

RON BRUNS FEEDYARDS – EAST PLACE

NDEEID# - 72327
NPDES# - NE0106526



NUTRIENT MANAGEMENT PLAN



449 E. Deere Street ■ West Point, NE 68788 ■ Phone: 402.372.2236

NUTRIENTADVISORS.COM

Ron Bruns Feedyards-East Place

Introduction

- Ron Bruns Feedyards-East Place is located approximately 1 mile west of Pender, NE in Thurston County. It is an existing open-lot beef feeder cattle operation. The operation is currently permitted for 2,800 head of feeder cattle.
- Ron Bruns Feedyards-East Place is proposing to construct two additional pens on site. The head count will not change.

Ron Bruns Feedyards – East Place

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Section 1

Forms

Form B

Form C

Citizenship Attestation Form

NPDES Form 1

NPDES Form 2B

TITLE 130 - FORM B – PERMIT APPLICATION

- NEW CONSTRUCTION & OPERATING PERMIT (\$200) MODIFIED CONSTRUCTION & OPERATING PERMIT OR APPLICATION (\$200)
- NEW NPDES GENERAL PERMIT COVERAGE.. (\$200) MODIFIED NPDES PERMIT COVERAGE: GENERAL INDIVIDUAL (\$200)
- NEW NPDES INDIVIDUAL PERMIT (\$200) RENEWAL OF NPDES PERMIT COVERAGE: GENERAL INDIVIDUAL (\$200)
- MODIFICATION TO EXISTING PERMIT NOT LISTED ABOVE: OPERATING CONSTRUCTION APPROVAL (\$200)

PRINT OR TYPE ALL INFORMATION

(If more space is required for any section, attach separate sheet of paper)

LEGAL NAME OF APPLICANT: Ron Bruns
(If approved, the permit will be issued in this name)

MAILING ADDRESS OF APPLICANT: 714 Carnes Ave Pender NE 68047
Street, Rural Route or P.O. Box City or Town State Zip

TEL. NO(S). OF APPLICANT: (402) 385 2202 ()
Main Number (Other – Cell, Home, etc.)

EMAIL (optional): rbrunsfy@abnebraska.com

NAME OF ANIMAL FEEDING OPERATION: Ron Bruns Feedyards - East Place
(If different from applicant name above, the name by which the operation does business)

ADDRESS OF OPERATION: 1539 Hwy 16 Pender NE 68047
Street (9-1-1) Address of Operation City or Town State Zip

LEGAL DESCRIPTION OF OPERATION:

SE SW 21 25 N 6 **E** or **W** Thurston County
Qtr. Qtr. Section Township Range

SW SE 21 25 N 6 **E** or **W** Thurston County
Qtr. Qtr. Section Township Range

Latitude 42 ° 7 ' 10.27 " Longitude 96 ° 44 ' 17.58 "
(NOTE: Latitude and longitude should be for the main entrance to the animal feeding operation from the public road.)

NAME OF AUTHORIZED REPRESENTATIVE: *(See Page 2 for definition of Authorized Representative)*

Ron Bruns Owner
Printed or Typed Name Title or Position

714 Carnes Ave Pender NE 68047
Mailing Address City or Town State Zip

TEL.: (402) 385 2202 () rbrunsfy@abnebraska.com
Main Number (Other – Cell, Home, Fax, etc.) Email (optional)

LIVESTOCK *(Indicate one-time capacity of entire operation, including any livestock previously exempted from permitting.)*

Species <i>(Cattle, Dairy, Swine, etc.)</i>	Average Weight <i>(in lbs.)</i>	Indicate Head Numbers Below			
		Existing	Proposed (+ or -)	Previously Exempted	New Total
Feeder Cattle	850	2,800			2,800

***For Modification of permit or application:** If increasing or decreasing head numbers, indicate the proposed change in head numbers separately from existing numbers. Attach a narrative description of the proposed modification(s).

NOTE: "Applicant" refers to the legal name of an individual, a corporation, a limited liability company, partnership, or government entity to whom the permit will be issued, if approved. If applicant is an individual, completion of a U.S. Citizenship Attestation form may be required, except when already on file with the Department. The Applicant is responsible for compliance with all local laws, and for obtaining applicable local, county, and other permits. The Certification below must be signed by the applicant or an authorized representative, as defined below.

CERTIFICATION

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

Ron Bruns RONALD H BRUNS
 Printed or Typed Name of Applicant or Authorized Representative

Ronald H Bruns
 Signature of Applicant or Authorized Representative

3/23/21
 Date of Signature

"Authorized Representative" means, for:
A Corporation: a principal executive officer in charge of a principal business function and of at least the level of vice president; or
A Limited Liability Company: a manager or principal executive officer; or
A Partnership: a general partner; or
A Sole Proprietorship: the proprietor; or
A Municipal, state or other public entity: a principal executive officer or ranking elected official

TECHNICAL ADVISOR INFORMATION

NAME OF CONSULTANT OR ADVISOR Allen Kampschnieder TITLE OR CERTIFICATION: Advisor

NAME OF COMPANY Nutrient Advisors

STREET ADDRESS 449 E Deere St. CITY/STATE/ZIP West Point, NE 68788

CONSULTANT PHONE NO.: (402) 372 2236 ()
 (Work) (Other: Cell, Home, Fax, etc.)

Email: info@nutrientadvisors.com

I certify that the design of the livestock waste control facility meets the minimum requirements as outlined in Title 130, "Livestock Waste Control Regulations," of the Nebraska Department of Environmental Quality.

Allen Kampschnieder
 Signature of Technical Advisor or Professional Engineer

Mar 26, 2021
 Date of Signature



NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

AGRICULTURE SECTION * 1200 N STREET, SUITE 400 * LINCOLN, NE 68509-8922 *

TEL: (402)471-4239 FAX: (402) 471-2909 * WEB SITE: *www.deq.state.ne.us*

TITLE 130 - FORM C APPLICANT DISCLOSURE

Reserved for NDEQ Use only

IIS # _____

This Applicant Disclosure is required from all applicants for construction and operating permits, major modifications, transfer requests, National Pollutant Discharge Elimination System (NPDES) individual permits, or requests for coverage under a NPDES General Permit. If additional space is needed for any section, please print, "See Attached," in that section and attach the required information on a separate sheet of paper.

LEGAL NAME OF APPLICANT: Ron Bruns

(Legal name of permittee, i.e.: Legal name of sole proprietor, partnership, limited liability company, corporation, or government entity)

NAME OF ANIMAL FEEDING OPERATION (AFO): *(May be different than Applicant Name given above.)*

Ron Bruns Feedyards - East Place

AFO LOCATION SEE ATTACHMENT, _____ N, _____ E or W Thurston County
Qtr. Qtr. Section Township Range

TYPE OF BUSINESS (check one): Sole Proprietor Partnership Limited Liability Company
 Corporation Government Entity

SECTION I – Owner or Authorized Representative Information

in the space provided below, disclose the name, title, address, phone number and email address *(email optional)* of the applicant, partners, owners, members, authorized representative(s), and all corporate officers, directors, and stockholders.

Name	Title or Association with Operation	Address & Phone No. (Email Optional)
Ron Bruns	Owner	Street Address: 714 Carnes Ave City/State/Zip: Pender, NE 68047 Phone No.: 402-385-2202 Email: rbrunsfy@abbnebraska.com
		Street Address: _____ City/State/Zip: _____ Phone No.: _____ Email: _____
		Street Address: _____ City/State/Zip: _____ Phone No.: _____ Email: _____

SECTION II – Participation in Other AFOs

In the space below, list the location of all animal feeding operations in Nebraska and other states wholly or partially owned or operated in the past 5 years by the applicant or individual(s) listed in Section I.

Name	Name of Operation	Legal Location of Operation <i>(Qtr, Section, Township, Range, County, State)</i>
Ron Bruns	Ron Bruns Feedyards - Home Place	S1/2 SE1/4, S11-T25N-R5E Thurston County, NE

SECTION III – Livestock Waste Discharges

In the space below, list any livestock waste discharges within the past five years that were not in compliance with permit conditions from any operation in Nebraska wholly or partially owned or operated by the applicant or individuals listed in Section I.

Name of Operation	Location & Legal Description of Operation	Date(s) of Discharge
None		

SECTION IV – Previous Violations of Environmental Laws

In the space below, list all criminal convictions for a violation of §81-1506 of the Nebraska Environmental Protection Act or all felony criminal convictions for violation of the environmental laws of any jurisdiction by any of the individuals listed in Section I. Include the name of the individual, name of the operation, date(s) of violation, and describe the violation. If additional space is needed, please attach a separate sheet of paper.

None

CERTIFICATION

As authorized representative for the animal feeding operation described above, I hereby certify the following:

- A. Neither I, nor any of the persons named in Section I, have:
- 1) Allowed three or more livestock waste discharges to Waters of the State within the past five years that were not in compliance with permit conditions from any operation in Nebraska wholly or partially owned or operated by the applicant and individuals listed in Section I;
 - 2) A criminal conviction for violation of §81-1506 of the Nebraska Environmental Protection Act, or a felony criminal conviction for violation of environmental laws in any jurisdiction.
- B. That to the best of my knowledge and belief, I have the authority under the laws of the State of Nebraska to sign this applicant disclosure.
- C. Under penalty of law, that the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that significant penalties exist for submitting false information, including the possibilities of a fine and imprisonment for knowing violations. I have completely and accurately disclosed all information required by this form.
- D. I understand any misrepresentation or withholding of information may result in rejection of the application or revocation of a permit once issued. I also understand that any misrepresentation on this form may result in civil or criminal penalties provided for by law.

Ron Bruns RONALD H BRUNS

Printed or Typed Name of Authorized Representative

Ronald H Bruns

Signature of Authorized Representative

3/23/21

Date of Signature

"Authorized Representative" means, for:

A Corporation: a principal executive officer in charge of a principal business function and of at least the level of vice president; or

A Limited Liability Company: a manager or principal executive officer; or

A Partnership: a general partner; or

A Sole Proprietorship: the proprietor; or

A Municipal, state or other public entity: a principal executive officer or ranking elected official

NOTE: Applicant is responsible for compliance with all local laws and for obtaining applicable local, county, and other permits.


United States Citizenship Attestation Form

For the purpose of complying with Neb. Rev. Stat. §§ 4-108 through 4-114, I attest as follows:

<input checked="" type="checkbox"/> I am a citizen of the United States.
— OR —
<input type="checkbox"/> I am a qualified alien under the federal Immigration and Nationality Act, my immigration status and alien number are as follows: _____, and I agree to provide a copy of my USCIS documentation upon request.

I hereby attest that my response and the information provided on this form and any related application for public benefits are true, complete, and accurate and I understand that this information may be used to verify my lawful presence in the United States.

PRINT NAME	<u>RONALD H BRUNS</u> (first, middle, last)
SIGNATURE	<u>Ronald H Brunz</u>
DATE	<u>3/23/21</u>

Form 1 NPDES		U.S. Environmental Protection Agency Application for NPDES Permit to Discharge Wastewater GENERAL INFORMATION
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SECTION 1. ACTIVITIES REQUIRING AN NPDES PERMIT (40 CFR 122.21(f) and (f)(1))

Activities Requiring an NPDES Permit	1.1	Applicants <i>Not Required</i> to Submit Form 1		
	1.1.1	Is the facility a new or existing publicly owned treatment works ? If yes, STOP. Do NOT complete Form 1. Complete Form 2A. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.1.2	Is the facility a new or existing treatment works treating domestic sewage ? If yes, STOP. Do NOT complete Form 1. Complete Form 2S. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	1.2	Applicants <i>Required</i> to Submit Form 1		
	1.2.1	Is the facility a concentrated animal feeding operation or a concentrated aquatic animal production facility ? <input checked="" type="checkbox"/> Yes → Complete Form 1 and Form 2B. <input type="checkbox"/> No	1.2.2	Is the facility an existing manufacturing, commercial, mining, or silvicultural facility that is currently discharging process wastewater ? <input type="checkbox"/> Yes → Complete Form 1 and Form 2C. <input checked="" type="checkbox"/> No
	1.2.3	Is the facility a new manufacturing, commercial, mining, or silvicultural facility that has not yet commenced to discharge ? <input type="checkbox"/> Yes → Complete Form 1 and Form 2D. <input checked="" type="checkbox"/> No	1.2.4	Is the facility a new or existing manufacturing, commercial, mining, or silvicultural facility that discharges only nonprocess wastewater ? <input type="checkbox"/> Yes → Complete Form 1 and Form 2E. <input checked="" type="checkbox"/> No
	1.2.5	Is the facility a new or existing facility whose discharge is composed entirely of stormwater associated with industrial activity or whose discharge is composed of both stormwater and non-stormwater ? <input type="checkbox"/> Yes → Complete Form 1 and Form 2F unless exempted by 40 CFR 122.26(b)(14)(x) or (b)(15). <input checked="" type="checkbox"/> No		

SECTION 2. NAME, MAILING ADDRESS, AND LOCATION (40 CFR 122.21(f)(2))

Name, Mailing Address, and Location	2.1	Facility Name		
		Ron Bruns Feedyards-East Place		
	2.2	EPA Identification Number		
		110008941324		
	2.3	Facility Contact		
		Name (first and last) Ron Bruns	Title Owner	Phone number (402) 385-2202
	Email address rbrunsfy@abbnebraska.com			
2.4	Facility Mailing Address			
	Street or P.O. box 714 Carnes Ave			
	City or town Pender	State NE	ZIP code 68047	

EPA Identification Number 110008941324		NPDES Permit Number NE0106526		Facility Name Ron Bruns Feedyards-East Place		Form Approved 03/05/19 OMB No. 2040-0004	
Name, Mailing Address, and Location Continued	2.5	Facility Location					
		Street, route number, or other specific identifier 1539 Hwy 16					
		County name Thurston		County code (if known)			
		City or town Pender		State NE		ZIP code 68047	
SECTION 3. SIC AND NAICS CODES (40 CFR 122.21(f)(3))							
SIC and NAICS Codes	3.1	SIC Code(s)		Description (optional)			
		0211		Beef Cattle Feedyards			
	3.2	NAICS Code(s)		Description (optional)			
SECTION 4. OPERATOR INFORMATION (40 CFR 122.21(f)(4))							
Operator Information	4.1	Name of Operator					
	Ron Bruns						
	4.2	Is the name you listed in Item 4.1 also the owner? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
	4.3	Operator Status <input type="checkbox"/> Public—federal <input type="checkbox"/> Public—state <input type="checkbox"/> Other public (specify) _____ <input checked="" type="checkbox"/> Private <input type="checkbox"/> Other (specify) _____					
Operator Information Continued	4.5	Operator Address					
		Street or P.O. Box 714 Carnes Ave					
		City or town Pender		State NE		ZIP code 68047	
		Email address of operator rbrunsfy@abbnebraska.com					
SECTION 5. INDIAN LAND (40 CFR 122.21(f)(5))							
Indian Land	5.1	Is the facility located on Indian Land? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					

EPA Identification Number 110008941324	NPDES Permit Number NE0106526	Facility Name Ron Bruns Feedyards-East Place
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Form Approved 03/05/19
OMB No. 2040-0004

SECTION 6. EXISTING ENVIRONMENTAL PERMITS (40 CFR 122.21(f)(6))

Existing Environmental Permits	6.1	Existing Environmental Permits (check all that apply and print or type the corresponding permit number for each)		
	<input checked="" type="checkbox"/>	NPDES (discharges to surface water) NE0106526	<input type="checkbox"/>	RCRA (hazardous wastes)
	<input type="checkbox"/>	PSD (air emissions)	<input type="checkbox"/>	Nonattainment program (CAA)
	<input type="checkbox"/>	Ocean dumping (MPRSA)	<input type="checkbox"/>	Dredge or fill (CWA Section 404)
			<input type="checkbox"/>	UIC (underground injection of fluids)
			<input type="checkbox"/>	NESHAPs (CAA)
			<input type="checkbox"/>	Other (specify)

SECTION 7. MAP (40 CFR 122.21(f)(7))

Map	7.1	Have you attached a topographic map containing all required information to this application? (See instructions for specific requirements.) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> CAFO—Not Applicable (See requirements in Form 2B.)
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SECTION 8. NATURE OF BUSINESS (40 CFR 122.21(f)(8))

Nature of Business	8.1	Describe the nature of your business. Ron Bruns Feedyards - East Place is an open lot beef cattle feeding operation.
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SECTION 9. COOLING WATER INTAKE STRUCTURES (40 CFR 122.21(f)(9))

Cooling Water Intake Structures	9.1	Does your facility use cooling water? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No → SKIP to Item 10.1.
	9.2	Identify the source of cooling water. (Note that facilities that use a cooling water intake structure as described at 40 CFR 125, Subparts I and J may have additional application requirements at 40 CFR 122.21(r). Consult with your NPDES permitting authority to determine what specific information needs to be submitted and when.)

SECTION 10. VARIANCE REQUESTS (40 CFR 122.21(f)(10))

Variance Requests	10.1	Do you intend to request or renew one or more of the variances authorized at 40 CFR 122.21(m)? (Check all that apply. Consult with your NPDES permitting authority to determine what information needs to be submitted and when.)
		<input type="checkbox"/> Fundamentally different factors (CWA Section 301(n)) <input type="checkbox"/> Water quality related effluent limitations (CWA Section 302(b)(2)) <input type="checkbox"/> Non-conventional pollutants (CWA Section 301(c) and (g)) <input type="checkbox"/> Thermal discharges (CWA Section 316(a)) <input checked="" type="checkbox"/> Not applicable

EPA Identification Number 110008941324	NPDES Permit Number NE0106526	Facility Name Ron Bruns Feedyards-East Place
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SECTION 11. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement	11.1	In Column 1 below, mark the sections of Form 1 that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.	
		Column 1	Column 2
	<input checked="" type="checkbox"/>	Section 1: Activities Requiring an NPDES Permit	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 2: Name, Mailing Address, and Location	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 3: SIC Codes	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 4: Operator Information	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 5: Indian Land	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 6: Existing Environmental Permits	<input type="checkbox"/> w/ attachments
	<input type="checkbox"/>	Section 7: Map	<input type="checkbox"/> w/ topographic map <input type="checkbox"/> w/ additional attachments
	<input checked="" type="checkbox"/>	Section 8: Nature of Business	<input type="checkbox"/> w/ attachments
	<input type="checkbox"/>	Section 9: Cooling Water Intake Structures	<input type="checkbox"/> w/ attachments
	<input type="checkbox"/>	Section 10: Variance Requests	<input type="checkbox"/> w/ attachments
	<input checked="" type="checkbox"/>	Section 11: Checklist and Certification Statement	<input type="checkbox"/> w/ attachments
11.2	Certification Statement		
	<i>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</i>		
	Name (print or type first and last name) Ron Bruns <i>RONALD H BRUNS</i>	Official title Owner	
	Signature <i>Ronald H Bruns</i>	Date signed <i>3/23/21</i>	

EPA Identification Number 110008941324	NPDES Permit Number NE0106526	Facility Name Ron Bruns Feedyards-East Place	Form Approved 03/05/19 OMB No. 2040-0004
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CAFO Location and Contact Information Continued	3.3	Integrator Name and Address		
	Name Ron Bruns			
	Street address 714 Carnes Ave			
	City or town Pender	State NE	Zip code 68047	

SECTION 4. CAFO TOPOGRAPHIC MAP (40 CFR 122.21(i)(1)(iv))

CAFO Topographic Map	4.1	Have you attached a topographic map containing all required information to this application? (See instructions for specific requirements.) <input checked="" type="checkbox"/> Yes → SKIP to Section 5. <input type="checkbox"/> No
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SECTION 5. CAFO CHARACTERISTICS (40 CFR 122.21(i)(1)(v ix))

CAFO Characteristics	5.1	Provide information on the type and number of animals in the table below.						
			Animal Type	Number in Open Confinement	Number Housed Under Roof	Animal Type	Number in Open Confinement	Number Housed Under Roof
		<input type="checkbox"/>	Mature dairy cows			<input type="checkbox"/>	Sheep or lambs	
		<input type="checkbox"/>	Dairy heifers			<input type="checkbox"/>	Chickens (broilers)	
		<input type="checkbox"/>	Veal calves			<input type="checkbox"/>	Chickens (layers)	
		<input checked="" type="checkbox"/>	Cattle (not dairy or veal calves)	2,800		<input type="checkbox"/>	Ducks	
		<input type="checkbox"/>	Swine (55 lbs. or more)			<input type="checkbox"/>	Other (specify)	
		<input type="checkbox"/>	Swine (under 55 lbs.)			<input type="checkbox"/>	Other (specify)	
		<input type="checkbox"/>	Horses			<input type="checkbox"/>	Other (specify)	
	<input type="checkbox"/>	Turkeys			Total Animals		2,800	
	5.2	Indicate the type of containment and storage, total number of days, and total capacity for manure, litter, and process wastewater storage in the table below.						
			Type of Containment and Storage	Total Number of Days	Total Capacity <small>(specify gallons or tons)</small>	Type of Containment and Storage	Total Number of Days	Total Capacity <small>(specify gallons or tons)</small>
		<input type="checkbox"/>	Anaerobic lagoon			<input type="checkbox"/>	Belowground storage tanks	
		<input type="checkbox"/>	Evaporation			<input type="checkbox"/>	Roofed storage shed	
		<input type="checkbox"/>	Aboveground storage tanks			<input type="checkbox"/>	Concrete pad	
<input checked="" type="checkbox"/>		Storage pond		6,414,878 gal	<input type="checkbox"/>	Impervious soil pad		
<input type="checkbox"/>	Underfloor pit			<input type="checkbox"/>	Other (specify)			
5.3	Indicate the total number of acres drained and collected in the containment and storage structure(s) reported under Item 5.2.							
	_____ <u>40.8</u> acres							

EPA Identification Number
110008941324

NPDES Permit Number
NE0106526

Facility Name
Ron Bruns Feedyards-East Pla

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CAFO Characteristics Continued

Manure, Litter, and/or Process Wastewater Production and Use							
5.4	How many tons of manure or litter and gallons of process wastewater are generated annually at the CAFO?						
	<table border="1"> <tr> <td>Manure</td> <td>~3,388 tons</td> </tr> <tr> <td>Litter</td> <td>N/A tons</td> </tr> <tr> <td>Process wastewater</td> <td>~4,801,267 gallons</td> </tr> </table>	Manure	~3,388 tons	Litter	N/A tons	Process wastewater	~4,801,267 gallons
Manure	~3,388 tons						
Litter	N/A tons						
Process wastewater	~4,801,267 gallons						
5.5	Is manure, litter, and/or process wastewater generated at the CAFO land applied? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 5.8.						
5.6	How many acres of land under the control of the applicant are available for applying the CAFO's manure, litter, or process wastewater? 221.55 acres						
5.7	Check all land application best management practices that are being implemented. <input type="checkbox"/> Buffers <input type="checkbox"/> Infiltration field <input checked="" type="checkbox"/> Setbacks <input type="checkbox"/> Grass filter <input checked="" type="checkbox"/> Conservation tillage <input type="checkbox"/> Terrace <input type="checkbox"/> Constructed wetlands <input type="checkbox"/> Other (specify)						
5.8	Is manure, litter, and/or process wastewater transferred to any other persons? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 5.10.						
5.9	How many tons of manure or litter and gallons of process wastewater, produced by the CAFO, are transferred annually to other people?						
	<table border="1"> <tr> <td>Manure</td> <td>0-1,500 tons</td> </tr> <tr> <td>Litter</td> <td>0 tons</td> </tr> <tr> <td>Process wastewater</td> <td>0 gallons</td> </tr> </table>	Manure	0-1,500 tons	Litter	0 tons	Process wastewater	0 gallons
Manure	0-1,500 tons						
Litter	0 tons						
Process wastewater	0 gallons						
5.10	Describe alternative use(s) of manure, litter, or process wastewater, if any.						

SECTION 6. CAFO NUTRIENT MANAGEMENT PLANS (40 CFR 122.21(i)(1)(x))

CAFO Nutrient Management Plans

6.1	Has the applicant attached a nutrient management plan that satisfies the requirements at 40 CFR 122.42(e) and, if applicable, the requirements at 40 CFR 412.4(c)? Note: A permit application is not complete until a nutrient management plan is submitted to the NPDES permitting authority. <input checked="" type="checkbox"/> Yes → SKIP to Item 6.3. <input type="checkbox"/> No
6.2	Explain why a nutrient management plan is not attached to the application.
6.3	Is a nutrient management plan being implemented at the CAFO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6.4	What was the date of the last review or revision of the nutrient management plan? Date 03/19/2021

EPA Identification Number
110008941324

NPDES Permit Number
NE0106526

Facility Name
Ron Bruns Feedyards-East Place

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 7. CAAP FACILITY CHARACTERISTICS (40 CFR 122.21(i)(2))

CAAP Facility Characteristics

7.1	Is the CAAP facility located on land? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 7.3.					
7.2	Provide the maximum daily and maximum average monthly discharge at CAAP by outfall.					
	Outfall Number	Discharge				
		Maximum Daily Discharge		Maximum Average Monthly Discharge		
		gpd		gpd		
		gpd		gpd		
		gpd		gpd		
7.3	Indicate the type and number of discharge structures at the CAAP. Provide a brief description of each structure. Also note the name of the receiving water and the source of the intake water for each structure.					
	Structure Type	Number of Each	Description	Receiving Water Name	Source of Intake Water	
	Ponds					
	Raceways					
	Net pens				Not applicable	
	Submerged cages				Not applicable	
	Similar structures (specify)					
7.4	List the cold-water and/or warm-water aquatic species raised/produced in the table below. For each species listed, indicate the total yearly and maximum harvestable weight (in pounds).					
	Cold Water Species			Warm Water Species		
	Species	Harvestable Weight		Species	Harvestable Weight	
		Total Yearly	Maximum		Total Yearly	Maximum
		lbs.	lbs.		lbs.	lbs.
		lbs.	lbs.		lbs.	lbs.
		lbs.	lbs.		lbs.	lbs.
		lbs.	lbs.		lbs.	lbs.
7.5	Indicate the calendar month of maximum feeding and the total mass of food fed (in pounds) during that month.					
	Month of Maximum Feeding			Total Mass of Food Fed		
				lbs.		

EPA Identification Number
110008941324

NPDES Permit Number
NE0106526

Facility Name
Ron Bruns Feedyards-East Place

Form Approved 03/05/19
OMB No. 2040-0004

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement	8.1	In Column 1, below, mark the sections of Form 2B that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.					
		Column 1	Column 2				
		<input checked="" type="checkbox"/> Section 1: General Information	<input type="checkbox"/> w/ attachments				
		<input checked="" type="checkbox"/> Section 2: CAFO Owner/Operator Contact Information	<input type="checkbox"/> w/ attachments				
		<input checked="" type="checkbox"/> Section 3: CAFO Location and Contact Information	<input type="checkbox"/> w/ attachments				
		<input checked="" type="checkbox"/> Section 4: CAFO Topographic Map	<input type="checkbox"/> w/ topographic map <input type="checkbox"/> w/ additional attachments				
		<input checked="" type="checkbox"/> Section 5: CAFO Characteristics	<input type="checkbox"/> w/ attachments				
		<input checked="" type="checkbox"/> Section 6: CAFO Nutrient Management Plans	<input checked="" type="checkbox"/> w/ nutrient management plan <input type="checkbox"/> w/ attachments				
		<input type="checkbox"/> Section 7: CAAP Facility Characteristics	<input type="checkbox"/> w/ attachments				
		<input checked="" type="checkbox"/> Section 8: Checklist and Certification Statement	<input type="checkbox"/> w/ attachments				
	8.2	<p>Certification Statement</p> <p><i>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</i></p> <table border="1" style="width: 100%;"> <tr> <td>Name (print or type first and last name) Ron Bruns <i>RONALD H. BRUNS</i></td> <td>Official title Owner</td> </tr> <tr> <td>Signature <i>Ronald H Bruns</i></td> <td>Date signed <i>3/23/21</i></td> </tr> </table>		Name (print or type first and last name) Ron Bruns <i>RONALD H. BRUNS</i>	Official title Owner	Signature <i>Ronald H Bruns</i>	Date signed <i>3/23/21</i>
Name (print or type first and last name) Ron Bruns <i>RONALD H. BRUNS</i>	Official title Owner						
Signature <i>Ronald H Bruns</i>	Date signed <i>3/23/21</i>						

Section 2

Narrative

Narrative 2-1



Ron Bruns Feedyards-East Place

Nutrient Management Plan

001 Operation & Maintenance Plan

001.01 Facility Description & Operation

Ron Bruns Feedyards-East Place is an open-lot beef cattle operation covering approximately 40.8 acres in Thurston County. The facility has a maximum one-time capacity of 2,800 head of beef cattle weighing an average of 850 pounds. The manure will primarily be applied to cropland by solid manure spreaders and through a center pivot system. Manure generated in pens or sediment cleaned from the basin and holding pond may be stockpiled on application sites throughout the growing season and applied after crop removal. Ron Bruns Feedyards-East Place has 221.5 acres available for manure application. Ron Bruns Feedyards-East Place may also transfer manure to other recipients in any given year.

001.02 Manure Estimates

It is estimated that the operation will produce approximately 3,388 tons of solid cattle manure and 4.8 million gallons of effluent water annually. These are estimates and will vary depending on annual stocking rates and weather conditions.

Cattle manure production was determined using book values from the Agricultural Waste Management Field Handbook Part 651 (AWMFH) calculations. Tables and production calculations can be found in Section 5.

Actual manure analysis are used and summarized for the purpose of nutrient management planning for Ron Bruns Feedyards-East Place. The manure nutrient analysis reports and the summary are found in Section 5.

001.03 Best Management Practices

Ron Bruns Feedyards-East Place will be operated and maintained to prevent water pollution and to protect the environment. Best management practices will be implemented to prevent or reduce the discharge of pollutants to waters of the state and control odor where appropriate. Manure contained at Ron Bruns Feedyards-East Place may be land applied onto application sites at a rate that prevents field runoff.

001.03A Adequate Storage

Any time the waste storage volume in the livestock waste control facility exceeds the "Must Pump Level," manure will be land applied on all available days until adequate storage is restored. Care will be taken to monitor field conditions so that effluent water is not applied to saturated soils to prevent field runoff. Each fall, the LWCF will be pumped down to the "Pre Winter Pumpdown Level" to ensure enough capacity to store production throughout the winter months. The sludge level will be inspected at the time that the winter pump-down level is

achieved. Liquid levels are inspected weekly and after precipitation events to ensure adequate storage.

001.03B Waste Handling Equipment

Appropriate waste handling equipment for cleaning and emptying the facilities will be available as needed to operate and maintain the facility to meet the capacity and storage requirements. Ron Bruns Feedyards-East Place may apply manure fertilizer primarily with a 14-22 ton pull-type or truck mounted solid spreader. Other equipment is available for use if necessary. Ron Bruns Feedyards-East Place owns their own equipment and may also contract additional custom services for the application of manure. Ron Bruns Feedyards-East Place may apply effluent water as fertilizer using a center pivot system (see Effluent Distribution Plan, Section 3). Adequate application area will be available to meet land application needs each year.

001.03C Waste Removal and Land Application

All livestock wastes removed from the LWCF will be applied in a manner that minimizes potential for water pollution. Stockpiles of manure will be managed as necessary by strategic placement, berms and/or other means to prevent discharges until the stockpile is utilized for application. The owner or authorized representative shall remain responsible for manure applied from the operation to land under their control.

The protocols for land application of manure are based on: 1) preventing discharges to the waters of the state; 2) not exceeding the capacity of the soil; and 3) not exceeding the expected crop nutrient uptake between applications. Site specific nutrient management practices will be followed to ensure appropriate agricultural utilization of the nutrients in the manure.

Some livestock wastes removed from the facility may be land applied on acres that are not in the Nutrient Management Plan and beyond the control of Ron Bruns Feedyards-East Place. If Ron Bruns Feedyards-East Place is hired for custom application on these acres, a Manure Agreement will be signed (Section 7). Ron Bruns Feedyards-East Place will supply purchasers with a manure fertilizer product and the purchaser will control the timing of application and the application rate.

For manure transferred to other recipients, but not applied by Ron Bruns Feedyards-East Place, the manure nutrient analysis results, the date of the analysis, recipient name and address, and approximate amount transferred will be held as a record. The manure nutrient analysis will be supplied to the recipient.

001.03D Sludge Accumulation Levels

Sludge will be removed when sludge levels are at or exceed the "Maximum Sludge" (Pre Winter Pumpdown Level) identified in the facility design. When sludge, sediment, or other solid or liquid accumulations are removed from the LWCF, the equipment used for the removal will not be allowed to compromise the structure of the facility. Sludge or solids will not be allowed to accumulate such that it cannot be utilized at agronomic rates.



001.03E Emergency Response Plan

In the event of an accident or emergency, such as a spill, release or discharge of animal waste, the owner or authorized representative will take actions as needed to stop the cause, contain and control any release, and cleanup any affected areas. Any discharge of waste will be reported to NDEE within 24 hours of the event. A written report will be submitted to NDEE within five days of the event. Ron Bruns can be contacted at 402-385-2202 and/or Thurston County dispatch at 402-385-3018.

001.03F LWCF Maintenance

Ron Bruns Feedyards-East Place will be maintained in proper operating condition. Weed growth will be routinely controlled so that it does not prevent or limit facility inspections. Animals shall not be allowed access to livestock waste control facility liners or allowed to otherwise compromise liner integrity. Animal contact with facility structures will be prevented or minimized to avoid damage to these structures. Structures subject to animal contact will be included in routine inspections. Structures will be maintained to prevent the growth of trees and shrubs, and any such growth will be routinely controlled.

001.03G Clean Water Diversions

Clean water will be diverted from waste storage facilities according to the engineering plans.

001.03H Closure Plan

The animal feeding operation shall maintain the production area for periods of time when it is not in operation. NDEE shall be notified if and when the operation will close. If the operation is discontinued and ceases operation, the following minimum closure requirements will also be followed:

001.03H1 Removal of All Manure

Accumulated manure, including any sludge and sediment will be removed. The product will be sampled and tested and applied in an agronomic manner.

001.03I Ground Water Monitoring

Ron Bruns Feedyards-East Place will continue ground water monitoring, as required, unless NDEE has vacated the monitoring requirement. If the ground water monitoring requirement has been vacated, monitoring wells shall be properly decommissioned.

001.03J Chemical Management Plan

Refer to the Chemical Management Plan in Section 4.

001.03K Livestock Mortality Management Plan

Mortalities will not be disposed of in the LWCF. The primary method of carcass disposal is rendering and the secondary method is burial. The temporary storage areas for mortalities will be placed in a manner so that runoff does not affect waters of the state. See Livestock Mortality Management Plan in Section 4.

001.03L Odor Control Plan

In order to minimize the effect of odor, the following practices shall be utilized by the management of Ron Bruns Feedyards-East Place based upon physical and economic conditions, opportunities and constraints.

001.03L1 Livestock Production Area

Pens will be kept as clean and dry as possible to avoid anaerobic decomposition of organic material. Manure buildup will be avoided when possible. Basin will be cleaned periodically.

001.03L2 Livestock Waste Control Facility

The holding pond will be managed properly with respect to dewatering. The holding pond is large enough to consistently hold all runoff, store production, store excess runoff and apply in a timely manner to cropland. The holding pond will be inspected and monitored as specified in the Operation and Maintenance Plan to prevent excess sludge accumulation and odor production associated with normal holding pond activities.

001.03L3 Land Application Sites

Management will be sensitive to neighbors in regard to manure application timing. Manure will be injected or incorporated into the soil if management feels it is necessary. Wind speed and direction will be monitored and application sites will be selected accordingly when possible.

Management will review this plan as needed. New technology will be reviewed and implemented where appropriate.



002 Nutrient Management Plan

002.01 Nutrient Form, Source and Removal

The source of manure is an open-lot beef feedyard. The forms of manure are solids scraped from the pens, sediment cleaned from the basin, and effluent water from the holding pond. Other sources of nutrients to be used to produce crops may include commercial fertilizers, previous legume crop residues, nutrients in the soil, nitrogen in irrigation water, and manure fertilizer obtained from other livestock feeding operations.

All of these sources will be accounted for on each application site being utilized. The expected requirement for nitrogen in the harvested crop is shown on Page 36 of the Ward Guide (Section 7), and the expected removal of other nutrients is on Page 52 of the Ward Guide (Section 7).

002.02 Land Application of Nutrients

Manure from the facility will be applied to land at agronomic rates for nitrogen utilization necessary for crop production, unless the Phosphorus Risk Assessment for a specific site requires a phosphorous-based application. Manure will primarily be applied after crops have been harvested and prior to planting the following crop. Manure may be applied to crops during growing season or between alfalfa cuttings. If weather does not allow land application, stockpiles of manure will be managed as necessary by strategic placement, berms and/or other means to prevent discharges until the stockpile is utilized for application. Effluent may be applied before, during or after the growing season.

002.03 Minimization of Nitrogen and Phosphorus Mobilization

All manure will be applied at agronomic rates to minimize movement of nitrogen into ground water. This will also minimize the movement of nitrogen and phosphorus to surface waters.

002.04 Each field used for land application will show:

002.04A Application Site Maps

The legal description and maps of planned manure application sites to be utilized by the operation are shown in Section 6. The maps also show the location and extent of any known surface water within the boundaries of the field, as well as the location and extent of any known surface water within 200 ft of the field. Also indicated on the maps are any wells in the field, or within 200 ft of the field boundary. Setbacks from surface water and wells are indicated on the maps. One-hundred-foot setbacks are maintained from concentrated surface water drainage, streams, wells, and tile inlets unless a 35 ft vegetative buffer exists, then 35 ft of buffer is sufficient. Setbacks will be maintained unless a satisfactory demonstration that a setback or buffer is not necessary because implementation of alternative conservation practices will provide pollutant reductions equal to or better than reductions that would be achieved by the 100-foot setback. Site specific soil-type maps are included in Section 6.

002.04B Site Summary

The application sites are summarized in the site summary (Section 6). The summary includes the useable acres for each site as well as the land use, the

dominant soil type and slope, the legal description and landowner contact information.

002.04C Land Application Agreements

Land application agreements were obtained for areas not owned by the permittee or an owner or authorized representative of the operation. These include the landowner's name, address, legal description, number of acres, and the landowner's signature. The agreements clearly identify the area and allow for the agronomic application of manure within the parameters of this Nutrient Management Plan to the land areas identified (Section 6).

002.04D Shared Manure Application Sites

There are no known shared manure application sites.

002.05 Sampling Methods

002.05A Soil Sampling and Analysis Guidelines

University of Nebraska (NebGuide G1740, Section 7) guidelines for soil sampling and analysis may be used. All samples will be taken and analyzed prior to manure application. The soil sample will be sent to a professional lab and analyzed for nitrogen, phosphorus, potassium and organic matter. Forty-acre composite sampling, grid sampling or zone sampling methods may be used as well.

002.05B Manure/Effluent Sampling Procedures

University of Nebraska (NebGuide G1450, Section 7) guidelines for manure sampling and analysis may be used. Manure will be sampled at least once annually and submitted to a professional laboratory for analysis of total nitrogen, organic nitrogen, ammonium nitrogen, phosphorus, moisture content, and additional nutrients.

002.05C Soil Sampling Procedures for Nitrogen

Management will have a soil sample taken on all land prior to application that is to receive manure as fertilizer. Samples will be submitted to a professional laboratory for analysis (possible soil analysis methods can be found in the Midwest Memo, Section 7). The samples will be a representative sample, with a sample representing no more than 40 acres (unless the field is less than 50 acres). A 0 to 6-10 in. sample will be taken for surface nitrogen.

Deep nitrate samples will be taken annually whenever manure will be applied unless the following exceptions apply. The depth will be determined by management but will be no less than 24 in. The following exceptions and guidelines will apply:

- Non-legume crops following annual and biennial legumes (corn following soybeans/edible beans/sweet clover); deep nitrate tests are not necessary unless there is a reason to believe nitrate levels are elevated due to previous applications of manure or nitrogen fertilizer, drought, crop failure, or any other reason there might be residual nitrogen in the soil profile;

- Non-legume crops following alfalfa or other perennial legume (corn following alfalfa); deep nitrate tests are not necessary unless there is a reason to believe they are elevated;
- Pastures/CRP—deep nitrate tests are not necessary unless there is a reason to believe they are elevated due to previous applications of manure or nitrogen fertilizer. Refer to NebGuide G78-406-A “Fertilizing Grass Pastures and Haylands”;
- Deep nitrate tests are not required when the only source of N is a starter fertilizer and less than 25 lb of N will be applied; and
- When deep nitrate tests are not taken, an assumed value of at least 3 ppm for residual nitrate values will be used in the nutrient budget in addition to appropriate N-credits when following legumes.

002.05D Irrigation Water Sampling Procedures for Nitrogen

An irrigation water sample will be obtained, submitted to a professional lab, and analyzed for nitrates prior to initial land application and prior to subsequent applications that are five years or more past the previous analysis.

002.05E Sampling Procedures for Phosphorus

The initial 0 to 6-10 in. surface soil samples taken for nitrogen will also be analyzed at the professional laboratory for Phosphorus levels. This sample will represent no more than 40 acres (unless the field is less than 50 acres). The laboratory will select the analysis method that is appropriate for the soil type and geography of the sample, example soil analysis methods can be found in the Midwest Memo, Section 7. Application site soils will be analyzed for phosphorus content before the initial application and then analyzed at least every five years thereafter if used for application.

002.06 Record Keeping

Ron Bruns Feedyards-East Place shall maintain production area and land application area records at the concentrated animal feeding operation for a period of at least five years. A complete copy of the following information is required:

- Records to document the weekly inspections at the production area of all LWCFs. Records will document any actions taken to correct deficiencies found as a result of required inspections. For any deficiencies not corrected within 30 days, the record shall include an explanation of the factors preventing immediate correction;
- Daily inspection of water lines at the production area;
- Daily monitoring and recording of any precipitation events;
- The production area and the LWCF will be inspected weekly; liquid levels will be checked by the levels indicated on the slope of the holding pond and all levels will be recorded;

- Inspections at least once a year to determine the sludge and sediment accumulation level in the LWCF;
- Records of mortality management, chemical management, and related practices used by the operation;
- The completed NPDES permit application and/or the state operating permit, including the records documenting the current design of any manure storage structures, total design capacity for manure, all sampling and test results related to the design and construction of the facility, and approximate number of days of storage capacity, which demonstrates that the facility capacity is adequate to meet the design storage requirements;
- The nutrient management plan, which also includes the test methods used to sample and analyze manure and soil;
- The date, time and estimated volume of any overflow or discharge; and
- Record of correspondence with NDEE as to adjustments necessary to this plan.

The following information will be kept for each manure application, and retained at the CAFO facility office for at least five years. The records will be available upon request.

- Expected crop yields for the land application areas;
- The date(s) manure was applied to each field;
- Weather conditions at the time of application and for 24 hours prior to and following application;
- Results from manure, irrigation water, and soil sampling and testing;
- Explanation of the basis for determining manure application rates, as required by NDEE;
- Results of the most recent phosphorus risk assessment for each field or field segment including the legal description, date assessed, name of the person or consulting firm who completed the assessment, and the level of risk assessed;
- Calculations that show the maximum nitrogen and/or phosphorus to be applied to each field;
- Total amount of nitrogen and phosphorus actually applied to each field;
- The method used to apply the manure;
- For manure transferred to others, the nutrient analysis results and the date, recipient name and address, and approximate amount transferred; and
- Dates of inspections of equipment used to apply manure.

002.07 Application Rates—Effluent

Application rates of effluent water will not exceed the intake rate of the soil in order to minimize the risk of field runoff.

002.08 Conservation Practices

Site-specific conservation practices may be implemented at the discretion of management. This may include appropriate setbacks or equivalent practices to control runoff of nutrients.

002.09 Phosphorus Risk Assessment

The phosphorus risk assessment used for each field or field segment will be the University of Nebraska model or the NRCS model found in Nebraska Title 130. The planned application rates for manure will be consistent with the risk assessment for each field, or field segment. A P-Index for each application site was completed; see Section 6 Site 1 for an example; see the Best Management Practices in Section 6 for site-specific ratings. Subsequent assessments will be conducted if risk factors change significantly or five years have passed since the previous assessment.

002.09A Low or Medium Risk

For a field or field segment with a low or medium risk of phosphorus movement from the field, a single year's application of manure may be based on the expected annual nitrogen requirement for the planned crop.

002.09B High Risk

For a field or field segment where there is a high risk of phosphorus movement from the field, the phosphorus content of the manure will be applied at a rate equal to or less than the expected phosphorus removal in harvested plant biomass for a planned crop sequence of five years or less.

002.09C Very High Risk

For a field or field segment with a very high risk of phosphorus movement from the field, manure will not be applied.

