNTY **CORSON**
TWP **21-27**
SEC **6** QTR **ACRES 73.3**
PREV. CRDP **Barley**

REF# 8163109 LAB# 24526 BOX# 856

Field Location



SUBMITTED FOR:

WOLFS

MCLAUGHLIN, SD
57642

SUBMITTED BY: SO0453

SD WHT GROWERS-MCLAUGHLIN
BOX 640
MCLAUGHLIN, SD
57642

Date Sampled:

Date Received:

7/15/2011

Date Reported:

7/18/2011

NUTRIENT IN SOIL

Nitrogen	5 lb/ac 12 lb/ac 17 lb/ac
Phosphorus	13 ppm
Potassium	357 ppm
Sulfur	24 lb/ac 42 lb/ac
Zinc	0.61 ppm
Manganese	
Copper	
Magnesium	
Sodium	
Calcium	2.7 %
Iron	
Electrical Conductivity	0.24 mmho/cm 0.39 mmho/cm

INTERPRETATION

	VLow	Low	Med	High
Nitrogen				
Phosphorus				
Potassium				
Sulfur				
Zinc				
Manganese				
Copper				
Magnesium				
Sodium				
Calcium				
Iron				
Electrical Conductivity				

1st CROP CHOICE

CONCENTRATION	RECOMMENDATION
115	
44	Band *
10	Band (2x2) *
7	Band (Trial)
0	
0	
0	
0	
0	
0	
0	

2nd CROP CHOICE

CONCENTRATION	RECOMMENDATION
83	
25	Band *
10	Band (Starter) *
7	Band (Trial)
2	Band (Trial)
0	
0	
0	
0	
0	
0	

3rd CROP CHOICE

CONCENTRATION	RECOMMENDATION
91	
25	Band *
10	Band (Starter) *
7	Band (Trial)
0	
0	
0	
0	
0	
0	
0	

Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 44 K2O = 30AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 19AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 15AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by *Agvise Laboratories*
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

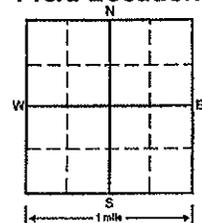
MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **10411** SAMPLE 7
 CNTY **CORSON**
 TWP **21-27** SECTION 8
 QTR
 ACRES
 PREV. CROP **Corn-Grain**

SUBMITTED BY: **SO0453**
 SD WHT GROWERS-MCLAUGHLIN
 109 ELEVATOR ROAD
 BOX 640
 MCLAUGHLIN, SD
 57642

Field Location



REF# 8162647
 LAB# 2269
 BOX# 622

Date Sampled: **2/15/2010**

Date Received: **2/18/2010**

Date Reported: **2/19/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE			2ND CROP CHOICE			3RD CROP CHOICE		
		VLow	Low	Med	High	Wheat-Spring			Corn-Grain			Sunflower		
Nitrate	0-6"	18 lb/ac				YIELD GOAL			YIELD GOAL			YIELD GOAL		
	6-24"	42 lb/ac				40 BU			100 BU			2000 LBS		
	0-24"	60 lb/ac	****	***		SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
						Band			Band			Band		
Olsen Phosphorus	19 ppm	****	****	****	****	LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION	
Potassium	342 ppm	****	****	****	****	N	48		N	60		N	40	
Chloride	0-24"	12 lb/ac	***			P ₂ O ₅	15	Band(Starter)*	P ₂ O ₅	15	Band (2x2) *	P ₂ O ₅	12	Band *
	0-6"	12 lb/ac	****	***		K ₂ O	10	Band(Starter)*	K ₂ O	10	Band (2x2) *	K ₂ O	0	
Sulfur	6-24"	24 lb/ac	****	**		Cl	28	Broadcast	Cl	**		Cl	**	
Boron						S	7	Band (Trial)	S	7	Band (Trial)	S	7	Band (Trial)
Zinc						B			B			B		
Iron						Zn			Zn			Zn		
Manganese						Fe			Fe			Fe		
Copper	0.65 ppm		****	****	****	Mn			Mn			Mn		
Magnesium						Cu	1	Band (Trial)	Cu	0		Cu	1	Band (Trial)
Calcium						Mg			Mg			Mg		
Sodium						Lime	0.0		Lime	0.0		Lime	0.0	
Carbonate(CCE)						Soil pH			Buffer pH			Cation Exchange Capacity		
Sol. Salts	0-6"	0.36 mmho/cm	****	**		% Base Saturation (Typical Range)			% Ca			% Mg		
	6-24"	0.33 mmho/cm	****	**										

Crop 1: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



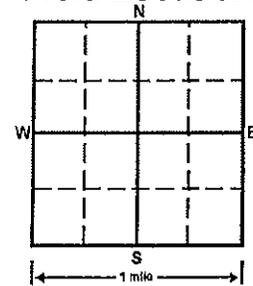
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD AIRPORT 12413
 SAMPLE 5
 CNTY CORSON
 TWP 21-27
 SEC 9 QTR ACRES 0
 PREV. CROP Wheat-Spring

REF# 8163141 LAB# 42528 BOX# 2576

Field Location



SUBMITTED FOR:

CORSON COUNTY FEEDERS

MCLAUGHLIN, SD
 57642

SUBMITTED BY: SO0453

SD WHT GROWERS-MCLAUGHLIN
 BOX 640
 MCLAUGHLIN, SD
 57642

Date Sampled:

Date Received:

9/8/2011

Date Reported:

9/9/2011

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE		2nd CROP CHOICE		3rd CROP CHOICE	
		Very	Low	Med	High	Corn-Grain		Corn-Grain		Sunflower	
0-6 6-24 0-24	29 lb/ac 36 lb/ac 65 lb/ac	*****	*****	*****	*****	Yield Goal		Yield Goal		Yield Goal	
Nitrate		*****	*****	*****	*****	100 BU		120 BU		2000 LBS	
		*****	*****	*****	*****	SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
		*****	*****	*****	*****	Band/Maint.		Band/Maint.		Band/Maint.	
		*****	*****	*****	*****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Olsen Phosphorus	11 ppm	*****	*****	*****	*****	N	55	N	79	N	35
Potassium	248 ppm	*****	*****	*****	*****	P ₂ O ₅	40 Band *	P ₂ O ₅	48 Band *	P ₂ O ₅	19 Band *
Chloride		*****	*****	*****	*****	K ₂ O	27 Band *	K ₂ O	32 Band *	K ₂ O	22 Band *
0-6 6-24	104 lb/ac 66 lb/ac	*****	*****	*****	*****	Cl	0	Cl	0	Cl	0
Sulfur		*****	*****	*****	*****	S	0	S	0	S	0
Boron		*****	*****	*****	*****	B	0	B	0	B	0
Zinc	0.84 ppm	*****	*****	*****	*****	Zn	0	Zn	0	Zn	2 Band (Trial)
Iron		*****	*****	*****	*****	Fe		Fe		Fe	
Manganese		*****	*****	*****	*****	Mn		Mn		Mn	
Copper		*****	*****	*****	*****	Cu		Cu		Cu	
Magnesium		*****	*****	*****	*****	Mg		Mg		Mg	
Calcium		*****	*****	*****	*****	Lime	0	Lime	0	Lime	0
Sodium		*****	*****	*****	*****	Soil pH		Buffer pH		Cation Exchange Capacity	
Org. Matter	3.5 %	*****	*****	*****	*****	6.6				% Base Saturation (typical Range)	
Carbonate		*****	*****	*****	*****					% Ca % Mg % K % Na % H	
0-6 6-24	0.5 mmho/cm 0.36 mmho/cm	*****	*****	*****	*****						
Soil Sals		*****	*****	*****	*****						

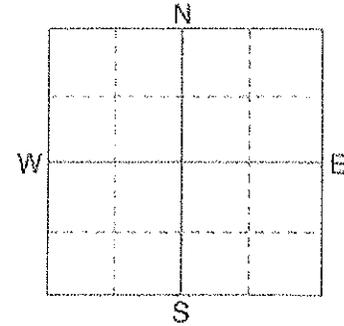
Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 40 K2O = 27AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 48 K2O = 32AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 18 K2O = 22AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **14415**
 SAMPLE ID **27**
 COUNTY **CORSON**
 TWP **22-27**
 SECTION **9** QTR ACRES **0**
 PREV. CROP **Sunflower**



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: **SO0453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD 57642

REF # **11234718** BOX # **0**
 LAB # **NW180933**

Date Sampled

Date Received **12/12/2011**

Date Reported **1/17/2012**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
0-6"	21 lb/ac		Wheat-Spring		Corn-Grain		Oats	
6-24"	15 lb/ac		YIELD GOAL		YIELD GOAL		YIELD GOAL	
0-24"	36 lb/ac		40	BU	100	BU	100	BU
Nitrate			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
			Band		Band		Band	
Olsen Phosphorus	8 ppm		LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Potassium	381 ppm		N	72	N	84	N	64
Chloride	28 lb/ac		P ₂ O ₅	23 Band *	P ₂ O ₅	35 Band *	P ₂ O ₅	26 Band *
Sulfur	24 lb/ac		K ₂ O	10 Band (Starter)*	K ₂ O	10 Band (2x2) *	K ₂ O	10 Band (Starter)*
Boron			Cl	12 Broadcast	Cl	Not Available	Cl	12 Broadcast
Zinc			S	0	S	0	S	0
Iron			B		B		B	
Manganese			Zn		Zn		Zn	
Copper	0.69 ppm		Fe		Fe		Fe	
Magnesium			Mn		Mn		Mn	
Calcium			Cu	1 Band (Trial)	Cu	0	Cu	1 Band (Trial)
Sodium			Mg		Mg		Mg	
Org. Matter			Lime	0	Lime	0	Lime	0
Carbonate (CCE)			Soil pH Buffer pH		Cation Exchange Capacity		% Base Saturation (Typical Range)	
0-6"	0.35 mmho/cm						% Ca	% Mg
6-24"	1.69 mmho/cm		6.4				% K	% Na
Sol. Salts							% H	

Crop 1: 26 lbs of 0-0-60 = 12 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K20 = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.

Crop 2: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 40 K20 = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.

Crop 3: 26 lbs of 0-0-60 = 12 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K20 = 19 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

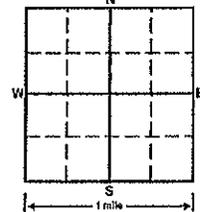
MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **16** SAMPLE **3**
 CNTY **CORSON**
 TWP **22-27** SECTION **10**
 QTR **ACRES**
 PREV. CROP **Corn-Grain**

SUBMITTED BY: **SO0453**
 SD WHT GROWERS-MCLAUGHLIN
 109 ELEVATOR ROAD
 BOX 640
 MCLAUGHLIN, SD
 57642

Field Location



REF# 8162663
 LAB# 2500
 BOX# 679

Date Sampled: **2/24/2010**

Date Received: **3/1/2010**

Date Reported: **3/2/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE				
		VLow	Low	Med	High	Corn-Grain		Wheat-Spring		Sunflower				
Nitrate	0-6"	32 lb/ac				YIELD GOAL		YIELD GOAL		YIELD GOAL				
	6-24"	36 lb/ac	****	***		100 BU		40 BU		2000 LBS				
	0-24"	68 lb/ac				SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES				
		Band		Band		Band		Band		Band				
		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		LB/ACRE	APPLICATION		
Olsen Phosphorus	42 ppm	****	****	****	****	N	52	N	40	N	32			
Potassium	600 ppm	****	****	****	****	P ₂ O ₅	15 Band (2x2) *	P ₂ O ₅	15 Band(Starter)*	P ₂ O ₅	10 Band(Starter)*			
Chloride	0-24"	48 lb/ac	****	****	****	K ₂ O	10 Band (2x2) *	K ₂ O	10 Band(Starter)*	K ₂ O	0			
	0-6"	20 lb/ac	****	****	**	Cl	0	Cl	0	Cl	0			
Sulfur	6-24"	54 lb/ac	****	****	**	S	5 Band (Trial)	S	5 Band (Trial)	S	5 Band (Trial)			
Boron						B		B		B				
Zinc						Zn		Zn		Zn				
Iron						Fe		Fe		Fe				
Manganese						Mn		Mn		Mn				
Copper	0.78 ppm	****	****	****	****	Cu	0	Cu	1 Band (Trial)	Cu	1 Band (Trial)			
Magnesium						Mg		Mg		Mg				
Calcium						Lime	0.0	Lime	0.0	Lime	0.0			
Sodium						Soil pH		% Base Saturation (Typical Range)						
Org. Matter						Buffer pH		Cation Exchange Capacity		% Ca	% Mg	% K	% Na	% H
Carbonate(CCE)						7.1								
Sol. Salts	0-6"	0.45 mmho/cm	****	***										
	6-24"	0.3 mmho/cm	****	**										

Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
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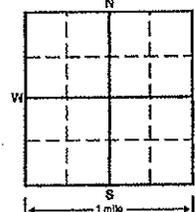
SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **17** SAMPLE 18
 CNTY **CORSON**
 TWP **21-26** SECTION 13
 QTR ACRES
 PREV. CROP **Corn-Grain**

Field Location



SUBMITTED BY: **SO0453**
 SD WHT GROWERS-MCLAUGHLIN
 109 ELEVATOR ROAD
 BOX 640
 MCLAUGHLIN, SD
 57642

REF# 8162658
 LAB# 2280
 BOX# 622

Date Sampled: **2/15/2010**

Date Received: **2/18/2010**

Date Reported: **2/19/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE			2ND CROP CHOICE			3RD CROP CHOICE		
		VLow	Low	Med	High	Wheat-Spring			Corn-Grain			Sunflower		
Nitrate	0-6"	15 lb/ac				YIELD GOAL			YIELD GOAL			YIELD GOAL		
	6-24"	45 lb/ac	****	***		40 BU			100 BU			2000 LBS		
	0-24"	60 lb/ac				SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
						Band			Band			Band		
						LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	
Olsen Phosphorus	20 ppm	****	****	****	****	N	48	N	60	N	40	N	40	
Potassium	376 ppm	****	****	****	****	P ₂ O ₅	15 Band(Starter)*	P ₂ O ₅	15 Band (2x2) *	P ₂ O ₅	12 Band *	P ₂ O ₅	12 Band *	
Chloride	0-24"	4 lb/ac	**			K ₂ O	10 Band(Starter)*	K ₂ O	10 Band (2x2) *	K ₂ O	0	K ₂ O	0	
Sulfur	0-6"	12 lb/ac	****	***		Cl	36 Broadcast	Cl	**	Cl	**	Cl	**	
	6-24"	18 lb/ac	****			S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)	
Boron						B		B		B		B		
Zinc						Zn		Zn		Zn		Zn		
Iron						Fe		Fe		Fe		Fe		
Manganese						Mn		Mn		Mn		Mn		
Copper	23.89 ppm		****	****	****	Cu	0	Cu	0	Cu	0	Cu	0	
Magnesium						Mg		Mg		Mg		Mg		
Calcium						Lime	0.0	Lime	0.0	Lime	0.0	Lime	0.0	
Sodium						Soil pH			% Base Saturation (Typical Range)			% Base Saturation (Typical Range)		
Org. Matter						Buffer pH		Cation Exchange Capacity		% Ca	% Mg	% K	% Na	% H
Carbonate(CCE)						7.2								
Soil Salts	0-6"	0.39 mmho/cm	****	***										
	6-24"	0.35 mmho/cm	****	**										

Crop 1: 79 lbs of 0-0-60 = 36 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 79 lbs of 0-0-60 = 36 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 79 lbs of 0-0-60 = 36 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

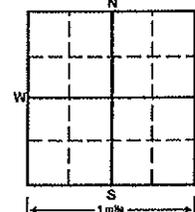
SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **18419** SAMPLE **5**
 CNTY **CORSON**
 TWP **22-27** SECTION **15**
 QTR ACRES
 PREV. CROP **Corn-Grain**

Field Location



SUBMITTED BY: **SO0453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD
57642

REF# **8162665**
 LAB# **2496**
 BOX# **681**

Date Sampled: **2/24/2010**

Date Received: **3/1/2010**

Date Reported: **3/2/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE	
		VLow	Low	Med	High	Corn-Grain		Wheat-Spring		Sunflower	
Nitrate	0-6"	12 lb/ac				YIELD GOAL		YIELD GOAL		YIELD GOAL	
	6-24"	18 lb/ac				100 BU		40 BU		2000 LBS	
	0-24"	30 lb/ac	***			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
						Band		Band		Band	
Olsen Phosphorus	14 ppm	****	****	****	****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Potassium	294 ppm	****	****	****	****	N	90	N	78	N	70
Chloride	0-24"	56 lb/ac	****	****	****	P ₂ O ₅	19 Band *	P ₂ O ₅	15 Band(Starter)*	P ₂ O ₅	16 Band *
	0-6"	12 lb/ac	****	****	****	K ₂ O	10 Band (2x2) *	K ₂ O	10 Band(Starter)*	K ₂ O	0
6-24"	48 lb/ac	****	****	*	****	Cl	0	Cl	0	Cl	0
Sulfur						S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)
Boron						B		B		B	
Zinc						Zn		Zn		Zn	
Iron						Fe		Fe		Fe	
Manganese						Mn		Mn		Mn	
Copper	0.57 ppm	****	****	****	****	Cu	0	Cu	1 Band	Cu	1 Band (Trial)
Magnesium						Mg		Mg		Mg	
Calcium						Lime	0.0	Lime	0.0	Lime	0.0
Sodium						Soil pH		% Base Saturation (Typical Range)			
Org.Matter						Buffer pH	Cation Exchange Capacity	% Ca	% Mg	% K	% Na
Carbonate(CCE)											% H
0-6"	0.25 mmho/cm	****	*			6.4					
6-24"	0.29 mmho/cm	****									
Sol. Salts											

Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by *Agvise Laboratories*
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SUBMITTED FOR:
 CORSON COUNTY
 FEEDERS

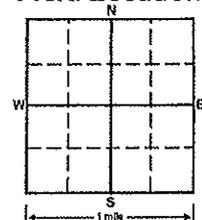
MCLAUGHLIN, SD
 57642

SOIL TEST REPORT

FIELD **20** SAMPLE 4
 CNTY **CORSON**
 TWP **22-27** SECTION 16
 QTR
 PREV. CROP **Corn-Grain** ACRES

SUBMITTED BY: **SO0453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD
57642

Field Location



REF# **8162664**
 LAB# **2501**
 BOX# **681**

Date Sampled: **2/24/2010**

Date Received: **3/1/2010**

Date Reported: **3/2/2010**

NUTRIENT IN THE SOIL		INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE		
		VLow	Low	Med	High	Corn-Grain		Wheat-Spring		Sunflower		
Nitrate	0-6"	20 lb/ac					YIELD GOAL		YIELD GOAL		YIELD GOAL	
	6-24"	24 lb/ac					100 BU		40 BU		2000 LBS	
	0-24"	44 lb/ac	****	**			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
Olsen Phosphorus	22 ppm	****	****	****	****	Band		Band		Band		
	389 ppm	****	****	****	****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	
Potassium	24 lb/ac	****	***			N	76	N	64	N	56	
	0-24"	24 lb/ac	****	***		P ₂ O ₅	15 Band (2x2) *	P ₂ O ₅	15 Band (Starter) *	P ₂ O ₅	10 Band (Starter) *	
Chloride	12 lb/ac	****	***			K ₂ O	10 Band (2x2) *	K ₂ O	10 Band (Starter) *	K ₂ O	0	
	6-24"	36 lb/ac	****	***		Cl	**	Cl	16 Broadcast	Cl	**	
Sulfur						S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)	
						B		B		B		
Boron						Zn		Zn		Zn		
Zinc						Fe		Fe		Fe		
Iron						Mn		Mn		Mn		
Manganese						Cu	0	Cu	1 Band (Trial)	Cu	1 Band (Trial)	
Copper	0.65 ppm	****	****	****	**	Mg		Mg		Mg		
Magnesium						Lime	0.0	Lime	0.0	Lime	0.0	
Calcium						Soil pH		% Base Saturation (Typical Range)				
Sodium						Buffer pH		% Ca	% Mg	% K	% Na	
Org. Matter						Cation Exchange Capacity		% H				
Carbonate (CCE)												
Sol. Salts	0-6"	0.32 mmho/cm	****	**								
	6-24"	0.25 mmho/cm	****	**								

Crop 1: 35 lbs of 0-0-60 = 16 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 35 lbs of 0-0-60 = 16 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 35 lbs of 0-0-60 = 16 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * No credits have been given for applied manure. Crop Removal: P2O5 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



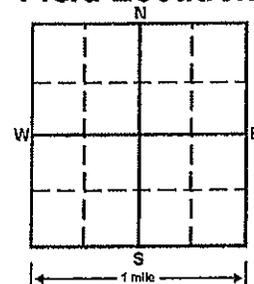
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **23**
 SAMPLE **5**
 CNTY **CORSON**
 TWP **22-27**
 SEC **31** QTR **N1/2** ACRES **0**
 PREV. CROP **Oats**

REF# 8164773 LAB# 25618 BOX# 990

Field Location



SUBMITTED FOR:

WOLF

SUBMITTED BY: SO0453

SD WHT GROWERS-MCLAUGHLIN
 BOX 640
 MCLAUGHLIN, SD
 57842

Date Sampled: 7/21/2011

Date Received: 7/25/2011

Date Reported: 7/26/2011

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE		2nd CROP CHOICE		3rd CROP CHOICE		
		VLow	Low	Med	High	Barley-Maltng		Wheat-Spring		Corn-Grain		
0-6 6-24 0-24'	9 lb/ac 15 lb/ac 24 lb/ac	*****				Yield Goal	Yield Goal	Yield Goal	Yield Goal	Yield Goal	Yield Goal	
Nitrate		*****				40 BU	40 BU	40 BU	40 BU	110 BU	110 BU	
		*****				SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	
		*****				Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	
Olsen Phosphorus	24 ppm	*****	*****	*****	*****	LB/ACRE APPLICATION	LB/ACRE APPLICATION	LB/ACRE APPLICATION	LB/ACRE APPLICATION	LB/ACRE APPLICATION	LB/ACRE APPLICATION	
Potassium	332 ppm	*****	*****	*****	*****	N 38	N 84	N 108	N 38	N 84	N 108	
0-24" Chloride	20 lb/ac	*****	**			P ₂ O ₅ 19 Band *	P ₂ O ₅ 25 Band *	P ₂ O ₅ 44 Band *	P ₂ O ₅ 19	P ₂ O ₅ 25	P ₂ O ₅ 44	
Sulfur	6 lb/ac 24 lb/ac	*****	*****	***		K ₂ O 10 Band (Starter)*	K ₂ O 10 Band (Starter)*	K ₂ O 10 Band (Starter)*	K ₂ O 10	K ₂ O 10	K ₂ O 10	
Boron	0.5 ppm	*****	**			Cl 20 Broadcast	Cl 20 Broadcast	Cl 20 Broadcast	Cl	Cl	Cl	
Zinc	1.27 ppm	*****	*****	*****	*****	S 10 Band	S 10 Band	S 10 Band	S 10	S 10	S 10	
Iron	46.5 ppm	*****	*****	*****	*****	B 0	B 0	B 0	B 0	B 0	B 0	
Manganese	8.2 ppm	*****	*****	*****	*****	Zn 0	Zn 0	Zn 0	Zn 0	Zn 0	Zn 0	
Copper	0.64 ppm	*****	*****	***		Fe 0	Fe 0	Fe 0	Fe 0	Fe 0	Fe 0	
Magnesium	780 ppm	*****	*****	*****	*****	Mn 0	Mn 0	Mn 0	Mn 0	Mn 0	Mn 0	
Calcium	2328 ppm	*****	*****	*****	*****	Cu 1 Band (Trial)	Cu 1 Band (Trial)	Cu 1 Band (Trial)	Cu 1	Cu 1	Cu 1	
Sodium	40 ppm	*****				Mb 0	Mg 0	Mg 0	Mg 0	Mg 0	Mg 0	
Org. Matter	3.4 %	*****	*****	*		Lime 0	Lime 0	Lime 0	Lime 0	Lime 0	Lime 0	
Carbonate	0.1 %	*****				Soil pH Buffer pH Cation Exchange Capacity		% Base Saturation (Typical Range)				
Sol. Salts	0.38 mmho/cm 0.33 mmho/cm	*****	***			6.2	19.2 meq	% Ca (65-75) 60.7	% Mg (15-20) 33.9	% K (1-7) 4.4	% Na (0-5) 0.9	% H (0-5)

Crop 1: 44 lbs of 0-0-60 = 20 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 19 K2O = 20AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: 44 lbs of 0-0-60 = 20 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 15AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

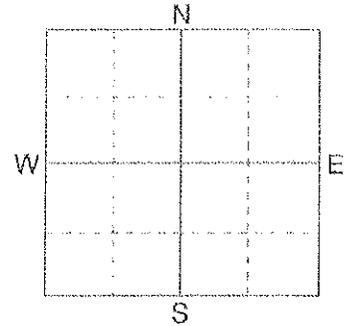
Crop 3: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 44 K2O = 30AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **15, 26**
 SAMPLE ID **1A 1B**
 COUNTY **CORSON**
 TWP **22-26**
 SECTION **34** QTR ACRES **308**
 PREV. CROP **Sunflower**



