

# Varel Dairy, Inc.

## Livestock Operation Owner(s)

**Owner 1 Name** Eric Varel  
**Address:** 13094 Pioneer Rd.  
**City, State, Zip** Bartelso IL 62218  
**Phone** (618) 765-2548 **Work Phone** (618) 765-2216  
**Cell Phone** **Pager**  
**Fax #**  
**E-mail Address**

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**Owner 2 Name** Jason Varel  
**Address** 7304 Twin Levee Rd.  
**City, State, Zip** Bartelso IL 62218  
**Phone** **Work Phone** (618) 765-2216  
**Cell Phone** **Pager**  
**Fax #**  
**E-mail Address**

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**Owner 3 Name** Jesse Varel  
**Address** 7300 Twin Levee Rd.  
**City, State, Zip** Bartelso IL 62218  
**Phone** **Work Phone** (618) 765-2216  
**Cell Phone** **Pager**  
**Fax #**  
**E-mail Address**

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**Owner 4 Name**  
**Address**  
**City, State, IL**  
**Phone** **Work Phone**  
**Cell Phone** **Pager**  
**Fax #**  
**E-mail Address**

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## Livestock Facility Manager

**Name** Eric Varel  
**Address** 7300 Twin Levee Rd.  
**City, State, Zip** Bartelso IL 62218  
**Phone** **Work Phone** (618) 765-2216  
**Cell Phone** **Pager**  
**Fax #**  
**Email Address**  
**Certificate #**  
**Expiration Date**

# Varel Dairy, Inc.

## Facility Location and Directions

**Address** 7300 Twin Levee Rd  
**City, State, Zip** Bartelso IL 62218  
**Facility Phone** (618) 765-2216  
**Facility Fax #**

## Plat Location of Facility

**County** Clinton  
**Township** Sante Fe  
**Township #** 1N  
**Range** 3W  
**Section** 16  
**FSA Number** 4913  
**Directions from Nearest Post Office** Begin at Bartelso Post Office. Turn Right on S. Washington St. Proceed south 0.7 miles. Turn left to arrive at Varel Dairy.

## **Certified Livestock Manager Responsibilities**

1. Achieve certification with the Illinois Department of Agriculture as a Certified Livestock Manager for a facility of greater than 1,000 animal units but less than 5,000 animal units.
2. To Maintain and update Waste Management Plan annually.
3. Review the Waste Management Plan with the owner/operator:
  - a. When any change in the waste management practices of this facility change.
  - b. When a major change occurs in the nutritional needs or feeding practices of the facility than may change the nutrient content of the waste.
  - c. Prior to the spring and fall land application periods.
4. Review the Waste Management Plan with waste application field operator(s):
  - a. To document nutrient content of waste
  - b. To review the planned application fields
  - c. Review the provisions for each application field
  - d. Document yield goals
  - e. Review target application rates
  - f. Review calibration methods for application equipment
5. Direct sampling and integrity of livestock waste from each waste storage structure for nutrient analysis at a laboratory.

# **Procedure for Reporting Livestock Waste Releases and Containment Plan**

## **Livestock Waste Release Definition**

A release of 25 gallons of livestock waste released into the environment for either a livestock waste handling facility or from the transportation of livestock waste. A controlled or recovered release during field application need not be reported as long as the unrecovered portion of the release does not exceed 25 gallons.

## **1st Notification of Release**

Initial notification should be made of a release by calling the Illinois Emergency Management Agency (IEMA) within 24 hours of the discovery of the release. This emergency notification line is available 24 hours per day. The numbers that they can be reached at are:

**IEMA 1-800-782-7860**

**or**

**1-217-782-7860**

### **Information needed when reporting a release:**

- 1. Location of release**
- 2. Amount of release**
- 3. Apparent environmental impacts of the release**
- 4. Action taken to contain or mitigate the release**

## **2nd Notification of Release**

Within 5 days of the initial telephone release reporting, a written notification (2 following pages) is due the Illinois Environmental Protection Agency.

Their address and fax number are:

**IEPA Illinois EPA**

**Bureau of Water, Compliance Assurance Section**

**P.O. Box 19276**

**Springfield, IL 62794-9276**

**or**

**Fax 217-557-1407**

## Written Release Report Form

Submit to Illinois EPA within 5 days of release discovery

Name of Person Reporting Release: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Release Source: \_\_\_\_\_

County (where release occurred): \_\_\_\_\_

Date and Time Release Began: \_\_\_\_\_

Duration of Release: \_\_\_\_\_

Cause of Release: \_\_\_\_\_

Legal Description of Release (down to 1/4 Section): \_\_\_\_\_

Distance from nearest town, village or municipality: \_\_\_\_\_

Estimated Quantity that was released and the flow rate if the release is ongoing:

Quantity \_\_\_\_\_ Gallons/Tons      Flow Rate \_\_\_\_\_ Gallons/Day

Circle appropriate area(s) into which release occurred:

Field

Ditch

Stream

Other (Describe): \_\_\_\_\_

Estimated Release Extent:

\_\_\_\_\_ Sq. Ft.      \_\_\_\_\_ Sq. Yd.      \_\_\_\_\_ Acres

What are the apparent environmental impacts of the release?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact Person for Additional Information:

Name: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Describe any dangers to health or the environment resulting from the release.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Describe all actions taken to respond to, contain and mitigate the release.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Operation Name Varel Dairy, Inc.

Mailing Address 7300 Twin Levee Rd.

City, State, Zip Bartelso IL 62218

Signature \_\_\_\_\_

Date \_\_\_\_\_

## ***Emergency Contacts***

**Varel Dairy, Inc.**

**52182**

Eric Varel

13094 Pioneer Rd.

Bartelso IL 62218- **Phone** (618) 765-2548 **Work Phone** (618) 765-2216

### **Ambulance**

St. Joseph's Hospital

Breese

(618) 526-4511

### **Fire**

Bartelso Fire Department

Bartelso

(618) 765-2311

Carlyle Fire Department

Carlyle

(618) 594-2451

### **Wrecker**

Robertson Towing

Albers

(618) 248-5562

Isaak Body Shop

Carlyle

(618) 594-2435

### **County Sheriff**

Clinton Co. Sheriff

Carlyle

(618) 594-8725

### **State Police**

Illinois State Police District 11

Collinsville

(618) 346-3990

### **Dirt Moving Equipment and Trucks**

Holthaus Truck Service

Beckemeyer

(618) 227-8812

Regis Voss (Honey Wagon)