002.10 Narrative Approach

002.10A Maximum Amount of Nitrogen and Phosphorus Application

002.10A1 Planned Crop Rotations

The planned crop rotation for the majority of fields is a corn-corn rotation (see Five Year Field Plans, Section 5). Fields may also have a rotation that includes alfalfa, corn silage, grain sorghum, oats, potatoes, sugar beets, soybeans, sunflowers or wheat, or may be used as pasture or left fallow. Phosphorus and Nitrogen requirements for crops are found on Pages 36 and 52 of the Ward Guide (Section 7). Yields for alternative crops may or may not come from the 2019 Nebraska Agricultural Overview (Section 7).

002.10A2 Yield Goals

Realistic yield goals have been determined using Thurston County average yields +10%. Actual production records may also be used in

determining realistic yield goals. The yields used in these calculations are 225 bu/ac for irrigated corn and 206 bu/ac for dryland corn; 67 bu/ac for irrigated soybeans and 61 bu/ac for dryland soybeans. Average alfalfa yields are 5.3 ton/ac (Section 5).

002.10A3 Nitrogen and Phosphorus Application Rates

Nitrogen will be applied at a rate consistent with the Ward Guide (Section 7). If the High Phosphorus Risk category applies, then maximum phosphorus application rates will be calculated by the expected yield goal of the five year crop sequence multiplied by the Phosphate factor in the Quantities of Plant Nutrients in Crops Table on Page 52 of the Ward Guide (Section 7).

002.10B Methodology for Accounting Factors

002.10B1 Results of soil tests

The nutrient management plan accounts for the results of soil tests conducted. To find the available pounds of nitrogen in the soil sample, the following equation is used: (ppm topsoil \times 0.3 \times depth in inches) + (ppm subsoil \times 0.3 \times depth in inches). For planning purposes, 30 lb N soil credit is used. See Ward Guide Page 60 in Section 7.

002.10B2 Credits for Nitrogen

Ammonium and organic nitrogen available from manure will be determined using NebGuide G1335, Determining Crop Available Nutrients from Manure, Figure 2 (Section 7).

All sources of nitrogen are taken into consideration when planning for fertilizer application. Using a realistic yield goal, the amount of nitrogen needed to produce the crop is figured using crop removal rates from the Ward Guide. Next the credits are accounted for: the amount of N available in the soil (see equation above; for planning purposes, 30 lb N credit is used), irrigation water (for planning purposes, we assume 5 ppm with 10 acre-inches applied; ppm \times acre-inches of application \times 0.2266), previous legume crop contributions (45 lb if soybeans, 80 lb if alfalfa) and nitrogen credit from previous manure fertilizer applications are added together. When all of the credits are subtracted from the nitrogen requirement for the intended crop, the remaining amount of nitrogen needed is found. This number is then divided by the pounds of nitrogen available in each manure unit (tons or acre-inches) to give an amount of manure to apply.

Example (dryland corn-soybean rotation, field plan I): 227 (total crop N needed lb/ac) – 30 (soil credits) – 45 (previous crop soybeans) – 0 (no previous manure) – 0 (no fresh irrigation water) = 152 lb/ac of nitrogen required. If the manure sample has 2.2 lb of N per ton available the first year, then $152 \div 2.2 = 69$ tons of manure can be applied per acre.

002.10B3 Volatilization and Mineralization of Nitrogen

The volatilization of nitrogen is accounted for by NebGuide G1335, Determining Crop Available Nutrients from Manure, Figure 2 (Section 7).

The volatilization of ammonium nitrogen for solid manure that is not incorporated is 100% of the total, leaving 0% of the ammonium nitrogen available to the crop. The volatilization of ammonium nitrogen in effluent water applied by sprinkler is 50% of the total, leaving 50% of the ammonium nitrogen available to the crop. These figures for volatilization will be used to determine actual application rates.

The mineralization of nitrogen is also accounted for by NebGuide G1335, Determining Crop Available Nutrients from Manure, Figure 2 (Section 7), indicating that 25% of the organic nitrogen in solid manure will be available to the first-year crop, 15% to the second-year crop and 7% to the third-year crop. Effluent applications will have 35% of organic nitrogen available to the first-year crop, 15% to the second-year crop and 7% to the third-year crop. These figures for mineralization will be used to determine actual application rates

Other volatilization and mineralization factors from NebGuide G1335, Determining Crop Available Nutrients from Manure, Figure 2 (Section 7), may be used if alternative application methods or conditions apply.

002.10B4 Methodology for Phosphorus Application

This plan uses nitrogen recommendations from Ward Laboratories in order to determine nitrogen utilization rates, and uses phosphorus removal rates (Ward Guide, Section 7) in order to determine phosphorus utilization rates. This is because some sites may or may not require phosphorus to be applied as an agronomic recommendation; however the phosphorus risk assessment will allow for phosphorus to be applied if there is a low, medium or high risk. Removal rates will be used to balance phosphorus additions over time.

002.10B5 Multi-year Phosphorus Application

If the high phosphorus risk category applies, then phosphorus application rates will be calculated by the expected yield goal of the five year crop sequence multiplied by the phosphate factor in the "Quantities of Plant Nutrients in Crops Table" on Page 52 of the Ward Guide (Section 7). The manure phosphorus application rate in a five year period will not exceed the expected phosphorus removal.

Example (dryland corn-soybean rotation, field plan I): the amount of phosphorus used per bushel of corn is 0.35 lb and 0.73 lb for soybeans. For a 206 bu corn yield goal, the phosphorus quantity is 72 lb/yr. For a 61 bu soybean yield goal, the phosphorus quantity is 45 lb/yr. In a five year rotation the crop will use 306 lb of phosphorus. Based on the manure analysis, the pounds of phosphorus per ton are divided into the total phosphorus used by the crop; $306 \text{ lb of P} \div 19.73 \text{ lb of P in manure} = 15.5 \text{ tons of manure per acre}$ to be applied over the five year period. If further soil samples and a P-Index are completed prior to the end of the initial five year period that indicate a medium or low phosphorus risk assessment, another application may be made prior to the end of the five-year period on a nitrogen based application.

002.10B6 Other Additions of Nitrogen and Phosphorus

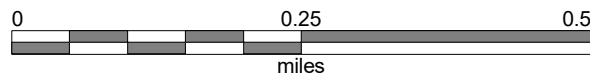
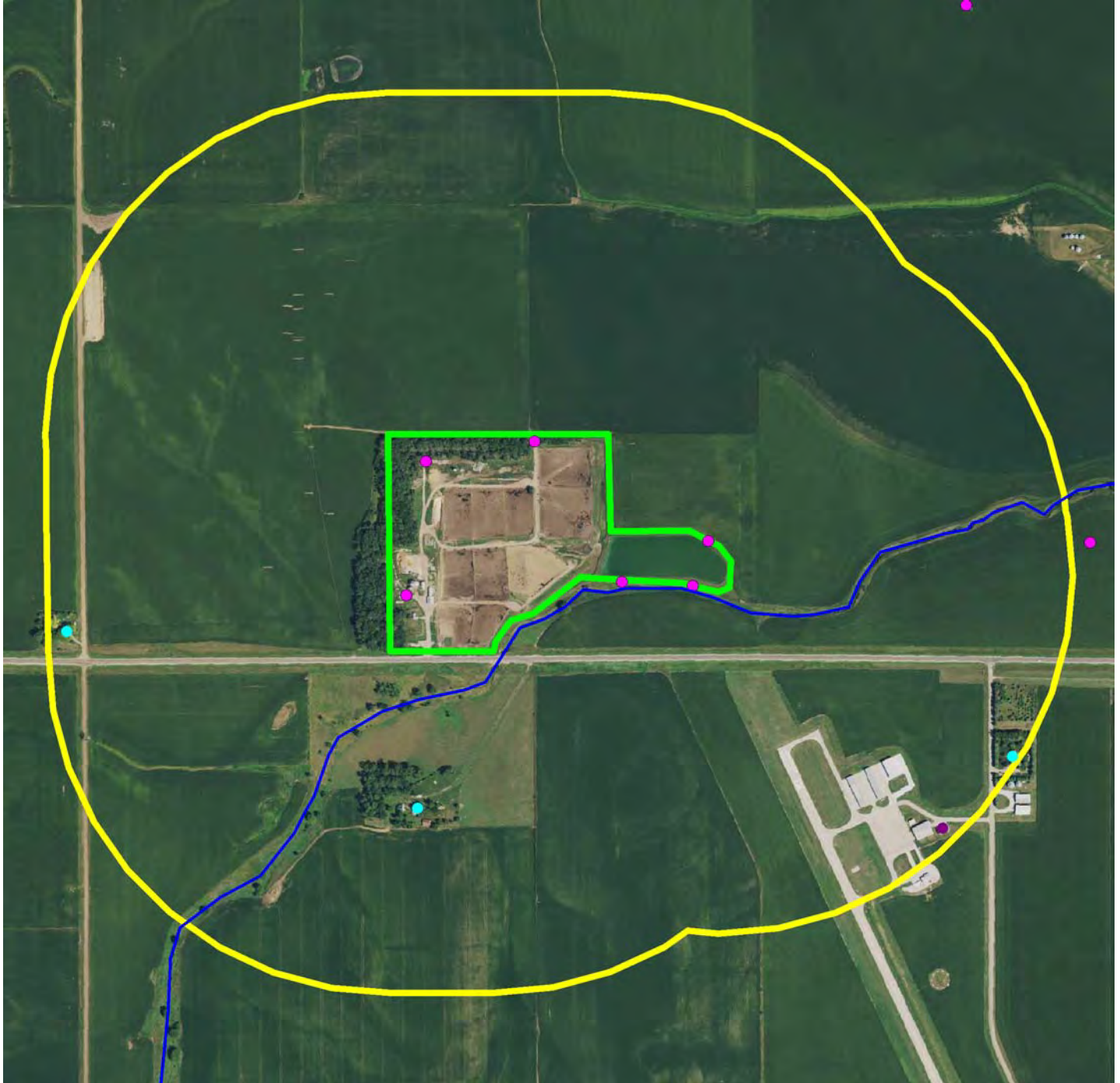
When manure nutrients applied plus the other nitrogen credits added together do not supply the crop with the necessary nutrients, nitrogen and phosphorus may be supplemented with commercial fertilization. If nutrient deficiencies are suspected, in season soil sampling or plant tissue tests may be used to determine if additional nutrients are necessary.

Section 3

Manure & Waste Water Handling & Storage

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Ron Bruns Feedyards - East Place



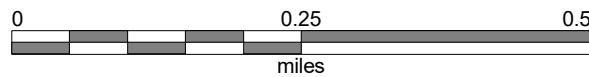
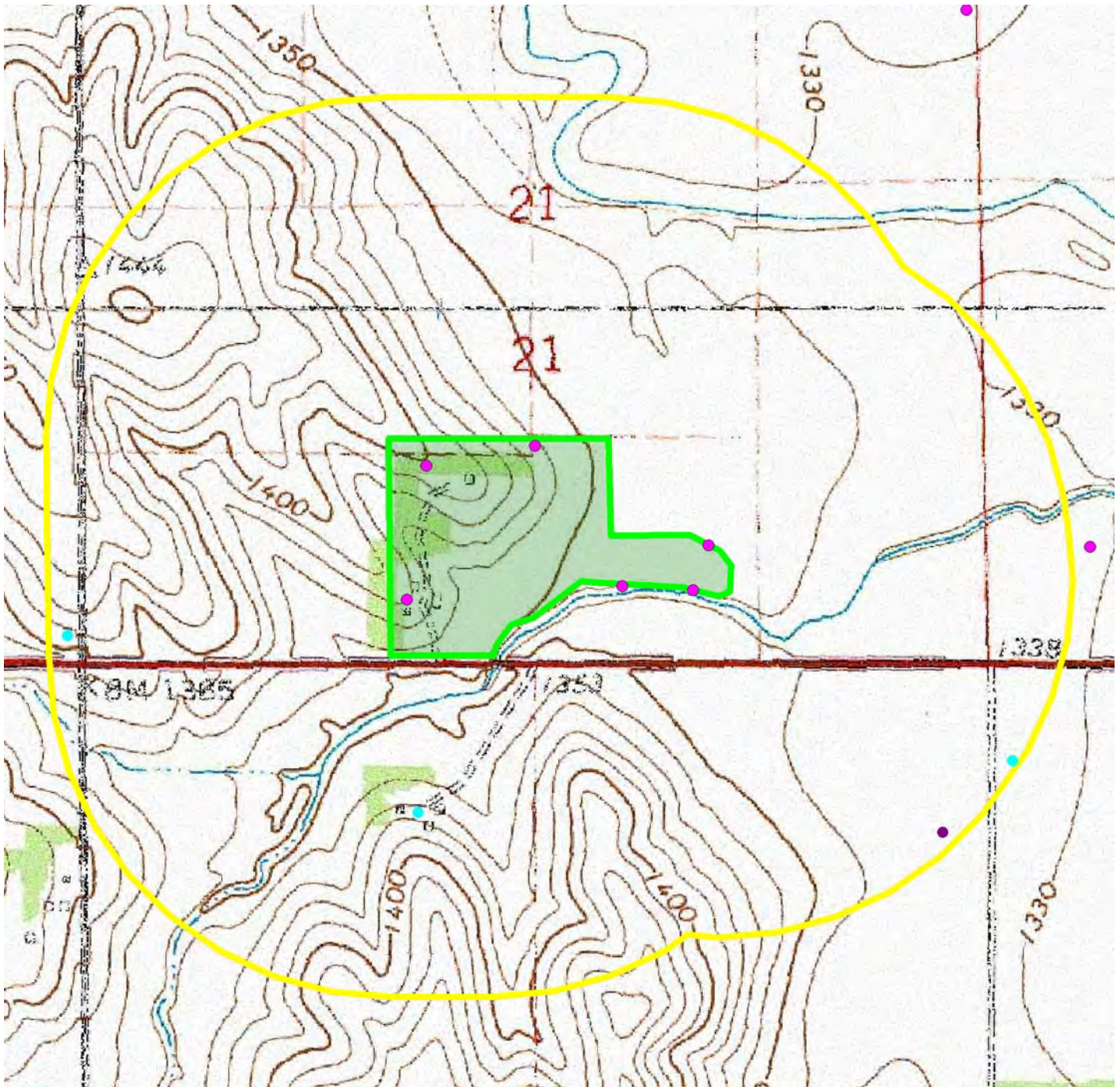
-  2000 ft Boundary
-  Business
-  Facility
-  Homestead
-  Stream
-  Well

2000 ft. Boundary Map

County: Thurston
Township: Pender
Legal: S21-T25N-R6E



Ron Bruns Feedyards - East Place



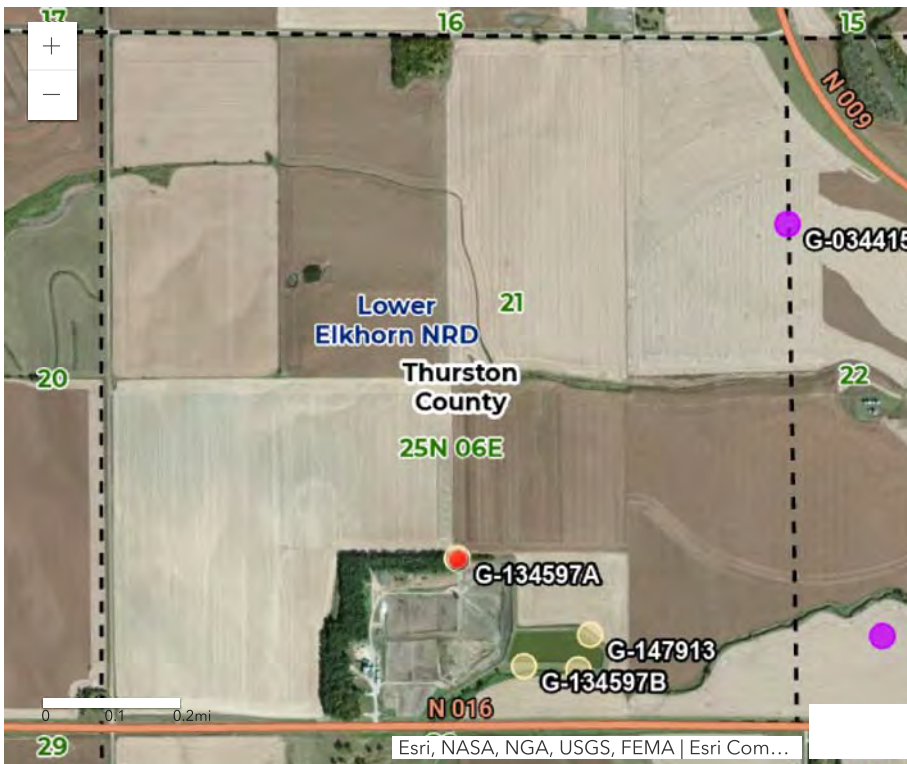
- 2000 ft Boundary
- Business
- Facility
- Homestead
- Stream
- Well

2000 ft. Topography Map

County: Thurston
Township: Pender
Legal: S21-T25N-R6E



Processed by State of Nebraska Department of Natural Resources Data(Bank) 2/8/2021 11:19:16 AM
Subsection: SWSE Section: 21 Township: 25 Range: 6E
Footage: 1266 feet from the South section line and 2579 feet from the East section line.
Latitude: 42° 7' 22.14" Longitude: -96° 44' 09.30"



Legend

Zooming – 3 options

- Double click on Map to zoom in
- Plus(+) and minus(-) signs in upper left corner of map also zoom in and out. Hover with mouse over area and when pointer disappears, click. Plus is on top and minus is below it.
- Click on map and use mouse wheel to zoom in or out.

Panning – Moving around map

Click on map and hold, drag mouse direction to move map

DISCLAIMER

The well location computations are based on calculated section corners, and not surveyed information or GPS coordinates. Therefore, **ALWAYS** check with the water well owner for the land description (including Footage, Quarter/Quarter, Section, Township, Range and County) of the property where the well is located. This computed well location information is for checking purposes only.

Return to Search Page
Nebraska Department of Natural Resources
 Database Through: 2/8/2021
 Processed: 2/8/2021 11:18:48 AM

REGISTERED GROUNDWATER WELLS DATA RETRIEVAL
Search Results Maximum 1000 Per Page

Note:

Information on Public Water Supply Wells is not available through this interface. Contact the Department of Natural Resources (Data Bank) at 402-471-2363 for more information. All registration documentation for water wells registered after January 1, 1969, except Public Water Supply wells, are now available.

Due to possibility of a well being in more than one series, an individual well might be listed more than once.

8 Records Found

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth	Owner's Name Owner's ID Address
G-034415 WellID: 41463 View Details View Logs View Scans	I X	Thurston Lower Elkhorn 25N 6E 21 SENE 1600N 300E Map It	5/11/1971 5/13/1971 12/1/2001 --- ---	125 1200 gpm 20 ft 45 ft PRO	8 in --- 143 ft	Wayne & Sally & Rory & Carol Allen & Allen OwnerID: 105032 1047 Highway 9 Pender NE 68047
G-034415 WellID: 137343 View Details View Logs View Scans	I X	Thurston Lower Elkhorn 25N 6E 21 SENE 1434N 46E Map It	11/7/2001 12/26/2001 2/1/2010 1 ---	140 1200 gpm 19 ft 42 ft PRO	8 in 60 ft 145 ft	Wayne & Sally & Rory & Carol Allen & Allen OwnerID: 105032 1047 Highway 9 Pender NE 68047
G-134597A WellID: 168951 View Details View Logs View Scans	Q A	Thurston Lower Elkhorn 25N 6E 21 SESW Map It 42°7' 22.140" -96°44' 9.300"	5/9/2005 7/8/2005 --- ---	--- --- 27 ft --- Mon	--- --- 45 ft	Ronald H Bruns Feedyard OwnerID: 72684 RR 3 Box 172 Pender NE 68047
G-134597B WellID: 168952 View Details View Logs View Scans	Q A	Thurston Lower Elkhorn 25N 6E 21 SESW Map It 42°7' 14.040" -96°44' 2.520"	5/10/2005 7/8/2005 --- ---	--- --- 20 ft --- Mon	--- --- 29 ft	Ronald H Bruns Feedyard OwnerID: 72684 RR 3 Box 172 Pender NE 68047

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth	Owner's Name Owner's ID Address
G-134597C WellID: 168953 View Details View Logs View Scans	Q A	Thurston Lower Elkhorn 25N 6E 21 SESW Map It 42°7' 13.800" -96°43' 57.000"	5/10/2005 7/8/2005 ---	--- --- 19 ft --- Mon	--- --- 25 ft	Ronald H Bruns Feedyard OwnerID: 72684 RR 3 Box 172 Pender NE 68047
G-147913 WellID: 189984 View Details View Logs View Scans	Q A	Thurston Lower Elkhorn 25N 6E 21 SWSE Map It 42°7' 16.400" -96°43' 55.800"	12/20/2007 1/9/2008 ---	--- --- 11 ft --- PRO	--- --- 19 ft	Ronald H Bruns Feedyard OwnerID: 72684 RR 3 Box 172 Pender NE 68047
G-034415 WellID: 202949 LE-09077 View Details View Logs View Scans	I I	Thurston Lower Elkhorn 25N 6E 21 SENE 1414N 7E Map It 42°7' 47.360" -96°43' 35.750"	2/1/2010 3/12/2010 2 12663317827126	220 --- 20 ft 40 ft PRO	--- --- 145 ft	Wayne & Sally & Rory & Carol Allen & Allen OwnerID: 105032 1047 Highway 9 Pender NE 68047
WellID: 237641 View Details View Logs View Scans	D U	Thurston Lower Elkhorn 25N 6E 21 NWNE Map It 42°8' 0.200" -96°44' 9.400"	 3/30/2015 ---	--- --- --- --- PRO	--- --- 30 ft	Alan Doht OwnerID: 131138 821 13th Rd Pender NE 68047
Next						

- Data copy of requested wells.
- Data copy of Geo Logs for requested wells.
- Data copy of Casing Screen for requested wells.
- Data copy of Grout Gravel for requested wells.
- Data copy of requested contacts.

Legend and Notes

Proposed Engineering Documents

**RON BRUNS FEEDYARD – EAST PLACE
NDEE ID 72327
PROPOSED OPEN FEEDLOT EXPANSION
THURSTON COUNTY, NEBRASKA**

ProAg Job No. 21-022

February 2021

***Pro Ag* Engineering, Inc.**

Nicholaus J. Rowe, P.E.
77402 U.S. Highway 71
P.O. Box 181
Jackson, MN 56143

507-849-7200 – Office
507-841-3269 – Cell
nic@proageng.com

Justin D. Sprague, P.E.
302 Broadway
Audubon, IA 50025

712-563-2168 – Office
507-329-2440 – Cell
justin@proageng.com



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507-849-7200
nic@proageng.com

Justin D. Sprague, P.E.
302 Broadway Street
Audubon, IA 50025

712-563-2168

justin@proageng.com

4 February 2021

Nebraska DEE
Agriculture Section
PO Box 98922
1200 N Street, Suite 400
Lincoln, Nebraska 68509-8922

RE: Ron Bruns Feedyard – East Place
NDEE ID 72327
Proposed Open Feedlot Expansion
Thurston County, Nebraska
ProAg Project No. 21-022

Ag Section:

On behalf of the Ron Bruns Feedlot, this information is being provided in support of the new construction and operating permit for the proposed open feedlot expansion. The site is located one mile west of Pender in the SW ¼, Section 21, T-25-N, R-06-E, Thurston County.

The proposed expansion will result in a total contained drainage area of 40.8 acres. Construction will include new open cattle feedlots and a feedlot runoff diversion. All of the livestock waste control facility structures comply with the design standards of NDEE Title 130.

Enclosed please find the original and five (5) copies of the following:

1. Site Maps
2. Design Report with supporting calculations
3. Construction Inspection and Quality Assurance Plan
4. Technical Specifications
5. Engineering Drawings showing site, livestock waste facility structures, stage storage table, and construction details

We trust the above information is adequate for your review and approval. Should you have any questions, please do not hesitate to call me at 712-563-2168.

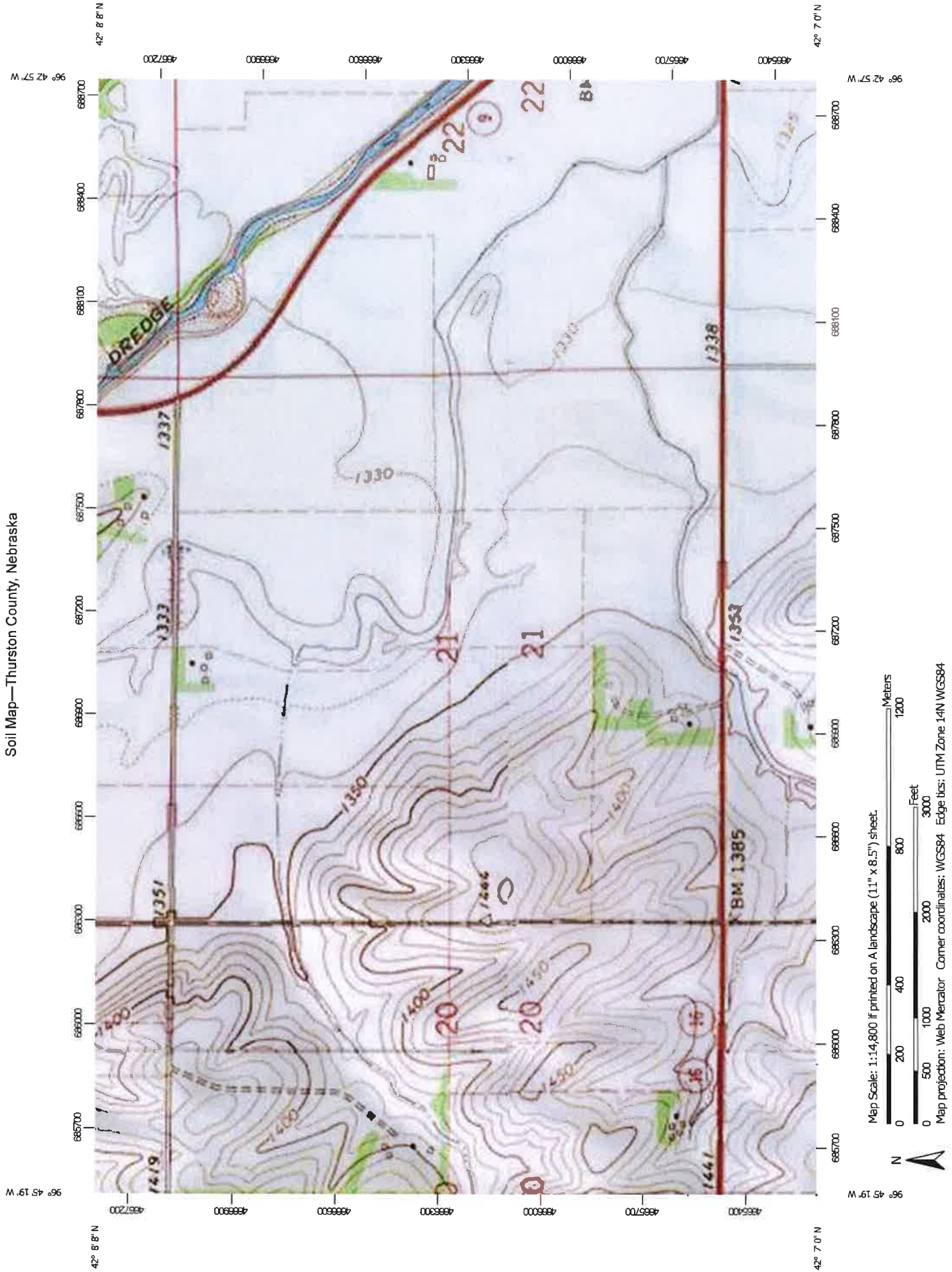
Respectfully submitted,



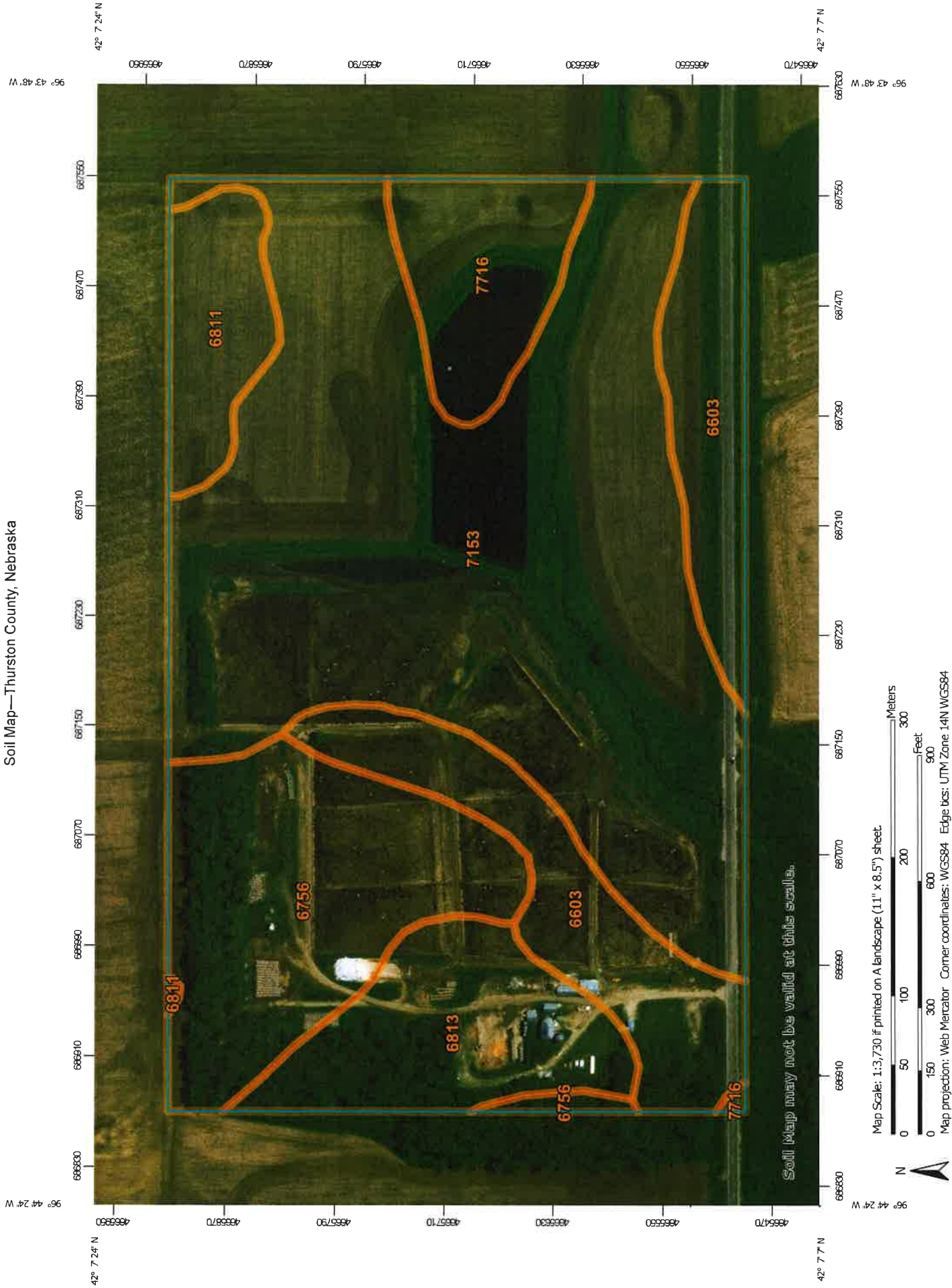
Justin D. Sprague, P.E.
ProAg Engineering, Inc.

cc: Ron Bruns, owner
Allen Kampschneider, Nutrient Advisors

Soil Map—Thurston County, Nebraska



Soil Map—Thurston County, Nebraska



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6603	Alcester silty clay loam, 2 to 6 percent slopes	10.8	15.2%
6756	Nora silt loam, 6 to 11 percent slopes, eroded	11.0	15.5%
6811	Moody silty clay loam, 2 to 6 percent slopes	3.4	4.7%
6813	Moody silty clay loam, 6 to 11 percent slopes	6.4	8.9%
7153	Kennebec silt loam, rarely flooded	35.1	49.4%
7716	McPaul silt loam, occasionally flooded	4.4	6.2%
Totals for Area of Interest		71.0	100.0%

Depth to Water Table—Thurston County, Nebraska



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
6603	Alcester silty clay loam, 2 to 6 percent slopes	>200	10.8	15.2%
6756	Nora silt loam, 6 to 11 percent slopes, eroded	>200	11.0	15.5%
6811	Moody silty clay loam, 2 to 6 percent slopes	>200	3.4	4.7%
6813	Moody silty clay loam, 6 to 11 percent slopes	>200	6.4	8.9%
7153	Kennebec silt loam, rarely flooded	137	35.1	49.4%
7716	McPaul silt loam, occasionally flooded	>200	4.4	6.2%
Totals for Area of Interest			71.0	100.0%

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

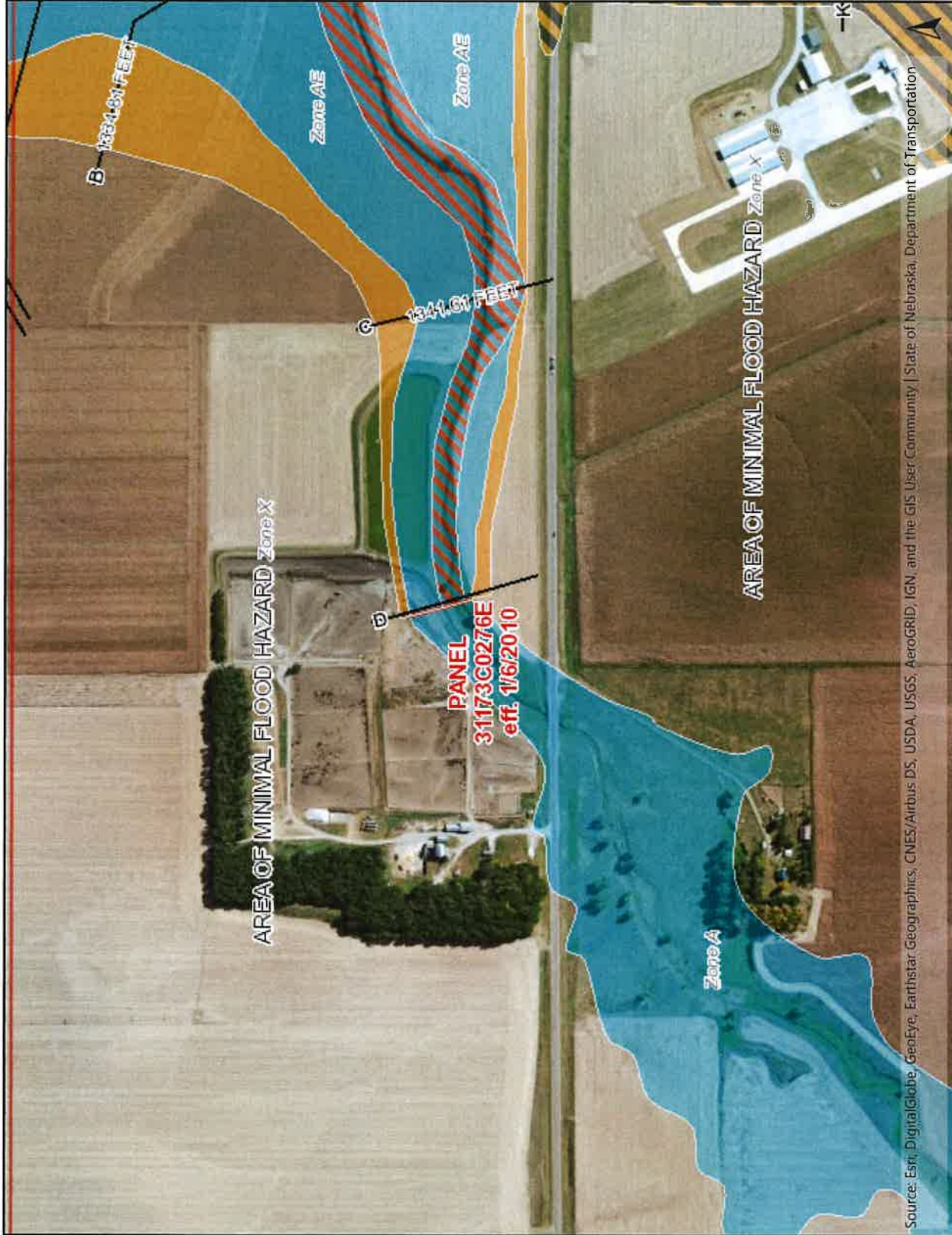
Tie-break Rule: Lower

Interpret Nulls as Zero: No

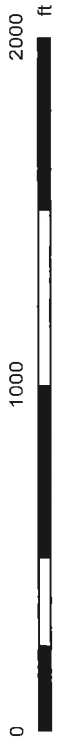
Beginning Month: January

Ending Month: December

Floodplain Management Interactive Map



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community | State of Nebraska, Department of Transportation



Date Printed: 2/4/2021

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



Legend

BFE Determinations



Effective Paper Maps



Flood Hazard Zones

- 1% Annual Chance
- Regulatory Floodway
- 0.2% Annual Chance
- Reduced Risk Due to Levee

Flood Hazard Layers

- FIRM Panels
- Cross-Sections
- Limit Lines

Other Map Layers

- Sections
- Communities
- NRDs

Notes

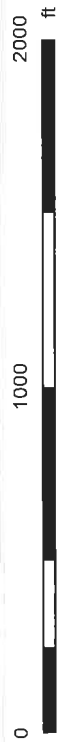


Legend

- Counties
- NRDs
- SubSections
- Active, Registered Wells
- Unregistered Wells

Well Use Descriptions

- Aquaculture
- Commercial/Industrial
- Dewatering (>90 Days)
- Domestic
- Geothermal
- Ground Heat Exchange
- Heat Pump Well (Open)
- Injection
- Irrigation
- Livestock
- Monitoring (Quality)
- Observation (Quantity)
- Other
- Pit (Excavation)
- Recovery
- Unspecified



Disclaimer

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Printed Date 2/4/2021 3:57:58 PM

Mail to
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone (402)471-2363

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 7-8-2015 Sequence No. 168951 Registration No. 4-134597A
Owner Code No. 103598 Receipt No. R18329 Lower Elkham NRD

1. a. Well Owner's First Name Ron Last Name Bruns
b. Company Name Ron Bruns Feed Yards - East
c. Correspondent Name _____ Attention _____
Address RR-3 Box 172
City Pender State NE Zip 68049 Telephone _____

2. a. Contractor's License No. 39349 Contractor's Name MICHAEL O'MALLEY
Contractor's Email Address omalleydrill@aol.com
b. Drilling Firm Name O'MALLEY DRILLING INC
Address PO BOX 426
City BLAIR State NE Zip 68008 Telephone 402 426 5791
Drilling Firm's Email Address _____

3. a. Well location SE 1/4 of the SW 1/4 of Section 21, Township 25 North, Range 6 E W THURSTON County.
b. Natural Resources District _____
c. The well is _____ feet from the (N S) section line and _____ feet from the (E W) section line
(circle one) (circle one)
or Latitude Degree 42 Minute 07 Second 369
Longitude Degree 096 Minute 44 Second 155
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) _____
f. If for irrigation, the land to be irrigated is _____ acres.
g. Well reference letter(s), if applicable MW-1 HHSS PWSID _____

4. Permits
Management Area Permit Number _____ Surface Water Permit Number _____
Geothermal Permit Number _____ Industrial Permit Number _____
Municipal Permit Number _____ Transfer Out-Of-State Permit Number _____
Well Spacing Permit Number _____ Conduct Permit Number _____
HHSS _____ Other Permit Number _____
NDEQ _____

5. Purpose of well (indicate one) Aquaculture Commercial/Industrial Dewatering (over 90 days)
 Domestic Ground Heat Exchanger Groundwater Source Heat Pump Irrigation Injection
 Livestock Monitoring Observation Public Water Supply (with spacing (46-638))
 Public Water Supply (without spacing) Recovery Other _____
(indicate use)

6. Wells in a Series.
a. Is this well a part of a series? Yes go to part b of this section No go to part 7 of this application
b. If one or more of the wells in the series is currently registered, give the well registration number _____
c. How many wells in the series are you registering at this time? 3

7. Replacement and abandoned well information.
a. Is this well a replacement well? Yes No
b. Registration number of abandoned well _____ If not registered, date abandoned well was constructed (m) ____ / (d) ____ / (y) ____
c. Replacement well is _____ feet from abandoned well. d. Abandoned well last operated (m) ____ / (d) ____ / (y) ____
e. Original well pump column size _____ inches. f. Completion of original well abandonment on (m) ____ / (d) ____ / (y) ____
g. Location of water use of abandoned well _____

8. Pump Information.

- a. Is pump installed at this time Yes No
 Is pump installed by well owner in section 1? Yes No Is pump installed by contractor in section 2? Yes No
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. _____ Pump Installer's Name _____
 Pump Installer's Email Address _____
 Pump Installer's Firm Name _____
 Pump Installer's Firm Address _____
 City _____ State _____ Zip _____ Telephone _____
 Pump Installer's Firm Email Address _____
- c. Pumping rate _____ gallons per minute Measured Estimated
 d. Drop pipe diameter _____ inches e. Length of drop pipe _____ feet
 f. Pumping equipment installed (m) _____ / (d) _____ / (y) _____ g. Pump Brand _____
 h. This well is designed and constructed to pump less than 50 gpm Yes No

9. Well Construction Information.

- a. Total well depth 45 feet. b. Static water level 27 feet.
 c. Pumping water level _____ feet. d. Well Construction began (month) 5 / (day) 9 / (year) 05
 e. Well Construction completed (month) 5 / (day) 9 / (year) 05 f. Bore hole diameter in inches Top 8.25 Bottom 8.25
 g. Casing and Screen Joints are Welded Glued Threaded Other _____

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a Placement Depth in Feet		b Casing or Screen	c Inside Diameter	d Outside Diameter	e Wall Thickness	f Screen Slot Size	g Type of Material	h Trade Name
From	To							
0	35	Casing	2	2.25	.25		40 PV2	Ti Tan
35	45	Screen	2	2.25	.25	0.010	40 PV2	Ti Tan

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
25 32.5	45	Gravel	16x30
30	32.5	Non-Toxic	chyp
1	30	Grout	

12. Geologic Materials Logged

Depth in Feet		Description
From	To	
0	2	Developed Zone / Colluvium
2	21	Pecora Loess Silty clay
21	45	Lorland Silty clay & clay

Depth in Feet		Description
From	To	

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Michael O'Malley
 Water Well Contractor's Signature

6-18-05
 Date

 Well Owner's Signature
 if Contractor is unknown or Deceased

 Date

Mail to
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone (402)471-2363

07082005-168952-WWRF
Department of Natural Resources (2)

January 2004
DNR Form 145

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 7-8-2005 Sequence No. 168952 Registration No. Y-134597 B
Owner Code No. 63598 Receipt No. R18329 Lauren Johnson NRD

1. a. Well Owner's First Name Ron Last Name Bruhs
b. Company Name Ron Bruhs Feed Yard - East
c. Correspondent Name _____ Attention _____
Address RR-3 Box 172
City Pender State NE Zip 68047 Telephone _____

2. a. Contractor's License No. 39349 Contractor's Name MICHAEL O'MALLEY
Contractor's Email Address omalleydrill@aol.com
b. Drilling Firm Name O'MALLEY DRILLING INC
Address PO BOX 426
City BLAIR State NE Zip 68008 Telephone 4024265791
Drilling Firm's Email Address _____

3. a. Well location SE 1/4 of the SW 1/4 of Section 21, Township 25 North, Range 6 E W THURSTON County.
b. Natural Resources District _____
c. The well is _____ feet from the (N S) section line and _____ feet from the (E W) section line
(circle one) (circle one)
or Latitude Degree 42 Minute 07 Second 234
Longitude Degree 096 Minute 44 Second 042
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) _____
f. If for irrigation, the land to be irrigated is _____ acres.
g. Well reference letter(s), if applicable MW-2 HHSS PWSID _____

4. Permits
Management Area Permit Number _____ Surface Water Permit Number _____
Geothermal Permit Number _____ Industrial Permit Number _____
Municipal Permit Number _____ Transfer Out-Of-State Permit Number _____
Well Spacing Permit Number _____ Conduct Permit Number _____
HHSS _____ Other Permit Number _____
NDEQ _____

5. Purpose of well (indicate one) Aquaculture Commercial/Industrial Dewatering (over 90 days)
 Domestic Ground Heat Exchanger Groundwater Source Heat Pump Irrigation Injection
 Livestock Monitoring Observation Public Water Supply (with spacing (46-638))
 Public Water Supply (without spacing) Recovery Other _____
(indicate use)