SUBMITTED FOR:
WULF CATTLE COMPANY

SUBMITTED BY: **MZ1154**
MZB-SDWG-MCLAUGHLIN
ZONES ONLY-BRENT
BOX 640
MCLAUGHLIN, SD 57647

REF # **11234893** BOX # **0**
 LAB # **NW3077**

Date Sampled **01/19/2012**

Date Received **01/23/2012**

Date Reported **1/24/2012**

Nutrient In The Soil		Integration	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
				Oats	Barley-Malting	Corn-Grain		
			YIELD GOAL		YIELD GOAL		YIELD GOAL	
			100 BU	50 BU	100 BU			
			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
			Band/Maint.		Band/Maint.		Band/Maint.	
			LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Nitrate	0-6" 16 lb/ac 6-24" 12 lb/ac		N 72		N 50		N 92	
Phosphorus	Olsen 7 ppm		P ₂ O ₅ 27	Band *	P ₂ O ₅ 24	Band *	P ₂ O ₅ 40	Band *
Potassium	395 ppm		K ₂ O 10	Band (Starter)*	K ₂ O 10	Band (Starter)*	K ₂ O 10	Band (2x2) *
Chloride	0-24" 16 lb/ac		Cl 24	Broadcast	Cl 24	Broadcast	Cl	Not Available
Sulfur	0-6" 8 lb/ac 6-24" 90 lb/ac		S 0		S 0		S 0	
Boron			B		B		B	
Zinc			Zn		Zn		Zn	
Iron			Fe		Fe		Fe	
Manganese			Mn		Mn		Mn	
Copper	0.65 ppm		Cu 1	Band (Trial)	Cu 1	Band (Trial)	Cu 0	
Magnesium			Mg		Mg		Mg	
Calcium			Lime 0		Lime 0		Lime 0	
Sodium			Soil pH Buffer pH		% Base Saturation (Typical Range)			
Org. Matter			Cation Exchange Capacity		% Ca % Mg % K % Na % H			
Carbonate (CEC)			6.1					
Sol. Salts	0-6" 0.25 mmho/cm 6-24" 0.6 mmho/cm							

Crop 1: 52 lbs of 0-0-60 = 24 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 19 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: 52 lbs of 0-0-60 = 24 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 24 K2O = 25 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 3: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



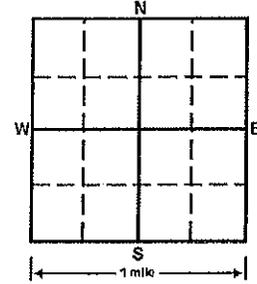
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **27**
 SAMPLE **1**
 CNTY **CORSON**
 TWP **22-27**
 SEC **34** QTR **NW** ACRES **0**
 PREV. CROP **Oats**

REF# 8164769 LAB# 25620 BOX# 959

Field Location



SUBMITTED FOR:

WOLF

SUBMITTED BY: **SO0453**

SD WHT GROWERS-MCLAUGHLIN
BOX 640
MCLAUGHLIN, SD
57642

Date Sampled: **7/21/2011**

Date Received: **7/25/2011**

Date Reported: **7/26/2011**

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE		2nd CROP CHOICE		3rd CROP CHOICE				
		Very	Low	Med	High	Barley-Malting		Wheat-Spring		Corn-Grain				
		*****	*****	*****	*****	Yield Goal		Yield Goal		Yield Goal				
		*****	*****	*****	*****	40 BU		40 BU		110 BU				
		*****	*****	*****	*****	SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES				
		*****	*****	*****	*****	Band/Maint.		Band/Maint.		Band/Maint.				
		*****	*****	*****	*****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION			
0-6" 6-24" 0-24"	13 lb/ac 12 lb/ac 25 lb/ac	*****	*****	*****	*****	N	37	N	83	N	107			
Nitrate	8 ppm	*****	*****	*****	*****	P ₂ O ₅	19	P ₂ O ₅	25	P ₂ O ₅	44			
Olsen Phosphorus	274 ppm	*****	*****	*****	*****	K ₂ O	10	K ₂ O	10	K ₂ O	10			
Potassium	32 lb/ac	*****	*****	*****	*****	Cl	8	Cl	8	Cl	Not Available			
0-24" Chloride	8 lb/ac 12 lb/ac	*****	*****	*****	*****	S	9	S	9	S	9			
Sulfur	0.4 ppm	*****	*****	*****	*****	B	1	B	1	B	1			
Boron	0.74 ppm	*****	*****	*****	*****	Zn	0	Zn	0	Zn	0			
Zinc	33.6 ppm	*****	*****	*****	*****	Fe	0	Fe	0	Fe	0			
Iron	8.2 ppm	*****	*****	*****	*****	Mn	0	Mn	0	Mn	0			
Manganese	0.57 ppm	*****	*****	*****	*****	Cu	1	Cu	1	Cu	0			
Copper	504 ppm	*****	*****	*****	*****	Mg	0	Mg	0	Mg	0			
Magnesium	1797 ppm	*****	*****	*****	*****	Lime	0	Lime	0	Lime	0			
Calcium	19 ppm	*****	*****	*****	*****	Soil pH		Buffer pH		Cation Exchange Capacity				
Sodium	2.5 %	*****	*****	*****	*****	6.1				14.0 meq				
Org. Matter	0.0 %	*****	*****	*****	*****					% Base Saturation (Typical Range)				
Carbonate	0.25 mmho/cm 0.24 mmho/cm	*****	*****	*****	*****					% Ca	% Mg	% K	% Na	% H
Sol. Salts		*****	*****	*****	*****					(85-75) 64.3	(15-20) 30.1	(1-7) 5.0	(0-5) 0.6	(0-5)

Crop 1: 17 lbs of 0-0-60 = 8 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 19 K2O = 20AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: 17 lbs of 0-0-60 = 8 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 15AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 3: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 44 K2O = 30AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



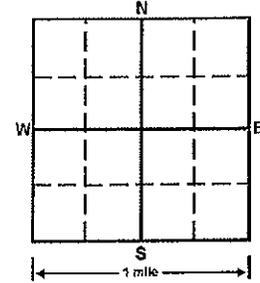
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD TAYLOR HILL, 28
 SAMPLE 4
 CNTY CORSON
 TWP 22-27
 SEC 34 QTR 254.65 ACRES 0
 PREV. CROP Oats

REF# 8163140 LAB# 42525 BOX# 2576

Field Location



SUBMITTED FOR:

CORSON COUNTY FEEDERS

MCLAUGHLIN, SD
 57642

SUBMITTED BY: SO0453

SD WHT GROWERS-MCLAUGHLIN
 BOX 640
 MCLAUGHLIN, SD
 57642

Date Sampled:

Date Received:

9/8/2011

Date Reported:

9/9/2011

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE		2nd CROP CHOICE		3rd CROP CHOICE			
		Very Low	Low	Med	High	Sunflower		Corn Grain		Wheat Spring			
Nitrate	30 lb/ac 21 lb/ac 51 lb/ac	*****	****			Yield Goal	Yield Goal	Yield Goal	2000 LBS	100 BU	40 BU		
Olsen Phosphorus	32 ppm	*****	*****	*****	*****	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	Band/Maint.	Band/Maint.	Band/Maint.		
Potassium	572 ppm	*****	*****	*****	*****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION		
Chloride						N	49	N	69	N	57		
Sulfur	26 lb/ac 36 lb/ac	*****	*****	****	****	P ₂ O ₅	18 Band *	P ₂ O ₅	40 Band *	P ₂ O ₅	25 Band *		
Boron						K ₂ O	0	K ₂ O	10 Band (2x2) *	K ₂ O	10 Band (Starter) *		
Zinc	1.41 ppm	*****	*****	*****	****	Cl		Cl		Cl			
Iron						S	5 Band (Trial)	S	5 Band (Trial)	S	5 Band (Trial)		
Manganese						B		B		B			
Copper						Zn	0	Zn	2 Band (Trial)	Zn	0		
Magnesium						Fe		Fe		Fe			
Calcium						Mn		Mn		Mn			
Sodium						Cu		Cu		Cu			
Org. Matter	3.1 %	*****	*****	*****	*****	Mg		Mg		Mg			
Carbonate						Lime	0	Lime	0	Lime	0		
Soil Salts	0.36 mmho/cm 0.23 mmho/cm	*****	**			% Base Saturation (Typical Range)							
						Soil pH	Buffer pH	Cation Exchange Capacity	% Ca	% Mg	% K	% Na	% H
						6.2							

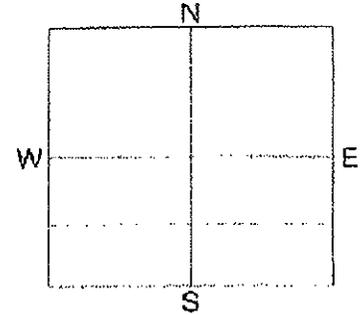
Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 18 K2O = 22AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 40 K2O = 27AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 15AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **4-20-25** Field 29
 SAMPLE ID **44**
 COUNTY **CORSON**
 TWP **21-25**
 SECTION **32** QTR ACRES **0**
 PREV. CROP **Sunflower**



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: **SD0453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD 57642

REF # **11234743** BOX # **0**
 LAB # **NW181635**

Date Sampled

Date Received **12/14/2011**

Date Reported **12/29/2011**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
	8 lb/ac 12 lb/ac 20 lb/ac		Wheat Spring		Wheat Spring		Wheat Spring	
			YIELD GOAL		YIELD GOAL		YIELD GOAL	
			30 Bushels		40 Bushels		50 Bushels	
			SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
			Band		Band		Band	
	12 ppm		LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
	280 ppm		61		88		115	
	12 lb/ac		15	Band (Starter)*	10	Band *	23	Band *
	4 lb/ac 6 lb/ac		10	Band (Starter)*	10	Band (Starter)*	10	Band (Starter)*
			28	Broadcast	28	Broadcast	28	Broadcast
			10	Band	10	Band	10	Band
	0.36 ppm							
			2	Band	2	Band	2	Band
			0		0		0	
	0.13 mmho/cm 0.25 mmho/cm		Cation Exchange Capacity		Cation Exchange Capacity		Cation Exchange Capacity	
			6.0					

Crop 1: 61 lbs of 0-0-60 = 28 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 19 K2O = 11 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 61 lbs of 0-0-60 = 28 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 15 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 61 lbs of 0-0-60 = 28 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 31 K2O = 19 A GVISE Band guidelines will build P & K test levels to the medium range over many years.



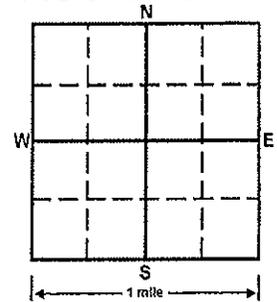
Soil Analysis by: Agvise Laboratories
Northwood: (701) 587-6010
Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **30, 31, 32**
SAMPLE **2**
CNTY **CARSON**
TWP **21-26**
SEC **4** QTR **ACRES 0**
PREV. CROP **Wheat-Spring**

REF# 8163510 LAB# 55763 BOX# 3925

Field Location



SUBMITTED FOR:
WULF CATTLE CO.
MCLAUGHLIN, SD

SUBMITTED BY: **SO0453**
SD WHT GROWERS-MCLAUGHLIN
BOX 640
MCLAUGHLIN, SD
57642

Date Sampled:

Date Received:

9/19/2011

Date Reported:

11/11/2011

NUTRIENT IN SOIL

INTERPRETATION

1st CROP CHOICE

2nd CROP CHOICE

3rd CROP CHOICE

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE			2nd CROP CHOICE			3rd CROP CHOICE		
		VLow	Low	Med	High	Oats			Corn-Grain			Sunflower		
0-6"	17 lb/ac	*****				Yield Goal			Yield Goal			Yield Goal		
6-24"	15 lb/ac					100 BU			100 BU			2000 LBS		
0-24"	32 lb/ac					SUGGESTED GUIDELINES			SUGGESTED GUIDELINES			SUGGESTED GUIDELINES		
Nitrate		Band/Maint.			Band/Maint.			Band/Maint.						
Olsen Phosphorus	7 ppm	*****	*****			LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION			
Potassium	333 ppm	*****	*****	*****	*****	N	68	N	88	N	68			
0-24" Chloride	20 lb/ac	*****	**			P ₂ O ₅	27	Band *	P ₂ O ₅	40	Band *			
Sulfur	26 lb/ac 360 +lb/ac	*****	*****	*****	*****	K ₂ O	10	Band (Starter)*	K ₂ O	10	Band (2x2) *			
Boron						Cl	20	Broadcast	Cl		Not Available			
Zinc						S	0		S	0				
Iron						B			B					
Manganese						Zn			Zn					
Copper	0.58 ppm	*****	*****	*		Fe			Fe					
Magnesium						Mn			Mn					
Calcium						Cu	1	Band (Trial)	Cu	0				
Sodium						Mg			Mg					
Org. Matter						Lime	0		Lime	0				
Carbonate						Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation(Typical Range)					
Sol. Salts	0.38 mmho/cm 1.09 mmho/cm	*****	***	*****	**	% Ca	% Mg	% K	% Na	% H				
		*****	*****	*****	**	6.9								

Crop 1: 44 lbs of 0-0-60 = 20 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 19AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 40 K2O = 27AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 3: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 18 K2O = 22AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



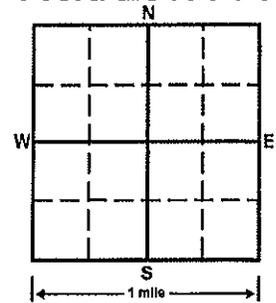
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD 35
 SAMPLE
 CNTY CORSON
 TWP 21-25
 SEC 10 QTR ACRES 0
 PREV. CROP Wheat-Spring

REF# 8164472 LAB# 2250 BOX# 0

Field Location



SUBMITTED FOR:
 BACHMIER FARMS

SUBMITTED BY: SO0453
 SD WHT GROWERS-MCLAUGHLIN
 BOX 640
 MCLAUGHLIN, SD
 57642

Date Sampled:

Date Received:

2/13/2009

Date Reported:

11/11/2011

NUTRIENT IN SOIL

INTERPRETATION

1st CROP CHOICE

2nd CROP CHOICE

3rd CROP CHOICE

0-6" 15 lb/ac
 6-24" 48 lb/ac
 0-24" 63 lb/ac

VLow Low Med High

Wheat-Spring

Sunflower

Yield Goal

Nitrate

Yield Goal

Yield Goal

Yield Goal

Olsen Phosphorus

8 ppm

40 BU

2000 LBS

Yield Goal

Potassium

424 ppm

SUGGESTED GUIDELINES

SUGGESTED GUIDELINES

SUGGESTED GUIDELINES

0-24" Chloride

24 lb/ac

Band

Band

Band

0-6" Sulfur

14 lb/ac

LB/ACRE APPLICATION

LB/ACRE APPLICATION

LB/ACRE APPLICATION

N

45

N

37

N

Boron

P₂O₅

23

P₂O₅

22

P₂O₅

Zinc

K₂O

10

K₂O

0

K₂O

Iron

Cl

16

Cl

Not Available

Cl

Manganese

S

7

S

7

S

Copper

0.63 ppm

B

B

B

Magnesium

Zn

Zn

Zn

Calcium

Fe

Fe

Fe

Sodium

Mn

Mn

Mn

Org. Matter

Cu

1

Cu

1

Cu

Carbonate

Mg

Mg

Mg

0-6" Sol. Salts

0.38 mmho/cm

Lime

Lime

Lime

0.55 mmho/cm

Lime

Lime

Lime

Soil pH

7.0

Buffer pH

Cation Exchange Capacity

% Base Saturation(Typical Range)

% Ca

% Mg

% K

% Na

% H

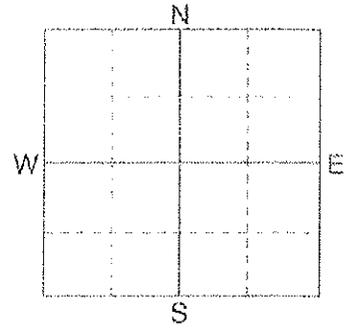
Crop 1: 35 lbs of 0-0-60 = 16 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 15AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 18 K2O = 22AGVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **36**
 SAMPLE ID **4A 4B**
 COUNTY **CORSON**
 TWP **21N-25E**
 SECTION **10** QTR **ACRES 159**
 PREV. CROP **Sunflower**



SUBMITTED FOR:
WULF CATTLE COMPANY

SUBMITTED BY: **MZ1154**
MZB-SDWG-MCLAUGHLIN
ZONES ONLY-BRENT
BOX 640
MCLAUGHLIN, SD 57647

REF # **11234896** BOX # **0**
 LAB # **NW3080**

Date Sampled **01/19/2012**

Date Received **01/23/2012**

Date Reported **1/24/2012**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
Depth	Concentration		Yield Goal	Suggested Guidelines	Yield Goal	Suggested Guidelines	Yield Goal	Suggested Guidelines
0-6"	8 lb/ac		Oats	Barley-Malting	Corn-Grain	100	50	100
6-24"	6 lb/ac		YIELD GOAL	YIELD GOAL	YIELD GOAL	BU	BU	BU
0-24"	14 lb/ac		SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	Band/Maint.	Band/Maint.	Band/Maint.
Nitrate			LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Olsen Phosphorus	23 ppm		N	86	N	64	N	106
Potassium	576 ppm		P ₂ O ₅	25 Band *	P ₂ O ₅	24 Band *	P ₂ O ₅	40 Band *
Chloride	8 lb/ac		K ₂ O	10 Band (Starter) *	K ₂ O	10 Band (Starter) *	K ₂ O	10 Band (2x2) *
Sulfur	10 lb/ac		Cl	32 Broadcast	Cl	32 Broadcast	Cl	Not Available
6-24"	24 lb/ac		S	7 Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)
Boron			B		B		B	
Zinc			Zn		Zn		Zn	
Iron			Fe		Fe		Fe	
Manganese			Mn		Mn		Mn	
Copper	0.5 ppm		Cu	1 Band (Trial)	Cu	2 Band	Cu	0
Magnesium			Mg		Mg		Mg	
Calcium		Lime	0	Lime	0	Lime	0	
Sodium		Soil pH Buffer pH Cation Exchange Capacity		% Base Saturation (Typical Range)				
Org. Matter		% Ca	% Mg	% K	% Na	% H		
Carbonate (CCE)		6.2						
0-6"	0.2 mmho/cm							
6-24"	0.32 mmho/cm							
Soil Salts								

Crop 1: 70 lbs of 0-0-60 = 32 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 25 K2O = 19 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 2: 70 lbs of 0-0-60 = 32 lbs of Chloride" * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 24 K2O = 25 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Crop 3: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 40 K2O = 27 AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



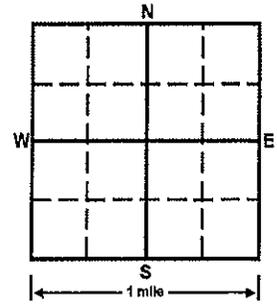
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **37**
 SAMPLE
 CNTY **CORSON**
 TWP **21-25**
 SEC **11** QTR **ACRES 0**
 PREV. CROP **Wheat-Spring**

REF# 8164471 LAB# 2249 BOX# 0

Field Location



SUBMITTED FOR:
BACHMIER FARMS

SUBMITTED BY: **SO0453**

SD WHT GROWERS-MCLAUGHLIN
BOX 640
MCLAUGHLIN, SD
57642

Date Sampled:

Date Received:

2/13/2009

Date Reported:

11/11/2011

NUTRIENT IN SOIL

INTERPRETATION

1st CROP CHOICE

2nd CROP CHOICE

3rd CROP CHOICE

0-6" 17 lb/ac
 6-24" 39 lb/ac
 0-24" 56 lb/ac

VLow Low Med High

Wheat-Spring

Sunflower

Nitrate

Yield Goal

Yield Goal

Yield Goal

40 BU

2000 LBS

SUGGESTED GUIDELINES

SUGGESTED GUIDELINES

SUGGESTED GUIDELINES

Band

Band

Olsen Phosphorus 13 ppm

LB/ACRE APPLICATION

LB/ACRE APPLICATION

LB/ACRE APPLICATION

Potassium 516 ppm

N 52

N 44

N

0-24" Chloride 28 lb/ac

P₂O₅ 17 Band *

P₂O₅ 16 Band *

P₂O₅

0-6" 16 lb/ac
 6-24" 30 lb/ac

K₂O 10 Band (Starter)*

K₂O 0

K₂O

Boron

Cl 12 Broadcast

Cl Not Available

Cl

Zinc

S 5 Band (Trial)

S 5 Band (Trial)

S

Iron

B

B

B

Manganese

Zn

Zn

Zn

Copper 0.65 ppm

Fe

Fe

Fe

Magnesium

Mn

Mn

Mn

Calcium

Cu 1 Band (Trial)

Cu 1 Band (Trial)

Cu

Sodium

Mg

Mg

Mg

Org. Matter

Lime

Lime

Lime

Carbonate

Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation(Typical Range)				
			% Ca	% Mg	% K	% Na	% H
6.7							

0-6" 0.38 mmho/cm
 6-24" 0.38 mmho/cm

Crop 1: 26 lbs of 0-0-60 = 12 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 15AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 18 K2O = 22AGVISE Band guidelines will build P & K test levels to the medium range over many years.



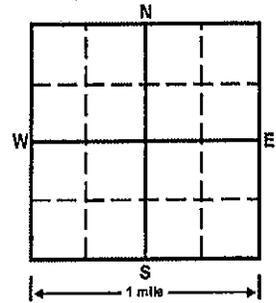
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD **38**
 SAMPLE **4**
 CNTY **CARSON**
 TWP **21-25**
 SEC **12** QTR **ACRES 0**
 PREV. CROP **Wheat-Spring**

REF# 8162968 LAB# 127096 BOX# 3973

Field Location



SUBMITTED FOR:
BACHMIER FARMS

SUBMITTED BY: **SO0453**

SD WHT GROWERS-MCLAUGHLIN
BOX 640
MCLAUGHLIN, SD
57642

Date Sampled: **10/21/2010** Date Received: **10/25/2010** Date Reported: **11/11/2011**

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE			2nd CROP CHOICE			3rd CROP CHOICE					
		VLow	Low	Med	High	Wheat-Spring			Barley-Malting			Sunflower					
0-6" 6-24" 0-24"	6 lb/ac 6 lb/ac 12 lb/ac	**				Yield Goal	Yield Goal	Yield Goal	40 BU	80 BU	2000 LBS	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES	SUGGESTED GUIDELINES			
Nitrate						Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	Band/Maint.	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Olsen Phosphorus	8 ppm	*****	*****			N	96		N	112		N	88		N	88	
Potassium	334 ppm	*****	*****	*****	*****	P ₂ O ₅	25	Band *	P ₂ O ₅	38	Band *	P ₂ O ₅	22	Band *	P ₂ O ₅	22	Band *
0-24" Chloride	20 lb/ac	*****	**			K ₂ O	10	Band (Starter)*	K ₂ O	10	Band (Starter)*	K ₂ O	0		K ₂ O	0	
0-6" 6-24"	4 lb/ac 36 lb/ac	****	*****	*****	**	Cl	20	Broadcast	Cl	20	Broadcast	Cl		Not Available	Cl		Not Available
Sulfur		*****	*****	*****	**	S	10	Band	S	10	Band	S	10	Band	S	10	Band
Boron						B			B			B			B		
Zinc						Zn			Zn			Zn			Zn		
Iron						Fe			Fe			Fe			Fe		
Manganese						Mn			Mn			Mn			Mn		
Copper	0.43 ppm	*****	****			Cu	2	Band	Cu	2	Band	Cu	1	Band (Trial)	Cu	1	Band (Trial)
Magnesium						Mg			Mg			Mg			Mg		
Calcium						Lime	0		Lime	0		Lime	0		Lime	0	
Sodium						Soil pH	6.4		Buffer pH			% Base Saturation(Typical Range)					
Org. Matter						Cation Exchange Capacity			% Ca	% Mg	% K	% Na	% H				
Carbonate																	
0-6" 6-24"	0.18 mmho/cm 0.33 mmho/cm	****	*****	**													
Soil Salts																	

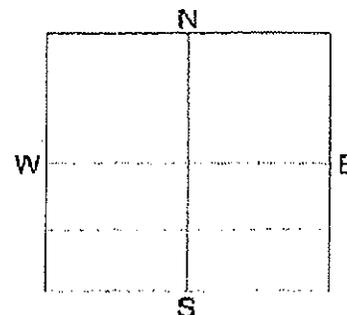
Crop 1: 44 lbs of 0-0-60 = 20 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 25 K2O = 15AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 2: 44 lbs of 0-0-60 = 20 lbs of Chloride** Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 38 K2O = 40AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 3: ** Chloride yield data is limited for this crop.* Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests.Crop Removal: P2O5 = 18 K2O = 22AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **39**
 SAMPLE ID **36** *Y 23-21-25*
 COUNTY **CORSON**
 TWP **21-25**
 SECTION **14** QTR **0** ACRES **0**
 PREV. CROP **Com-Grain**



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: **S00453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD 57642

REF # **11234727** BOX # **0**
 LAB # **NW180930**

Date Sampled

Date Received **12/12/2011**

Date Reported **12/29/2011**

Nutrient In The Soil		Interpretation Low Med High	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
Phosphorus	7 lb/ac 9 lb/ac			2000	Pounds	40	Bushels	1800	Pounds
Potassium	16 lb/ac		Not Available		20	Broadcast	Not Available	
Calcium	13 ppm		7	Band (Trial)	7	Band (Trial)	7	Band (Trial)
Magnesium	376 ppm		1	Band (Trial)	1	Band (Trial)	1	Band (Trial)
Sulfur	20 lb/ac		0		0		0	
Zinc	14 lb/ac 36 lb/ac		0		0		0	
Copper	0.68 ppm		0		0		0	
Manganese								
Iron								
Sodium								
Chloride								
Electrical Conductivity	0.22 mmho/cm 0.41 mmho/cm		6.7					

Crop 1: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 18 K2O = 22 AGVISE Band guidelines will build P & K test levels to the medium range over many years.