Germantown

(618) 523-4793

### **Vet Clinic**

Nashville Animal Clinic

Nashville

(618) 327-8731

### **Mortality Removal**

Darling International

East Saint Louis

(618) 271-8190

### **Electrician**

Kohrmann Electric

Bartelso

(618) 765-2345

### **Equipment Repair**

Raikers

Beckemeyer

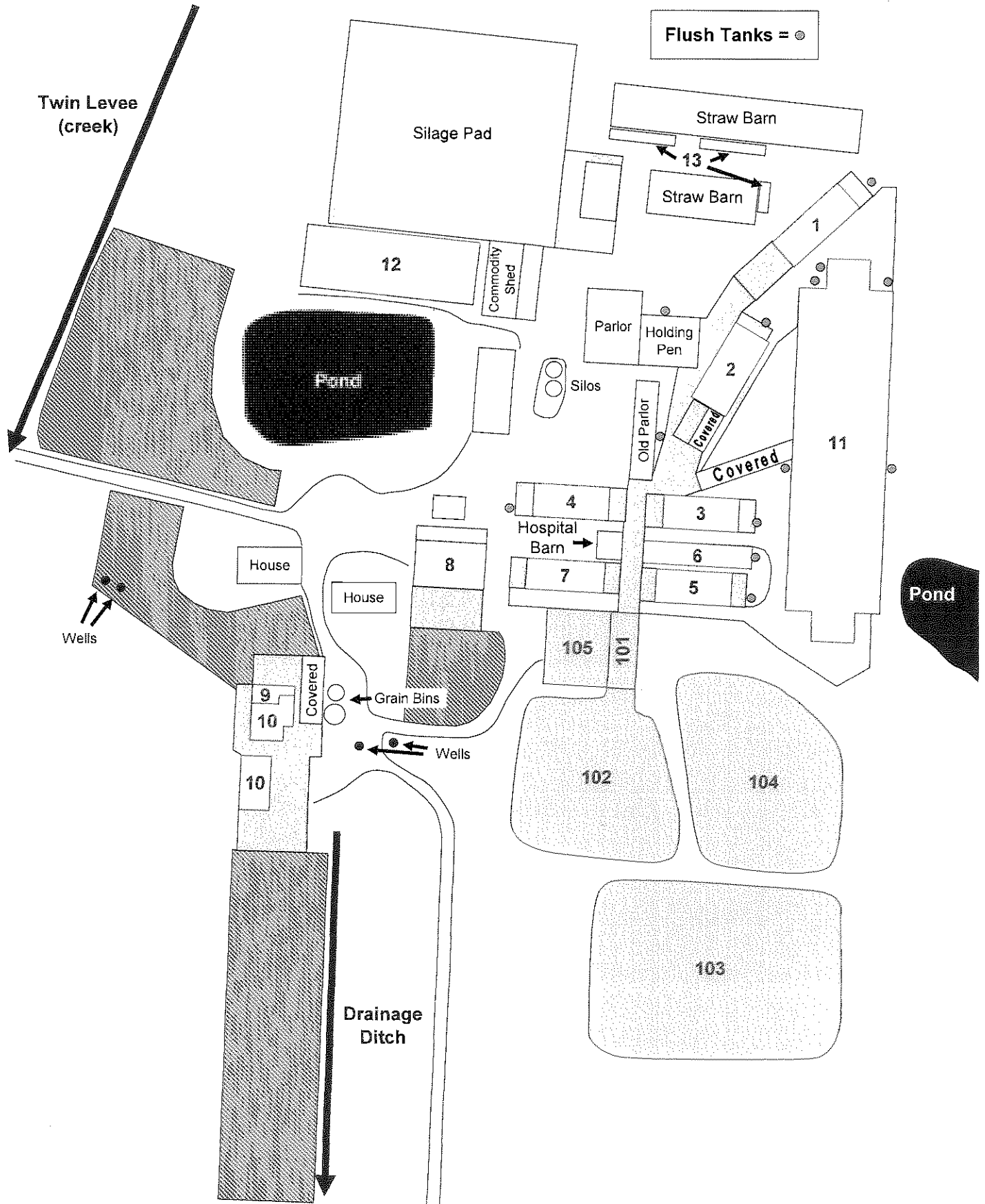
(618) 227-8766

### **Plumber**

Beckemeyer Sales & Service

Beckemeyer

(618) 227-8220





# Varel Dairy, Inc. - Concrete



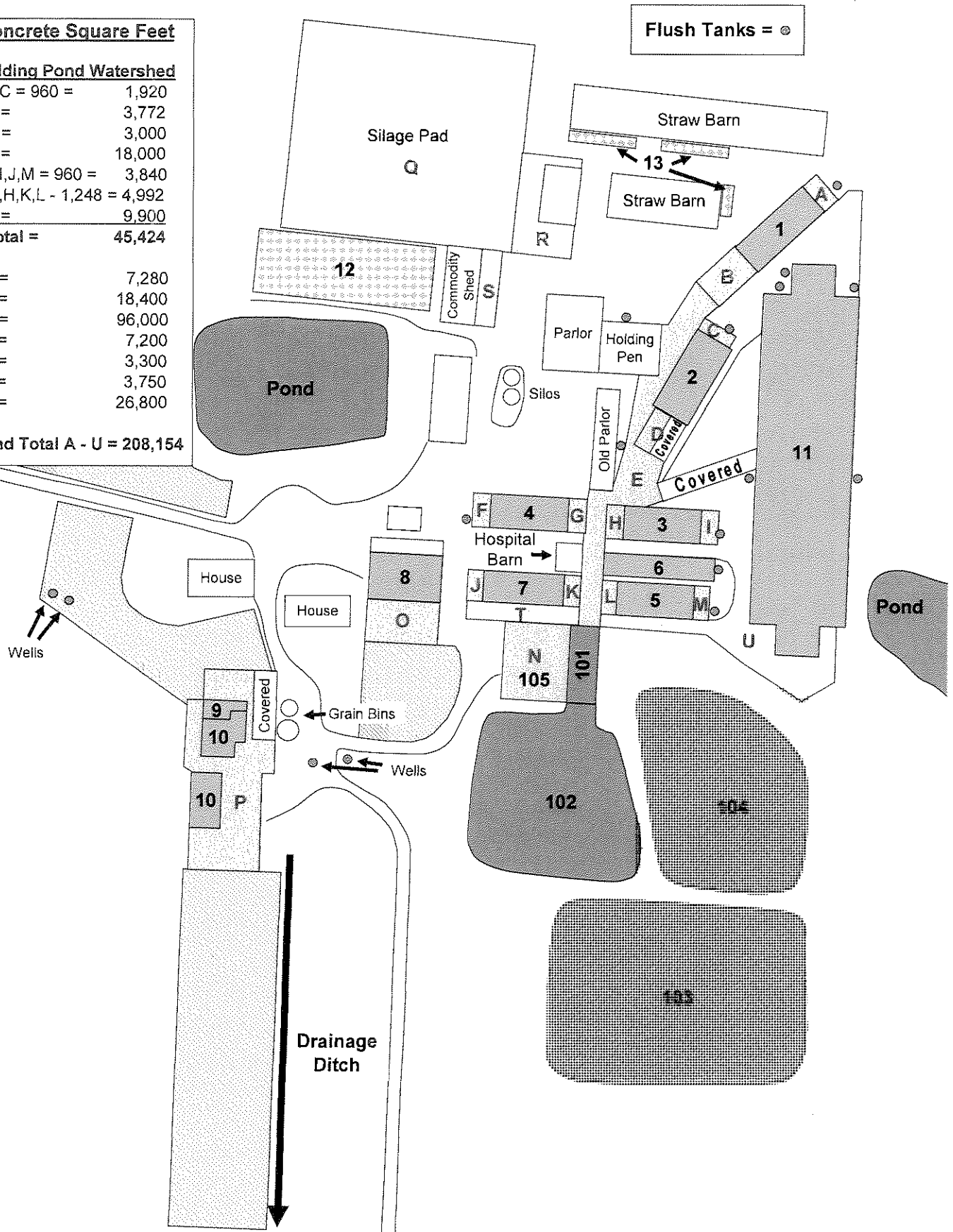
## Concrete Square Feet

### Holding Pond Watershed

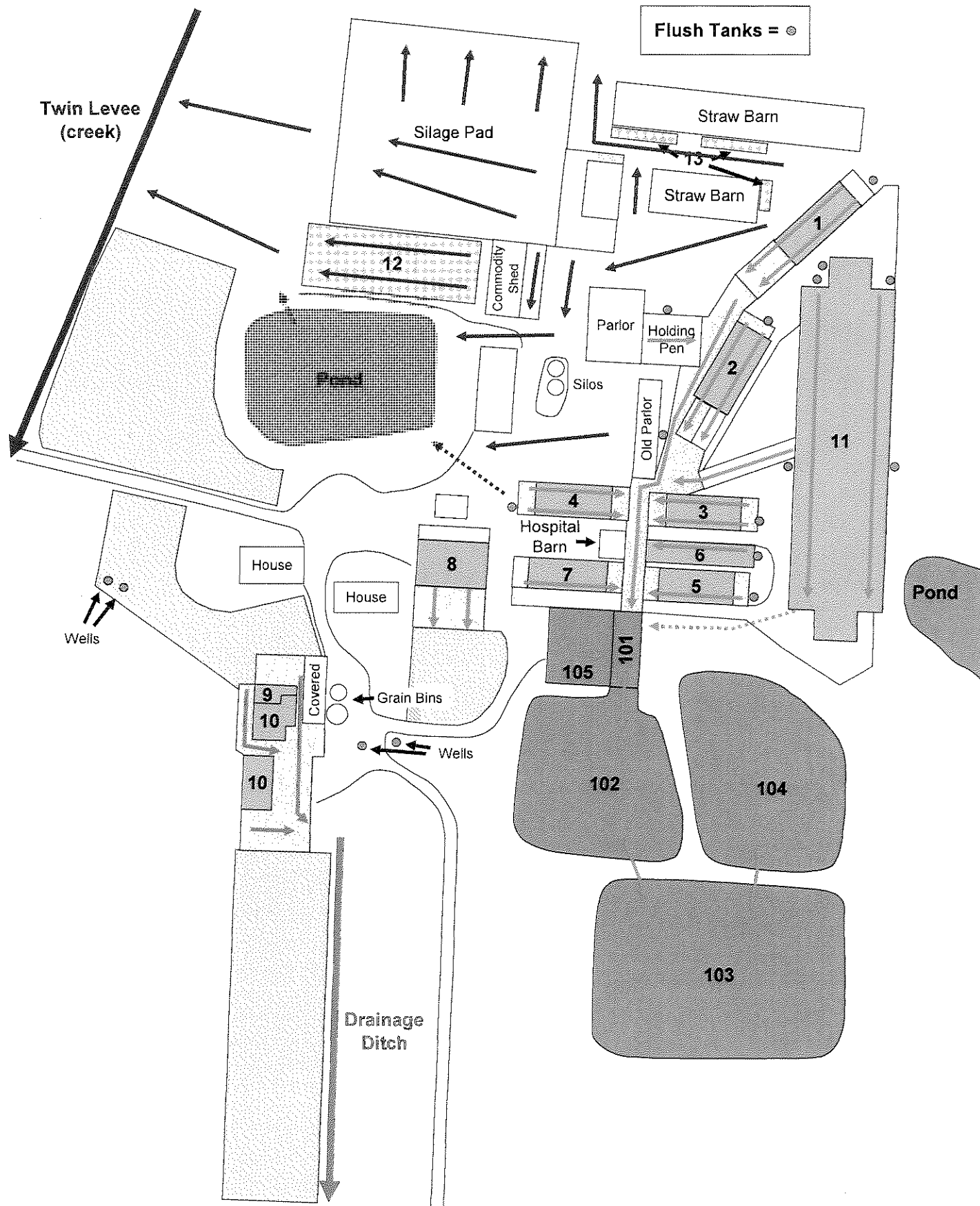
A, C = 960 =	1,920
B =	3,772
D =	3,000
E =	18,000
F, I, J, M = 960 =	3,840
G, H, K, L - 1,248 =	4,992
N =	9,900
<b>Total =</b>	<b>45,424</b>

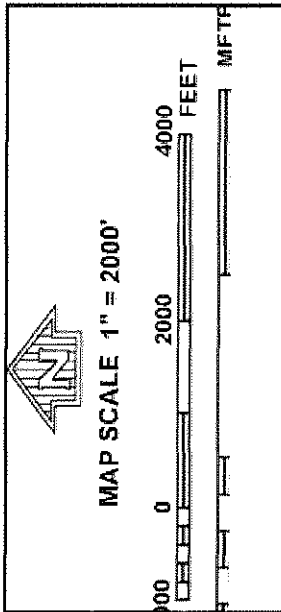
O =	7,280
P =	18,400
Q =	96,000
R =	7,200
S =	3,300
T =	3,750
U =	26,800

**Grand Total A - U = 208,154**



# Varel Dairy, Inc. - Water & Manure Flow





NFIP

# NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0200D

## FIRM FLOOD INSURANCE RATE MAP CLINTON COUNTY, ILLINOIS AND INCORPORATED AREAS

PANEL 200 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY

NUMBER	PANEL	SUFFIX
170859	0200	D
170859	0200	D
170859	0200	D
170859	0200	D
170859	0200	D
170859	0200	D

NOTE: The Map Number shown below should be used when ordering maps from the Community Number shown above. For the latest product information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at [www.fema.gov](http://www.fema.gov).



MAP NUMBER  
17027C0200D  
MAP REVISED  
AUGUST 2, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using E-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at [www.fema.gov](http://www.fema.gov).



# Varel Dairy, Inc. Manure Calculations

Barn 1

120 Head of Dairy Cows -- Average Weight 1,400 pounds

Daily Manure Production each =	Pounds	Lbs/Ft3	Cubic Feet
Daily Sand Bedding Use each =	120.00	62.0	1.935
% Confinement =	26.00	100.0	0.260
Manure Storage and Containment Needs per Animal =	100%		
	146.00	66.5	2.195
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	263.46	96,162	8.76
Inventory	120		Tons/Year
			3,197

Barn 2

120 Head of Dairy Cows -- Average Weight 1,400 pounds

Daily Manure Production each =	Pounds	Lbs/Ft3	Cubic Feet
Daily Sand Bedding Use each =	120.00	62.0	1.935
% Confinement =	26.00	100.0	0.260
Manure Storage and Containment Needs per Animal =	100%		
	146.00	66.5	2.195
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	263.46	96,162	8.76
Inventory	120		Tons/Year
			3,197

Barn 3

90 Head of Dairy Heifers -- Average Weight 750 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	66.00	62.0	1.065
Daily Sand Bedding Use each =	14.00	100.0	0.140