6. Wells in a Series.
a. Is this well a part of a series? Yes go to part b of this section No go to part 7 of this application
b. If one or more of the wells in the series is currently registered, give the well registration number _____
c. How many wells in the series are you registering at this time? 3

7. Replacement and abandoned well information
a. Is this well a replacement well? Yes No
b. Registration number of abandoned well _____ If not registered, date abandoned well was constructed (m) ____ / (d) ____ / (y) ____
c. Replacement well is _____ feet from abandoned well. d. Abandoned well last operated (m) ____ / (d) ____ / (y) ____
e. Original well pump column size _____ inches. f. Completion of original well abandonment on (m) ____ / (d) ____ / (y) ____
g. Location of water use of abandoned well _____

8. Pump Information.

- a. Is pump installed at this time Yes No
 Is pump installed by well owner in section 1? Yes No Is pump installed by contractor in section 2? Yes No
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. _____ Pump Installer's Name _____
 Pump Installer's Email Address _____
 Pump Installer's Firm Name _____
 Pump Installer's Firm Address _____
 City _____ State _____ Zip _____ Telephone _____
 Pump Installer's Firm Email Address _____
- c. Pumping rate _____ gallons per minute Measured Estimated
 d. Drop pipe diameter _____ inches e. Length of drop pipe _____ feet
 f. Pumping equipment installed (m) _____ / (d) _____ / (y) _____ g. Pump Brand _____
 h. This well is designed and constructed to pump less than 50 gpm Yes No

9. Well Construction Information.

- a. Total well depth 29 feet. b. Static water level 20 feet.
 c. Pumping water level _____ feet d. Well Construction began (month) 5 / (day) 10 / (year) 05
 e. Well Construction completed (month) 5 / (day) 10 / (year) 05 f. Bore hole diameter in inches Top 8.25 Bottom 8.25
 g. Casing and Screen Joints are Welded Glued Threaded Other _____

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a Placement Depth in Feet		b Casing or Screen	c Inside Diameter	d Outside Diameter	e Wall Thickness	f Screen Slot Size	g Type of Material	h Trade Name
From	To							
0	19	Casing	2	2.25	.25	-	MVC-40	Titan
19	29	Screen	2	8.25	.25	0.010	PR-40	Titan

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0	16	Grout	
16	18	Bentonite	chip
18	29	Gravel Pack	16250

12. Geologic Materials Logged

Depth in Feet		Description	Depth in Feet		Description
From	To		From	To	
0	6	Fill / Plastic Parent Material			
6	20	Clay / silt / Alluvium silt, clay			
20	29	Lowland silt, clay / clay			

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Michael O'Malley 6-19-05 _____
 Water Well Contractor's Signature Date Well Owner's Signature
 if Contractor is unknown or Deceased Date

Mail to
DNR
PO Box 94676
Lincoln, NE 68509-4676
Phone (402)471-2363

07082005-168953 WWRP

Department of Natural Resources (2) January 2004
DNR Form 145

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 7-8-2005 Sequence No. 168953 Registration No. 1-134597C
Owner Code No. 63598 Receipt No. R18329 Lower Elkham NRD

1. a. Well Owner's First Name Ron Last Name Bovns
b. Company Name Ron Bovns Feed Yard - EAST
c. Correspondent Name _____ Attention _____
Address R.R. 3 Box 172
City Pender State NE Zip 68047 Telephone _____

2. a. Contractor's License No. 39349 Contractor's Name MICHAEL O'MALLEY
Contractor's Email Address omalleydrill@aol.com
b. Drilling Firm Name O'MALLEY DRILLING INC
Address PO BOX 426
City BLAIR State NE Zip 68008 Telephone 4024265791
Drilling Firm's Email Address _____

3. a. Well location SE 1/4 of the SW 1/4 of Section 21, Township 25 North, Range 6 E W _____ County.
b. Natural Resources District _____
c. The well is _____ feet from the (N S) section line and _____ feet from the (E W) section line
(circle one) (circle one)
or Latitude Degree 42 Minute 07 Second 230
Longitude Degree 096 Minute 43 Second 950
d. Street address and subdivision, if applicable _____
Block _____ Lot _____
e. Location of water use, if applicable (give legal descriptions) _____
f. If for irrigation, the land to be irrigated is _____ acres.
g. Well reference letter(s), if applicable MW-3 HHSS PWSID _____

4. Permits
Management Area Permit Number _____ Surface Water Permit Number _____
Geothermal Permit Number _____ Industrial Permit Number _____
Municipal Permit Number _____ Transfer Out-Of-State Permit Number _____
Well Spacing Permit Number _____ Conduct Permit Number _____
HHSS _____ Other Permit Number _____
NDEQ _____

5. Purpose of well (indicate one) Aquaculture Commercial/Industrial Dewatering (over 90 days)
 Domestic Ground Heat Exchanger Groundwater Source Heat Pump Irrigation Injection
 Livestock Monitoring Observation Public Water Supply (with spacing (46-638))
 Public Water Supply (without spacing) Recovery Other _____
(indicate use)

6. Wells in a Series.
a. Is this well a part of a series? Yes go to part b of this section No go to part 7 of this application
b. If one or more of the wells in the series is currently registered, give the well registration number _____
c. How many wells in the series are you registering at this time? 3

7. Replacement and abandoned well information.
a. Is this well a replacement well? Yes No
b. Registration number of abandoned well _____ If not registered, date abandoned well was constructed (m) ____ / (d) ____ / (y) ____
c. Replacement well is _____ feet from abandoned well. d. Abandoned well last operated (m) ____ / (d) ____ / (y) ____
e. Original well pump column size _____ inches. f. Completion of original well abandonment on (m) ____ / (d) ____ / (y) ____
g. Location of water use of abandoned well _____

8. Pump Information.

- a. Is pump installed at this time Yes No
 Is pump installed by well owner in section 1? Yes No Is pump installed by contractor in section 2? Yes No
 If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. _____ Pump Installer's Name _____
 Pump Installer's Email Address _____
 Pump Installer's Firm Name _____
 Pump Installer's Firm Address _____
 City _____ State _____ Zip _____ Telephone _____
 Pump Installer's Firm Email Address _____
- c. Pumping rate _____ gallons per minute Measured Estimated
 d. Drop pipe diameter _____ inches e. Length of drop pipe _____ feet
 f. Pumping equipment installed (m)____/(d)____/(y)____ g. Pump Brand _____
 h. This well is designed and constructed to pump less than 50 gpm Yes No

9. Well Construction Information.

- a. Total well depth 25 feet. b. Static water level 19 feet.
 c. Pumping water level _____ feet. d. Well Construction began (month) 5 / (day) 10 / (year) 05
 e. Well Construction completed (month) 5 / (day) 10 / (year) 05 f. Bore hole diameter in inches Top 8.25 Bottom 8.25
 g. Casing and Screen Joints are Welded Glued Threaded Other _____

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a Placement Depth in Feet		b Casing or Screen	c Inside Diameter	d Outside Diameter	e Wall Thickness	f Screen Slot Size	g Type of Material	h Trade Name
From	To							
0	15	Casing	2	2.25	.25		PVC-40	TSTA
15	25	Screen	2	2.25	.25	0.010	PVC-40	TSTA

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0	12	Grout	
12	14	Bestcrete	Chyp
14	25	Gravel Pack	16.30

12. Geologic Materials Logged

Depth in Feet		Description	Depth in Feet		Description
From	To		From	To	
0	16	Colluvial sediments			Silty clay
16	25	levelled			Silty clay

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Michael O'Malley 6-18-05
 Water Well Contractor's Signature Date Well Owner's Signature Date
 if Contractor is unknown or Deceased

Mail to
Department of Natural Resources
PO Box 94676
Lincoln, NE 68509-4676
Phone (402)471-2363

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

Please indicate NA for items unknown

FOR DEPARTMENT USE ONLY

Date Filed 1-9-2008 Owner Code No. 63598 Registration No. 647913
01092008 - 189984 - WWRP(3) Well ID Receipt R22666 Lower Elkhorn NRD

1. a. Well Owner's First Name _____ Last Name _____

OR Company Name Ron Bruns Feed Yards

b. Attention Name Ron Bruns

c. Address Route 3, Box 172

City Pender State NE Zip 68047 Telephone 402 385 2202

2. a. Contractor's License No. 39395 Contractor's Name Ricky Kuehn

Contractor's Email Address _____

b. Drilling Firm Name Contract Exploration Drilling Inc

Address 506 W 12 Road

City Phillips State NE Zip 68865 Telephone 402 886 2336

Drilling Firm's Email Address _____

3. a. Well location SW 1/4 of the SE 1/4 of Section 21, Township 25 North, Range 6 E W , Thurston County

b. Natural Resources District Lower Elkhorn

c. The well is _____ feet from the (N S) section line and _____ feet from the (E W) section line

OR Latitude Degree 42 Minute 07 Second 16.4

Longitude Degree 096 Minute 43 Second 55.8

Location of well for a pit is the location of the pump

d. Street address and subdivision, if applicable _____

Block _____ Lot _____

e. Location of water use (give legal descriptions) _____

f. If for irrigation, the land to be irrigated is _____ acres. Location of water use is required on all wells

g. Well reference letter(s), if applicable MW4 HHSS PWSID _____

4. Permits
Management Area Permit Number _____ Surface Water Permit Number _____
Geothermal Permit Number _____ Industrial Permit Number _____
Municipal Permit Number _____ Transfer Out-Of-State Permit Number _____
Well Spacing Permit Number _____ Conduct Permit Number _____
HHSS _____ Other Permit Number _____
NDEQ _____

5. Purpose of well (indicate one) Aquaculture Commercial/Industrial Dewatering (over 90 days)
 Domestic Ground Heat Exchanger Groundwater Source Heat Pump Irrigation Injection
 Livestock Monitoring Observation Pit (for irrigation) Public Water Supply (with spacing (46-638))
 Public Water Supply (without spacing) Recovery Other _____
(further description of use can be provided under other) (indicate use)

6. Wells in a Series.
a. Is this well a part of a series? Yes go to part b of this section No go to part 7 of this application
b. If one or more of the wells in the series is currently registered, give all well registration numbers _____
c. How many wells in the series are you registering at this time? _____

7. Replacement and decommissioned/modified well information.

6-147913

- a. Is this well a replacement well? Yes No go to part 8 of this application
- b. Registration number of original well _____ If not registered, date original well was constructed (m) ___ / (d) ___ / (y) ___
- c. Original well last operated (m) ___ / (d) ___ / (y) ___
- d. Replacement well is _____ feet from original well.
- e. Location of water use of original well _____

Please Select One:

- f.1. Original water well decommissioned on (m) ___ / (d) ___ / (y) ___ **OR**
- 2. I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well. **OR**
- 3. I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well. It will be used for one of the following:
 - a. Livestock
 - b. Monitoring c. Observation
 - d. nonconsumptive or de minimus use approved by the applicable natural resources district. State use: _____

If 3d is chosen, NRD signature is required. (Signature can be submitted on NRD Approval form to DNR prior to registration)

NRD signature _____ Date _____ **OR**

- 4. Decommission/Modification Certification form is submitted by landowner.

8. Pump Information. (Pump information is required if registering a pit)

- a. Is pump installed at this time Yes No
- Is pump installed by well owner in section 1? Yes No Is pump installed by contractor in section 2? Yes No
- If pump installed by pump installer, please fill out license number below
- b. Pump Installer's License No. _____ Pump Installer's Name _____
 Pump Installer's Email Address _____
 Pump Installer's Firm Name _____
 Pump Installer's Firm Address _____
 City _____ State _____ Zip _____ Telephone _____
 Pump Installer's Firm Email Address _____
- c. Pumping rate _____ gallons per minute Measured _____ Estimated _____
- d. Drop pipe diameter _____ inches e. Length of drop pipe _____ feet
- f. Pumping equipment installed (m) ___ / (d) ___ / (y) ___ g. Pump Brand _____
- h. This well is designed and constructed to pump less than 50 gpm Yes No (8H is required on ALL wells)

9. Well Construction Information.

- a. Total well depth 19 feet. b. Static water level 11 feet. c. Pumping water level _____ feet
- d. Well Construction Began (m) 12 / (d) 20 / (y) 2007 e. Well Construction Completed (m) 12 / (d) 20 / (y) 2007

Wells drilled prior to stays or moratoriums require NRD signature NRD signature _____ Date _____
 (Signature can be submitted on NRD Approval form to DNR prior to registration)

- f. Bore hole diameter in inches Top 8.5 Bottom 8.5
- g. Casing and Screen Joints are Welded Glued Threaded Other _____

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Screen Slot Size	Type of Material	Trade Name
From	To							
19	9	Screen	2.000	2.400	0.200	0.010		PVC - Horizon
9	0	Casing	2.000	2.400	0.200			PVC - Horizon



DESIGN REPORT
RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN LOT EXPANSION
THURSTON COUNTY, NEBRASKA
ProAg Project No. 21-022

BACKGROUND INFORMATION

The Ron Bruns Feedyard – East Place is an existing open lot beef cattle operation that is now proposing to expand the open feedlots. The site will have a total contained drainage area of 40.8 acres. All of the contained feedlot area drains to the existing debris basin and then to existing runoff holding pond. A feedlot runoff diversion will direct the expanded feedlot area into the existing debris basin. No changes are proposed to the existing basin or the runoff holding pond. All of the proposed livestock waste control facility structures comply with the design standards of NDEE Title 130.

The proposed construction will consist of the open dirt lot area and a feedlot runoff diversion.

The site is located one mile west of Pender in the SW ¼, Section 21, T-25-N, R-06-W, Thurston County.

DESIGN BASIS

The NDEE requires a minimum level of runoff control for permitted open feedlots. The storage volume available in the runoff holding pond at the end construction will be approximately 133% of the minimum required design storage volume for the drainage area. The pond will maintain the required 1.5-feet of freeboard at all times.

The site will have one distinct drainage area, including the open cattle feedlots, feed storage area, and debris basin. The basin is designed to collect and contain the majority of manure solids while allowing the settled runoff effluent to drain through the outlet into the runoff holding pond. Eliminating the majority of the manure solids from entering the runoff holding pond allows for easier pump-out and prevents most of the nutrients from entering the pond. This makes the liquid runoff ideal for land applying with irrigation equipment on standing crops.

The contained drainage area consists of 21.0 acres of feedlot with 19.8 additional acres of farmstead, feed storage area, and row crop field contributing area draining to the existing basin.

The staff gauge in the runoff holding pond will be updated at the completion of construction. The markings for the required “Freeboard,” “Must Pump,” and “Pre-Winter Drawdown” elevations will be marked on the staff gauge. If the liquid level in a runoff holding pond rises above the “Must Pump” elevation, the pond will be pumped out through irrigation equipment every day that conditions permit until the liquid level is lowered to the required elevation. Prior to entering each winter season, the ponds will be pumped out through irrigation equipment until the liquid level is lowered to the required elevation. The additional volume available below the critical elevations allows for extra operating storage volume in the pond, which prevents pumping out the pond after every significant rainfall and conserves runoff water for ideal irrigation timing.

STORM WATER

A NPDES Storm Water Discharge Permit will not be required for construction. All of the storm water will be directed through the proposed diversion ditch to the existing runoff controls. Bale checks will be installed in the newly constructed diversion for erosion protection as needed.

GEOLOGY

The proposed open lots will be located in the Nora soil series. The Nora soil series consists of very deep, well drained soils that formed in loess on uplands. The existing slopes in the area of the proposed construction range from 6-11%.

GROUND WATER

The available area well logs on the site show four existing groundwater monitoring wells. No changes are proposed to the existing groundwater monitoring plan.

WETLANDS

The proposed construction is not in the location of a designated wetland area, and no wetland indicators were observed on site.

FEEDLOT RUNOFF DIVERSION DESIGN

A feedlot runoff diversion is proposed along the bottom side (north) of the proposed open dirt lots in order to divert all feedlot runoff to the existing debris basin. The diversion is designed to route the twenty-five (25) year, twenty-four (24) hour storm event into the runoff control structures. The proposed diversion will consist of an earthen open channel draining to a culvert under the feed alley. See the design worksheet for the complete diversion calculations.

SOLIDS SETTLING BASIN DESIGN

The settling basin has the capacity to route the twenty-five (25) year, twenty-four (24) hour storm event falling on the contained drainage area through basin to the runoff holding pond. See the design worksheet for the complete settling basin design calculations.

PROPOSED EARTHEN FEEDLOT RUNOFF HOLDING POND DESIGN

The holding pond is designed to store greater than the runoff from the 25-year, 24-hour rainfall, the average annual runoff from the month of June, and all process wastewater. The pond will maintain no less than 1.5-foot of freeboard below the lowest point at which runoff could leave the holding pond. See the design worksheet for the complete runoff holding pond design calculations.

Runoff Holding Pond 1

- Volume @ Freeboard = 6,117,669 gallons
 - Contained Drainage Area = 40.8 acres
 - Volume @ Must-Pump elevation = 2,054,113 gallons
 - Volume at Pre-Winter Drawdown elevation = 996,989 gallons





RUNOFF HOLDING POND DESIGN
RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
THURSTON COUNTY, NEBRASKA
 ProAg Project No. 21-022

BACKGROUND INFORMATION

Type of Construction: EXISTING-land use change PROPOSED–runoff controls PROPOSED-expansion
 Feedlot surface: Paved Dirt Dirt (Steep)
 Overflow waterers: Yes No

25-Year, 24-Hour Rainfall	4.95	inches	Curve Number (Feedlot Area)	90
June Rainfall	4.05	inches	Curve Number (Contributing Area)	71
June Evaporation	5.30	Inches		

PROPOSED HOLDING POND # 1

Drainage Area # 1

a. Feedlot Area	21.0	acres
b. Contributing Area	19.8	acres
c. Total Drainage Area.....	40.8	acres
d. Pond Surface Area (at Top of Dike).....	4.0	acres
e. Pond Surface Area (at Freeboard).....	3.8	acres

25-Year, 24-Hour Runoff

f. Feedlot Area Runoff Depth.....	3.83	in
g. Feedlot Area Runoff Volume	291,961	ft ³
h. Contributing Area Runoff Depth	2.08	in
i. Contributing Area Runoff Volume	149,498	ft ³
j. Pond Surface Direct Depth	4.95	in
k. Pond Surface Direct Volume	71,874	ft ³
l. Solids Volume to Holding Pond	0	ft ³
m. Total Runoff Volume	513,333	ft ³

Month of June Runoff

n. Feedlot Area Runoff Depth.....	1.19	in
o. Feedlot Area Runoff Volume	90,714	ft ³
p. Contributing Area Runoff Depth	0.16	in
q. Contributing Area Runoff Volume	11,500	ft ³
r. Pond Surface Direct Depth (Precip-Evap)	(1.25)	in
s. Pond Surface Direct Volume	-not credit-	ft ³
t. Total Runoff Volume	102,214	ft ³

Overflow Waterers

u. Estimated overflow volume (2,670 ft ³ per waterer)	-	ft ³
--	---	-----------------

Design Volumes

v. Total Volume to be stored 25-YR, 24-HR Event	513,333	ft ³
w. Total Minimum Design Storage Volume	615,547	ft ³

Proposed Pond Volume

x. Total Volume at Freeboard Elevation	817,870	ft ³
y. Total Volume at Must-Pump Elevation	274,614	ft ³
z. Total Volume at Winter Drawdown Elevation	133,287	ft ³
aa. Percent of Minimum Design Required Volume.....	133	%

SETTLING BASIN DESIGN CALCULATIONS
RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
THURSTON COUNTY, NEBRASKA
 ProAg Project No. 21-022

BACKGROUND INFORMATION

Type of Basin: Dry Wet
 Feedlot surface: Paved Dirt Dirt (Steep)
 25-Year, 24-Hour Rainfall 4.95 inches
 Curve Number (Feedlot Area) 90
 Curve Number (Contributing Area) 71

PROPOSED BASIN A

Drainage Area 1

a. Feedlot Area 21.0 acres
 b. Contributing Area 19.8 acres
 c. Total Drainage Area 40.8 acres
 d. Hydraulic Length 2,743 ft
 e. Average Slope 0.026 ft/ft

Solids Storage

f. Solids (0.5 in per acre of lot area) 10.5 Ac-in
 g. Solids volume 38,115 ft³

25-Year, 24-Hour Runoff

h. Feedlot Area Runoff 3.83 in
 i. Feedlot Area Runoff Volume 291,961 ft³
 j. Contributing Area Runoff 2.08 in
 k. Contributing Area Runoff Volume 149,498 ft³
 l. Total Runoff Volume 441,459 ft³
 m. Peak Flow 81.84 cfs
 n. Time to Concentration 42.8 min

Basin Outflow

o. Pipe flow capacity 7.23 cfs
 p. Riser/Picket Screen capacity 8.123 cfs
 q. Picket overflow (weir) - cfs
 r. Pump capacity - cfs
 s. Flow-limiting device pipe
 t. Auxiliary spillway capacity - cfs

Basin Design Volume

u. Total capacity required (full detention)..... 479,574 ft³
 v. Total capacity provided..... 422,288 ft³
 w. Percentage solids passed to pond 0 %
 x. Volume solids passed to pond 0 ft³

Req'd of Ret. = 283,220 CF

Summary for Pond BA: Basin A

Inflow Area = 40.800 ac, 0.00% Impervious, Inflow Depth = 2.94" for 25-Year event
 Inflow = 81.84 cfs @ 12.40 hrs, Volume= 10.000 af
 Outflow = 5.04 cfs @ 15.80 hrs, Volume= 9.790 af, Atten= 94%, Lag= 204.1 min
 Primary = 5.04 cfs @ 15.80 hrs, Volume= 9.790 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 3.35' @ 15.80 hrs Surf.Area= 0 sf Storage= 283,220 cf

Plug-Flow detention time= 806.1 min calculated for 9.790 af (98% of inflow)
 Center-of-Mass det. time= 793.4 min (1,643.9 - 850.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	422,288 cf	Custom Stage Data Listed below

Elevation (feet)	Cum.Store (cubic-feet)
0.00	0
5.00	422,288

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	12.0" Round UGO L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -3.00' S= 0.0750 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.04 cfs @ 15.80 hrs HW=3.35' (Free Discharge)
 ↑1=UGO (Inlet Controls 5.04 cfs @ 6.42 fps)

FEEDLOT DIVERSION DESIGN
RON BRUNS FEEYARD – EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
THURSTON COUNTY, NEBRASKA
ProAg Project No. 21-022

EARTHEN DIVERSION DESIGN

Hydrologic Soil Group: C

Land Use: Feedlot, dirt

Design Storm 25-YR, 24-HR: 4.95 in

CN: 90

Runoff 25-YR, 24-HR: 3.83 in.

Design data is as follows:

- Channel bottom width = 8 feet
- Channel Sideslopes = 4:1
- Roughness coefficient = 0.025

EARTHEN DIVERSION

An earthen diversion is proposed along the north side of the open lots in order to divert all feedlot runoff toward the containment structures.

- Drainage Area = 2.4 acres
- Max flow length = 537 feet
- Average Slope = 4%
- Time of concentration = 6 min.
- Peak Flow = 14.61 cfs

- Channel bottom width = 8 feet
- Channel height = 2.5 feet
- Design flow depth = 2.0 feet
- Channel slope = 0.55%
- Culvert flow capacity = 3.68 cfs

21-022 Bruns

Type II 24-hr 25-Year Rainfall=4.95"

Prepared by ProAg Engineering, Inc.

Printed 3/25/2021

HydroCAD® 10.00-22 s/n 10680 © 2018 HydroCAD Software Solutions LLC

Summary for Pond Div: Expansion Diversion

Inflow Area = 2.400 ac, 0.00% Impervious, Inflow Depth = 3.83" for 25-Year event
 Inflow = 14.61 cfs @ 11.98 hrs, Volume= 0.766 af
 Outflow = 3.68 cfs @ 12.14 hrs, Volume= 0.765 af, Atten= 75%, Lag= 10.0 min
 Primary = 3.68 cfs @ 12.14 hrs, Volume= 0.765 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 2.02' @ 12.14 hrs Surf.Area= 8,790 sf Storage= 11,587 cf

Plug-Flow detention time= 50.3 min calculated for 0.765 af (100% of inflow)
 Center-of-Mass det. time= 51.3 min (839.9 - 788.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	16,193 cf	8.00'W x 348.00'L x 2.50'H Prismatoid Z=4.0

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	12.0" Round Culvert L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -3.00' S= 0.0750 ' / Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.68 cfs @ 12.14 hrs HW=2.02' (Free Discharge)
 ↑=Culvert (Inlet Controls 3.68 cfs @ 4.68 fps)





POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.373 (0.308-0.461)	0.436 (0.359-0.539)	0.542 (0.445-0.671)	0.633 (0.517-0.786)	0.763 (0.604-0.976)	0.868 (0.670-1.12)	0.976 (0.727-1.28)	1.09 (0.777-1.46)	1.25 (0.853-1.70)	1.37 (0.910-1.89)
10-min	0.546 (0.451-0.675)	0.638 (0.526-0.789)	0.793 (0.651-0.982)	0.927 (0.757-1.15)	1.12 (0.884-1.43)	1.27 (0.981-1.64)	1.43 (1.06-1.88)	1.60 (1.14-2.14)	1.82 (1.25-2.49)	2.00 (1.33-2.76)
15-min	0.666 (0.550-0.823)	0.778 (0.641-0.962)	0.967 (0.794-1.20)	1.13 (0.923-1.40)	1.36 (1.08-1.74)	1.55 (1.20-2.00)	1.74 (1.30-2.29)	1.95 (1.39-2.61)	2.22 (1.52-3.04)	2.44 (1.63-3.37)
30-min	0.952 (0.786-1.18)	1.11 (0.915-1.37)	1.38 (1.13-1.71)	1.61 (1.32-2.00)	1.95 (1.54-2.49)	2.21 (1.71-2.86)	2.49 (1.85-3.27)	2.78 (1.98-3.73)	3.18 (2.18-4.35)	3.49 (2.33-4.82)
60-min	1.23 (1.01-1.52)	1.42 (1.17-1.76)	1.76 (1.45-2.18)	2.06 (1.68-2.56)	2.49 (1.98-3.20)	2.84 (2.20-3.68)	3.22 (2.40-4.24)	3.61 (2.58-4.86)	4.17 (2.86-5.71)	4.61 (3.07-6.36)
2-hr	1.51 (1.25-1.85)	1.74 (1.44-2.13)	2.14 (1.77-2.63)	2.50 (2.06-3.08)	3.03 (2.43-3.87)	3.48 (2.71-4.47)	3.95 (2.97-5.16)	4.45 (3.20-5.94)	5.16 (3.57-7.02)	5.72 (3.84-7.84)
3-hr	1.66 (1.39-2.02)	1.91 (1.59-2.32)	2.34 (1.94-2.86)	2.74 (2.26-3.35)	3.33 (2.68-4.24)	3.83 (3.00-4.90)	4.36 (3.29-5.69)	4.93 (3.57-6.56)	5.74 (4.00-7.80)	6.40 (4.32-8.73)
6-hr	1.91 (1.60-2.30)	2.19 (1.84-2.65)	2.70 (2.26-3.27)	3.16 (2.63-3.84)	3.86 (3.13-4.87)	4.44 (3.51-5.65)	5.07 (3.86-6.56)	5.74 (4.19-7.59)	6.71 (4.70-9.04)	7.48 (5.09-10.1)
12-hr	2.14 (1.81-2.56)	2.49 (2.10-2.98)	3.09 (2.60-3.71)	3.63 (3.04-4.37)	4.42 (3.60-5.52)	5.08 (4.04-6.39)	5.78 (4.43-7.41)	6.53 (4.80-8.54)	7.58 (5.35-10.1)	8.41 (5.77-11.3)
24-hr	2.41 (2.06-2.86)	2.81 (2.39-3.33)	3.48 (2.95-4.14)	4.08 (3.44-4.87)	4.95 (4.06-6.11)	5.66 (4.52-7.05)	6.41 (4.95-8.14)	7.20 (5.33-9.34)	8.30 (5.91-11.0)	9.18 (6.35-12.3)
2-day	2.77 (2.38-3.26)	3.18 (2.73-3.74)	3.89 (3.32-4.59)	4.51 (3.83-5.34)	5.42 (4.47-6.63)	6.16 (4.96-7.60)	6.94 (5.40-8.73)	7.76 (5.79-9.98)	8.90 (6.39-11.7)	9.80 (6.84-13.0)
3-day	3.02 (2.60-3.53)	3.46 (2.98-4.05)	4.20 (3.60-4.93)	4.85 (4.13-5.70)	5.78 (4.79-7.02)	6.54 (5.29-8.02)	7.33 (5.72-9.16)	8.15 (6.11-10.4)	9.30 (6.70-12.2)	10.2 (7.15-13.5)
4-day	3.24 (2.80-3.77)	3.69 (3.19-4.30)	4.47 (3.84-5.22)	5.14 (4.39-6.02)	6.09 (5.06-7.36)	6.87 (5.56-8.38)	7.66 (6.00-9.55)	8.50 (6.39-10.8)	9.65 (6.98-12.6)	10.6 (7.43-13.9)
7-day	3.80 (3.31-4.40)	4.30 (3.73-4.98)	5.14 (4.45-5.96)	5.86 (5.04-6.82)	6.88 (5.74-8.24)	7.70 (6.28-9.32)	8.54 (6.73-10.6)	9.41 (7.12-11.9)	10.6 (7.72-13.7)	11.5 (8.18-15.1)
10-day	4.33 (3.78-4.99)	4.87 (4.24-5.61)	5.77 (5.01-6.66)	6.54 (5.64-7.57)	7.62 (6.38-9.07)	8.48 (6.93-10.2)	9.35 (7.40-11.5)	10.3 (7.79-12.9)	11.5 (8.40-14.8)	12.5 (8.87-16.2)
20-day	5.91 (5.19-6.74)	6.59 (5.78-7.51)	7.69 (6.73-8.79)	8.61 (7.49-9.88)	9.87 (8.31-11.6)	10.8 (8.93-12.9)	11.8 (9.41-14.4)	12.8 (9.79-15.9)	14.1 (10.4-18.0)	15.1 (10.8-19.5)
30-day	7.24 (6.38-8.20)	8.04 (7.09-9.12)	9.34 (8.21-10.6)	10.4 (9.08-11.9)	11.8 (9.96-13.8)	12.9 (10.6-15.2)	13.9 (11.1-16.8)	14.9 (11.5-18.5)	16.3 (12.0-20.6)	17.2 (12.4-22.2)
45-day	8.90 (7.89-10.0)	9.89 (8.75-11.2)	11.4 (10.1-12.9)	12.7 (11.1-14.4)	14.3 (12.1-16.5)	15.5 (12.8-18.1)	16.6 (13.3-19.8)	17.6 (13.6-21.6)	19.0 (14.1-23.9)	19.9 (14.5-25.6)
60-day	10.3 (9.17-11.6)	11.5 (10.2-12.9)	13.2 (11.7-14.9)	14.6 (12.9-16.5)	16.4 (13.9-18.8)	17.7 (14.7-20.6)	18.8 (15.1-22.4)	19.9 (15.4-24.3)	21.3 (15.8-26.6)	22.2 (16.1-28.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

CONSTRUCTION INSPECTION & QUALITY ASSURANCE PLAN
RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN LOT EXPANSION
THURSTON COUNTY, NEBRASKA
ProAg Project No. 21-022

This Construction Inspection & Quality Assurance plan outlines the responsibilities of the parties involved in the construction of the open feedlot expansion and livestock waste control structures, a description of roles for various construction items, and a timeline of notifications. These parties involved include the Owner, Contractor, Construction Inspector, and the Engineer. The purpose of this Plan is to provide assurance that the overall construction quality is being effectively implemented provide the opportunity for verification and evaluation of the quality factors that affect the livestock waste control facility.

Note: A written Construction Quality Assurance plan must be included in applications for a Construction and Operating Permit for Large CAFOs under Title 130—Livestock Waste Control Regulations, Chapter 4.

Roles and Responsibilities

Owner: The owner is responsible for obtaining the contractor of his choice to install components of the proposed design. The owner is responsible for payment to the contractor for his services. It will be the owner's ultimate responsibility to require the contractor to install the structures according to the plans and specifications. It is also the owner's responsibility to notify the inspector in a timely fashion in order to allow for all required testing and inspection of critical points of construction.

Contractor: The contractor will install the components of the design as shown on the plans and specifications.

Inspector: The engineer will provide the construction inspector for the project. The inspector is responsible to assure the structures are being installed according to the plans and specifications. The construction inspector will serve as the representative of the engineer and will not direct or be expected to direct the operations of the contractor. The inspector may provide suggestions to the contractor, if asked, but the contractor is under no obligation to implement these suggestions. If the inspector determines the plans and specifications are not being followed, he/she will notify the designing engineer. The inspector will be, at a minimum, a certified ACI Concrete Field Testing Technician – Grade 1 and have adequate Construction Inspection experience.

Engineer: Under no circumstances will major modifications be made without first notifying the designing engineer. If modifications are necessary, the designing engineer will consult with NDEE before approving the modification. If deficiencies in construction are brought to the attention of the designing engineer, he/she will contact the owner and inform them of the deficiencies. If the structures are not constructed according to the plans and specifications, the designing engineer will not certify the construction to NDEE.

Items of Construction

1. **Pre-Construction Meeting-** A meeting will be held between the contractor, landowner, inspector, suppliers, and engineer prior to any construction taking place. Discussions will include review of the drawings and specifications, work schedules, safety issues, inspection requirements, NDEE certification, and other items pertaining to construction and quality control of this project.
2. **Surveying-** The engineer will provide the required construction staking and layout prior to construction *if requested* by the owner or contractor. The contractor will be provided all bench mark information so that they can do any grade checks required if engineering personnel are not on site.
3. **Excavation-** The construction inspector will approve all excavation prior to placing any earthfill or beginning any formwork. The inspector will not be required to be on site during the excavation operations but approval will be required before any of excavation can be backfilled.
4. **Earthfill, Backfill-** The backfill will require periodic inspection by the inspector for moisture content and compaction methods.
5. **Pipe Trench Excavations and Backfill-** Earthen backfill in the delivery pipe trenches will require periodic inspection to ensure the envelope of the pipe backfill meets specifications. Trench excavation will require periodic inspection to ensure excavation is to the neat lines as shown on drawings. The inspector will approve the grade and placement of the pipe and associated appurtenances before any blinding of backfill over the pipe is performed.
6. **Record keeping-** The inspector will keep an on-going written record of construction activities and his observations. He will use the inspection form or a bound notebook for documenting construction activities, progress, discrepancies, certification of materials, test results, photo log, etc.
7. **Report—**A report will be prepared upon completion of construction which will summarize the inspection elements of the project, any deficiencies that occurred, and any deviations from the drawings and specifications and the reasons thereof. A copy of this report will be attached to the certification of completion.

Timeline and Notifications

Work under these specifications is subject to NDEE inspection and review.

1. BEFORE STARTING CONSTRUCTION, Owner shall:
 - A. Consult the NDEE for required submittals, notifications and approvals.
2. Arrange for pre-construction meeting with engineer, owner, and contractors.
3. Notify engineer, 3 days before starting construction.
4. Notify permitting agency 3 days before starting construction.
5. UPON COMPLETION, Owner shall notify Engineer when all of these items are done.
 - A. Finish grading completed.
 - B. Safety signs (if required) installed.
 - C. Engineer completes inspection and closes out the project.

Construction Tolerances

1. **Location.** All structures must be constructed within 100-feet of the proposed and permitted plans. Engineer will provide staking of all the proposed structures at the owner's request. Any deviations from the construction stakes require Engineer approval and any major deviations greater than 100-feet require NDEE approval prior to construction.

2. **Elevation.** All elevations must be at least up to the proposed permitted elevations. No finished elevations can be lower than the proposed elevations. Finished dike elevations can be up to 12-inches higher than proposed to account for settlement. Any major deviations greater than 12-inches higher on the bottom elevation or greater than 12-inches higher on the dike elevations require NDEE approval prior to construction.

TECHNICAL SPECIFICATIONS
RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
THURSTON COUNTY, NEBRASKA

PROAG PROJECT No. 21-022

February 2021

ENGINEER: ***ProAg Engineering, Inc.***

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

SECTION 200

I. GENERAL

A. Construction Sequence and Best Management Practices (BMP's)

1. The construction site shall be planted to grass (or cover crop) prior to commencement of construction. See Grass Seeding Guidelines.
2. Areas not to be disturbed during construction shall be staked and marked. Considerable rain water and sediment can be trapped on areas planted to grass and not compacted by construction traffic.
3. Install silt fence as shown on the site plan or according to Engineer.
4. All drive entrances shall be protected with rock. Install road culvert(s) as per highway department specifications.
5. Build a berm to prevent field water from entering the construction site. Make berm 18-24" high with 3:1 side slopes. Use loose top soil from the disturbed area. A berm is an alternative to using silt fence. The loose soil will absorb a lot of water. Construct the berm on the contour with no channel on the up-hill side of the berm.
6. Temporary stockpiles shall have silt fence or other effective sediment controls and cannot be placed in stormwater conveyances, ditches or grass waterways.
7. Dewatering of pits and basins shall be done in a manner that does not cause nuisance conditions or discharge onto down-slope property. Rain and ground water in pit excavations shall not be allowed to flow direct into open tile, unless the tile inlet has silt fence or other protection or the perimeter tile is installed and covered with pea rock or crushed rock.
8. After backfilling and final grading is done, those areas shall be planted to grass. Slopes steeper than 4:1 shall be mulched. All seeding and mulching operations shall commence within 1 week after completion of each portion of the construction or as soon as soil conditions permit. See Grass Seeding Guidelines.
9. After berms are removed and backfill around barns is re-graded (the following spring) those areas shall be re-seeded to grass.
10. Final stabilization is achieved when soils have been stabilized by a uniform perennial vegetative cover over at least 70% of the pervious area, and all drainage ditches and grass waterways have been stabilized, then the silt fence may be removed.
11. The Owner shall keep the plans and records on file for a minimum of six (6) years.

B. Maintenance of BMP's

1. Owner shall inspect all BMP's weekly and within 24 hours after each rain event of 1/2" or more in 24 hours.
2. Silt shall be removed from behind silt fences within 24 hours of when the depth reaches 1/3 the height of the fence.
3. Mud and crushed rock are tracked onto public roads, it shall be removed within 24 hours.
4. If sediment escapes the site, off-site accumulations must be removed in a manner and frequency sufficient to minimize off-site impacts.

C. Assignment of Responsibilities for Execution of the SWPPP

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

SECTION 200

1. Owner shall be responsible for execution, inspection, record keeping and up-dating The SWPPP as required.
2. Owner shall inspect all BMP's weekly and within 24 hours after each rain event of 1/2" or more in 24 hours and supervise proper maintenance of erosion and sediment control practices.
3. Earthwork Contractor shall be responsible for implement, manage and maintain both temporary and permanent erosion and sediment control BMP's (except seeding) until final grading has been completed on site.
4. Owner shall be responsible for seedbed preparation, planting and mulching operations prescribed by the SWPPP.
5. Changes to the SWPPP shall be approved and recorded by Owner prior to implementation.

D. Grass Seeding Guidelines

1. All inplace topsoil shall be salvaged to the maximum extent possible. It is ideal to place 6 inches of top soil in areas to be seeded. Harrowing before and packing with roller after planting will help germination, make the ground smoother and easier to mow.
2. Seeding mixture and rates are recommendations based on NDOR specs. Fertilizer is important for quick growth. Mixtures can be mowed.
 - a. Temporary seeding: Fertilizer 10-10-20 at 200 lbs/acre. Oats at 100 lbs/ac for spring/summer seeding of areas that will be left undisturbed for 21 days or more.
 - b. Winter wheat at 100 lbs/ac for fall seeding of areas that will be disturbed again in the spring, such as backfill around barns.

Turf and agricultural grasses: Fertilizer 20-10-20 at 350 lbs/acre.

General Roadside mix.

Brome grass, smooth	9.8 lbs/ac	14.0%
Bluegrass, Kentucky "Certified Park"	20.3	29.0
Bluegrass, Canada	9.8	14.0
Switch grass	2.1	3.0
Wheat-grass, slender	2.8	4.0
Rye-grass, perennial	14.7	21.0
Timothy	2.1	3.0
Redtop	2.1	3.0
Alfalfa, creeping	4.2	6.0
White clover	2.1	3.0
Total	70 lb/ac	

Agricultural Roadside mix.

Alfalfa, creeping	15 lb/ac	30.0%
Brome grass, smooth	10	20.0
Redtop	3	6.0
Rye-grass, perennial	15	30.0
Switch grass	2	4.0
Timothy	2	4.0
Wheat-grass, slender	3	6.0
Total	50 lb/ac	

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

SECTION 200

c. Equivalent seeding and fertilizer that is able to establish the required vegetative cover are acceptable.

EROSION PROTECTION

SECTION 210

I. GENERAL

A. SCOPE

1. This section covers the requirements, materials, installation and maintenance of erosion control features.
2. Furnish, install and maintain all erosion control improvements as shown, specified or required by governing agencies.
3. Perform work in accordance with best present day installation and construction practices.

B. APPROVALS AND PERMITS

1. Owner/Engineer shall obtain the following erosion control permits as required.
 - a. NPDES Storm Water Discharge General Permit administered by NDEE.
2. Contractor shall be responsible for applying for, paying all fees and obtaining any other erosion control permits including but not limited to:
 - a. Local silt screen or erosion control ordinance.
 - b. General building permits.
 - c. Any additional permits required.
3. Contractor shall notify Engineer and/or governing agency when erosion control measures are in place prior to commencing any land disturbing activities.

II. PRODUCTS

- A. Silt Screen: Synthetic Monofilament Woven material, 36 inches tall meeting NDOR SSHC Section 809.
- B. Fence Post: Steel "T" posts with lugs to prevent vertical slipping. Length to be minimum six feet.
- C. Jute Mesh: Non-toxic, single jute, plain weave meeting NDOR SSHC Section 811.
- D. Wood Excelsior Mat: Interlocking wood fiber or straw with plastic netting on one side. Matting shall meet NDOR SSHC Section 811.
- E. Manufactured Surface Intake Covers: Fabric covers with rigid frame as manufactured by Silt Saver, Inc. or equal.
- F. Compost: Controlled production compost consisting of yard trimmings, sewage sludge, animal manure or food processing residue. Compost shall meet the following AASHTO specifications:
 1. Carbon to Nitrogen Ratio – minimum 30:1
 2. Organic Matter – 30-60%

EROSION PROTECTION

SECTION 210

3. Moisture Content – 40% Target
4. Particle Size – 1/4" -- 5/8" for turf area, 1 1/4" for mulch
5. pH – 5.0 – 8.5
6. Soluble Salts – maximum 4 mmhos/cm
7. Heavy Metals – as regulated by US EPA, Class A 40 CFR 503.13, Tables 1 & 3

Compost facility shall comply with U.S. Composting Councils Seal of Testing Assurance (STA) Program.

III. EXECUTION

- A. Prior to any site disturbing activities all required silt fence, compost fences, temporary detention ponds and hay bale silt checks shall be installed and approved.
- B. A copy of an approved permit from all governing agencies shall be kept on site or with the responsible individual.
- C. Installation:
 1. Silt fence shall be installed in accordance with NDOR SSHC Section 809. Location of silt fence shall be according to approved plans.
 2. Compost erosion control measures shall be installed in accordance with current installation practices.
 3. Jute Mesh or Wood Excelsior Mat shall be installed according to NDOR SSHC Section 811.
 4. After installation of storm intakes, field drains or culverts, adequate erosion and sediment control shall be installed in accordance with the standard details shown in the specification or on the drawing.
- D. Monitoring:
 1. The Contractor shall designate an individual, including name, title, address and phone number, to be responsible for the following duties throughout the duration of the project.
 - a. Initial installation of the erosion control measures.
 - b. Site inspections on a weekly basis and after rains greater than 1/4" to assess the effectiveness of existing erosion control measures and to direct installation of additional erosion control measures in response to problems noted during said inspections. The designated individual will keep a log of the inspections and any corrective measures taken. No inspections are required while the ground is frozen or there is snow cover. Inspection will resume when the snow begins to melt. Inspections will continue until adequate ground cover is established to control erosion.

EROSION PROTECTION

SECTION 210

2. Maintenance:

a. Silt fences, intake protection devices and straw bales shall be kept in proper working condition until all land disturbing activities are complete, all turf re-establishment is complete and final inspections are performed.

3. Removal:

a. Contractor shall be responsible for complete removal of silt fence, posts, or any non-biodegradable items used for installation of erosion control measures after Owner, Engineer or governing agency indicates they are no longer needed.

