MA No.: 1000014
AWMP No.: 15042

ANIMAL WASTE MANAGEMENT PLAN

For

WINDY RIDGE, LLC

CONFINED ANIMAL FEEDING OPERATION

Located at:
3162 Burgdorf Road
Bonanza, Oregon

For submittal to

Oregon Department of Agriculture
Natural Resources Division CAFO Program
635 Capitol Street NE
Salem, OR 97301-2532

Prepared by

Fazio Engineering
P.O. Box 246
Milton-Freewater, OR 97862

December 18, 2015

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Animal Waste Management Plan Signature Page

Windy Ridge, LLC

Bonanza, Oregon

Plan Owner/Operator:

Arie DeJong
4721 Harpold Road
Bonanza, OR 97623
(541) 545-6173

As owner and operator of Windy Ridge, I intend to manage in accordance with the practices and operation and maintenance described in this Animal Waste Management Plan. I understand that I am responsible for keeping all necessary records associated with the implementation of this plan.

Signature _____ Date 2/6/16

Prepared By:

Fazio Engineering
P.O. Box 246
Milton-Freewater, OR 97862
(541) 938-6084

WINDY RIDGE, LLC
CONFINED ANIMAL FEEDING OPERATION (CAFO)
ANIMAL WASTE MANAGEMENT PLAN

1. SUMMARY OF CAFO OPERATION

a. Contact Information

Owner/Operator: Windy Ridge, LLC
Arie DeJong
4721 Harpold Road
Bonanza, OR 97623
(541) 545-6173

b. Facility Location

Windy Ridge is located at 3162 Burgdorf Road approximately 3 miles southwest of Bonanza, Oregon. The dairy site is located in Section 13, Township 39 S, Range 11 1/2 E, Willamette Meridian. The dairy parlor and pens are centrally located on the 880-acre farm.

c. Type of Operation

Windy Ridge dairy is designated a Large Confined Animal Feeding Operation.

i Livestock Numbers

The facility is permitted for 8,040 dairy livestock with a herd composition of 3,540 milking and dry cows and 4,500 heifers and calves.

d. Manure Handling System

i Collection Storage and Transfer

Solid and scraped manure from the pens and feed alleys will be hauled periodically to the designated manure handling areas. Within the handling area or pens, during dry conditions the manure mound is spread, harrowed, and allowed to dry. Once dry, manure is stockpiled and used for bedding. Collected manure is also used for application to crops or export.

Feed lanes within the loafing barns are flushed using recycled lagoon water. Flush water, parlor and holding pen wash water and runoff water flow by gravity through a drain pipe that carries water to the lagoon system. The lagoon system consists of a settling cell and main storage lagoon. Prepared manure handling areas are located on both sides of the settling cell to facilitate cleaning of the settling cell or storage lagoon. A floating pump provides dairy flush water. Portable pumps are used to transfer lagoon water to the irrigation system for application to cropland.

ii Utilization

Windy Ridge's nutrient management goal is to apply all generated liquids on owned or managed cropland at agronomic rates. Windy Ridge has about 550 irrigated acres which is predominantly pasture with other silage crops. The owner also manages adjacent cropland and nearby farms

that can be used for manure utilization. Manure is also exported to other, local farms.

2. SPECIFIC DESCRIPTIONS AND CALCULATIONS

a. Description of Production Area and Land Application Location

i Aerial Photo and Topography

Appendix A contains a Production Area Map showing an aerial photograph of the dairy site. Aerial photos and topography of the land application fields is located with the soils information in Appendix B.

ii Site Soils

Appendix B contains the USDA-Natural Resources Conservation Service soils map for the farm location. The primary soils farmed are Fordney loamy fine sand, 0 to 2 percent slopes and Calimus loam, 0 to 5 percent slopes. Other soils include Henley and Laki loams. Stukel-Capona association with 2 to 15 percent slopes is the predominant soil type for the rangeland. These loam and fine sandy loam soils have relatively high water holding capacities that help prevent leaching of nutrients from the soil profile. The risk of soil loss to water or wind erosion is low due to the pasture cropping system, relatively flat topography, and fine textured soils.

b. Manure, Litter and Process Waste Volumes

The volume of manure and process waste water was estimate for the mix of milking cows, dry cows, heifers and calves. The specific values are located in the appendix and not included here in the text. This allows for changes in management without changing the text of this AWMP.

ORAWM spreadsheet version 4.7 was used to estimate solid and liquid volumes. A 150 day winter storage period covering November through March was chosen to accommodate the typical growing season of March through September. The required storage capacity was determined to be about 42 acre-feet for the storage period.

The existing settling cell has bottom dimensions of 30 feet by 750 feet and a total depth of 10 feet. The storage lagoon has bottom dimensions of 280 feet by 750 feet with a total depth of 11 feet average. Inside slopes for both the settling cell and lagoon are 3.5:1. At an 9 foot depth the settling cell stores about 10 acre-feet. The lagoon's capacity is 56.9 acre-feet at a 10 foot depth. There is an additional 1 foot of freeboard.

i Manure Volumes

Manure volumes are based on the number milk cows, dry cows, heifers and calves and their respective average weights. It is assumed that the calves will be confined all year, while the other livestock are on pasture a portion of the time.

ii Bedding Volumes

The dairy uses dry manure for bedding the milk cows. Straw bedding is used for calves and also for the open pens during wet winter conditions.

iii Process and Wash Water Volumes

Parlor water use includes cleaning the milk room floor, pipelines and other equipment. Plate

cooler water is recycled for livestock drinking water and parlor wash water. Parlor water usage changes depending on the seasonal conditions. More holding pen flush water is used in the summer months with very little being used in the winter months.

iv Silage and Feed Processing Leachate

Silage is stored in AgBags at the dairy without significant leachate.

c. Contaminated Storm Water

Runoff from the parlor, barn roofs, and open lots is directed and handled with the flush water system. Runoff from the manure handling area directly drains into the settling cell. An upgradient diversion ditch diverts surface runoff around the dairy. A buried perimeter drain collects groundwater around the lagoon complex and manure handling area.

d. Nutrient Content of Manure, Litter and Process Waste

The most recent test results are shown in Table 1.

Table 1: Manure Nutrient Content

Lagoon Water (#/1,000 gallons)			Solid Manure (58% moisture) (#/ton) dry basis		
N	P_2O_5	K_2O	N	P_2O_5	K_2O
8.33	2	14	28.2	18.3	26.8

e. Farm Nutrient Balance

i Nutrients Generated and Losses

The ORAWM spreadsheet was used to estimated amount of nutrients generated and remaining after storage, application, and denitrification losses.

ii NRCS Agronomy Techinal Note #26 and Phosphorous Index

The Site Vulnerability Class has been determined to be MEDIUM or LOW for the fields. The phosphorous index calculations for each field are located in Appendix B. In practice, soil P values have only been taken on fields that are expected to receive manure applications. The phosphorous index calculations will be updated when data is available. With a MEDIUM or LOW phosphorous index the nutrient calculations balance for nitrogen.

iii Acreage Owned or Leased

Windy Ridge has about 550 irrigated acres. An adjacent Masten farm has about 300 irrigated acres. There are other managed fields located on the nearby Stepp and Deer Hill farms. The combined total is about 1,334 irrigated acres.

Based on the ORAWM nutrient calculations at the planned herd size, the acreage owned or leased can utilize all the liquids generated and grazing. A majority of the solid manure in the pens will need to be exported. The specific amount of manure exported will change based on herd size, cropping patterns, yields and field soil test results.

f. Application Schedule and Limitations

i Schedule of Applications and Methods

Application of liquids and solids will be done during favorable climatic conditions and crop condition. The normal schedule of liquids application is March through September, and other months weather permitting. Solids may be applied throughout the year if climatic conditions allow. Application of manure will be done at appropriate times of the year to utilize nutrients for high forage production.

Stored liquids will be pumped through the center pivots, wheel lines or big guns. Slurry and stored liquids may also be injected or knifed into the cropland. Solid manure is applied using conventional truck mounted spreaders.

ii Application Limitations and Guidance

The application limitations are:

1. All liquid and solid manure applications are applied at agronomic rates.
2. Manure will not be applied to saturated soil.
3. Manure will not be applied during any precipitation that is excessive enough to cause ponded water.
4. Dry, stackable, solid manure intended for field applications, may only be temporarily stored on field corners or staging areas up to 4 months prior to application.
5. Maintain setbacks from surface waters. The ODA minimum setbacks are 35 feet from open water if you maintain a vegetative buffer and 100 feet for a non-vegetative buffer.

iii Guidance for Winter Manure Applications

Only apply manure during this time period if the following guidelines can be met. Call the ODA CAFO Program for guidance if a manure application is needed and the guidelines can't be met.

1. Apply manure only to actively growing crops such as pastures or cover crop.
2. Minimize application rates by using the maximum practical travel rates for the application equipment.
3. Maintain a 100 foot setback buffer distance from all down gradient surface ditches or ponds.
4. Do not apply during rainfall events that are expected to result in saturated soils or surface runoff.
5. Do not apply to saturated or flooded soil.
6. Do not apply to slopes greater than 5%.
7. Application of manure to frozen soil should be avoided if possible. Do the following guidelines if manure is applied to frozen soil.
    a. Apply only enough manure to address storage limitations.
    b. Minimize applications to 5 wet tons per acre or less for solids and 6,788 gallons (0.25 inches) per acre for liquids or slurry.
    c. Apply to fields of established hay, pasture or fields containing at least 90% cover and the furthest from surface water sources.
    d. Do not apply manure within 200 feet of surface water sources, drainage ditches, wells, or inlets to subsurface drainage systems.
    e. Runoff control systems such as earthen dikes must be in place where applications are made to fields with slopes greater than 5%.

iv Irrigation Water Management

Application of irrigation water is managed relative to lagoon water applications. Irrigation water management will minimize leaching of soluble nutrients or runoff. The total application should not exceed the field capacity of the soil.

The loam soil holds about 2 inches of water per foot depth of soil. Assuming the effective root zone for pasture is 2 feet, the total maximum amount of water stored in the root zone is 4 inches. Assuming an allowable deletion of 50%, the maximum readily available water in the soil is 2 inches. During the peak growing season, the evapotranspiration of pasture is about 0.25 inches per day. The time between irrigations during the peak crop water use is about 8 days (2 in/0.25 in/day). During the spring and fall, the time between irrigations can be increased to near two weeks. What this simple analysis shows is that each irrigation event should apply no more that about 2 inches. If irrigation events immediately follow lagoon water applications, the combined depth of applications should not exceed 2 inches, under this scenario.

A standard wheel line with 5/32" nozzles has an application rate of about 0.2 inches per hour. At this application rate assuming 70% application efficiency it will only take about 14 hours (2 inches/0.2 in/hr/70%). Twelve hour set times are proposed for the wheel lines when irrigating.

g. Animal Mortality Management

Mortalities are hauled off the farm within two days. They are buried at Bonanza View Dairy.

h. Mechanical Operation and Maintenance

The following identifies the general operation and maintenance procedures required to ensure proper function of each component of the manure handling facilities. The operator will contain all wastewater within the facilities.

i Settling Cell and Storage Lagoon

Routine operations of the storage lagoon cells include monitoring the collected flush water flow into the settling cell. During the spring and throughout the summer months, the settling cell and storage lagoon are cleaned.

Inspect compacted soil liner periodically and after cleaning to verify that soil liner has not eroded or otherwise damaged. Restore all soil liner to original conditions. All foreign material such as tumbleweeds and other foreign debris will be removed from the lagoon cells and pipes. Promptly repair all leaks around valves, fittings, and pipelines. Eradicate or otherwise remove all rodents and/or burrowing animals that have or can potentially damage any part of the soil liner. Immediately repair any damage caused by their activity. Do not allow livestock access to the liner. Immediately repair any vandalism, vehicular or livestock damage.

ii Manure Handling Areas

The manure handling areas next to the lagoon are recessed and bermed to allow any runoff to collect within each area and flow into the settling cell or storage lagoon. Settled solids removed from the settling cell or lagoon are dried and stockpiled for bedding. The grading needs to be maintained so that all runoff is contained within the manure drying areas and directed to the settling cell or lagoon.

Dried manure for bedding has been stored on the east side of the future heifer pens and calf hutch area. This area will continue to be used for storing dry stackable manure and bedding until all the pens are constructed.

iii Irrigation Pipeline

Pipeline routes and water line will be inspected periodically for leaks. Any leaks, damaged sprinklers and or broken pipes will be repaired and or replaced. The irrigation pipes will be flushed periodically to assure no sediment buildup in the lines. Water will be drained during cold weather to prevent frozen lines and possible breakage. Shut off valves will be inspected annually. Broken valves will be replaced.

iv Pumps

Pump(s) will be operated and maintained according to manufacturer's manual. Liquids will be drained from pump during freezing weather. Pump will be inspected periodically to prevent debris from wrapping around the impeller. Broken lines will be replaced or repaired. Loose connections will be tightened. The agitators, pumps and electrical controls will be periodically inspected to ensure proper operation. In the event of a power failure generators will be used as backup power.

v Trough or Tank

Watering facilities will be inspected periodically. Damaged facilities will be repaired. Float valves will be maintained in working order. Areas immediately around the facilities will be maintained in a stable condition.

3. Record Keeping and Reporting

a. Monitoring and Testing

1. Collect and analyze manure, litter and other process wastewaters annually for nutrient content, including nitrogen and phosphorus.
2. At a minimum of once of every five years collect and analyze representative soil samples for phosphorus and nitrogen content from all fields where manure, litter and other process wastewaters are applied.

The following documents provide protocols for testing: manure, litter and process waste water; measuring crop nutrient removals; soil testing to evaluate nutrient application and crop uptake, and calculating manure application rates.

- PNW 570-E, Monitoring Soil Nutrients Using a Management Unit Approach
- E306, Manure Sampling & Analysis
- EM 8768, Calculating Dairy Manure Nutrient Application Rates.
- EM 8832-E, Post-harvest Soil Nitrate Testing for Manured Copping Systems West of the Cascades

b. Inspections

1. Daily inspections: water lines.
2. Weekly inspection: storm water diversions, run-off diversions, waste transport, conveyance structures, storage structures, storage structure volumes.
3. Periodic inspections: equipment used for land application of manure liquids and/or solids when in use.

c. Record Keeping

i Record results of:

1. Daily inspections.
2. Weekly inspections.
3. Periodic inspections.
4. Corrective actions taken, explain those not corrected.
5. Expected crop yields (if not in the plan).
6. Applications of manure, litter and process waste will be kept, including the date, location, and the amount of N and P applied during each application.
7. Weather conditions at the time of manure, litter or process water application and 24 hours before and after application.
8. Total amount of manure or wastewater transferred to other persons, including date and amount of each transfer and the name and address of each recipient.

ii REPORTING TO OREGON DEPARTMENT OF AGRICULTURE (ODA):

1. Any discharge will be reported orally to ODA within 24 hours. Within 5 days, a written statement describing this discharge will also be submitted to ODA.
2. The amount of manure, litter and process waste applied will be reported annually.

3. The amount of manure, litter and process waste exported will be reported annually.

iii OPERATION REQUIREMENTS

1. Must have depth markers in all surface liquid impoundments (i.e. lagoons, ponds, tanks). Markers must indicate:
    a. Maximum design volume (freeboard).
    b. Minimum capacity necessary to contain 25-year, 24 hours rainfall event.
    c. Depth of manure and process wastewater.
2. Maintain setback area within 100 feet of any down gradient surface water, open tile line intake structure, sinkholes, agricultural wellheads, or other conduits to surface and ground waters where manure, litter, and other process wastewaters are prohibited. As a compliance alternative, and if demonstrated to the satisfaction of ODA, the permittee may:
    a. Establish a 35 ft vegetated buffer where manure, litter and other process waste waters are prohibited: or
    b. Demonstrate that a setback or vegetated butter is not necessary or may be reduced.