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	80.00	66.4	1.205
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	108.41	39,568	3.60
Inventory	90		Tons/Year
			1,314

Barn 4

90 Head of Dairy Heifers -- Average Weight 750 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	66.00	62.0	1.065
Daily Sand Bedding Use each =	14.00	100.0	0.140
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	80.00	66.4	1.205
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	108.41	39,568	3.60
Inventory	90		Tons/Year
			1,314

# Barn 5

40 Head of Dairy Cows -- Average Weight 1,400 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	120.00	62.0	1.935
Daily Straw Bedding Use each =	4.00	10.0	0.400
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	124.00	53.1	2.335
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	93.42	34,098	2.48
Inventory	40		Tons/Year
			905

# Barn 6

40 Head of Dairy Cows -- Average Weight 1,400 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	120.00	62.0	1.935
Daily Sand Bedding Use each =	26.00	100.0	0.260
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	146.00	66.5	2.195
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	87.82	32,054	2.92
Inventory	40		Tons/Year
			1,066

# Barn 7

40 Head of Dairy Cows -- Average Weight 1,400 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	120.00	62.0	1.935
Daily Straw Bedding Use each =	4.00	10.0	0.400
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	124.00	53.1	2.335
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	93.42	34,098	2.48
Inventory	40		Tons/Year
			905

# Barn 8

175 Head of Baby Dairy Calves -- Average Weight 250 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	22.00	62.0	0.355
Daily Straw Bedding Use each =	1.50	10.0	0.150
% Confinement =	66%		
Manure Storage and Containment Needs per Animal =	15.51	46.5	0.333
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	58.31	21,283	1.36
Inventory	175		Tons/Year
			495

# Barn 9

20 Head of Bulls -- Average Weight 1,200 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	60.00	62.0	0.968
Daily Straw Bedding Use each =	3.00	10.0	0.300
% Confinement =	66%		
Manure Storage and Containment Needs per Animal =	41.58	49.7	0.837
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	16.73	6,108	0.42
Inventory	20		Tons/Year
			152

# Barn 10

70 Head of Dairy Heifers -- Average Weight 1,000 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	86.00	62.0	1.387
Daily Straw Bedding Use each =	3.00	10.0	0.300
% Confinement =	66%		
Manure Storage and Containment Needs per Animal =	58.74	52.8	1.113
	Cubic Feet /Day	Cubic Feet /Year	Tons/Day
Manure Production - Manure with Bedding	77.94	28,450	2.06
Inventory	70		Tons/Year
			750