SEEDING & FERTILIZING

SECTION 230

I. GENERAL

A. SCOPE

1. Work involves seeding and fertilizing all disturbed grass areas as shown on drawings.
2. All work shall conform to NDOR SSHC Section 800.

II. PRODUCTS

A. MATERIALS

1. Urban Seed Mixture: Application Rate: 4 lbs/1000 S.F.

Kentucky Bluegrass	70%
Perennial Ryegrass	10%
Creeping Red Fescue	20%

2. Rural Seed Mixture:

Fescue, Kentucky 31 or Fawn	25 lbs/acre
Ryegrass (perennial)	15 lbs/acre
Sideoats Grama (Butte or Trakway)	5 lbs. Pure Live Seed (PLS) per acre
Switchgrass (Neb. 28, Blackwell, Pathfinder or Cave-in Rock)	3 lbs. PLS/acre
Birdsfoot Trefoil (Empire)	5 lbs/acre

3. Alternative Mixture: Alternative seed mixes that are able to establish the required vegetative cover will be reviewed by the design engineer.

4. Temporary Cover or Nurse Crop Seed Mixture: NDOR SSHC Section 803. Seed mixture shall be based on time of year nurse crop is to be planted.

- B. Fertilizer: Urban and Rural Areas (13-13-13) or equivalent.
Application Rate: 750 lbs. per acre.

- C. Mulch: NDOR SSHC Section 805. No mulching is required unless specifically noted on plans or bid item. Any areas to be mulched shall be at a rate of 3000 lbs/acre

- D. Silt Fencing: NDOR SSHC Section 809, Trevira, Spunbound Fabric Type 1114 or equal.

- E. Furnish seed analysis labels meeting NDOR SSHC Section 803 for all seed mixtures.

III. EXECUTION

A. INSTALLATION

1. Prepare seeding bed as per NDOR SSHC Section 803.
2. Apply fertilizer at the rate specified in NDOR SSHC Section 804.
3. Furnish and spread seed at the rate called for in depending on mixture specified.

SEEDING & FERTILIZING

SECTION 230

4. Normal seeding periods shall be March 1 through May 31 and August 10 through September 30. Deviation from these seeding periods will be considered by the Engineer upon written request from the Contractor.
5. Seed all disturbed areas with rural seed mixture except residential type lawns shall be urban mixture, unless approved by design engineer.
6. Mulch all seeded areas in accordance with NDOR SSHC Section 805.
7. Install silt fencing as shown on the drawings or as directed by the Engineer.
8. Contractor shall fence or rope off areas seeded which may be disturbed during turf establishment.
9. Contractor shall be responsible for keeping soil moist during germination and watering lawns a minimum weekly for 45 days.
10. Contractor shall regrade and reseed disturbed or unestablished turf areas.

END OF SECTION

EXCAVATION & BORROW

SECTION 300

I. GENERAL

A. SCOPE

1. All excavation to be performed shall be considered as Unclassified Excavation and shall consist of either topsoil stripping, site grading, pond excavation or building excavation.
2. Includes all required excavation, stockpiling, placement, compaction and fine grading.

B. EXISTING UTILITIES

1. Cooperate with Owner and utility companies for maintaining service.
2. Repair damage to existing utilities as directed by utility company.

II. PRODUCTS

A. FILL MATERIALS

1. Suitable clay material from grading and excavation operations on the site may be used upon approval from the Engineer.
2. Pit run gravel as approved by Engineer.
3. Do not use black earth or topsoil as fill in dikes or under proposed paving, structures or pads.

III. EXECUTION

A. EXCAVATION

1. All areas to be excavated or filled shall have vegetation removed prior to excavating.
2. Excavation consists of removal and disposal of materials encountered when establishing required grade elevations.
3. Topsoil shall be stockpiled separate from other materials to be used later for earth slope finishing.
4. Stockpiling of stripped topsoil shall be as shown on the drawings or within the site limits as directed by the Engineer.
5. Any wood, piping, rubble or deleterious materials encountered during excavation shall be disposed of by the Contractor.
6. "Topsoil Removal":
 - a. Strip topsoil as directed below unless shown on plans otherwise or as directed by Engineer.

EXCAVATION & BORROW

SECTION 300

- b. Earthen Basins:* Strip all topsoil and vegetation from proposed pond bottom areas and off any dike areas to receive fill.
 - c. Buildings:* Strip top six (6) inches of topsoil and vegetation beneath building structures.
 - d. Roadways/Parking Area:* Strip top six (6) inches to remove vegetation.
 - e. Areas to have Grade Lowered:* Strip top six (6) inches to remove vegetation
7. If the grade is inadvertently cut below proposed subgrade elevation, provide acceptable clay or granular material from the site for fill, free of rock or gravel larger than 2 inches in diameter, debris, waste, frozen materials, vegetable and other deleterious matter.
 8. Basin Side Slope Excavation: When an earthen pond is being constructed wholly or partially into existing soil the existing exposed side slope shall be overexcavated, material replaced and compacted to provide a minimum 12" recompacted liner.
 9. Basin Bottom Excavation: As the basin is excavated near the bottom elevation it is recommended that suitable excavated material is placed on the interior side slopes in areas where the side slopes were cut into the existing ground. This placed material will become the 12-inch compacted liner for the interior side slopes. Once the basin bottom is excavated to grade the bottom shall be over-excavated a minimum of twelve (12) inches below the proposed bottom of basin. If unsuitable material, as determined by the Engineer, is encountered an additional twelve (12) inches shall be over-excavated for a total over-excavation of twenty-four (24) inches. The Contractor shall be responsible for controlling rainwater during construction (i.e. pumping, grading to sump, diversion ditch, etc.). It is anticipated that basin excavation would be performed with scrapers, however the Contractor is responsible for his means and methods of construction. Basin will be staked by Engineer prior to construction. Finished grade shall be within 0.1 feet plus or minus.
 10. Cast In Place Concrete Structures: Excavate to firm subgrade and place granular base. Remove unsuitable material and replace with stabilization rock.

B. FILL

1. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil, obstructions and deleterious materials from ground surface prior to placement of fills. Disk surfaces (minimum 8" deep) so that fill material will bond with existing surface.
2. Place fill in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact as described in Paragraph 3.3 below.
3. Do not place fill on surfaces that are muddy, frozen or contain frost.
4. Additional fill required in roadways or building pads shall be suitable clay obtained from on site or borrow source.
5. Top 6" of final grade shall be replaced topsoil in areas where seeding is shown or specified.
6. Basin Dike Construction: After topsoil has been removed the underlying material shall be prepared as specified in paragraph A above. Suitable fill material shall be placed in maximum 6" lifts and compacted as specified in Section 3.3.

EXCAVATION & BORROW

SECTION 300

7. Basin Side Slope Liner Construction: After excavation is complete down to the designed basin bottom elevation along any interior dike sides that were formed by excavation, the side slopes shall be inspected for unsuitable material. If unsuitable material is encountered, as determined by the Engineer, it shall be removed to a minimum depth of twelve (12) inches. This would provide for a total of 24 inches of overexcavated material on the interior side slopes because the slopes were overexcavated 12 inches to start with (Refer to Section 3.1.G. above). If no unsuitable material is encountered on the excavated side slope then 12 inches of suitable material from the remaining basin bottom excavation shall be placed on the side slopes in two 6-inch lifts and compacted to produce a minimum 12-inch compacted liner.
8. Basin Bottom Construction: After all over-excavation has been performed, in accordance with Section 3.1.G above, the underlying material shall be scarified by disking to a minimum depth of 6 inches. This disked material shall be inspected by the Engineer to determine if it is suitable material. If it is considered unsuitable additional over-excavation shall be performed as specified in BASIN EXCAVATION above. If the disked material is suitable the disked material shall be recompacted as specified. The original 12 inches of over-excavated material shall be replaced and compacted in two 6-inch lifts. The initial over-excavation and disking of suitable material shall provide for an 12- inch compacted soil liner in the basin bottom. If more than the initial six inches of overexcavated material was removed, suitable fill material shall be placed and compacted to bring basin bottom up to proposed elevation and to provide a 24" compacted soil liner in basin bottom. If any sand seams, gravel, organic or unsuitable material is encountered during basin bottom overexcavation or disking these soils shall be removed to a minimum depth of 24 inches and suitable fill placed and compacted.
9. NE DEQ Design Criteria: Contractor shall be responsible for conforming to NE DEQ specifications for basin seal and construction. Copy of specifications is included in these specifications at the back of this section.

C. COMPACTION

1. All disked materials and fill materials shall be placed in lifts not exceeding 6 inches and compacted to a minimum of 95% of the maximum density as determined by the Standard Proctor Test. Material shall be placed when it exhibits a moisture content at or above the optimum content as determined by the Standard Proctor Test. Compaction shall be achieved by using a standard sheepsfoot roller with a minimum of 4 passes per lift so that the roller walks out of each lift. Engineer will conduct soil density tests of two tests per foot of fill per acre. Contractor to assist Engineer with tests by leveling grades, etc.
2. Moisture Control:
 - a. Material shall be compacted at or above the optimum moisture content.
 - b. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density.
 - c. Soil that has been removed, because it is too wet to permit compaction, may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture density tests.
 - d. Add water uniformly to soil that is too dry to compact to specified density.

EXCAVATION & BORROW

SECTION 300

e. Contractor shall supply his own water. It may be obtained from the Owner if well is installed.

D. TESTING

1. Once the basin bottom and dikes are completed permeability tests shall be performed on undisturbed core samples from the basin bottom and interior dikes. At least two bottom samples shall be tested with an additional sample tested per additional acre of surface area. One sample shall also be obtained from each interior dike below the maximum manure level. The undisturbed samples shall be tested for permeability in accordance with ASTM D-1587. The percolation shall not exceed the NE DEQ criteria of 3.82×10^{-6} cm/sec. If permeabilities fall below the NE DEQ criteria the pond bottom or dike shall be reworked to achieve proper compaction and successful retesting of permeabilities. Sample holes shall be filled with granular bentonite. Well abandonment forms shall be filled out for each monitoring well abandoned.

E. MAINTENANCE

1. Protection of Graded Areas: Protect newly graded areas from traffic and erosion and keep free of trash and debris.
2. Protection of Basin Liners: If construction of ponds precede use of ponds such that dry conditions will dry out pond bottoms or dikes, Contractor shall be responsible for filling basins to maintain seal or redisking bottom and sides and recompacting prior to use.
3. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
4. Install erosion protection rock on inside corners of earthen basins as shown. Rock to be native fieldstone, crushed limestone or crushed concrete.

F. DISPOSAL OF EXCESS AND WASTE MATERIALS

1. Excess clay material shall be hauled to the pad areas. Excess clay remaining after final grading shall be placed on basin dike exterior.
2. Excess topsoil shall be left in designated stockpile area.

END OF SECTION

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

I. GENERAL

A. SCOPE

1. This section covers the labor and materials relating to excavation, backfilling and compaction of backfill.
2. Contractor shall perform all necessary excavation, shoring, bracing, dewatering, bottom stabilization, utility protection, pipe bedding, initial backfill, trench backfill, compaction, grading and cleanup as required to install utilities and structures as shown on plans or specified herein.
3. Perform all work in accordance with best present day construction practices.

B. WORK BY OTHERS

1. Engineer shall perform all soil compaction testing. Contractor shall assist Engineer during testing and notify Engineer when new areas are being backfilled.
2. Reference to percent maximum density shall mean a soil density not less than the stated percent of maximum density for soil as determined by ASTM D698 "Moisture-Density Relations of Soils using 5.5 lb. Hammer and 12" Drop (Standard Proctor).

C. PROTECTION OF EXISTING UTILITIES

1. Contactor shall be responsible for making a locate call to have utility companies field locate existing utilities before the start of any excavation.
2. Contractor shall be responsible for verifying location and existence of all underground utilities. Omission from or inclusion of located utility items does not constitute non-existence or definite location. Secure and examine local utility records for available location data.
3. Take necessary precautions to protect existing utilities from damage due to any construction activity. Repair all damages to utility items at sole expense. Assess no cost to Owner, Engineer or auxiliary party for any damages.

D. JOB CONDITIONS

1. Contractor shall accept site in condition at time of construction. Notify Engineer or Owner immediately if site conditions are significantly different than during solicitation of construction bids. Surface water or groundwater level fluctuation shall not be considered change in site condition.
2. Contractor shall make provisions if working in wet or frozen conditions to prevent installation on frozen ground or backfilling with excessively wet or frozen material.

E. SAFETY

1. Nothing as indicated in these specifications or drawings shall relieve the Contractor from complying with appropriate safety regulations including OSHA Standards or state and local building codes.

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

2. Pile excavated material suitable for backfill in an orderly manner sufficient distance back from edge of excavation to avoid rollbacks, slides or cave-ins.
3. Erect sheeting, shoring and bracing as necessary for protection of persons, improvements and excavations.

II. PRODUCTS

A. EXCAVATION CLASSIFICATION

1. Earth: All materials not classified as rock or rubble; includes clay, silt, sand, gravel, hardpan, disintegrated shale and rock debris, junk, brick, loose stones and boulders less than ½ cubic yard in volume.
2. Rock: Buried boulders larger than ½ cubic yard in volume or solid deposits so firmly cemented together that they cannot be removed with a ½ cubic yard rated backhoe.
3. Rubble: Buried concrete foundations, beams, walls and other materials which required continuous use of pneumatic tools or blasting.

B. TRENCH STABILIZING MATERIAL

1. 2" coarse, sharp, clean crushed stone. Material shall be crushed to 100% passing a 2" sieve, 10%-50% passing a ¾" sieve and less than 5% passing a No. 8 sieve or other material approved by the Engineer.

C. PIPE OR STRUCTURE BEDDING

1. Crushed stone or gravel meeting NDOR Class F Aggregate for coarse aggregate for concrete.

D. INITIAL BACKFILL

1. NDOR Class C Aggragate.

E. POROUS BACKFILL

1. NDOR SSHC Section 1033 (washed pea gravel)

F. GRANULAR BACKFILL

1. Pit run material subject to approval of Engineer.

G. CONTROLLED DENSITY FILL

1. High slump mixture of Portland Cement.

III. EXECUTION

A. INSPECTION

1. Verify that preceding work affecting work of this section has been satisfactorily completed.

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

2. Correct conditions adversely affecting work of this section.
3. Verify that existing utilities are marked prior to excavation.
4. Perform any exploratory excavation as shown or specified.

B. EXCAVATION FOR STRUCTURES AND APPURTENANCES

1. Includes excavation for manholes and other appurtenances.
2. Strip suitable topsoil or granular surfacing materials for later replacement.
3. Excavate as required to firm, undisturbed soil. If excavation is carried below bottom of foundations as shown on plans, fill with 3,000 psi concrete or stabilizing material as directed by Engineer at no expense to Owner.
4. When unstable material is encountered which will not provide suitable foundation, fill with 3,000 psi concrete or stabilizing material specified hereinafter or as directed by Engineer. Extra work provisions shall apply.

C. TRENCH EXCAVATION

1. Excavate trenches by open cut method. Permission to tunnel under crosswalks, driveways or utility lines may be granted by Engineer or Owner.
2. Limit open trench to 300 lineal feet at any one time.
3. Keep width of trench as narrow as possible. See utility specification for the maximum trench width.
4. Keep sides of trench as nearly vertical as practicable within the limits of excavating safety and applicable codes. Maintain vertical walls of excavation below top of pipe.
5. Provide access to operable fire hydrants, driveways and accesses unless specifically noted otherwise.
6. When unstable material is encountered which may not provide a suitable foundation for pipe:
 - a. Notify Engineer immediately.
 - b. Engineer will investigate questionable material to determine its suitability for pipe foundation.
 - c. If material is considered unsuitable for foundations, Engineer will specify and authorize remedial measures in writing.
 - d. If removal of unsuitable material is authorized:
 1. Replace with trench stabilizing material.
 2. Authorized over-excavation and trench stabilizing material will be paid for as trench stabilizing material.

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

3. Provide minimum of 4" of bedding material on top of stabilizing material to prevent point load. Bedding material shall be graded sufficiently coarse to prevent movement and loss of bedding into trench stabilizing material.

e. Authorized remedial measures not covered by contract unit prices will be paid for as Extra Work.

7. Excavate by hand:

a. Under and around utilities.

b. Where overhead clearance prevents use of machine.

c. Under trees and shrubs that are shown to remain.

D. ROCK AND RUBBLE EXCAVATION

1. Excavate to provide 2" of granular bedding for pipe, structures and appurtenances.

2. Use of explosives: Submit detailed plans outlining all proposed blasting operations, locations, methods and use of mats and other safety measures.

a. Obtain written approval from municipal authority and Engineer before using explosives.

b. Provide Special Hazard Insurance covering liability for all blasting operations. Cost is incidental to cost of rock excavation.

c. Use experienced demolition personnel.

3. Remove excavated rock or rubble not suitable for backfill to an acceptable disposal area. Disposal is incidental to cost of rock excavation.

4. Trench bottom carried below required elevations: Replace with pipe bedding material.

E. DEWATERING

1. Perform all work in the dry to satisfaction of Engineer.

2. Lay no pipe in, and pour no concrete on, excessively wet soil.

3. Prevent surface water from flowing into excavation. Remove water as it accumulates.

4. Divert stream flow away from areas of construction.

5. Contractor's method of managing water encountered during construction shall conform to all laws and permits in effect.

6. Contractor shall obtain approval from Engineer prior to any dewatering.

7. Do not pump water onto adjacent property without approval of Engineer and adjacent property owner. Do not use sanitary sewers for disposal of ground water.

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

F. SHEETING, SHORING AND BRACING

1. Construct sheeting, shoring and bracing required to hold walls of excavation and to provide safety for workmen; to protect existing utilities or structures; or to permit construction in the dry.
2. Wood sheeting driven below level of pipe. Leave in place to a level 5' below finish grade.
3. Pull steel sheeting except where shown on plans.
4. When moveable trench shield is used below spring-line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

G. BEDDING

1. Place specified bedding after excavation or trench has been excavated to proper grade.
2. Place, compact and shape bedding material to uniformly support structure or full length of piping.
3. Provide bedding as shown on plans or specified in utility sections.

H. BACKFILL FOR STRUCTURES

1. Backfill after poured-in-place concrete or masonry has cured for 48 hours.
2. Backfill with material removed from excavation except where sand or granular backfill is specified. Use no debris, frozen earth, large clods, stones or other unsuitable material.
3. Backfill simultaneously on all sides of structure. Save structure from damage at all times.
4. Compact backfill at structures to density not less than specified for adjacent trench.

I. INITIAL PIPE BACKFILL

1. Place specified initial backfill after pipe has been placed, checked for grade and alignment and pipe bedding is fully supporting pipe.
2. Place initial backfill in maximum 8" lifts. Spread backfill uniformly and hand compact to 12" above pipe as specified.

J. TRENCH BACKFILL

1. Backfill with material removed from excavation except where sand or granular backfill is specified. Use no debris, frozen earth, large clods, stones or other unsuitable material.
2. Place backfill into the trench at an angle so that impact on installed pipe is minimized.
3. Install cushion of 4 feet of backfill above pipe envelope before using heavy compacting equipment.

- a. Trenches where "granular" is shown on plans.

1. Backfill with pit run up to bottom of specified surface restoration.

TRENCHING, BACKFILLING & COMPACTING

SECTION 320

2. Compact to 95% minimum standard proctor density under and within six feet of pavement; 90% minimum density in other areas.
 3. Hydraulic compaction permitted only upon approval by Engineer.
 4. Top 12 inches of backfill shall match soil equivalent to adjacent excavation.
 5. Refer to Paving Section for subbase requirements beneath pavements.
- b. Trenches where "Compacted Backfill" is shown on plans:
1. Backfill with suitable excavated material up to bottom of specified surface restoration.
 2. Dry or moisten if required; compact to 95% minimum standard proctor density under and within two feet of pavement; 90% minimum density in other areas. Engineer will conduct soil compaction tests as needed. Contractor shall rework all areas not meeting compaction specification.
 3. Top 12 inches of backfill shall match soil equivalent to adjacent excavation.
 4. Refer to paving section for subbase requirement beneath pavements.
 5. Maximum lift of compacted backfill shall be 12".
- c. "Ordinary Backfill":
1. Use unless otherwise shown on plans.
 2. Backfill trench with excavated material and compact to same density as adjoining soils.
 3. Top 12 inches of backfill equivalent to adjacent topsoil.
 4. Mound up or level off to original surface as directed by Engineer.
- d. Where select earth backfill is required to replace unsuitable excavated material, Extra Work provisions shall apply.
3. If settlement above compacted or sand backfill occurs within period of guarantee and bond, refill, compact, level off and resurface.
 4. If new pipe is installed below existing utilities (i.e. water, sewer, gas, electric, etc.) then Contractor shall backfill beneath utility to satisfaction of utility owner.

END OF SECTION

UTILITY CONFLICT REPAIRS

SECTION 330

I. GENERAL

A. SCOPE

1. This section covers the requirements for materials to furnish and install all pipe, fittings, structures and accessories required for moving existing utility mains and services out of the way of new storm, sanitary sewer, water main or other construction to be installed as specified or shown on the plans.
2. Before installation of new facilities, verify sizes, measurements, type and location of existing piping and appurtenances at points of connection to existing system.
3. Make necessary field measurements to determine piping laying lengths; work pipe into place without forcing or springing.
4. Do work in accordance with best present-day installation and construction practices.

II. PRODUCTS

A. MATERIALS

1. Ductile Iron Pipe (water main):
 - a. AWWA C151, Class 52, unless specified otherwise
2. PVC C900 or C909 (water main or sanitary sewer main)
3. PVC SCH40 (sanitary sewer service lines):
 - a. ASTM D2665
 - b. Joints and Fittings, solvent weld
4. Copper Pipe (water service lines): ASTM B88, Type K, annealed
5. Fittings: AWWA C153 compact, restrained, mechanical joint for water main.
6. Repair Sleeves: Clow Band-Seal or approved equal meeting ASTM C-594
7. Coupling: "Dresser" style coupling with gaskets to suit pipe encountered.
8. Concrete: Class B Mix or solid concrete block as directed by the Engineer.
9. Field Tile:
 1. PVC Plastic, ASTM C900, Class 150. Use Fernco rubber adapters as necessary.
 2. HDPE, Heavy Duty, perforated with connecting bands.

III. EXECUTION

A. PIPE INSTALLATION

UTILITY CONFLICT REPAIRS

SECTION 330

1. Ductile Iron Pipe: AWWA C600
2. PVC C900 or C909: ASTM D2321
3. PVC SCH 40 Pipe: ASTM D2774
4. Minimum depth to top of water line pipe: 6.0 feet or as directed by the Engineer.
5. The width of the trench shall be ample to permit the pipe to be laid and joined properly but should be no more than 12 inches on either side of the pipe.
6. Lay pipe in the dry and thoroughly compacted backfill.
7. Clean pipe interior of foreign material before lowering into trench; keep clean at all times by securely closing open ends of pipe and fittings with watertight plug to prevent ingress of foreign material at all times when pipe jointing operation is not in progress. If water is in the trench, the seal shall remain in place until the trench is pumped dry.
8. Place in trench in sound, undamaged conditions. Do not injure pipe coating or lining. Do not use end hooks to install or move pipe.
9. Cut pipe in neat and workmanlike manner without damage to pipe; mechanical pipe cutters subject to approval of Engineer; bevel cut ends of push-on type pipe.
10. Before installation, visually inspect for cracks or defects; damaged or unsound pipe will be rejected.
11. Deflect pipe joints, as shown on plans, in accordance with pipe manufacturer's recommendations.
12. Plug or cap and block all pipe ends or fittings left for future connections.
13. Uncover existing mains a sufficient time ahead of pipe laying operations to determine fittings required to make connections; make connections between existing and new water mains with specials and fittings as required.

B. WATER MAIN AND SERVICE LOWERING OR RAISING WITH ELBOWS OR PIPE EXTENSIONS

1. Locate valves and shut off line.
2. Cut and install necessary elbows, pipe restrained fitting and thrust blocks.
3. Provide a minimum of two inch clearance between water line and storm sewers.
4. Refer to water main or sanitary sewer specifications for clearances.
5. Maintain uniform, thoroughly compacted trench bottom to support piping.
6. Secure pipe and return pressure to the line and inspect all joints for leaks before completion of backfilling and compaction.
7. Backfill with granular material if directed by the Engineer.
8. Use 45° elbows on mains 4" and larger.

UTILITY CONFLICT REPAIRS

SECTION 330

C. SEWER SERVICE LINE RECONSTRUCTION

1. Where sewer service lines cannot be supported across the proposed storm sewer trench, the lines may be temporarily removed and reconstructed. Keep length to be replaced to a minimum.
2. Prevent service lines from being plugged during construction.
3. Backfill and compact sewer trench to maximum density under all sewer services. Use granular material if directed by the Engineer.
4. Cut pipe and place watertight repair sleeve on firm, undisturbed soil. Contractor may use PVC or DIP across sewer trench.
5. Backfill and compact granular material around sewer repair to 24" above pipe with hand tamper.
6. Complete backfilling and compaction as directed by the Engineer.
7. Reference sewer repair location and depth for future location.

END OF SECTION

STORM SEWERS AND CULVERTS

SECTION 600

I. GENERAL

A. SCOPE

1. This section covers the materials to furnish and install all pipes, fittings, and accessories required for storm sewer and culvert construction as shown on plans and/or specified herein.
2. Before installation of new storm sewer facilities, verify sizes, measurements, type and location of existing piping and appurtenances at points of connection to existing system.
3. Do work in accordance with best present-day installation and construction practices.

B. WORK BY OTHERS

1. Engineer will stake storm sewer construction for line and grade. Contractor shall coordinate with Engineer for staking preferences.

II. PRODUCTS

A. MATERIALS

1. Storm Sewer Pipe: Reinforced concrete pipe (RCP), tongue and groove meeting ASTM C76, Class 2000D, IDOT Sec. 4145. Pipe shall be manufactured by an NDOR Certified Facility.
2. Joint Sealer: NDOR SSHC Section 612. Seal all joints of pipe under roads, drives and parking areas.
3. Joint Connections: NDOR SSHC Section 612
4. Storm Sewer Pipe: High Density Polyethylene (where shown on plans) HDPE, dual wall, smooth interior with push on bell and spigot gasketed ends. As manufactured by Hancor, Prinsco or equal.
5. Culverts:
 - a. R.C.P. as specified for storm sewer pipe above.
 - b. HDPE as specified for storm sewer pipe above.
 - c. Corrugated Metal Pipe (CMP):
 - a. Pipe: ASTM A444, 2 2/3" x 1/2" 16 gauge for 24" diameter pipe and small, and 14 gauge for all pipe larger than 30 inch diameter.
 - b. Seams: Riveted (rivets ASTM A31) or Welded (AASHTO M-16)
 - c. Connecting Bands: 12" wide, ASTM A307, Grade A
7. Trench Stabilization Material: 2" coarse, sharp and clean crushed stone or other material as approved.
8. Pipe Bedding: Class "C" Gravel.
9. Granular Pipe Backfill: IDOT Sec. 4133, Class "C" Gravel or pit run sand as approved by

STORM SEWERS AND CULVERTS

SECTION 600

Engineer.

10. Engineering Fabric: Meeting NDOR SSHC Section 811, manufactured by Trevira or equal.
11. Rip Rap: See Section.

III. EXECUTION

A. INSTALLATION

1. Follow NDOR SSHC Section 720 for installation of reinforced concrete pipe (R.C.P.)
2. Subgrade shall be firm so that the pipe rests and bears uniformly along its length. If unsuitable subgrade conditions are encountered, Engineer may authorize use of trench stabilization material.
3. Place each pipe to line and grade with closed joints.
4. Apply joint sealer to all R.C.P. pipe under roadway, drives and parking areas and where shown on plans.
5. Tie pipe sections and aprons as shown or specified.
6. All R.C.P. interior pipe joints with an installed gap greater than one and one-half inches (1½") shall be hand-grouted from the inside being non-shrink grout or covered on the outside with a 12" wide strip of engineering fabric over the joint.

B. TRENCH WIDTH

1. Keep width of trench as narrow as possible. The maximum trench widths for the various pipes from 12" above the top of the pipe to the bottom of the trench shall be as follows:

<u>Pipe Size</u>	<u>Maximum Trench Width</u>
12"	18"
15"	24"
18"	30"
24"	42"
36"	54"

2. There shall be a minimum of 6" clearance between the trench wall and pipe on pipe larger than 30" diameter.

C. BEDDING AND BACKFILL (Refer to Standard Detail drawing)

END OF SECTION



TABLE OF CONTENTS

- SHEET 1 – COVER PAGE
- SHEET 2 – SITE PLAN
- SHEET 2 – POND STAGE STORAGE TABLE
DIVERSION DETAIL

I certify that this site survey and the design of the Livestock Waste Control Facilities represented on these drawings were made under my direct and consist of 3 sheets.

[Signature]
ENGINEER



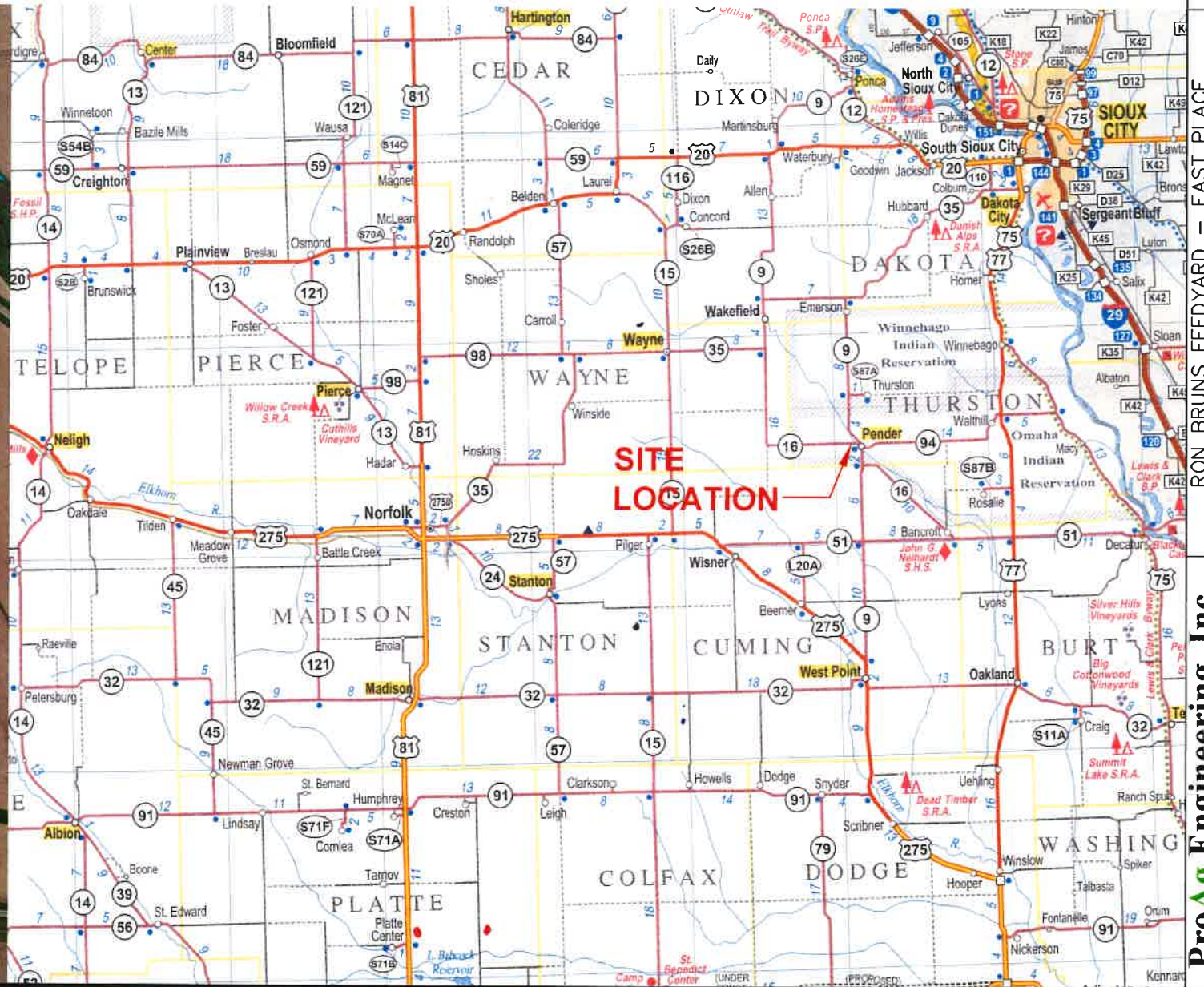
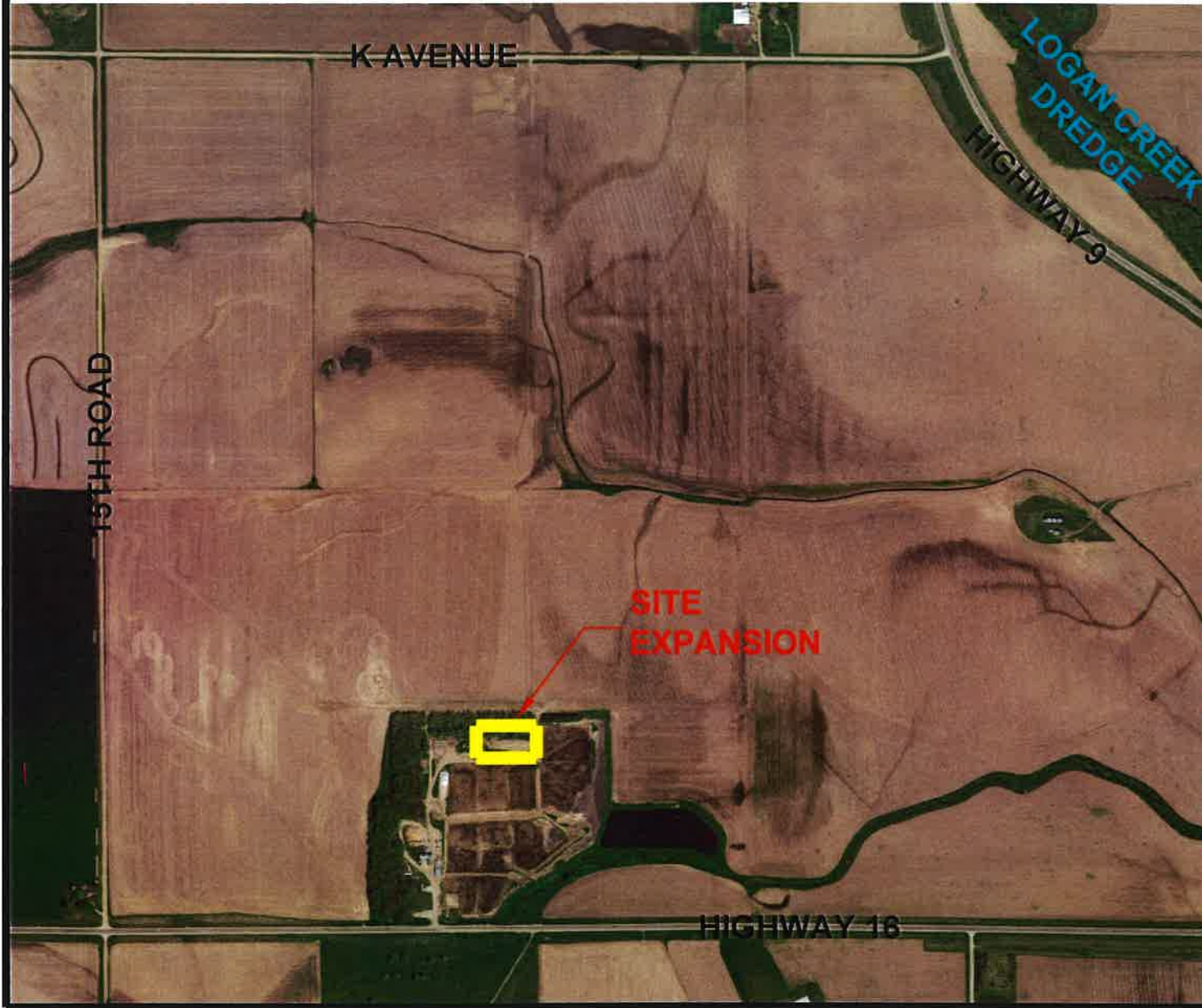
SHEET
1/3

Project No.
21-022

Checked By
J.D.S.

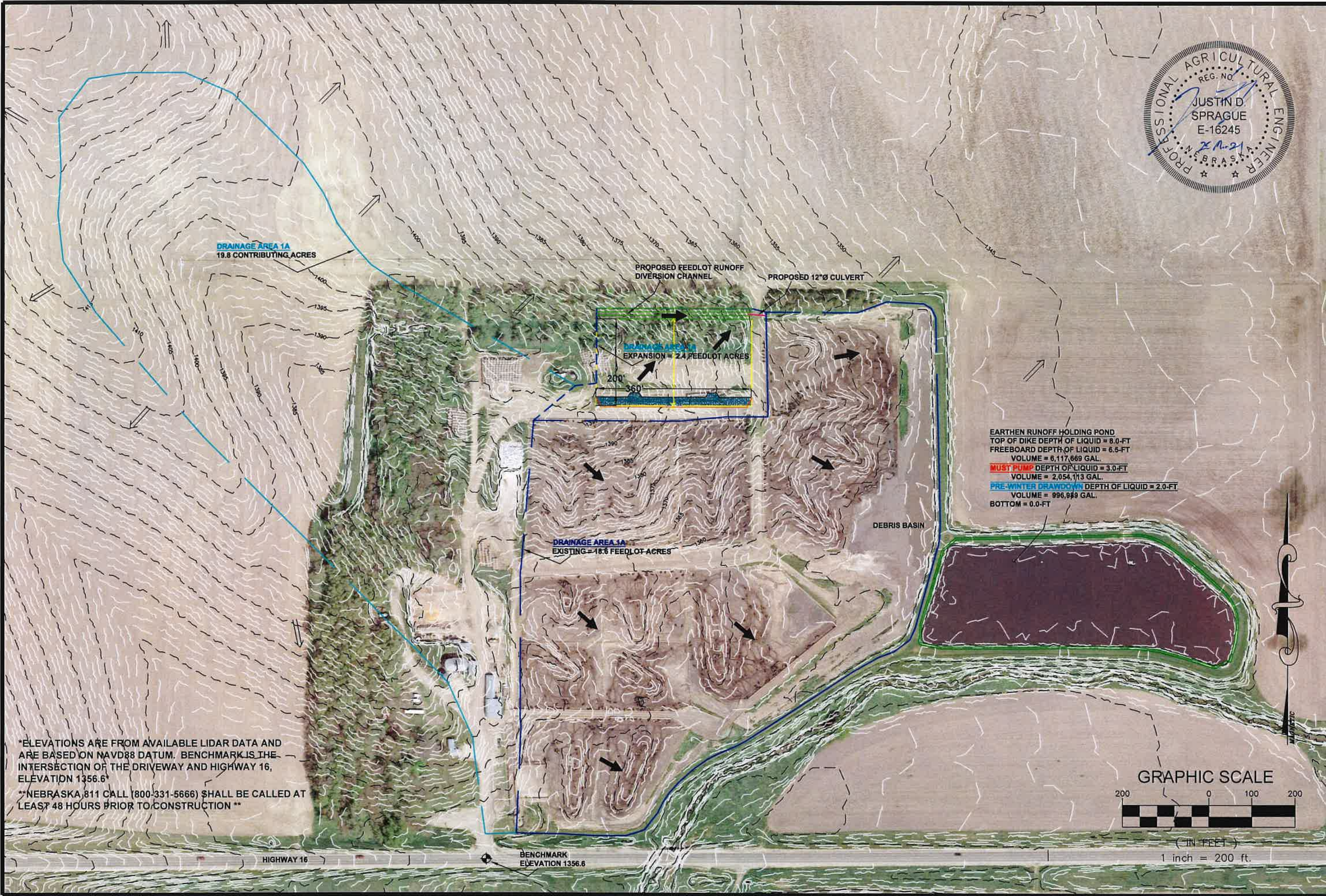
Date
3/25/21

Drawn
T.M.W.



RON BRUNS FEEDYARD – EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
SW 1/4, SECTION 21, T-25-N, R-06-W
THURSTON COUNTY, NEBRASKA

ProAg Engineering, Inc.
77402 U.S. Highway 71, P.O. Box 181
Jackson, MN 56143
(507) 849-7200



SHEET
2/3

Project No.	21-022
Checked By	J.D.S.
Date	3/25/21
Drawn	T.M.W.