Crop 2: 44 lbs of 0-0-60 = 20 lbs of Chloride** * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.

Crop 3: ** Chloride yield data is limited for this crop. * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 16 K2O = 20 AGVISE Band guidelines will build P & K test levels to the medium range over many years.



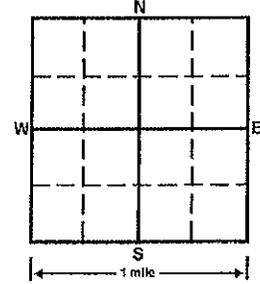
Soil Analysis by: Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 643-4109

SOIL TEST REPORT

FIELD KAPASTINSKI SOU/41 & 42
 SAMPLE 3
 CNTY CORSON
 TWP 21-26
 SEC 24 QTR 158.52 ACRES 0
 PREV. CROP Wheat-Spring

REF# 8163139 LAB# 42519 BOX# 2576

Field Location



SUBMITTED FOR:
 CORSON COUNTY FEEDERS

MCLAUGHLIN, SD
 57642

SUBMITTED BY: SO0453

SD WHT GROWERS-MCLAUGHLIN
 BOX 640
 MCLAUGHLIN, SD
 57642

Date Sampled: _____ Date Received: 9/8/2011 Date Reported: 9/9/2011

NUTRIENT IN SOIL		INTERPRETATION				1st CROP CHOICE		2nd CROP CHOICE		3rd CROP CHOICE	
		V. Gov.	Low	Med	High						
0-6"	15 lb/ac	*****	**			Corn-Grain		Corn-Grain		Sunflower	
6-24"	24 lb/ac					Yield Goal		Yield Goal		Yield Goal	
0-24"	39 lb/ac					100 BU		120 BU		2000 LBS	
Nitrate		SUGGESTED GUIDELINES				SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	
		Band/Maint.				Band/Maint.		Band/Maint.		Band/Maint.	
Olsen Phosphorus	17 ppm	*****	*****	*****	*****	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Potassium	257 ppm	*****	*****	*****	*****	N	81	N	105	N	61
Chloride						P ₂ O ₅	40 Band *	P ₂ O ₅	48 Band *	P ₂ O ₅	18 Band *
Sulfur	0-6" 10 lb/ac 6-24" 18 lb/ac	*****	**			K ₂ O	10 Band (2x2) *	K ₂ O	10 Band (2x2) *	K ₂ O	0
Boron						Cl		Cl		Cl	
Zinc	0.47 ppm	*****	**			S	9 Band (Trial)	S	9 Band (Trial)	S	9 Band (Trial)
Iron						B		B		B	
Manganese						Zn	2 Band	Zn	2 Band	Zn	2 Band (Trail)
Copper						Fe		Fe		Fe	
Magnesium						Mn		Mn		Mn	
Calcium						Cu		Cu		Cu	
Sodium						Mg		Mg		Mg	
Org. Matter	2.7%	*****	*****			Lime		Lime		Lime	
Carbonate						Soil pH		Buffer pH		Cation Exchange Capacity	
Sol. Salts	0-6" 0.18 mmho/cm 6-24" 0.18 mmho/cm	****				5.6				% Base Saturation (Typical Range)	
										% Ca % Mg % K % Na % H	

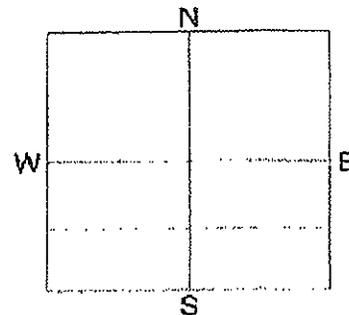
Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 40 K2O = 27AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 48 K2O = 32AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury *Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P2O5 = 18 K2O = 22AGVISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID 44
 SAMPLE ID 44
 COUNTY **CORSON**
 TWP 21-25
 SECTION 32 QTR ACRES 0
 PREV. CROP **Sunflower**



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: S00453
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD 57642

REF # **11234743** BOX # **0**
 LAB # **NW181635**

Date Sampled _____ Date Received **12/14/2011** Date Reported **12/29/2011**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
			YIELD GOAL	SUGGESTED GUIDELINES	YIELD GOAL	SUGGESTED GUIDELINES	YIELD GOAL	SUGGESTED GUIDELINES
	8 lb/ac 12 lb/ac 20 lb/ac		30 Bushels	40 Bushels	50 Bushels			
	12 ppm 280 ppm 12 lb/ac		61 15 Band (Starter)* 10 Band (Starter)* 28 Broadcast 10 Band	88 18 Band* 10 Band (Starter)* 28 Broadcast 10 Band	115 23 Band* 10 Band (Starter)* 28 Broadcast 10 Band			
	0.36 ppm		2 Band	2 Band	2 Band			
	0.13 mmho/cm 0.25 mmho/cm		0	0	0			

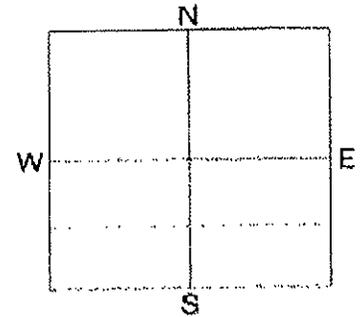
Crop 1: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 19 K2O = 11 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K2O = 15 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 61 lbs of 0-0-60 = 28 lbs of Chloride * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 31 K2O = 19 A GVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID 45
 SAMPLE ID 1
 COUNTY **CORSON**
 TWP **22-26**
 SECTION **32** QTR ACRES **0**
 PREV. CROP **Grass/Alfalfa**



SUBMITTED FOR:
WOLF CATTLE CO.

SUBMITTED BY: **500453**
SD WHT GROWERS-MCLAUGHLIN
109 ELEVATOR ROAD
BOX 640
MCLAUGHLIN, SD 57642

REF # **11234817** BOX # **0**
 LAB # **NW183228**

Date Sampled _____ Date Received **12/27/2011** Date Reported **12/29/2011**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
Phosphorus	8 lb/ac 6 lb/ac		Med. High	Grass/Alfalfa		Alfalfa/Grass		Grass/Alfalfa
Potassium	14 lb/ac	YIELD GOAL		YIELD GOAL		YIELD GOAL		
Calcium	2 ppm	2 Tons		40 Bushels		100 Bushels		
Magnesium	214 ppm	SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		
Sulfur	6 lb/ac 12 lb/ac	LB/ACRE		APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
Nitrogen	0.30 ppm	16			94		106	
Organic Matter	2.7 %	25		Broadcast	31	Band *	51	Band *
Moisture	0.21 mmho/cm 0.35 mmho/cm	0			10	Band (Starter)*	10	Band (2x2) *
		12		Band	12	Band	12	Band
		2		Band	0		3	Band
		0		0		0		
			Base Sat. (Typical Range)		Base Sat. (Typical Range)		Base Sat. (Typical Range)	
			6.8					

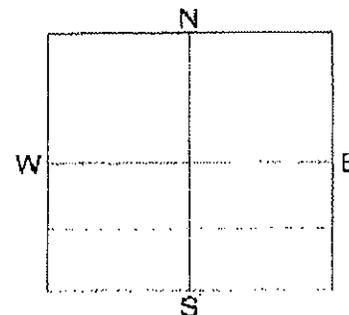
Crop 1: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 20 K20 = 96 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 25 K20 = 15 A GVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 40 K20 = 27 A GVISE Band guidelines will build P & K test levels to the medium range over many years.



Soil Analysis by **Agvise Laboratories**
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID + 35 *Field 46*
 SAMPLE ID 43
 COUNTY CORSON
 TWP 21-25
 SECTION 26 QTR ACRES 0
 PREV. CROP Sunflower



SUBMITTED FOR:
CORSON COUNTY FEEDERS

SUBMITTED BY: 500453
SD WHT GROWERS-MCLAUGHLIN
 109 ELEVATOR ROAD
 BOX 640
 MCLAUGHLIN, SD 57642

REF # 11234742 BOX # 0
 LAB # NW181634

Date Sampled _____ Date Received **12/14/2011** Date Reported **12/29/2011**

Nutrient In The Soil		Interpretation	1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
Phosphorus	9 lb/ac 9 lb/ac		Low Med High	Wheat Spring		Wheat Spring		Wheat Spring
	18 lb/ac		YIELD GOAL: 30 Bushels		YIELD GOAL: 40 Bushels		YIELD GOAL: 50 Bushels	
	12 ppm		SUGGESTED GUIDELINES: Band		SUGGESTED GUIDELINES: Band		SUGGESTED GUIDELINES: Band	
	275 ppm		LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION
	18 lb/ac		63		90		117	
	8 lb/ac 12 lb/ac		15	Band (Starter)*	18	Band *	23	Band *
			10	Band (Starter)*	10	Band (Starter)*	10	Band (Starter)*
			24	Broadcast	24	Broadcast	24	Broadcast
			7	Band (Trial)	7	Band (Trial)	7	Band (Trial)
	0.56 ppm							
			1	Band (Trial)	1	Band (Trial)	1	Band (Trial)
			0		0		0	
	0.23 mmho/cm 0.38 mmho/cm		Soil pH (Ever) Application Exchange Capacity			Dr. Page Saturation (Typical Range)		
			6.3					

Crop 1: 52 lbs of 0-0-80 = 24 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 19 K2O = 11 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 2: 52 lbs of 0-0-60 = 24 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 15 K2O = 15 AGVISE Band guidelines will build P & K test levels to the medium range over many years.
 Crop 3: 52 lbs of 0-0-60 = 24 lbs of Chloride* * Caution: Seed Placed Fertilizer Can Cause Injury * Many crops may respond to a starter application of P & K even on high soil tests. Crop Removal: P205 = 31 K2O = 19 AGVISE Band guidelines will build P & K test levels to the medium range over many years.

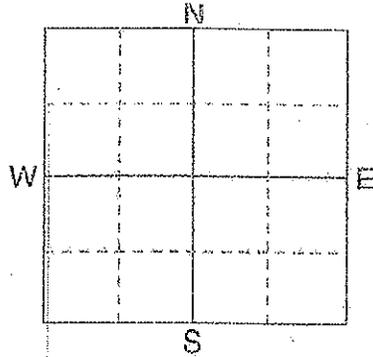


P.O. BOX 510, NORTHWOOD, ND 58267
(701) 587-6010

Mizera Report

SOIL TEST REPORT

FIELD **47A & 47B** SAMPLE 1
 COUNTY **CORSON**
 TWP **21-27** SECTION **9**
 QTR. ACRES
 PREV CROP **SUNFLOWER**



SUBMITTED FOR:
WULF CATTLE DEPDT

SUBMITTED BY: **HZ1154**
HZB-SDWG-MCLAUGHLIN
ZONES ONLY-BRENT
BOX 640
NCLAUGHLIN, SD 57642

REF # **13408649**
 LAB # **11338** BOX # **5047**

DATE SAMPLED _____ DATE RECEIVED **4/ 1/13** DATE REPORTED **4/ 2/13**

NUTRIENT IN THE SOIL	INTERPRETATION (LOW, LOW-MED, HIGH)	1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE	
		WHEAT		OATS		OATS	
Nitrate-N	18 lb/ac 12 lb/ac 30 lb/ac						
Phosphorus	10 ppm						
Potassium	334 ppm						
Chloride 0-24"	16 lb/ac						
Sulfur 0-6" 6-24"	10 lb/ac 18 lb/ac						
Boron							
Zinc							
Iron							
Manganese							
Copper	0.54 ppm						
Magnesium							
Calcium							
Sodium							
Organic Matter							
Carbonate (COE)							
Soluble 0-6" salts 6-24"	0.13 mmho/cm 0.26 mmho/cm						
		Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)		
		0-6"	6.2		% Ca	% Mg	% K
		6-24"			% Na	% H	

52 LBS OF 0-0-30 = 24 LBS OF CHLORIDE

* CAUTION: SEED PLACED FERTILIZER CAN CAUSE INJURY *

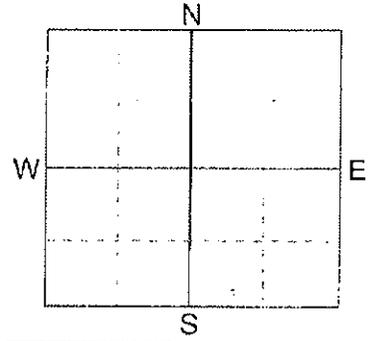
Crop Removal: Crop 1: P205= 25 K2O= 15 Crop 2: P205= 20 K2O= 15 Crop 3: P205= 25 K2O= 19
 GWISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.



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(701) 587-6010

SOIL TEST REPORT

FIELD *Field 48* SAMPLE *2*
 COUNTY *CORSON*
 TWP *21-27* SECTION *16*
 QTR _____ ACRES _____
 PREV CROP *SUNFLOWER*



SUBMITTED FOR:
WULF CATTLE DEPOT

SUBMITTED BY: *MZ1154*
MZB-SBWG-MCLAUGHLIN
ZONES ONLY-BRENT
 BOX 640
 MCLAUGHLIN, SD 57642

REF # *13408650*
 LAB # *11339* BOX # *5064*

DATE SAMPLED _____ DATE RECEIVED *4/ 1/13* DATE REPORTED *4/ 2/13*

NUTRIENT IN THE SOIL	INTERPRETATION				1ST CROP CHOICE		2ND CROP CHOICE		3RD CROP CHOICE			
	V LOW	LOW	MED	HIGH	WHEAT		OATS		OATS			
0- 6" 18 lb/ac					YIELD GOAL 40 BU		YIELD GOAL 90 BU		YIELD GOAL 100 BU			
6-24" 27 lb/ac					SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES			
0-24" 45 lb/ac	*****				P & K MAINTENANCE		P & K MAINTENANCE		P & K MAINTENANCE			
Nitrate N					LB/ACRE	APPLICATION	LB/ACRE	APPLICATION	LB/ACRE	APPLICATION		
0lsen Phosphorus 6 ppm	*****				N	63	N	35	N	55		
Potassium 358 ppm	*****				P ₂ O ₅	26 Band #	P ₂ O ₅	22 Band #	P ₂ O ₅	28 Band #		
Chloride 0-24" 12 lb/ac	*****				K ₂ O	10 Band(Starter)#	K ₂ O	10 Band(Starter)#	K ₂ O	10 Band(Starter)#		
Sulfur 0- 6" 10 lb/ac	*****				Cl	28 Broadcast	Cl	28 Broadcast	Cl	28 Broadcast		
6-24" 24 lb/ac	*****				S	? Band (Trial)	S	7 Band (Trial)	S	7 Band (Trial)		
Boron					B	50# 10-50-0	B	40# 10-50-0	B	55# 10-50-0		
Zinc					Zn	10# 25-0-0-65	Zn	10# 25-0-0-65	Zn	10# 25-0-0-65		
Iron					Fe	125# 46-0-0	Fe	65# 46-0-0	Fe	110# 46-0-0		
Manganese					Mn	20# 21-0-0-24	Mn	10# 21-0-0-24	Mn	16# 21-0-0-24		
Copper	*****				Cu	1 Band	Cu	1 Band (Trial)	Cu	1 Band (Trial)		
Magnesium					Mg		Mg		Mg			
Calcium					Lime	0.0	Lime	0.0	Lime	0.0		
Sodium												
Organic Matter												
Carbonate (CCE)					Soil pH	Buffer pH	Cation Exchange Capacity	% Base Saturation (Typical Range)				
Soluble Salts					0- 6" 6.5			% Ca	% Mg	% K	% Na	% H
6-24" 0.30 mmo/cm	*****				6-24" _____							

61 LBS OF 0-0-60 = 28 LBS OF CHLORIDE

! CAUTION: SEED PLACED FERTILIZER CAN CAUSE INJURY !

Crop Removal: Crop 1: P205= 25 K2O= 15 Crop 2: P205= 20 K2O= 15 Crop 3: P205= 25 K2O= 19
 WISE Band/Maintenance guidelines will build P & K test levels to the medium range over many years and then maintain them.

Section K: Livestock Feed Management



Extension Extra

ExEx 2029
August 2001
Animal & Range Sciences

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

Managing Feedlot Cattle to Reduce Nutrient Waste

by Julie Walker, area beef Extension specialist, and
Brad Johnson,¹ Extension ruminant nutrition and beef feedlot specialist,
SDSU Animal & Range Sciences Department

Management opportunities can reduce feed costs and the cost of excess nutrient waste outputs. The key to controlling excess nutrient output is controlling nutrient intakes. The question becomes whether nutrient excretion can be reduced without negatively impacting animal performance?

Balanced Rations

Nitrogen and phosphorus are the primary nutrients considered in nutrient waste management systems. Excess nutrient excretion can be controlled by properly balancing diets according to nutrient requirements for production.

The maintenance recommendations for phosphorus (NRC 1996) have been reduced by approximately 43% from 1984 NRC recommendations. The new recommendation is 0.22% P to meet nutrient needs for maintenance and gain of an 800 lb steer on a finishing diet. Erickson et al. (1998) conducted an experiment to evaluate animal performance across various levels (0.14 - 0.34%) of P intake. Steer performance was measured as average daily gain (ADG), dry matter intake (DMI), and feed efficiency. These variables were not affected by P level in the diet. This suggests that when steer diets are balanced, producers can lower the P levels in the diet to the 1996 NRC recommendations without negatively affecting performance.

Most corn-based diets average 0.28 - 0.32 % P, exceeding the requirement for an 800 lb steer. The challenge then becomes lowering the phosphorus concentration of a corn-based diet.

Typically feedstuffs other than corn are needed to lower the phosphorus concentration of the diet. Comparing phosphorus book values of whole grains (barley, oats, sorghum, and wheat), corn has the lowest phosphorus level. Therefore, the best possible management alternative is to minimize additional supplementation of phosphorus.

Forages are typically lower in phosphorus than concentrates. However, lowering the ration P concentration by increasing levels of forage has the disadvantage of decreasing gains.

Protein (nitrogen) requirements can be divided into two segments, protein needed by the microbial population in the rumen and protein needed by the animal. Degradable intake protein (DIP) is the protein used to meet the microbial requirement and the animal requirement can be met by microbial protein leaving the rumen and by undegradable intake protein (UIP). Excess DIP is converted to ammonia and excreted in the urine.

Protein requirements change as the animal grows. There is an opportunity to reduce crude protein level of the diet. When a ration is balanced using DIP and UIP, usually the crude protein of the ration is lower than when balanced with crude protein levels.

¹ Department of Animal Science and Industry, 126 Call Hall, Kansas State University, Manhattan, KS 66506

Feedstuffs vary in the amount of protein degraded in the rumen (DIP) versus small intestine (UIP). For example, dry-rolled corn is 40% DIP and high-moisture corn is 60% DIP with the same amount of crude protein (8-10%).

Protein sources also vary in DIP percentages, such as soybean meal 65%, cottonseed meal 57%, feathermeal 30% and fishmeal 40%. By using a variety of feedstuffs, UIP, and DIP requirements can be met at lower crude protein levels in the diet, thus reducing nitrogen excretion.

Phase Feeding

Phase feeding is a systematic method for adjusting the animal's diet during the feeding period to meet its nutrient requirements. Since nutrient requirements change as cattle grow, protein and phosphorus requirements can be reduced as an animal matures. This suggests the opportunity to reduce nitrogen and phosphorus intakes and excretion.

An experiment was conducted by the University of Nebraska to evaluate phase feeding with yearlings and calves. The concentrate portion of the diets was comprised of dry rolled corn, high moisture corn, or corn bran. Control (CON) steers consumed a diet of 13.6% CP, 4.48% UIP, and .34% P compared to a balanced (BAL) yearling diet that was systematically reduced during the feeding period from 11.9-11.2% CP, 3.67% UIP, and .24-.22% P. Yearlings fed the balanced diet consumed less dry matter than the control steers (Table 1). However, no differences in ADG, feed efficiency, or carcass characteristics (data not shown) were found.

The second experiment involved calves. The control diet was 13.4% CP, 5.16% UIP, .35% P compared to the balanced diet (12.7-10.8% CP, 5.51-3.02% UIP, and .26-.20% P), which was phase-fed in 8 finishing diets. Calves fed the balanced diet had similar DMI, ADG, and feed efficiency as control calves (Table 1).

Table 1. Feedlot performance for yearlings and calves fed control or balanced rations.

ITEM	YEARLING		CALVES	
	CON	BAL	CON	BAL
Initial Wt, lb	652	660	539	542
Final Wt, lb	1249	1249	1245	1247
DMI, lb	26.2	25.0*	20.6	20.5
ADG, lb	4.06	4.01	3.66	3.65
%G	6.45	6.21	5.72	5.64

Erickson et al., 1998

* P < .05

Phase feeding yearling steers reduced N and P excretion by 16 and 44% respectively (Table 2). This indicates improved nutrient output (i.e. lower N and P excretion) can be achieved without compromising animal performance.

Table 2. Nitrogen and Phosphorus Balance for yearlings.

	NITROGEN		PHOSPHORUS	
	CON	BAL	CON	BAL
	Lbs/hd/d		Lbs/hd	
Intake	.56	.47*	12.52	7.90*
Retention	.06	.06	2.05	2.03
Excreted	.50	.42*	10.47	5.87*

Erickson et al., 1998

* P < .01

Phase feeding allows nutritionists to more effectively optimize performance without overfeeding. This improvement was demonstrated by reducing intake thus reducing potential feed costs. Additional cost savings could be realized by reducing the amount of nutrients excreted in animal waste.

A practical disadvantage of phase feeding is constantly changing diets. Phase feeding increases management requirements to ensure proper delivery of the correct diet. The risk of metabolic disorders that could occur with improper diet changes is increased in these systems.

Implants

Anabolic growth-promoting agents, commonly referred to as implants, are approved for use in steers and heifers targeted for harvesting. Characteristics of implanted cattle are enhanced growth rate, feed efficiency, and lean tissue accretion. Implanting steers on finishing diets has improved gains by 8-20% and feed efficiency by 5-15%. With implanted heifers, gains were increased 10-20% and feed conversion improved by 7-12%.

The increased tissue accretion suggests the possibility of reduced nutrient excretions. An example from Johnson et al. (1996) showed that the animals implanted with trenbolone acetate (TBA) + estradiol (E2) increased ADG by 18% (Table 3) during the 40 day period, suggesting that nitrogen and phosphorus retention would be higher in the implanted animals. Table 4 shows that the amount of nitrogen retained in the carcass was increased by 82% during the first 40 days for implanted animals. Similar intakes were observed in this study; therefore, the amount of nitrogen excreted would be less from implanted animals compared to control animals. Table 5 illustrates calculated estimates for reducing phosphorus excretion by implanting during the first 40 days. Phosphorus is needed for both maintenance

(Pm) and gain (Pg). Since the maintenance requirement is calculated from body weight, implanted animals have a slightly higher requirement. Phosphorus for gain is calculated as 3.9 g per 100 g of protein gain or 5.54 g P/d and 10.10 g P/d for control and implanted animals, respectively.

Since true absorption of phosphorus is 68%, 18.3 g P/d and 25.1 g P/d were needed by the control and implanted steers to meet their phosphorus requirements for maintenance and gain. The phosphorus balance calculations indicate potential for reduced phosphorus excretion.

Table 3. Feedlot Performance for initial 40 days of finishing period

ITEM	CONTROL	IMPLANTED
Initial Wt, lb	869	869
Days 0-40		
ADG, lb	3.89	4.58*
F/G	5.47	4.83*
DMI, lb	21.3	22.2
P Intake, g/d	26.14	27.19

Johnson et al., 1996
P < .05

Table 4. Effect of TBA + E2 on Carcass Nitrogen

ITEM	CTL		IMP		%Response
	N Intake, g/d		Carcass N gain, g/d		
Days 0-40	186	193	18.2	33.1	82**
Days 0-115			18.9	25.3	34*
Days 0-143			18.2	22.7	25*
Days 41-115	192	210	19.5	20.3	4
Days 116-143	179	201	11.5	18.2	58

Johnson et al., 1996
** P < .01
* P < .10

Table 5. Phosphorus Balance for first 40 days

ITEM	CONTROL	IMPLANTED
P Intake, g/d	26.14	27.19
Pm, g/d	6.89	6.99
Whole Body Protein Gain, g/d	142	259
Pg, g/d	5.54	10.10
P Excreted, g/d	20.6	17.09
Estimated requirement, g/d	18.3	25.1
P Excess, g/d	7.8	2.09

Calculated from Johnson et al. 1996 data.

Summary

Ration balancing allows producers to manage the nutrient intake for optimum performance and minimizing nutrient output. Adjusting rations throughout the feeding period reduces potential of overfeeding of nutrient such as nitrogen and phosphorus. Use of implant and other growth enhancers permits for improvements nutrient retention, thus reducing nutrient output.

Reference

- Erickson, G., M. Klemesrud, T. Milton, and T. Klopfenstein. 1998. Phosphorus Requirement of Finishing Yearlings. Nebraska Beef Report: 78-80.
- Erickson, G., T. Milton, and T. Klopfenstein. 1998. Evaluation of 1996 NRC for Protein and Phosphorus Requirements of Finishing Cattle. Nebraska Beef Report: 84-85.
- Johnson, B.J., P.T. Anderson, J.C. Meiske, and W.R. Dayton. 1996. Effect of a Combined Trenbolone Acetate and Estradiol Implant on Feedlot Performance, Carcass Characteristics, and Carcass Composition of Feedlot Steers. J. Anim. Sci. 74:363-371.