# Barn 11

600 Head of Dairy Cows -- Average Weight 1,400 pounds

Daily Manure Production each =	Pounds	Lbs/Ft3	Cubic Feet
Daily Sand Bedding Use each =	120.00	62.0	1.935
% Confinement =	26.00	100.0	0.260
Manure Storage and Containment Needs per Animal =	100%		
	146.00	66.5	2.195

	Cubic Feet /Day	Cubic Feet /Year	Tons/Day	Tons/Year
Manure Production - Manure with Bedding	1317.29	480,811	43.80	15,987
Inventory	600			

# Barn 12

120 Head of Baby Dairy Calves -- Average Weight 150 pounds

Daily Manure Production each =	Pounds	Lbs/Ft3	Cubic Feet
Daily Straw Bedding Use each =	13.00	62.0	0.210
% Confinement =	1.50	10.0	0.150
Manure Storage and Containment Needs per Animal =	100%		
	14.50	40.3	0.360

	Cubic Feet /Day	Cubic Feet /Year	Tons/Day	Tons/Year
Manure Production - Manure with Bedding	43.16	15,754	0.87	318
Inventory	120			

25 Head of Baby Bull Calves -- Average Weight 100 pounds

	Pounds	Lbs/Ft3	Cubic Feet
Daily Manure Production each =	6.00	62.0	0.097
Daily Straw Bedding Use each =	1.50	10.0	0.150
% Confinement =	100%		
Manure Storage and Containment Needs per Animal =	7.50	30.4	0.247
Cubic Feet    Cubic Feet			
Inventory		/Year	Tons/Day
Manure Production - Manure with Bedding	25	2,252	0.09
			Tons/Year
			34

## Manure Calculations Summary

	Daily Manure			180 Days			Yearly	
	# Head	Cubic Feet	Tons	Cubic Feet	Tons		Cubic Feet	Tons
Barn 1	120	263	8.76	47,422	1,577		96,162	3,197
Barn 2	120	263	8.76	47,422	1,577		96,162	3,197
Barn 3	90	108	3.60	19,513	648		39,568	1,314
Barn 4	90	108	3.60	19,513	648		39,568	1,314
Barn 5	40	93	2.48	16,815	446		34,098	905
Barn 6	40	88	2.92	15,807	526		32,054	1,066
Barn 7	40	93	2.48	16,815	446		34,098	905
Barn 8	175	58	1.36	10,496	244		21,283	495
Barn 9	20	17	0.42	3,012	75		6,108	152
Barn 10	70	78	2.06	14,030	370		28,450	750
Barn 11	600	1,317	43.80	237,112	7,884		480,811	15,987
Barn 12	120	43	0.87	7,769	157		15,754	318
Barn 13	25	6	0.09	1,110	17		2,252	34
<b>Totals</b>	<b>1,550</b>	<b>2,538</b>	<b>81.19</b>	<b>456,839</b>	<b>14,615</b>		<b>926,368</b>	<b>29,635</b>

## Milkhouse Waste Water

	Daily		Annual	
	Gallons	Cubic Feet	Gallons	Cubic Feet
Cow Prep	1300	174	474,500	63,432
Bulk Tank Washing	200	27	73,000	9,759
Pipeline Washing	300	40	109,500	14,638
Equipment Washing	200	27	73,000	9,759
Milk House Floor	100	13	36,500	4,879
Parlor Floor	400	53	146,000	19,517
<b>Total</b>	<b>2,500</b>	<b>334</b>	<b>912,500</b>	<b>121,984</b>

# Precipitation Gain - Feedlots & Waste Holding Ponds

Month	Historical Clinton County Precipitation (a)	Waste Holding Ponds			Paved Feedlots			Total Gain Lot & Storage Cubic Ft
		% of annual Evaporation	Evaporation Inches (b)	Precipitation Minus Evaporation	Runoff %	Runoff Inches	Runoff Gain Cubic Ft	
January	2.17	2%	0.80	1.37	55%	1.19	4,518	28,048
February	2.41	3%	1.20	1.21	50%	1.21	4,561	25,343
March	3.82	6%	2.40	1.42	55%	2.10	7,953	32,341
April	3.91	9%	3.60	0.31	55%	2.15	8,140	13,465
May	4.23	13%	5.20	-0.97	58%	2.45	9,287	-7,373
June	4.44	15%	6.00	-1.56	61%	2.71	10,252	-16,541
July	3.69	15%	6.00	-2.31	62%	2.29	8,660	-31,014
August	2.84	14%	5.60	-2.76	60%	1.70	6,450	-40,953
September	3.05	10%	4.00	-0.95	64%	1.95	7,389	-8,927
October	3.01	7%	2.80	0.21	58%	1.75	6,608	10,215
November	3.84	4%	1.60	2.24	59%	2.27	8,576	47,048
December	3.23	2%	0.80	2.43	30%	0.97	3,668	45,403
<b>Total</b>	<b>40.64</b>	<b>100%</b>	<b>40.00</b>	<b>0.64</b>	<b>55.94%</b>	<b>22.74</b>	<b>86,063</b>	<b>97,055</b>

(a) [http://mcc.sws.uiuc.edu/climate\\_midwest/historical/precip/il/11290\\_psum.html](http://mcc.sws.uiuc.edu/climate_midwest/historical/precip/il/11290_psum.html)

(b) AWMFH Figure 10C-27

## Yearly Precipitation Gain

	Square Feet	Cubic Feet	Gallons
Waste Holding Ponds	206,100	10,992	82,226
Paved Feedlots	45,424	86,063	643,797
<b>Total</b>	<b>251,524</b>	<b>97,055</b>	<b>726,022</b>
25yr/24hr Storm event	5.5 inches	115,282	862,366
Total Required Capacity		212,337	1,588,388

Waste Holding Pond - 102 Volume Calculations	
Top Length - feet	240
Top Width - feet	210
Overall Depth - feet	15
Slope (Z) - percent	3
Freeboard Depth - feet	2
Length at Freeboard - feet	228
Width at Freeboard - feet	198
Depth at Freeboard (D) - feet	13
Base Length (L) - feet	150
Base Width (W) - feet	120
Volume at Freeboard - ft <sup>3</sup>	397,254
$V = L*W*D + (L+W)*Z*D^2 + 4/3(Z^2*D^3)$	
Volume at Freeboard - gal	2,971,659
Surface Area (top) - ft <sup>2</sup>	50,400
Surface Area (freeboard) - ft <sup>2</sup>	45,144

Waste Holding Pond - 103 Volume Calculations	
Top Length - feet	370
Top Width - feet	255
Overall Depth - feet	16
Slope (Z) - percent	3
Freeboard Depth - feet	2
Length at Freeboard - feet	358
Width at Freeboard - feet	243
Depth at Freeboard (D) - feet	14
Base Length (L) - feet	274
Base Width (W) - feet	159
Volume at Freeboard - ft <sup>3</sup>	897,456
$V = L*W*D + (L+W)*Z*D^2 + 4/3(Z^2*D^3)$	
Volume at Freeboard - gal	6,713,420
Surface Area (top) - ft <sup>2</sup>	94,350
Surface Area (freeboard) - ft <sup>2</sup>	86,994

Waste Holding Pond - 104 Volume Calculations Liquid Retained for Recirculation	
Top Length - feet	240
Top Width - feet	235
Overall Depth - feet	15
Slope (Z) - percent	3
Freeboard Depth - feet	2
Length at Freeboard - feet	228
Width at Freeboard - feet	223
Depth at Freeboard (D) - feet	13
Base Length (L) - feet	150
Base Width (W) - feet	145
Volume at Freeboard - ft <sup>3</sup>	458,679
$V = L*W*D + (L+W)*Z*D^2 + 4/3(Z^2*D^3)$	
Volume at Freeboard - gal	3,431,148
Surface Area (top) - ft <sup>2</sup>	56,400
Surface Area (freeboard) - ft <sup>2</sup>	50,844