RON BRUNS FEEDYARD - EAST PLACE
PROPOSED OPEN FEEDLOT EXPANSION
SW 1/4, SECTION 21, T-25-N, R-06-W
THURSTON COUNTY, NEBRASKA

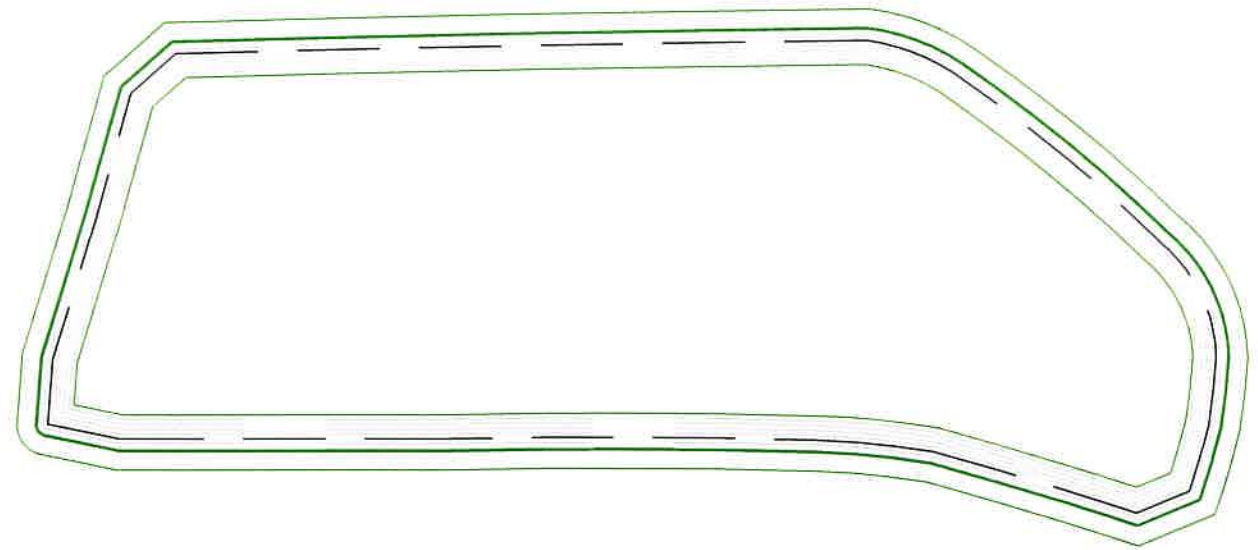
ProAg Engineering, Inc.
77402 U.S. Highway 71, P.O. Box 181
Jackson, MN 56143
(507) 849-7200

ELEVATIONS ARE FROM AVAILABLE LIDAR DATA AND ARE BASED ON NAVD88 DATUM. BENCHMARK IS THE INTERSECTION OF THE DRIVEWAY AND HIGHWAY 16, ELEVATION 1356.6
NEBRASKA 811 CALL (800-331-5666) SHALL BE CALLED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION

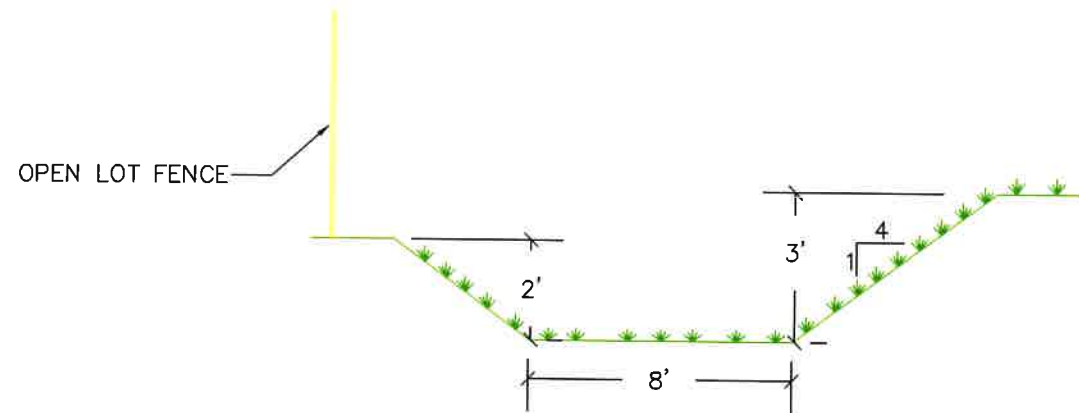


HOLDING POND STAGE STORAGE
 (STAGE STORAGE VOLUMES FROM EXISTING PERMIT)

Depth of Liquid (ft)	Proposed Basin Volume (CF)	Proposed Basin Volume (GAL)	Notes
8.0	1,072,314	8,020,906	TOP OF DIKE
7.5	986,055	7,375,692	
7.0	901,238	6,741,257	
6.5	817,870	6,117,669	FREEBOARD
6.0	735,949	5,504,901	
5.5	655,472	4,902,929	
5.0	576,434	4,311,726	
4.5	498,833	3,731,269	
4.0	422,665	3,161,531	
3.5	347,926	2,602,487	
3.0	274,614	2,054,113	MUST PUMP
2.5	202,751	1,516,580	
2.0	133,287	996,989	PRE-WINTER DRAWDOWN
1.5	74,095	554,229	
1.0	31,797	237,843	
0.5	3,846	28,765	
0.0	0	0	BOTTOM



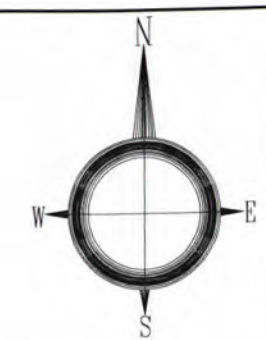
EARTHEN RUNOFF HOLDING POND LAYOUT
 (NOT TO SCALE)



DIVERSION DETAIL
 (NOT TO SCALE)

- NOTES: 1. STRIP TOPSOIL
 2. CONSTRUCT DIVERSION DITCH MINIMUM 2' DEEP.
 3. CONTAINMENT DIKE TO BE MINIMUM 3' ABOVE BOTTOM OF DITCH.
 4. DITCH SLOPED AT 0.5% TO CULVERT (EAST).
 5. REPLACE TOPSOIL
 6. SEED DISTURBED AREAS WITH RURAL SEED MIXTURE
 7. INSTALL SILT FENCE OR BALE CHECKS EVERY 300' IN NEW DITCH

Previously Approved Engineering Documents



SCALE: 1"=200'

11.3 ACRES DIVERTED TO DITCH

DRAINAGE AREA 1A
9.5 CONTRIBUTING ACRES

DRAINAGE AREA 1A
18.7 FEEDLOT ACRES

BASIN 1A

POND 1

12 INCH RISER (ELE. 1304.5)

12 INCH RISER (1269.5)

8 INCH PIPE (1275.0)
LIFT STATION

TOP BERM (1276.5)

BENCH MARK TOP ROW MARKER
NORTH=4004.0, EAST=4802.3, ELE.=1282.6

1600' FROM SECTION CORNER

HWY 1281.0

CL OF ROAD / BRIDGE 1277.3

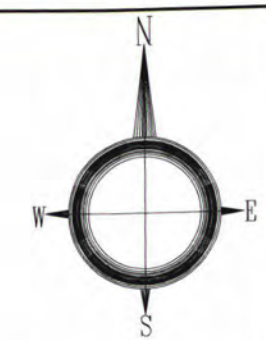
CL OF CREEK 1256.3

6 INCH PIPE (ELE. 1262.0)

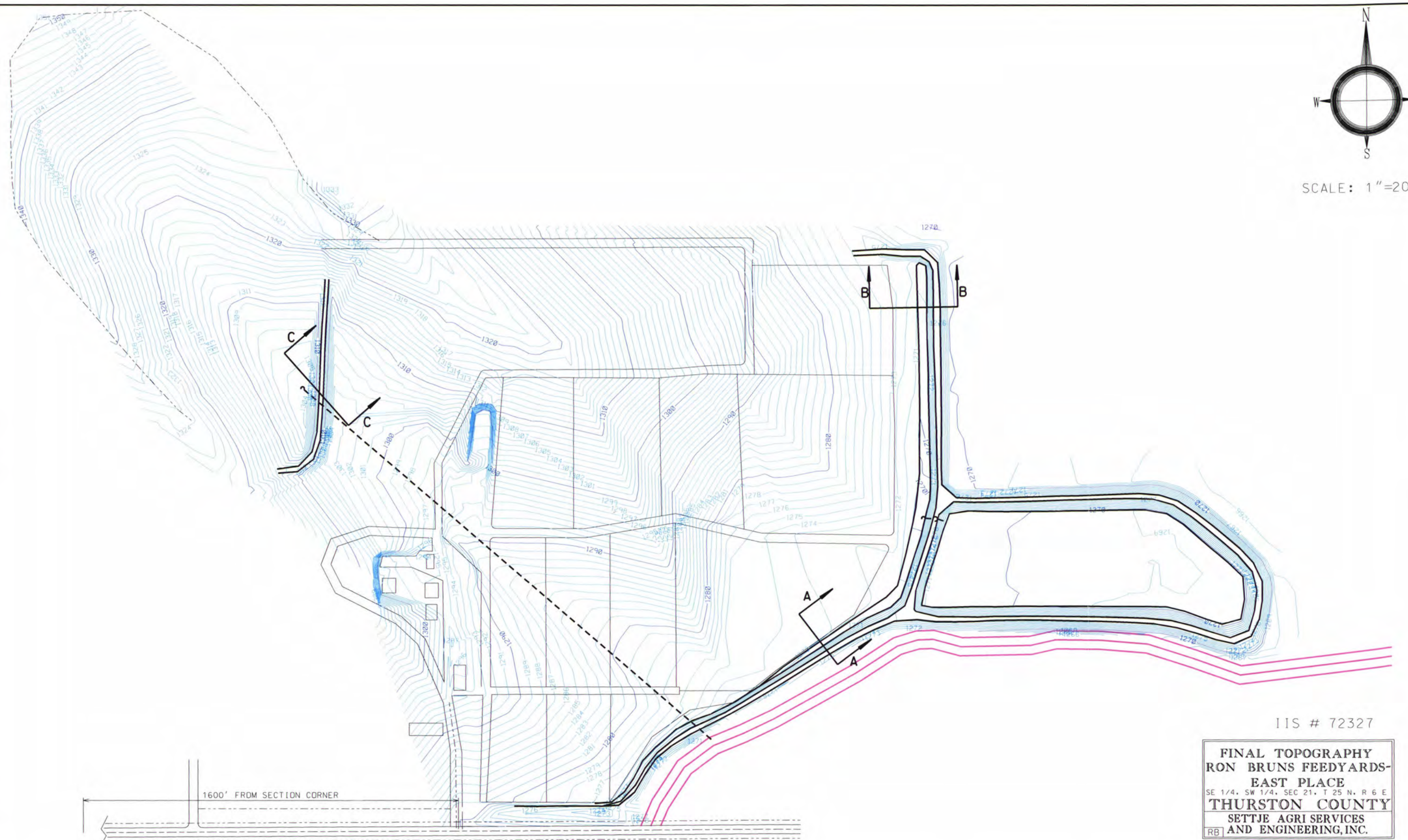
CL OF CREEK 1260.3

IIS # 72327

SITE MAP
RON BRUNS FEEDYARDS-
EAST PLACE
SE 1/4, SW 1/4, SEC 21, T 25 N, R 6 E
THURSTON COUNTY
SETTJE AGRI SERVICES
AND ENGINEERING, INC.



SCALE: 1"=200'



1600' FROM SECTION CORNER

IIS # 72327
FINAL TOPOGRAPHY
RON BRUNS FEEDYARDS-
EAST PLACE
SE 1/4, SW 1/4, SEC 21, T 25 N, R 6 E
THURSTON COUNTY
SETTJE AGRI SERVICES
AND ENGINEERING, INC.
RB

Section II - Waste Production
Drainage Area 1

A. Background Information:

- 1. Type of Construction: Existing Pens and New Holding Pond
- 2. Animal Type: feeder or fat cattle
- 3. Feedlot Capacity: 2,800
- 4. Average Animal Weight 850 pounds
- 5. Type of Feedlot Surface: ... Dirt
- 6. Are overflow waterers used and piped to pond? no

B. Minimum Runoff Storage Requirement:

1. Drainage Area

- (a) Feedlot Area 18.7 acres
- (b) Contributing Drainage Area 9.5 acres
- (c) Total Runoff Area 28.2 acres

2. Runoff

- (d) Minimum Runoff ... (see Appendix, Figure 1) 6.0 inches
- (e) Runoff Volume (see calculations on next page) = 12.2 acre feet
- Volume Needed to Contain Tank Overflow Water 0.0 acre feet
(SEE ATTACHED CALCS.)

3. Solids

- (f) Minimum Solids Accumulation Allowance (a)x(0.5)/12 = 0.0 acre feet

4. Freeboard

- (g) Minimum Freeboard Requirement = 1.5 feet

5. Storage

- (h) Minimum Runoff Storage Requirement ... (e + f + overflow) = 12.2 acre feet

Optional Conversions:

(acre feet) x 43,560 = 531,057 cubic feet (cubic feet) / 27 = 19,669 cubic yards

Section II -Waste Production (continued)
Drainage Area 1

Additional Information Provided by Settje Agri-Services and Engineering

A. Curve Number Calculation

1. Enter Variables

- (a) Precipitation 6 inches
- (b) Curve Number for Feedlot 90
- (c) Curve Number for Contributing Drainage 71
- (d) Soil Type Nora Silt Clay Loam
- (e) Hydrologic Soil Group B

2. Calculate Curve Number

	Curve Number	90	71
Find S $CN=1000/(10+S)$		1.11	4.08
Solve for Runoff $Q=((P-(.2*S))^2)/(P+(.8*S))$		4.85	2.90
Ratio of Contributing Acres to Feedlot Acres		0.60	

- Feedlot Acres 18.7 acres
- Feedlot Runoff 6.0 inches
- Feedlot Runoff Volume 9.4 acre feet

- Contributing Acres 9.5 acres
- Contributing Runoff 3.6 inches
- Contributing Runoff Volume 2.8 acre feet

Total Drainage Area Runoff 12.2 acre feet

B. Tank Overflow Calculations

A 30,000 head feedyard was observed to have the following characteristics

- (a) Time of overflow during the year 4 months
- (b) Overflow Pipe Diameter 4 inch
- (c) Amount of Pipe Used During Overflow Conditions 0.25 full
- (d) Overflow Volume 0.076 cubic feet per sec.

- (e) Volume of Overflow Water Per Head (d) / 30,000 = cubic feet per sec.
- (f) Number of Cattle 0 head
- (g) Volume produced per second (e) * (f) = cubic feet per sec.
- (h) Volume produced per 4 months ((i)*(1/3)) = cubic feet

Optional Conversions:

- (i) Volume produced per year (g) * seconds in a year = cubic feet per year
- (j) Volume produced per 4 months (acre ft.) (h)/43560 = acre feet

No overflow water reaches the holding pond

Section III - Waste Storage
Drainage Area 1

A. Runoff Storage Provided

Capacity Calculation Method Used Method III

Method I - Capacity Calculations for Irregular Shaped Pond $V = D/3 * (A_r + A_s + (A_r * A_s)^{0.5})$

V=Estimated Capacity; A_r=Pond Floor Area; A_s=Pond Surface Area; D=Design Full Depth

1. Holding Pond Dimensions:

Area of Pond Floor (ft ²)	<u>0</u>	Side Slopes	<u>3</u>	:1
Area of Pond Surface (ft ²)	<u>0</u>	End Slopes	<u>3</u>	:1
Design Full Depth (feet)	<u>0.0</u>			
Overflow Depth (feet)	<u>0.0</u>			
Provided Freeboard (feet)	<u>0.0</u>	(Overflow Depth) - (Design Full Depth)		

2. Holding Pond Capacity:

<u>0</u>	Cubic Feet	<u>0.0</u>	Acre Feet	<u>0</u>	Cubic Yards
<u>531,057</u>	Cubic Feet Required (from section II)				
<u>0</u>	% of required capacity				

Method II - Capacity Calculations for Rectangular Shaped Pond

Capacity = Volume Above Rectangular Floor + Volume Above Side Slopes

1. Holding Pond Dimensions:

Bottom Length (feet)	<u>0</u>	Bottom Width (feet)	<u>0</u>	feet
Top Length (feet)	<u>0</u>	Top Width (feet)	<u>0</u>	feet
Design Full Depth (feet)	<u>0.0</u>	End Slopes	<u>3</u>	:1
Overflow Depth (feet)	<u>0.0</u>	Side Slopes	<u>3</u>	:1
Provided Freeboard (feet)	<u>0.0</u>	(Overflow Depth) - (Design Full Depth)		

2. Holding Pond Capacity:

<u>0</u>	Cubic Feet	<u>0.0</u>	Acre Feet	<u>0</u>	Cubic Yards
<u>531,057</u>	Cubic Feet Required (from section II)				
<u>0</u>	% of required capacity				

Method III - Capacity Calculated Using Digital Terrain Modeling

1. Holding Pond Dimensions:

Design Full Depth (feet)	<u>6.5</u>
Overflow Depth (feet)	<u>8.0</u>
Provided Freeboard (feet)	<u>1.5</u> (Overflow Depth) - (Design Full Depth)

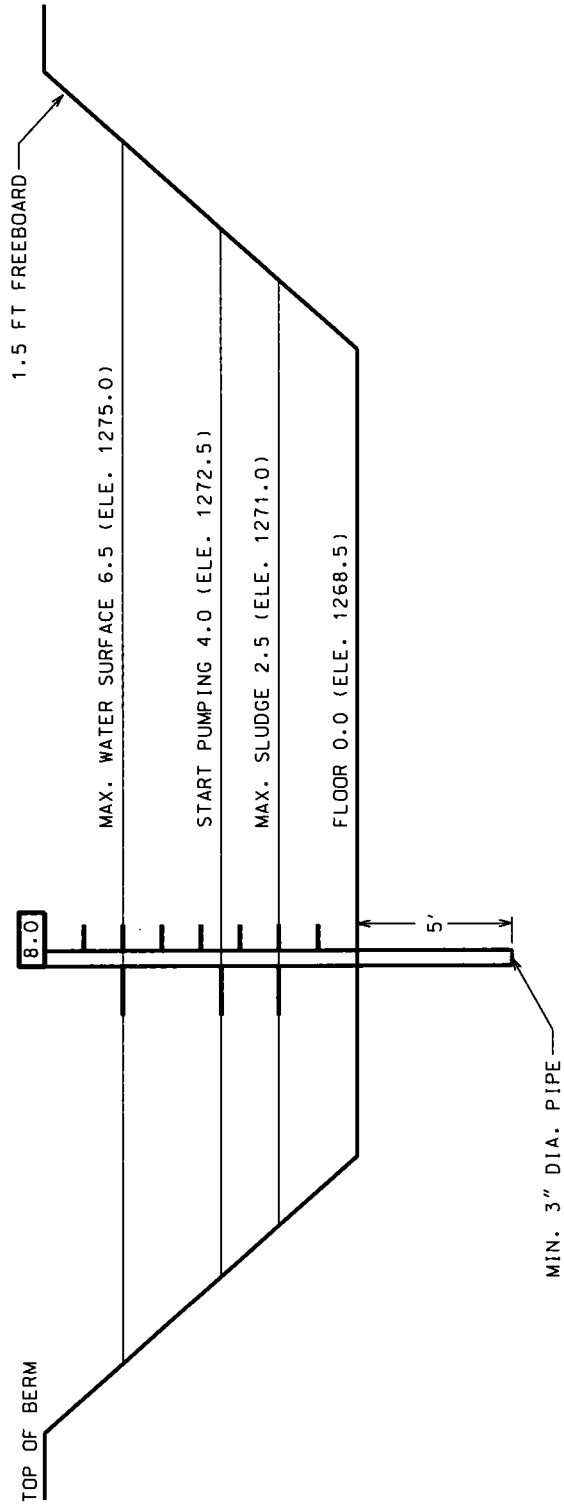
2. Holding Pond Capacity:

<u>817,870</u>	Cubic Feet	<u>18.8</u>	Acre Feet	<u>30,291</u>	Cubic Yards
<u>531,057</u>	Cubic Feet Required (from section II)				
<u>154</u>	% of required capacity				

B. Provide Liner or Sealing Information

- | | |
|--|--|
| 1. Soil Type or Unified Soil Classification at Bottom of Excavation: | <u>Kennebec Silt Loam</u> |
| 2. Soil Type or Unified Soil Classification of Soil Liner (if used): | <u>Kennebec Silt Loam</u> |
| 3. Depth to Water Table from the BOTTOM of the Excavation: | <u>35'</u> |
| 4. Describe in detail the Type of Sealing Provided: | <u>See Construction Specifications</u> |

3-5



STAFF GAUGE
RON BRUNS FEEDYARDS-
EAST PLACE
 SE 1/4, SW 1/4, SEC 21, T 25 N, R 6 E
THURSTON COUNTY
SETTJE AGRI SERVICES
AND ENGINEERING, INC.

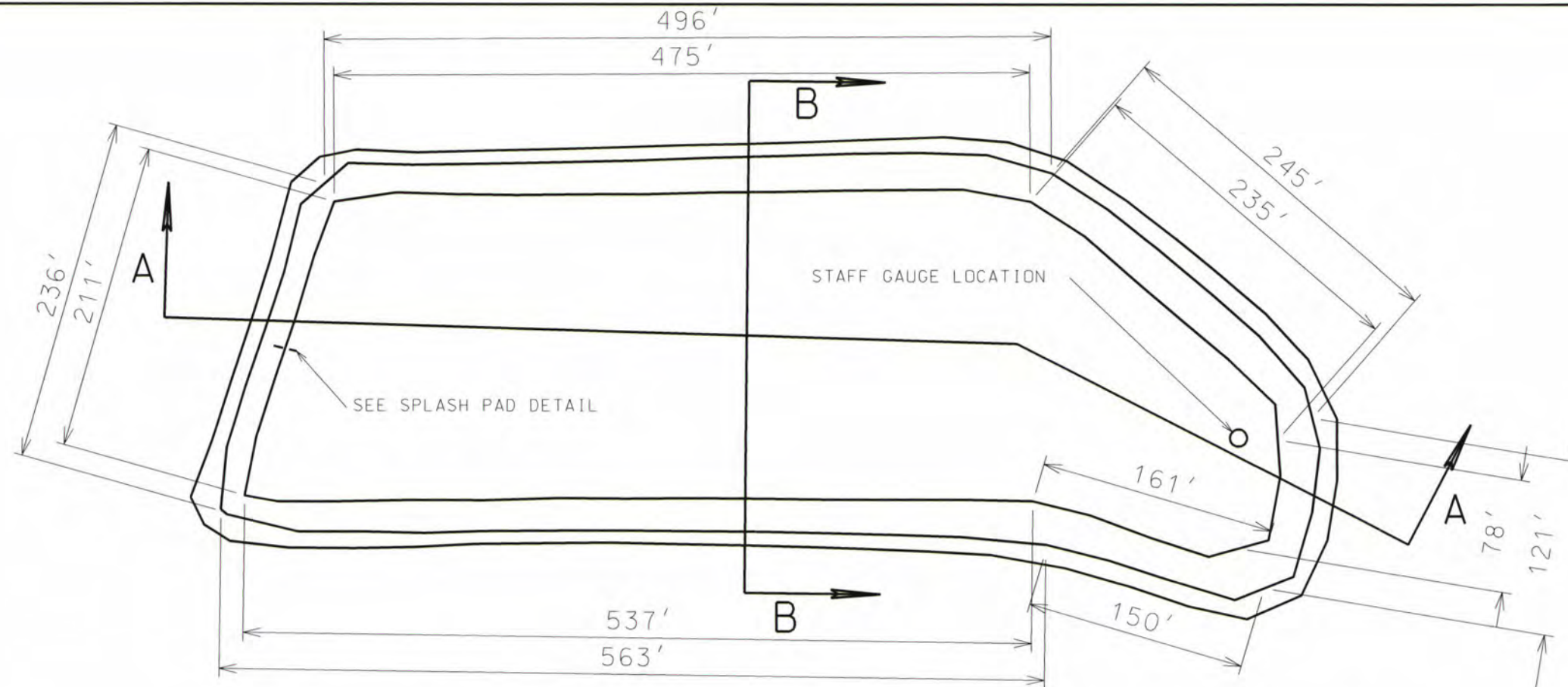
Stage Storage Data
Ron Bruns Feedyard, East Place - Pond #1

Feedlot Area (Acres)	<u>18.7</u>	Head count in drainage area	<u>2,800</u>
Feedlot Curve Number	<u>90</u>	Design Full Depth (feet)	<u>6.5</u>
Contributing Drainage Area (Acres)	<u>9.5</u>	25-Year 24-Hour Storm (in)	<u>5</u>
Contributing Area Curve Number	<u>74</u>	Runoff for 25-Year Storm + June	<u>6</u>
Total Runoff Area (Acres)	<u>28.2</u>	25 Year Storm Runoff Volume (ft ³)	<u>351,069</u>
Eff. Runoff Area At Feedlot CN	<u>24.9</u>	25 Yr Storm Vol.+ June + tanks (ft ³)	<u>543,274</u>
Do tanks overflow to pond	<u>No</u>	Total Pond Capacity (ft ³)	<u>817,870</u>

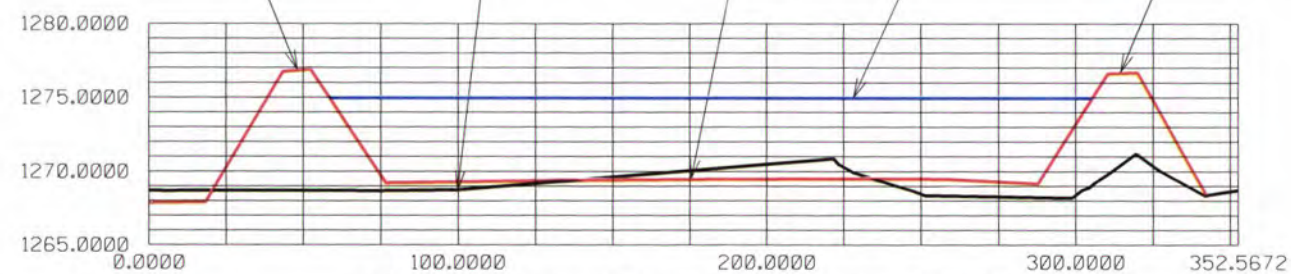
	Depth		Volume		
	From Bottom	Cubic ft.	Acre ft.	Acre in.	Gallons
	8	1,072,314	24.6	295.4	8,020,906
	7.5	986,055	22.6	271.6	7,375,692
	7	901,238	20.7	248.3	6,741,257
Max Water Surface	6.5	817,870	18.8	225.3	6,117,669
	6	735,949	16.9	202.7	5,504,901
	5.5	655,472	15.0	180.6	4,902,929
	5	576,434	13.2	158.8	4,311,726
	4.5	498,833	11.5	137.4	3,731,269
Start Pumping	4	422,665	9.7	116.4	3,161,531
	3.5	347,926	8.0	95.8	2,602,487
	3	274,614	6.3	75.7	2,054,113
Sludge	2.5	202,751	4.7	55.9	1,516,580
	2	133,287	3.1	36.7	996,989
	1.5	74,095	1.7	20.4	554,229
	1	31,797	0.7	8.8	237,843
	0.5	3,846	0.1	1.1	28,765
	0	0	0.0	0.0	0



SCALE: 1"=100'

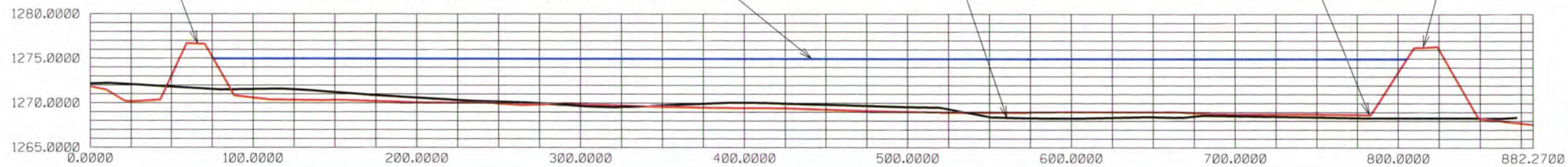


TOP BERM (ELE. 1276.5) ORIGINAL GRADE MAX. WATER SURFACE (ELE. 1275.0) FLOOR TOP BERM (ELE. 1276.5)



CROSS SECTION B-B

TOP BERM (ELE. 1276.5) MAX. WATER SURFACE (ELE. 1275.0) ORIGINAL GRADE FLOOR (ELE. 1268.5) TOP BERM (ELE. 1276.5)



CROSS SECTION A-A

POND #1
RON BRUNS FEEDYARDS-
EAST PLACE
 SE 1/4, SW 1/4, SEC 21, T 25 N, R 6 E
THURSTON COUNTY
 SETTJE AGRI SERVICES
 AND ENGINEERING, INC.

Section III - Waste Storage (continued)
Drainage Area 1

A. Debris Basin Sizing

BASIN 1A

1. Required Capacity:

Feedlot Area (Acres)	<u>18.7</u>	25 Year-24 Hour Design Storm (in)	<u>5</u>
Contributing Drainage Area (Acres)	<u>9.5</u>	Minimum Solids Storage (acre-in)	<u>9.4</u>
Feedlot Curve Number	<u>90</u>	Feedlot Runoff (in)	<u>3.9</u>
Contributing Area Curve Number	<u>71</u>	Contributing Area Runoff (in)	<u>2.1</u>
Total Runoff Area (Acres)	<u>28.2</u>	Full Detention Capacity	<u>101.9</u> acre inches
			<u>8.5</u> acre feet
			<u>370,056</u> cubic feet

Capacity Calculation Method Used Method II

Method I - Capacity Calculations for Rectangular Shaped Basin (See Attached Calculations)

2. Debris Basin Dimensions:

Total Water Depth	<u>0</u>	feet
Bottom Length	<u>0</u>	feet
Maximum Detention Depth	<u>0</u>	feet
Basin Channel Grade	<u>0.00</u>	%
Bottom Width	<u>0</u>	feet

	<u>North Side</u>		<u>South Side</u>
Depth Before Add. Storage (feet)	<u>0</u>	Depth Before Add. Storage (feet)	<u>0</u>
Lot Slope	<u>0</u> %	Lot Slope	<u>0</u> %
Side Slopes	<u>0</u> :1	Side Slopes	<u>0</u> :1

3. Debris Basin Capacity:	<u>0.0</u> acre inches
	<u>0.0</u> acre feet
	<u>0</u> cubic feet= <u>0</u> % Full Detention

Method II - Capacity Calculated Using Digital Terrain Modeling

2. Debris Basin Dimensions:

Maximum Detention Depth	<u>5.5</u>	feet
Max. Water Elevation (at capacity below)	<u>1275</u>	feet

3. Debris Basin Capacity	<u>123.5</u> acre inches
	<u>10.3</u> acre feet
	<u>448,433</u> cubic feet= <u>121</u> % Full Detention

B. Riser Information

Aperture Type (Circular or Slotted)	<u>Circular</u>
Aperture Size	<u>1.5-Inch-Diameter</u> (See attached calculations)
Aperture Vertical Spacing (inches)	<u>4.0</u> (See attached calculations)
Aperture Horizontal Spacing (inches)	<u>5.4</u> (See attached calculations)
Riser Diameter (inches)	<u>12</u> (See attached calculations)
Riser Height (feet)	<u>5.5</u>
Discharge Pipe Diameter (inches)	<u>8</u>
Outflow Location	<u>POND 1</u>
Is a Pump Used?	<u>yes</u>
Is an Orifice Plate Used?	<u>No</u>
Flowrate (cfs)	<u>1.45</u>

BASIN 1A IS PUMPED TO POND 1 AT 1.45 CFS

BASIN FLOW CALCULATIONS

BASIN 1A

Required Basin Vol. (ft ³)	<u>370,056</u>	Limiting Device	<u>pump</u>
In-Flow Volume (ft ³)	<u>0</u>	Limiting Flowrate (cfs)	<u>1.45</u>
Maximum Head (feet)	<u>5.5</u>	In-Flow (cfs)	<u>0</u>
Pump Capacity (gpm)	<u>650</u>	Release Time (hours)	<u>71</u>
Pump Capacity (cfs)	<u>1.45</u>		

DISCHARGE PIPE FLOW CALCULATIONS $Q=VA$; $V=(2g\Delta Z/(1+fL/D+\Sigma K_L))^{1/2}$

Q=flowrate; A=inside pipe area; V=velocity in pipe; g=acceleration of gravity; ΔZ =total head; f=friction losses due to pipe roughness; L=pipe length; D=inside pipe diameter; ΣK_L =total minor losses from entrances, exits, valves, etc.

L, Pipe Length (ft)	<u>40</u>	Pipe Material	<u>PVC</u>
D, Inside Pipe Diameter (in)	<u>8</u>	ϵ , Roughness	<u>0.0E+00</u>
Inside Pipe Area (in ²)	<u>50.3</u>	Re, Reynold's Number	<u>5.50E+05</u>
ΔZ , Average Head (ft)	<u>4</u>	Turbulent/Laminar?	<u>Turbulent</u>
ΣK_L , Total Minor Losses	<u>0.8</u>	V, Avg. Velocity (ft/s)	<u>9.99</u>
Seed Friction Factor	<u>0.013</u>	Q, Avg. Flowrate (cfs)	<u>3.49</u>
f, Friction Factor (calculated)	<u>0.013</u>	Q, Avg. Flowrate (gpm)	<u>1565</u>

RISER CALCULATIONS-CIRCULAR HOLES $Q=C_dA(2gH)^{0.5}$

Q=Flowrate; C_d =Discharge Coefficient (0.61); A=Orifice Area; H=head

Riser Diameter (inches)	<u>12</u>	Hole Diameter (inches)	<u>1.5</u>
Riser Circumference (inches)	<u>37.7</u>	Portion of H Used	<u>1/2</u>
Vertical Hole Spacing (inches)	<u>4</u>	0.5H (feet)	<u>2.75</u>
Horizontal Hole Spacing (inches)	<u>5.39</u>	Flowrate at 0.5H (cfs)	<u>4.22</u>

Center of hole from bottom (feet)	Head on orifice (feet)	Number of orifices in row	Flow Through Orifice (cfs)	Flow Through Row (cfs)	Cumulative Flow (cfs)
0.0	2.7	7	0.100	0.699	0.699
0.3	2.4	7	0.094	0.656	1.355
0.7	2.1	7	0.087	0.609	1.964
1.0	1.7	7	0.080	0.558	2.522
1.3	1.4	7	0.072	0.502	3.024
1.7	1.1	7	0.063	0.439	3.463
2.0	0.7	7	0.052	0.365	3.828
2.3	0.4	7	0.039	0.272	4.101
2.7	0.1	7	0.017	0.122	4.222

**Section III - Waste Storage (continued)
Drainage Area 1**

A. Debris Basin Sizing

DIVERTED ACRES

1. Required Capacity:

Feedlot Area (Acres)	<u>0</u>	25 Year-24 Hour Design Storm (in)	<u>5</u>	
Contributing Drainage Area (Acres)	<u>11.3</u>	Minimum Solids Storage (acre-in)	<u>0.0</u>	
Feedlot Curve Number	<u>90</u>	Feedlot Runoff (in)	<u>3.9</u>	
Contributing Area Curve Number	<u>84</u>	Contributing Area Runoff (in)	<u>3.3</u>	
Total Runoff Area (Acres)	<u>11.3</u>	Full Detention Capacity	<u>37.0</u>	acre inches
			<u>3.1</u>	acre feet
			<u>134,149</u>	cubic feet

Capacity Calculation Method Used Method II

Method I - Capacity Calculations for Rectangular Shaped Basin (See Attached Calculations)

2. Debris Basin Dimensions:

Total Water Depth	<u>0</u>	feet
Bottom Length	<u>0</u>	feet
Maximum Detention Depth	<u>0</u>	feet
Basin Channel Grade	<u>0.00</u>	%
Bottom Width	<u>0</u>	feet

	<u>North Side</u>		<u>South Side</u>
Depth Before Add. Storage (feet)	<u>0</u>	Depth Before Add. Storage (feet)	<u>0</u>
Lot Slope	<u>0</u> %	Lot Slope	<u>0</u> %
Side Slopes	<u>0</u> :1	Side Slopes	<u>0</u> :1

3. Debris Basin Capacity:

	<u>0.0</u>	acre inches	
	<u>0.0</u>	acre feet	
	<u>0</u>	cubic feet=	<u>0</u> % Full Detention

Method II - Capacity Calculated Using Digital Terrain Modeling

2. Debris Basin Dimensions:

Maximum Detention Depth	<u>7.5</u>	feet
Max. Water Elevation (at capacity below)	<u>1312</u>	feet

3. Debris Basin Capacity

	<u>68.4</u>	acre inches	
	<u>5.7</u>	acre feet	
	<u>248,342</u>	cubic feet=	<u>185</u> % Full Detention

B. Riser Information

Aperture Type (Circular or Slotted)	<u>Circular</u>	
Aperture Size	<u>1.5-Inch-Diameter</u>	(See attached calculations)
Aperture Vertical Spacing (inches)	<u>4.0</u>	(See attached calculations)
Aperture Horizontal Spacing (inches)	<u>6.3</u>	(See attached calculations)
Riser Diameter (inches)	<u>12</u>	(See attached calculations)
Riser Height (feet)	<u>7</u>	
Discharge Pipe Diameter (inches)	<u>6</u>	Is a Pump Used? <u>no</u>
Outflow Location	<u>DITCH</u>	Is an Orifice Plate Used? <u>No</u>
		Flowrate (cfs) <u>1.81</u>

DIVERTED ACRES FLOWS BY GRAVITY TO DITCH AT 1.81 CFS

BASIN FLOW CALCULATIONS

DIVERTED ACRES

Required Basin Vol. (ft ³)	<u>134,149</u>	Limiting Device	<u>PIPE</u>
In-Flow Volume (ft ³)	<u>0</u>	Limiting Flowrate (cfs)	<u>1.81</u>
Maximum Head (feet)	<u>7.5</u>	In-Flow (cfs)	<u>0</u>
Pump Capacity (gpm)	<u>0</u>	Release Time (hours)	<u>21</u>
Pump Capacity (cfs)	<u>0.00</u>		

DISCHARGE PIPE FLOW CALCULATIONS $Q=VA$; $V=(2g\Delta Z/(1+fL/D+\Sigma K_L))^{1/2}$

Q=flowrate; A=inside pipe area; V=velocity in pipe; g=acceleration of gravity; ΔZ =total head; f=friction losses due to pipe roughness; L=pipe length; D=inside pipe diameter; ΣK_L =total minor losses from entrances, exits, valves, etc.

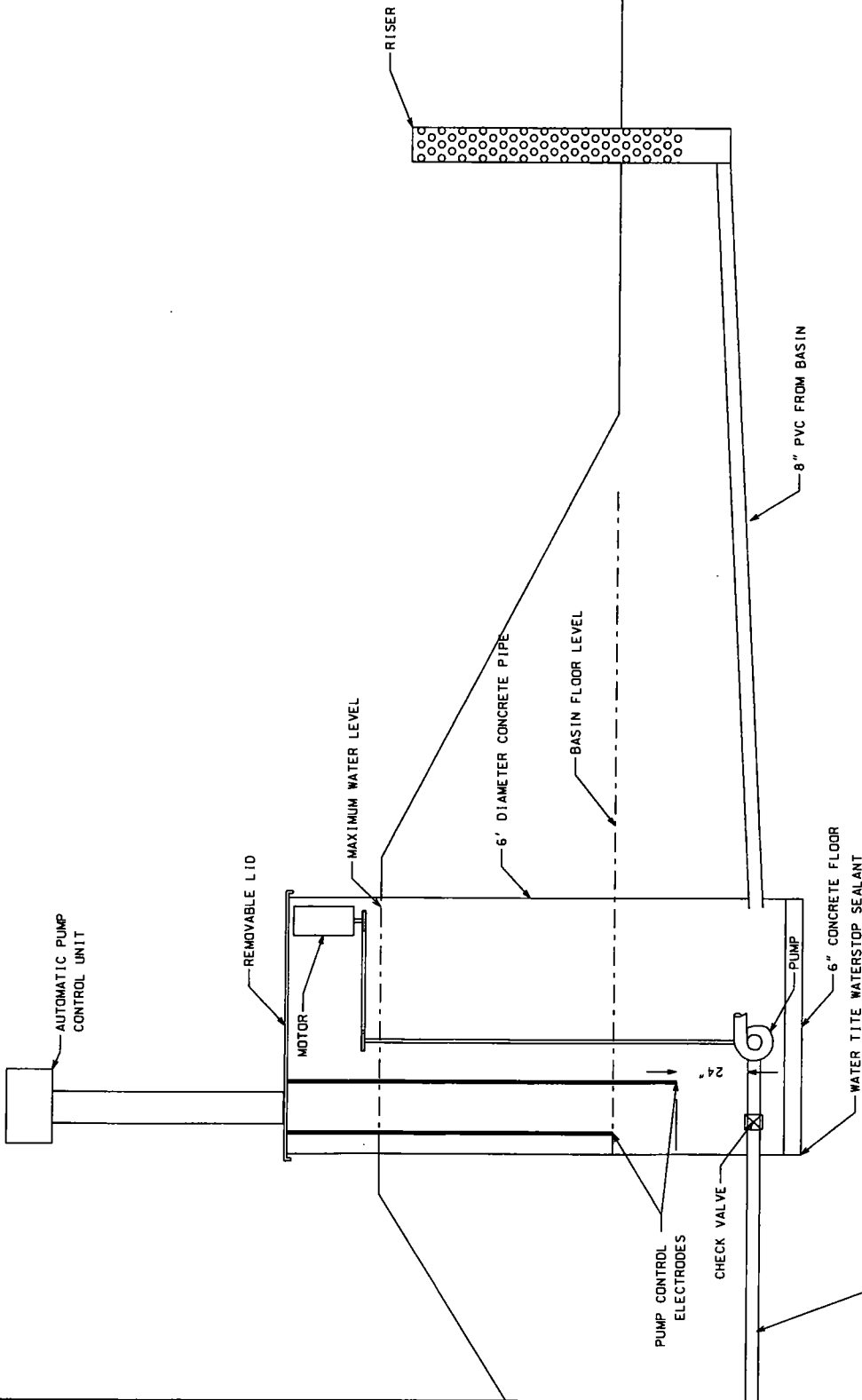
L, Pipe Length (ft)	<u>1185</u>	Pipe Material	<u>PVC</u>
D, Inside Pipe Diameter (in)	<u>6</u>	ϵ , Roughness	<u>0.0E+00</u>
Inside Pipe Area (in ²)	<u>28.3</u>	Re, Reynold's Number	<u>3.81E+05</u>
ΔZ , Average Head (ft)	<u>46.25</u>	Turbulent/Laminar?	<u>Turbulent</u>
ΣK_L , Total Minor Losses	<u>0.8</u>	V, Avg. Velocity (ft/s)	<u>9.22</u>
Seed Friction Factor	<u>0.014</u>	Q, Avg. Flowrate (cfs)	<u>1.81</u>
f, Friction Factor (calculated)	<u>0.014</u>	Q, Avg. Flowrate (gpm)	<u>813</u>

RISER CALCULATIONS-CIRCULAR HOLES $Q=C_dA(2gH)^{0.5}$

Q=Flowrate; C_d =Discharge Coefficient (0.61); A=Orifice Area; H=head

Riser Diameter (inches)	<u>12</u>	Hole Diameter (inches)	<u>1.5</u>
Riser Circumference (inches)	<u>37.7</u>	Portion of H Used	<u>1/2</u>
Vertical Hole Spacing (inches)	<u>4</u>	0.5H (feet)	<u>3.75</u>
Horizontal Hole Spacing (inches)	<u>6.28</u>	Flowrate at 0.5H (cfs)	<u>5.62</u>

Center of hole from bottom (feet)	Head on orifice (feet)	Number of orifices in row	Flow Through Orifice (cfs)	Flow Through Row (cfs)	Cumulative Flow (cfs)
0.0	3.7	6	0.117	0.700	0.700
0.3	3.4	6	0.111	0.668	1.368
0.7	3.1	6	0.106	0.635	2.003
1.0	2.7	6	0.100	0.600	2.603
1.3	2.4	6	0.094	0.562	3.165
1.7	2.1	6	0.087	0.522	3.687
2.0	1.7	6	0.080	0.478	4.165
2.3	1.4	6	0.072	0.430	4.595
2.7	1.1	6	0.063	0.376	4.972
3.0	0.7	6	0.052	0.313	5.285
3.3	0.4	6	0.039	0.233	5.518
3.7	0.1	6	0.017	0.104	5.622

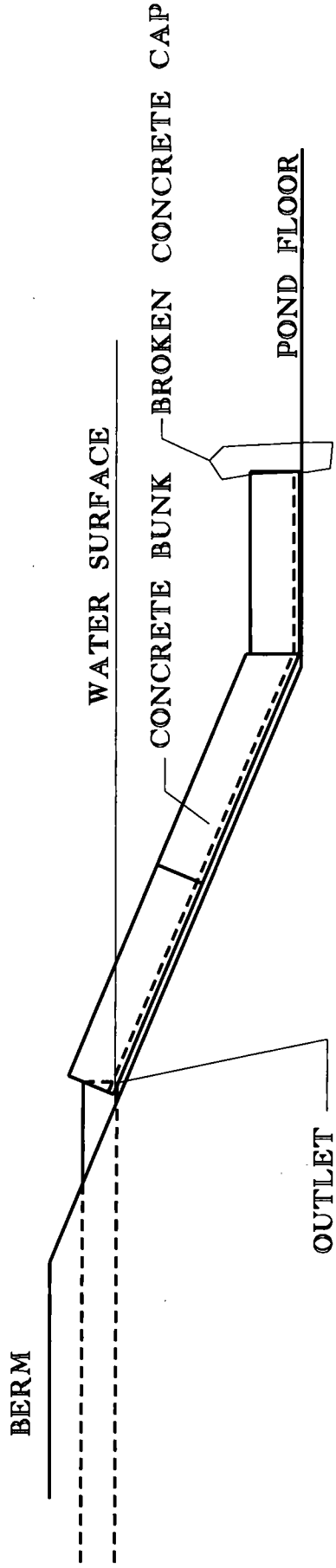
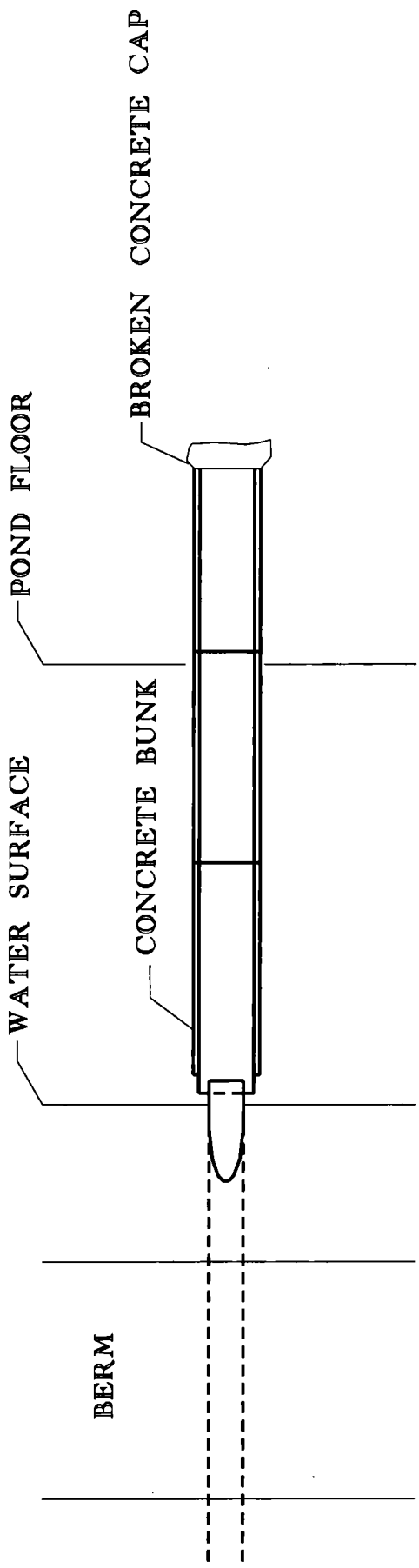


PUMP STATION
RON BRUNS FEEDYARDS-
EAST PLACE
 SE 1/4, SW 1/4, SEC 21, T 25 N, R 6 E
THURSTON COUNTY
SETTIE AGRI SERVICES
AND ENGINEERING, INC.