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Section L: Odor and Insect Pest Control

RECOMMENDED STRATEGIES FOR ODOR CONTROL IN CONFINEMENT BEEF CATTLE OPERATIONS

*Kent Tjardes¹, Alvaro Garcia², Hans Stein¹,
Charles Ullery³, Stephen Pohl³, and Christopher Schmit⁴*

¹Animal and Range Sciences Department, ²Dairy Science Department, ³Agriculture and Biosystems Engineering Department, and ⁴Civil and Environmental Engineering Department, South Dakota State University, Brookings, S.D.

Odors coming off a beef feeding operation are generated from three different sources: the feedlot facility, waste storage, and the land where the manure is applied. In some operations, the feedlot facility may also serve as the primary waste storage area. To reduce the total amount of odor generated from a beef feeding operation, odor generation and emission by each of these three sources needs to be reduced.

Several options for odor reduction are available in each area. Only practices that are proven to be effective and that can be immediately implemented in new and existing facilities are listed in Table 1. Other options are currently being developed or tested; continued research will reveal whether they can be successfully implemented in the future.

The table is organized in four sections covering practices to reduce odor generation, reduce odor emission from facilities and storage units, increase odor dispersion, and reduce odor emission from manure application. For each practice, advantages and disadvantages are listed. The effectiveness and the cost of implementing each practice are indicated using odor generation from a standard beef feeding operation as a base line. The base line operation is assumed to be dirt-lot with no slope, no additional manure storage structure, and no dietary modifications to reduce odor generation.

The effectiveness of each practice is indicated as "low," "moderate," or "high." A low effectiveness is assumed to reduce odor generation by less than 20%; moderate, 20 to 50%; and high, more than 50% relative to the base line operation. These values relate only to the specific area in which the practices are used.

Some practices in the table are listed as best management practices (BMP). These are practices with a well-documented beneficial effect on the sustainability of a production system. Their implementation should be encouraged even without considering their potential for reduction of odor emission.

The cost of each practice is indicated. A "low" cost is assumed to be less than \$0.50 per head marketed (steer or heifer), "moderate" adds \$0.50-\$1.50 per head, and "high" adds more than \$1.50 per head to total production costs as compared to the base line unit.

Final Recommendations

The most common beef cattle feeding facilities in South Dakota are dirt lots. Simply modifying management practices, such as balancing diets properly, keeping the lots dry by providing adequate slope and manure removal, and incorporating manure as quickly as possible following application, can reduce odors emissions from these types of facilities. Other practices listed also should be considered for greater levels of odor control.

For cattle confined in a building, a biofilter may be considered. This is an inexpensive, environmentally friendly system producers can construct. It is made from a compost-woodchip mixture that, when moistened, captures and contains many common odors. It is attached to an exhaust fan, and when air is directed through the compost mixture, it traps up to 96% odor-free air.

Research in the area of odor reduction is ongoing and many new technologies are being developed. As independent research using these technologies become available, some of them may prove to be even more effective than the once listed above.

References

1. Extension Odor Team. 2002. Livestock and poultry odor. Department of Biosystems and Agricultural Engineering. University of Minnesota, St. Paul, Minn.
2. MidWest Plan Service. 2001. Livestock and poultry environmental stewardship curriculum. Iowa State University, Ames, Iowa.
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4. Sutton, A., T. Applegate, S. Hankins, B. Hill, G. Allee, W. Greene, R. Kohn, D. Meyer, W. Powers, T. van Kempen. 2001. Manipulation of animal diets to affect manure production, composition and odors: state of the science. Proc, Addressing Animal Production and Environmental Issues. North Carolina State University, Raleigh, N.C.
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Table 1. Odor reduction practices for beef feedlots

Practice	Description	Advantages	Disadvantages	Effectiveness	Cost	Comments
Generation						
a. Diet manipulation	Feeding closer to protein requirements (phase feeding).	Decreased N excretion with diets balanced for requirements.	None	Low to moderate	Low	Returns in production offset costs. Should be considered a BMP.
	Balance diets for protein degradability rather than total crude protein.	Overfeeding crude protein (CP) avoided. Efficient nutrient use.	Possibly more labor	Low to moderate	Low	Returns in production offset costs. Should be considered a BMP.
	Avoid overfeeding sulfur	Sulfur excretion prevented, reduced production of hydrogen sulfide and other aromatic compounds	If requirements are underfed, microbial protein may be depressed	Low	Low	
b. Feed preservation	Avoid ensiling forages with excess moisture. Adjust feed-out face to minimize aerobic exposure.	Reduced spoilage. Increased efficiency of feed utilization.	Dependent on weather and timely availability of harvesting equipment.	Low	Low	Improved efficiency of nutrient utilization offsets costs. Should be considered a BMP.

Table 1. Odor reduction practices for beef feedlots (cont.)

Practice	Description	Advantages	Disadvantages	Effectiveness	Cost	Comments
EMISSION						
a. Animal housing						
1. Earthen lots (with or without sheds)	a. Adequate slope b. Oil treatment	Keeps lots dry to reduce microbial activity Prevents dust and may prevent respiratory irritations in cattle	Need collection for runoff	Moderate	Low	Waste management issues may need to be addressed
2. Concrete lots with sheds	a. Scrape manure often	Reduces volatilization	Increased cost of product and application	Low	Low to moderate	Some of the cost may be offset by improved performance
3. Solid floor building	b. Bedding a. Deep pack	May reduce volatilization of nitrogen and sulfur May reduce volatilization of nitrogen and sulfur	Increases labor Increased cost of bedding, manure handling and labor Increased cost of bedding, manure handling and labor	Moderate Low to moderate Low to moderate	Low Low	Should be considered a BMP
4. Slatted floor building	a. Biofilters. Air is exhausted through a biofilter. Materials: Mixtures with 30% to 50% of compost (by weight) and 70% to 50% of wood chips	Very effective	Cost and building design may prevent use	Moderate	Moderate	More research with these building types need to be conducted Lateness and reduced performance may be a problem with long days on feed
b. Manure storage						
1. Earthen basins (single or double cell)	Covers: Natural crust Bio-covers (straw) Inorganic (geo-textile, clay balls, plastic cover)	High nutrient retention	Difficult to cover evenly. Care must be taken during agitation and pumping (particularly with inorganic covers). With plastic covers air can exhaust through a bio-filter	Natural crust: Bio-covers: Inorganic covers:	High High High	Odor potential if slurry is not injected. Local ordinances may limit design options. Effectiveness highly dependent on proper management
2. Steel or concrete tanks above or below ground:	Covers: a. Impermeable (PVC, wood, concrete) b. Permeable (straw)	Duration (10-15 years) Cost May reduce odor/ammonia. Easier agitation and pumping.	Cost Duration. Sometimes difficult to maintain afloat Capital/operational costs; reliability	a. Impermeable: b. Permeable: Moderate	High High Moderate	Impermeable cover: A bio-filter needs to be added at the end of the vents to treat exhaust gases Adds another "waste" source to be managed by the producer
3. Solids separation	Solids separated from liquids through sedimentation basins or mechanical separators	Reduces methane, hydrogen sulfide, ammonia and volatile fatty acids.	Added utility costs. Requires power to aerate the materials	Moderate	Moderate	
4. Aeration	Air is forced into the manure storage system. Aerobic bacteria oxidize odorous compounds to carbon dioxide and water	Generation of electricity.	Currently suitable for dairies with 1,000 animal units or more. Likely requires slatted floor building	High	High	Limited data
5. Methane digesters	Treats waste with 3-10% solids. Biogas methane produced to maintain digester temperature					

Table 1. Odor reduction practices for beef feedlots (cont.)

Practice	Description	Advantages	Disadvantages	Effectiveness	Cost	Comments
Siting/Dispersion						
a. Shelterbelts	Creates barrier of vegetation for dust and odor compounds.	Help disperse and dilute odors. Cost. Environment. Aesthetics	Planning and time required for effective barrier to grow	Low	Low	The most cost effective odor dispersion method.
b. Windbreak walls	Solid or porous wall 10 to 15 feet from the exhaust fans causes dust to settle.	Rapid implementation. Help disperse and dilute odors. Trap dust particles	Cost. Aesthetics. Need for periodic cleaning of dust from porous walls	Low	Low to moderate.	Recent and on-going research but needs more
c. Setback distances	Optimize distance between odor emission sources and urban areas	Complaints less likely	Not applicable for dairies currently in operation	High	Variable.	Recent and on-going research but needs more
Land Application						
a. Manure incorporation	Manure is rapidly incorporated in the soil after spreading with plowing	Reduces odor and ammonia emissions	Requires some degree of management by the producer	Moderate	Moderate	Most research has been done in Europe. More research on odor emission needed
b. Manure injection	Manure is injected into the soil (shallow and deep)	Reduces odor and ammonia emissions	Cost	High	Low	Most research has been done in Europe. More research on odor emission needed
c. Band spreading	Manure is discharged at ground level through a series of trailing pipes	Reduces odor and ammonia emissions	Manure must be rapidly incorporated	Low	Low	Most research has been done in Europe. More research on odor emission needed

Identifying and Controlling Flies

On dairy, beef, other livestock and pets

W.L. Gojmerac

Among the more common flies associated with livestock are the house, face, stable, horn, deer and horsefly. Before starting control procedures, it is important to accurately identify them since their behavior, life cycle, and sites where larvae develop are different. For example, horn and face fly larvae develop only in fresh cow manure in the pasture, deer and horsefly larvae in swamps, and house and stable fly larvae in decaying organic matter. The following descriptions will enable you to identify the type of fly which is causing problems.

Identification

House Fly

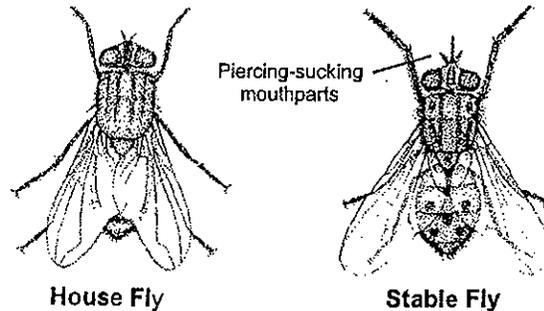
Description: The house fly is well known because it is generally near human and animal habitations. The fly is gray in color with four dark stripes down its back and the face is slightly straw colored. It feeds with a swabbing type mouth rather than a blood-sucking type. The house fly is about 1/4 inch long. While most important as a disease carrier, house flies also disturb cattle. They are most active on hot, sunny days.

Life History: Adult flies become active in April and May and lay eggs in batches of 100–150 in manure and garbage. Up to four layings have been noted. Eggs hatch in about 24 hours. Maggots have fully grown in about 7–10 days and then pupate. At the end of the pupation period, flies emerge and in several days lay eggs. In hot weather, populations increase rapidly because the life cycle requires only 10–14 days; but during cooler periods, the life cycle may be as long as 2–3 months. Normally the maggots or pupae overwinter, but often adults survive in heated buildings or barns.

Stable Fly

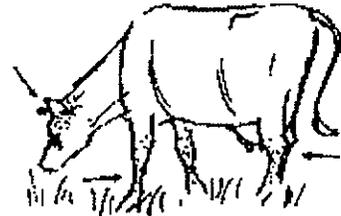
Description: The stable fly is similar in appearance and size to the house fly except that it has well-developed black, piercing-sucking mouth parts. The back and abdomen have several large spots on them. When not on cattle, the stable fly likes to rest in the shade on wooden posts, trees, and buildings. The stable fly prefers to attack active animals rather than those at rest. Ears and legs of cattle are the parts most often fed upon, and without control, numbers of flies are particularly noticeable on the legs of cattle. The stable fly generally feeds upwards, and attacks cattle only during the day.

Life History: Stable flies lay their eggs in manure and decaying vegetation. Egg laying is started only after the female has consumed three blood meals which may be as soon as 9 days after the fly emerges. The cycle from egg to adult takes about a month and there may be several



House Fly

Stable Fly

Stable Fly
Attack points

generations per year. Maggots and pupae overwinter in strawy manure.

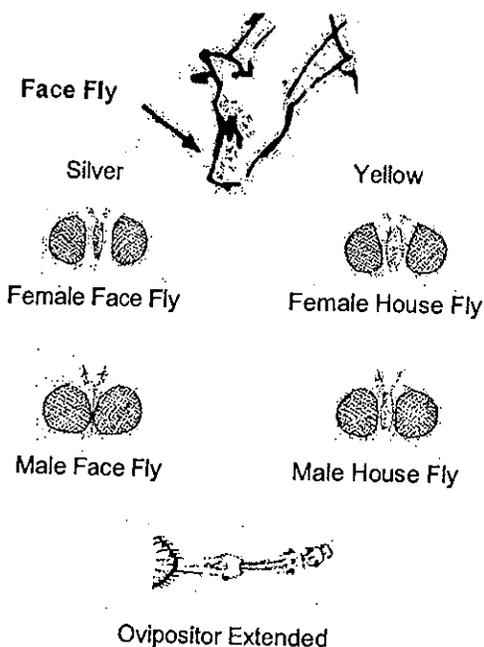
Face Fly

Description: In size and appearance the face fly is nearly identical to the house fly and it takes an expert to distinguish between them; however, the face fly can usually be identified by its location on the cow. Face flies congregate in large numbers around the heads of cattle, particularly those moist areas caused by tears and saliva. This is very annoying to a cow and can cause reductions in weight gains or milk production. Pink eye and blindness in cattle are believed to be spread by this fly as it swabs up mucus and moisture about the eyes. In summer the face fly often rests in the sunlight on wooden posts and feed bunkers where cattle are kept.

There is a positive method for distinguishing between face flies and house flies, but it is necessary to catch the fly. The female face fly has a silvery face; the female house fly has a yellowish face. Females can be distinguished by squeezing their abdomen. This causes the ovipositor or egg laying structure to extend from the tip of the abdomen. No similar structure is present in males. The eyes of male face flies almost meet in the center of the head but the eyes of the male house fly are well separated. With a little practice, it becomes unnecessary to capture the fly to make such distinctions.

Life History: The life cycle of the face fly is nearly identical with that of the house fly, except that a face fly can lay as many as 1500 eggs in its life span. Eggs are laid and

larvae develop in fresh cow manure in pastures. The fly often overwinters in houses and when numerous become a household pest on warm winter and spring days.



Horn Fly

Description: The horn fly is about half the size of a house fly (slightly more than 1/8 inch), dark gray in color, and has piercing-sucking mouth parts. The horn fly remains on cattle day and night, leaving only to lay eggs in freshly dropped cow manure. Horn flies feed primarily on withers, around the horns, and along the back. They generally feed facing downwards. During hot weather or rains, the flies may move to the belly and on cool nights may cluster around the udder. The adults live about 3 weeks and feed exclusively on cattle blood. The annoyance caused by horn flies causes milk production and weight gains to be reduced.

Life History: Horn flies lay their eggs in fresh cow manure where the maggots can feed. The eggs hatch in about 20 hours and maggots develop for about 5 days before pupating. At the end of a 5-day pupation period, the flies emerge and within 3 hours begin feeding on a cow. By the third day the females can begin laying eggs. Only about 20 eggs are produced per batch, but a female may lay up to 400 eggs in her lifetime. Maggots and pupae overwinter in manure.

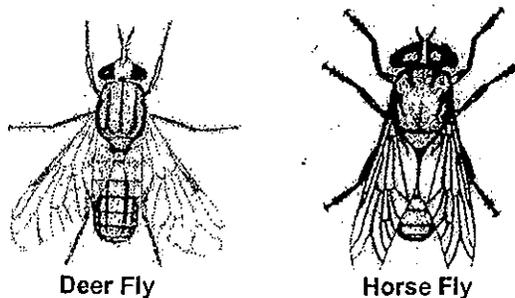


Horn Fly

Deer Fly

Description: Deer flies are a little larger than house flies and the body is yellow with brown stripes. The wings have conspicuous brown bands and the mouth parts are the piercing-sucking type. Deer flies are heavy feeders, and wounds they make by feeding may bleed after an attack. They are daytime feeders and most active on hot days.

Life History: Eggs are usually attached to vegetation above water or moist ground. Upon hatching, the larvae drop into the soil and spend one to several winters here, before maturing in pupae and finally emerging as adults.



Horse Fly

Description: Horse flies are the largest and most easily recognized cattle pests in Wisconsin. There are several species of horse flies in Wisconsin; however, all can be recognized as horse flies by their large size, their large rounded eyes, and the loud buzzing they make while in flight. The females have large, piercing-sucking mouth parts which inflict painful wounds. The males are harmless flower feeders. Biting is usually confined to the back with only a few flies on a cow at one time. They attack cattle only during the day and are most active on hot days.

Life History: See deer fly.

Control

Livestock Operations

Good sanitation is required if house and stable fly population are to be kept at a minimum. Weekly cleanout of calf pens, hutches and box stalls is a must. Don't forget the accumulated feed, especially under drinking cups.

Flies can and will breed in manure that accumulates in exercise yards around feed bunks, fence lines and any place not trampled by cattle. If cattle are kept in the exercise yard during the summer, you will have more fly problems than if cattle are pastured away from farm buildings—manure handling and feed storage facilities will require special attention.

Health and milk quality control officials specify how often gutters should be cleaned. But remember, flies also breed in decaying feed, in manure that accumulates around sprockets of the barn cleaner and in recesses, corners and crevices where manure has accumulated longer than one week.

Dairy Cattle

The selection of fly sprays for use on dairy cattle is important. Using the wrong product could not only injure the animal, but might contaminate its milk with an illegal residue. Products approved for use on dairy cattle by state and federal authorities are safe and will not contaminate milk when used properly. Be sure the label states this approval and follow directions exactly.

Several coumaphos (CO-RAL), dichlorvos (Vapona), permethrin (Ectiban, Atroban), pyrethrins and tetrachlorvinphos (Rabon) products are available and registered for use on dairy cattle. They can be purchased as a ready-to-use mixture or as a concentrate to be mixed with water. Naled (Dibrom) can be used in the dairy barn but not in the milk room or milk house. Coumaphos (CO-RAL), malathion, methoxychlor, permethrin (Ectiban, Atroban) and tetrachlorvinphos (Rabon) dusts are also registered.

Although dusts are available and registered for use on dairy cattle, some milk-marketing organizations object to their use. Check with your local fieldmen before using them. Dusts applied directly to cattle have been effective only on horn flies.

Cattle can be self-treated as they enter or leave the barn, hand sprayed, or the barn can be mist- or fog-treated while the cattle are inside. Do not individually treat cattle and mist/fog barn at the same time. Follow directions on the container exactly. Observe all safety precautions. If face flies are a problem, give special attention to spraying head and shoulders.

Back rubbers are an effective way to treat cattle not regularly coming into the barn. Use only those products approved for backrubber use on dairy cattle, such as permethrin or coumaphos (CO-RAL). Follow mixing directions on the label.

DO NOT MAKE YOUR OWN COMBINATION PRODUCTS BY MIXING INSECTICIDES.

Milkhouse and Egg Handling Room

Hand spray or fog with dichlorvos (Vapona) or pyrethrins when necessary. Use the same dosage listed for dairy cattle. Do not contaminate food handling utensils. The dichlorvos (Vapona) strip can be used. But do not use it in kitchens or in food handling and processing establishments where there is exposed food. Sticky fly strips or papers can also be used where appropriate.

Electronic ultrasonic repellers are supposed to "drive away" pests and not harm the good animals. These devices simply don't work.

Electrocutors and light traps will kill insects when employed properly. Some are designed to intercept night-flying insects entering a food plant that are attracted to light. Others are designed to monitor insect populations. This is far different than trying to control insects, such as flies, which are not highly attracted to light. There is no question that some flies will be electrocuted when they contact the exposed wires, but the number killed is a very low percentage of flies in the area. So for practical purposes, electrocutors and light traps are of no value.

Buying and releasing beneficial, parasitic or predator insects is an excellent way to control pests, but this technique works only in a very limited number of situations, and managing this process is a highly complex operation. The U.S.D.A. studied fly populations on feedlots and dairies. Researchers reported no differences in adult populations of flies on those farms releasing parasites when compared to the other farms.

Livestock Barns

Diazinon (WP), dimethoate, fenthion (Baytex), malathion, naled (Dibrom) permethrin (Ectiban, Atroban) and tetrachlorvinphos (Rabon) can be used in livestock housing.

As a routine precaution, remove all livestock from the building being sprayed. Spray the walls and ceilings with insecticide. Repeat when flies no longer drop from the surface because insecticide has lost its toxicity. Insecticides are generally non-toxic or useless if applied to a concrete or brick surface—improved performance is obtained by painting or whitewashing before spraying. Some insecticides can be mixed and applied with whitewash. Do not spray exposed Styrofoam insulation with the insecticide mixture.

Feed Additives to Control Flies

Several products are approved for use as a feed or mineral additive or in a bolus to control flies. They are diflubenzuron, phenothiazine, methoprene (Altosid) and tetrachlorvinphos (Rabon). These chemicals pass through the digestive tract without harm to the animal and leave no illegal residues in the meat and/or milk when mixed and fed according to manufacturer's directions. Enough insecticide remains in the manure to kill or prevent flies from completing their development.

Tetrachlorvinphos (Rabon) is registered for use in dairy as well as beef animals, while phenothiazine is approved only for beef animals.

The insecticide must be mixed with either the feed concentrate or mineral mixture. The animal must consume a specific amount of feed-insecticide or mineral-insecticide mixture daily. For example, tetrachlorvinphos is registered to be fed at 70 milligrams per 100 lbs. of body weight per day. You need to know the weight of the animal being fed and the amount of feed consumed each day by this animal. Based on this information your feed dealer and/or chemical supplier can determine the quantity of stirofos to be mixed into your feed.

Bolus

To control developing flies (maggots) in manure, uniform quantities of insecticide must be present at all times. A bolus containing diflubenzuron (Vigilante), when placed in the animal's stomach, will constantly release insecticide all season, at concentrations adequate to kill developing flies. The bolus can be administered with a standard balling gun. Small animals require 1/2 bolus; medium animals, 1 bolus; and large animals, 1 1/2 boluses. This product is approved for beef as well as dairy animals.

Ear Tags

Insecticide-impregnated ear tags have been approved for use on dairy and beef animals. Be sure tags are attached correctly. They are very effective in controlling horn flies, only moderately effective in reducing numbers of face flies, and are much less effective against house and stable flies.

Beef Cattle

Primary pests on beef cattle are horn, face, deer and horse flies; and mosquitoes. Currently there is no practical control for deer and horse flies or mosquitoes. Face flies are also difficult to control. However, the horn fly is easy to control, and the farmer has a choice of insecticides. Use the proper dosage; follow all safety precautions; and if cattle are to be sold for slaughter, observe the proper withdrawal periods. These products can be applied by spray, backrubber or self-treating dust bags.

Other Animals

While flies generally do not bother hogs, chickens, and rabbits, and horses and dogs are not involved in human food production, fly control is still important. Flies are considered a public health nuisance and health authorities can force you to take action.

If you are involved with these animals, recognize your responsibilities. Decaying organic matter such as manure, unconsumed food, spilled food, or wet bedding can help produce large quantities of flies. Do not rely on insecticides. **Sanitation can replace insecticides, but insecticides will not replace sanitation.** Generally the most practical solution is a compromise.

When using insecticides near and around animals:

- a. Read and follow label directions exactly.
- b. Do not apply any insecticide directly on an animal unless the label specifically states the animal can be safely treated.
- c. When using any insecticide near the animals, be aware of the animals' normal or natural behavior. Horses can be frightened by a spray; cats, by their normal grooming, might ingest chemicals applied to their fur; and birds might pick up fly or roach bait, or they may try to alight on a suspended dichlorvos (Vapona) strip.

Recent Changes

Under current federal regulations, insecticides are not permanently registered. The Environmental Protection Agency reviews the current research data base, and if it is incomplete, the EPA can require the manufacturer to provide additional data to support the registration claims. If there is evidence that the insecticide causes an unreasonable adverse effect on the applicator, animal, food product or environment, the EPA can require modified directions on the label.

The manufacturer has several options: 1) provide the required data to support registration; 2) withdraw certain uses; or 3) withdraw the registration and stop making and selling the product.

Unless there are questions of safety and/or serious illegal residues, existing supplies of the product may be used.

Several popular insecticides are now being phased out or having uses withdrawn because the manufacturers believe the cost of supplying the data won't be recovered from product sales. You may find that your favorite product is no longer available, or that you may no longer use it to control a specific pest.

Therefore, it's important to 1) buy only reasonable quantities of any insecticide at one time, and 2) deal with responsible suppliers handling only currently registered products.

Resistance

In some parts of the United States, flies have developed a high degree of resistance to the pyrethroid insecticides such as cyfluthrin, cypermethrin, cyhalothrin, fenvalerate and permethrin. If you have fly-control failures with pyrethroid insecticides, consider using phosphate products (a different class) such as coumaphos, diazinon, dichlorvos or tetrachlorvinphos.

Buying an Insecticide

Consult a knowledgeable person when buying insecticides—mistakes can be costly. When in doubt, contact the State Department of Agriculture, Trade and Consumer Protection. It is responsible for administering and enforcing Wisconsin insecticide laws.