APPENDIX A: SITE LAYOUT

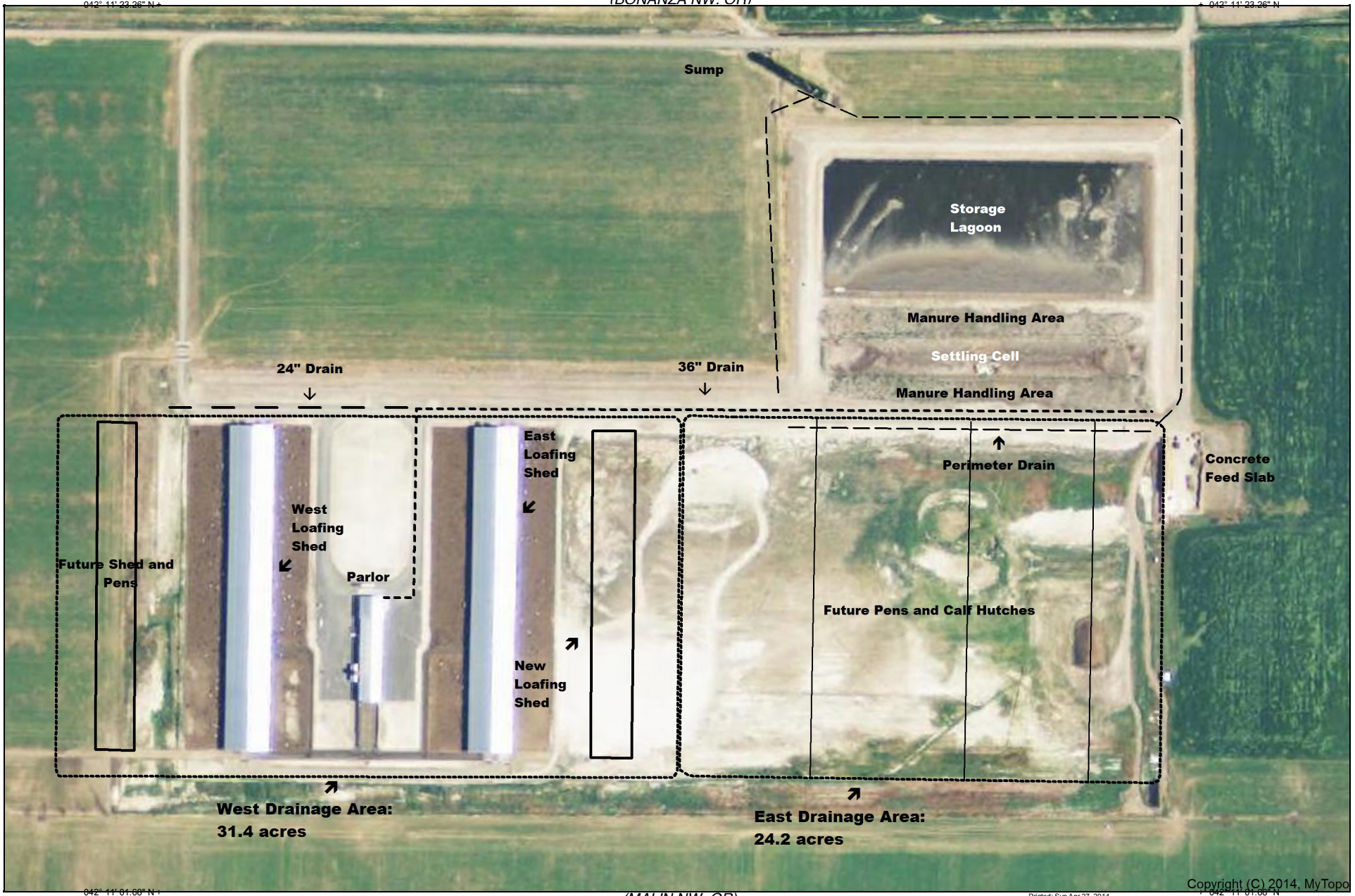
Dejong/Windy Ridge Dairy Drainge Areas

BONANZA SW, OR QUADRANGLE
OREGON
AERIAL PHOTO SERIES

(DAIRY NE, OR) (BONANZA NW, OR) (BONANZA NE, OR)

121° 28' 50.67" W
042° 11' 23.26" N

121° 28' 06.47" W
042° 11' 23.26" N



042° 11' 01.68" N
121° 28' 50.67" W

(MALIN NW, OR)

Printed: Sun Apr 27, 2014

042° 11' 01.68" N
121° 28' 06.47" W

(MALIN NE, OR)

Declination

MN

MN 14.76° E

SCALE 1:4000

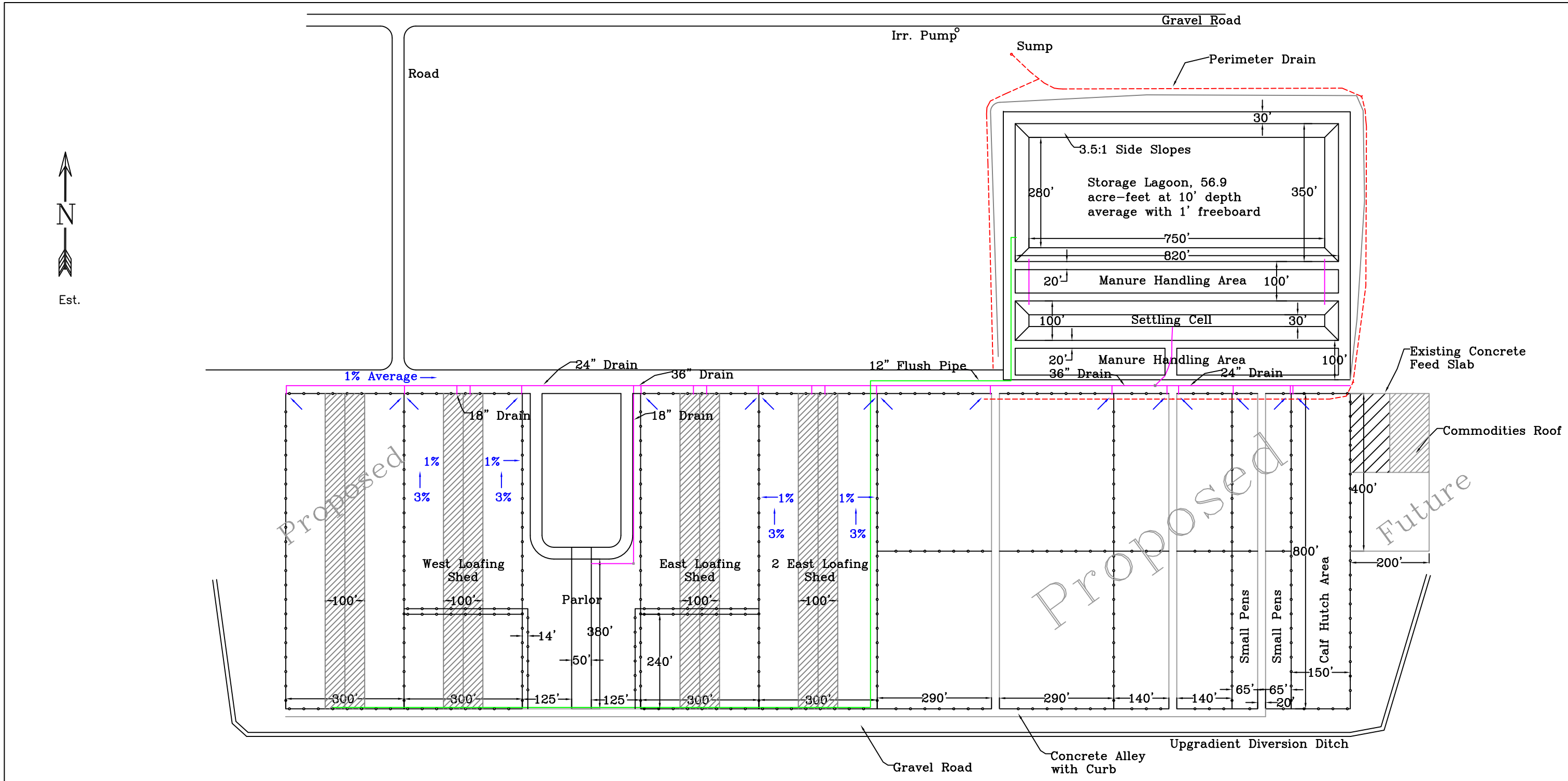
0.0 0.1 0.2
MILES

0 100 200 300
YARDS

0.0 0.1 0.2 0.3

CONTOUR INTERVAL UNKNOWN NONE
NATIONAL GEODETIC VERTICAL DATUM 1929

BONANZA SW, OR, OR
JUL 22, 2012



NO.	DATE	REVISION	BY

0 125' 250' 500'

FAZIO ENGINEERING
P.O. BOX 246
MILTON-FREEWATER, OR 98762
(541) 938-6084

SITE LAYOUT

Windy Ridge, LLC
Bonanza, Oregon

DATE 12/16/15	PROJ. NO.
DESIGN BY Owner	DWG NO. layout
FILE layoutdrawing2015	SCALE 1" = 250'

APPENDIX B: SITE SOILS AND PHOSPHOROUS INDEX

23-Jun-14

Field/Area	Acres		Farmed	Primary	P test (5/13)	P test (4/4/14)
Windy Ridge Farm			Acres	Soil	ppm	ppm
3	58.36		58.4	19A	38	87
5	31.64		31.6	19C	10	87
6	13.3		13.3	19C	16	39
7	50.68		50.7	7A	33	13
9	18.96		19.0	19C	21	74
10	6.68		6.7	40	99	
11	18.79		18.8	74B, 40	31	
12	25.41		25.4	74B	113	
17	5.27		5.3	51E		
19	171.63		171.6	19C,7B,51E	16	27
20	8.16		8.2	40	76	
22	13.04		13.0	28		
23	29.13		29.1	7B	10	
24	89.07	dairy area		7B,19C		
25	3.92		3.9	74B		
26	23.93		23.9	7A	24	
27	25.96		26.0	7B	9	
28	58.52	house and field	37.0	40		109
29	220.64	sage		51E		
30	6.48		6.5	7B		
Total	879.57		548.4			

Masten Farm				Primary Soil	P test (2012) ppm
5	62.92		62.92	40, 7A	
6	14.11	Not Managed			
7	22.16		22.16	7B	31
8	4.63		4.63	40	
9	23.16	house & range			
10	31.01	Not Managed			
13	62.72		62.72	7A, 7B	100
14	143.16		143.16	40, 7A	99
15	4.04		4.04	40	
Total	367.91		299.63		

Stepp Farm					
11	120.9		120.9	74B, 74D	
12	18.7		18.7	74B	
Total	139.6		139.6		

Deer Hill					
2	47.4		47.4	74B	
4	88.7		88.7	26	
17	85.3		85.3	74B, 74D	
20	91.6		91.6	7A, 40	
21	33.4		33.4	40	
Total	346.4		346.4		

Grand Total			1,334.1

Windy Ridge 17-Dec-15
Phosphorous Index Summary

Field	W3	W5	W6	W7	W9	W10	W11	W12	W17	W19
Predominant Map Unit	19A	19C	19C	7A	19C	40	74B, 40	74B	51E	19C,7B
Hydraulic Soil Group	C	A	A	B	A	B	D,B	D	D	A
Average Slope %	1	5	5	1	5	1	5	5	6	5
Flooding Frequency	none	none	none	none	none	rare	none	none	none	none
Crops	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan
Soil Test P Olsen 1ft (ppm)	87	87	39	13	74	99	31	113	0	27
Commercial Application Rate (lbs/ac P2O5)	0	0	0	0	0	0	0	0	0	0
Organic Application Rate (lbs/ac P2O5)	209	209	209	209	209	209	209	209	209	209
Nutrient Application Method	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk
Transport Factors										
Soil Erosion	3	3	3	3	3	3	3	3	3	3
Soil Erosion from Sprinkler Irrigation	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Soil Erosion from Surface Irrigation	0	0	0	0	0	0	0	0	0	0
Runoff Class	1	0	0	0.5	0	0.5	1	1	2	0
Distance to Perennial Surface Waters	0	0	0	0	0	0	0	0	0	0
Subsurface Drainage	0	0	0	0	0	0	0	0	0	0
Transport Factors Subtotal (TFS)	4.25	3.25	3.25	3.75	3.25	3.75	4.25	4.25	5.25	3.25
Source Factors										
Soil Test P (0-12")	6.7	6.7	1.9	0	5.4	7.9	1.1	9.3	0	0.7
Commercial P Application Rate	0	0	0	0	0	0	0	0	0	0
Commercial P Application Method	0	0	0	0	0	0	0	0	0	0
Organic P Application Rate	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Organic P Application Method	4	4	4	4	4	4	4	4	4	4
Source Factors Subtotal (SFS)	14.88	14.88	10.08	8.18	13.58	16.08	9.28	17.48	8.18	8.88
Total Rating Value (TFS x SFS)	63.24	48.36	32.76	30.68	44.14	60.30	39.44	74.29	42.95	28.86
Site Vulnerability Class	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Low

Assumption/Notes:
Assumed soil erosion factor of 3.
Used latest P soil values, 0 = not available.
Solids applied, incorporated within 21 days
P applied to Sudan when balancing for N

Windy Ridge
Phosphorous Index Summary

Field	W20	W22	W23	W25	W26	W27	W28	W30	M5	M7
Predominant Map Unit	40	28	7B	74B	7A	7B	40	7B	40, 7A	7B
Hydraulic Soil Group	B	C	A	D	B	B	B	B	B	A
Average Slope %	1	1	5	5	1	1	1	1	1	1
Flooding Frequency	rare	rare	none	none	none	none	rare	none	rare	none
Crops	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan
Soil Test P Olsen 1ft (ppm)	76	0	10	0	24	9	109	0	0	31
Commercial Application Rate (lbs/ac P2O5)	0	0	0	0	0	0	0	0	0	0
Organic Application Rate (lbs/ac P2O5)	209	209	209	209	209	209	209	209	209	209
Nutrient Application Method	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk
Transport Factors										
Soil Erosion	3	3	3	3	3	3	3	3	3	3
Soil Erosion from Sprinkler Irrigation	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Soil Erosion from Surface Irrigation	0	0	0	0	0	0	0	0	0	0
Runoff Class	0.5	1	0	1	0.5	0.5	0	0.5	0.5	0.5
Distance to Perennial Surface Waters	0	0	0	0	0	0	0	0	0	0
Subsurface Drainage	0	0	0	0	0	0	0	0	0	0
Transport Factors Subtotal (TFS)	3.75	4.25	3.25	4.25	3.75	3.75	3.25	3.75	3.75	3.75
Source Factors										
Soil Test P (0-12")	5.6	0	0	0	0.4	0	8.9	0	0	1.1
Commercial P Application Rate	0	0	0	0	0	0	0	0	0	0
Commercial P Application Method	0	0	0	0	0	0	0	0	0	0
Organic P Application Rate	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Organic P Application Method	4	4	4	4	4	4	4	4	4	4
Source Factors Subtotal (SFS)	13.78	8.18	8.18	8.18	8.58	8.18	17.08	8.18	8.18	9.28
Total Rating Value (TFS x SFS)	51.68	34.77	26.59	34.77	32.18	30.68	55.51	30.68	30.68	34.80
Site Vulnerability Class	Medium	Medium	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium

Assumption/Notes:
Assumed soil erosion factor of 3.
Used latest P soil values, 0 = not available.
Solids applied, incorporated within 21 days
P applied to Sudan when balancing for N