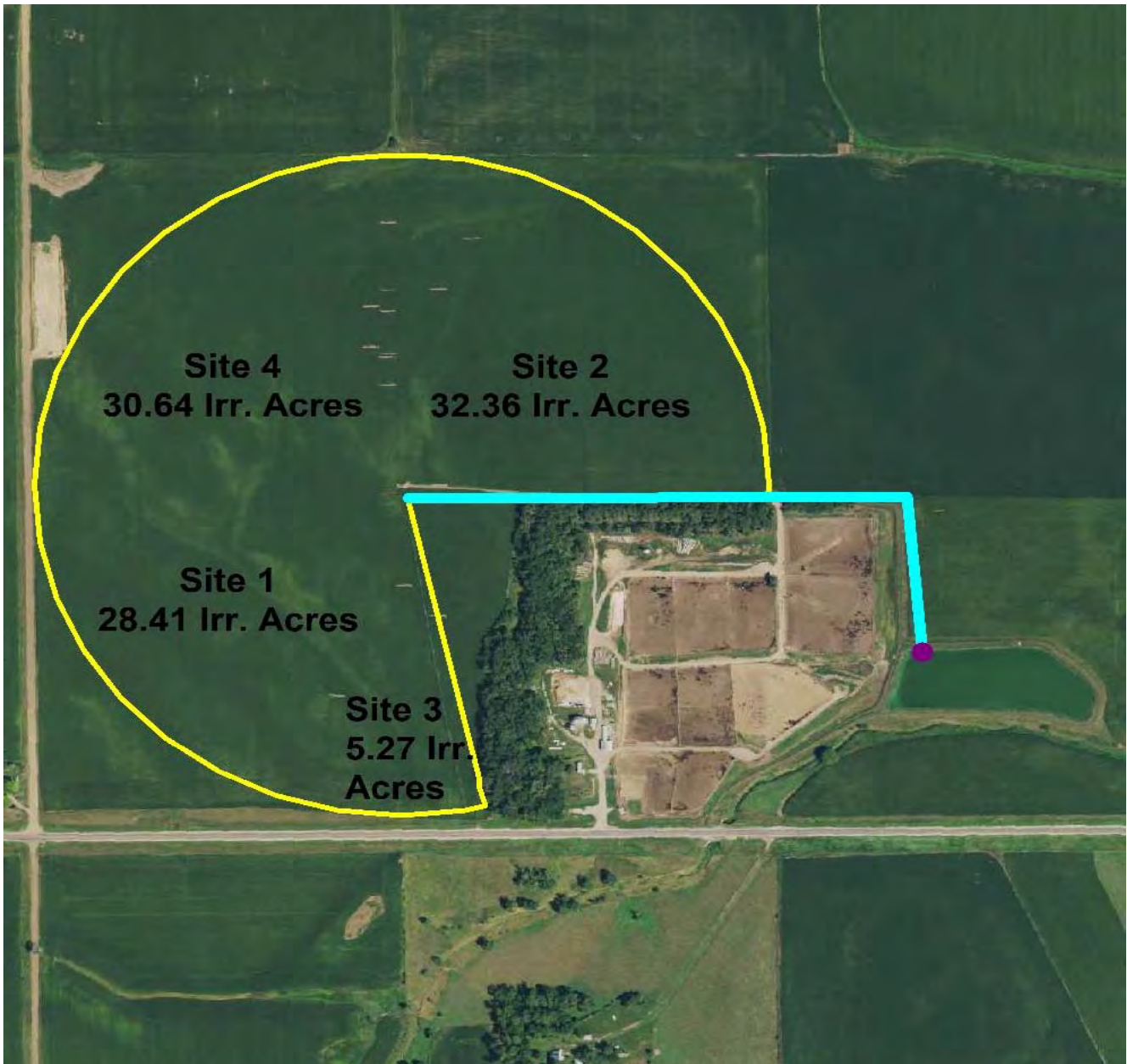
PUMPING STATION DETAIL
 NOT TO SCALE

8" PVC TO
 CHECK VALVE
 (SEE DETAIL)
 AND HOLDING POND





SPLASH PAD DETAIL



Effluent Distribution Plan



Layer Key

-  Boundary
-  Pump
-  Surface Hose/Pipe
-  Underground Pipe

Ron Bruns Feedyards - East Place

County: Thurston

Township: Pender

Legal: S21-T25N-R6E



Ron Bruns Feedyards – East Place Effluent Distribution Plan

Effluent water from the holding pond at Ron Bruns Feedyards – East Place is dewatered to application site 1-4. This system uses a 600-700 gpm pump and power unit and connects to the center pivot system on sites 1-4 via underground pipe from the holding pond to the pivot point. This is a total disconnect system; sites 1-4 will not receive fresh irrigation water.

Section 4

Facility Safety & Security

Livestock Mortality Management Plan	4-1
Chemical Management Plan.....	4-2
Facility Component Map	4-3

Livestock Mortality Management Plan - Supplement

Name of Operation & Address (please print)

Ron Bruns Feedyards - East Place

1539 Highway 16

Pender NE 68047

City State Zip Code
Phone No. 402-385-2202

IIS No. 72327 (if known)

For NDEQ use

Indicate your primary and secondary means of carcass disposal.

	<u>Burial</u>	<u>Render</u>	<u>Compost</u>	<u>Incinerate</u>	<u>Landfill</u>
Primary		X			
Secondary	X				

Is temporary on-site storage used? Yes No

If yes indicate the means to control runoff from the temporary storage area:

- Area controlled by Livestock Waste Control Facility: yes no
- Carcasses containerized or covered (tarp): yes no
- Storage area controlled by berms or diversion: yes no
- If controlled by other means or practices please

describe: _____

Attach an aerial photo or site map showing the location and extent of temporary storage areas, burial sites or compost sites.

Disposal of animal carcasses in the Livestock Waste Control Facility is prohibited.

Additional information on mortality management is available through Nebraska Department of Agriculture.

**Printed or typed name of Authorized representative*

**Signature of Authorized Representative:* Date: _____

**Signature not required if supplement submitted within a complete application*

Chemical Management Plan - Supplement

Name of Operation & Address (please print)

Ron Bruns Feedyards - East Place

1539 Highway 16

Pender	NE	68047
<i>City/Town</i>	<i>State</i>	<i>Zip Code</i>

Phone No. 402-385-2202

IIS No. 72327 (if known)

For NDEQ use

Does your operation store chemicals (insecticides, herbicides or other pesticides or disinfectants) on or adjacent to the animal feeding operation (including chemicals used for farming practices as well as livestock production)? yes no

If yes, indicate the area chemicals are stored on a site map or describe the storage area location(s)
See component map.

If pesticides are mixed or loaded into application equipment on site please indicate the location where this normally occurs.

Does your operation store petroleum products, fuels, lubricants or oils, used oils or antifreeze on or adjacent to the animal feeding operation? Yes No

If yes, indicate the area chemicals are stored on a site map or describe the storage area location(s) **See component map.**

If used, attach an aerial photo or site map showing the location of storage areas and mixing/loading area.

Disposal of Chemicals in the Livestock Waste Control Facility is prohibited.

Additional information on chemical management for pesticides is available through Nebraska Department of Agriculture and UNL Extension.

For additional information on bulk fuel storage contact the Nebraska State Fire Marshal.

**Printed or typed name of Authorized representative*

**Signature of Authorized Representative*







Date: _____

**Signature not required if supplement submitted within a complete application.*

Ron Bruns Feedyards-East Place

Facility Component Map



- | | | |
|---|---|---|
|  Temporary Mortality Site |  Burial Site |  Chemical Storage Site |
|  Fuel Storage |  Stockpile or Compost Site |  Water Source |

Section 5

Manure Production & Utilization

USDA National Agricultural Statistics Service County Yield Data.....	5-1
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Nitrogen Availability Chart	5-3
Five Year Field Plan Worksheets	5-4
Nutrients Required for Crop Growth Chart.....	5-7
Manure Production Chart.....	5-8
Manure Averages Chart.....	5-9
Manure Analysis Reports.....	5-10
Alternative Crop Yields & Nutrient Needs Chart	5-14



United States Department of Agriculture
National Agricultural Statistics Service

Year	Period	Geo Level	State	County	Data Item	Domain	Value
2018	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	207
2017	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	210.4
2016	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	203.7
2015	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	206.8
2014	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	196.8
County Average							205
County Average +10%							225
2018	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	197.7
2017	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	184.2
2016	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	183.1
2015	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	193.3
2014	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	CORN, GRAIN, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	179.7
County Average							188
County Average +10%							206
2018	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	61.8
2017	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	60.5
2016	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	63.9
2015	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	61.9
2014	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	55
County Average							61
County Average +10%							67
2018	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	56.8
2017	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	53.9
2016	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	59.1
2015	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	56.9
2014	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	SOYBEANS, NON-IRRIGATED - YIELD, MEASURED IN BU / ACRE	TOTAL	52.7
County Average							56
County Average +10%							61
2018	YEAR	COUNTY	NEBRASKA	THURSTON	HAY, ALFALFA - YIELD, MEASURED IN TONS / ACRE	TOTAL	4.9
2017	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	HAY, ALFALFA - YIELD, MEASURED IN TONS / ACRE	TOTAL	4.8
2016	YEAR	COUNTY	NEBRASKA	THURSTON	HAY, ALFALFA - YIELD, MEASURED IN TONS / ACRE	TOTAL	5
2015	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	HAY, ALFALFA - YIELD, MEASURED IN TONS / ACRE	TOTAL	4.75
2014	YEAR	COUNTY	NEBRASKA	OTHER (COMBINED) COUNTIES	HAY, ALFALFA - YIELD, MEASURED IN TONS / ACRE	TOTAL	4.5
County Average							4.8
County Average +10%							5.3

Ron Bruns Feedyards - East Place

Manure Production Summary

Production based on AWMFH Calculations

Manure Production Calculation Method	Tons of Solid Manure	Gallons of Effluent	Gallons of Slurry Manure	Annual Inventory	Livestock Type
AWFMH Calculations	3,388	4,801,267	0	2,800	Feeder Cattle

Ron Bruns Feedyards - East Place

Nutrient Production Worksheet

Maximum Capacity

A	B	C	D	E	F	G
Manure Type / Amount <small>(See Manure Production Summary)</small>	Nutrient	Lbs. / Unit <small>(See Manure Analysis Summary)</small>	Nutrient Production Actual Inventory <small>(A x C)</small>	Nutrient Production Maximum Inventory <small>(D x % Increase)</small>	% Available After Application <small>(NebGuide G1335)</small>	Total lbs. Nutrient Available <small>(ExF)</small>
Actual Inventory Feeder Cattle			<u>2,800</u>	Maximum Capacity Feeder Cattle		<u>2,800</u>
						% Increase 0.0
Solid Manure (Tons) 3,388	Ammonium N	1.37	4,641	4,641	0%	0
	Organic N	8.87	30,051	30,051	47%	14,124
	Phosphorus	19.73	66,844	66,844	100%	66,844
Effluent (Acre Inches) 4,801,267	Ammonium N	10.00	1,768	1,768	50%	884
	Organic N	13.30	2,352	2,352	57%	1,340
	Phosphorus	15.60	2,758	2,758	100%	2,758



Total Ammonium N: 884 lbs.
 Total 1st Yr. Organic N: 8,336 lbs.
 Total 2nd Yr. Organic N: 4,860 lbs.
 Total 3rd Yr. Organic N: 2,268 lbs.
 Total N Available All Sources: 16,348 lbs.
 Total Phosphorus Available: 69,602 lbs.

Ron Bruns Feedyards - East Place

Percent Nitrogen Available after Application

<u>Ammonium Nitrogen</u>	<u>Lbs. N Available</u>
Dry Manure Preplant Application and Not Incorporated 0%	0
Effluent Sprinkler Application 50%	884
<u>Availability of Organic Nitrogen in Solid Manure</u>	
Solid Manure First Year Availability 25%	7,513
Solid Manure Second Year Availability 15%	4,508
Solid Manure Third Year Availability 7%	2,104
Total Availability of Solid Manure Application 47%	14,124
<u>Availability of Organic Nitrogen in Effluent</u>	
Effluent First Year Availability 35%	823
Effluent Second Year Availability 15%	353
Effluent Third Year Availability 7%	165
Total Availability of Effluent Application 57%	1,340
Values based on NebGuide G1335 Figure 2	

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION



**NUTRIENT
ADVISORS**

Ron Bruns Feedyards - East Place

Field Management Description:	A. Irrigated Corn Corn Rotation
	Site # in Rotation: Sites 1, 2, 4
	Effluent Application

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits				Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure Application Yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
					Soil N lb/ac	Previous Crop Legume N lb/ac		Prior Manure Organic N					
						2nd year lb/ac	3rd year lb/ac						
1	Corn	Corn	225	248	30	0	0.0	0.0	11.3	207	14	192	0
2	Corn	Corn	225	248	30	0	3.0	0.0	11.3	204	14	189	0
3	Corn	Corn	225	248	30	0	3.0	1.4	11.3	202	14	188	0
4	Corn	Corn	225	248	30	0	3.0	1.4	11.3	202	14	188	0
5	Corn	Corn	225	248	30	0	3.0	1.4	11.3	202	14	188	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus			
					Need before Manure Application lb/ac	Planned Manure Application lb/ac	Planned Commercial P Application lb/ac	
1	Corn	Corn	225	79	79	23	0	-56
2	Corn	Corn	225	79	79	23	0	-111
3	Corn	Corn	225	79	79	23	0	-167
4	Corn	Corn	225	79	79	23	0	-222
5	Corn	Corn	225	79	79	23	0	-278

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.

* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.

* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION



Ron Bruns Feedyards - East Place

Field Management Description:	C. Dryland Corn Soybean Rotation	Site # in Rotation:	Site 3
	Effluent Application		
Field Plan For Nitrogen			

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits				Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac	
					Soil N lb/ac	Previous Crop Legume N lb/ac	Prior Manure Organic N						Irr. N lb/ac
							2nd year lb/ac	3rd year lb/ac					
1	Soybeans	Corn	206	227	30	45	0.0	0.0	152	14	138	0	
2	Corn	Soybeans	61	203	30	0	3.0	0.0	170	14	0	0	
3	Soybeans	Corn	206	227	30	45	3.0	1.4	148	14	133	0	
4	Corn	Soybeans	61	203	30	0	3.0	1.4	168	14	0	0	
5	Soybeans	Corn	206	227	30	45	3.0	1.4	148	14	133	0	

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus				Phosphorus Balance lb/ac
					Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac	
1	Soybeans	Corn	206	72	72	23	0	-49	
2	Corn	Soybeans	61	45	45	23	0	-70	
3	Soybeans	Corn	206	72	72	23	0	-119	
4	Corn	Soybeans	61	45	45	23	0	-141	
5	Soybeans	Corn	206	72	72	23	0	-189	

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.

* County Averages are used for crop yield goals in this crop rotation projection -

Actual yield goals may be based on site specific yield data at time of manure application.

* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION



**NUTRIENT
ADVISORS**

Ron Bruns Feedyards - East Place

Field Management Description:	I. Dryland Corn Soybean Rotation	Site # in Rotation:	Site 5
	Dry Manure Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits			Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure N Application yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
					Soil N lb/ac	Prior Manure Organic N						
						Previous Crop Legume N lb/ac	2nd year lb/ac					
1	Soybeans	Corn	206	227	30	45	0.0	0.0	152	67	85	0
2	Corn	Soybeans	61	203	30	0	39.9	0.0	133	0	0	0
3	Soybeans	Corn	206	227	30	45	0.0	18.6	133	0	133	0
4	Corn	Soybeans	61	203	30	0	0.0	0.0	173	0	0	0
5	Soybeans	Corn	206	227	30	45	0.0	0.0	152	0	152	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus		
					Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac
1	Soybeans	Corn	206	72	72	592	0
2	Corn	Soybeans	61	45	45	0	0
3	Soybeans	Corn	206	72	72	0	0
4	Corn	Soybeans	61	45	45	0	0
5	Soybeans	Corn	206	72	72	0	0

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.

* County Averages are used for crop yield goals in this crop rotation projection -

Actual yield goals may be based on site specific yield data at time of manure application.

* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

Ron Bruns Feedyards - East Place

Nutrients Required for Crop Growth

Crop	Irrigated Corn	Dryland Corn	Dryland Soybeans	Totals
Crop Yield bu/ac	225	206	61	
Crop Acres	116	53	53	222
Total N Required ¹ lbs.	28,750	11,987	10,711	51,448
Total P Required ¹ lbs.	9,148	3,814	2,369	15,331
Total N Required for Crop	<u>51,448</u>	Lbs.	Total P ₂ O ₅ Required for Crop	<u>15,331</u> Lbs.
Total N Available all Sources ²	<u>16,348</u>	Lbs.	Total P ₂ O ₅ Available all Sources ²	<u>69,602</u> Lbs.
Un-utilized Manure N	<u>0</u>	Lbs.	Un-utilized Manure P ₂ O ₅	<u>54,271</u> Lbs.
Number of acres to utilize all Nitrogen produced:	<u>70</u>		Number of acres to utilize all Phosphorus produced:	<u>1006</u>

¹Nutrient Required based on **Wardguide**

²See Nutrient Production Worksheet

Ron Bruns Feedyards - East Place

Manure Production Summary

Values are derived from the Agricultural Waste Management Field Handbook Part 651 (Table 4-8)

Animal Type	A No. of head	B Average Weight	C Volume Ft ³ /d/1000#	D Weight lbs/d/1000#	E % moisture	F Days	Manure Excreted
Beef Excreted high energy yearling	2,800	850		65	92.00%	365	28,233 Tons

28,233 - Tons of Manure Excreted @ 92.0% = $((A * B * D / 1000) * F) / 2000$ [AWMMFH]

Average of Manure Samples = 31.0% Moisture: $\frac{100 - 92.0}{100 - 31.0} \times 28,233 = 3,388$

(See Section 5, Manure Analysis Report)

3,388 - Tons of Solid Manure Produced @ 31.0% Moisture

4,801,267 - Gallons of Effluent Runoff (NRCS Form NE-ENG-81)

Manure Averages for Ron Bruns Feedyards - East Place

	Ammonium Nitrogen		Organic Nitrogen		Phosphorus	
	Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch	Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch	Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch
Averages	1.4	10.0	8.9	13.3	19.7	15.6
Report Number						
338	0.3		10		22.7	
337	2.6		6.8		14.8	
2535	1.2		9.8		21.7	
11109		10.0		13.3		15.6

Values from ServiTech and Ward Manure Analysis Reports

Account No. : 41001

Manure Analysis Report

BRUNS, RON
RON BRUNS FEEDYARDS-HOME PLACE
714 CARNS AVE
PENDER NE 68047

Invoice No. : 1307090
Date Received : 12/17/2019
Date Reported : 12/18/2019

Lab No. : 2535

Results For : RON BRUNS FEEDYARDS-HOME PLACE
Sample ID : EAST PLACE NORTHWEST CORNER

	Analysis Dry Basis	Lbs / Ton		Available First Year
		Dry Basis	As Is Basis	
Organic N, % N	0.73	14.6	9.8	2.4
Ammonium, % N	0.090	1.8	1.2	1.1
Nitrate, % N	0.025	0.5	0.3	0.3
Total N (TKN), % N	0.84	16.8	11.3	3.9
Phosphorus, % P ₂ O ₅	1.61	32.3	21.7	15.2
Potassium, % K ₂ O	0.98	19.5	13.1	11.8
Sulfur, % S	0.36	7.2	4.8	1.9
Calcium, % Ca	1.73	34.7	23.3	16.3
Magnesium, % Mg	0.72	14.4	9.7	6.8
Sodium, % Na	0.11	2.2	1.5	1.5
Sodium Adsorption Ratio (SAR)	1.79			
Zinc, ppm Zn	221.1	0.4	0.3	0.2
Iron, ppm Fe	15107.0	30.2	20.3	14.2
Manganese, ppm Mn	756.5	1.5	1.0	0.7
Copper, ppm Cu	7.1	0.0	0.0	0.0
Boron, ppm B	9.6	0.0	0.0	0.0
Soluble Salts, mmho / cm	19.99	25.6	17.2	17.2
pH	7.9			
Moisture, %	32.80			
Dry Matter (TS), %	67.20			

Reviewed By : Raymond Ward

12/19/2019 Copy : 1

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1602 Park West Dr. • PO Box 169 • Hastings, NE 68902
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Phone: 402.463.3522

800.557.7509

Fax: 402.463.8132

Lab No.: 338		LABORATORY ANALYSIS REPORT		Report Date: 10/23/2020 04:48 pm	
Send To: 32494	RON BRUNS FEEDYARD 714 CARNES AVE PENDER, NE 68047	 Hans Burken Agronomist			
Results For: Sample ID: Location	RON BRUNS FEEDYARD STOCK PILE EAST PLACE	Received:	10/22/2020	Invoice No:	979480
		Analysis (as rec'd)	Total content lbs per ton (as rec'd)	Estimated available first year* lbs per ton (as rec'd)	
NUTRIENTS					
<u>Nitrogen</u>					
Total Nitrogen	%	0.561	11.2	5.8	
Organic Nitrogen	%	0.499	10.0	4.5	
Ammonium Nitrogen	%	0.013	0.3	0.3	
Nitrate Nitrogen	%	0.049	1.0	1.0	
<u>Major and Secondary Nutrients</u>					
Phosphorus	%	0.496			
Phosphorus as P2O5	%	1.133	22.7	20.4	
Potassium	%	0.488			
Potassium as K2O	%	0.586	11.7	11.7	
Sulfur	%	0.154	3.1	1.4	
Calcium	%	1.363	27.3	27.3	
Magnesium	%	0.468			
Magnesium as MgO	%	0.783	15.7	15.7	
Sodium	%	0.005	0.1	0.1	
<u>Micronutrients</u>					
Zinc	mg/kg	163	0.3	0.2	
Iron	mg/kg	10556	21.1	10.6	
Manganese	mg/kg	585	1.2	0.6	
Copper	mg/kg	42	<0.1	<0.1	
Boron	mg/kg	6	<0.1	<0.1	
OTHER PROPERTIES					
Moisture	%	32.1			
Solids	%	67.9	1358		
Organic Matter	%	9.5	190		
Ash	%	58.4	1168		
C:N Ratio	ratio	9.8			
Electrical Conductivity	mmho/cm	3.30			
pH	unit	6.57			

* Assumes 45% of organic nitrogen available during first crop year after application. Assumes 100% of ammonium and nitrate nitrogen available, but should be adjusted for potential field losses at application site.

The reported analytical results apply only to the sample as it was supplied.

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Lab No.: 337 **LABORATORY ANALYSIS REPORT** Report Date: 10/23/2020 04:48 pm

Send To: 32494	RON BRUNS FEEDYARD 714 CARNES AVE PENDER, NE 68047	 Hans Burken Agronomist
--------------------------	--	--

Results For: Sample ID: Location	RON BRUNS FEEDYARD SETTLING BASE EAST PLACE	Received: Invoice No:	10/22/2020 979480
---	---	--	----------------------

		Analysis (as rec'd)	Total content lbs per ton (as rec'd)	Estimated available first year* lbs per ton (as rec'd)
NUTRIENTS				
<u>Nitrogen</u>				
Total Nitrogen	%	0.482	9.6	6.1
Organic Nitrogen	%	0.341	6.8	3.3
Ammonium Nitrogen	%	0.13	2.6	2.6
Nitrate Nitrogen	%	0.011	0.2	0.2
<u>Major and Secondary Nutrients</u>				
Phosphorus	%	0.324		
Phosphorus as P2O5	%	0.740	14.8	13.3
Potassium	%	0.704		
Potassium as K2O	%	0.843	16.9	16.9
Sulfur	%	0.147	2.9	1.4
Calcium	%	0.989	19.8	19.8
Magnesium	%	0.420		
Magnesium as MgO	%	0.700	14.0	14.0
Sodium	%	0.037	0.7	0.7
<u>Micronutrients</u>				
Zinc	mg/kg	108	0.2	0.1
Iron	mg/kg	11283	22.6	11.3
Manganese	mg/kg	604	1.2	0.6
Copper	mg/kg	29	<0.1	<0.1
Boron	mg/kg	5	<0.1	<0.1

OTHER PROPERTIES				
Moisture	%	28.1		
Solids	%	71.9	1438	
Organic Matter	%	6.8	136	
Ash	%	65.1	1302	
C:N Ratio	ratio	8.2		
Electrical Conductivity	mmho/cm	3.82		
pH	unit	8.28		

* Assumes 48% of organic nitrogen available during first crop year after application. Assumes 100% of ammonium and nitrate nitrogen available, but should be adjusted for potential field losses at application site.

The reported analytical results apply only to the sample as it was supplied.
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Account No. : 25575

Slurry Analysis Report

SETTJE COMPLIANCE SERVICE
15460 NW 48TH ST
RAYMOND NE 68428

Invoice No. : 1316909
Date Received : 05/26/2020
Date Reported : 05/27/2020

Lab No. : 11109

Results For : RON BRUNS EAST
Sample ID : POND

	Analysis As Received	Lbs per Acre Inch	Lbs per 1000 gal	Available First Year	
				Lbs per Acre Inch	Lbs per 1000 gal
Organic N, ppm N	58.6	13.3	0.5	6.6	0.2
Ammonium, ppm N	44.1	10.0	0.4	9.5	0.4
Nitrate, ppm N	0.3	0.1	0.0	0.1	0.0
Total N (TKN), ppm N	103.0	23.3	0.9	16.2	0.6
Phosphorus, ppm P ₂ O ₅	69.0	15.6	0.6	11.0	0.4
Potassium, ppm K ₂ O	497.4	112.8	4.2	101.5	3.8
Sulfur, ppm S	45.0	10.2	0.4	4.1	0.2
Calcium, ppm Ca	134.7	30.5	1.1	21.4	0.8
Magnesium, ppm Mg	69.7	15.8	0.6	11.1	0.4
Sodium, ppm Na	97.9	22.2	0.8	22.2	0.8
Sodium Adsorption Ratio (SAR)	2.40				
Zinc, ppm Zn	0.5	0.1	0.0	0.1	0.0
Iron, ppm Fe	7.9	1.8	0.1	1.3	0.0
Manganese, ppm Mn	0.9	0.2	0.0	0.1	0.0
Copper, ppm Cu	< 0.1	0.0	0.0	0.0	0.0
Boron, ppm B	0.3	0.1	0.0	0.1	0.0
Soluble Salts, mmho / cm	2.79	379	14	379	14
pH	8.1				
Dry Matter (TS), %	0.26				

"<" - Not Detected / Below Detection Limit

Reviewed By : Nick Ward

5/28/2020

Copy : 1

Page 1 of 1

Alternative Crop Nitrogen and Phosphorus Needs

Alternative Crop	Average Yield ^A	Production Unit	Nitrogen Requirement per Unit ^B	Phosphorus Removal Rate per Unit ^C	Nitrogen Requirement to Raise Average Yield (lbs./acre) ^B	Phosphorus Requirement to Raise Average Yield (lbs./acre) ^C
Irrigated Soybeans	66.7	bushels/acre	3.3	0.73	220	49
Alfalfa	5.3	ton/acre	51	10	269	53
Corn Silage	23.0	ton/acre	9.9	5.9	228	136
Grain Sorghum	93.0	bushels/acre	0.66	0.39	61	36
Oats	63.0	bushels/acre	1.3	0.28	82	18
Potatoes	475.0	cwt.	5	0.15	2375	71
Sugar Beets	25.4	ton/acre	8	2.2	203	56
Sunflowers	18.7	cwt.	0.05	0.97	1	18
Wheat	57.0	bushels/acre	2.4	0.48	137	27

A - "2019 Nebraska State Agricultural Overview"

B - "Nitrogen Requirement" Ward Guide page 36

C - "Quantities of Plant Nutrients in Crops" Ward Guide page 52

* A different source for providing proven yields may or may not be used at time of alternative crop planting.

Section 6

Application Site Information

Application Site Summary..... 6-1

Best Management Practices..... 6-2

Aerial Maps

Soils Maps

Phosphorus Index

Land Application Agreements

Ron Bruns Feedyards - East Place

Application Site Summary

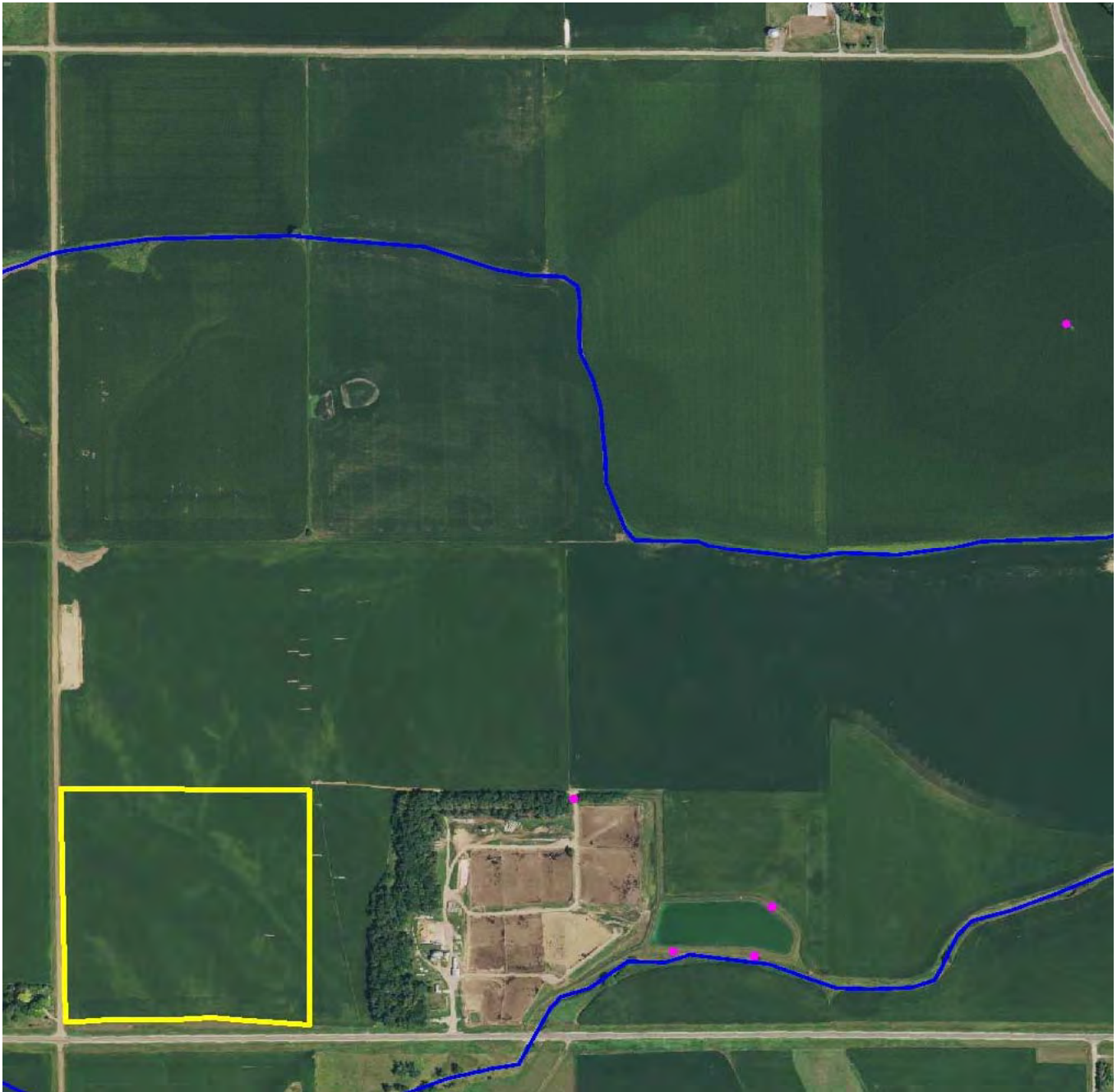
Application Site # / Name	Useable Acres	Land Use	Dominate Soil Slope ^A	Legal Description	Land Owner	Application Agreement	Shared Manure Application Site
Total Acres: 221.55							
Site 1 Ron's SW 40	36.09	Effluent Irrigated Cropland	Moody silty clay loam, 2 - 6% slopes	SW 1/4 SW 1/4, S21-T25N-R6E	Ronald H Bruns Trust 714 Carns Avenue Pender, NE 68047	Owned	No
Site 2 Ron's NE 40	40.63	Effluent Irrigated Cropland	Nora silt loam, 6 - 11% slopes, eroded	NE 1/4 SW 1/4, S21-T25N-R6E	Ronald H Bruns Trust 714 Carns Avenue Pender, NE 68047	Owned	No
Site 3 Ron's East of Feedyard	31.01	Effluent Irrigated Cropland	Kennebec silt loam, rarely flooded	Pt. SW 1/4 SE 1/4 & Pt. SE 1/4 SW 1/4, S21-T25N-R6E	Ronald H Bruns Trust 714 Carns Avenue Pender, NE 68047	Owned	No
Site 4 Florene's	39.22	Effluent Irrigated Cropland	Nora silt loam, 6 - 11% slopes, eroded	NW 1/4 SW 1/4, S21-T25N-R6E	Ams Heese & Bryce Heese 20019 N Concho Circle Sun City, AZ 85373	Yes	No
Site 5 Sandahl	74.60	Dry Cropland	McPaul silt loam, occasionally flooded	W 1/2 NW 1/4, S21-T25N-R6E	John Sandahl 85597 Childs Avenue Wakefield, NE 68784	Yes	No

Ron Bruns Feedyards - East Place

Best Management Practices

Application Site #	Phosphorus Risk Assessment ^B	Nitrogen Risk Assessment ^C	Conservation Practices	Setbacks ^D	Best Management Practices Phosphorus	Best Management Practices Nitrogen
Site 1 Ron's SW 40	Low Risk 1.6	Silty Clay Loam = Fine Texture Fine Texture + Fall or Spring Application = Low Nitrogen Leaching Potential	No-Till/Conservation Tillage	None	Soil Sampling Manure Sampling No-Till/Conservation Tillage	Soil Sampling Manure Sampling No-Till/Conservation Tillage
Site 2 Ron's NE 40	Medium Risk 3.3	Silt Loam = Medium Texture Medium Texture + Fall or Spring Application = Low Nitrogen Leaching Potential	No-Till/Conservation Tillage	None	Soil Sampling Manure Sampling No-Till/Conservation Tillage	Soil Sampling Manure Sampling No-Till/Conservation Tillage
Site 3 Ron's East of Feedyard	Low Risk 0.63	Silt Loam = Medium Texture Medium Texture + Fall or Spring Application = Low Nitrogen Leaching Potential	No-Till/Conservation Tillage	Streams Wells	Soil Sampling Manure Sampling No-Till/Conservation Tillage	Soil Sampling Manure Sampling No-Till/Conservation Tillage
Site 4 Florence's	Medium Risk 2.7	Silt Loam = Medium Texture Medium Texture + Fall or Spring Application = Low Nitrogen Leaching Potential	No-Till/Conservation Tillage	None	Soil Sampling Manure Sampling No-Till/Conservation Tillage	Soil Sampling Manure Sampling No-Till/Conservation Tillage
Site 5 Sandahl	Medium Risk 4.7	Silt Loam = Medium Texture Medium Texture + Fall or Spring Application = Low Nitrogen Leaching Potential	No-Till/Conservation Tillage	Stream	Soil Sampling Manure Sampling No-Till/Conservation Tillage	Soil Sampling Manure Sampling No-Till/Conservation Tillage

Ron Bruns Feedyards - East Place



Layer Key

-  Boundary
-  Registered Wells
-  Setbacks
-  Streams/Water
-  Tile Inlets

Name: Site 1 Ron's SW 40

Landowner: Ronald H Bruns Trust

Legal: SW1/4 SW1/4,
S21-T25N-R6E

Acres: 36.09



Ron Bruns Feedyards - East Place



Area Symbol: NE173, Soil Area Version: 18

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
6811	Moody silty clay loam, 2 to 6 percent slopes	10.71	29.7%	Ile	IIIe	74	75
6603	Alcester silty clay loam, 2 to 6 percent slopes	9.56	26.5%	Ile	IIIe		72
6756	Nora silt loam, 6 to 11 percent slopes, eroded	9.12	25.3%	IIIe	IVe	55	68
6813	Moody silty clay loam, 6 to 11 percent slopes	5.54	15.4%	IIIe	IVe	69	74
6814	Moody silty clay loam, 6 to 11 percent slopes, eroded	1.16	3.2%	IIIe	IVe	66	62
Weighted Average						48.6	*n 71.9

Name: Site 1 Ron's SW 40

Landowner: Ronald H Bruns Trust

County: Thurston

Legal: SW1/4 SW1/4,
S21-T25N-R6E

Acres: 36.09



NEBRASKA PHOSPHORUS LOSS ASSESSMENT RATING

Livestock Operation: Ron Bruns Feedyards - East Place
 Crop Producer: Ron Bruns Feedyards - East Place

Field ID: Site 1 - Ron's SW 40
 Legal Desc: S21-T25N-R6E
 Completion Date: February 2021



Prepared by: *Nutrient Advisors*





County	Thurston
Field	Site 1 - Ron's SW 40
Option	6811
Erosion, S&R	2.9
Sediment trap	None
Field radius	855.0
Filter width	0-10 ft
Enrichment	Tillage
Land use	No-Till and Conservation Till without contouring Continuous High Residue Crops - cnt
Soil type	Moody silty clay loam, 1 to 7 percent slopes
Soil P ppm	50.0
Applied P lbs	75.0
Irrigation	Surface Application, No Incorporation
Rate gpm	Sprinkler
Furrow slope%	
Manure	5.0 tons/acre over years
P-Index Value	1.6
Rating	Low

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Ron Bruns Feedyards - East Place



Layer Key

-  Boundary
-  Registered Wells
-  Setbacks
-  Streams/Water
-  Tile Inlets

Name: Site 2 Ron's NE 40

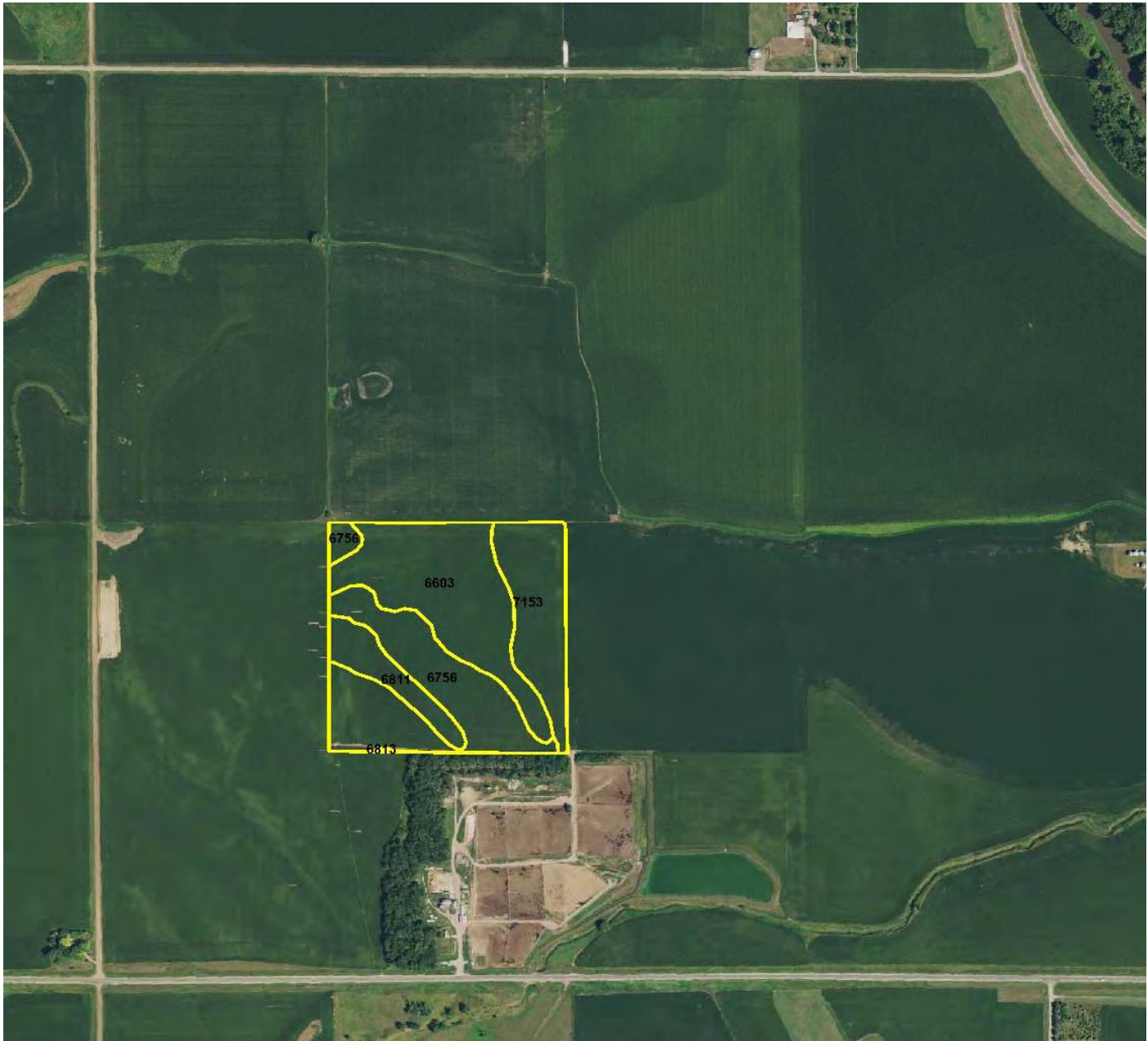
Landowner: Ronald H Bruns Trust

Legal: NE1/4 SW1/4,
S21-T25N-R6E

Acres: 40.63



Ron Bruns Feedyards - East Place



Area Symbol: NE173, Soil Area Version: 18

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
6756	Nora silt loam, 6 to 11 percent slopes, eroded	15.23	37.5%	IIIe	IVe	55	68
6603	Alcester silty clay loam, 2 to 6 percent slopes	13.90	34.2%	Ile	IIIe		72
7153	Kennebec silt loam, rarely flooded	7.62	18.8%	Iw	I	74	83
6811	Moody silty clay loam, 2 to 6 percent slopes	3.74	9.2%	Ile	IIIe	74	75
6813	Moody silty clay loam, 6 to 11 percent slopes	0.14	0.3%	IIIe	IVe	69	74
Weighted Average						41.5	*n 72.8