Waste Holding Pond - <i>Proposed</i> Volume Calculations	
Top Length - feet	395
Top Width - feet	350
Overall Depth - feet	16
Slope (Z) - percent	3
Freeboard Depth - feet	2
Length at Freeboard - feet	383
Width at Freeboard - feet	338
Depth at Freeboard (D) - feet	14
Base Length (L) - feet	299
Base Width (W) - feet	254
Volume at Freeboard - ft <sup>3</sup>	1,421,336
$V = L*W*D + (L+W)*Z*D^2 + 4/3(Z^2*D^3)$	
Volume at Freeboard - gal	10,632,304
Surface Area (top) - ft <sup>2</sup>	138,250
Surface Area (freeboard) - ft <sup>2</sup>	129,454

Waste Holding Capacity	Ft <sup>3</sup>
102 - 103	1,294,710
Precip Gain	97,055
25yr/24hr Storm event	115,282
Volume Unpumpable	123,132
Available	959,241

Waste Holding Capacity	Ft <sup>3</sup>
102 - 103, Proposed	2,716,046
Precip Gain	153,084
25yr/24hr Storm event	190,416
Volume Unpumpable	275,024
Available	2,097,522

## Precipitation Gain - Barn 8

Month	Historical Clinton County Precipitation (a)	Paved Feedlot		
		Runoff %	Runoff Inches	Runoff Gain Cubic Ft
January	2.17	55%	1.19	724
February	2.41	50%	1.21	731
March	3.82	55%	2.10	1,275
April	3.91	54%	2.11	1,281
May	4.23	57%	2.41	1,463
June	4.44	60%	2.66	1,616
July	3.69	62%	2.29	1,388
August	2.84	59%	1.68	1,017
September	3.05	62%	1.89	1,147
October	3.01	57%	1.72	1,041
November	3.84	56%	2.15	1,305
December	3.23	30%	0.97	588
<b>Total</b>	<b>40.64</b>	<b>55.06%</b>	<b>22.38</b>	<b>13,574</b>

(a) [http://mcc.sws.uiuc.edu/climate\\_midwest/historical/precip/il/111290\\_psum.html](http://mcc.sws.uiuc.edu/climate_midwest/historical/precip/il/111290_psum.html)

(b) AWMFH Figure 10C-27

### Yearly Precipitation Gain

		Square Feet	Cubic Feet	Gallons
	Paved Feedlot	7,280	13,574	101,544
25yr/24hr Storm event	5.5 inches	7,280	3,337	24,960
		Total	16,911	126,504

## Precipitation Gain - Barns 9 & 10

Month	Historical Clinton County Precipitation (a)	Paved Feedlot		
		Runoff %	Runoff Inches	Runoff Gain Cubic Ft
January	2.17	55%	1.19	1,830
February	2.41	50%	1.21	1,848
March	3.82	55%	2.10	3,222
April	3.91	54%	2.11	3,237
May	4.23	57%	2.41	3,697
June	4.44	60%	2.66	4,085
July	3.69	62%	2.29	3,508
August	2.84	59%	1.68	2,569
September	3.05	62%	1.89	2,900
October	3.01	57%	1.72	2,631
November	3.84	56%	2.15	3,297
December	3.23	30%	0.97	1,486
<b>Total</b>	<b>40.64</b>	<b>55.06%</b>	<b>22.38</b>	<b>34,309</b>

(a) [http://mcc.sws.uiuc.edu/climate\\_midwest/historical/precip/il/111290\\_psum.html](http://mcc.sws.uiuc.edu/climate_midwest/historical/precip/il/111290_psum.html)

(b) AWMFH Figure 10C-27

### Yearly Precipitation Gain

		Square Feet	Cubic Feet	Gallons
Paved Feedlot		18,400	34,309	256,649
25yr/24hr Storm event	5.5 inches	18,400	8,433	63,086
		Total	42,742	319,735

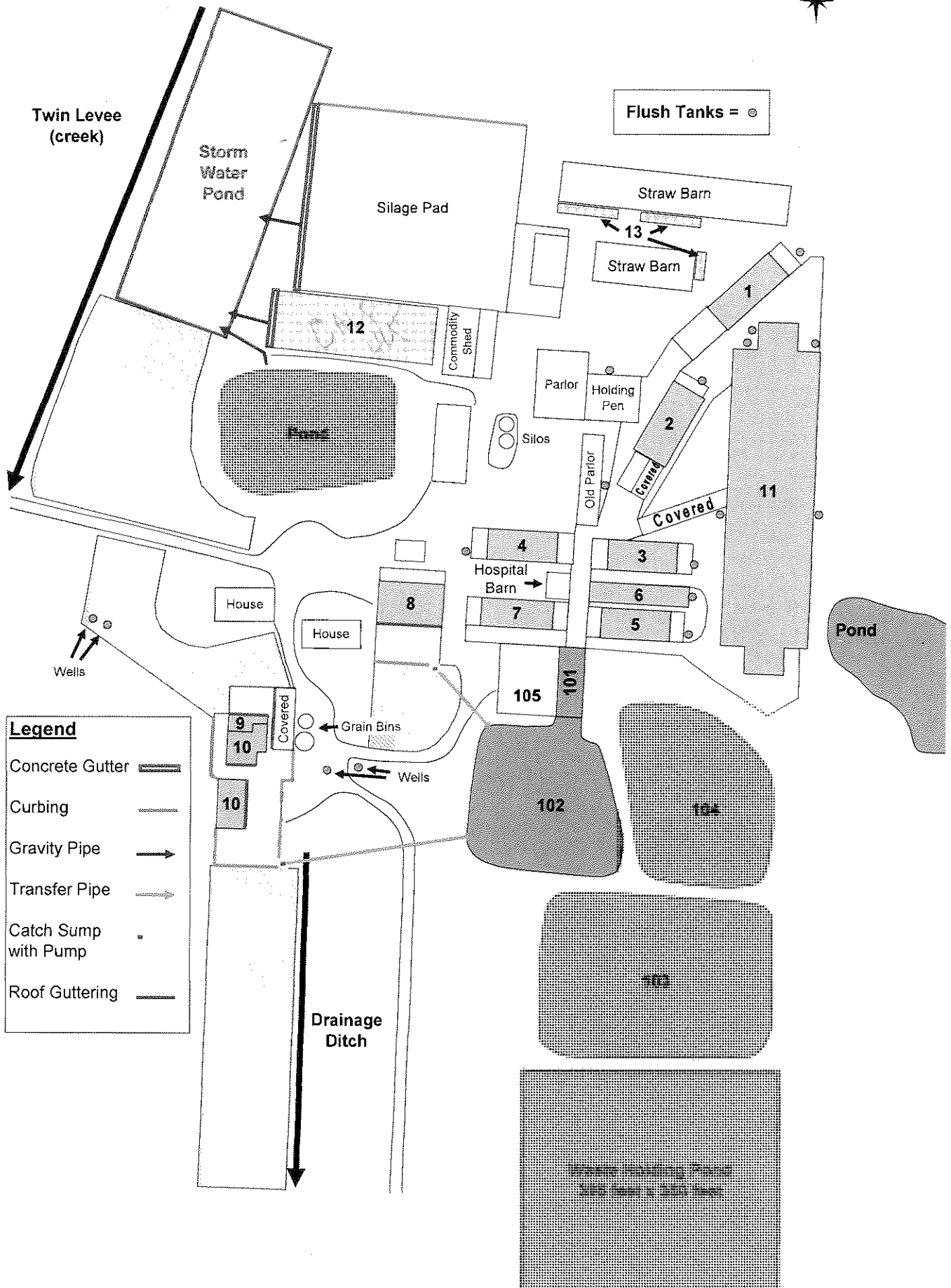
# Manure Storage Analysis -- Current Facilities