Windy Ridge
Phosphorous Index Summary

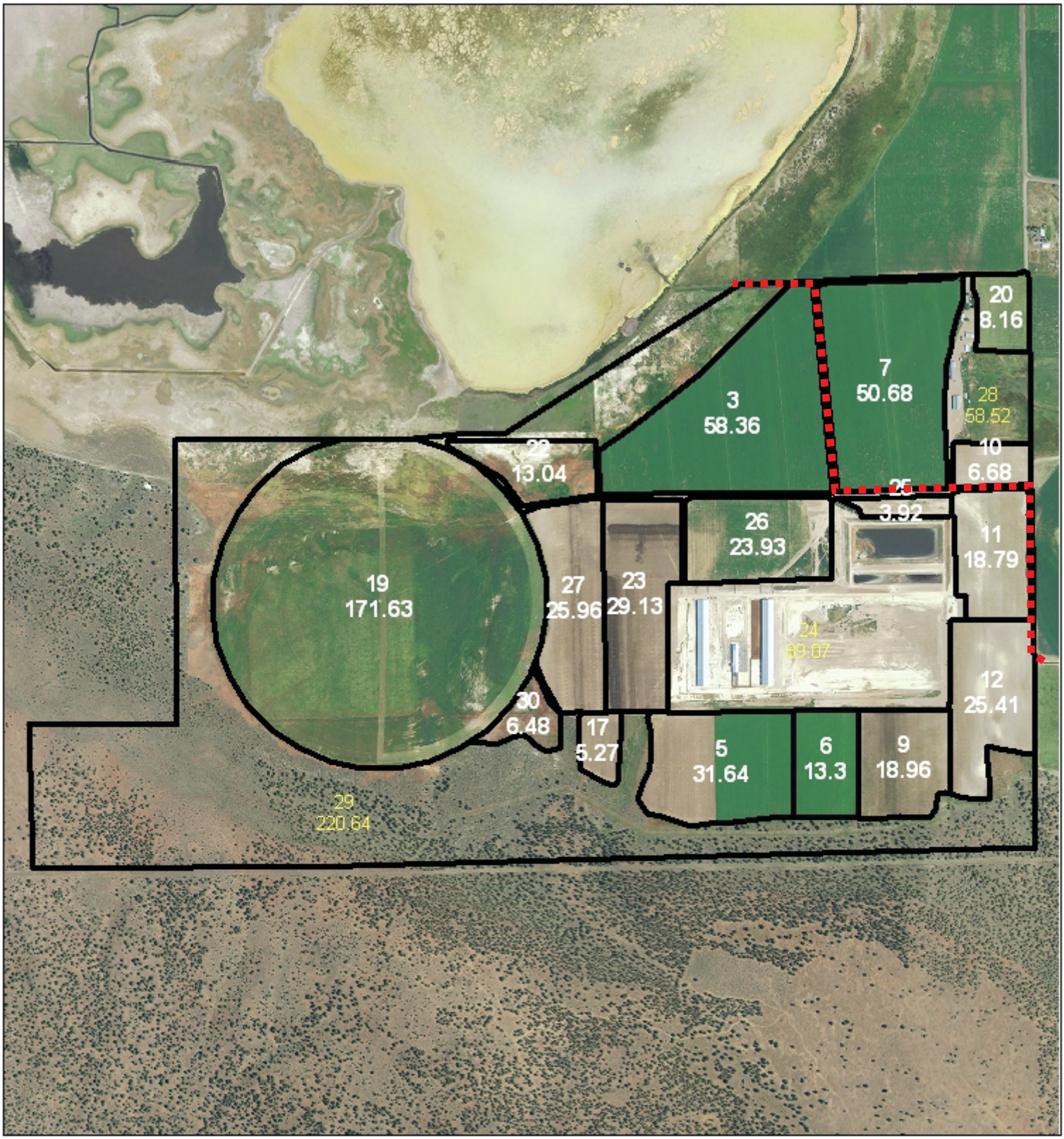
Field	M8	M13	M14	M15	S11	S12	D2	D4	D17	D20
Predominant Map Unit	40	7A, 7B	40, 7A	40	74B, 74D	74B	74B	26	74B, 74D	7A, 40
Hydraulic Soil Group	B	B	B	B	C	C	C	C	C	C
Average Slope %	1	1	1	1	10	5	5	1	10	5
Flooding Frequency	rare	none	rare	rare	none	none	none	rare	none	rare
Crops	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan	Sudan
Soil Test P Olsen 1ft (ppm)	0	100	99	0	0	0	43	44	76	56
Commercial Application Rate (lbs/ac P2O5)	0	0	0	0	0	0	0	0	0	0
Organic Application Rate (lbs/ac P2O5)	209	209	209	209	209	209	209	209	209	209
Nutrient Application Method	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk	Inject/Spk
Transport Factors										
Soil Erosion	3	3	3	3	3	3	3	3	3	3
Soil Erosion from Sprinkler Irrigation	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Soil Erosion from Surface Irrigation	0	0	0	0	0	0	0	0	0	0
Runoff Class	0.5	0.5	0.5	0.5	2	1	1	1	2	0.5
Distance to Perennial Surface Waters	0	0	0	0	0	0	0	0	0	0
Subsurface Drainage	0	0	0	0	0	0	0	0	0	0
Transport Factors Subtotal (TFS)	3.75	3.75	3.75	3.75	5.25	4.25	4.25	4.25	5.25	3.75
Source Factors										
Soil Test P (0-12")	0	8	7.9	0	0	0	2.3	2.4	5.6	3.6
Commercial P Application Rate	0	0	0	0	0	0	0	0	0	0
Commercial P Application Method	0	0	0	0	0	0	0	0	0	0
Organic P Application Rate	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Organic P Application Method	4	4	4	4	4	4	4	4	4	4
Source Factors Subtotal (SFS)	8.18	16.18	16.08	8.18	8.18	8.18	10.48	10.58	13.78	11.78
Total Rating Value (TFS x SFS)	30.68	60.68	60.30	30.68	42.95	34.77	44.54	44.97	72.35	44.18
Site Vulnerability Class	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

Assumption/Notes:
Assumed soil erosion factor of 3.
Used latest P soil values, 0 = not available.
Solids applied, incorporated within 21 days
P applied to Sudan when balancing for N

Windy Ridge
Phosphorous Index Summary

Field	D21
Predominant Map Unit	40
Hydraulic Soil Group	B
Average Slope %	1
Flooding Frequency	none
Crops	Sudan
Soil Test P Olsen 1ft (ppm)	0
Commercial Application Rate (lbs/ac P2O5)	0
Organic Application Rate (lbs/ac P2O5)	209
Nutrient Application Method	Inject/Spk
Transport Factors	
Soil Erosion	3
Soil Erosion from Sprinkler Irrigation	0.25
Soil Erosion from Surface Irrigation	0
Runoff Class	0.5
Distance to Perennial Surface Waters	0
Subsurface Drainage	0
Transport Factors Subtotal (TFS)	3.75
Source Factors	
Soil Test P (0-12")	0
Commercial P Application Rate	0
Commercial P Application Method	0
Organic P Application Rate	4.18
Organic P Application Method	4
Source Factors Subtotal (SFS)	8.18
Total Rating Value (TFS x SFS)	30.68
Site Vulnerability Class	Medium

Assumption/Notes:
Assumed soil erosion factor of 3.
Used latest P soil values, 0 = not available.
Solids applied, incorporated within 21 days
P applied to Sudan when balancing for N



USDA

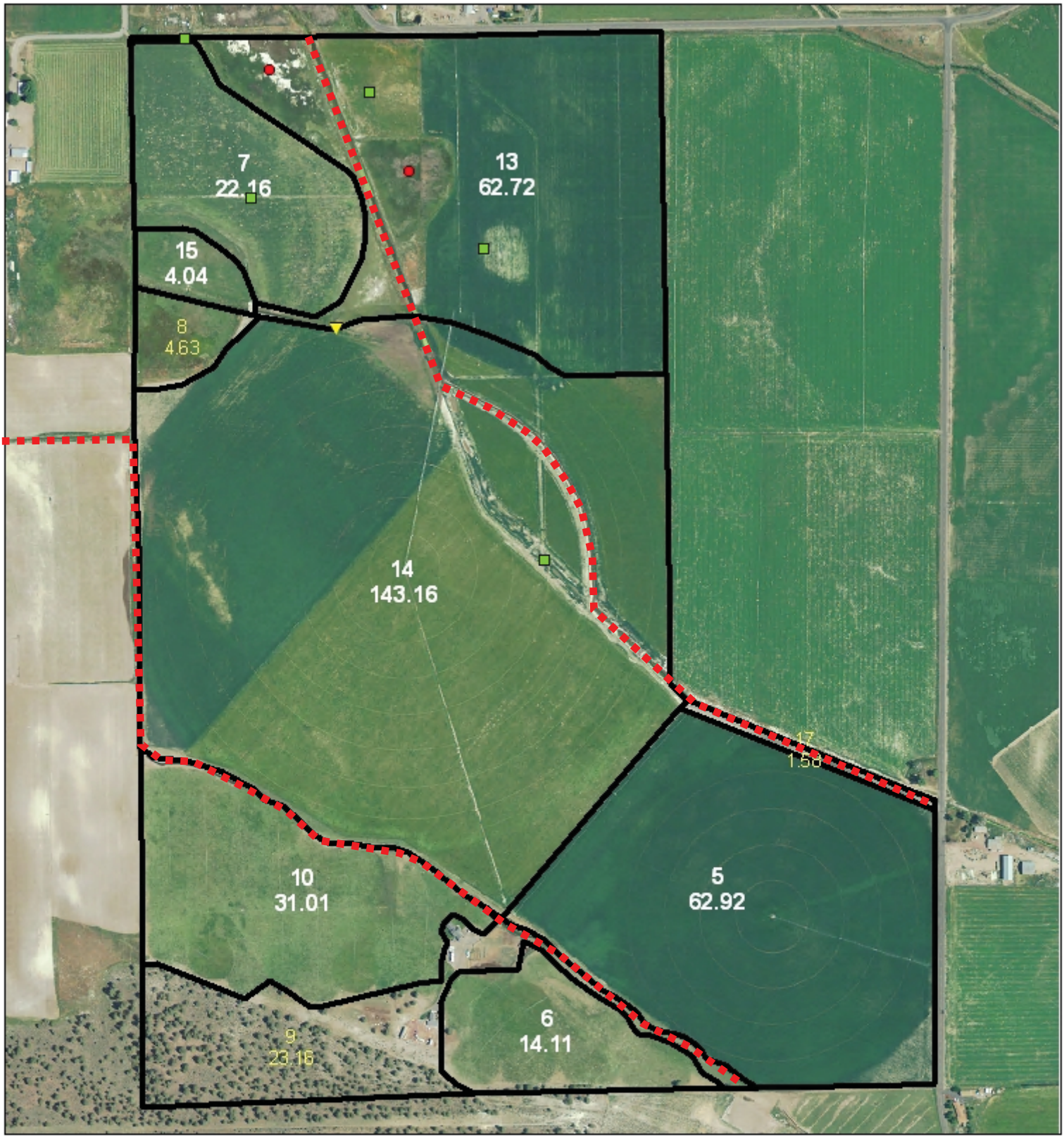
United States Department of Agriculture
Farm Service Agency
Klamath County, OR
Farm: 989
Tract: 1538

Windy Ridge
Setback Areas

Wetland Determination Identifiers
- Restricted Use
- Limited Restrictions
- Exempt from Conservation Compliance Provisions
- Section Boundary
- CLU Boundary

1:15,060

December 22, 2009



United States Department of Agriculture
Farm Service Agency
Klamath County, OR
Farm: 3833
Tract: 3700

Masten Farm

Setback Areas

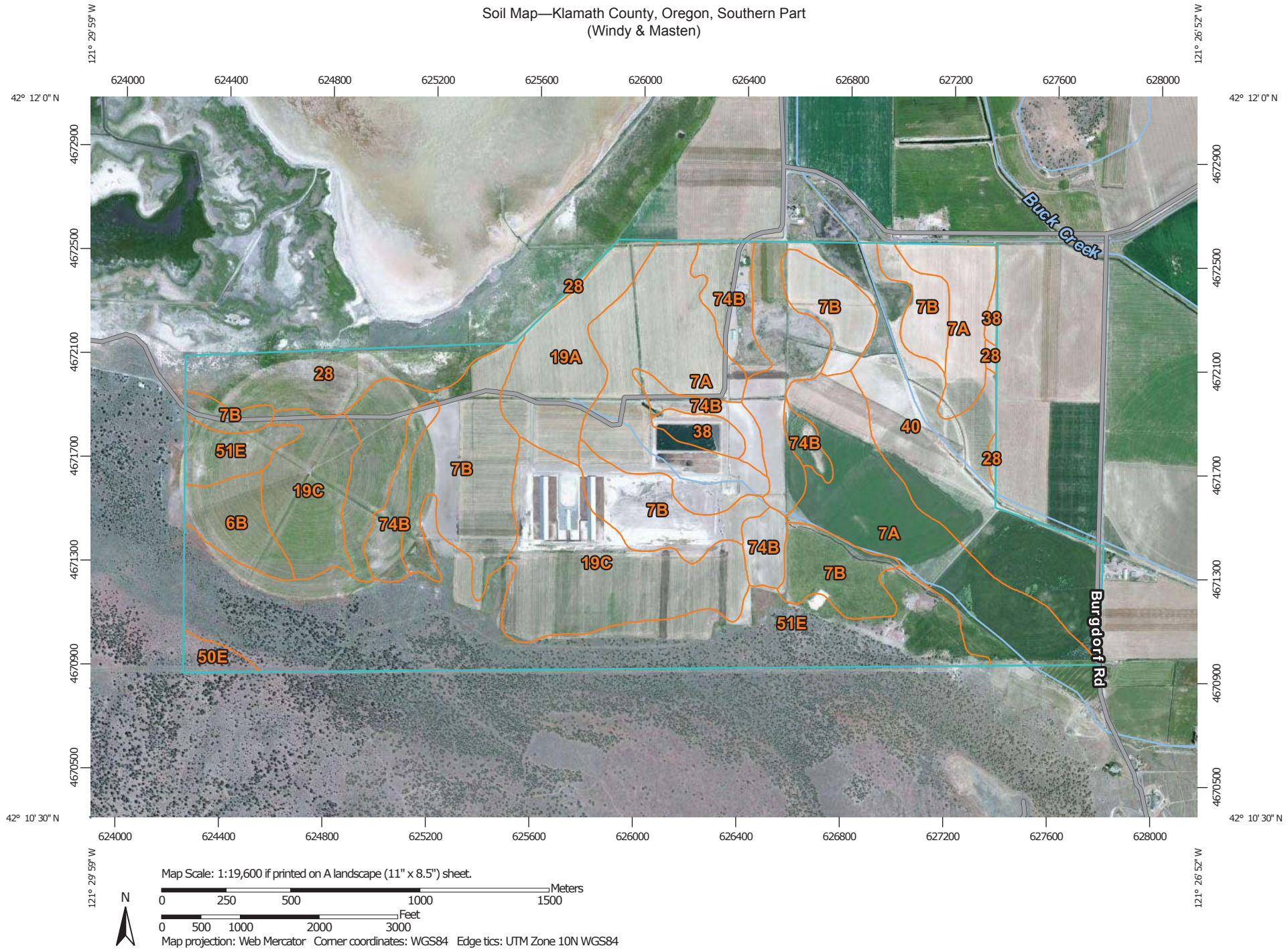
Wetland Determination Identifiers

- Restricted Use
- Limited Restrictions
- Exempt from Conservation Compliance Provisions
- Section Boundary
- CLU Boundary

1:8,060

December 22, 2009

Soil Map—Klamath County, Oregon, Southern Part
(Windy & Masten)



Map Scale: 1:19,600 if printed on A landscape (11" x 8.5") sheet.