Name: Site 2 Ron's NE 40

Landowner: Ronald H Bruns Trust

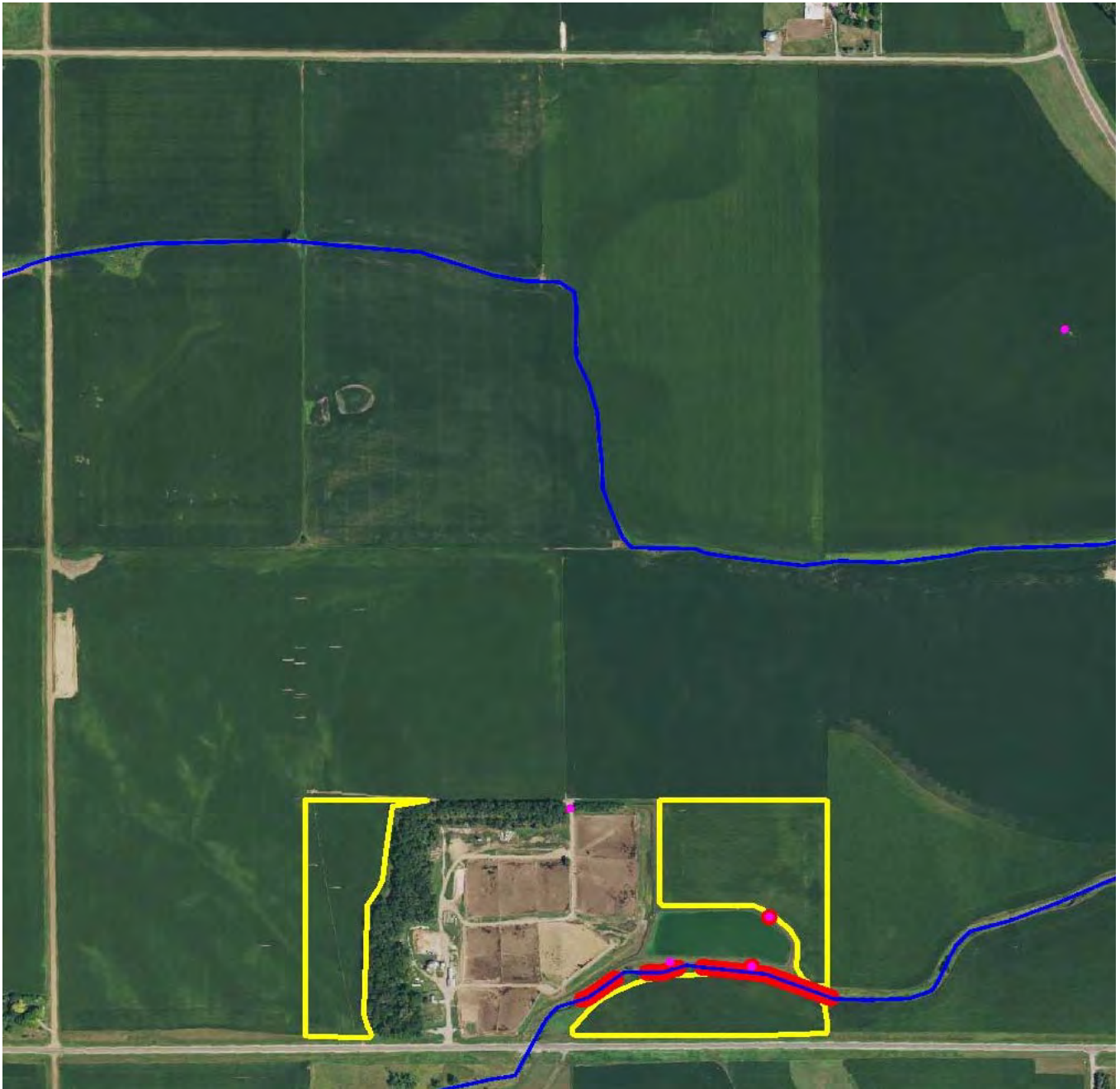
County: Thurston

Legal: NE1/4 SW1/4,
S21-T25N-R6E

Acres: 40.63



Ron Bruns Feedyards - East Place



Layer Key

-  Boundary
-  Registered Wells
-  Setbacks
-  Streams/Water
-  Tile Inlets

Name: Site 3 Ron's East of Feedyard

Landowner: Ronald H Bruns Trust

Legal: Pt. SW1/4 SE1/4 & Pt. SE1/4 SW1/4,
S21-T25N-R6E

Acres: 31.01



Ron Bruns Feedyards - East Place



Area Symbol: NE173, Soil Area Version: 18

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7153	Kennebec silt loam, rarely flooded	13.61	43.9%	Iw	I	74	83
6603	Alcester silty clay loam, 2 to 6 percent slopes	5.89	19.0%	Ile	IIIe		72
6756	Nora silt loam, 6 to 11 percent slopes, eroded	5.06	16.3%	IIIe	IVe	55	68
6811	Moody silty clay loam, 2 to 6 percent slopes	2.43	7.8%	Ile	IIIe	74	75
7716	McPaul silt loam, occasionally flooded	2.16	7.0%	IIw	IIw	47	71
6813	Moody silty clay loam, 6 to 11 percent slopes	1.86	6.0%	IIIe	IVe	69	74
Weighted Average						54.7	*n 76.5

Name: Site 3 Ron's East of Feedyard

Landowner: Ronald H Bruns Trust

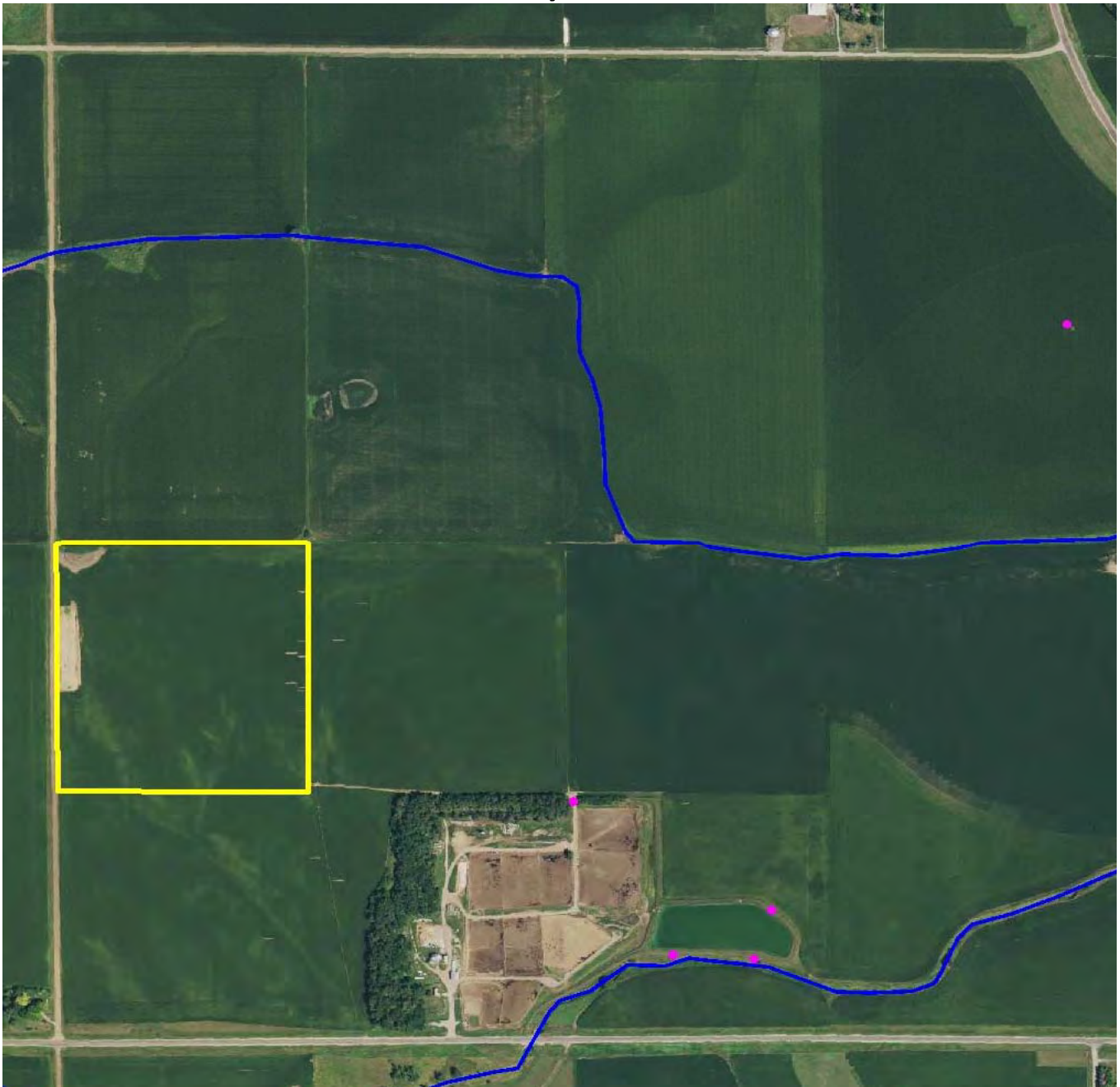
County: Thurston

Legal: Pt. SW1/4 SE1/4 & Pt. SE1/4 SW1/4, S21-T25N-R6E

Acres: 31.01



Ron Bruns Feedyards - East Place



Layer Key

-  Boundary
-  Registered Wells
-  Setbacks
-  Streams/Water
-  Tile Inlets

Name: Site 4 Florene's

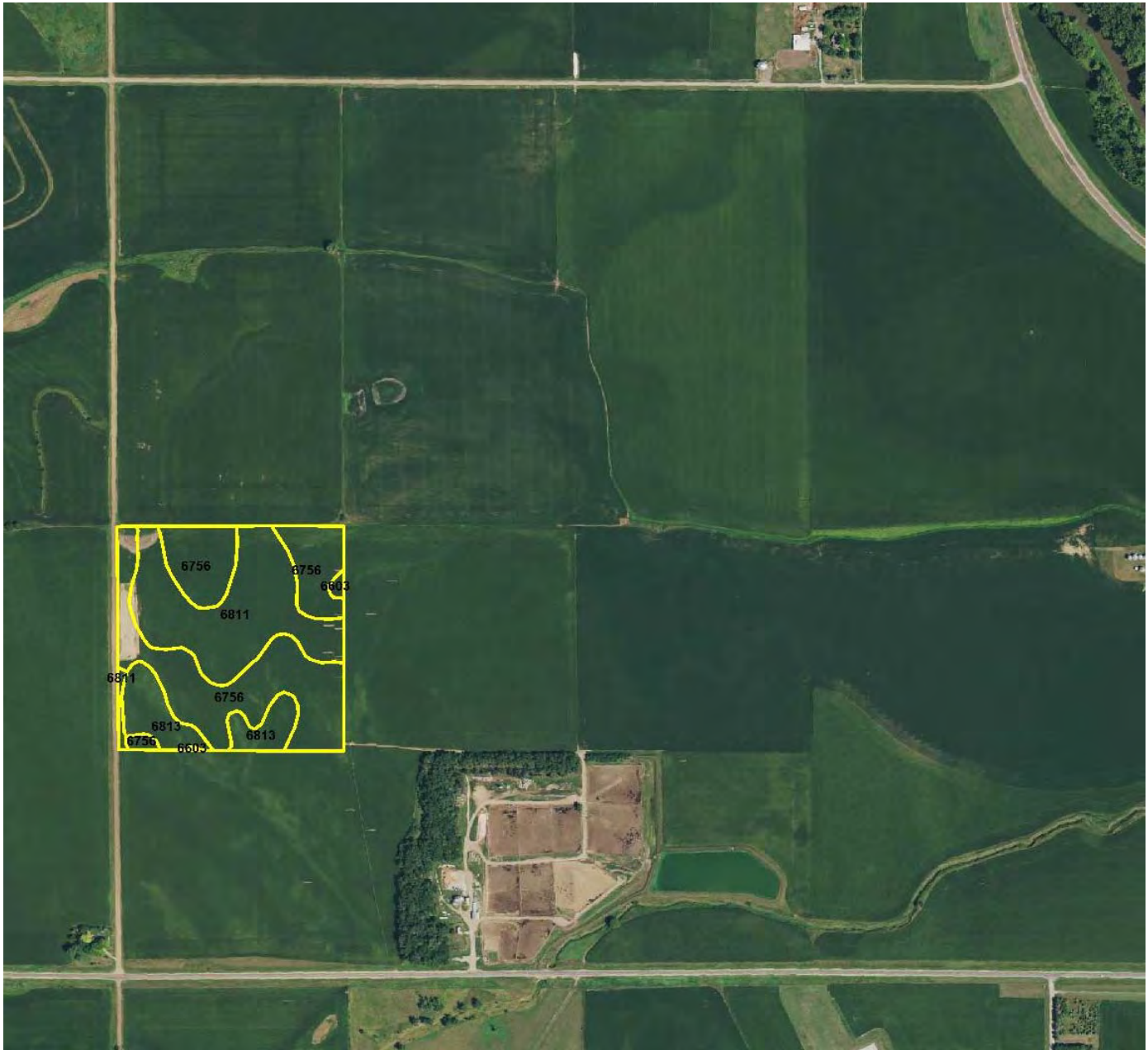
Landowner: Arns Heese & Bryce Heese

Legal: NW1/4 SW1/4,
S21-T25N-R6E

Acres: 39.22



Ron Bruns Feedyards - East Place



Area Symbol: NE173, Soil Area Version: 18

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
6756	Nora silt loam, 6 to 11 percent slopes, eroded	19.66	50.1%	IIIe	IVe	55	68
6811	Moody silty clay loam, 2 to 6 percent slopes	13.91	35.5%	Ile	IIIe	74	75
6813	Moody silty clay loam, 6 to 11 percent slopes	5.32	13.6%	IIIe	IVe	69	74
6603	Alcester silty clay loam, 2 to 6 percent slopes	0.33	0.8%	Ile	IIIe		72
Weighted Average						63.2	*n 71.3

Name: Site 4 Florene's
Landowner: Arns Heese & Bryce Heese
County: Thurston

Legal: NW1/4 SW1/4,
 S21-T25N-R6E
Acres: 39.22



Land Application Area Agreement for Livestock Manure

This agreement made between the:

Livestock Operation: Ron Bruns Feedyards - East Place

1539 Highway 16	Pender	NE	68047	402-385-2202
(Address)	(City)	(State)	(Zip)	(Phone)

And

Landowner: Arns Heese & Bryce Heese				
20019 N Concho Circle	Sun City	AZ	85373	
(Address)	(City)	(State)	(Zip)	(Phone)

The Landowner/Operator is the owner of the following described Real estate, to wit:

Legal Description: NW1/4 SW1/4, S21-T25N-R6E

Total Acres: 40.00 Useable Acres: 39.22 Irrigated Dryland

Legal Description: _____

Total Acres: _____ Useable Acres: _____ Irrigated Dryland

Legal Description: _____

Total Acres: _____ Useable Acres: _____ Irrigated Dryland


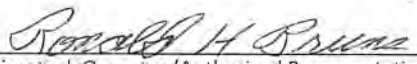
Legal Description: _____

Total Acres: _____ Useable Acres: _____ Irrigated Dryland

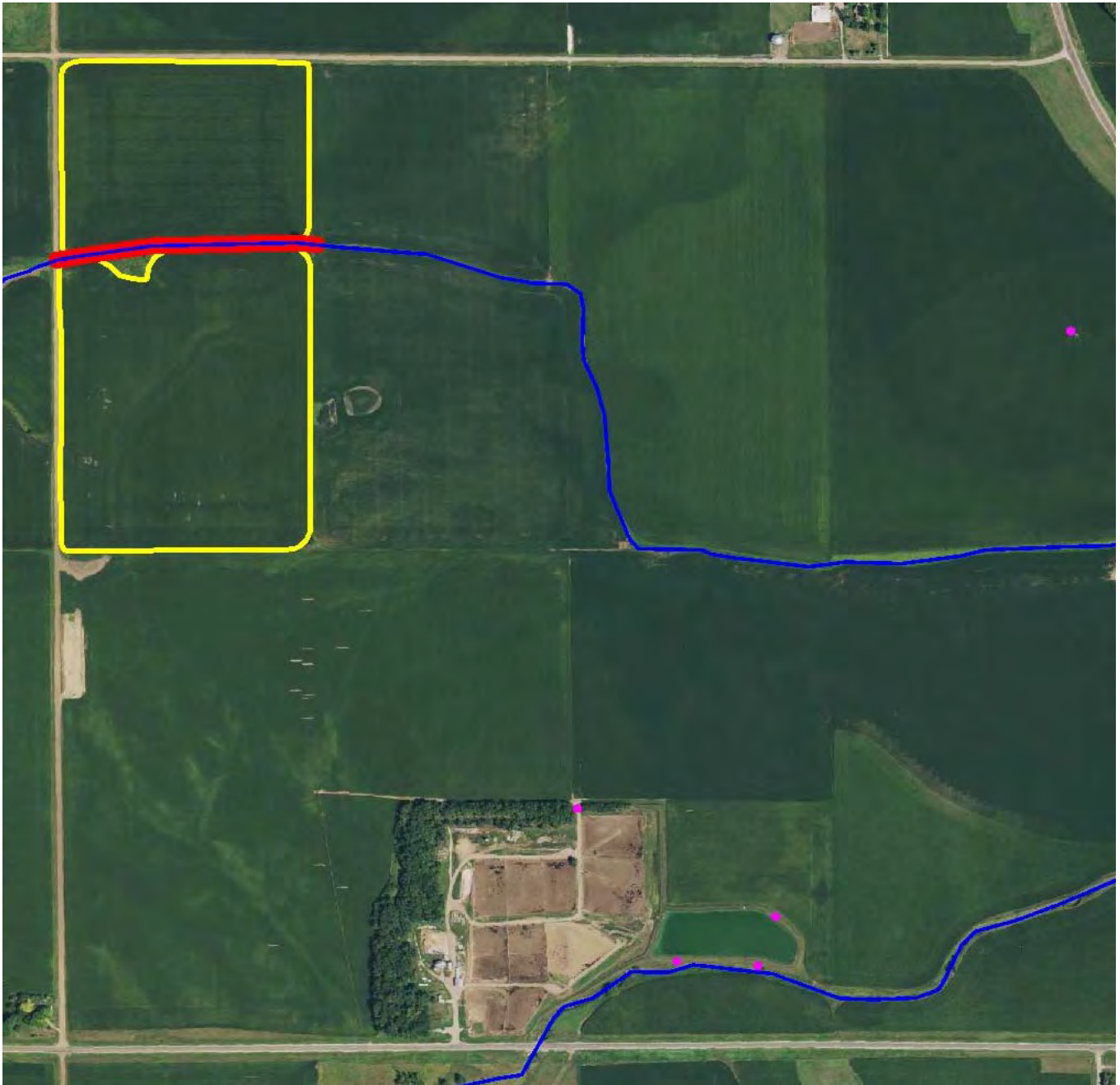
Legal Description: _____

Total Acres: _____ Useable Acres: _____ Irrigated Dryland





1. This agreement allows the said Livestock Operation to spread livestock manure on said landowners/operators property.
2. The Landowner/Operator hereby consents to the Operation spreading manure on said premises at such times as are mutually agreeable by the parties. The Operation may or may not spread manure in any given year of this agreement.
3. The livestock operator shall use current manure analysis to establish the amount of nutrients that shall be applied at normal agronomic rates within the parameters of the livestock operations Nutrient Management Plan.
4. Landowner/Operator shall be able to specify the quantity of manure and location on premises to spread manure, within the parameters of the livestock operations Nutrient Management Plan.
5. This agreement shall continue from year to year without further renewal, except if either party desires to cancel this Agreement they shall do so on or before September 1, of any given year.
6. Landowner/Operator agrees to provide the Livestock Operation with information, including crop yields, planned crop rotation and other commercial fertilizer applied (if any), which the Livestock Operation will need to know in order to apply the manure in an environmentally responsible manner.

BY: <u></u> x Landowner	Date: <u>03/01/2021</u>
<u></u> Livestock Operator (Authorized Representative)	Date: <u>3/18/21</u>

Ron Bruns Feedyards - East Place



Layer Key

-  Boundary
-  Registered Wells
-  Setbacks
-  Streams/Water
-  Tile Inlets

Name: Site 5 Sandahl

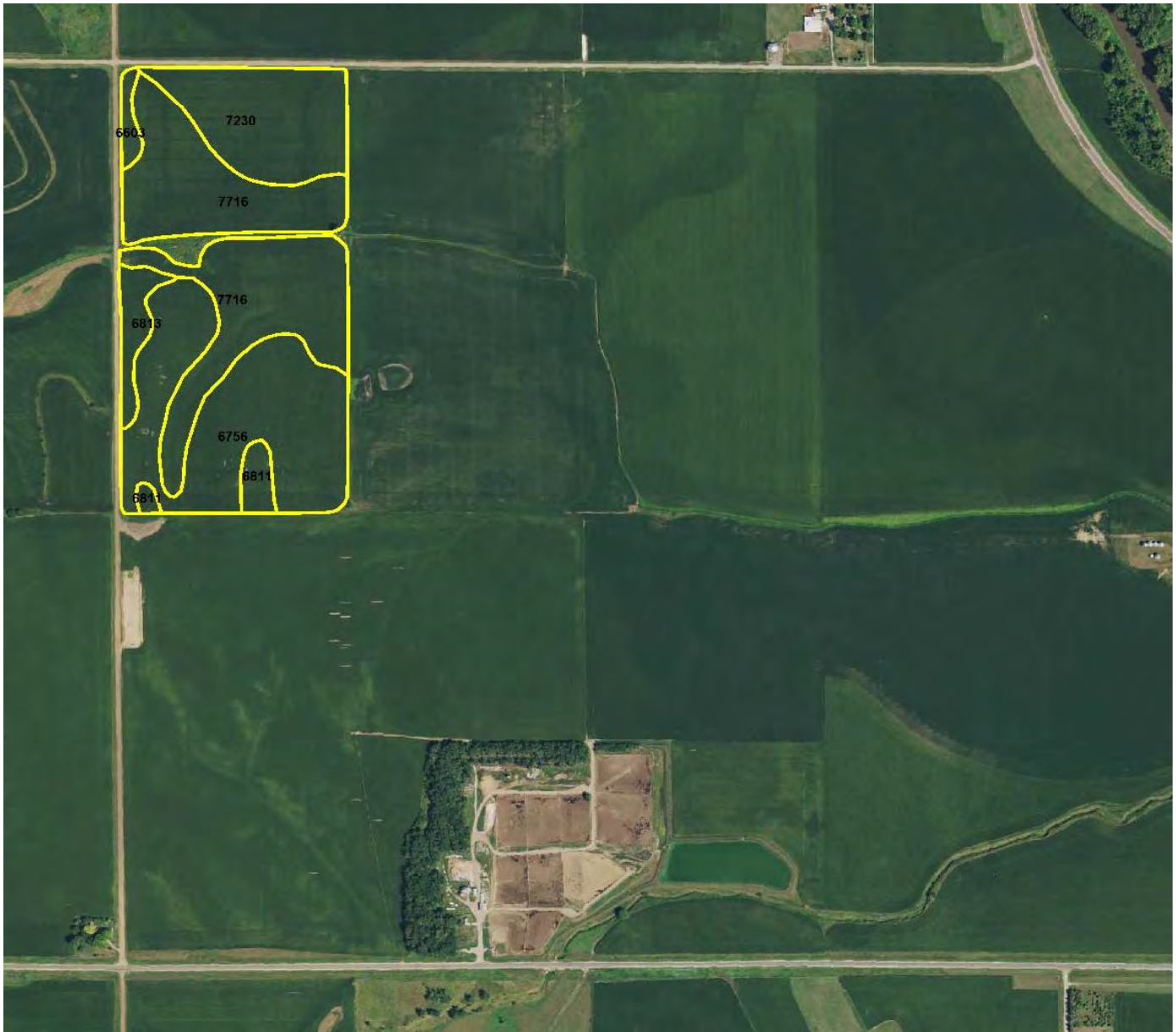
Landowner: John Sandahl

Legal: W1/2 NW1/4,
S21-T25N-R6E

Acres: 74.60



Ron Bruns Feedyards - East Place



Area Symbol: NE173, Soil Area Version: 18

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7716	McPaul silt loam, occasionally flooded	30.23	40.5%	IIw	IIw	47	71
6756	Nora silt loam, 6 to 11 percent slopes, eroded	25.75	34.5%	IIIe	IVe	55	68
7230	Alcester silty clay loam, 0 to 2 percent slopes	12.57	16.8%	I	I	77	73
6813	Moody silty clay loam, 6 to 11 percent slopes	3.04	4.1%	IIIe	IVe	69	74
6811	Moody silty clay loam, 2 to 6 percent slopes	2.05	2.7%	Ile	IIIe	74	75
6603	Alcester silty clay loam, 2 to 6 percent slopes	0.96	1.3%	Ile	IIIe		72
Weighted Average						55.8	*n 70.5

Name: Site 5 Sandahl

Landowner: John Sandahl

County: Thurston

Legal: W1/2 NW1/4,
S21-T25N-R6E

Acres: 74.60



Nutrient Application Agreement

This agreement is hereby made between JOHN SANDAHL (owner) and Ron Bruns representing Ron Bruns Feedboard - East Place Feedyard - East Place, representing the application of nutrients to the land of said landowner beyond the limits of the facility.

4. Owner may specify application rate if desired but application rate will not exceed normal agronomic rates.
 5. This Agreement shall continue from year to year without further renewal, except if either party desires to change or cancel this Agreement they shall do so in writing 60 days before September 1, of any given year for the following year.
 6. Owner agrees to provide the following land tracts for manure and nutrient applications:

SASE Office Use Only	Common Name	Legal Description	County	Irrigated ?
12		Example: NE 1/4 of SW 1/4 S 14 T 11 R 4 W W 1/2 of NW 1/4 S 21 T 25 R 6 E	THURSDAY	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		S T R		<input type="checkbox"/> Yes <input type="checkbox"/> No
		S T R		<input type="checkbox"/> Yes <input type="checkbox"/> No
		S T R		<input type="checkbox"/> Yes <input type="checkbox"/> No
		S T R		<input type="checkbox"/> Yes <input type="checkbox"/> No

Titled Owner(s): JOHN SANDAHL
 Address: 85597 CHILDS AVE
 City State Zip: WAKEFIELD, NE 68784
 Phone: 402-287-2457
 Ron Bruns (Signature) John Sandahl
 Date: 3-21-03
 Ron Bruns (Signature) _____
 Date: 3-19-03

**Please note. County average yields will have to be used unless insurance yield documentation from the past 3 years is provided for each tract of land. Typically, when county averages are used, more acres are required to meet the acres needed.

Please attach FSA photos of application land with fields highlighted.

Scout Agri-Sciences & Engineering, Inc.

Section 7

Supporting Documentation

Nitrogen Leaching Potential Chart.....	7-1
AWMFH Animal Excretion Chart	7-2
Ward Guide Pages 36, 52 and 54	7-3
NebGuide G1335, Determining Crop Available Nutrients from Manure, Figure 2	7-6
Midwest Memo Soil Analysis Methods.....	7-7
NebGuide G1740, Guidelines for Soil Sampling.....	7-9
NebGuide G1450, Sampling Manures for Nutrient Analysis	7-13
2019 Nebraska State Agriculture Overview	7-17
Manure Fertilizer Sales Agreement	7-20

Nitrogen Leaching Potential

Timing of Application	Soil Texture		
	Coarse	Medium	Fine
Fall Application	High	Medium-Low	Low
Spring Application, Pre-Plant	High-Medium	Medium-Low	Low
Sidedress or Split Application	Medium-Low	Low	Low

Coarse Texture	(Sand, Loamy sand, sandy loam)
Medium Texture	(Silt, silt loam, loam);
Fine Texture	(silty clay loam, silty clay, clay, clay loam, sandy clay loam, sandy clay)

This table indicates the leaching potential based on soil texture and application timing. This information can be used to make appropriate adjustments in the timing, method and formulation of Nitrogen applied to avoid excessive losses.

Contents of table is from NRCS Nutrient Management (S-590)

NRCS S590 Nitrogen Risk Guide

Table 4–8 Beef waste characterization—as excreted—Continued(c) Finishing cattle excretion in units per finished animal ^{1/}

Components	Units	Finishing cattle			
		Corn, no supplemental P	Corn with supplemental P	Corn with 25% wet distillers grains	Corn with 30% wet corn gluten feed
Weight	lb/f.a.	9,800	9,800		
Volume	ft ³ /f.a.	160	160		
Moisture	% w.b.	92	92		
TS	lb/f.a.	780	780		
VS	lb/f.a.	640	640		
BOD	lb/f.a.	150	150		
N	lb/f.a.	53	53	75	66
P	lb/f.a.	6.6	8.3	10	11
K	lb/f.a.	38	38		

^{1/} Assumes a 983 lb finishing animal fed for 153 days(d) Finishing cattle in units per day per 1,000 lb animal unit ^{1/}

Components	Units	Finishing cattle			
		Corn, no supplemental P	Corn with supplemental P	Corn with 25% wet distillers grains	Corn with 30% wet corn gluten feed
Weight	lb/d/1000 lb AU	65	65		
Volume	ft ³ /d/1000 lb AU	1.1	1.1		
Moisture	% w.b.	92	92		
TS	lb/d/1000 lb AU	5.2	5.2		
VS	lb/d/1000 lb AU	4.3	4.3		
BOD	lb/d/1000 lb AU	1.0	1.0		
N	lb/d/1000 lb AU	0.36	0.36	0.50	0.44
P	lb/d/1000 lb AU	0.044	0.056	0.069	0.076
K	lb/d/1000 lb AU	0.25	0.25		

Table 4–9 Nitrogen content of cattle feedlot runoff (Alexander and Margheim 1974) ^{1/2}

Annual rainfall	Below-average conditions ^{3/}	Average conditions ^{4/}	Above-average conditions ^{5/}
	lb N/acre-in		
<25 in	360	110	60
25 to 35 in	60	30	15
>35 in	15	10	5

^{1/} Adapted from the 1992 version of the AWMFH^{2/} Applies to waste storage ponds that trap rainfall runoff from uncovered, unpaved feedlots. Cattle feeding areas make up 90 percent or more of the drainage area. Similar estimates were not made for phosphorus and potassium. Phosphorus content of the runoff will vary inversely with the amount of solids retained on the lot or in settling facilities.^{3/} No settling facilities are between the feedlot and pond, or the facilities are ineffective. Feedlot topography and other characteristics are conducive to high solids transport or cause a long contact time between runoff and feedlot surface. High cattle density—more than 250 head per acre.^{4/} Sediment traps, low gradient channels, or natural conditions that remove appreciable amounts of solids from runoff. Average runoff and solids transport characteristics. Average cattle density—125 to 250 head per acre.^{5/} Highly effective solids removal measures such as vegetated filter strips or settling basins that drain liquid waste through a pipe to storage pond. Low cattle density—less than 120 head per acre.

Table 16 Nitrogen Requirements and Subsoil Factors for Various Crops

Crop	Nitrogen Required	Subsoil Factor
Corn	1.1 lbs / bu	0.3
Milo	1.15 lbs / bu	0.3
Popcorn	1.3 lbs / bu	0.3
Seed Corn	1.4 lbs / bu	0.3
Corn Silage	9.9 lbs / ton	0.3
Sorghum Silage	8.5 lbs / ton	0.3
Feed-Hay	25 lbs / ton	0.3
Sudan Hay	27 lbs / ton	0.3
Soybeans	0	0.0
Pinto Beans	1.45 lbs / bu	0.3
Great Northern Beans	1.35 lbs / bu	0.3
Peanuts	3.0 lbs / cwt	0.3
Winter Wheat	2.4 lbs / bu	0.3
Spring Wheat	2.4 lbs / bu	0.3
Oats	1.3 lbs / bu	0.3
Rye	1.9 lbs / bu	0.3
Feed Barley	1.5 lbs / bu	0.3
Malting Barley	1.1 lbs / bu	0.3
Small Grain Silage	17 lbs / ton	0.3
Small Grain Hay	40 lbs / ton	0.3
Alfalfa	0	0.0
New Alfalfa	5 lbs / ton	0.3
Grass-Alfalfa	20 lbs / ton	0.3
Clover	0	0.0
Bromegrass	40 lbs / ton	0.3
Bermudagrass	40 lbs / ton	0.3
Fescue	35 lbs / ton	0.3
Native Grass	27 lbs / ton	0.3
Lovegrass	32 lbs / ton	0.3
Cool Grass	40 lbs / ton	0.3
Sugar Beets	8 lbs / ton	0.3
Sunflowers	0.05 lbs / lb	0.3
Potatoes	5.0 lbs / cwt	0.3
Cotton	0.1 lbs / lb	0.3
Millet	1.7 lbs / bu	0.3
Onions	0.25 lbs / cwt	0.3
Melons	14 lbs / ton	0.3
Garden	110 lbs / unit	0.3

The nitrogen rate for these legume crops is calculated on the basis of the P₂O₅ requirement. The N requirement is based on a 1:3 ratio (N:P₂O₅).

Quantity of Plant Nutrients in Various Crops

Table 33: Quantity of Plant Nutrients in Various Crops
(Pounds of Plant Nutrient per Unit Indicated)

Crop	Yield Unit	N (Nitrogen)	P ₂ O ₅ (Phosphate)	K ₂ O (Potash)	Calcium	Magnesium	Sulfur	Copper	Manganese	Zinc
Corn (Grain)	per bu	0.67	0.35	0.25	0.01	0.05	0.08	0.0004	0.0006	0.001
	200 bu	134	70	50	2	10	16	0.08	0.12	0.20
Soybeans (Grain)	per bu	3.30	0.73	1.20	0.18	0.18	0.18	0.001	0.0013	0.001
	60 bu	198	44	84	10.8	10.80	11	0.06	0.078	0.06
Wheat (Grain)	per bu	1.20	0.48	0.29	0.015	0.15	0.10	0.0007	0.002	0.003
	60 bu	72	29	17	1.5	9	6	0.042	0.12	0.18
Cotton (Lint and Seed)	per bale	32	14	19	0.67	1.33	2.70	0.02	0.037	0.107
	2 bale	64	28	38	1.34	2.66	5.40	0.04	0.074	0.214
Sorghum (Grain)	per bu	0.66	0.39	0.27	0.067	0.083	0.06	0.000167	0.0007	0.00067
	100 bu	66	39	27	6.7	8.30	6	0.0167	0.07	0.067
Sunflowers (Grain)	per cwt	2.70	0.97	0.90	1.20	0.20	0.25	0.002	0.002	0.005
	20 cwt	54	19	18	2.40	4.00	5	0.04	0.04	0.10
Alfalfa (Total)	per ton	51	10	49	28	5.25	5.40	0.015	0.11	0.105
	6 ton	306	60	294	168	31.50	32	0.09	0.66	0.63
Grass (Total)	per ton	32	10	46	8	3.50	5	0.01	0.15	0.04
	4 ton	128	40	184	32	14	20	0.04	0.60	0.16
Sugar Beets (Root)	per ton	3.70	2.20	7.30	2.20	0.50	0.45	0.002	0.05	0.002
	25 ton	93	55	183	55	12.50	11.30	0.05	1.25	0.05
Oats (Grain)	per bu	0.77	0.28	0.19	0.025	0.0375	0.07	0.0004	0.0015	0.0006
	80 bu	62	22	15	2	3	5.60	0.032	0.12	0.048
Potatoes (Tuber)	per cwt	0.30	0.15	33	0.015	0.03	0.03	0.0002	0.0005	0.00025
	500 cwt	150	75	60	1.50	3	15	0.02	0.05	0.025
Peanuts (Nuts)	per cwt	3.50	0.55	0.85	0.60	0.57	0.40	*	*	*
	35 cwt	123	19	30	21	19.95	14	*	*	*

*No data for this nutrient. Data collected from IPNI.

Table 35: CEC Ranges for Different Soil Textures, pH < 7.0

Sand	< 6
Sandy Loam	5 – 10
Loam	9 – 18
Silt Loam	15 – 25
Clay	> 22

Table 36: 1:1 pH Rating

< 5.4	Strongly acidic
5.4 – 5.7	Moderately acidic
5.8 – 6.2	Slightly acidic
6.3 – 7.3	Neutral
> 7.3	Alkaline

Table 37: Soluble Salt Ratings

mmho/cm	Crop Impacts
0 – 1.0	No crop hazard
1.1 – 1.5	Yield reduction on sensitive crops
1.6 – 3.5	Moderate to severe yield reduction
3.6 +	Severe yield reduction

Nitrogen and Sulfur Fertilizer Recommendation Calculations

Nitrogen Recommendations

$$N \text{ lbs/A} = (\text{Crop yield} \times N \text{ req}) - (\text{ppm topsoil NO}_3 \text{ N} \times 0.3 \times \text{depth in inches}) \\ - (\text{ppm subsoil NO}_3 \text{ N} \times 0.3 \times \text{depth in inches}) - \text{legume credit} - \text{manure credit} \\ - \text{irrigation water credit}$$

- ① If no subsoil sample, assume 2 ppm NO₃-N for sandy soils and 5 ppm NO₃-N for loamy or heavier subsoils. For more information on how soil nitrogen is tested, please refer to the [Soil Nitrate Testing](#) section of this guide.

Sulfur Recommendations

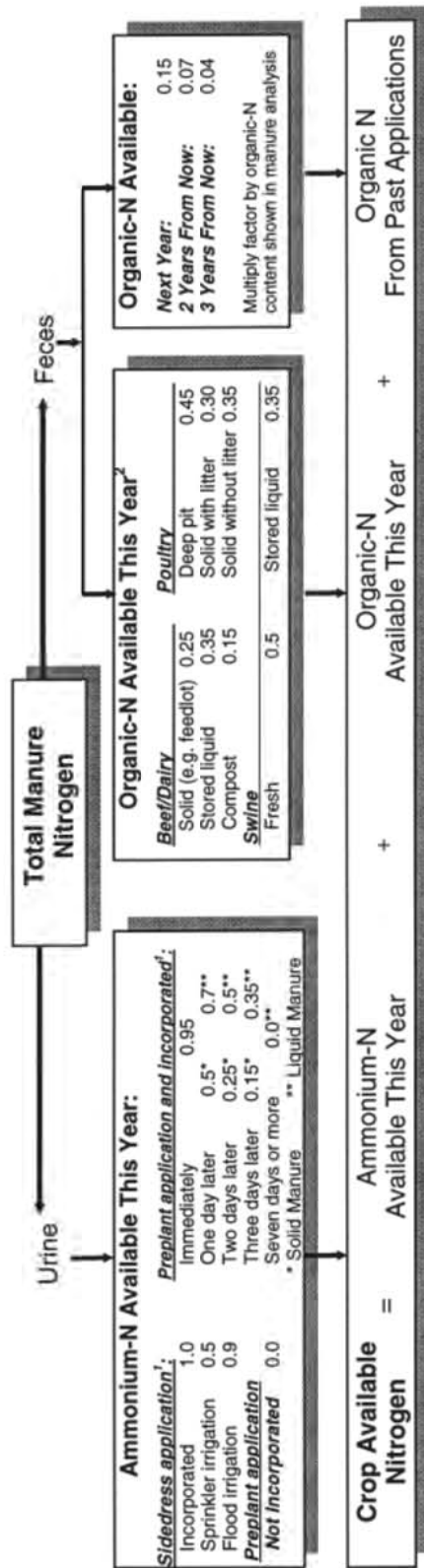
$$S \text{ rec} = \frac{S \text{ req} - \text{Soil S}}{0.8 \text{ or } 1.0}$$

- ① divide by 0.8 for sandy soils or by 1.0 for loamy and clayey soils.

S_{req} = Yield goal x S req factor

Soil S = ppm S x 0.3 x depth in inches with a maximum of 8 in.

For more information on how soil sulfur is tested, please refer to the [Soil Sulfur Testing](#) section of this guide.



¹Incorporation can be accomplished by tillage or by a 0.50 inch or greater rainfall.

²Organic-N availability assumes spring seeded crops such as corn and soybeans. For winter or spring manure application prior to planting small grains, multiply organic-N availability factor by 0.7.

Figure 2. Availability factors for manure nitrogen.

SOIL ANALYSIS METHODS

used by Midwest Laboratories, Inc.

Analysis	Method	Reference
Organic Matter	Loss of Weight on Ignition	NCR, p. 32
Phosphorus		
a. P ₁	Extraction with dilute acid and ammonium fluoride (Weak Bray)/colorimetric	NCR, p. 14-15
b. P ₂	Extraction with strong Bray solution (4 times the acid concentration of weak Bray)/colorimetric	
c. Bicarbonate P	Extraction with sodium bicarbonate/colorimetric	ASA, p. 421-422
Potassium, Magnesium, Calcium, Sodium, Sulfur	Neutral ammonium acetate (1 N) extraction/ Inductively Coupled Argon Plasma (ICAP) detection	RMST, p. 60-65 NCR, p.17-18
pH	1:1 Soil:Water mixture/combination electrode.	NCR, p. 5-8
Soil pH, Buffer index		
Cation Exchange Capacity (CEC)	a. Summation of cations, Ca ⁺⁺ , Mg ⁺⁺ , K ⁺ , Na ⁺ , and H ⁺ (see 3 & 4) b. Ammonium acetate saturation/displacement with NaCl/distillation and titration	ASA, p. 149-151
Nitrate-N	Saturated CaO Extraction/Cadmium Reduction/Segmental Flow Analysis (SFA)	NCR, p. 11
Ammonia-N, Exchangeable	Neutral salt (KCl) extraction/SFA	ASA, p. 648
Zinc, Manganese, Iron, Copper	a. DPTA extraction/ICAP detection b. 0.1 N HCl extraction ICAP detection	NCR, p.18-19 NCR, p. 19-20
Boron	DTPA/Sorbitol ICAP	NAPT
Excess Lime	1 N HCl spot test	-
Soluble Salts	Conductivity meter 1:1 Soil:Water	USDA, P. 89-90
Soil Texture	Hydrometer method	ASA, p. 549-566
Chloride	.01 M Ca(NO ₃) ₂ FIA	NCR 13, p. 26-27
Molybdenum, extractable	Acid ammonium oxalate extraction/ICAP	ASA, p. 491-493
Water Soluble Cations	1:5 Water extraction ICAP det.	RMST, p. 87
Field Capacity (1/3 Bar moisture holding capacity)	Porous plate pressure apparatus	ASTM, D 2325 (1981)
Wilting Point (15 Bar moisture holding capacity)	Porous plate pressure apparatus	ASTM, D 2325 (1981)
Bulk Density	Disturbed sample	Volume weight

References

NCR - Recommended Chemical Soil Test Procedures for the North Central Region. No. 499 (revised).
North Dakota State University.

ASA - Methods of Soil Analysis - Part 2: Chemical and Microbiological Properties, Second Edition, 1982.
American Society of Agronomy.

RMST - Handbook on Reference Methods for Soil Testing, 1974, Council on Soil Testing and Plant Analysis.

USDA - USDA Agriculture Handbook 60.

ASTM - American Society for Testing and Materials 04.08 Soil and Rock, Building Stones: Geo Textiles

Guidelines for Soil Sampling

Richard B. Ferguson, Gary W. Hergert, Charles A. Shapiro and Charles S. Wortmann
Extension Soil Specialists

Soil samples representative of a field are the best guidelines to determine fertilizer needs. This publication describes proper procedures to collect representative soil samples.

Objectives

The primary objectives of soil sampling are to determine the average nutrient status and degree of variability in a field. Correct fertilizer use, based on accurate information about soil fertility levels in fields, can result in increased crop yield, reduced cost and minimized environmental impact. Knowing a field's nutrient status variability means fertilizer application can be adjusted to more closely meet the supplemental nutrient needs of a crop for specific field areas.

General Guidelines

Determine Sampling Approach

With the development of technologies and procedures for site-specific management of fertilizer and other inputs, producers can collect and quantify information about soil nutrient variability within a field. Prior to sampling, decide how soil nutrient information will be used to manage fertilizer, and that will help determine how samples should be collected. For uniform fertilizer application, collect soil samples randomly within representative areas of the field. If variable rate fertilizer application is anticipated, sample either in predefined management zones or in a grid pattern with known sample locations.

Uniform Fertilizer Application

If fertilizer is to be applied uniformly, it still is helpful to have some idea of the variability in soil fertility within a field. Knowing this variability may allow you to adjust rates, application timing or fertilizer sources accordingly. Collect samples from subareas within fields that are relatively uniform. These areas can be determined based on soil type, slope, degree of erosion, cropping history, known crop growth differences, spatial patterns of crop yield and any other factors that may influence nutrient levels in the soil.

Avoid odd areas in the field (eroded spots, turn rows, abandoned farmsteads or feedlots), or sample them separately. Soil samples from these areas can significantly alter test results for the rest of the field. When sampling furrow-irrigated fields for residual nitrate-nitrogen, collect samples from the upper, middle and lower portions of the field (Figure 1). The amount

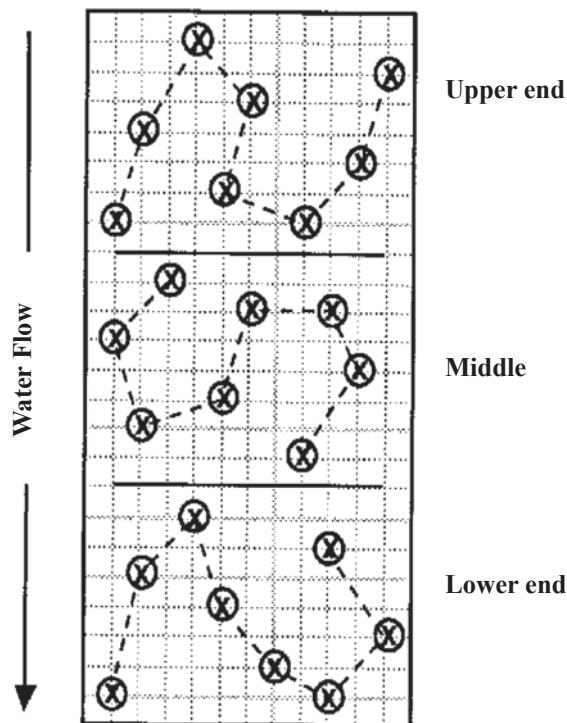


Figure 1. Dividing and sampling a furrow-irrigated field.

of irrigation water that infiltrates the soil will influence the amount and depth of nitrate-nitrogen in the soil.

Variable Rate Fertilizer Application

There are two basic approaches to soil sampling for site-specific fertilizer management — grid sampling or management zone-based sampling. Both approaches provide more detailed information about the variability of nutrient levels within a field than sampling normally done as described above for uniform fertilization. Grid sampling is more expensive and time-consuming, but can provide useful information for variable rate fertilization for several years. Management zone sampling is based on zones derived from various spatial information resources — yield maps, soil surveys, aerial photographs, soil apparent electrical conductivity, etc. Often information from several spatial data layers can be combined to derive management zones. Figure 2 illustrates grid and management zone approaches to sampling a field. More detailed information on site-specific sampling is available in two other resources — *Soil Sampling for Precision Agriculture* (EC154) and *Site-Specific Nitrogen Management for Irrigated Corn* (EC163).