See publication A1991, Controlling Mosquitoes for recommendations for mosquito control; and publication A1235, Spider Control in Homes and Barns, for spider control.

University of Wisconsin-Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and provides equal opportunities in employment and programming including Title IX requirements.

W.L. Goljmerac is professor of entomology, College of Agricultural and Life Sciences, University of Wisconsin-Madison and University of Wisconsin-Extension, Cooperative Extension. We extend appreciation to O.L. Lovett and Wisconsin State Department of Agriculture, Trade and Consumer Protection for the illustrations and descriptions of flies.

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Section M: Operation & Maintenance,
Holding Pond Pumping and Emergency Plan

M. OPERATION & MAINTENANCE GUIDELINE

The owner acknowledges responsibility for the proper operation and maintenance of the animal waste management system. Although the design is based on the best available technical knowledge, it must be recognized that any system creates some risks, and therefore needs to be properly operated and maintained, including periodic inspection. In addition, maximum efficiency cannot be obtained unless the system is properly operated and maintained so that it will function safely in its intended manner.

Recognizing this, this Manual has been prepared as a general guideline for operating and maintaining the system. This Manual is not inclusive of all of the provisions of the General Water Pollution Control Permit for Concentrated Animal Feeding Operations, therefore the owner should review the permit in its entirety.

It is recommended that the following list be reviewed and be used as a checklist to ensure major elements of operation and maintenance are consistently being observed.

I. General Considerations

- A. Any discharge from the waste management system or land application sites must be reported as soon as possible, but no later than twenty-four hours after the discharge was discovered. The discharge must be reported to the EPA at (303) 293-1788.
- B. All inspections should be documented on the forms included with this manual or other suitable forms. Documentation must be maintained on site and be made available to the EPA when requested.
- C. Travel of vehicles and livestock should be confined to designated areas to prevent erosion and enhance vegetation.
- D. Maintain grades around containment structures to assure positive surface drainage away from the structures in all directions. Fill any settled areas which may collect water.
- E. Any discovered damage to any facility component must be repaired as soon as possible to original specifications.
- F. Do not allow trees to grow adjacent to holding ponds, to avoid root damage to the structures.
- G. Manage vegetation growth on and near facility components so that adequate component inspection is possible.

- H. Control vegetation growth on the holding pond interior below the maximum operating elevation to prevent liner damage from roots.
- I. Maintain the overall system (i.e. pens, building covers, diversion channels, stacking pads settling basins and risers) to ensure that all contaminated runoff enters the containment structures.
- J. The entire feed storage area must be managed to minimize both seepage from any high moisture feed and runoff from the area. Silage piles shall be covered as soon as possible after the feed is harvested and uncovered as the silage is fed.

II. Waste Application Considerations

- A. Routinely monitor the level of the pond to assure there's enough storage remaining (plus freeboard) to hold the designed volume of a 25 year 24 hour storm event. This maximum operating level is marked on the staff gage in Holding Pond 4. Land application must be planned and carried out to prevent holding pond levels from rising above the maximum operating elevation. In the event that this level is exceeded, the producer has 14 days of possible land application days to restore the pond to a level at or below the maximum operating elevation.
- B. Plan ahead and use the "Plan for Pumping feedlot Runoff Holding Ponds" following this section for additional information.
- C. Whenever possible, apply downwind from any residences. Avoid applying on calm, humid days, since these conditions restrict the dispersion and dilution of odors. Application on weekends or holidays, when people in the area are more likely to be outdoors, should also be avoided.
- D. Do not apply waste on snow or frozen ground unless unavoidable. Consult the General Permit for conditions that must be followed in these circumstances
- E. Do not apply waste material immediately after rain or within twelve hours of forecasted rain unless it can be immediately incorporated into the soil.

III. Inspection and Documentation

- A. Items to be Performed Daily
 - 1. Year Round
 - a. Record any measurable precipitation.
 - b. Record the date that livestock are brought in to and removed from the facility.

2. During Periods of Land Application
 - a. Record the days each field is applied to, as well as weather conditions including; temperature and wind speed and direction.
 - b. Inspect and record the condition of the land application fields being used.
 - c. Inspect and record the condition of all land application equipment being used.
 - d. Inspect and record the condition of the holding pond liner and embankment near the pump intake if pumping is taking place.
- B. Items to be Performed Weekly

The entire Waste Management System must be inspected weekly. This includes but is not limited to the following.

 1. Record the depth of water in all evaporative ponds.
 2. Inspect risers and pipe to ensure they are not plugged or damaged. Clean any significant sediment build up as soon as possible.
 3. Inspect evaporative ponds for signs of leaking or seepage, excessive settling, excessive vegetation growth or damage due to vehicles or equipment, rodents or erosion. Report any leakage as detailed above and make plans to rectify any problems as soon as possible.
 4. Inspect fences and safety signs around facility, if applicable, to ensure they are present and in good condition. If necessary repair immediately.
 5. Record any livestock mortalities and how the carcasses were properly disposed of.(i.e. rendering service receipt, location of burial, etc.)
- C. Items to be Performed Annually
 1. Conduct soil and manure nutrient testing as required by the Nutrient Management Plan.
 2. Prepare an annual Planned Manure Recommendations based on current data.
 3. Prepare and submit an annual report to the EPA.
- IV. Items pertaining to the control of odors, flies and other nuisances
 - A. As much as is reasonable, standing water and wet pen conditions shall be prevented or eliminated by routine pen maintenance.
 - B. Mortalities shall be promptly disposed of in an appropriate manner (incineration, burial, etc.).
 - C. Feed storage and bunk areas will be managed to as much as possible prevent

spoilage of feed. When spoilage does occur, it shall be promptly cleaned up and disposed of properly (i.e. field applied, dried and stockpiled, buried, etc.).

D. If insects become problematic, a pesticide program will be undertaken for control.

V. Record Keeping

A. The following items should be kept on site at all times.

1. Copy of the approved EPA Permit Application.
2. Copy of current nutrient management plan.

B. The following items should be kept on site for a period of 5 years from the date they are created.

1. Inspection reports from all inspections listed above.
2. Soil and manure nutrient test results.
3. Calculations of allowable manure application rates and actual rates applied.
4. Documentation of any action taken to correct deficiencies.
5. Documentation of any discharge, steps taken to minimize it and the estimated volume discharged.

I have reviewed the above Operation and Maintenance Manual for my Waste Management System and agree to provide the necessary resources to properly implement its provisions.



Operator

09/28/2020

Date

Plan For Pumping Holding Ponds

Operator Name Wulf Cattle Depot
 Date 09/25/2020

County Corson Pond ID or Legal Description Holding Pond 4

- Method Selected for Land Application of Wastewater
X Pipeline/Sprinkler System (Permanent): *Waste Storage Pond 2*
 _____ Big Gun Sprinkler (Temporary)
 _____ Drag Hose System
 _____ Tank Wagon: *Waste Storage Pond 1*
 _____ Other (Explain) _____

- Pre-Arranged Source of Application Equipment (List all necessary equipment and access to it).

<u>Type Equip.</u>	<u>Obtain Where</u>
Pump	Floating Pump on Pond 4
Pipe	To Existing Pivot on Field 3, 12B, 47B
Center Pivot	Existing on Field 3
Center Pivot	Existing on Field 12B & 47B

- Fields Available for Land Application of Wastewater in an Emergency

<u>Legal Description</u>	<u>Landuse</u>	<u>Acres Available</u>
<u>Predom. Soil</u> SW 1/4, Section 4, T 21 N, R 27 E	Grass & Cropland	103.0
N 1/2, Section 9, T 21 N, R 27 E	Grass & Cropland	120.0

- Holding Capacity of Ponds at Maximum Operating Level 11,218,511 gallons
Bottom of 25-year, 24-hour storage level. Pond is to be pumped within 10 days below level.
- Holding Capacity of Ponds at High Water Line 22,763,595 gallons
Top of 25-year, 24-hour storage level (bottom of freeboard).
- Holding Capacity of Ponds between Freeboard and Maximum Operating Elevation 11,545,084 gallons
Bottom of freeboard- Maximum Operating Elevation.

Application Rates

The fertilizer value of wastewater in Holding Ponds is variable. Prior to land application, it is recommended to collect a representative sample from the pond and sent to a testing laboratory for analysis. If time does not permit waiting for test results, estimates of the nutrient content can be made from data previously collected.

The land application rate should be calculated based on (1) the nutrient content of the wastewater, (2) current soil tests, (3) crop needs and (4) the water intake capacity (inches/hour) of the soil if an irrigation system is used.

For more information and/or assistance in calculating application rates, refer to SD-CPA-63.

Section N: Record Keeping Guidelines

Recordkeeping

Keeping records plays a critical role in a manure management system. Records are essential to determine appropriate rates of manure to apply to the land while protecting surface and groundwater resources. It enables operators to make good annual and long-term decisions concerning efficient use of manure. Additionally, records serve to document compliance with regulations or voluntary adoption of best management practices.

Records should be maintained for five years or as otherwise instructed by specific federal and state laws, local county ordinances and/or program requirements.

At a minimum, track manure applications by collecting and keeping records of the following information:

- **Soil test results and recommendations for all fields receiving manure (sampled and tested prior to hauling manure).**
- **Manure test results.**
- **Identity of the fields hauled to (including acres spread on and where in the field).**
- **Calculated “planned” manure application rate per field.**
- **Calculated “actual” manure application rate per field.**
- **Method of manure application.**
- **Date(s) and time(s) of manure application.**

The following additional records are recommended if the goal is to implement a whole farm nutrient budget program:

- **Soil test results and recommendations for the remaining fields receiving nutrients from other sources (i.e. commercial fertilizer).**
- **Form/rates of other nutrient sources applied per field.**
- **Crop planting and harvest dates and yields per field.**

Soil testing on a whole farm basis provides fertility level information on all fields allowing operators to make decisions as to where manure nutrients can best be utilized.

The Manure Nitrogen and Phosphorus Application Worksheets provided with this plan serve as excellent recordkeeping tools to document test results and manure applications.

Section O: Manure Application Planning

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South Dakota N & P Manure Application Determination

Three factors are considered when recommending a nitrogen-based or phosphorus-based manure application. They include (1) the current level of phosphorus in the soil, (2) the potential soil loss, and (3) the presence or absence of a 100 foot vegetated buffer in fields having certain soil phosphorus test levels. See table below.

Nitrogen need/Phosphorus Crop Removal Manure Application Determination					
Soil Test Phosphorus (ppm)	Predicted Soil Loss - Sheet and Rill Erosion (tons per acre per year) ¹		4 to 6		
	Less than 4		Greater than 6		
	Min. 100 Foot Vegetated Buffer ²		Min. 100 Foot Vegetated Buffer ²		
	Yes	No	Yes	No	
Olsen					
Bray-1					
0-25	Nitrogen Need	Nitrogen Need	Nitrogen Need	Nitrogen Need	No application
26-50	Nitrogen Need	Nitrogen Need	Nitrogen Need	Phosphorus crop removal ³	No application
51-75	Nitrogen Need	Phosphorus crop removal	Phosphorus crop removal	Phosphorus crop removal	No application
76-100	Phosphorus crop removal	Phosphorus crop removal	Phosphorus crop removal	Phosphorus crop removal	No application
Greater than 100	No application	No application	No application	No application	No application

¹ Refers to a calculated soil loss estimate using the Revised Universal Soil Loss Equation (RUSLE).

² Refers to the vegetated area width between manure or wastewater land application and a natural/manmade drainage, tile inlet or other conduit.

³ Crop removal is the amount of phosphorus a planned crop removes in one crop year.

Note: A single application of phosphorus applied as manure may be made at a rate equal to the recommended phosphorus application for the entire crop rotation or multiple years in the crop sequence. When such applications are made, however, the application rate should not exceed the recommended nitrogen application rate for the planned crop.



Recommended Soil Sampling Methods for South Dakota

FS915

Photo courtesy of USDA-NRCS

R. Gelderman, manager, SDSU Soil Testing Laboratory
 J. Gerwing, SDSU Extension soils specialist
 K. Reitsma, South Dakota Department of Agriculture

Soil testing is your best way to evaluate the fertility status of a field or of areas within a field. When you send a sample off to the laboratory for plant-available nutrient analysis, a good soil sample that adequately represents your field or area gives you good results. A poor sample will only lead to an analysis of limited value and be a waste of your time and money.

The volume of the soil sample you will send in shrinks at each step from field to laboratory (Fig 1). Thus, it is imperative to start with a representative sample from the field. Depth of sampling, timing of sampling, equipment, sample handling, and sampling procedures all have an effect on a good representative soil sample.

When and how often to sample?

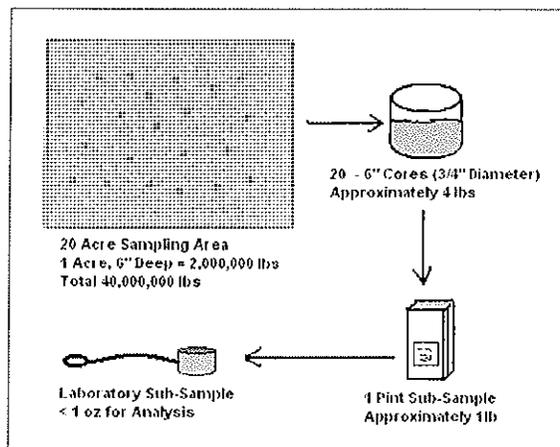
About 70% of soil sampling in South Dakota fields is done in the fall with the remainder done in winter and early spring. Phosphorus (P), potassium (K), pH, soluble salt content, and micro- and most secondary nutrient soil tests are not affected by sampling time; therefore, soil samples for these tests can be taken any time during the year.

Soil biological activity affects nitrogen (NO_3^- -N) and sulfur (SO_4^{2-}) soil test levels. Therefore, if you sample in the fall, it is recommended to wait until after soil

temperatures are below 50° F. Above this temperature, nitrogen and sulfur are released from organic matter and crop residue; and below this temperature, nutrient releases normally become negligible.

Warmer than normal winters with an early spring sometimes lead to higher NO_3^- -N levels in spring compared to fall, particularly after a soybean crop. Sampling small grain stubble with excessive regrowth can

Fig 1. Relative sample size to sampling area.



lead to lower soil test NO_3^- -N levels because of nitrogen uptake by the regrowth. Winter sampling is dependent on the amount of snow cover, an issue in some years.

Whatever season you choose, sampling fields at approximately the same time each year will lead to more consistent results when comparing soil tests from year to year.

In general, soil tests for P, K, pH, soluble salts, calcium (Ca), magnesium (Mg), and micronutrients will change very little from year to year and need to be analyzed only every 2 to 3 years. In contrast, levels of NO_3^- -N can change dramatically from year to year and should be analyzed every year prior to planting non-legume crops.

However, many producers and crop advisors prefer to test each nutrient every season to quickly develop a nutrient history for each field or area sampled. An erratic analysis due to sampling or laboratory error can easily be found by using this approach.

In summary, a soil sample for most soil tests can be taken anytime during the year. For most mobile nutrients, in particular NO_3^- -N, samples should be taken in late fall (when soil temperatures are below 50° F), in winter, or in early spring.

Is sample depth important?

Many plant nutrients are concentrated near the soil surface and decrease with depth. Depth of sampling should be consistent between fields and over years to obtain comparable nutrient values.

Most soil tests were originally related to crop response using a specific soil sampling depth. It is important to keep using this sampling depth to obtain proper plant nutrient recommendations. Depth of sampling will depend on nutrient sampled, crop, and perhaps tillage.

Nutrients

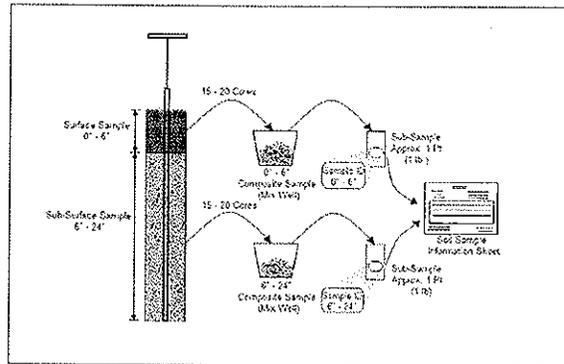
A 0-6 inch sample is recommended for P, K, pH, organic matter, soluble salts, zinc (Zn), iron (Fe), manganese (Mn), copper (Cu), and boron (B). A deep sample (24-inch) is recommended for mobile nutrients such as NO_3^- -N, chloride (Cl), and sulfur (SO_4^{2-} -S). It is recommended to separate deep samples (0-24 inch) into two separate samples; one representing the 0-6 inch depth and the other a 6-24 inch depth (Fig 2).

If an even deeper (0-48 inch) sample is desired or required to determine deep NO_3^- -N, separate this sample into 0-6, 6-24, and 24-48 inch depths.

Crop

A deep sample (6-24 inch along with the 0-6 inch depth) should be taken for all proposed non-legume crops and some legumes such as edible beans that have been shown to respond to additional nitrogen. For other pro-

Fig 2. Dividing samples by depth increment.



posed legume crops and permanent grass, a 0-6 inch depth is sufficient. However, cropping plans often change and a deep sample may be advised for these situations as well.

A deep sample must be taken if the field is part of a Concentrated Animal Feeding Operation (CAFO) manure plan.

Tillage

With limited tillage, nutrients can become stratified or concentrated near the soil surface to a greater degree than with tillage. Soil pH can be lower at the soil surface with less tillage and increase with depth. If these conditions appear to be a problem for plant growth, it is recommended that samples be taken at 0-2, 2-4, and 4-6 inch depths to determine any pH or nutrient stratification.

If possible, it is recommended to soil sample before any tillage is completed. It is difficult to maintain the correct sample depth (especially of the surface soil) after tillage is done and surface conditions are very soft. Sampling the surface (0-6 inches) by hand may be the only option in such cases because of compaction of the loose surface soil in the sampling tube.

Sampling "holes"

Samples for multiple depth increments can be taken from a single core if equipment allows. Taking continuous cores is preferred but if equipment does not allow this; a surface sample may be taken, removed, and the sampling equipment placed in the same "hole" to obtain a deeper depth. Be sure to remove any topsoil contamination from subsequent cores when using the same hole. This procedure can be repeated until the desired depth is sampled.

Special sampling situations

Banding fertilizer with no-till, strip-till, ridge till, or seeding operations with little tillage can cause very high nutrient levels within these band areas. This can lead to

high levels of soil test variability from year to year in these fields. Research from Colorado State University suggests the following sampling procedure for these fields when the location of the band is known:

$$S = 8(BS)/12$$

Where:

S = Cores taken between bands

BS = Band spacing (inches)

The number of cores taken between the bands is related to the fertilizer band width. For example, if band spacing is 30 inches, 20 cores should be taken between the bands to be mixed with one core taken from within the band area. The mixture will be the composite sample for the area sampled and should provide a reasonable average for the sampling area.

An alternative is to sample only the area outside of the fertilizer band(s). This will provide a representation of soil test levels of non-banded soil areas.

If the location of the band is unknown, it is recommended to sample the area randomly or use a paired sample method. Paired sampling is used with a random sample pattern, taking an initial core and then a second core half the distance of the band spacing and perpendicular to the direction of the band. For example, if band spacing is 30 inches, randomly select a location for sampling; take the core; measure 15 inches in the direction perpendicular to the band; take a second core. Continue sampling in this manner until 15 to 20 locations have been sampled. A composite of these cores is then subsampled and submitted for analysis.

Sampling equipment

The right tools can make sampling easier and provide better cores and a better sample. Consider the sampling operation step by step and the tools you will need to take the sample, hold and mix the composite sample, contain the subsample, and record information about the sample.

Having alternate equipment to anticipate varied soils and sampling conditions can also help with sampling.

Sampling probe

A sample (core) probe is the best tool for taking a soil sample. These may be hand or hydraulic probes. Hydraulic probes can be truck (in-cab, side, or rear mount), or ATV or tractor mount. In-cab mount probes have become popular, as samples can be taken without leaving the cab of the pickup (Fig 3). ATV mounted probes can sometimes be used to sample under more adverse field conditions and will do minimal crop damage.

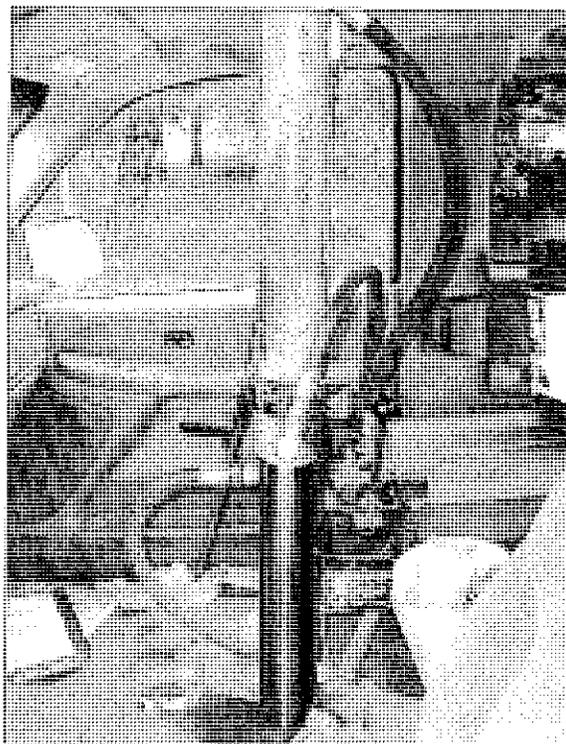
Sampling equipment considerations.

- Extra probe and tips
- Field information (i.e. maps, aerial photos, soils information)
- Sampling tool(s) to clean probe
- Tape measure or ruler
- Knife or sample divider
- Lubricant (i.e. WD-40)
- Clean plastic containers (at least 1 1/2 gallon)
- Sample bags/boxes
- Box or container to hold sample bags/boxes
- Permanent marker and/or pencil

Many types of probes are available, each with different characteristics and price ranges. Regardless of what type is used, a probe should provide a uniform soil core to the depth of insertion without compacting inside the probe. In practice this depends on many factors, including tillage practice, soil texture, soil moisture, and lubrication and characteristics of the probe.

Some probes work better in some situations than others. Experience is the best teacher. Always ask the vendor for references in your area to obtain their experiences with the product or equipment.

Fig 3. In-cab truck mount hydraulic probe.



Lubricants

Lubricants can be helpful in some soil conditions by preventing soil from plugging in the tube, especially when soils are wet. Water repellent petroleum-based lubricants such as WD-40TM can be used. In research studies this lubricant did not influence most soil tests.

Avoid or limit use of lubricants for samples where testing for soil carbon (organic matter) or micronutrients. Cooking sprays or crop oils may influence NO₃⁻-N mineralization on some soils, affecting analysis.

It is best to take the sample without a lubricant if possible. However, use one if necessary to get a good sample.

Other tools

Containers that can hold the cores from which you will make a composite sample are recommended to be made of plastic and hold a volume of 1 1/2 gallons or more. This allows for additional room for mixing and a reduced chance of sample contamination. Mark each container with a permanent marker to indicate depth intervals.

Avoid using containers that previously held materials such as hydraulic fluid, motor oil, fertilizer, feed, or other materials that may contain residues. Tools or containers that are galvanized or rusted should be avoided, as these could influence micronutrient analysis.

Sample handling and shipping

Soil NO₃⁻-N levels can increase substantially if samples are left moist and warm. Samples intended for NO₃⁻-N analysis should be air dried or frozen within 12 hours of collection. If possible, keep these samples cool while in the field. To dry, spread the sample out on clean paper in a dust-free heated room. Samples will usually air dry within 6 to 12 hours by directing a household fan on them. If frozen, pack the frozen samples into a shipping container. During cooler weather the samples should be fine if arriving at the laboratory within 2 days.

Use latex/rubber gloves to mix and handle samples for chloride analysis to limit chloride contamination from perspiration.

For some high clay content soils or soils that are very moist, the cores will not break up easily to obtain a mixed, composite, pint sample. In these cases it may be necessary to take the entire sample out of the field for drying and/or grinding so an adequate subsample can be obtained.

Mail soil sample information under separate cover or, if mailing in the soil shipping container, seal the information in a plastic bag, especially if the samples are frozen or moist.

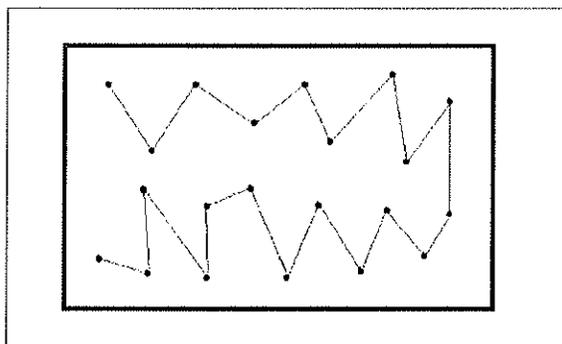
Field sampling methods

Fields may be divided into smaller parcels or "zones" or sampled as a whole field. The strategy used to sample a field will often dictate the number of samples submitted for analysis.

Whole field composite method

Traditionally this is the method that many consultants, dealers, and producers in South Dakota follow to obtain a soil sample. The procedure consists of taking at least 15 random cores from the field and compositing (mixing) by depth increment (Fig 4). The advantage of this system is that it is quick, relatively inexpensive, and fairly reproducible.

Fig 4. Random, whole field composite sampling.



With this method it is advised to avoid unusual areas or sample these areas separately. Identifying these outlier areas is sometimes difficult. The whole field method also does not determine what nutrient variability exists in the field.