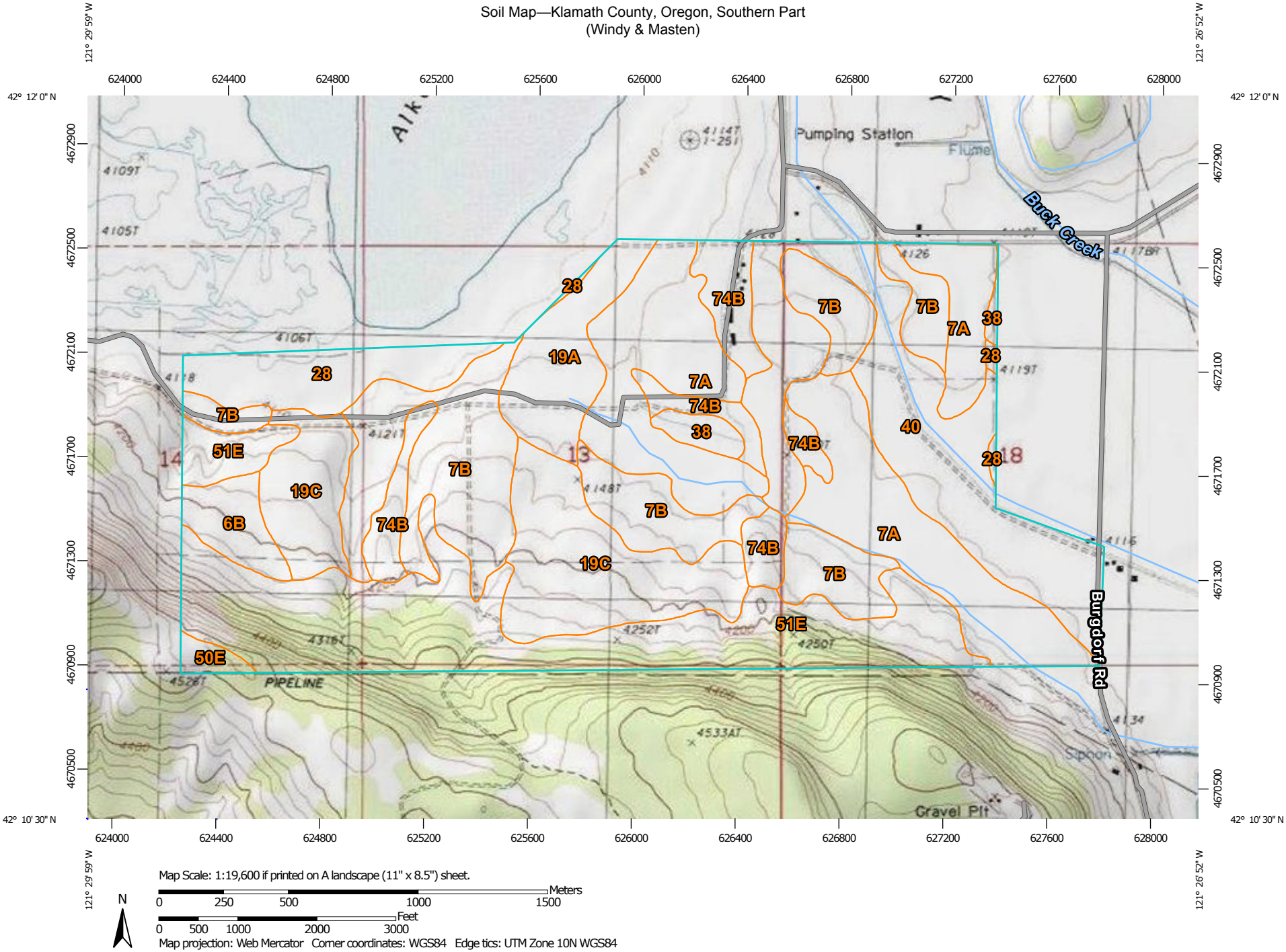
N

Meters
0 250 500 1000 1500

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Soil Map—Klamath County, Oregon, Southern Part
(Windy & Masten)



Map Scale: 1:19,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Topographic Map
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

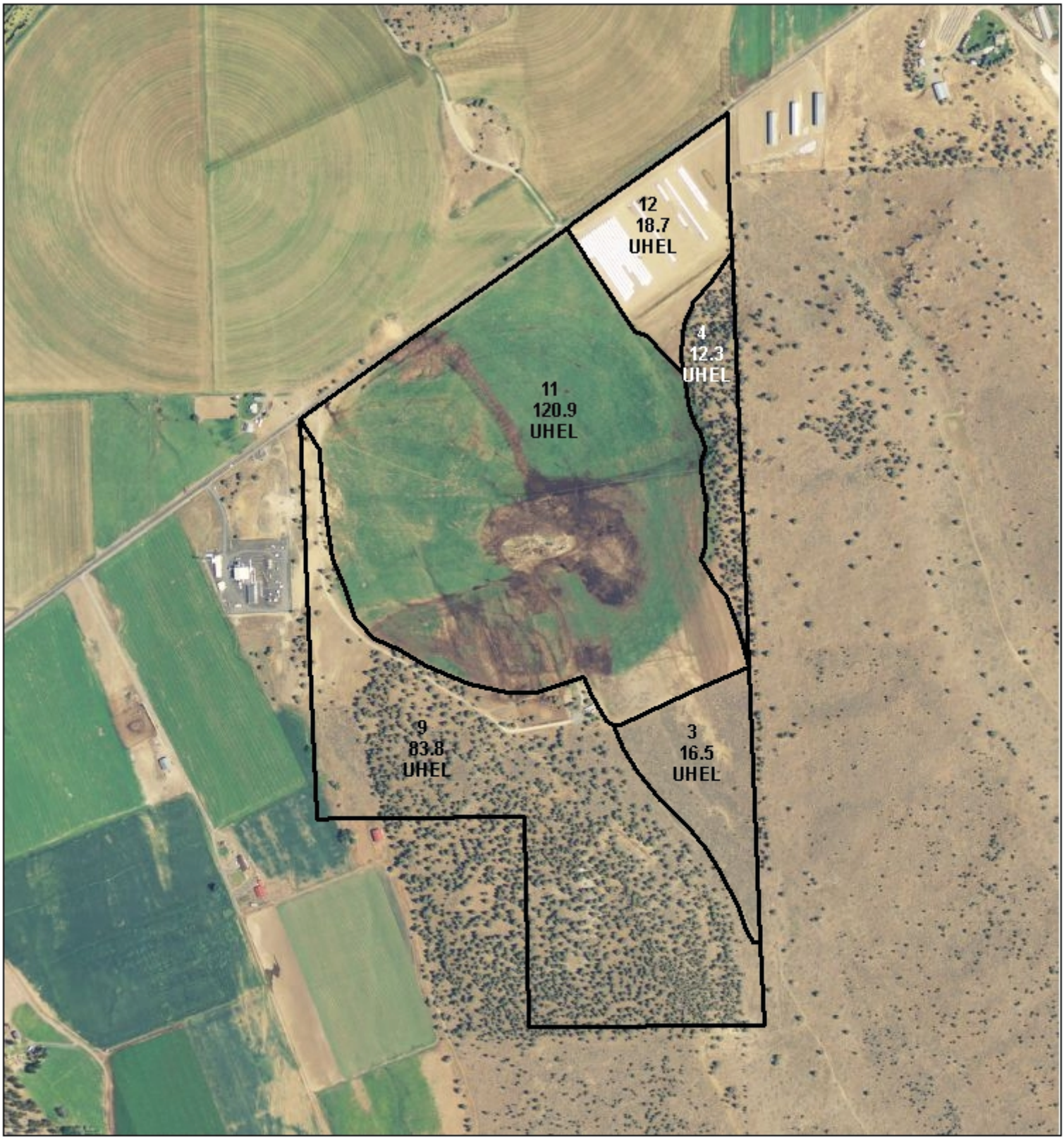
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Klamath County, Oregon, Southern Part
Survey Area Data: Version 8, Aug 20, 2012

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 12, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



United States Department of Agriculture
Farm Service Agency
Klamath County
Farm 3931
Tract 886

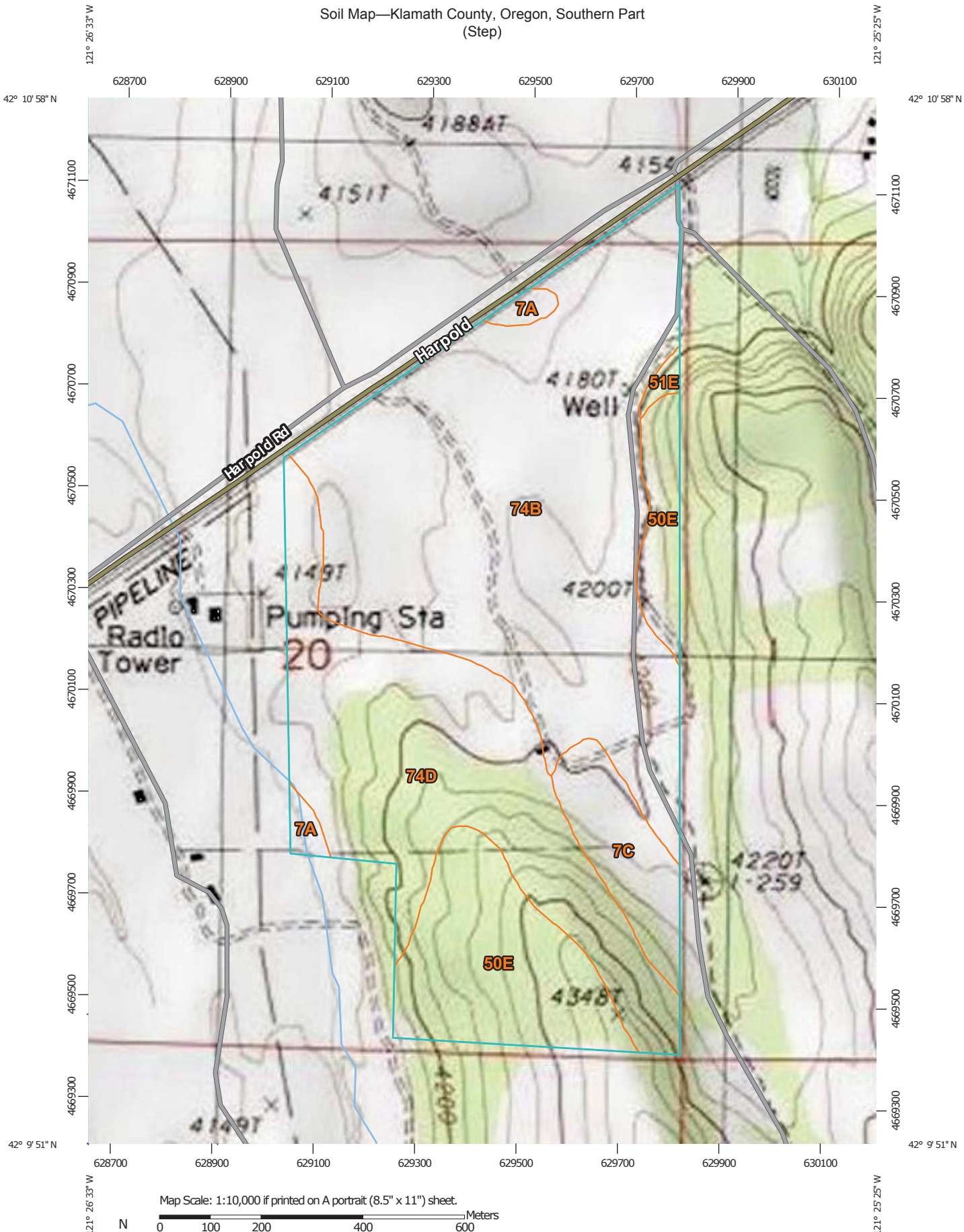
1:10,000

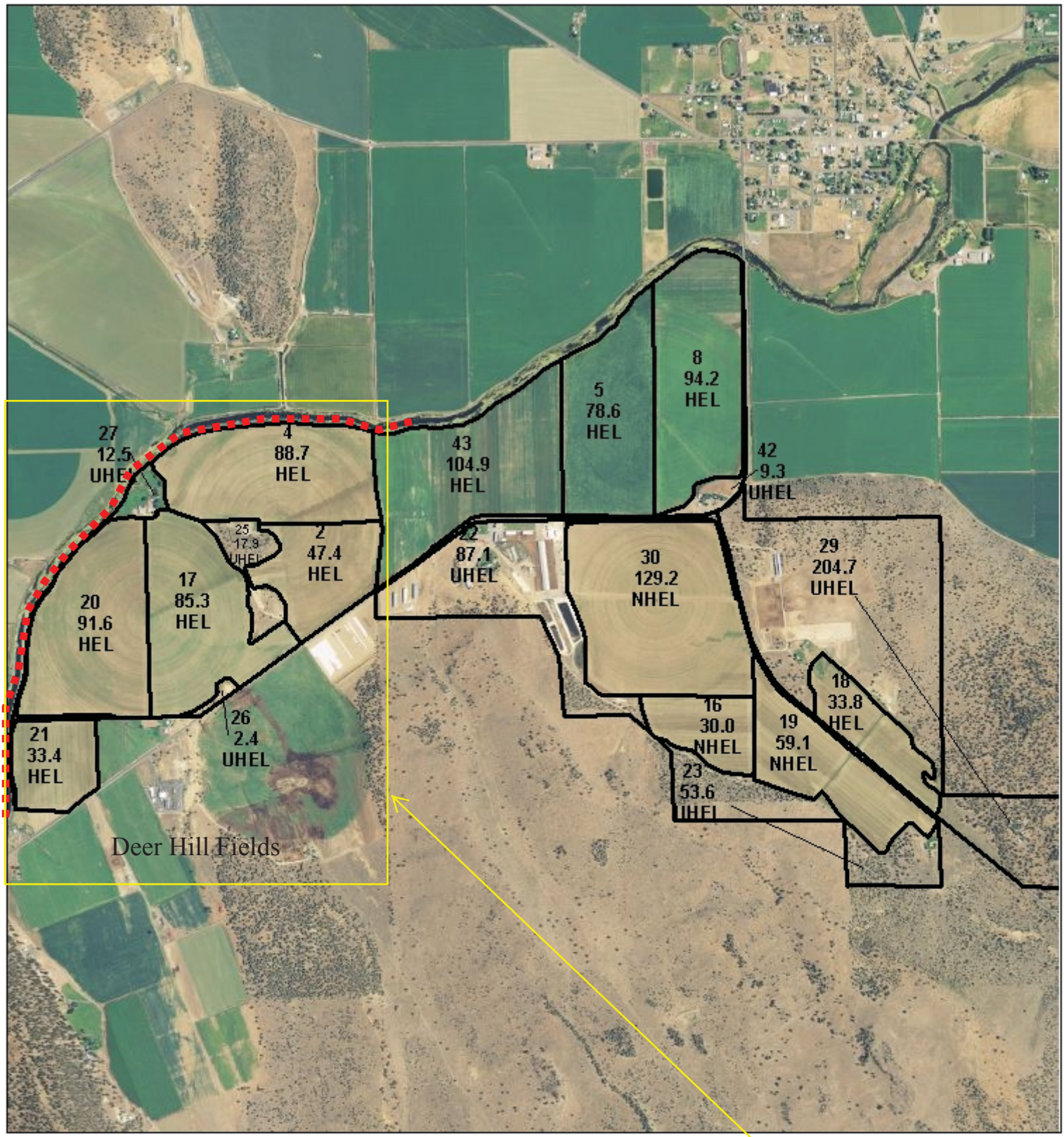
N

Stepp Farm

Disclaimer: Wetland identifiers do not represent the size, shape or specific determination of the area. Refer to your original determination (CPA-026 and attached maps) for exact wetland boundaries and determinations, or contact NRCS.
Disclaimer

Soil Map—Klamath County, Oregon, Southern Part
(Step)





United States Department of Agriculture
Farm Service Agency
Klamath County
1:22,770