Location	Daily Manure Cubic Feet	Storage Needs - Cubic Feet				Facility Size			Storage Excess (Deficit)			Storage Capacity Days
		180 Days		365 Days		Cubic Feet	Depth	Cubic Feet	Cubic Feet			
		180 Days	365 Days	180 Days	365 Days							
Waste Holding Pond Manure												
Barn 1	263	47,422	96,162	136	46	0.00	0	(47,422)	(96,162)	0	0	
Barn 2	263	47,422	96,162	126	46	0.00	0	(47,422)	(96,162)	0	0	
Barn 3	108	19,513	39,568	112	48	0.00	0	(19,513)	(39,568)	0	0	
Barn 4	108	19,513	39,568	112	48	0.00	0	(19,513)	(39,568)	0	0	
Barn 5	93	16,815	34,098	112	38	1.50	6,384	(10,431)	(27,714)	68	68	
Barn 6	88	15,807	32,054	160	24	0.00	0	(15,807)	(32,054)	0	0	
Barn 7	93	16,815	34,098	112	38	1.50	6,384	(10,431)	(27,714)	68	68	
Barn 11	1,317	237,112	480,811	500	140	0.00	0	(237,112)	(480,811)	0	0	
Milkhouse Waste	334	60,156	121,984									
Settling Pit 101				110	45	3.00	14,850					
Dry Stacking Area 105				60	30	5.00	9,000					
Waste Holding Ponds 102-103							959,241					
(available manure volume)												
	2,669.88					Total	995,859	(407,654)	(839,754)	373	373	

<b>Pen Pack Manure</b>											
Barn 8	58.31	10,496	21,283			112	72	1.5	12,096	1,600	(9,187)
Barn 9	16.73	3,012	6,108			60	30	2.0	3,600	588	(2,508)
Barn 10	77.94	14,030	28,450			100	49	2.0	9,800	(4,230)	(18,650)
Barn 12	43.16	7,769	15,754			360	6	1.0	2,160	(5,609)	(13,594)
Barn 13	6.17	1,110	2,252			75	6	1.0	450	(660)	(1,802)
	202.32							Total	28,106	(8,311)	(45,740)
											139
<b>Grand Total</b>		<b>2,872.20</b>							<b>1,023,965</b>		<b>357</b>



# Varel Dairy, Inc. - Proposal 1, Zero Discharge



# Precipitation Gain - Feedlots & Waste Holding Ponds -- With Added WH Pond

Month	Historical Clinton County Precipitation (a)	Existing Waste Holding Ponds			Paved Feedlots			Total Gain Lot & Storage Cubic Ft
		% of annual Evaporation	Evaporation Inches (b)	Precipitation Minus Evaporation	Gain Cubic Ft	Runoff %	Runoff Inches	Runoff Gain Cubic Ft
January	2.17	2%	0.80	1.37	39,313	55%	1.19	7,072
February	2.41	3%	1.20	1.21	34,722	50%	1.21	7,140
March	3.82	6%	2.40	1.42	40,748	55%	2.10	12,449
April	3.91	9%	3.60	0.31	8,896	55%	2.15	12,742
May	4.23	13%	5.20	-0.97	-27,835	58%	2.45	14,537
June	4.44	15%	6.00	-1.56	-44,766	61%	2.71	16,048
July	3.69	15%	6.00	-2.31	-66,287	62%	2.29	13,556
August	2.84	14%	5.60	-2.76	-79,201	60%	1.70	10,097
September	3.05	10%	4.00	-0.95	-27,261	64%	1.95	11,566
October	3.01	7%	2.80	0.21	6,026	58%	1.75	10,344
November	3.84	4%	1.60	2.24	64,279	59%	2.27	13,424
December	3.23	2%	0.80	2.43	69,731	30%	0.97	5,742
<b>Total</b>	<b>40.64</b>	<b>100%</b>	<b>40.00</b>	<b>0.64</b>	<b>18,365</b>	<b>55.94%</b>	<b>22.74</b>	<b>134,718</b>
								<b>153,084</b>

(a) [http://mcc.sws.uiuc.edu/climate\\_midwest/historical/precip/111290\\_psum.html](http://mcc.sws.uiuc.edu/climate_midwest/historical/precip/111290_psum.html)

(b) AVMFH Figure 10C-27

## Yearly Precipitation Gain

	Square Feet	Cubic Feet	Gallons
Existing Waste Holding Ponds	206,100		
Proposed Waste Holding Pond	138,250		
	344,350	18,365	137,382
Paved Feedlots	45,424		
Barn 8 Feedlot	7,280		
Barns 9 & 10 Feedlots	18,400		
	71,104	134,718	1,007,761
<b>Total</b>	<b>415,454</b>	<b>153,084</b>	<b>1,145,143</b>
25yr/24hr Storm event	5.5 inches	190,416	1,424,410
Total Required Capacity		343,500	2,569,553

# Storm Water Precipitation Gain - Proposal 1, Zero Discharge

Month	Historical Clinton County Precipitation (a)	Storm Water Ponds				Paved			Unpaved			Total Gain	
		% of annual Evaporation	Evaporation Inches (b)	Precip - Evaporation	Gain Cubic Ft	Runoff %	Runoff Inches	Runoff Cubic Ft	Runoff %	Runoff Inches	Runoff Cubic Ft	Total Gain Cubic Ft	Total Gain Cubic Ft
January	2.17	2%	0.80	1.37	16,535	55%	1.19	9,876	26%	0.56	11,143	37,554	37,554
February	2.41	3%	1.20	1.21	14,603	50%	1.21	9,971	18%	0.43	8,568	33,142	33,142
March	3.82	6%	2.40	1.42	17,138	55%	2.10	17,386	22%	0.84	16,598	51,122	51,122
April	3.91	9%	3.60	0.31	3,741	55%	2.15	17,795	24%	0.94	18,533	40,070	40,070
May	4.23	13%	5.20	-0.97	-11,707	58%	2.45	20,302	25%	1.06	20,886	29,481	29,481
June	4.44	15%	6.00	-1.56	-18,828	61%	2.71	22,412	27%	1.20	23,676	27,261	27,261
July	3.69	15%	6.00	-2.31	-27,879	62%	2.29	18,932	28%	1.03	20,406	11,458	11,458
August	2.84	14%	5.60	-2.76	-33,310	60%	1.70	14,101	29%	0.82	16,266	-2,944	-2,944
September	3.05	10%	4.00	-0.95	-11,466	64%	1.95	16,153	28%	0.85	16,867	21,554	21,554
October	3.01	7%	2.80	0.21	2,534	58%	1.75	14,446	25%	0.75	14,862	31,843	31,843
November	3.84	4%	1.60	2.24	27,035	59%	2.27	18,748	26%	1.00	19,718	65,501	65,501
December	3.23	2%	0.80	2.43	29,328	30%	0.97	8,018	20%	0.65	12,759	50,105	50,105
<b>Total</b>	<b>40.64</b>	<b>100%</b>	<b>40.00</b>	<b>0.64</b>	<b>7,724</b>	<b>55.94%</b>	<b>22.74</b>	<b>188,140</b>	<b>24.95%</b>	<b>10.14</b>	<b>200,281</b>	<b>396,145</b>	<b>396,145</b>

(a) [http://mcc.sws.uiuc.edu/climate\\_midwest/historical/precip/111290\\_psum.html](http://mcc.sws.uiuc.edu/climate_midwest/historical/precip/111290_psum.html)

(b) AWMFH Figure 10C-27

## Yearly Precipitation Gain

	Square Feet	Cubic Feet	Gallons
Existing Storm Water Pond	56,628		
Proposed Storm Water Pond	88,200		
Total	144,828	7,724	57,781
Paved	99,300	188,140	1,407,384
Unpaved	237,000	200,281	1,498,201
<b>Total</b>	<b>481,128</b>	<b>396,145</b>	<b>2,963,365</b>
25yr/24hr Storm event	5.5 inches	220,517	1,649,577
Total Required Capacity		616,662	4,612,943