If substantial nutrient variability does exist, use of the whole field composite method can result in over- or under-fertilization on large areas of the field. This can be expensive, either from costs from applying unneeded nutrients or from yield loss due to under-fertilization.

Other field soil sampling methods do a better job of measuring the nutrient variability within a field, and they provide a better picture of available plant nutrients. The following is a brief summary of methods currently recommended in South Dakota.

Sampling for within-field variability

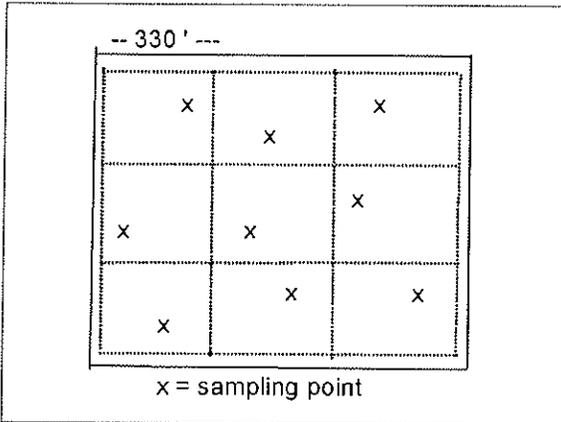
The goal for within-field sampling is to determine the nutrient, salt, or pH variability within a field. Once this is determined, the nutrients are mapped and fertilizer and/or lime is variably applied.

Grid sampling

The field is divided into rectangular grids and a sample is taken from each grid. Each grid sample is usually a composite of 6 to 8 cores.

In some procedures the cores may be taken in a "point," usually from a circle of 6 to 8 feet around the point located in the grid of interest. If this system is used the points should be staggered in the grid as one goes from one grid to the next (Fig 5). Because of past management practices "streaks" of higher nutrient concentrations can often be found from one end of the field to the other. Staggering the point samples can avoid bias in the soil tests.

Fig 5. A 2 1/2-acre grid pattern, staggered system.



A number of studies have determined that the largest grid size that will adequately measure nutrient variability for a field should be no more than 2.5 acres in size. In fact, many studies have shown the size should be less than one acre. This is cost prohibitive in most situations, and many workers have found that the nutrient variability within a grid may be as high as that within the whole field.

Consider using a grid system where the field history is unknown, the non-mobile nutrients (P, K, Zn) are of primary importance and are high either from past fertilization or manure applications, where small fields have been merged into one or more large fields, or where year to year variability in non-mobile nutrient tests are high.

Directed sampling

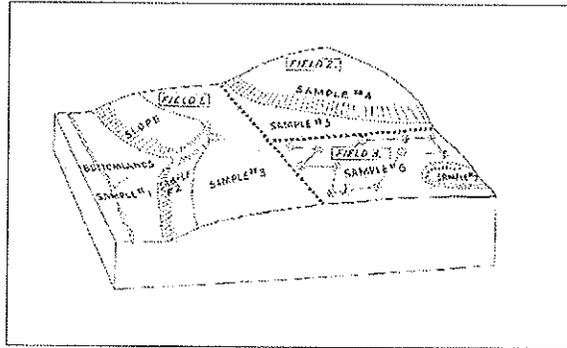
A more direct approach to sampling can be done by assuming there is a logical reason to nutrient variability in the field. Directed sampling is also called "zone sampling," "management zone sampling," or "smart sampling."

Detailed information about a field, such as yield monitor maps, remote sensing imagery, digital soil survey or topographic maps, and/or electrical conductivity data, can all help define nutrient management zones.

Sampling by landscape/topography

One of the oldest procedures used to divide fields into variable nutrient zones is sampling by visual landscape differences (Fig 6). Perhaps uplands are one sample, slopes another, and low ground another.

Fig 6. Soil sampling method based on landscape.



Logically this makes sense in that you would expect the sloped, eroded areas would have less nutrients than the low ground where soil and nutrients tend to accumulate. The higher (less sloping) landscape areas usually would be in between.

Sampling zones by landscape can be done visually, with aerial or satellite photos, or by using elevational data from GPS units. A study in North Dakota on a 40-acre field required only four to seven samples (zones), compared to 36 for a grid sampling approach. A field with four landscape zones would have four separate samples, each with a minimum of 15 cores.

Other methods of directed sampling

There are other logical reasons to use directed soil sampling. One of the most common forms of directed sampling is to use yield zones within the field. Reasons to use this method include: 1) soil areas with high yields may lead to lower soil nutrient levels, because more nutrients were removed as more grain was produced, and 2) areas with lower yields may be limited by nutrients.

In other cases, yield variability is not because of nutrient limitations but due to other growth factors such as soils, water limitations, drainage, etc.

Other directed sampling methods include using aerial or satellite imagery that shows soil color differences or crop growth patterns or color.

Measuring soil conductivity with an on-the-go sensor also may help define management or sampling zones. If the measured conductivity relates to plant nutrient levels, then such a system is useful. Knowledge of the field and other layers of information can also be useful when establishing management zones.

Recent or older field maps such as from the Farm Service Agency (FSA) will provide a reasonable aerial photograph of the field. County soil surveys provide aerial photographs with soil phase mapping units imposed over an aerial photograph. These maps can be useful for deciding if the field should be divided into sampling zones. Older aerial photographs may be useful in identifying areas to avoid such as old farm yards, fence lines, or other

features that may no longer exist but can influence a soil test.

Combinations of the various directed sampling methods listed above are also sometimes used. For example, combining yield zones, conductivity areas, and landscapes with a computer program or "black box" approach could be used in designing management zones. Whatever the approach, check the system with ground truth information. Use of a program alone is no substitute for field knowledge.

It is important to remember how these different sampling methods fit with your fertilization program. In the whole field approach, it is assumed that the whole field is somewhat uniform and the field is fertilized the same. With the grid sampling method, the analysis from each grid is used to create a variable map (using various statistical techniques) to determine the amount of fertilizer to use. With directed soil sampling, some identification (i.e., yields, landscapes, aerial photos or some combination) is

used to make the management zone maps. These areas are then sampled, analyzed, mapped, and fertilized according to area soil test results.

With any of these sampling methods—whole field composite, grid, or directed—locating the core point with GPS may lead to more consistent results when re-sampling these fields or areas.

Review

Any good soil fertility program begins with a good soil test, which begins with a good soil sample. For any field sampling method, the basics of good sampling remain the same and should be followed. For many producers a whole field randomized composite sampling method is a good first step. However, for those wishing to obtain more knowledge about nutrient variability within a field and to possibly increase productivity, a more intensive sampling program should be used.

For more information, contact:

Soil Testing Laboratory
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Telephone: (605) 688-4766
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E-Mail: SDSU_Soillab@sdstate.edu

South Dakota State University
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Web: <http://sdces.sdstate.edu/index.cfm>

Available online: <http://agbiopubs.sdstate.edu/articles/FS935>

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For information or assistance with management options, contact your local:

- Conservation District,
- Cooperative Extension Service or
- Natural Resources Conservation Service.

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 Pierre, SD 57501-0275
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 Department of Plant Science
 Federal Building
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 SD 57501
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publicaffairs@sd.usda.gov

South Dakota Department of Agriculture
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www.state.sd.us/oda

For information or assistance with regulatory requirements:

South Dakota Department of Environment and Natural Resources
 Surface Water Quality Program
 Foss Building, 523 E. Capitol Avenue
 Pierre, SD 57501-3182
 (605) 773-3351 • Fax: (605) 773-5286
www.state.sd.us/demr/DES/surfacewater/feedback.htm

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Sampling Manure for Nutrient Management

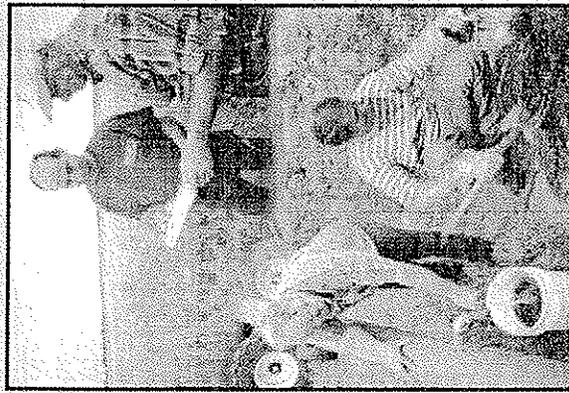


Photo courtesy: USDA-NRCS, SD

Sampling Manure for Nutrient Management

Nutrients needed for crop production can be supplied by manure, commercial fertilizer, or a combination of the two.

Regardless of the source, nutrients must be applied in the right amount to meet crop production needs and prevent surface and ground water pollution.

By knowing the nutrient content of the manure applied, producers can adjust the amount of commercial fertilizer needed to meet crop requirements.

Producers have two options for determining

the nutrient content of manure produced on their farm:

1. Estimate using published values (see table below) or
2. Use the results of a laboratory analysis.

An analysis estimates the nutrients in manure from a specific operation. Nutrient values listed in publications are averages from samples tested over a period of several years.

A laboratory analysis is the preferred and most accurate of the two methods. All permitting facilities are required to use a lab analysis.

The nutrient content of manure varies with the type, age, and weight of livestock; feed program; and manure handling system.

At minimum, manure should be tested for total nitrogen, inorganic nitrogen, total phosphorus and total potassium. An analysis for these nutrients provides the information needed to develop a nutrient management plan.

Estimated Nutrient Content of Selected Types of Manure¹

	Nitrogen Content	Phosphorus Content	Potassium Content
Solid Manure (Lbs/ton)			
Beef or Dairy Cattle	5	5	5
Swine or Turkeys	25	40	30
Liquid Manure (Lbs/1,000 gallons)			
Dairy	15	10	20
Swine Finishers	40	35	30

¹Adapted from Foraker Recommendations Guide (EC750), South Dakota State University, Cooperative Extension Service. For additional estimated nutrient content of manure, values see Midwest Farm Science Publication #MFS-16.

This publication describes how to collect, handle, and ship manure samples. For information about how to interpret manure test results, refer to "Using Results from a Manure Analysis" (SD-NRCS-FS-38). For information about land application, refer to

"Calibrating Manure Spreader Application Rates" (SD-NRCS-FS-43). Brochures are available online at SD DENR's website. Visit: <http://www.state.sd.us/demr/DFTA/WatershedProtection/WQInfo.htm>.

How to Sample Manure

The accuracy of a laboratory analysis depends on the quality of the manure sample received. A solid manure sample collected as close to the time of land application as possible provides the best information about its fertilizer value. It is important, however, to allow the laboratory time

to complete the analysis and return the results. Usually three weeks is sufficient. Liquid manure must be agitated before sampling and is usually land applied after the sample is taken. Therefore, it is suggested that producers handling liquid manure use the average of several years

of nutrient test results to estimate the nutrient level in the manure. When information from past years is not available, cooperative extension and conservation district professionals can provide publications that list the estimated nutrient levels commonly found in liquid manure.

SAMPLING SOLID MANURE

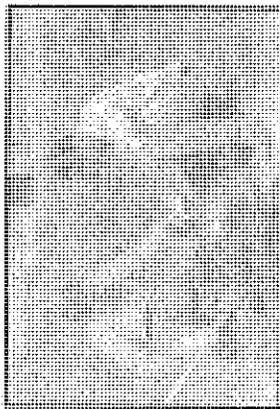


Photo courtesy USDA NRCS SD

An accurate lab analysis of solid manure hinges on collecting a representative sample.

1. Collect manure from at least 10 different locations in the barnyard or feedlot. The locations selected should be similar in moisture, feed, hay and bedding content. Avoid areas near waterers, drains, and feedbunks where materials other than manure often accumulate. If sampling stockpiled manure, collect manure from several depths. Avoid the exposed outer layer of the pile.
2. Dump the manure collected on a hard, flat surface. Use a shovel or pitchfork to mix the manure until the pile looks uniform.
3. Take several small samples from the mixture until about a gallon has been collected.
4. Place the mixture in a heavy weight plastic freezer bag. Squeeze the bag to remove the air. Place the bag in a second freezer bag to prevent leakage.
5. Freeze or store the sample in a cool place until ready to ship. See information airtight for sample identification and shipping instructions.

SAMPLING LIQUID MANURE

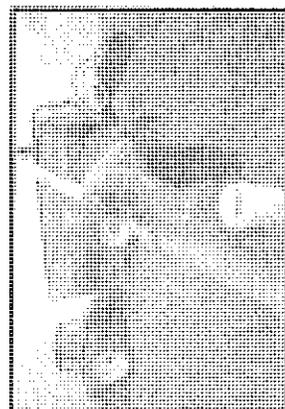


Photo courtesy USDA NRCS SD

Sampling from a loading pipe or tank spreader is the preferred method of collecting a liquid manure sample.

1. Agitate the manure in the storage facility thoroughly before loading the tank spreader. If this step is omitted, the sample will not accurately estimate the nutrient value of the manure in the storage pit.
2. Collect one quart samples from at least five different tank spreader loads using a clean plastic container.
3. Pour the samples into a clean, large plastic pail.
4. Thoroughly stir the contents of the pail. Use a long handled dipper to transfer several cups of

the swirling mixture to a clean, one quart plastic bottle until the liquid is about two inches from the top of the bottle. **DO NOT FILL TO THE TOP!**

5. Place the bottle in a heavy weight resealable plastic freezer bag to prevent leakage.
6. Freeze or store the sample in a cool place until ready to ship. See information airtight for sample identification and shipping instructions.

SAMPLE IDENTIFICATION AND SHIPPING

1. Attach a label to the bag or bottle of manure. List:
 - Name
 - Mailing address
 - Telephone number
 - Sample site (feedlot, pit, pond)
 - Type of manure (beef, dairy, swine, chicken, turkey)
 - Date the sample was collected.
2. Complete a laboratory information sheet. If possible, use an information sheet from the lab that will complete the test. Visit the county Cooperative Extension or conservation district office for assistance in obtaining forms.*
3. Place the frozen or refrigerated sample and laboratory information sheet in a styrofoam or similar insulated container. Add cold packs and packing materials to protect the sample during shipment.
4. Deliver the sample to the lab or ship by overnight mail or courier. If using regular mail, ship the sample early in the week so that it arrives at the lab by Thursday. Samples that arrive on the weekend may warm up and start to decompose. The nitrogen test for these samples will be inaccurate.

Ship samples to:

Analytical Services
Olson Biochemistry Labs, ASC 133
South Dakota State University
Box 2170
Brookings, SD 57007-1217
Phone: (605) 688-6171
Fax: (605) 688-6295

*A form for submitting manure samples to the lab at SDSU is available online. Visit: <http://anserv.sdsu.edu> and click on "Submission Form" to download the file. Fees are listed.

LIVESTOCK MANURE SAMPLE SUBMISSION FORM

Analytical Services, Olson Biochemistry Labs, ASC 133
South Dakota State University, Box 2170, Brookings, SD 57007-1217
Phone: 605-688-6172 FAX: 605-688-6295
Web address: <http://anserv.sdstate.edu>

Use one sheet for each sample.

Bill:

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ FAX: _____

Email: _____

Copy:

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ FAX: _____

Email: _____

Sample Identification _____

Date Collected: _____

Sample Information (check **only one** of each group)

Species: Beef Dairy Swine Poultry Other Mixed

Report as: lb/ton (solid) lb/1000 gallons (liquid)

Storage System/Solid: Daily scrape, Manure pack, Open lot, Deep pit(poultry), Litter(poultry), Manure stacking.

Storage System/Liquid: Anaerobic pit, Above ground tank, Earthen storage (pond), Lagoon

Payment Enclosed: \$_____ All fees subject to 4% sales tax and applicable city tax.

Charges for out of state residents are 1.5 times those listed below.

Make Checks Payable to: Olson Biochemistry Labs

For information on collecting samples refer to SD-NRSC-FS-36, "Sampling Manure for Nutrient Management" (11/2002) available from your local Conservation District /NRCS or Cooperative Extension Service office.

\$10.00 Sample handling and preparation. (Required for all samples)

\$40.00 N, P, K and NH₄-N (required for DENR general permit coverage).

\$28.00 N, P, K analysis.

\$19.00 P and K analysis.

Individual Tests

\$ 9.00 Total nitrogen (N)

\$15.00 Nitrate-nitrogen (NO₃-N)

\$12.00 Ammonium Nitrogen (NH₄-N)

\$24.00 Urea-nitrogen, includes Ammonium N

\$12.00 Selenium (Se)

\$14.50 Sulfur (S)

\$ 4.50 Moisture

\$ 4.00 Density

\$ 5.00 pH

Check desired element(s). First element is \$14.50 and \$4.50 for each additional element.

Phosphorus (P)

Iron (Fe)

Cobalt (Co)

Potassium (K)

Zinc (Zn)

Magnesium (Mg)

Sodium (Na)

Calcium (Ca)

Manganese (Mn)

Check desired element(s). First element is \$27.00 and \$14.50 for each additional element.

Arsenic (As)

Lead (Pb)

Cadmium (Cd)

Molybdenum (Mo)

Element profile by ICP. Inquire.

Note: All elements are "total" unless otherwise indicated. P is reported as P₂O₅ and K is reported as K₂O.

For information or assistance with management options, contact your local:

- Conservation District,
- Cooperative Extension Service, or
- Natural Resources Conservation Service.

South Dakota Association South Dakota Cooperative of Conservation Districts Extension Service/South P.O. Box 275
Dakota State University
Pierre, SD 57501-0275
(800) 729-4099
Fax: (605) 895-9424
www.sdconservation.org
info@sdconservation.org

Department of Agricultural and Biosystems Engineering
Box 2120, SDSU
Brookings, SD 57007
(605) 688-5144
Fax: (605) 688-6764
charles_willery@sdstate.edu

Conservation Service
Federal Building
200 Fourth Street SW
Huron, SD 57501
(605) 352-1200
Fax: (605) 352-1270
www.sd.nrcs.usda.gov
publicaffairs@sd.usda.gov

South Dakota Department of Agriculture
Office of the Secretary
Foss Building, 523 E. Capitol, Pierre, SD 57501
(800) 228-5254 • (605) 773-3375 • Fax: (605) 773-4003
www.state.sd.us/doga

For information or assistance with regulatory requirements:

South Dakota Department of Environment and Natural Resources
Surface Water Quality Program
Foss Building, 523 E. Capitol Avenue
Pierre, SD 57501-3182
(800) GET-DENR • (605) 773-3351 • Fax: (605) 773-5286
www.state.sd.us/denr/DES/surfacewater/eediol.htm

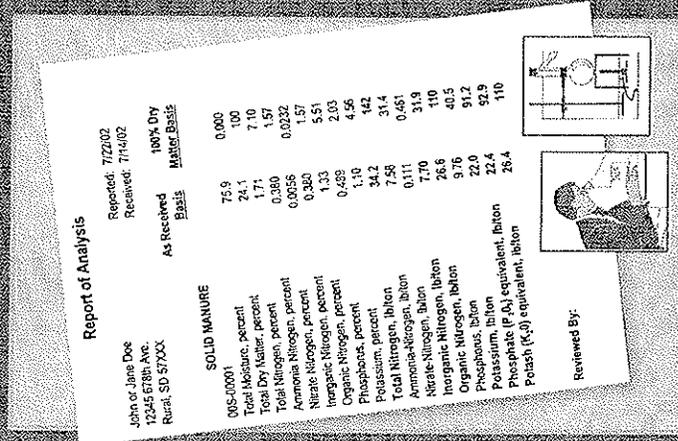
This publication is part of a cooperative educational project by the above entities.

Printing of this publication was made possible by Section 319 NPS and Pollution Prevention Incentives to States Grants from the U.S. EPA - Region VIII.

Programs and services are available to everyone on a nondiscriminatory basis.

SD-NRCS-FS-38 • March 2003

Using Manure Analysis Results



Using Manure Analysis Results

Livestock manure is a valuable resource. When applied to cropland, manure:

- provides nutrients for crop production,
- improves soil structure and water holding capacity, and
- reduces the amount of commercial fertilizer needed to reach yield goals.

To fully realize the fertilizer value of manure and protect the environment, a nutrient management plan is recommended for each field that will receive manure. The plan is a plant food budget for the field. Balancing the nutrients added with uptake by the crop prevents nutrient buildup and helps prevent surface and ground water pollution.

Nutrient management plans include:

- yield goals for the crops to be grown,
- plant nutrients needed to reach the goals,
- soil test results for each field,
- an estimate, based on a lab analysis, of the nutrients that will be supplied by manure
- credits for nutrients supplied from other sources such as legumes,
- the amount of commercial fertilizer required to meet the remaining crop production needs, and
- identification of areas where manure should not be applied.

An accurate estimate of the nutrients available from manure is influenced by how:

- the manure sample was collected, prepared, and shipped; and
- the manure will be applied.

Poorly handled samples do not provide an accurate estimate of the nutrients contained in the manure. Improperly calibrated equipment will result in over or under applying manure. Making either mistake can be costly:

- expected nutrients from manure may be insufficient to reach yield goals,
- more, or less, commercial fertilizer than needed could be applied, and
- nutrient build up in the soil may affect future manure applications to the field.

For information about sampling manure and calibrating application equipment see:

“Sampling Manure for Nutrient Management” (SD-NRCS-FS-36) and “Calibrating Manure Spreader Application Rates” (SD-NRCS-FS-43). Brochures are available on SD DENR’s website. Visit:

<http://www.state.sd.us/denr/DES/Surfacewater/ManureMgt/Tools.htm>

<http://www.state.sd.us/denr/DFIA/WatershedProtection/WQInfo.htm>

NUTRIENT AVAILABILITY

The nitrogen, phosphorus and potassium in manure are present in two forms:

- organic compounds and
- inorganic compounds.

Nutrients become available for plant growth when organic compounds decay. During the decay process, bacteria and fungi convert the organic compounds to inorganic compounds by a process called mineralization. The rate of mineralization is affected by temperature, moisture, soil chemistry and time. Therefore, not all of the nutrients in the organic compounds are available for use by plants the year manure is applied.

Mineralization occurs most rapidly in warm, moist, neutral to slightly alkaline soils. For South Dakota, a common rule of thumb for nitrogen mineralization is:

About one-third of the organic nitrogen becomes available each year for three years following a manure application.

The South Dakota Experiment Station found the following amounts of the nutrients are usually available for crop production during the year the manure is applied:

- Inorganic Nitrogen 100 percent
- Organic Nitrogen 35 percent
- Phosphorus 80 percent
- Potassium 100 percent

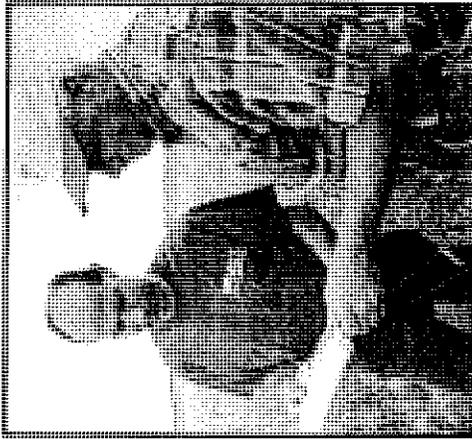


Photo: Richard H. Smith

USING THE ANALYSIS REPORT

Most laboratory reports provide information about the moisture, dry matter and nutrient content of the manure sample submitted. The format of the report may vary with the type of manure submitted, the analysis requested, and the laboratory completing the analysis. The test results are usually reported:

- as a percent by weight per ton or 1,000 gallons, or
- on both an "As Received" and "Dry Matter" basis.

The cover of this publication shows a report format used by many laboratories.

Manure is normally applied in the form it was sampled. Therefore, the "As Received" results must be used to plan a manure application. If "As Received" values are not provided by the lab,

CALCULATING THE NUTRIENT

VALUE OF MANURE AS FERTILIZER

The fertilizer value of manure is calculated using information provided by the laboratory report. Using the report shown on the brochure cover as an example, the fertilizer value is:

Fertilizer Values (lbs./ton)

Nitrogen:	Inorganic Nitrogen	7.7
	+ Organic Nitrogen (26.6 x 0.35)	9.3
	Total Nitrogen	17.0
Phosphorus:	P ₂ O ₅ equivalent (22.4 x 0.80)	17.9
Potassium:	Potash (K ₂ O) equivalent	26.4

The example shows only the estimated nutrients available for crop production during the year the manure was applied. It does not account for nutrients lost during application.

The nutrients from manure applied during the previous two years must also be considered in a nutrient management plan (see Nutrient Availability section).

The method used to apply manure and the length of time between application and incorporation reduces the nutrients available for plant growth. Producers can expect a one to five percent nitrogen loss with same day incorporation or a knife application. After four days, the nitrogen content of manure left on the soil surface may decrease by as much as 30 - 40 percent through volatilization. Thirty percent of the nitrogen content of manure applied through sprinkler irrigation systems is commonly lost to the atmosphere.

Delays in incorporating manure increase the potential for phosphorus to pollute streams and lakes if run off occurs.

To reduce nutrient losses and prevent pollution:

- incorporate surface applied manure within 24 hours, and
- do not spread manure on frozen or snow covered ground.