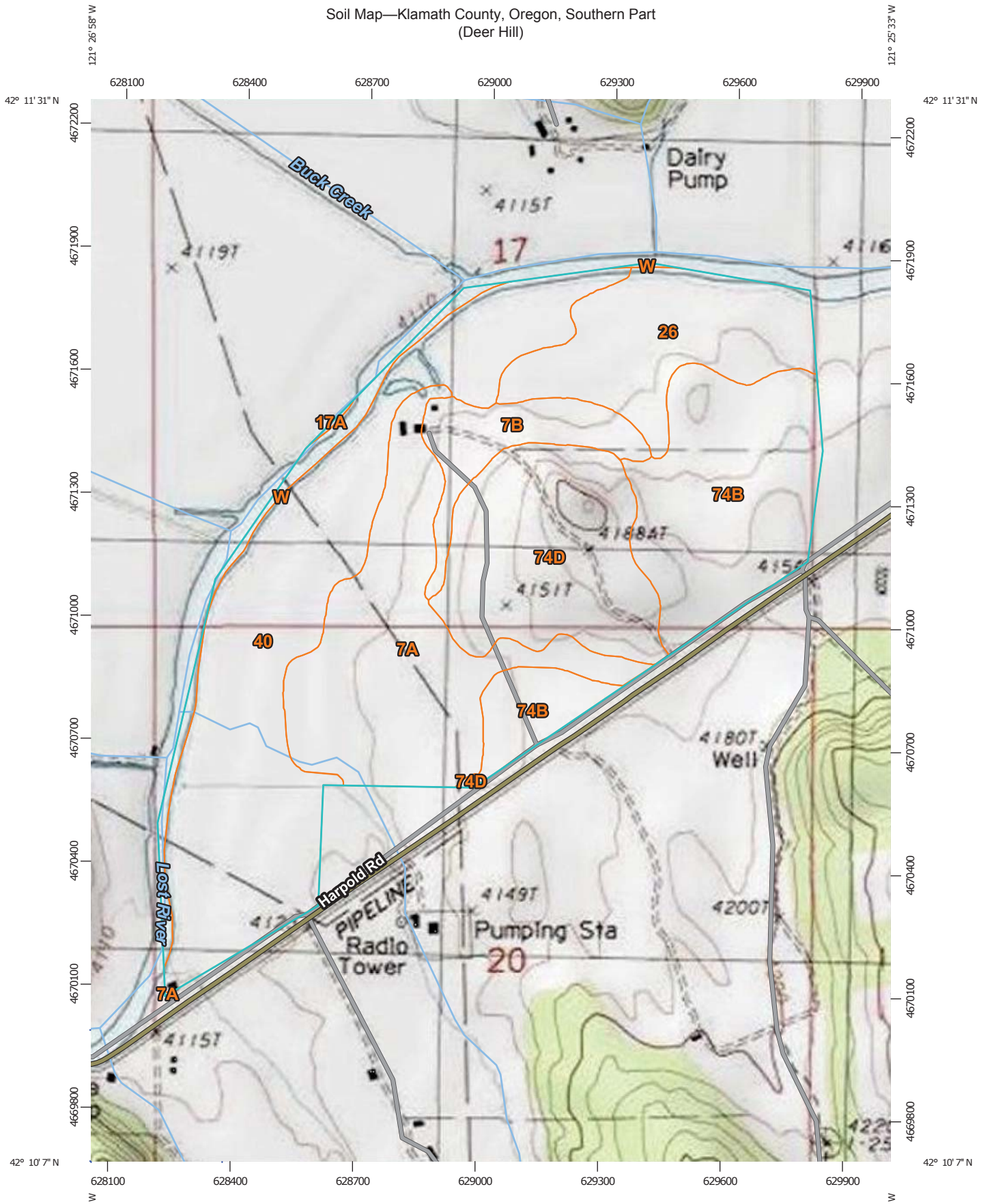
Farm 3931
Tract 127

N

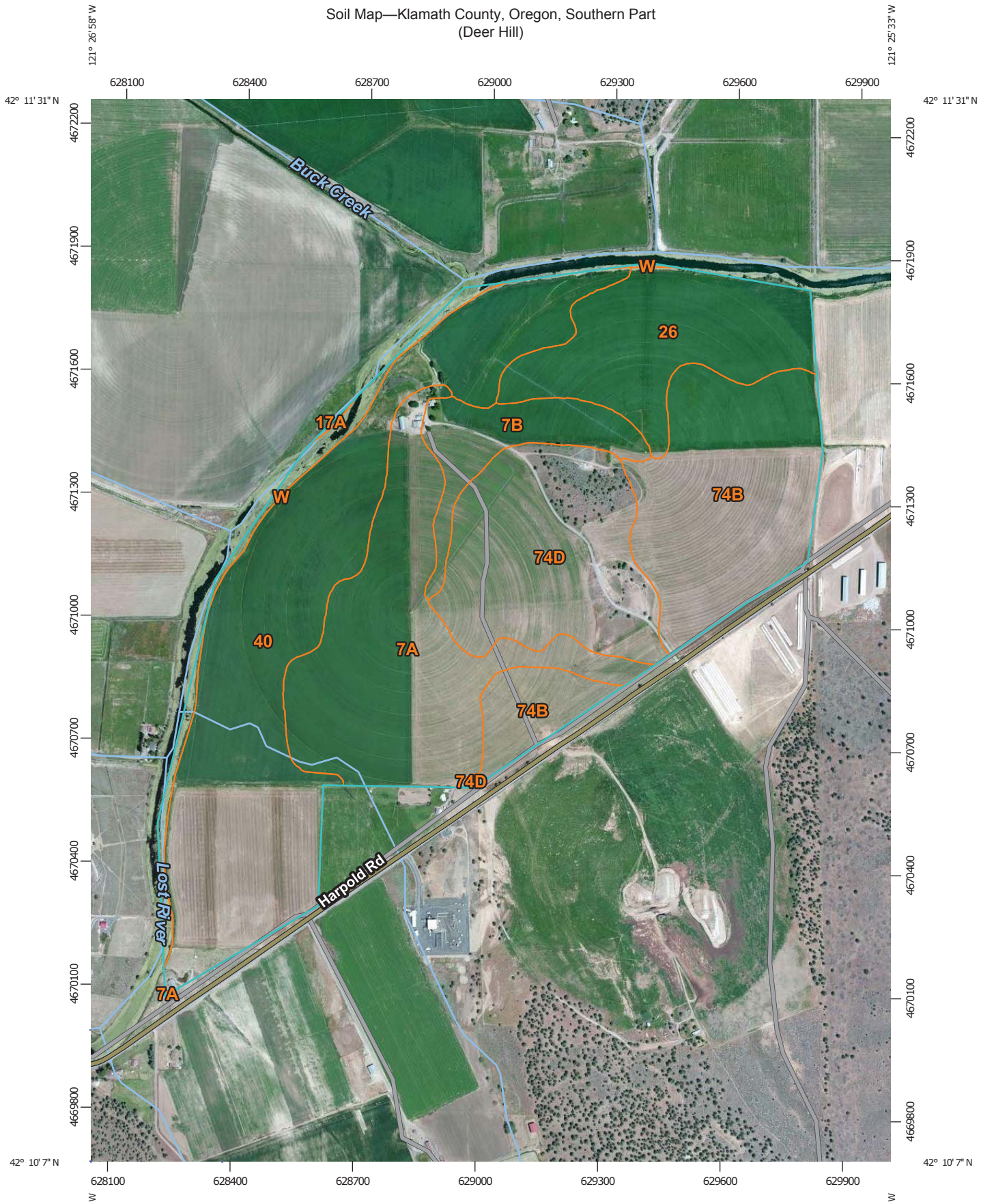
Deer Hill Fields
Setback Areas

Disclaimer: Wetland identifiers do not represent the size, shape or specific determination of the area. Refer to your original determination (CPA-026 and attached maps) for exact wetland boundaries and determinations, or contact NRCS.
Disclaimer

Soil Map—Klamath County, Oregon, Southern Part
(Deer Hill)



Soil Map—Klamath County, Oregon, Southern Part
(Deer Hill)



Map Scale: 1:12,600 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

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

Report—Map Unit Description

Klamath County, Oregon, Southern Part

6B—Calimus fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: jdn8
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Calimus and similar soils: 76 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calimus

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Alluvium and lacustrine sediment derived from tuff, basalt and diatomite

Typical profile

H1 - 0 to 11 inches: fine sandy loam
H2 - 11 to 40 inches: loam
H3 - 40 to 60 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B

7A—Calimus loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jdnq
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Calimus and similar soils: 59 percent
Minor components: 1 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calimus

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy sediment derived from tuff, basalt and diatomite

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 40 inches: loam
H3 - 40 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: B

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

7B—Calimus loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: jdnr
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Calimus and similar soils: 67 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calimus

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Alluvium and lacustrine sediment derived from tuff, basalt and diatomite

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 40 inches: loam
H3 - 40 to 60 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

7C—Calimus loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: jdns
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 90 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Calimus and similar soils: 78 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calimus

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Alluvium and lacustrine sediment derived from tuff, basalt and diatomite

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 40 inches: loam
H3 - 40 to 60 inches: loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: DEEP LOAMY 10-14 PZ (R021XY206OR)

17A—Deter clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jdky
Elevation: 4,100 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Deter and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deter

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium and lacustrine deposits derived from tuff, diatomite and basalt

Typical profile

H1 - 0 to 8 inches: clay loam
H2 - 8 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 3c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

19A—Fordney loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jdl2
Elevation: 4,050 to 4,180 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fordney and similar soils: 72 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fordney

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and lacustrine deposits derived from tuff

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Stream terraces

19C—Fordney loamy fine sand, 2 to 20 percent slopes

Map Unit Setting

National map unit symbol: jdl3
Elevation: 4,100 to 4,500 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fordney and similar soils: 88 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fordney

Setting

Landform: Escarpments, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from tuff

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 60 inches: loamy sand

Properties and qualities

Slope: 2 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: SANDY 10-14 PZ (R021XY208OR)

26—Henley loam

Map Unit Setting

National map unit symbol: jdld
Elevation: 4,050 to 4,150 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Henley and similar soils: 69 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henley

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and lacustrine deposits

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 36 inches: sandy loam
H3 - 36 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

28—Henley-Laki loams

Map Unit Setting

National map unit symbol: jdlg
Elevation: 4,050 to 4,150 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Henley and similar soils: 60 percent

Laki and similar soils: 39 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henley

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and lacustrine deposits

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 36 inches: sandy loam
H3 - 36 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C

Description of Laki

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and lacustrine deposits

Typical profile

H1 - 0 to 19 inches: loam
H2 - 19 to 32 inches: loam
H3 - 32 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to strongly saline (0.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very high (about 13.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

38—Laki loam

Map Unit Setting

National map unit symbol: jdlw
Elevation: 4,050 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laki and similar soils: 79 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laki

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and lacustrine deposits derived from basalt, diatomite, tuff and ash

Typical profile

H1 - 0 to 19 inches: loam
H2 - 19 to 32 inches: loam

H3 - 32 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to strongly saline (0.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very high (about 13.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

40—Laki-Henley loams

Map Unit Setting

National map unit symbol: jdly
Elevation: 4,050 to 4,150 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Laki and similar soils: 60 percent
Henley and similar soils: 38 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laki

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium and lacustrine deposits derived from basalt, diatomite, tuff and ash

Typical profile

H1 - 0 to 19 inches: loam
H2 - 19 to 32 inches: loam
H3 - 32 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to strongly saline (0.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very high (about 13.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Description of Henley

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and lacustrine deposits derived from diatomite, tuff, basalt and ash

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 36 inches: sandy loam
H3 - 36 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Lake terraces

50E—Lorella very stony loam, 2 to 35 percent south slopes

Map Unit Setting

National map unit symbol: jdmh
Elevation: 4,140 to 5,500 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Lorella, south, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lorella, South

Setting

Landform: Escarpments
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest, nose slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Very cobbly and gravelly colluvium and residuum derived from basalt and tuff

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 10 inches: very cobbly clay loam
H3 - 10 to 19 inches: very gravelly clay
H4 - 19 to 29 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: LOAMY 10-14 PZ (R021XY200OR)

51E—Lorella-Calimus association, steep north slopes

Map Unit Setting

National map unit symbol: jdmj
Elevation: 4,140 to 4,700 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Lorella, north, and similar soils: 60 percent
Calimus, north, and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lorella, North

Setting

Landform: Escarpments
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest, nose slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Very cobbly and gravelly colluvium and residuum derived from basalt and tuff

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 10 inches: very cobbly clay loam
H3 - 10 to 19 inches: very gravelly clay
H4 - 19 to 29 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: NORTH SLOPES 14-18 PZ (R021XY312OR)

Description of Calimus, North

Setting

Landform: Escarpments
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lacustrine sediment

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 48 inches: loam
H3 - 48 to 60 inches: loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: NORTH SLOPES 14-18 PZ (R021XY312OR)

74B—Stukel-Capona loams, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jdnh
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Stukel and similar soils: 55 percent
Capona and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stukel

Setting

Landform: Structural benches
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from tuff and diatomite

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 17 inches: loam
H3 - 17 to 27 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: LOAMY 10-14 PZ (R021XY200OR)

Description of Capona

Setting

Landform: Structural benches
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and residuum derived from tuff and diatomite

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 25 inches: gravelly sandy clay loam
H3 - 25 to 35 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY 10-14 PZ (R021XY200OR)

74D—Stukel-Capona loams, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: jdnj
Elevation: 4,100 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Stukel and similar soils: 65 percent
Capona and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stukel

Setting

Landform: Structural benches
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from tuff and diatomite

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 17 inches: loam
H3 - 17 to 27 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: LOAMY 10-14 PZ (R021XY200OR)

Description of Capona

Setting

Landform: Structural benches
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and residuum derived from tuff and diatomite

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 25 inches: gravelly sandy clay loam
H3 - 25 to 35 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: LOAMY 10-14 PZ (R021XY200OR)

Data Source Information

Soil Survey Area: Klamath County, Oregon, Southern Part
Survey Area Data: Version 12, Sep 30, 2015

APPENDIX C: ORAWM SPREADSHEET PRINTOUT

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

12/16/2015

CLIENT: Windy Ridge, LLC

ASSISTED BY: John Fazio

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Milk Production in Pounds/Cow/Day= 70						Manure CF/D/AU	Annual		
				Nutrient Production									
				(lbs./day/1000 lb. Animal Unit)			(lbs./day)						
				N	P	K	N	P	K		Days Confined	Days Grazed	Days Off Farm
MILKER (Holstein)	3,040	1,300	3,952.0	0.70	0.12	0.32	2766.40	475.03	1271.75	1.70	321	44	0
MILKER (DRY)	500	1,400	700.0	0.30	0.04	0.10	210.00	29.40	70.00	0.92	301	64	0
HEIFERS (12-24 Months)	4,000	700	2,800.0	0.27	0.05	0.12	744.80	127.40	336.00	0.90	0	0	365
CALVES (1-12 Months)	500	150	75.0	0.42	0.05	0.11	31.50	4.05	8.25	1.34	335	0	30
Totals/Averages-	8,040	888	7,527.0	0.50	0.08	0.22	3,752.7	635.9	1,686.0	1.3			

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing												
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
MILKER (Holstein)	0%	0%	0%	0%	0%	0%	25%	25%	25%	25%	25%	20%	
	3040	3040	3040	3040	3040	3040	3040	3040	3040	3040	3040	3040	5,730
MILKER (DRY)	33%	0%	0%	0%	0%	25%	25%	25%	25%	25%	25%	25%	
	500	500	500	500	500	500	500	500	500	500	500	500	1,456
HEIFERS (12-24 Months)	0%	0%	0%	0%	0%	25%	25%	25%	25%	25%	25%	0%	
	0	0	0	0	0	0	0	0	0	0	0	0	0
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	500	500	500	500	500	500	500	500	500	500	500	0	0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	0	0	0	0	0	0	0	0	0	0	0	0	0
Total AUM's Needed>>>	231	0	0	0	0	175	1,163	1,163	1,163	1,163	1,163	965	7,186
Total AUM's>>>>>>>>>>	-231	0	0	0	0	-175	-1,163	-1,163	-1,163	-1,163	-1,163	-965	-7,186

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

12/16/2015

CLIENT: Windy Ridge, LLC

ASSISTED BY: John Fazio

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION

KLAMATH FALLS AG-STN

Month	25Yr-24Hr	2.40	Lot Runoff Factors as a Percent of Monthly Precipitation	
	RCN=	95.00		
	Average Monthly Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	0.89	3.23	40%	10%
November	1.87	0.67	40%	10%
December	2.04	0.38	40%	10%
January	1.14	0.50	45%	15%
February	1.86	0.88	35%	10%
March	1.31	1.77	35%	10%
April	0.73	3.65	30%	10%
May	0.67	5.54	30%	5%
June	0.63	6.53	40%	5%
July	0.48	7.78	30%	0%
August	0.48	7.23	35%	5%
September	0.75	4.69	35%	10%
Annual	12.85	42.85		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >>> Is paved lot scraped daily? (Y/N) NO	176,000
Unpaved Lot Area >>>	1,995,436
Roof Area >>	250,500
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	2,421,936