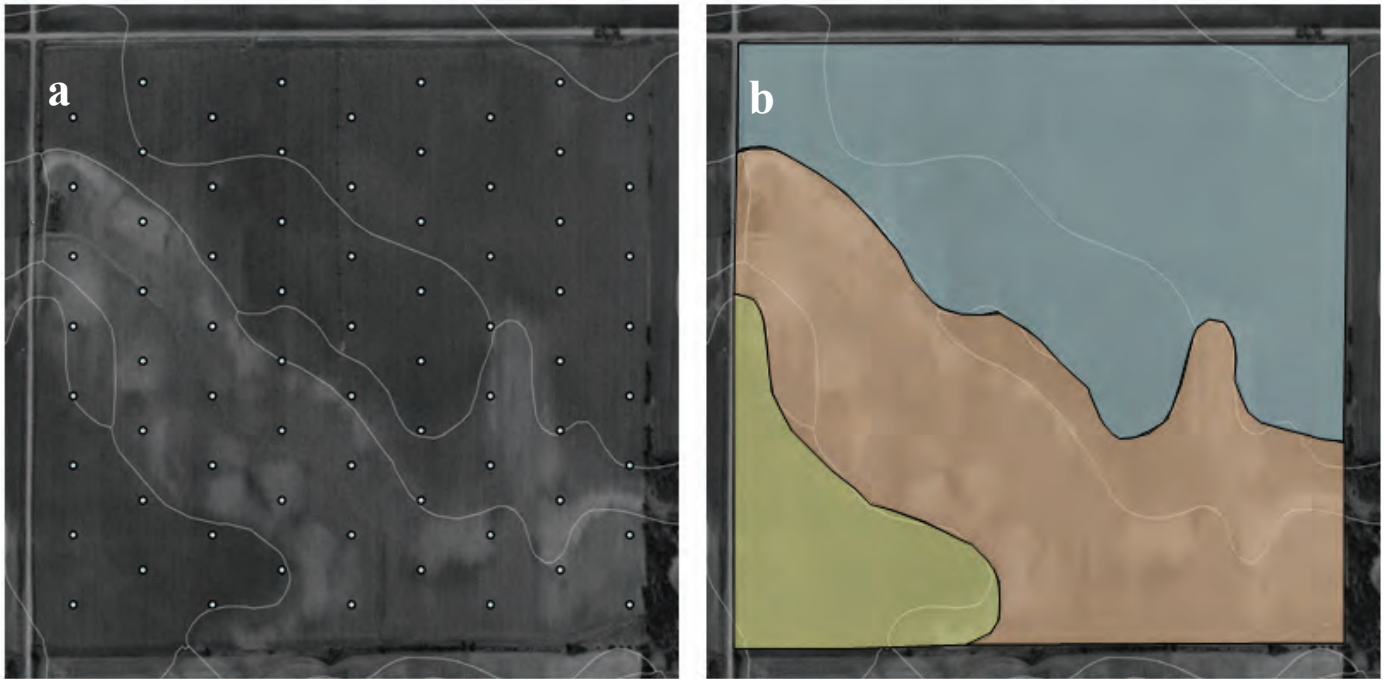


Figure 2. Examples of grid and management zone approaches to collecting soil samples. *Figure 2a* has 72 sample points. Within each of the three management zones in *Figure 2b*, 10-15 cores should be collected and composited into a sample representing each zone.

Select Proper Sampling Depth

Surface samples are used to determine soil pH, lime need, organic matter, phosphorus, potassium, sulfur and zinc. In Nebraska, soil test correlation and calibrations for these tests are based on surface samples collected from 0-8 inches. It is important to use the same sampling depth when re-sampling fields so soil test values over time can be accurately compared. Sampling deeper than 8 inches generally results in lower test values for organic matter, phosphorus and zinc. Potassium and pH may increase, decrease or remain the same with deeper samples. Surface samples are needed for all crops. Fertilizer recommendations for all nutrients except nitrogen are based on nutrient levels in the surface soil sample. Nitrogen recommendations for many crops depend on the organic matter content in the surface soil sample, as well as residual nitrate-nitrogen in surface and subsurface samples.

Stratification of soil nutrients can occur when fields have not been tilled for several years, with higher nutrient concentrations close to the soil surface, often in the top 2-3 inches. Availability of nutrients from fields where stratification exists generally is not a concern, as plant roots can effectively access nutrients at shallow depths. However, it is important to sample to the proper depth of 8 inches, with complete mixing of all cores collected prior to retention of a subsample to send to the lab. If stratification exists and samples are not collected to the proper depth or not well mixed, there is greater risk of a nonrepresentative sample and an inaccurate fertilizer recommendation.

Both surface (0-8 inches) and subsurface (below 8 inches) samples are needed to accurately estimate nitrate-nitrogen in the root zone, because nitrogen in the nitrate form moves easily with water and will leach into the subsoil. Nitrate-nitrogen in the root zone is readily used by plants. For most soils and annual crops, roots will reach a depth of 4 feet or more. To accurately predict nitrate-nitrogen in the root zone, subsurface samples should be collected to a depth of 3 feet. A

2-foot sample is the minimum sampling depth recommended for nitrate-nitrogen, and will not predict plant available nitrate-nitrogen as accurately as a deeper sample. For crops with shallow root zones, such as dry beans, canola and millet, a 2-foot sample is adequate. If rooting depth is limited because of coarse sand or gravel, rock or a high water table, sample to the depth possible. Nitrogen fertilizer recommendations for several crops grown in Nebraska are based on the amount of nitrate-nitrogen in the root zone determined from subsurface samples, as well as organic matter content in the surface sample. If subsurface samples for nitrate-nitrogen aren't taken, nitrogen recommendations for crops will be based on historical average values of nitrate-nitrogen in the root zone, and the accuracy of fertilizer recommendations may decrease.

Collect Soil Cores

A soil core is an individual sample collected at one spot in the field. For each area of the field to be sampled, collect cores randomly throughout the area, unless information is being collected for site-specific fertilizer management. Take care to adequately represent the entire area when sampling. Be sure to sample the entire 0-8 inch layer for general fertility analysis. Place individual soil cores in a clean plastic pail for mixing. Separate pails should be used for subsurface samples. Break up and thoroughly mix soil cores in each pail after collecting samples over the entire area. After mixing, retain a portion of the mixed soil and place it in a properly labeled sample bag or box to send to the laboratory for analysis. Typically, a sample of a pint volume, or one pound in weight, will be adequate for analysis. The sample label should include the producer's name, field ID, sample ID, and depth of sample (*Figure 3*).

The University of Nebraska–Lincoln recommends that samples represent fields or areas within fields no larger than 40 acres. Larger areas may contain enough variability in soil properties and nutrient values to render the average soil test level from a single sample meaningless. Sampling field areas

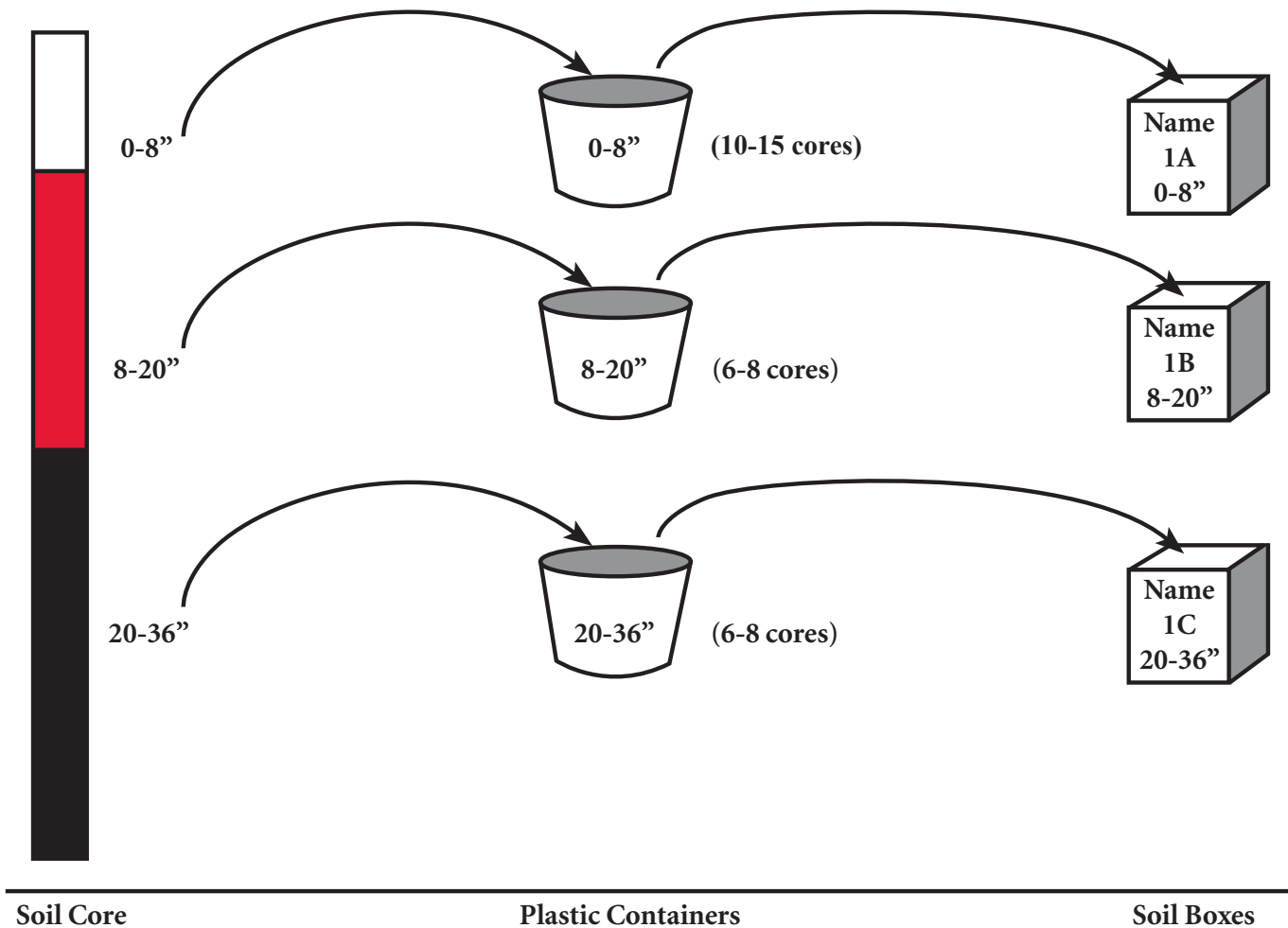


Figure 3. Division of soil cores by depth, with retention of a well-mixed subsample into labeled boxes or sample bags.

smaller than 40 acres in size can increase the accuracy of the test, and provide a measure of variability across the field.

Acceptable measurement of the average nutrient status in a 40-acre area can be obtained with 10 to 15 randomly collected surface cores and six to eight subsoil cores for nitrate-nitrogen analysis. For furrow-irrigated fields, four to five subsurface cores per 20 acres generally will provide more useful estimates of nitrate-nitrogen than six to eight cores per 40 acres, provided the field is divided into upper, middle and lower portions based on the direction of water flow across the field.

Subsurface samples should be continuous to the bottom of the core. For example, with a surface sample of 0-8 inches, collect the subsurface sample from 8-36 inches. However, information about the vertical distribution of nitrate-nitrogen in the field can be obtained if the subsoil sample is broken into segments. A surface sample of 0-8 inches, combined with a subsoil sample separated into depth increments of 8-20 and 20-36 inches, has several advantages over a single subsurface sample. It is difficult to obtain a well-mixed, representative sample from multiple cores covering a large depth range. Variations in soil texture and moisture by depth, coupled with the large volume of soil involved, make mixing difficult. Also, nitrate-nitrogen concentration in the subsoil is likely to vary with depth. The normal pattern is for nitrate-nitrogen

concentrations to decrease with depth, but that is not always the case. If nitrate-nitrogen concentrations increase at deeper depths, perhaps caused by dry growing conditions followed by improved moisture and increased crop nitrogen removal, the availability of nitrate-nitrogen in the subsoil may be over-estimated. *Figure 4* illustrates two situations where the total amount of root zone nitrate-nitrogen is the same. *Figure 4a* is typical. *Figure 4b* has a significant amount of nitrate-nitrogen deeper in the root zone, which may result in the deeper nitrate-nitrogen leaching below the root zone before crop roots can reach it. For situations like that in *Figure 4b*, it is appropriate to increase nitrogen fertilizer rate recommendations because of uncertainty regarding availability of nitrate-nitrogen deep in the root zone.

Soil Sampling Equipment

Surface soil samples can be collected using a soil probe or soil auger. The soil probe is the most desirable tool for collecting soil samples. It will give a continuous core with minimal disturbance of the soil. Cores can be subdivided for various depth increments. In many soils, a probe can be placed back into the hole left by sampling the surface layer to collect a subsoil sample. Normally very little contamination occurs from one depth to another with a soil probe. A

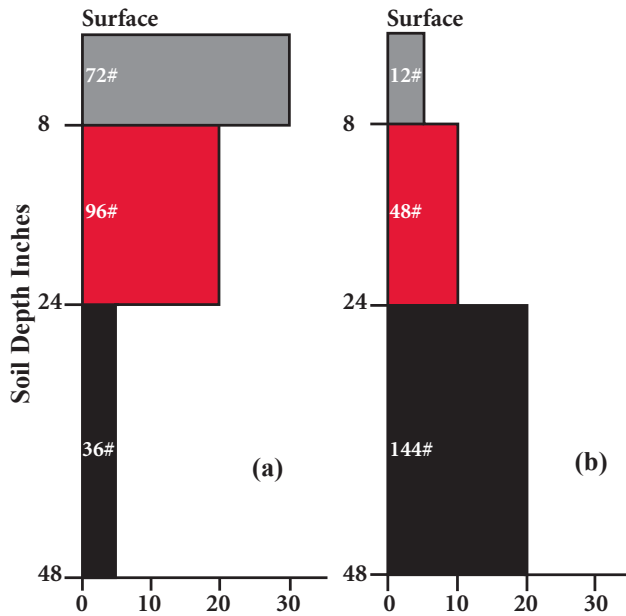


Figure 4. Two potential patterns of vertical distribution of nitrate-N in the root zone. Both contain 204 lb nitrate-N/acre.

soil probe cannot be used when the soil is too wet, too dry, rocky or frozen. High clay content soils can be difficult to sample with a probe, but most problems can be avoided by using a tip intended for high clay soils; avoiding very wet or dry conditions; lubricating the probe with silicone spray; and using a probe that is in good condition.

A soil auger can be used in soils that are frozen or contain gravel; however, care must be taken to obtain representative samples and to avoid mixing soil from different depths. If soils are too wet or dry when sampled with an auger, mixing soil from different depths can occur. A soil auger will not effectively gather dry, powdery soils. Use a soil auger only if a soil probe cannot be used or is unavailable.

A variety of hydraulic or mechanical samplers are available for collecting both surface and subsurface samples. Generally these are designed to push soil probes into the soil, but some may have rotary heads allowing the use of an auger. For commercial use or when sampling many fields, these samplers can be very helpful.

Time of Sampling

Late fall or early winter is a good time for soil sampling, except for testing nitrate-nitrogen on coarse-textured soils. Fall sampling allows more time to get results back from the laboratory and to use the information in designing the fertilizer management program for the following year.

Fall samples should provide meaningful results for all nutrients. However, excessive precipitation between the time of sampling and when crops are grown the next year may result in some leaching of nitrate-nitrogen — either deeper in the root zone, or out of the root zone altogether. If more than 8 inches of effective precipitation (total amount that percolates into the soil) occurs on fine-textured soils, or 4 inches on coarse-textured soils, between the time of sampling and the time the crop is planted, leaching losses of nitrate-nitrogen may have occurred. If leaching loss of nitrate-nitrogen in the root zone is suspected due to winter or spring precipitation, re-sample the field.

Spring sampling prior to planting is the preferred option. Delaying sampling until spring allows soil moisture in the root zone to be replenished, thus easing sampling on many soils. The distribution of nitrate-nitrogen in the subsoil is more likely to be representative of conditions during the growing season with spring sampling.

Handling of Samples

Be careful to avoid contamination when collecting soil samples. Use clean sampling equipment and plastic buckets to receive and mix soil samples. Do not leave samples moist and warm for more than 24 hours after collection. If moist soil samples are stored for extended periods of time, additional mineralization from soil organic matter can occur, increasing soil nitrate concentrations, and perhaps affecting other nutrients as well. If samples cannot be taken to the lab within 24 hours after collection, they should be dried, refrigerated or frozen. Dry soil samples by spreading them out to air dry at room temperature for two to three days, depending on air circulation and humidity. Do not dry soil samples at high temperatures, as this can affect the analysis. Avoid contaminating samples while drying, such as with wind-blown dust. Refrigerating or freezing samples will slow or stop microbial activity adequately until the samples can be dried and ground at the lab.

Acknowledgments

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Index: Soil Management Fertility

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Manure Testing for Nutrient Content

Charles S. Wortmann, Nutrient Management Specialist; Charles A. Shapiro, Extension Soils Specialist; and Amy M. Schmidt, Livestock Bioenvironmental Engineer

This publication contains guidelines for determining manure nutrient content to improve crop and soil management. Manure testing combined with agronomically sound nutrient management and uniform application optimizes manure nutrient use while protecting water resources.

Manure and Soil Fertility Management

Animal manure has long been recognized as a source of nutrients for crop growth. When substituting manure for chemical fertilizers, farmers need to know the amounts of nutrients supplied to crops in the manure to properly adjust commercial fertilizer rates to meet crop needs while minimizing contamination of water supplies through leaching or runoff.

Typical values for the nutrient content of different animal manures are available in other extension publications, but actual nutrient values can differ significantly from farm to farm due to variations in manure storage and handling conditions, livestock type and age, ration formulation, and other management practices. Weather conditions and variations in management practices can cause manure nutrient contents to vary from month to month and from year to year on the same farm. To determine the nutrient content of manure, submit samples for analysis to one of the laboratories serving Nebraska livestock producers (see Page 4).

Sampling Manure for Nutrient Analysis

If manure is tested before land application, the results can be used to adjust application rates. This may not be practical, however, and livestock feeding operations that are consistent in their feeding and manure management practices can determine application rates based on the average results of past manure analyses. Samples collected at the time of application have several advantages: The manure is mixed and similar to what is being applied; storage and handling losses do not need to be estimated; analysis results can be used to determine if additional nitrogen or other nutrients will be needed; and current analysis records are valuable for maintaining records of manure application.

The manure sample must be properly collected and handled to ensure reliable results. As explained in the following subsection, samples need to be composed of several subsamples for various types of manure to represent the available nutrients. The minimum numbers of subsamples suggested in this document are based upon generating a reliable estimate of manure nitrogen availability.



Figure 1. A soil probe can help provide a representative sample.

Solid and Semisolid Manure

Manure with greater than 20 percent dry matter is considered solid manure while manure with 10-20 percent dry matter is considered semisolid. While a spade can be used to sample a manure pile, more representative samples can be obtained using an auger or soil probe, which can reach deep into a manure pile (Figures 1 and 2).

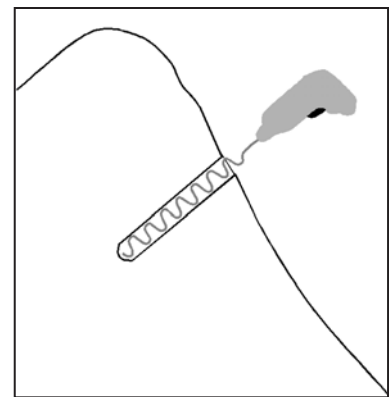


Figure 2. Using an auger bit to sample a manure pile.

Compared to sampling in open lots or from manure piles, sampling during or after loading the manure spreader is preferred because manure is mixed during loading and a more representative sample is obtained. When sampling during manure loading, a few handfuls — or “grab samples” — of manure should be collected from each spreader load and placed in a clean plastic bucket. The samples should then be thoroughly mixed and a single sample collected from the bucket for analysis. If several spreader loads of manure are being hauled, grab samples should be collected from at least 10 spreader loads to form a composite sample.

Manure can be sampled from open lots by scraping together manure in at least 20 areas of the feedlot and putting grab samples into a 5-gallon plastic bucket. The collection points should be representative of the entire feedlot area from which manure will be removed for spreading. Wet areas near water-



Figure 3. Place solid manure samples in a resealable freezer bag.

Subsampling and Packaging Solid Manure Samples

During sampling, put the manure in a five-gallon bucket and break up the lumps (Figure 3). Mix manure well and subsample enough to fill a resealable, quart-sized freezer bag. Squeeze the bag to remove excess air and seal. Put the bag into a second resealable bag to further ensure against leakage. Refrigerate if the sample cannot be sent to the laboratory immediately. Freeze the sample if delivery will be delayed by several days.

ing points may have a different analysis than manure scraped from mounds. Carefully consider where to sample to obtain a sample that represents the manure that will be land applied. Avoid getting hay or other feedstuffs in the sample.

Manure that is stacked can be sampled by following a few simple rules: The surface crust of the pile should not be included. Rather, begin sampling at least 6 inches below the pile surface. Grab samples should be taken from at least 15 locations in a manure stack, including from the center of the stack. Recent research indicates that taking 30 samples minimizes error.

Solid manure can also be collected during application by spreading a plastic sheet or tarp measuring at least 4 feet by 4 feet in the path of the applicator. After the spreader passes, the manure on the tarp should be weighed. Manure should be gathered in this way five to six times during application, mixed thoroughly, and subsampled. An advantage of this method is that the manure spreader can be calibrated simultaneously. The number of pounds of manure collected on a tarp of 22 square feet — 5.5 feet by 4 feet — equals the number of tons per acre. If a differently sized tarp is used, the application rate can be calculated as shown:

$$\text{Application Rate} \left(\frac{\text{tons}}{\text{acre}} \right) = \frac{\text{lb of manure}}{\text{area of tarp (ft}^2\text{)}} \times 21.78$$

Slurry and Liquid Manure

Manure having 4 to 10 percent dry matter is considered slurry, while liquid manure has less than 4 percent dry matter by weight. Because these types of manure tend to contain a variety of suspended and settleable solids, causing the manure to become stratified, sampling during pumping is recommended to obtain a representative sample. The concentration of phosphorus can be two to eight times greater at a 14-foot depth compared to a 2-foot depth. Nitrogen concentration can be twice as high at the 14-foot depth as near the surface. Therefore, reliability of slurry or liquid manure analysis results is best with agitation.



Figure 4. Liquid out of pump.

Good mixing of manure in a storage facility may require two to four hours of agitation before manure removal and continued mixing during the emptying process.

Collect a sample in a clean container from the pump during loading, or when pumping to an irrigation system or an umbilical cord applicator (Figure 4). Samples can be taken from the unloading port of a tank spreader immediately after loading. Do this for several loads or several times during pumping to ensure a representative sample. Be sure the sampling port does not have an accumulation of solids.

If sampling directly from the storage facility is the only option, a tool made with PVC pipe may be useful for vertical sampling (Figure 5). Again, it is ideal to collect the sample during or immediately following agitation. If a storage structure is sampled without agitation, it is especially important to obtain manure from the various depths due to stratification of the nutrients. A good estimate of manure nitrogen content of liquid manure sampled from unagitated storage requires at least 20 subsamples.

*It is hazardous to sample slurry and liquid manures from inside a building storage (e.g., a deep pit under a slatted floor) due to the possibility of falling into the storage unit or breathing potentially lethal gases emitted during agitation of manure in enclosed pits or tanks. To protect animals and workers, all people and animals should be removed from the building during agitation, and all available ventilation options should be implemented, including opening curtains, running ventilation fans, and opening other vents. Take additional precautions: Wear gloves and have someone else present when you are in the building. **Never enter confined manure storage areas without the appropriate safety equipment.***

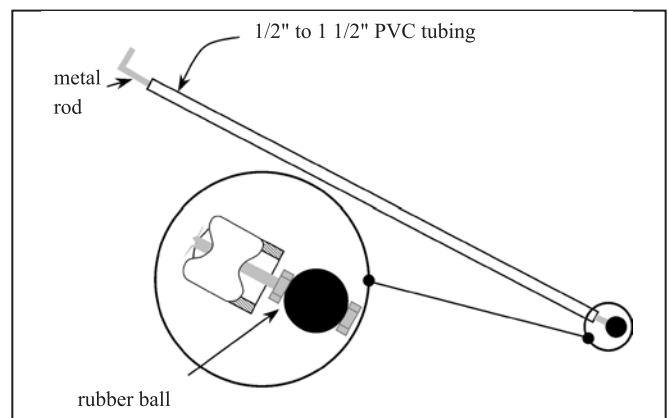


Figure 5. PVC pipe sampler.

Laboratory Analysis

Tests Desired

The tests most frequently needed to optimize nutrient management are total and ammonium nitrogen, phosphorus, pH, soluble salts, sodium, and dry matter content.

Nitrogen. Manure contains both organic and inorganic forms of nitrogen. Ammonium-N is the primary inorganic form in manure and is readily available to crops. Nitrate-N is usually too small to affect management decisions, unless the manure is composted. Organic nitrogen is determined as the difference between total nitrogen and inorganic nitrogen. Organic nitrogen becomes available to plants as manure decomposes, with 20 to 50 percent of organic nitrogen available to the first crop after application. Much of the remaining organic nitrogen becomes available in subsequent years.

Phosphorus. Most manure phosphorus (about 75 percent) is in inorganic forms. Phosphorus analysis allows calculation

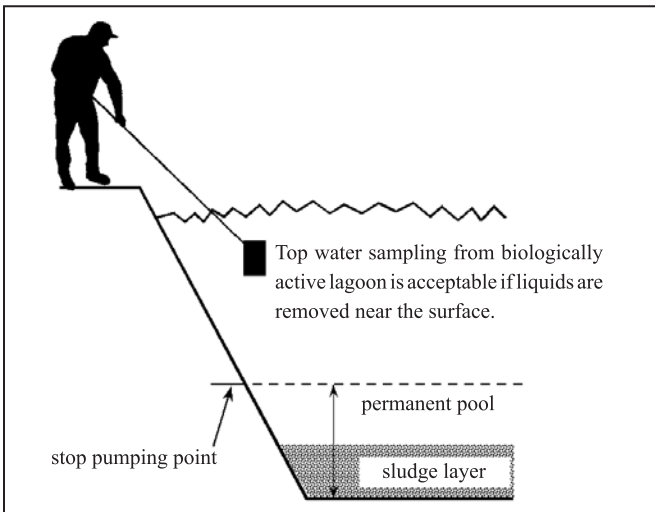


Figure 6. Sampling from a lagoon.

Anaerobic Lagoons

Anaerobic lagoons are not usually agitated before manure removal. When sampled from May through November, the top layer from the surface to the interface with the sludge layer (i.e., effluent) is fairly uniform in nutrient concentration due to biological mixing. If anaerobic lagoons are pumped from near the surface, a representative effluent sample can be obtained by taking several surface samples with a small container attached to a 10-foot pole (Figure 6). Floating solids on the lagoon surface and near the edge of the lagoon should be avoided as these can misrepresent actual nutrient content of the liquid.

Liquid manure applied through sprinkler irrigation systems also can be collected during application. Place collection pans or buckets at eight or more points throughout the application area to collect the manure. This accounts for any dilution if water is added to the manure and for ammonium losses during application; however, ammonium losses from the soil surface will not be accounted for by collecting samples after sprinkler irrigation.

Labeling, Shipping, and Analysis of Samples

Label the sample container for identification, including your name and address, your sample identification, the date of sampling, manure type, and the sample location. Provide additional information with the sample as requested by the laboratory. A link to a generic manure sample submission form is included at the end of this NebGuide. It includes information useful in making a manure application recommendation. Each laboratory has its own sample forms, so check with the lab to determine what information will be required.

If it will take more than a few hours to deliver the sample, it should be refrigerated or frozen to prevent nutrient losses and transformations. Keep in mind that freezing samples will cause them to expand so containers should not be filled completely to the top. If kept at room temperature, the manure may eventually ferment or decompose, with significant breakdown of the solids. Avoid leaving samples in a vehicle where they can become very warm.

If the sample will be shipped, keep the sample chilled during shipping by packing it in an insulated container or wrapping it in layers of newspaper. Cold packs may be added. Avoid weekend delays in shipping by sending it early in the week.



Figure 7. Put liquid manure samples in plastic, screw-topped containers.



Figure 8. Seal liquid manure samples carefully.

Subsampling and Packaging Liquid of Slurry Manure Samples

During sampling, collect the manure in a five-gallon bucket. Mix well and remove a subsample while the sample is still swirling. Put the subsample in a pint-sized plastic, screw-topped container that can be tightly closed (Figure 7). Never use glass containers. Fill the bottle to 1-2 inches from the top and seal the lid with tape to ensure that it does not become unscrewed (Figure 8). Put the sample in a resealable plastic bag. Chill the sample and send or deliver to the laboratory within a few days. Freeze the sample if delivery will be delayed.

of the most economical manure rates while avoiding overapplication of phosphorus, which can have severe consequences to surface waters.

Other tests. Tests for potassium, sulfur, zinc, and other nutrients may be useful. When manure is applied to meet nitrogen or phosphorus needs, other nutrients are generally adequate for soils in Nebraska. If liquid manure is applied to a crop through sprinkler irrigation, testing for soluble salts, or electrical conductivity (EC), helps predict if there might be potential for leaf burning (See <http://www.ianrpubs.unl.edu/sendIt/ec778.pdf>). Information on soluble salt content or EC is useful in managing anaerobic lagoons. When the surface of a lagoon has a purple color, the microbial processes are functioning well and the odor is less.

Report Information

Units. Specify if the results should be reported in pounds of nutrient per ton (spreader), per 1,000 gallons (tanks or umbilical cord), or per acre-inch (irrigation). This depends on your application method. Phosphorus and potassium should be reported in the oxide form (P_2O_5 and K_2O) so their fertilizer value is easy to calculate.

Moisture. Reporting the results on an “as is” or “wet” basis allows a producer to determine the nutrient application rate without adjusting for water content.

Nutrient availability. Laboratories can estimate the amount of nutrients available in the first year, and the amount of manure nitrogen that will be available during following years. This is especially important for solid manures.

Application basis. Manure is often applied on a “nitrogen basis” to supply enough nitrogen to meet crop needs. When soil test phosphorus is excessive, manure may be applied on a “phosphorus basis” that is at a rate sufficient to match phosphorus removal by the crop.

Land Application and Rate Determination

Some manure nutrients will not be available to the crop in the season following application. The laboratory report should give an estimate of nutrients available to the first crop following manure application as well as total nutrient content. For example, 20-50 percent of the organic nitrogen should be available to the first crop, depending on the manure type; much of the remaining organic nitrogen becomes available in following years. The report also may provide an estimate of ammonium-nitrogen losses, which will vary with application and incorporation practices.

Nebraska Laboratories Providing Manure Testing Services

Midwest Laboratories 13611 “B” St. Omaha, NE 68144 402-334-7770 https://www.midwestlabs.com/	Olsen’s Agricultural Laboratory 210 E. 1st St., P.O. Box 370 McCook, NE 69001 308-345-3670 http://www.olsenlab.com/	Platte Valley Laboratories 914 Hwy. 30, P.O. Box 807 Gibbon, NE 68840 308-468-5975 http://www.soillab.com/	Servi-Tech Laboratories 1602 Park West Dr., P.O. Box 169 Hastings, NE 68902 402-463-3522 800-557-7509 http://www.servitechlabs.com	Ward Laboratories 4007 Cherry Ave., P.O. Box 788 Kearney, NE 68848-0788 308-234-2418 800-887-7645 http://www.wardlab.com/
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This publication has been peer reviewed.



**Generic Manure Sample
Submission Form**

Disclaimer

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

UNL Extension publications are available online at <http://extension.unl.edu/publications>.
 Manure-related extension publications are available online at <http://manure.unl.edu>.

**Index: Waste Management
Waste Resource Management**

2002-2009, Revised June 2014

Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln cooperating with the Counties and the United States Department of Agriculture.

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2019 STATE AGRICULTURE OVERVIEW

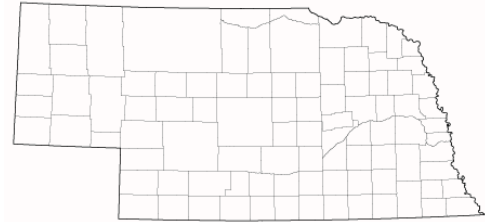
Nebraska

† Survey Data from [Quick Stats](#) as of: Jan/11/2021

Farms Operations †

Farm Operations - Area Operated, Measured in Acres / Operation
 Farm Operations - Number of Operations
 Farm Operations - Acres Operated

982
 45,700
 44,900,000



Livestock Inventory †

Cattle, Cows, Beef - Inventory (First of Jan. 2020)
 Cattle, Cows, Milk - Inventory (First of Jan. 2020)
 Cattle, Incl Calves - Inventory (First of Jan. 2020)
 Cattle, On Feed - Inventory (First of Jan. 2020)
 Goats, Milk - Inventory (First of Jan. 2020)
 Sheep, Incl Lambs - Inventory (First of Jan. 2020)
 Hogs - Inventory (First of Dec. 2019)

1,922,000
 58,000
 6,800,000
 2,600,000
 3,500
 78,000
 3,800,000

Milk Production †

Milk - Production, Measured in Lb / Head
 Milk - Production, Measured in \$
 Milk - Production, Measured in Lb

24,293
 259,256,000
 1,409,000,000

Crops - Planted, Harvested, Yield, Production, Price (MYA), Value of Production † Sorted by Value of Production in Dollars

Commodity	Planted All Purpose Acres	Harvested Acres	Yield	Production	Price per Unit	Value of Production in Dollars
CORN						
CORN, GRAIN		9,810,000	182 BU / ACRE	1,785,420,000 BU	3.52 \$ / BU	6,784,596,000
CORN, SILAGE		200,000	23 TONS / ACRE	4,600,000 TONS		
CORN	10,100,000					
SOYBEANS						
SOYBEANS	4,900,000	4,840,000	58.5 BU / ACRE	283,140,000 BU	8.27 \$ / BU	2,378,376,000
HAY & HAYLAGE						
HAY & HAYLAGE		2,505,000	2.5 TONS / ACRE, DRY BASIS	6,258,000 TONS, DRY BASIS		632,346,000
HAY & HAYLAGE, ALFALFA	140,000	990,000	3.75 TONS / ACRE, DRY BASIS	3,711,000 TONS, DRY BASIS		408,210,000
HAY & HAYLAGE, (EXCL ALFALFA)		1,515,000	1.68 TONS / ACRE, DRY BASIS	2,547,000 TONS, DRY BASIS		224,136,000
HAY						
HAY		2,450,000	2.48 TONS / ACRE	6,085,000 TONS	103 \$ / TON	614,900,000
HAY, ALFALFA		950,000	3.8 TONS / ACRE	3,610,000 TONS	109 \$ / TON	397,100,000
HAY, (EXCL ALFALFA)		1,500,000	1.65 TONS / ACRE	2,475,000 TONS	87 \$ / TON	217,800,000
WHEAT						
WHEAT, WINTER	1,070,000	970,000	57 BU / ACRE	55,290,000 BU	3.88 \$ / BU	210,102,000
WHEAT	1,070,000	970,000	57 BU / ACRE	55,290,000 BU	3.88 \$ / BU	210,102,000
WHEAT, WINTER, IRRIGATED	100,000	87,000	82.1 BU / ACRE	7,141,000 BU		
WHEAT, WINTER, NON-IRRIGATED	970,000	883,000	54.5 BU / ACRE	48,149,000 BU		
POTATOES						
POTATOES	20,500	20,200	475 CWT / ACRE	9,595,000 CWT	11.4 \$ / CWT	109,383,000
SORGHUM						
SORGHUM, GRAIN		130,000	93 BU / ACRE	12,090,000 BU	5.58 \$ / CWT	39,607,000
SORGHUM	200,000					
SORGHUM, SILAGE		60,000	10 TONS / ACRE	600,000 TONS		
MILLET						
MILLET, PROSO	115,000	106,000	31 BU / ACRE	3,286,000 BU	5.25 \$ / BU	15,411,000
SUNFLOWER						
SUNFLOWER	37,000	34,500	1,300 LB / ACRE	44,850,000 LB	18.7 \$ / CWT	8,067,000
PEAS						
PEAS, DRY EDIBLE	31,000	29,000	2,300 LB / ACRE	667,000 CWT	10.7 \$ / CWT	7,270,000
OATS						
OATS	120,000	18,000	63 BU / ACRE	1,134,000 BU	3.09 \$ / BU	3,402,000
HAYLAGE						
HAYLAGE		75,000	4.67 TONS / ACRE	350,000 TONS		
HAYLAGE, ALFALFA		50,000	4.1 TONS / ACRE	205,000 TONS		
HAYLAGE, (EXCL ALFALFA)		25,000	5.8 TONS / ACRE	145,000 TONS		
SUGARBEETS						
SUGARBEETS	44,000	42,100	25.4 TONS / ACRE	1,069,000 TONS		

(NA) Not Available
 (D) Withheld to avoid disclosing data for individual operations
 (S) Insufficient number of reports to establish an estimate
 (X) Not Applicable
 (Z) Less than half the rounding unit

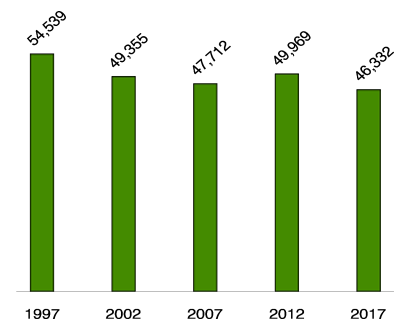


Nebraska

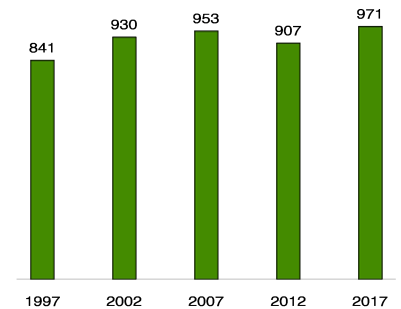
Total and Per Farm Overview, 2017 and change since 2012

	2017	% change since 2012
Number of farms	46,332	-7
Land in farms (acres)	44,986,821	-1
Average size of farm (acres)	971	+7
Total (\$)		
Market value of products sold	21,983,430,000	-5
Government payments	639,975,000	+63
Farm-related income	816,749,000	-28
Total farm production expenses	19,371,074,000	+1
Net cash farm income	4,069,079,000	-25
Per farm average (\$)		
Market value of products sold	474,476	+3
Government payments (average per farm receiving)	20,745	+81
Farm-related income	28,619	-23
Total farm production expenses	418,093	+9
Net cash farm income	87,824	-19

Number of Farms, 1997-2017



Average Farm Size, 1997-2017 (acres)



Farms by Value of Sales

	Number	Percent of Total ^a
Less than \$2,500	9,997	22
\$2,500 to \$4,999	2,198	5
\$5,000 to \$9,999	2,646	6
\$10,000 to \$24,999	3,683	8
\$25,000 to \$49,999	3,600	8
\$50,000 to \$99,999	4,597	10
\$100,000 or more	19,611	42

Farms by Size

	Number	Percent of Total ^a
1 to 9 acres	3,385	7
10 to 49 acres	7,641	16
50 to 179 acres	9,011	19
180 to 499 acres	8,689	19
500 to 999 acres	6,593	14
1,000 + acres	11,013	24

Market Value of Agricultural Products Sold

	Sales (\$1,000)	Rank in U.S. ^b	States Producing Item
Total	21,983,430	4	50
Crops	9,311,007	5	50
Grains, oilseeds, dry beans, dry peas	8,910,588	3	50
Tobacco	-	-	18
Cotton and cottonseed	-	-	17
Vegetables, melons, potatoes, sweet potatoes	93,461	27	50
Fruits, tree nuts, berries	3,431	44	50
Nursery, greenhouse, floriculture, sod	51,771	38	50
Cultivated Christmas trees, short rotation woody crops	506	36	50
Other crops and hay	251,250	20	50
Livestock, poultry, and products	12,672,422	3	50
Poultry and eggs	194,462	30	50
Cattle and calves	10,641,897	3	50
Milk from cows	287,974	25	50
Hogs and pigs	1,489,081	5	50
Sheep, goats, wool, mohair, milk	11,927	24	50
Horses, ponies, mules, burros, donkeys	15,755	25	50
Aquaculture	4,118	40	50
Other animals and animal products	27,208	16	50

6 Percent of U.S. agriculture sales

Share of Sales by Type (%)

Crops	42
Livestock, poultry, and products	58

Land in Farms by Use (acres)

Cropland	22,242,599
Pastureland	21,531,851
Woodland	352,535
Other	859,836

Top Counties: Land in Farms (acres)

Cherry	3,562,961
Sheridan	1,561,598
Custer	1,505,139
Holt	1,393,478
Lincoln	1,356,769

Total Producers ^c 77,097

Sex

Male	52,367
Female	24,730

Age

<35	8,226
35 – 64	45,084
65 and older	23,787

Race

American Indian/Alaska Native	94
Asian	40
Black or African American	22
Native Hawaiian/Pacific Islander	11
White	76,801
More than one race	129

Other characteristics

Hispanic, Latino, Spanish origin	540
With military service	6,965
New and beginning farmers	16,740

Percent of farms that:

Have internet access **81**

Farm organically **1**

Sell directly to consumers **3**

Hire farm labor **33**

Are family farms **95**

Top Crops in Acres ^d

Corn for grain	9,455,031
Soybeans for beans	5,664,225
Forage (hay/haylage), all	2,390,550
Wheat for grain, all	1,060,786
Corn for silage or greenchop	210,622

Livestock Inventory (Dec 31, 2017)

Broilers and other meat-type chickens	1,224,889
Cattle and calves	6,759,945
Goats	29,063
Hogs and pigs	3,584,756
Horses and ponies	48,596
Layers	7,353,761
Pullets	2,042,880
Sheep and lambs	63,043
Turkeys	(D)

See 2017 Census of Agriculture, U.S. Summary and State Data, for complete footnotes, explanations, definitions, commodity descriptions, and methodology.

^a May not add to 100% due to rounding. ^b Among states whose rank can be displayed. ^c Data collected for a maximum of four producers per farm.

^d Crop commodity names may be shortened; see full names at www.nass.usda.gov/go/cropnames.pdf. ^e Position below the line does not indicate rank.

(D) Withheld to avoid disclosing data for individual operations. (NA) Not available. (Z) Less than half of the unit shown. (-) Represents zero.

Manure Sales Agreement

Seller: Ron Bruns Feedyards-East Place

Date: _____

Address: 1539 Highway 16

Pender, NE 68047

Buyer: _____

Address: _____

Phone: _____

Application Details

Annual Acres Available: _____

Previous crop(s): _____ Planned crop(s): _____ Yield Goal: _____

Application fee: **current custom applicator rates determined by custom applicator**

Application rate to be determined by buyer.

Payment Terms: Due 30 days post completion of application. Seller reserves the right to file a lien against the crops of the stated fields in the event of non-payment.

Seller and Buyer agree to the above stated field details regarding the application of manure fertilizer on said fields. It will be the buyer's responsibility to notify seller when the fields are ready for application or stockpiling. Seller will supply manure fertilizer on a first available basis to its buyers. The buyer will control the application rate and timing of application of manure fertilizer and will pay the seller the above fee for custom application of the product. Seller shall be excused for failure to provide a saleable product under this agreement by labor problems, adverse weather, acts of God or other events beyond seller's control.

The seller and Nutrient Advisors will provide buyer with current laboratory results of the manure fertilizer product. Nutrient Advisors will use current soil sample analysis of each field and provide recommendations only for the said fields. The buyer will not apply supplemental commercial fertilizers in excess of recommended rates provided by Nutrient Advisors. These recommendations will be itemized on the nutrient budgets provided to buyer for each application site. The seller and Nutrient Advisors shall not be held liable for crop failures or economic losses from buyer's decisions. By signing this agreement and notifying seller of field availability, the buyer shall have determined that the manure fertilizer product is good and acceptable for its uses. The seller and Nutrient Advisors makes no expressed or implied representations and warranties beyond what is represented by the laboratory analysis. In no event shall seller be liable to buyer for any consequential or incidental damages in connection with the performance of the manure fertilizer product or its application. The buyer or seller shall have the right to cease applications at any time in the event that either party is dissatisfied. In this event, the buyer shall be responsible to pay seller for tons or acres of the contract that were delivered upon prior to ceasing.

Seller: _____

Buyer: _____

By: _____

By: _____

Date: _____

Date: _____