Fertilizer recommendations are based on the:

- inorganic (N) nitrogen and
- phosphorus (P₂O₅) and potash (K₂O) oxide equivalents

If the analysis report does not provide phosphorus and potash equivalents, the values can be determined using the formulas shown below. Each formula is accompanied by an example using numbers from the sample lab report shown on the cover:

$$\text{lbs. P}_2\text{O}_5 = \text{Lbs. Phosphorus} \times 2.29$$

$$22.4 = 9.76 \times 2.29$$

$$\text{lbs. K}_2\text{O} = \text{Lbs. Potassium} \times 1.20$$

$$26.4 = 22.0 \times 1.20$$

"Dry Matter" values can be converted to "As Received" using the following formula:

Formula for the Conversion Of "Dry Matter" to "As Received"

$$\%N_{AR} = \frac{\%N_{DM} \times \%DM}{100}$$

Where:

N_{AR} = % Nutrient As Received
 N_{DM} = % Nutrient Dry Matter Basis
 DM = % Dry Matter

For example, using the formula to convert dry matter nitrogen to "As Received" for the sample analysis shown on the cover:

$$\%N_{AR} = \frac{14.2 \times 24.1}{100}$$

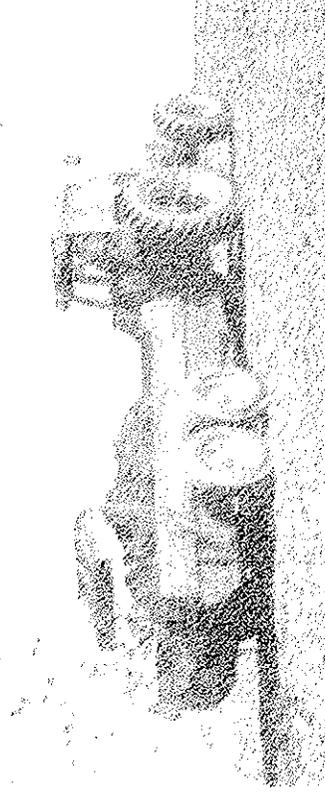
$$\%N_{AR} = 34.2$$

Calibrating Manure Spreader Application Rates

One of the most critical components of a comprehensive nutrient management plan that includes animal manure is the application rate. Calibration of a manure spreader helps livestock producers use the nutrients contained in manure more efficiently.

Calibrating a spreader takes one or two hours but can save hundreds of dollars in fertilizer costs. This publication describes two calibration methods that effectively estimate the amount of nutrients applied to a field.

Applying the nutrients in manure according to crop needs reduces production costs and protects water resources.



One of the keys to successful nutrient management is a sound manure application plan. This includes:

- Setting realistic yield goals.
- Keeping records of the rate, method and date of past manure and commercial fertilizer applications.
- Knowing the nutrients available through regular soil and manure tests.
- Using best management practices to reduce runoff and the leaching of nutrients.
- Crediting nutrient contributions from other sources, such as legumes.

Calibrating Manure Spreader Application Rates

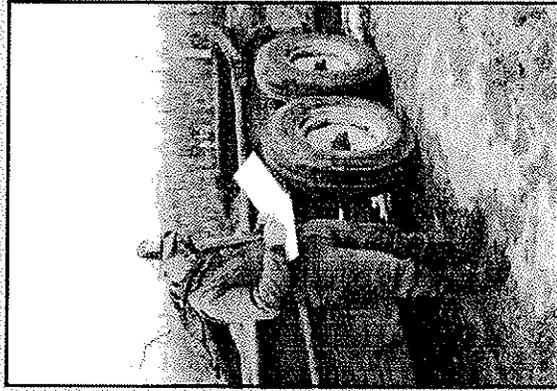


Photo courtesy USDA NRCS SD

For information or assistance with management options, contact your local:

- Conservation District,
- Cooperative Extension Service or
- Natural Resources Conservation Service.

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 Brookings, SD 57007
 (605) 688-5144
 Fax: (605) 688-6764

USDA Natural Resources Conservation Service
 Federal Building
 200 Fourth Street SW
 Huron, SD 57501
 (605) 352-1200
 Fax: 605-352-1270
www.sd.nrcs.usda.gov
publicaffairs@sd.usda.gov

Department of Plant Science
 Box 2207A, SDSU
 Brookings, SD 57007
 (605) 688-4772
 Fax: (605) 688-4667
james_gerwing@sdstate.edu

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 Pierre, SD 57501
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www.sdale.sd.us/daa

For information or assistance with regulatory requirements:

South Dakota Department of Environment and Natural Resources
 Surface Water Quality Program
 Foss Building, 523 E. Capitol Avenue
 Pierre, SD 57501-3182
 (605) GET-DENR • (605) 773-3351 • Fax: (605) 773-5286
www.sdale.sd.us/denr/DES/surfacewaterfeedlot.htm

Printing of this publication was made possible by a Section 319 Nonpoint Source grant to SD DENR from the U.S. Environmental Protection Agency - Region VIII. Programs and services are available to everyone on a nondiscriminatory basis.

Calibrating Manure Spreader Application Rates

The two best approaches for calibrating a manure spreader are the LOAD-AREA and WEIGHT-AREA methods. The load-area method is the most accurate and can be used for both liquid and solid manure. The weight-area method works only with solid or semi-solid manure.

LOAD AREA METHOD

The load area method is a three step process.

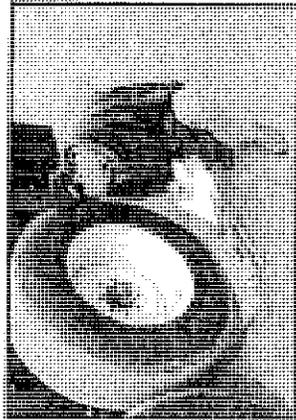


Photo courtesy: Davison County Conservation District

- Determine the amount of manure in the spreader.** The most accurate way to determine the amount of manure in a spreader is weighing the spreader when it is empty and again when it is full. For a reliable estimate of spreader capacity, weigh several representative spreader loads (recommend five) to determine the average gross weight. Subtract the empty spreader weight. Then, calculate the average net loaded weight.
- Determine the area of spread.** The "area of spread" is determined by measuring the length and width of the ground covered by the manure. Width measurements near the beginning and end of the spread pattern should be avoided because the spreader may not be operating at full capacity. Allow for the overlap of adjacent passes.

Formula for Solid Manure:

$$\text{Tons per acre} = \frac{\text{Average Loaded Weight (lbs.)} \times 21.8}{\text{Distance Traveled (ft.)} \times \text{Width of Spread (ft.)}}$$

Formula for Liquid Manure:

$$\text{Gallons per acre} = \frac{\text{Tank Volume (gal.)} \times 43,560}{\text{Distance Traveled (ft.)} \times \text{Width of Spread (ft.)}}$$

- Calculate the application rate. The application rate is calculated using the formula for either liquid or solid manure.

DETERMINING THE AREA OF SPREAD

The "area of spread" is the length and width of the ground covered with one load of manure. The area of spread is affected by speed and equipment settings. Spreaders discharge manure at varying rates depending on travel and PTO speed, gear box settings, and discharge openings. It is important to adjust the spreader so the spread pattern is uniform. Accurately measuring the length and width of this area is essential.

To determine width, measure two adjacent spreads and divide by two to find the "effective" spread width. This accounts for overlapping which is often required to make a more uniform application.

The length of spread is determined using the following three values:

- desired manure application rate (based on soil and manure tests),
- width of the manure spread, and
- manure spreader holding capacity (weight and/or volume).

With these values, calculate the distance or length of spread using one of the following formulas:

Formula for Solid Manure:

The Travel Distance (feet) per Load Equals:

$$\text{Average Load Weight (lbs.)} \times 21.8$$

Width of Spread (ft.) x Appl. Rate (tons per acre)

Formula for Liquid Manure:

The Travel Distance (feet) per Load Equals:

$$\text{Tank Volume (gallons)} \times 43,560$$

Width of Spread (ft.) x desired Appl. Rate (gallons/acre)

Spread a load. If the distance traveled does not equal the calculated distance, adjust speed or equipment settings.

WEIGHT AREA METHOD

When a scale is not available, the application rate of a box spreader can be estimated by collecting manure on a tarp or piece of heavy material.

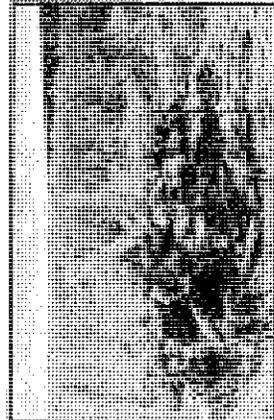


Photo courtesy: USDA NRCS SD

- Prepare/cut three 56 inch x 56 inch tarps or pieces of heavy material (This size equals 1/2000 of an acre). The pounds of manure collected on a 56 inch square equals tons applied per acre.
- Weight one of the clean tarps and a large bucket on a platform scale. Record the weight.
- In a field, anchor the three tarps ahead of the spreader near the beginning, middle and end of the area that will be spread with one load.

- Drive over the three tarps at a normal speed to collect representative manure samples.

- Fold and place the first tarp in the empty bucket without spilling the manure.

- Weight the bucket, tarp and manure. Subtract the weight of the clean tarp and bucket recorded in Step 2.

- Repeat the process for each of the two remaining tarps.

- Calculate the average weight (pounds) of the manure collected. This value equals the tons of manure applied per acre.

- Factor for converting pounds to tons and square feet to acres. (21.8 = 43,560 sq. ft. per acre divided by 2000 lbs./ton)
- The factor for converting square feet to acres = 43,560.

Manure Spreader Calibration Worksheet

Spreader Calibration for: Wulf Cattle Depot County: Corson

Date of Calibration: _____ Application Type: Liquid Solid

Manure Analysis N P₂O₅ K₂O

Solid Manure Calibration:

Type of Spreader: _____ Size of Spreader (Bu.): _____

Moisture Content: Wet Moist Dry Bedding Amount: _____

Scale #	Spreader Empty Weight (lbs.)	Spreader Full Weights (lbs.)					
		Load Number					
		1	2	3	4	5	
1							Average load Weight (lbs. and tons)
2							
3							
4							
5							
6							
Totals =	-						lbs.
	Tons/Load						Tons

Actual application rate:

Distance Traveled ft. x Spread Width ft. = Acres¹

Actual Manure Applied:

Nutrients Applied (lbs per ac): N P₂O₅ K₂O

¹ Acres = Distance x Width / 43,560

Unloading travel distance:

Desired Application Rate x Spread Width ft. Required Distance Ft.

Nutrients Applied (lbs per ac): N P₂O₅ K₂O

Desired Application Rate x Spread Width ft. Required Distance Ft.

Nutrients Applied (lbs per ac): N P₂O₅ K₂O

Desired Application Rate x Spread Width ft. Required Distance Ft.

Nutrients Applied (lbs per ac): N P₂O₅ K₂O

Note: Adjust travel speed and/or spreader discharge rate if the calculated travel distance, at first, is not achieved.

Comments:

Section P: Instruction to Calculate Manure
Application Rates

Nutrient Management Planning Tool Spreadsheet Instructions

Introduction

This "Nutrient Management Plan" consists of multiple spreadsheets designed to determine and document the necessary land base (acres) required to safely land apply manure generated by a livestock operation. The spreadsheets are made up of the following pages:
SD-CPA-63A – Total Nitrogen and Phosphorus Produced from Livestock Feeding Operation(s)
SD-CPA-63B – Part 1 – Field Information; Part 2 – Estimated Nutrient Requirement; Part 3 – Planned Nutrient Requirements; Part 4 – Nutrient Application

Summaries to document manure application can be printed from the main menu or from the heading in column 37. There is a summary for DENR permitted facilities or an agonomic summary for non-permitted facilities.

There are pop-up windows available to assist in calibrating equipment (main menu and in heading of column 37), and calculating commercial fertilizer blends (heading of column 38).

Where to Start

Begin the nutrient planning process by first collecting a set of aerial plan maps of land available for manure application. On these maps, outline the fields that are suitable to safely land apply manure. This is an important step to an orderly assembly of field information needed to make entries on the spreadsheets. For instructions on how to develop plan maps and other documents needed in the nutrient management plan, refer to the "Supporting Documents" section found on page 5 below.

Spreadsheet Capacity

SD-CPA-63B is designed with a capacity to enter land base information for up to 126 fields. Initially, 27 lines will appear on the spreadsheet to enter field information. If more lines are needed, the spreadsheet capacity can be increased in 33 line increments by pressing the "Add Fields" button located at the bottom of worksheet.

Instructions

Complete the following in the main menu screen:

- 1. Operator:** Enter the facility or land operator name.
- 2. County:** Enter the county where the feeding operation is located.
- 3. Prepared By:** Enter the name of the person completing the nutrient management plan spreadsheets.
- 4. Date:** Enter the date the plan was prepared.
- 4. Crop Year:** Enter the year of the 1st growing season.

Click on the grey box to go to the corresponding section within this plan.

SD-CPA-63A - Total Nitrogen and Phosphorus Produced from Operation (Columns 5-16)

Note: This spreadsheet must be filled out to allow proper functioning of Spreadsheet 63B.

- 5. Type of Animals:** Enter the type of animal confined at the facility.
- 6. No. of animals:** Enter number of animals confined at the facility (those confined for a total of 45 days or more in a 12 month period).

7. **Avg. weight:** Enter the average weight of the animals.
8. **Days of Confinement:** Enter the maximum number of days that the animals will be confined per year.
9. **N and P₂O₅ Total:** An estimated total pounds of nitrogen and phosphorus will be automatically calculated after the number of days of confinement has been entered. Both the organic and inorganic forms of nitrogen are considered in arriving at the initial pounds of nitrogen.
10. **Percent N retained during handling / storage:** Select from the drop down list the type of manure handling that best represents the facility. The % Nitrogen (N) retained will be automatically calculated and appear to the right of the entry. Press the "System Description" tab at the bottom of screen for a description of handling/storage systems.
11. **Total N available for application:** The total pounds of nitrogen available for application will be calculated after the manure storage option has been entered.
12. **Time of application:** Choose the time of application from the drop down list that represents your manure application practices.
13. **N Retained – Application method and % retained after application:** Select from the drop down list the appropriate application option. The % Nitrogen (N) retained will be calculated after the manure application option has been entered.
14. **Total N retained in field:** This value will be automatically calculated.
15. **3-Yr. Mineralization Rate:** The rate is based on type of manure handling. Choose from the drop down list the option that most closely represents the handling method that is or will be used. The estimated % inorganic Nitrogen (N) available over a 3 year mineralization period will appear to the right of the entry.
16. **N and P₂O₅ Available for the Crop:** The total pounds of Nitrogen (N) and Phosphorus (P₂O₅) available for crops will be automatically calculated. Cumulative totals will be shown on the lower right corner of this spreadsheet, and also carried over to the bottom of Spreadsheet 63B.

SD-CPA-63B (Part 1) – Field Information (Columns 17-28):

17. **Field ID:** Enter the field identification number or name (from plan map).
18. **Date Entered in Plan:** Enter the date that the field was added to the Nutrient Management Plan.
19. **Beginning acres in field:** Enter the total number of acres within the boundaries of the field, including all setback and/or exclusion areas.
20. **County:** Enter the county where the field is located.
21. **Soil Map Unit:** Enter the most predominant soil map unit symbol for the field (from plan map).
22. **Field Location:** Enter the legal description of each field to the nearest quarter/half section of land.
23. **Predicted Soil Loss using RUSLE:** Enter the calculated estimated water erosion (soil loss) figure, which is expressed in tons/ac/yr. This number is derived from an erosion prediction program called the Revised Universal Soil Loss Equation (RUSLE2). Use NRCS Form SD-CPA-29 to document calculations. Information about this computer program is available at the local Natural Resources Conservation Service (NRCS) office.
24. **Control of Land:** If the field is owned or leased by the livestock Operator, check the box. If the field is neither owned or leased, leave blank.

- 25. Acres Excluded from Manure Application:** These 2 columns address the acres that will be excluded from manure application to minimize the risk of potential nutrients or pollutants from leaving the fields and reaching surface waters. From a field assessment, indicate if a 100 foot vegetated "buffer" or "setback" is needed along all drainage ways or other water bodies in the field. Record the number of acres to be excluded, also consider all of the following "Drainages", "Wetlands", "Wells", "Slope" or any "Other" exclusions. (Determine and measure acres from the plan map).
- 26. Irrigated:** Place a check in the box if the field is irrigated.
- 27. No-till:** Check this box if the tillage/planting system that the land operator plans to use is a no-till, ridge-till or strip-till planting system.
- 28. Current Soil Test:** Enter the appropriate N, P and K test results from the land operator's current soil test report from the lab. The value for N is reported in lbs/ac for a normal 0-2 foot sample. If a deeper 2-4 foot sample was collected and tested, enter the test results in the worksheet column labeled as "2-4 foot". The nitrate nitrogen in the 2-4 foot sample is automatically adjusted based on the test results. (Refer to the SDSU EC 750 "Fertilizer Recommendations Guide" (Page 4) for additional information). Reminder: Sampling and testing for N and P is required prior to manure application but only P is required for initial planning purposes.
- Next, select the type of phosphorus extraction method used at the testing lab (shown on the lab report). Enter the potassium from the lab results. Enter the date that the soil sample was collected.

This spreadsheet can be sorted by clicking on the heading in columns 17 through 23.

SD-CPA-63B (Part 2) – Estimated Nutrient Requirement (Columns 29-31):

- 29. Crops and Average Yield in Rotation:** Enter crops from the drop down lists. First, enter the crop grown the year prior to writing the NMP or manure application. Then enter the projected crops to be grown in the next two years. Using the 3 buttons in the top header of these columns crop yields can automatically be calculated based on one of three methods: (1) South Dakota Agricultural Statistics Service (SDASS) county five-year average yield indexed by the predominant soil type productivity index (PI), (2) South Dakota Agricultural Statistics Service publication current five-year county average yields. **Note: Both these yields are already increased by 10 percent.** These yields can be over-ridden by entering a number in the yellow box to the right (Actual Yield column). (3) By choosing "Actual or Yield Goal" you can manually enter a yield for each crop. Enter actual or expected yields if either of the previous methods do not accurately reflect field conditions. Proof of field-by-field or farm-by-farm yields shall be based on an average of actual crop receipts from a minimum of three consecutive years. If there is no yield information available for a crop listed in the nutrient management plan, documentation from
- 30. Initial Nutrient Mgt. Plan - N based field Acres:** This column automatically calculates acres, but for nitrogen based fields only. Any fields identified as "Phosphorus Crop Removal" may be used for manure application, however, they are not used on the spreadsheet to meet land base requirements. Fields with "No Application" acres will not be used to meet land based requirements.
- 31. Nutrient Recommendations:** The computer program automatically makes plant nutrient recommendations (lbs/ac) based on the SDSU EC 750 "Fertilizer Recommendations Guide".

At the bottom of column 31 is a summary of "Total lbs of N and P2O5 available for the crops" (nutrients in manure - from CPA-63A), and "Total lbs of N and P2O5 required by fields". There is also a statment in red indicating if there is adequate acres available based on the Nitrogen analysis and if there is a phosphorus increase anticipated in the fields. If there is a phosphorus buildup expected, an approximate number of years will be given until all the available acres are at 50 ppm olson or 75 ppm bray1, this is usually when the field is in the phosphorus based catagory. see N-P table in main menu **This is the end of what is considered the Initial Plan and can be printed by clicking the Print button at the top of the spreadsheet, (remember to print CPA-63A). Complete the remaining part of the spreadsheet when manure application in taking place.**

SD-CPA-63B (Part 3) – Planned Nutrient Application (Columns 32-36):

- 32. Manure application based on:** A field is generally considered **Nitrogen based** when the P soil test level is below 50 ppm Olsen or 75 ppm Bray; generally **Phosphorus Crop Removal (phosphorus based)** if above these levels. When a field is designated as Phosphorus Crop Removal, manure may still be applied according to nitrogen crop needs; however, the amount of phosphorus applied must be used by the crop or future crops in the rotation before more phosphorus is applied. *See column 40 to know how many years until the P2O5 is used and the field is available for more manure applications.* A "No Application" appears in this column when the P soil test level for a field is greater than 100 ppm Olsen or 150 ppm Bray (which exceeds the limits set in South Dakota), or if the Predicted Soil Loss (column 23) exceeds 6 tons/ac/yr. *See N-P table in main menu.*
 - 33. Manure Application and Incorporation:** Select the type of manure planned (Liquid or Solid) and the method of manure application. This will determine a nitrogen mineralization rate.
 - 34. Manure Test:** Using the lbs/ton or lbs/1000 gal. enter the total nitrogen, inorganic nitrogen (ammonium N), total P2O5 and total K2O test results from the manure analysis report. A number must be entered in all four columns. Reminder: Check and ensure that the P2O5 and K2O test results are used, not elemental P and K.
 - 35. Available N (first crop year):** The computer program automatically makes a determination of available nitrogen. Includes Inorganic Nitrogen Retained and Organic Nitrogen.
 - 36. Maximum Manure Application:** The computer program automatically makes a manure application rate determination that reflects the **nitrogen recommendation** for the planned crop. At that rate the amount of manure required to evenly apply to all the available acres in the field will be given in the "Quantity of Manure" column.
- ### **SD-CPA-63B (Part 4) – Nutrient Application (Columns 36-35):**
- 37. Acres of Actual Manure Application:** Enter the actual amount of acres that manure was applied.

- 38. Manure Application:** Enter the actual amount of manure that the operator applied (tons/ac or gallons/ac), date of application and time of day (This is a matter of record to help support the timeframe of the manure haul - required for State Permitted Facilities). At the top of this column are three buttons: "DENR Summary" and "Agronomic Summary" summarizes nutrient application by field, print these out on an annual basis to document manure application (rather than the entire form); "Manure Rate Calculator" is a pop-up worksheet that is designed to assist in calculating actual manure application rates, speeds, and distances.
- 39. Nutrients Applied:** Enter the amount of nutrients applied using commercial fertilizer. To assist in the calculation of actual nutrient applied, press the "Commercial Application" for a pop-up form. To calculate an estimated value of manure applied, press the "Commercial Prices" button to update current commercial fertilizer prices. The estimated value of manure applied is calculated on the "Agronomic Summary" worksheet. The amount of available nutrients applied from manure will be calculated and displayed in the middle 3 columns and the total of manure plus commercial fertilizer will display in the end 3 columns.
- 40. Estimated time to raise P soil test level to 50 ppm Olsen or 75 ppm Bray:** This is the estimated time for the crop or future crops in the rotation to use up the phosphorus applied during a nitrogen based application.

List of summary statements that may appear to reflect adequacy of acres:

Nitrogen based statements --

- "Adequate acres are available based on Nitrogen analysis". *This means the plan meets the Nitrogen based requirements.*
- "Inadequate acres are available based on Nitrogen analysis". *This means that additional land must be added to the plan to utilize the manure nitrogen produced by the livestock operation.*

Phosphorus Crop Removal (phosphorus based) statements --

- "Phosphorus (P_2O_5) removal exceeds or is in balance with crop needs". *This means the plan meets the Phosphorus based requirements.*
- " P_2O_5 is in excess of removal. At this rate, it will take approximately _____ years to build all listed fields up to 50 ppm P (Olsen)". *This means the plan meets the Phosphorus based requirements. Note: A low single digit number is evidence that the operation has adequate acres only for the short term – adding and using more land for manure application now is recommended as a means to slow phosphorus buildup.*
- "Inadequate acres are available based on Phosphorus analysis". *This means that additional land must be added to the plan to utilize the manure phosphorus produced by the livestock operation.*

Supporting Documents –

The following documents must be included with the Initial Nutrient Management Plan spreadsheets:

- a. Copies of aerial photo plan maps that identify fields selected for manure application. Outline each field with a bold line boundary and label each with the following: (if possible, use ArcGIS or similar software to develop maps)
 - Field ID (Example: Field 1)
 - Acres (Example: 80 acres)
 - Land use (Example: Cropland)
 - Predominant soil map unit symbol (from soil survey map) (Example: Soil CaB)

The field ID may be a simple sequential numbering system, favorite field name or FSA Tract and field number.

The top of each map should be labeled “**Water Quality Risk Assessment Map**” along with the legal description (Section, Township, Range).

Locate and clearly outline (preferably cross-hatch) exclusion areas, setbacks or buffer areas around sensitive areas in fields or landscapes where manure will not be applied. If specific state and local compliance requirements are not known, contact the South Dakota DENR or local NRCS/Conservation District office for information.

Identify and mark the location of the headquarters, feedlots and water wells.

Make field risk assessments by analyzing surface water and aquifer resource information. Label fields that have a high vulnerability for nitrate leaching to an aquifer and/or phosphorus loss to surface waters. (Example: L = High leaching risk; R = High runoff risk). For guidance on how to make assessments, contact the South Dakota DENR or local NRCS/Conservation District office.

- b. NRCS soil survey maps of all the fields in the plan, along with a soil map unit legend. Mark each map with a legal description.
- c. If applicable, include a copy of signed manure application lease agreements executed with the land owner for fields not owned by the livestock operator. The written agreements will include, at a minimum, the legal description of individual fields, acres available for manure application, and time period (length in years) of the agreement. Agreements must be for at least one year.
- d. Copies of current soil test reports (showing phosphorus test results) for all fields in the plan. (*Reminder: the proper sampling depth for a phosphorus test is the top 0-6 inches of soil.*)
- e. Copies of calculations showing the predicted water erosion (soil loss) using the Revised Universal Soil Loss Equation (RUSLE2). Document the calculations on NRCS Form SD-CPA-29. For information on how to do RUSLE2 calculations, contact the Natural Resources Conservation Service (NRCS).

Additional Information –

For additional information on Manure and Nutrient Management or links to other websites, visit the South Dakota NRCS website at:

http://www.sd.nrcs.usda.gov/technical/Nutrient_Management.html

Section Q: Manure Test Records



DAIRYLAND

Laboratories, Inc.