WATER USE THAT ENTERS LIQUID STORAGE FACILITY

Type of Water Use	Number of Animals	Number of Washes per Day	Gallons of Water Used per Wash-Day	Total Water Use per Day, Gallons	Total Water Use per Day, Cubic Feet
Animal Washwater	3040.0	2	0.10	608	81.3
Equipment Wash		2	2200.00	4400	588.2
Flushwater		1	5000.00	5000	668.4
Miscellaneous		2	250.00	500	66.8
Total>>				10508	1404.8

CROP DATA

Field Number	Acres	Crop	Percent Dry Matter (DM)	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P2O5	Potassium K2O
Alfalfa	20.0	Alfalfa-Bromegrass Haylage	100%	Ton	6.00	305	93	318
Triticale	20.0	Triticale, Haylage	100%	Ton	6.00	294	93	82
Oat Silage	20.0	Oat Haylage	100%	Ton	4.50	144	58	101
Grass	458.0	Grass/Legume Hay/Pasture	100%	Ton	5.00	200	71	54
Sudan Sorghum	20.0	Sorghum-Sudan Haylage	100%	Ton	6.00	326	88	419
Wheat	10.0	Wheat, Haylage	100%	Ton	6.00	248	69	414
Masten Grass	300.0	Grass/Legume Hay/Pasture	100%	Ton	5.00	200	71	54
Stepp Grass	140.0	Grass/Legume Hay/Pasture	100%	Ton	5.00	200	71	54
Deer Grass	346.0	Grass/Legume Hay/Pasture	100%	Ton	5.00	200	71	54
Off Farm								
Total Acres-	1,334.0							

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

CLIENT: Windy Ridge, LLC

ASSISTED BY: John Fazio

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

BEDDING VOLUME

Type of Animal	Type of Bedding Facility	Bedding Material	Unit Weight Lbs/CF	Amount Needed Lbs/Day/AU	Volume CF/Day/AU	Total Volume CF/Day	Total Weight Lbs/Day
MILKER (Holstein)	Stanchion Stall	Soil	75.00	3.20	0.04	169	12,646
MILKER (DRY)	Loose Housing						
HEIFERS (12-24 Months)	Loose Housing						
CALVES (1-12 Months)	Confined	Loose Straw	2.50	25.00	10.00	750	1,875

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
MILKER (Holstein)	Gravity Basin	75%	5,177	1,726	1,684	5,051	969	36	186,376
MILKER (DRY)	Dry Scrape System	100%	644	0	0	644	0	36	23,184
HEIFERS (12-24 Months)	Dry Scrape System	100%	2,520	0	0	2,520	0	36	90,720
CALVES (1-12 Months)	Dry Scrape System	100%	851	0	0	101	0	36	30,618
Total Solids>>>			9,192	1,726	1,684	8,315	969		330,898

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

CLIENT: **Windy Ridge, LLC**
ASSISTED BY: **John Fazio**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 250,500	Paved Slab Area Square Feet 176,000	Unpaved Lot Area Square Feet 1,995,436	Silage Pit Surface Area, SF 0	Facility Water Use Cubic Feet	Manure Solids Cubic Feet	Manure Liquids Cubic Feet	Bedding Cubic Feet	Bedding Pounds	Solids Separated Cubic Feet	Solids Separated Pounds	Solids in Liquids Cubic Feet	Solids in Liquids Pounds	Total Solids Cubic Feet	Total Liquids Cubic Feet
October	18,579	5,221	14,799	0	43,549	28,390	196,862	28,477	450,163	200,232	7,208,356	53,497	1,925,889	200,232	135,646
November	39,036	10,971	31,096	0	42,144	28,214	196,148	27,559	435,642	200,149	7,205,350	51,771	1,863,763	200,149	175,018
December	42,585	11,968	33,922	0	43,549	29,154	202,686	28,477	450,163	206,820	7,445,528	53,497	1,925,889	206,820	185,522
January	23,798	7,524	28,435	0	43,549	29,154	202,686	28,477	450,163	206,820	7,445,528	53,497	1,925,889	206,820	156,803
February	38,828	9,548	30,929	0	39,335	26,333	183,071	25,721	406,599	186,805	6,724,993	48,320	1,739,512	186,805	166,959
March	27,346	6,725	21,784	0	43,549	28,575	198,274	28,477	450,163	201,829	7,265,852	53,497	1,925,889	201,829	152,901
April	15,239	3,212	12,139	0	42,144	21,243	147,782	26,294	340,794	156,490	5,633,647	38,828	1,397,822	156,490	111,562
May	13,986	2,948	5,571	0	43,549	21,951	152,708	27,170	352,154	161,707	5,821,435	40,123	1,444,416	161,707	106,177
June	13,151	3,696	5,238	0	42,144	21,243	147,782	26,294	340,794	156,490	5,633,647	38,828	1,397,822	156,490	103,058
July	10,020	2,112	0	0	43,549	21,951	152,708	27,170	352,154	161,707	5,821,435	40,123	1,444,416	161,707	95,804
August	10,020	2,464	3,991	0	43,549	21,951	152,708	27,170	352,154	161,707	5,821,435	40,123	1,444,416	161,707	100,147
September	15,656	3,850	12,471	0	42,144	22,193	153,918	4,047	303,514	138,741	4,994,672	41,417	1,491,011	138,741	115,539
Annual	**268,244**	**70,239**	**200,375**	**0**	**512,757**	**300,352**	**2,087,331**	**305,334**	**4,684,458**	**2,139,497**	**77,021,878**	**553,520**	**19,926,735**	**2,139,497**	**1,605,135**
Annual Gallons	**2,006,463**	**525,385**	**1,498,805**	**0**	**3,835,420**	**2,246,633**	**15,613,233**	**2,283,902**		**16,003,435**		**4,140,333**		**16,003,435**	**12,006,406**

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from **LIQUIDS** N	P_2O_5	K_2O	Pounds/Day of Nutrients from **SOLIDS** N	P_2O_5	K_2O	Pounds/Day of Nutrients from **GRAZING** N	P_2O_5	K_2O	Grazing Manure Gallons/Yr	Confined Manure Cubic Feet/Yr
MILKER (Holstein)	264.24	45.20	316.39	4,034.87	2,204.28	3,960.22	2,766.40	1,088.29	1,532.46	2,228,956	2,159,997
MILKER (DRY)	0.00	0.00	0.00	408.39	181.90	290.64	210.00	67.36	84.35	306,995	194,018
HEIFERS (12-24 Months)	0.00	0.00	0.00	1,448.42	788.23	1,395.07	744.80	291.87	404.88	0	0
CALVES (1-12 Months)	0.00	0.00	0.00	61.26	25.06	34.25	0.00	0.00	0.00	0	33,668
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
									Total-	**2,535,951**	**2,387,683**

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

CLIENT: **Windy Ridge, LLC**
ASSISTED BY: **John Fazio**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Total Pounds of Nutrients from ALL SOURCES		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
October	8,191	1,401	9,808	135,462	72,888	129,865	2,148	689	863	145,802	74,978	140,536
November	7,927	1,356	9,492	135,136	72,337	128,553	0	0	0	143,063	73,693	138,045
December	8,191	1,401	9,808	139,640	74,748	132,839	0	0	0	147,831	76,150	142,647
January	8,191	1,401	9,808	139,640	74,748	132,839	0	0	0	147,831	76,150	142,647
February	7,399	1,266	8,859	126,126	67,515	119,983	0	0	0	133,525	68,780	128,842
March	8,191	1,401	9,808	136,475	73,339	130,586	1,628	522	654	146,294	75,262	141,048
April	5,945	1,017	7,119	101,811	54,441	96,672	22,323	8,667	12,126	130,079	64,125	115,917
May	6,143	1,051	7,356	105,205	56,256	99,894	23,067	8,956	12,530	134,415	66,263	119,781
June	5,945	1,017	7,119	101,811	54,441	96,672	22,323	8,667	12,126	130,079	64,125	115,917
July	6,143	1,051	7,356	105,205	56,256	99,894	23,067	8,956	12,530	134,415	66,263	119,781
August	6,143	1,051	7,356	105,205	56,256	99,894	23,067	8,956	12,530	134,415	66,263	119,781
September	6,342	1,085	7,593	106,026	56,996	101,585	18,173	7,035	9,827	130,541	65,115	119,005
Annual	**84,754**	**14,497**	**101,481**	**1,437,741**	**770,219**	**1,369,277**	**135,797**	**52,450**	**73,187**	**1,658,292**	**837,166**	**1,543,946**

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

CLIENT: **Windy Ridge, LLC**
ASSISTED BY: **John Fazio**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply **2,139,497** cubic feet of solids generated from the operation it will take approximately **10,751** trips annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tractor Spreader Capacity		Spread Width	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Tons per Acre of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre	Assumed Solids Density lbs/CF
			Bushels	CF	Feet	PPM	Lbs/Ton						
Alfalfa	20	Alfalfa-Bromegrass Haylage	160	199	15	14,000	28.00	305	1.00	17.1	609	5	36
Triticale	20	Triticale, Haylage	160	199	15	14,000	28.00	294	1.00	16.5	631	5	36
Oat Silage	20	Oat Haylage	160	199	15	14,000	28.00	144	1.00	8.1	1288	2	36
Grass	458	Grass/Legume Hay/Pasture	160	199	15	14,000	28.00	200	1.00	11.2	930	3	36
Sudan Sorghum	20	Sorghum-Sudan Haylage	160	199	15	14,000	28.00	326	1.00	18.3	568	5	36
Wheat	10	Wheat, Haylage	160	199	15	14,000	28.00	248	1.00	13.9	749	4	36
Masten Grass	300	Grass/Legume Hay/Pasture	160	199	15	14,000	28.00	200	1.00	11.2	930	3	36
Stepp Grass	140	Grass/Legume Hay/Pasture	160	199	15	14,000	28.00	200	1.00	11.2	930	3	36
Deer Grass	346	Grass/Legume Hay/Pasture	160	199	15	14,000	28.00	200	1.00	11.2	930	3	36

MANAGEMENT CRITERIA FOR BIG GUN SPRINKLER APPLICATION OF LIQUIDS

To apply **2,123,251** gallons of liquids generated from the operation it will take approximately **118** hours of pumping annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, set times, and travel rates listed below for each crop.

Field Number	Acres	Crop	Sprinkler Flowrate GPM	Wetted Diameter Feet	Portion of Wetted Diameter Receiving Liquids	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Application Rate in Inches/Hour	Set Time Needed in Hours	Travel Rate Needed in Feet/Minute
						PPM	Lbs/1000Gal						
Alfalfa	20	Alfalfa-Bromegrass Haylage	300	250	1/2 Circle	959	8.00	305	1.00	2.06	1.45	3.49	0.94
Triticale	20	Triticale, Haylage	300	250	1/2 Circle	959	8.00	294	1.00	1.98	1.45	3.37	0.97
	20	Oat Haylage	300	250	1/2 Circle	959	8.00	144	1.00	0.97	1.45	1.65	1.98
Grass	458	Grass/Legume Hay/Pasture	300	250	1/2 Circle	959	8.00	200	1.00	1.35	1.45	2.28	1.43
Sudan Sorghum	20	Sorghum-Sudan Haylage	300	250	1/2 Circle	959	8.00	326	1.00	2.20	1.45	3.74	0.87
Wheat	10	Wheat, Haylage	300	250	1/2 Circle	959	8.00	248	1.00	1.67	1.45	2.84	1.15
Masten Grass	300	Grass/Legume Hay/Pasture	300	250	1/2 Circle	959	8.00	200	1.00	1.35	1.45	2.28	1.43
Stepp Grass	140	Grass/Legume Hay/Pasture	300	250	1/2 Circle	959	8.00	200	1.00	1.35	1.45	2.28	1.43
Deer Grass	346	Grass/Legume Hay/Pasture	300	250	1/2 Circle	959	8.00	200	1.00	1.35	1.45	2.28	1.43

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 4.7

CLIENT: **Windy Ridge, LLC**
ASSISTED BY: **John Fazio**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TANK WAGON APPLICATION OF LIQUIDS

To apply **2,123,251** gallons of liquids generated from the operation it will take approximately **531** trips annually. Based on applying NITROGEN, N at agronomic rates use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tank Wagon Capacity Gallons	Spread Width Feet	NITROGEN, N Concentration in Storage Facility PPM	NITROGEN, N Concentration in Storage Facility Lbs/1000Gal	Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
Alfalfa	20	Alfalfa-Bromegrass Haylage	4,000	15	959	8.00	305	1.00	0.96	447	6.5
Triticale	20	Triticale, Haylage	4,000	15	959	8.00	294	1.00	0.92	463	6.3
Oat Silage	20	Oat Haylage	4,000	15	959	8.00	144	1.00	0.45	945	3.1
Grass	458	Grass/Legume Hay/Pasture	4,000	15	959	8.00	200	1.00	0.63	682	4.3
Sudan Sorghum	20	Sorghum-Sudan Haylage	4,000	15	959	8.00	326	1.00	1.03	417	7.0
Wheat	10	Wheat, Haylage	4,000	15	959	8.00	248	1.00	0.78	549	5.3
Masten Grass	300	Grass/Legume Hay/Pasture	4,000	15	959	8.00	200	1.00	0.63	682	4.3
Stepp Grass	140	Grass/Legume Hay/Pasture	4,000	15	959	8.00	200	1.00	0.63	682	4.3
Deer Grass	346	Grass/Legume Hay/Pasture	4,000	15	959	8.00	200	1.00	0.63	682	4.3

COMPUTED NUTRIENT CONCENTRATIONS IN STORAGE

Storage Facility	Annual Volume Production	Units	Concentration of Nutrients in Storage N	P_2O_5	K_2O	Units
Storage Pond Manure Analysis	2,123,251	Gallons	8.00	2.00	14.00	lbs/1,000 Gal
Solids Storage Manure Analysis	19,255	Tons	28.00	18.00	32.00	lbs/Ton

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

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ASSISTED BY: **John Fazio**

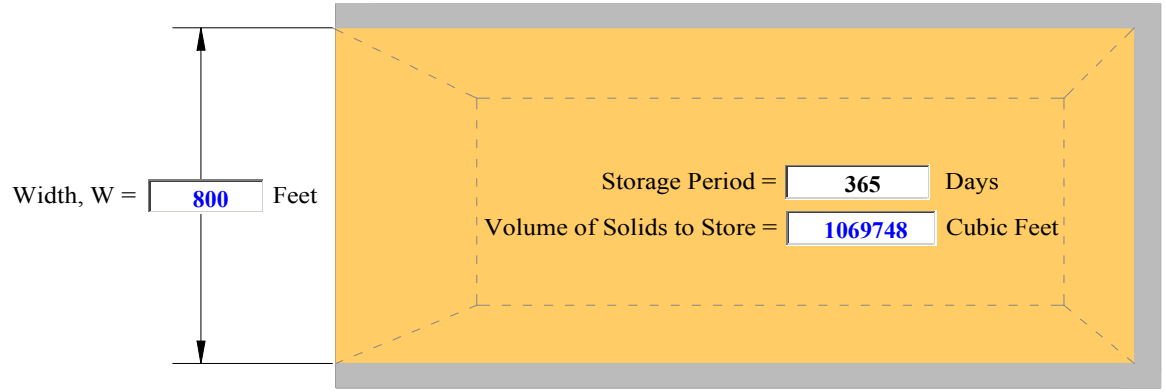
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