**Proposal 1, Zero Discharge  
Proposed Stormwater Pond  
Volume Calculations**

Top Length - feet	490
Top Width - feet	180
Overall Depth - feet	12
Slope (Z) - percent	3
Freeboard Depth - feet	2
Length at Freeboard - feet	478
Width at Freeboard - feet	168
Depth at Freeboard (D) - feet	10
Base Length (L) - feet	418
Base Width (W) - feet	108
Volume at Freeboard - ft <sup>3</sup>	621,240
$V = L*W*D + (L+W)*Z*D^2 + 4/3(Z^2*D^3)$	
Volume at Freeboard - gal	4,647,186
Surface Area (top) - ft <sup>2</sup>	88,200
Surface Area (freeboard) - ft <sup>2</sup>	80,304

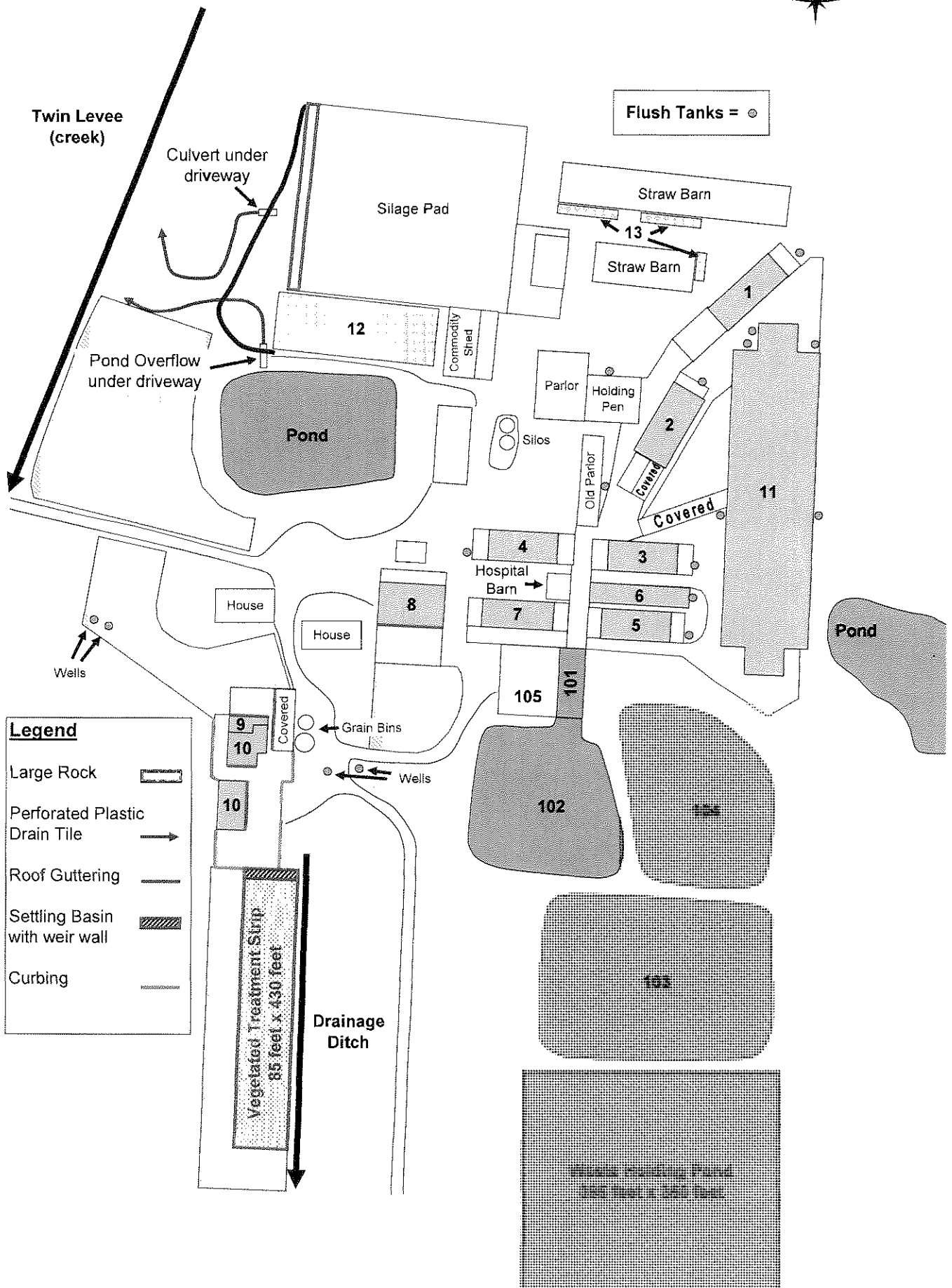
# Manure Storage Analysis -- Proposal 1, Zero Discharge

Location	Daily Manure Cubic Feet	Storage Needs - Cubic Feet		Facility Size			Storage Excess (Deficit) Cubic Feet			Storage Capacity Days
		180 Days	365 Days	Length	Width	Depth	Cubic Feet	180 Days	365 Days	
		Waste Holding Pond Manure								
Barn 1	263	47,422	96,162	136	46	0.00	0	(47,422)	(96,162)	0
Barn 2	263	47,422	96,162	126	46	0.00	0	(47,422)	(96,162)	0
Barn 3	108	19,513	39,568	112	48	0.00	0	(19,513)	(39,568)	0
Barn 4	108	19,513	39,568	112	48	0.00	0	(19,513)	(39,568)	0
Barn 5	93	16,815	34,098	112	38	1.50	6,384	(10,431)	(27,714)	68
Barn 6	88	15,807	32,054	160	24	0.00	0	(15,807)	(32,054)	0
Barn 7	93	16,815	34,098	112	38	1.50	6,384	(10,431)	(27,714)	68
Barn 11	1,317	237,112	480,811	500	140	0.00	0	(237,112)	(480,811)	0
Milkhouse Waste	334	60,156	121,984							
Settling Pit 101				110	45	3.00	14,850			
Dry Stacking Area 105				60	30	5.00	9,000			
Waste Holding Ponds 102-103							959,241			
Proposed Waste Holding Pond							1,138,281			
Precip Gain, 25yr/24hr-Barn 8	46.33		16,911						(16,911)	
Precip Gain, 25yr/24hr-Barns 9&10	117.10		42,742						(42,742)	
	2,833.31					Total	2,134,140	(407,654)	(899,408)	753

Pen Pack Manure										
Barn 8	58.31	10,496	21,283	112	72	1.5	12,096	1,600	(9,187)	207
Barn 9	16.73	3,012	6,108	60	30	2.0	3,600	588	(2,508)	215
Barn 10	77.94	14,030	28,450	100	49	2.0	9,800	(4,230)	(18,650)	126
Barn 12	43.16	7,769	15,754	360	6	1.0	2,160	(5,609)	(13,594)	50
Barn 13	6.17	1,110	2,252	75	6	1.0	450	(660)	(1,802)	73
	202.32				Total		28,106	(8,311)	(45,740)	139

Storm Water Pond									
Yearly Precipitation Gain			396,145					(396,145)	
25 year / 24 hour storm event			220,517					(220,517)	
Proposed Storm Water Pond							621,240	621,240	
	0.00					Total	621,240	4,578	
Grand Total	3,035.63						2,162,246		712

# Varel Dairy, Inc. - Proposal 2



# VEGETATED TREATMENT AREA DESIGN

## for feedlot runoff

NRCS Conservation Practice Standard 635

Illinois NRCS - Version 3.3

modified 11/6/08

Producer:  Date:

Notes:

County:   Tract:  Field:

Enter Feedlot Details:	Cattle	Swine	Totals
Animal Units	94.0		94.0 AU
Lot Size(Ft <sup>2</sup> )	18,400		18,400 sq.ft.