Dairyland Laboratories, Inc.
217 E. Main St.
Arcadia, WI 54612
Telephone: 608-323-2123
Fax: 608-323-2184
Email: info@dairylandlabs.com

Report Date: 9/16/2020
Sample No.: 001-2009-003365

To: Wulf Cattle Depot
26583 109th Street
McLaughlin, SD 57642

Account No.: 1002 (18)
Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT

Product: #1

MANURE ANALYSIS REPORT

ANALYSIS RESULTS

SAMPLE ID
SAMPLE NAME: #1
MATERIAL: Beef
STORAGE SYSTEM: Solid

ACTUAL ANALYSIS
MOISTURE: 26.15%
SOLIDS: 73.85%
NITROGEN: 0.93%
AMMONIA NITROGEN: 0.06%
PHOSPHORUS: 0.58%
POTASSIUM: 1.20%

Total
Nutrients

Estimated 1st year
Available Nutrients

----- Time to incorporation -----
>72 hours or not | | <1 hour or
incorporated | 1 to 72 hours | injected

	lbs/ton		lbs/ton	
NITROGEN	18.60	4.65	5.58	6.51
PHOSPHATE	26.60	21.28	21.28	21.28
POTASH	28.80	23.04	23.04	23.04
AMMONIA NITROGEN	1.20			
TOTAL VALUE	\$16.99	\$17.32		\$17.64

COMMENTS

Application of manure on the same field for 2 consecutive years increases availability of N, P, K, and S by 10%, and for 3 or more consecutive years by 15%.
Availability of N changes depending on application technique. Injection or incorporation within 3 days of application results in higher N availability.

Value based on commercial fertilizer costs as of 7/27/2020.

N (Urea)	0.35/lb
P205 (Triple Superphosphate)	0.43/lb
K20 (Potash)	0.27/lb
S (Elemental Sulfur)	0.40/lb

Billing Information

Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT
Product: #1

Reference: 0757012
Date: 9/16/2020
Sample No.: 001-2009-003365



DAIRYLAND
Laboratories, Inc.

Dairyland Laboratories, Inc.
217 E. Main St.
Arcadia, WI 54612
Telephone: 608-323-2123
Fax: 608-323-2184
Email: info@dairylandlabs.com

Report Date: 9/16/2020
Sample No.: 001-2009-003366

To: Wulf Cattle Depot
26583 109th Street
McLaughlin, SD 57642

Account No.: 1002 (18)
Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT

Product: #2

MANURE ANALYSIS REPORT

ANALYSIS RESULTS

SAMPLE ID		ACTUAL ANALYSIS	
SAMPLE NAME:	#2	MOISTURE:	15.90%
MATERIAL:	Beef	SOLIDS:	84.10%
STORAGE SYSTEM:	Solid	NITROGEN:	1.11%
		AMMONIA NITROGEN:	0.10%
		PHOSPHORUS:	0.66%
		POTASSIUM:	1.59%

Total Nutrients	Estimated 1st year Available Nutrients		
	----- Time to incorporation -----		
	>72 hours or not incorporated	1 to 72 hours	<1 hour or injected
	lbs/ton	lbs/ton	lbs/ton
NITROGEN	22.20	5.55	6.66
PHOSPHATE	30.20	24.16	24.16
POTASH	38.20	30.56	30.56
AMMONIA NITROGEN	2.00		
			7.77
			24.16
			30.56
	TOTAL VALUE	\$20.57	\$20.96
			\$21.34

COMMENTS

Application of manure on the same field for 2 consecutive years increases availability of N, P, K, and S by 10%, and for 3 or more consecutive years by 15%.
Availability of N changes depending on application technique. Injection or incorporation within 3 days of application results in higher N availability.
Value based on commercial fertilizer costs as of 7/27/2020.

N (Urea)	0.35/lb
P205 (Triple Superphosphate)	0.43/lb
K20 (Potash)	0.27/lb
S (Elemental Sulfur)	0.40/lb

Billing Information

Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT
Product: #2

Reference: 0757013
Date: 9/16/2020
Sample No.: 001-2009-003366

To: Wulf Cattle Depot
26583 109th Street
McLaughlin, SD 57642

Account No.: 1002 (18)
Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT

Product: #3

MANURE ANALYSIS REPORT

ANALYSIS RESULTS

SAMPLE ID
SAMPLE NAME: #3
MATERIAL: Beef
STORAGE SYSTEM: Liquid

ACTUAL ANALYSIS
MOISTURE: 99.81%
SOLIDS: 0.19%
NITROGEN: 0.01%
AMMONIA NITROGEN: 0.01%
PHOSPHORUS: 0.01%
POTASSIUM: 0.04%

Total Nutrients	Estimated 1st year Available Nutrients		
	Time to incorporation		
	>72 hours or not incorporated	1 to 72 hours	<1 hour or injected
	lbs/1000 gal	lbs/1000 gal	lbs/1000 gal
NITROGEN	0.83	0.25	0.33
PHOSPHATE	1.90	1.52	1.52
POTASH	3.98	3.19	3.19
AMMONIA NITROGEN	0.42		
TOTAL VALUE	\$1.59	\$1.62	\$1.65

COMMENTS

Application of manure on the same field for 2 consecutive years increases availability of N, P, K, and S by 10%, and for 3 or more consecutive years by 15%.
Availability of N changes depending on application technique. Injection or incorporation within 3 days of application results in higher N availability.
Value based on commercial fertilizer costs as of 7/27/2020.

N (Urea) 0.35/lb
P205 (Triple Superphosphate) 0.43/lb
K20 (Potash) 0.27/lb
S (Elemental Sulfur) 0.40/lb

Billing Information

Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT
Product: #3

Reference: 0757014
Date: 9/16/2020
Sample No.: 001-2009-003367



DAIRYLAND
Laboratories, Inc.

Dairyland Laboratories, Inc.
217 E. Main St.
Arcadia, WI 54612
Telephone: 608-323-2123
Fax: 608-323-2184
Email: info@dairylandlabs.com

Report Date: 9/16/2020
Sample No.: 001-2009-003368

To: Wulf Cattle Depot
26583 109th Street
McLaughlin, SD 57642

Account No.: 1002 (18)
Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT

Product: #4

MANURE ANALYSIS REPORT

ANALYSIS RESULTS

SAMPLE ID
SAMPLE NAME: #4
MATERIAL: Beef
STORAGE SYSTEM: Liquid

ACTUAL ANALYSIS
MOISTURE: 99.77%
SOLIDS: 0.23%
NITROGEN: 0.01%
AMMONIA NITROGEN: 0.01%
PHOSPHORUS: 0.01%
POTASSIUM: 0.04%

Total Nutrients	Estimated 1st year Available Nutrients		
	----- Time to incorporation -----		
	>72 hours or not incorporated	1 to 72 hours	<1 hour or injected
lbs/1000 gal	lbs/1000 gal	lbs/1000 gal	lbs/1000 gal
NITROGEN	0.83	0.25	0.33
PHOSPHATE	1.90	1.52	1.52
POTASH	3.98	3.19	3.19
AMMONIA NITROGEN	0.43		
TOTAL VALUE	\$1.59	\$1.62	\$1.65

COMMENTS

Application of manure on the same field for 2 consecutive years increases availability of N, P, K, and S by 10%, and for 3 or more consecutive years by 15%.
Availability of N changes depending on application technique. Injection or incorporation within 3 days of application results in higher N availability.

Value based on commercial fertilizer costs as of 7/27/2020.

N (Urea)	0.35/lb
P205 (Triple Superphosphate)	0.43/lb
K2O (Potash)	0.27/lb
S (Elemental Sulfur)	0.40/lb

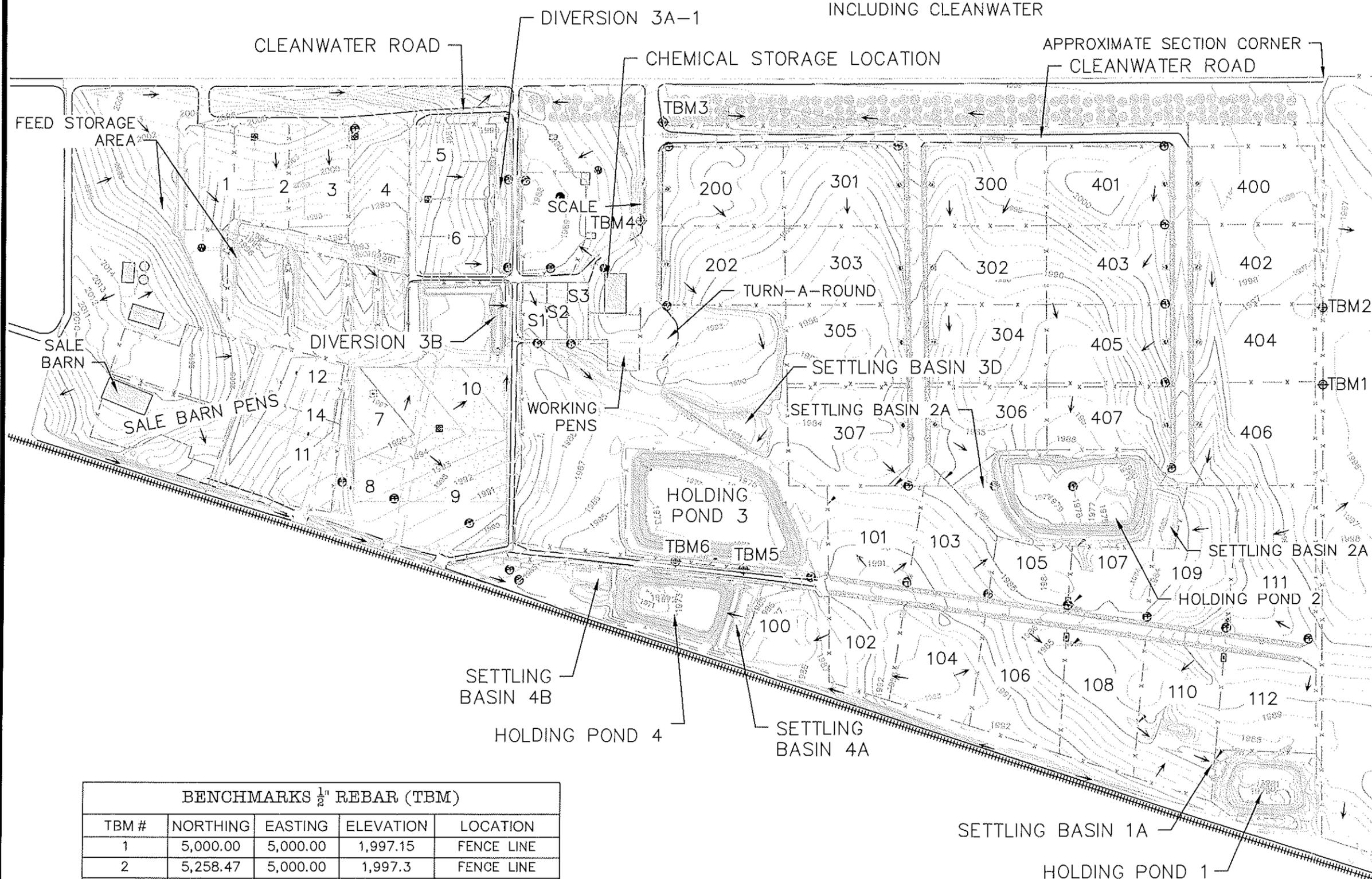
Billing Information

Sampled By: Wulf Cattle Depot
Sampled For: WULF CATTLE DEPOT
Product: #4

Reference: 0757015
Date: 9/16/2020
Sample No.: 001-2009-003368

Section R: Facility Maps

NOTE: PLEASE NOTE
CONTOURS AND DRAINAGE
ARROWS FOR DRAINAGE,
INCLUDING CLEANWATER



GENERAL NOTES

LEGEND

- ⊕ BENCHMARK
- ▭ BUILDINGS
- x- FENCELINE
- - - CULVERT/PIPE
- ← DRAINAGE ARROW

SCALE, FEET

0 175 350 525 700

DeHaan, Grabs & Associates, LLC
Registration Number: C-1341

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgaengineering.com

WULF CATTLE DEPOT

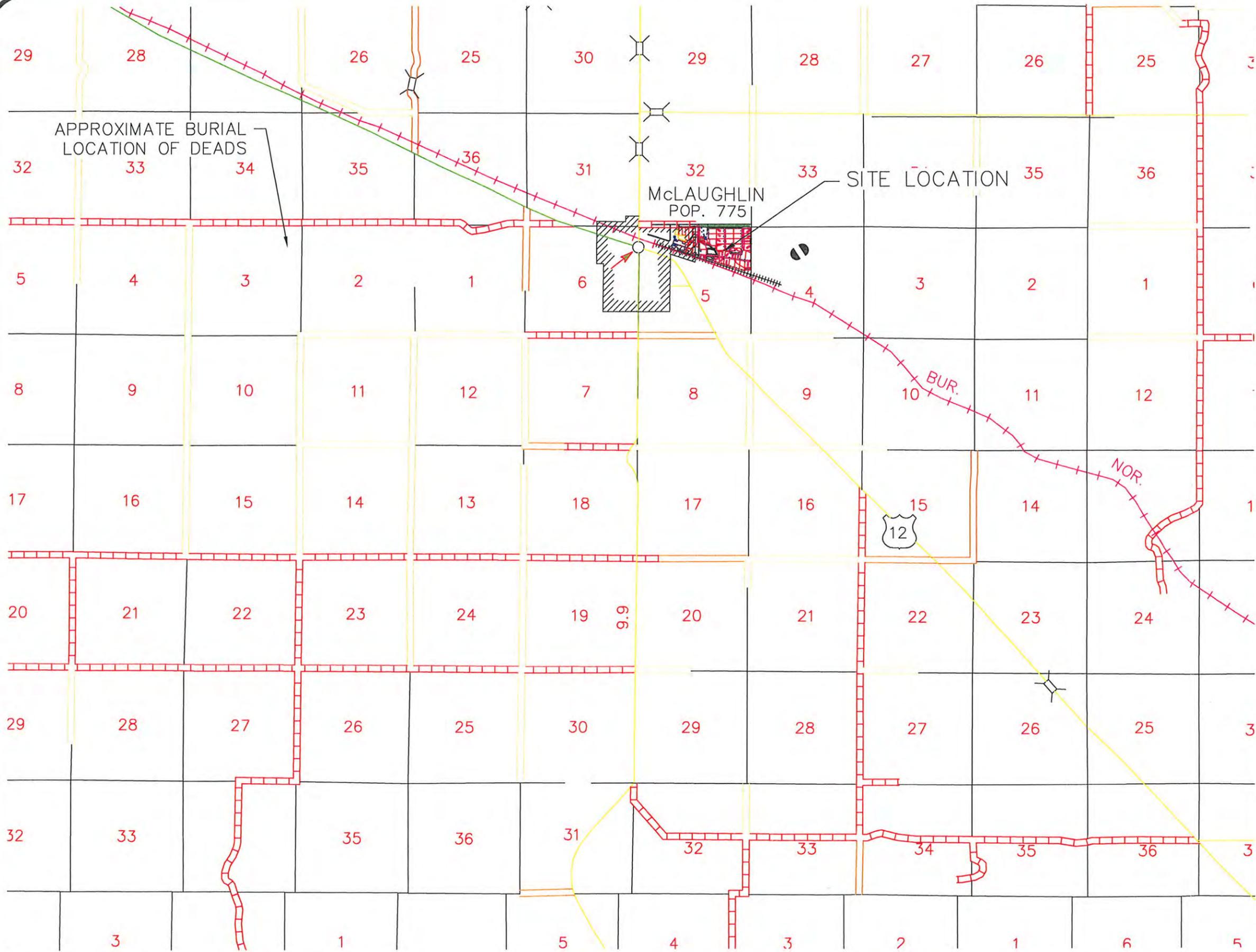
N 1/2, SECTION 5, T 21 N, R 27 E
CORSON COUNTY, SD

FEEDLOT SITE MAP

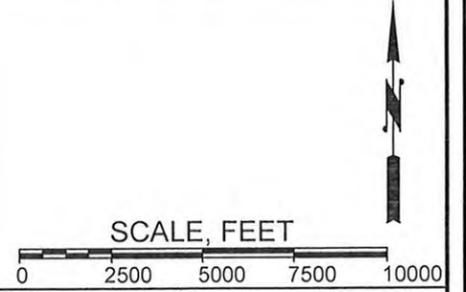
BENCHMARKS 1/2" REBAR (TBM)

TBM #	NORTHING	EASTING	ELEVATION	LOCATION
1	5,000.00	5,000.00	1,997.15	FENCE LINE
2	5,258.47	5,000.00	1,997.3	FENCE LINE
3	5,879.09	2,832.63	1,997.97	FENCE CORNER
4	5,550.66	2,761.47	1,999.50	POWER POLE
5	4,383.62	3,103.12	1,984.22	POWER POLE
6	4,410.06	2,881.59	1,984.80	POWER POLE

DATE: APR 8, 2011	SHEET: R.1.
SCALE: 1" = 350'	
DRAWN BY: CAS	
CHECKED BY: DLD	



GENERAL NOTES



DeHaan, Grabs & Associates, LLC
 Registration Number: C-1341

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
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 PO Box 522, Mandan, ND 58554
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 www.dgaengineering.com

**WULF CATTLE DEPOT
 BURIAL LOCATION**

N 1/2, SECTION 5, T 21 N, R 27 E
 CORSON COUNTY, SD

COUNTY LOCATION MAP

DATE: OCT 6, 2009	SHEET: R. 2.
SCALE: 1" = 5000'	
DRAWN BY: SLI	
CHECKED BY: NAP	

Cremator Location



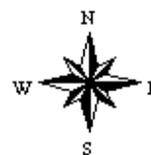
Map Center: 45° 49' 4.94, -100° 47' 23.35



DGA
CONSULTING ENGINEERS
4200 21ST St. SE UNIT 101 MANDAN ND 58554

4-21N-27E
Corson County
South Dakota

Maps Provided By:
 surety
CUSTOMIZED ONLINE MAPPING
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9/25/2020

Section S: Engineering Calculations for
Storage Considerations

S. Facility Design Calculations

A. Rainfall, Runoff & Facility Information

1. Rainfall Data

- a. Annual Rainfall = 17.4 inches
- b. Annual Runoff = 15.7% of Annual Rainfall for CN 90
- c. 25 Yr 24 Hr Storm Rainfall = 3.9 inches
- d. Annual Lake Evaporation = 35.3 inches



2. Measured Areas

Drainage Area - Pens	108.0	Acres
Drainage Area – Farmstead/Roads	45.3	Acres
Total Drainage Area	153.3	Acres
Holding Pond Surface Area at Top of FB	375,222	Sq. Ft.

3. Drainage Area Average Curve Number

Drainage Area Designation	Curve Number
Pens (DA-P)	90
Farmstead, Roads (DA-FR)	79

Hydrologic Soil Group B was used for all Drainage areas and was based off of the USDA Soil Survey. The fair Hydrologic Condition of the soil was used as a conservative assumption.

Average CN is equal to the sum of the products of each of the CN designation areas and their respective CN's divided by the total drainage area.

$$\left(\text{DA-P} \times \text{CN-P} + \text{DA-FW} \times \text{CN-FR} \right) / \text{DA-Total} = \text{Average CN}$$

$$\left(108 \times 90 + 45.3 \times 79 \right) / 153.3 = 87$$

4. Runoff Calculations

a. Annual Runoff

To estimate annual runoff from a curve number of 87, a conservative approach was used as a curve number 90 was used. Therefore $0.157 \times 17.4''$ the runoff for this site is.

2.7 Inches

b. 25 Yr 24 Hr Storm Runoff for a CN 87 (Soil Conservation method) =

2.5 Inches

B. Holding Pond Storage Components

1. 25 Yr 24 Hr Storm Runoff Volume

Storm Runoff Volume (SRV) = Drainage Area (DA) x 25 Yr 24 Hr Storm Runoff (SR)

DA (ac)	x	SR (in)	x	Units Conversion	=	SRV (ft ³)
153.3	x	2.5	x	3,630	=	1,391,198

2. Annual Runoff Volume

Annual Runoff Volume (ARV) = Drainage Area (DA) x Annual Runoff (AR)

DA (ac)	x	AR (in)	x	Units Conversion	=	ARV (ft ³)
153.3	x	2.7	x	3,630	=	1,502,493

3. 25 Yr 24 Hr Rainfall on Pond Surface

25 Yr 24 Hr Rainfall on Pond Surface Volume (SRNV) = Holding Pond Surface Area at Top of Berm (PSA) x 25 Yr 24 Hr Storm Rainfall (SRN)

PSA (ft ²)	x	SRN (in)	x	Units Conversion	=	SRNV (ft ³)
375,222	x	3.9	x	0.0833	=	121,898

4. Annual Rainfall on Pond Surface

Annual Rainfall on Pond Surface Volume (ARNV) = Holding Pond Surface Area at Top of Berm (PSA) x Annual Rainfall (ARN)

PSA (ft ²)	x	ARN (in)	x	Units Conversion	=	ARNV (ft ³)
375,222	x	17.4	x	0.0833	=	543,854

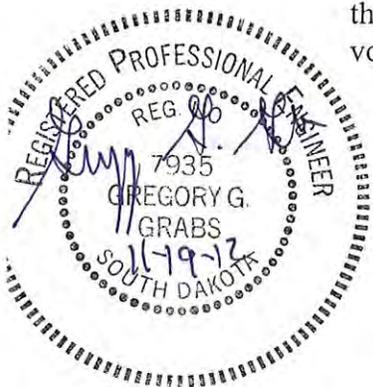
5. Estimated Annual Evaporation from Pond Surface

The estimated annual evaporation from the pond surface is calculated by multiplying the mean annual lake evaporation by the average evaporation area of the pond. The average evaporation area is the surface area of the pond at the elevation which provides storage that is halfway between the maximum operating volume and the residual water and solids volume.

- a. Maximum Operating Elevation = The elevation at which storage equaling Freeboard Storage Volume (Includes Basins Storage-Solids)(FV) minus the 25 Yr 24 Hr Storm Runoff Volume (SRV) minus the 25 Yr 24 Hr Rainfall on Pond Surface Volume (SRNV) is met.

FV (ft ³)	-	SRV (ft ³)	-	SRNV (ft ³)	=	Storage (ft ³)	Maximum Operating Elevation
3,205,498	-	1,391,198	-	121,898	=	1,692,402	1,981.5

- b. Average Evaporation Area = Area at the elevation which provides the average storage volume calculated as follows: (Maximum Operating El.



Volume + Residual Water and Solids El. Volume) / 2

(	Max Operating El. Volume	+	Residual El. Volume	) / 2 =	Average Evaporation El. Volume	Average Evaporation Area (ft ²)
(	1,199,371	+	115,956	) / 2 =	848,975	219,917

c. Annual Evaporation Volume (AEV) = Average Evaporation Area (AEA) x Annual Lake Evaporation (AE)

AEA (ft ²)	x	AE (in)	x	Units Conversion	=	AEV (ft ³)
219,917	x	33.7	x	0.0833	=	617,353

C. Holding Pond Storage Requirement

Required Storage = Annual Runoff Volume (ARV) + 25 Yr 24 Hr Storm Runoff Volume (SRV) + Annual Rainfall on Pond Surface Volume (ARNV) + 25 Yr 24 Hr Storm Rainfall on Pond Surface Volume (SRNV) - Annual Evaporation Volume (AEV)

ARV (ft ³)	+	SRV (ft ³)	+	ARNV (ft ³)	+	SRNV (ft ³)	-	AEV (ft ³)	=	Required Storage (ft ³)
1,502,493	+	1,391,198	+	543,854	+	121,898	-	617,353	=	2,942,090

D. Sediment Basin Solids Storage Requirement

The minimum sediment basin solids storage volume allowed by the SD DENR is 0.6 yd³ per head. Since actual cattle numbers above any one basin may vary a daily basis based on pen stocking rate, solids storage volume requirements will be based on average pen space per head. The maximum stocking basis on an annual basis is 12,000

Total Pen Area	/	Total Head #	=	Average Pen Area per Head
4,704,217	/	12,000	=	392



1. Settling Basin 1A

Pen Area Drained (ft ²)	/	Average Pen Area / Head	x	0.6 yd ³ per head	x	Conversion Factor	=	Required Solids Storage Volume (ft ³)
522,375	/	392	x	0.6	x	27	=	21,588

2. Settling Basin 2A

Pen Area Drained (ft ²)	/	Average Pen Area / Head	x	0.6 yd ³ per head	x	Conversion Factor	=	Required Solids Storage Volume (ft ³)
1,879,238	/	392	x	0.6	x	27	=	77,662

3. Settling Basin 3A (since there are long diversions and long flow distances 0.4 will be used for the actual basin.

Pen Area Drained (ft ²)	/	Average Pen Area / Head	x	0.6 yd ³ per head	x	Conversion Factor	=	Required Solids Storage Volume (ft ³)
1,731,437	/	392	x	0.4	x	27	=	47,703

4. Settling Basin 4A

Pen Area Drained (ft ²)	/	Average Pen Area / Head	x	0.6 yd ³ per head	x	Conversion Factor	=	Required Solids Storage Volume (ft ³)
171,508	/	392	x	0.6	x	27	=	7,088

5. Settling Basin 4B

Pen Area Drained (ft ²)	/	Average Pen Area / Head	x	0.6 yd ³ per head	x	Conversion Factor	=	Required Solids Storage Volume (ft ³)
399,659	/	392	x	0.6	x	27	=	16,517