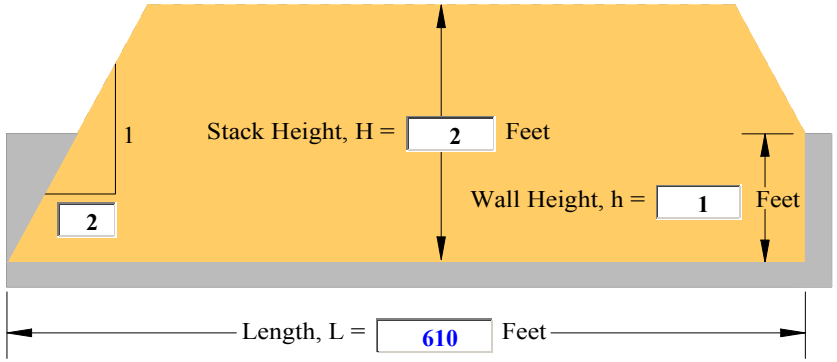
SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	365
Stacking Width, W in Feet=	800
Stacking Height, H in Feet=	2.00
Wall Height, h in Feet=	1.00
Stack Side Slope (X:1)=	2.00
Existing Storage, Cubic Feet=	100,000
Surface Area of Existing Storage, SF=	45,000
25 Year-24 Hour Storm Runoff, CF=	82,909
Volume Needed, Cubic Feet=	1,069,748
Design Volume, Cubic Feet=	970,789
Is Facility Covered?	NO

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Solids to Store Tons	Normal Runoff CF
October	31	173062	27,170	100,116	3,604	3,953
November	30	173855	26,294	100,074	3,603	8,306
December	31	179650	27,170	103,410	3,723	9,061
January	31	179650	27,170	103,410	3,723	7,595
February	28	162264	24,541	93,403	3,362	8,262
March	31	174659	27,170	100,915	3,633	5,819
April	30	131145	25,345	78,245	2,817	3,242
May	31	135516	26,190	80,853	2,911	1,488
June	30	131145	25,345	78,245	2,817	1,399
July	31	135516	26,190	80,853	2,911	0
August	31	135516	26,190	80,853	2,911	1,066
September	30	135706	3,035	69,370	2,497	3,331
Annual	365	1,847,683	291,813	1,069,748	38,511	53,522





OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

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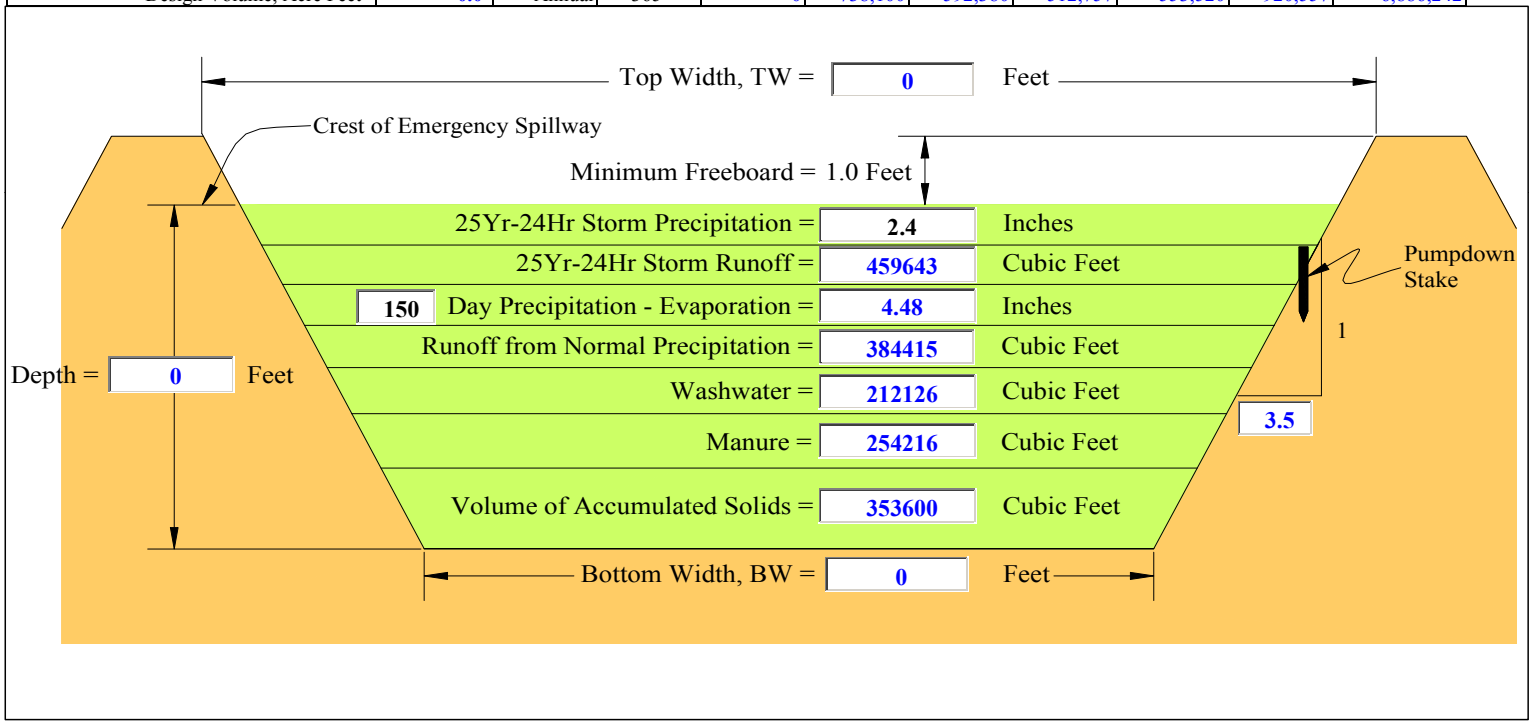
ASSISTED BY: **John Fazio**

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

WASTE STORAGE POND — **MONTHLY INFLOWS INTO WASTE STORAGE POND**

Pond Parameters	Value	Month	Number of Days	Rain-Evap on Pond CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	150	October	31	0	-57,572	42,553	43,549	53,497	82,027	613,604
Side Slope (X:1)=	3.50	November	30	0	29,524	89,408	42,144	51,771	212,848	1,592,213
Bottom Width, BW, Feet=	0	December	31	0	40,842	97,536	43,549	53,497	235,424	1,761,094
Bottom Length, BL, Feet=	0	January	31	0	15,746	67,352	43,549	53,497	180,144	1,347,570
Accumulated Solids Duration, Years=	1	February	28	0	24,111	87,566	39,335	48,320	199,332	1,491,108
Existing Storage, Acre Feet=	56.90	March	31	0	-11,318	61,673	43,549	53,497	147,402	1,102,640
Surface Area of Existing Storage, SF=	295,240	April	30	0	-71,842	33,832	42,144	38,828	42,963	321,386
Minimum Soil Liner Depth, Feet=	1.00	May	31	0	-119,818	23,993	43,549	40,123	-12,154	-90,915
25 Year-24 Hour Storm Runoff, CF=	459,643	June	30	0	-145,160	23,484	42,144	38,828	-40,702	-304,476
Top Width, TW, Feet=	0	July	31	0	-179,604	12,132	43,549	40,123	-83,800	-626,871
Top Length, TL, Feet=	0	August	31	0	-166,073	17,541	43,549	40,123	-64,860	-485,185
Volume Needed, Acre Feet=	42.2	September	30	0	-96,937	35,309	42,144	41,417	21,933	164,072
Design Volume, Acre Feet=	0.0	Annual	365	0	-738,100	592,380	512,757	553,520	920,557	6,886,242



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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
	Dairy	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Storage Pond Manure Analysis	26,134	4,470	31,292	**65%**	**95%**	**95%**	16,987	4,247	29,728
Solids	Solids Storage Manure Analysis	1,437,741	770,219	1,369,277	**75%**	**90%**	**90%**	1,078,306	693,197	1,232,350
Grazing	NONE	135,797	52,450	73,187	**100%**	**100%**	**100%**	135,797	52,450	73,187

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Sprinkling	16,987	4,247	29,728	**75%**	**100%**	**100%**	12,740	4,247	29,728
Solids	Broadcast (Incorporated 7 or more days after application)	1,078,306	693,197	1,232,350	**70%**	**100%**	**100%**	754,814	693,197	1,232,350
Grazing	Grazing	135,797	52,450	73,187	**85%**	**100%**	**100%**	115,427	52,450	73,187

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
	East of Cascade Mountains	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Moderately Well Drained	12,740	4,247	29,728	**91%**	**100%**	**100%**	11,594	4,247	29,728
Solids	Moderately Well Drained	754,814	693,197	1,232,350	**91%**	**100%**	**100%**	686,881	693,197	1,232,350
Grazing	Moderately Well Drained	115,427	52,450	73,187	**91%**	**100%**	**100%**	105,039	52,450	73,187
							TOTAL-	***803,513***	***749,893***	***1,335,264***

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Version 4.7

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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON NITROGEN, N

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
Alfalfa	20.0	Alfalfa-Bromegrass Haylage	10%	1,106	4	0%	0	0	2%	2,354	8
Triticale	20.0	Triticale, Haylage	10%	1,106	4	0%	0	0	2%	2,270	8
Oat Silage	20.0	Oat Haylage	10%	1,106	8	0%	0	0	1%	1,112	8
Grass	458.0	Grass/Legume Hay/Pasture	67%	7,742	39	7%	48,082	241	34%	35,280	177
Sudan Sorghum	20.0	Sorghum-Sudan Haylage	5%	534	2	0%	0	0	2%	2,521	8
Wheat	10.0	Wheat, Haylage	0%	0	0	0%	0	0	1%	957	4
Masten Grass	300.0	Grass/Legume Hay/Pasture	0%	0	0	5%	34,344	172	22%	23,109	116
Stepp Grass	140.0	Grass/Legume Hay/Pasture	0%	0	0	2%	13,738	69	10%	10,784	54
Deer Grass	346.0	Grass/Legume Hay/Pasture	0%	0	0	6%	41,213	207	25%	26,652	134
Off Farm			0%	0		80%	549,505		0%	0	
TOTALS-	**1334**		**100%**	**11,594**	**56**	**100%**	**686,881**	**689**	**100%**	**105,039**	**515**

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
Alfalfa	20.0	Alfalfa-Bromegrass Haylage	173	79	224	305	93	318	-132	-14	-94
Triticale	20.0	Triticale, Haylage	169	77	221	294	93	82	-125	-17	138
Oat Silage	20.0	Oat Haylage	111	48	181	144	58	101	-33	-10	80
Grass	458.0	Grass/Legume Hay/Pasture	199	151	285	200	71	54	-1	79	232
Sudan Sorghum	20.0	Sorghum-Sudan Haylage	153	73	156	326	88	419	-174	-15	-263
Wheat	10.0	Wheat, Haylage	96	48	67	248	69	414	-152	-21	-348
Masten Grass	300.0	Grass/Legume Hay/Pasture	192	154	259	200	71	54	-8	83	205
Stepp Grass	140.0	Grass/Legume Hay/Pasture	175	137	230	200	71	54	-24	66	176
Deer Grass	346.0	Grass/Legume Hay/Pasture	196	159	267	200	71	54	-3	87	214
Off Farm											

Crop Removal of Nutrients

				% of Dry Yield			Removal per Acre		
	Yield			N	P	K	N	P2O5	K2O
Crop	Unit	Condition	lbs/Unit	%	%	%	lbs/ton	lbs/ton	lbs/ton
				AWMFH Chapter 6 & OSU Extension					
Alfalfa	ton	DHM	2000	3.45%	0.35%	2.85%	69.0	16.0	68.7
Wheat/Oat/Trit Haylage	ton	DHM	2000	2.16%	0.38%	2.90%	43.2	17.4	69.9
Corn Silage	ton	DHM	2000	1.10%	0.25%	1.09%	22.0	11.4	26.3
Corn Grain	ton	DHM	2000	1.61%	0.28%	0.45%	32.2	12.8	10.8
Potato	ton	AH	2000	0.33%	0.09%	0.52%	6.6	4.1	12.5
Mint	ton	DHM	2000	2.41%	0.24%	1.85%	48.2	11.0	44.6
Sweet Corn	ton	AH	2000	0.89%	0.24%	0.58%	17.8	11.0	14.0
Wheat Grain & Straw	ton	DHM	2000	2.66%	0.62%	0.80%	53.2	28.4	19.3
Peas and Pea Hay	ton	DHM	2000				65.0	19.1	55.6
Carrots (org. & conv.)	ton	AH	2000				4.3	3.5	9.6
Onions	ton	AH	2000				5.6	2.5	5.0
Sudan Grass Hay	ton	DHM	2000				45.0	21.9	105.6
Beans & Bean Straw	ton	DHM	2000				83.0	19.0	75.0
Barley Grain & Straw	ton	DHM	2000				36.0	12.0	28.0
Soybeans	ton	DHM	2000				132.0	26.7	60.0
Teff Grain & Straw	ton	DHM	2000				40.0	12.0	28.0
Canola	ton	DHM	2000				67.0	31.0	55.0
Safflower	ton	DHM	2000				56.0	30.7	40.0
Grass for Seed	ton	DHM	2000				30.3	10.9	52.6
Fruit Trees	ton	AH	2000	0.13%	0.02%	0.16%	2.6	0.9	3.9
Grapes	ton	AH	2000	0.28%	0.10%	0.50%	5.6	4.6	12.1

*DHM = Dry Harvested Material

AH = As Harvested

Crop Removal of Nutrients

Per ORAWM 4.9		Yield		Removal per Acre N	P2O5	K2O
Crop	% DM	Units	lb/Unit	lbs/unit	lbs/unit	lbs/unit
Alta Fescue Hay/Pasture	100%	Ton	2000	38.8	18.6	53.3
Grass/Legume Hay/Pasture	100%	Ton	2000	39.9	14.3	10.7
Perennial Hay/Pasture(Med Intensity)	100%	Ton	2000	48.0	16.0	45.8
Meadow Fescue Hay/Pasture	100%	Ton	2000	48.9	23.5	67.2
Oats Hay/Pasture	100%	Ton	2000	30.6	27.5	21.0
Orchard Grass Hay/Pasture	100%	Ton	2000	62.6	23.1	26.4
Ryegrass Hay/Pasture	100%	Ton	2000	39.3	14.7	40.2
Timothy Hay/Pasture	100%	Ton	2000	28.2	11.9	44.8
Wheatgrass Hay/Pasture	100%	Ton	2000	33.4	14.5	76.0
Alfalfa-Orchardgrass Haylage	100%	Ton	2000	52.0	7.8	27.5
Oat Haylage	100%	Ton	2000	32.0	12.8	22.4
Ryegrass Haylage	100%	Ton	2000	50.0	18.3	51.3
Sorghum-Sudan Haylage	100%	Ton	2000	54.4	14.7	69.9
Triticale, Haylage	100%	Ton	2000	49.0	15.6	13.7
Wheat, Haylage	100%	Ton	2000	41.3	11.5	69.0
Corn Silage	100%	Ton	2000	25.0	9.2	24.1
Alfalfa for Seed	100%	cwt	100	6.8	1.8	3.1
Barley, Grain	100%	Bu	48	1.0	0.4	0.3
Barley, Grain Straw Removed	100%	Ton	2000	60.0	23.8	47.2
Buckwheat, Grain	100%	Bu	48	1.1	0.5	0.4
Buckwheat, Grain Staw Removed	100%	Ton	2000	57.2	19.7	76.9
Bluegrass for Seed	100%	cwt	100	3.2	1.1	2.7
Corn, Grain	100%	Ton	2000	32.2	12.8	9.6
Fescue Seed	100%	cwt	100	1.4	0.0	0.0
Peppermint, Oil	100%	Ton	2000	4.2	4.1	3.4
Peppermit, Oil Stems & Leaves Removed	100%	Ton	2000	87.2	84.3	69.6
Rapeseed	100%	Bu	50	1.5	0.8	0.4
Rapeseed, Stray Removed	100%	Ton	2000	161.6	45.8	117.2
Red Clover Seed	100%	cwt	100	5.2	1.2	0.0
Ryegrass Seed	100%	cwt	100	8.1	2.4	2.4
Wheat, Spring Hard Red	100%	Bu	60	1.8	0.9	0.4
Wheat, Spring Hard Red Straw Removed	100%	Ton	2000	83.4	39.2	44.7
Wheat, Winter Hard Red	100%	Bu	60	1.8	0.9	0.4
Wheat, Winter Hard Red Straw Removed	100%	Ton	2000	83.4	39.2	44.7
Beans, Dry	100%	Ton	2000	62.6	20.6	20.7
Blueberries	100%	Ton	2000	14.3	3.0	14.2
Peas, Austrian Winter	100%	Ton	2000	72.0	18.3	28.9
Peas, Green	100%	Ton	2000	73.6	18.3	21.7
Poplars for Pumpwood	100%	Ton	2000	0.3	0.2	0.1