This standard applies only on small AFOs as defined by the U.S. EPA:

Livestock Type	Number of Animals
Cattle or cow/calf pairs	less than 300
Mature dairy cattle	less than 200
Swine weighing over 55 lbs	less than 750
Swine weighing less than 55 lbs	less than 3000

Soil Infiltration Rate:	<input type="text" value="2"/>	inches per hour
Rainfall (1-year, 2 hour):	<input type="text" value="1.60"/>	inches
Runoff (1-year, 2 hour):	<input type="text" value="0.96"/>	inches
Min. Design Runoff Volume:	<input type="text" value="1,472"/>	cubic feet
Design Runoff Volume to use:	<input type="text"/>	cubic feet
Required VTA Area:	<input type="text" value="7,360"/>	square feet minimum

Design Flow Depth:	<input type="text" value="0.50"/>	inches
Minimum Design Flow:	<input type="text" value="0.204"/>	cfs

### VEGETATED TREATMENT AREA SIZING:

Segment Length (feet)	Slope (%)	Filter Width (feet)	Cumulative VTA Area (square feet)	Velocity (ft/s)	Segment Contact Time (minutes)	Capacity (cfs)	Cumulative Contact Time (minutes)
430	1	85	36,550	0.059	120.5	0.211	120.5

430 ft. Total Length

**\*\*Area Requirement Met\*\***

**\*\*Contact Requirement Met\*\***

### NITROGEN BALANCE:

Choose Type of Grass Mixture for Filter Strip

Grass Mixture Seeding Rate  Lbs PLS / acre ==>>

Nitrogen Removed Per Ton Harvested  Lbs./Ton = ==>>

Grass Mixture Yield in Tons/Acre/Year ==>>

Tall Fescue	<input type="text" value="▼"/>
<input type="text" value="24"/>	<input type="text" value="--"/>
<input type="text" value="30"/>	
<input type="text" value="4.0"/>	<input type="text" value="▼"/>

Nitrogen produced from Lot:	<input type="text" value="184"/>	lbs N produced per year
Nitrogen uptake of Filter Strip:	<input type="text" value="100.7"/>	lbs N uptake per year

**\*\*N Uptake Requirement Met\*\***

### NOTE:

This design tool applies to VTA design for feedlot runoff only. Systems that include other wastewater in the waste stream must be designed using other methods.

## Waste System Analysis

**Current** – The waste system utilized by Varel Dairy on their operation is a scrape to various storage containment areas and haul, to the field, waste management system. Due to the size of the Varel operation they are a 100% containment facility. Waste is stored in manure bedding packs, within the various facilities that straw bedding is needed, until such time that land applications are permissible. The dairy cows and heifers are housed in freestall buildings that have scrape alleys behind them, those alleys are flushed with recycled lagoon from basin 104 water twice a day. That manure that is produced in the freestall barns is stored in outside manure settling basin, located to the south of the production area. The manure that is collected in settling basin is either solid or liquid. The liquid portion of the manure is filtered from the solids by gravity and it goes to basin 102. The solid portion is stacked in the dry stacking area 105; it is then either hauled to the crop areas or dried and reused for bedding in the freestall barns. The straw portion of the manure system is either hauled to the field or piled in the dry stacking area of 105. There are thirteen individual buildings located on the main farm of the operation. Barns 1, 2, 5, 6, 7, & 11 houses mature lactating dairy cows. Barn 7 is a calving and treatment barn. Barns 3 & 4 houses growing and mature heifers. Barn 10 is a dry cow and close-up heifer barn that allows the cows to have access to pasture that is available. Barn 12 or Area 12 house baby heifer calves until they are weaned. Barn 9 houses the bulls that are used on the operation. Barn 8 houses weaned calves until they are 12 -14 weeks of age. Barn 13 or Area 13 houses newborn bull calves until they are picked up by their new owner. The manure in Barns 8, 9, & 10 is stored in manure bedding packs until land application can occur. Areas 12 & 13 are clean approximately every 7 to 8 weeks, and hauled to the field or stock piled on the edge of the lot. Land application of manure is conducted via a dry box spreader with a subsequent tillage pass for incorporation of the dry material that is stored in the manure basins and the dry stacking areas. The manure that is stored in the waste holding pond and the lagoons is land applied via a drag line system that directly injects the manure into the soil or irrigated onto growing crops or onto cropland. The current system has both adequacies and inadequacies.

First for the parts of the operation that are **adequate**.

1. Lots are paved for the capture of manure. Lots are flushed daily to ensure the cleanliness of the animals.
2. Clean roof water is being diverted away from all animal areas to prevent it from entering the waste stream. This reduces the amount of waste water that needs to be handled.
3. All areas are elevated adequately to avoid any outside surface water from entering the waste stream.
4. The operation has adequate storage available to maintain the 180 days of waste storage capacity.
5. The facility is a closed looped system that does not use any outside water to flush the lots and alleys; all the water is recycled out of the third stage lagoon.



Now for the parts of the operation that are **inadequate**.

1. Since waste is stored in earthen basins within the operation the producer need to maintain the vegetation around and near the embankments of those basins. Reseeding and mowing those in a more timely fashion is recommended.
2. There areas of the pasture acres showing signs of over grazing. It is recommended that the producer reseed the pasture to enhance the vigor and health of the forages uses and to rotational graze parts of the pasture.
3. There are places in Area 12 & 13 where straw pack is stored outside the building until land application occurs, there need to be a more permanent storage added in that location to prevent clean water contamination, or the pack needs to be transferred to stack 105.
4. There is evidence of waste runoff south of lot 9 & 10 thus there needs to be curbing added to the lot and either a sump basin to transfer the effluent to the lagoons or a filter strip added to the operation.
5. To contain the silage leachate, waste water runoff of Area 12 & 13, & feed stuff containments there need to be a storm water pond and levees built on the south side of the areas.

**Proposed** – Discussions regarding the solutions for the inadequacies bring to the forefront the desires for Varel Dairy to be environmentally friendly and good stewards of the land. The current operators have the desire to continue their operation along as they can economically viable. As this operation has grown in the past the producers have implemented the changes in their operation to be friendly to the environment. One of the main inadequacies that this operation faces in the future will be the availability of the operation to obtain the additional acres that is needed to evenly apply all the manure that it produces. Currently that operation has the acreage to apply the manure it produces for one year, but their soil test prove that the need to make sure that they watch what acreage that they apply on, due to the high fertility rate. There are areas of the lot near Barn 9 & 10 that are of risk for allowing waste water to exit and clean water to enter. To prevent this possibility curbing needs to be added to those areas, 450' of square curbing. To contain and collect the waste water runoff of Barns 8, 9, & 10 the producer need to add two collection pits and two pumps. The pumps will take the water from the collection tanks to the lagoon 102. There is need to collect and contain the waste water runoff and silage and feed leachate of the silage bags and Area 12. It is proposed to the producers to contain all the runoff with a concrete gutter on the west side of the Area. To contain the water that is collected with the concrete curb, there needs to be a storm water pond to the west of the area. The operation need to maintain and manage the pasture areas of the option differently to ensure the proper vegetation cover and growth of the pasture acres. The pastures need to be reseeded and grazed periodically to maintain them better. The operation, with having earthen basins for storage of manure, needs to manage the embankments to ensure the proper vegetation to control soil erosion. To maintain this, the producers need to mow and reseed those embankments according to NRCS guidelines, when necessary. With the labor force that the operation has they can frequently scrape and flush the lots when necessary. The current operators have the desire to address the situation; however how the containment will best benefit their current operation needs to be analyzed further.

***Air Quality Considerations*** – The operation currently uses waste storage systems that store waste in a fashion to minimize the odors released into the environment. Additional air quality practices implemented are frequent scraping of the concrete lots to eliminate dust being carried off site. Finally the operation follows the practice of manure incorporation for waste being applied to the crop land.

***Pathogen Considerations*** – The operation uses large amounts of bedding material due to utilizing the pen pack as part of their waste storage. By providing a dry environment the number of pathogens the inventory is exposed to is minimized. By utilizing mechanical incorporation of manure during land application of waste, any potential contamination or release of pathogens to the environment is minimized.

***Mortality Management*** – the operation currently utilizes the services of a rendering company for the timely disposal of any death loss of the mature cows. When death loss occurs the dead animal is removed from the operation and placed on the gravel driveway between Barn #4 and Barn #8. This location is away from potable water supplies and surface water. The rendering company has historically picked up the dead animal between 24 and 48 hours after they have been notified.