Other Crops

				Removal per Acre		
		Yield		N	P2O5	K2O
Crop	% DM	Units	lb/Unit	lbs/unit	lbs/unit	lbs/unit
Artichoke	100%	Ton	2000	54.0	22.1	51.0
Arugla	100%	Ton	2000	166.4	47.7	177.8
Asparagus	100%	Ton	2000	124.0	29.8	91.0
Bean, Green	100%	Ton	2000	57.6	17.4	50.4
Bean, Lima	100%	Ton	2000	72.5	20.8	37.5
Beet root	100%	Ton	2000	36.9	16.9	60.0
Bok Choy	100%	Ton	2000	120.0	42.4	151.8
Broccoli	100%	Ton	2000	106.7	33.6	87.0
Brussels Sprouts	100%	Ton	2000	77.7	22.6	66.9
Cabbage	100%	Ton	2000	54.9	15.1	84.7
Cane Berries	100%	Ton	2000	27.4	7.2	26.0
Carrot	100%	Ton	2000	26.7	16.8	64.9
Cauliflower	100%	Ton	2000	80.0	26.4	106.9
Celery	100%	Ton	2000	44.2	22.0	125.3
Collards	100%	Ton	2000	85.3	12.2	59.4
Cucumber	100%	Ton	2000	40.0	19.5	89.8
Eggplant	100%	Ton	2000	44.0	18.9	66.0
Endive	100%	Ton	2000	69.3	21.4	126.1
Fennel	100%	Ton	2000	49.6	28.6	42.5
Flax	100%	Ton	2000	63.0	31.6	21.1
Garlic	100%	Ton	2000	50.0	17.1	23.6
Hazelnuts	100%	Ton	2000	50.5	14.0	17.2
Hemp	100%	Ton	2000	39.6	9.2	41.3
Herbs	100%	Ton	2000	58.7	15.7	107.6
Hops	100%	Ton	2000	666.7	305.5	428.3
Jicama	100%	Ton	2000	23.0	8.2	36.1
Kale	100%	Ton	2000	70.4	17.1	71.8
Kohlrabi	100%	Ton	2000	60.4	23.4	93.7
Leek	100%	Ton	2000	28.2	9.4	25.5
Lettuce	100%	Ton	2000	83.2	21.1	122.9
Melon	100%	Ton	2000	28.8	7.8	74.5
Millet	100%	Ton	2000	38.6	15.8	1.8
Mustard Seed	100%	bu	58	same as rapeseed		
Mustard Plant	100%	Ton	2000	same as rapeseed removed		
Oats	100%	Ton	2000	49.3	22.1	10.3
Okra	100%	Ton	2000	64.0	28.9	73.0
Olives	100%	Ton	2000	same as fruit trees		
Parsnip	100%	Ton	2000	19.2	16.3	45.2
Pepper, Sweet	100%	Ton	2000	41.1	14.4	67.1
Pistacio	100%	Ton	2000	69.6	22.7	25.6
Pumpkin	100%	Ton	2000	40.0	25.2	102.4
Quinoa	100%	Ton	2000	50.3	24.9	14.8
Radish	100%	Ton	2000	38.4	16.5	111.8
Rhubarb	100%	Ton	2000	48.0	10.7	115.7
Rutabaga	100%	Ton	2000	38.4	26.6	81.2
Safflower	100%	Ton	2000	55.1	31.4	17.6
Soybean	100%	Ton	2000	46.3	8.5	15.3
Spinach	100%	Ton	2000	116.0	28.1	168.1
Squash, Butternut/ winter	100%	Ton	2000	22.9	10.8	60.6
Squash, summer	100%	Ton	2000	64.0	26.7	78.3
Squash, Zucchini	100%	Ton	2000	96.0	36.7	149.4
Strawberry	100%	Ton	2000	24.0	10.9	50.0
Sunflower Oil	100%	Ton	2000	TBD		
Sunflower Seed	100%	Ton	2000	55.6	53.6	11.9
Tomato	100%	Ton	2000	53.3	17.6	83.1
Tamatillos	100%	Ton	2000	53.3	17.6	83.1
Turnips	100%	Ton	2000	37.3	19.9	71.1

WINDY RIDGE 12/17/2015

LAGOON VOLUME CALCULATON

Location	Side Slope ft/ft	Bottom Width ft	Bottom Length ft	Inside Top Width ft	Inside Top Length ft	Water Depth ft	freeboad ft	Active Storage cf	Total Storage cf	Active Storage acre-feet	Total Storage acre-feet
Settling Cell	3.5	30	750	100	820	9	1.00	435,537	514,333	10.0	11.8
Lagoon	3.5	280	750	357	827	10	1.00	2,476,833	2,767,945	56.9	63.5
									Total	66.9	75.4

Stage Curve: Lagoon

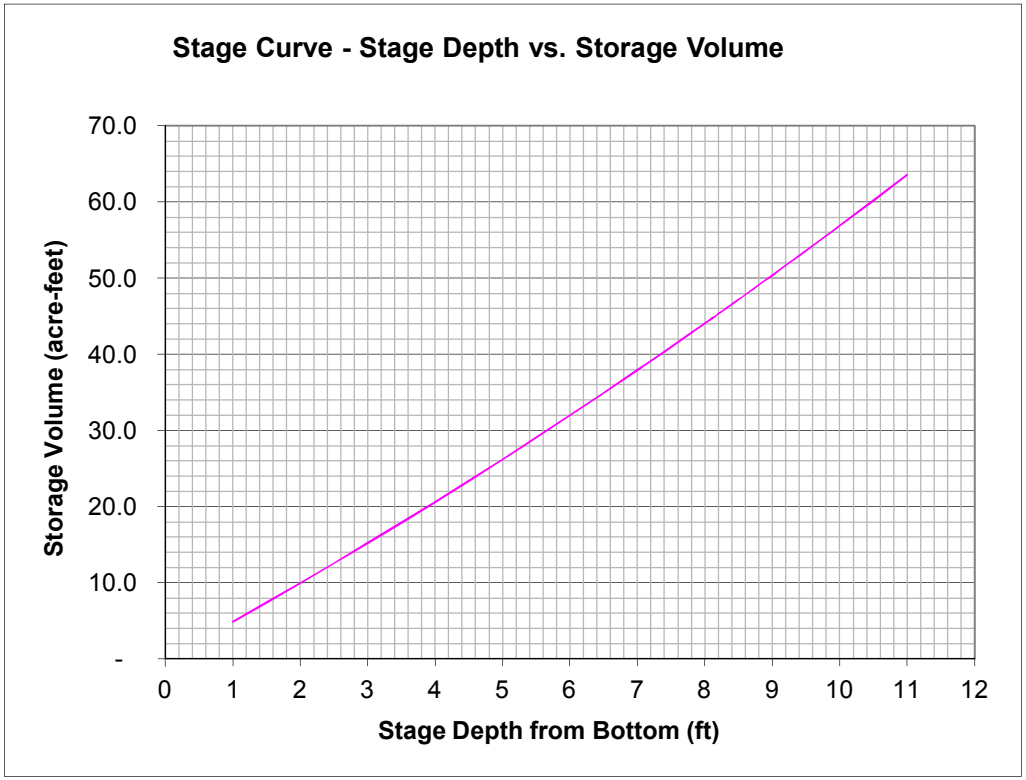
Dimensions	Feet	
Side Slope (Z)	3.5	ft/ft
Bottom Width (W)	280	ft
Bottom Length (L)	750	ft
Depth (D)		ft

VOLUME = (W*L*D)+(Z*D^2*L)+(Z*D^2*W)+((4*Z^2*D^3)/3)

Stage Depth from Bottom feet	Storage Volume cu ft	Storage Volume acre-feet	
1	213,621	4.9	
2	434,551	10.0	
3	662,886	15.2	
4	898,725	20.6	
5	1,142,167	26.2	
6	1,393,308	32.0	
7	1,652,247	37.9	
8	1,919,083	44.1	
8.17	1,965,237	45.1	25yr/24hr Mark
8.37	2,019,833	46.4	
9	2,193,912	50.4	
10	2,476,833	56.9	Freeboard
11	2,767,945	63.5	Overflow

10.5 acre-feet of runoff from 25 yr storm, per AWMP 12/17/15

56.9-10.5=46.4 acre-feet less 2.4"



MATERIALS TESTING & INSPECTION

MOISTURE DENSITY / PROCTOR TEST REPORT

❑ Environmental Services ❑ Geotechnical Engineering ❑ Construction Materials Testing ❑ Special Inspections

John Fazio
Fazio Engineering
PO Box 246
Milton-Freewater, OR 97862

Phone: 541-938-6084
Fax:
Other: E-REPORTS ONLY

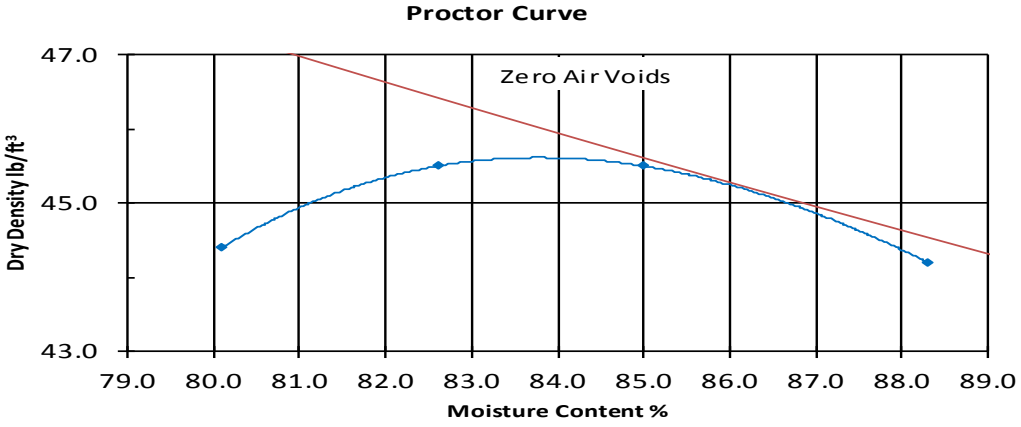
Project: **2018 Miscellaneous Laboratory Services**
Project Manager: **Jason Plunkett**
Lab Technician: **Ryan Hart**
Test Date: **June 1, 2018**

As requested MTI has performed a proctor on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source and Description:	Windy Ridge Southern Oregon – Chalk						
Date Obtained:	January 18, 2018						
Sample ID:	18-5105						
Sampling and Preparation:	ASTM D75:	X	Moist:	X	Manual:	X	Mechanical:
Test Standard:	AASHTO T99:		AASHTO T180:		**Method**		
	ASTM D698:	X	ASTM D1557:		A		

Assumed Sp. Gr.	Point Number	Percent Moisture	Dry Density
1.93	1	80.1	44.4
	2	82.6	45.5
	3	85.0	45.5
	4	88.3	44.2

	Maximum Dry Density		Optimum Moisture
Uncorrected:	45.6	lbs/ft³	83.8 %
ASTM D 4718 Correction:	N/A	lbs/ft³	N/A
As Found Correction:	N/A	lbs/ft³	N/A



Sieve Size	Percent Passing
6.0"	
5.0"	
4.0"	
3.0"	
2.0"	
1.5"	
1.0"	
3/4"	
1/2"	
3/8"	100
1/4"	99
#4	99
#8	99
#10	99
#16	99
#30	98
#40	98
#50	97
#100	95
#200	92.5

Note: ASTM D698 and D1557 valid with up to 5% Oversize Particles; correctable up to 30% via ASTM D 4718 and invalid for Oversized Particles greater than 30% retained on the ¾ inch screen.

If there are questions concerning this report (*P18-5105-Chaulk*), please contact the project manager at (541) 889-3602.

Respectfully submitted,
MATERIALS TESTING & INSPECTION, LLC

Reviewed By: **Charles D. Walker**
Regional Manager

0 250 500 ft

Windy Ridge
Grade Map
1/19/18

MATERIALS TESTING & INSPECTION

HYDRAULIC CONDUCTIVITY

❑ Environmental Services ❑ Geotechnical Engineering ❑ Construction Materials Testing ❑ Special Inspections

John Fazio
Fazio Engineering
P.O. Box 246
Milton-Freewater, OR 97862

Phone: (541) 938-6084
Fax:

Project: Fazio Engineering - 2014
Test Date: June – July 2018
Lab Technician: Ryan Hart

As requested MTI has performed hydraulic conductivity testing on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source & Description:	Windy Ridge Southern Oregon - Chalk							
Date Obtained:	January 2018							
Sample ID:								
Sampling and Preparation:	ASTM D75:		AASHTO T2:		ASTM D421:	X	AASHTO T87:	
Test Standard:	ASTM D5856:	X	Falling Head:	X	Constant Tailwater:			

	At 90% Maximum Density
Hydraulic Conductivity (cm/s)	7.873×10^{-09}
Hydraulic Conductivity (m/s)	7.873×10^{-07}
Hydraulic Conductivity (ft/s)	2.585×10^{-06}

If you have any questions concerning this report (Perm Template), please call us at **(541) 889-3602**.

Respectfully submitted,
MATERIALS TESTING & INSPECTION LLC.

Charles D. Walker

Reviewed By: **Charles D. Walker**
Regional Manager

FAZIO ENGINEERING
P.O. Box 246
Milton-Freewater, OR 97862
(541) 938-6084

December 29, 2008

Oregon Department of Agriculture
Natural Resources Division, CAFO Program
Attn: Wym Matthews
635 Capitol Street NE
Salem, OR 97301-2532

RE: Windy Ridge Lagoon Construction

Dear Wym,

As requested by Paul Measeles' letter dated November 7, 2008, this letter provides the details of the lagoon construction and perimeter drain at Windy Ridge.

Compacted Soil Liner
The onsite soils consist of 1-5 feet of topsoil over a very thick diatomaceous material. I took soil samples at several locations on May 8, 2008 for permeability testing. The test results for the native topsoil showed a hydraulic conductivity of 1.13 X 10^{-6} cm/sec and 2.34 X 10^{-8} cm/sec at an 88% and 95% compaction effort respectively. The diatomaceous material took an extended time to hydrate and appears to have good sealing properties, but had a final hydraulic conductivity near 6 X 10^{-6} cm/sec. Copies of the laboratory test results are attached.

The native topsoil was chosen for the compacted soil liner in the lagoon cells and the berms. This material was stockpiled prior to grading the general dairy site. The original liner thickness was increased from 1 foot to at least 1.5 feet to eliminate the need for a cover soil over the compacted liner. For construction purposes, the liner is constructed using four six-inch lifts targeting a 2 feet total depth. A vibratory roller was used for compaction and water trucks used for any moisture adjustment. Based on the permeability test results, a 90% or greater compaction effort was targeted so the resulting permeability would be less than 1 X 10^{-6} cm/sec.

Construction Status

Settling Cell
The settling cell is essentially complete. The general timeline for each phase of construction is as follows.

- 8/23 site visit, observed stock piling and preliminary site grading
- Site grading throughout October 2008.
- Berms shaped and constructed October and mid-November 2008.
- Liner placed in late November 2008
- Compaction tests performed by Klamath Pacific Co. on December 2, 2008

The remaining items are to install the pipes into and out of the settling cell, along with some final cleanup work outside the cell.

According to the compaction test results, the minimum compaction was 91.8%. About half of the 22 tests were above 95% and half below. It has been requested that the liner satisfy the Oregon NRCS's new guidelines that the pond leakage not exceed 5,000 gallons per day per acre, as constructed. The specific discharge was calculated assuming that the permeability is the average the test results, a conservative value.

Specific Discharge Calculations

General Equation: v = k * (H+d)/d
Where:
v=specific discharge (ft3/ft2/day)
k= coefficient of permeability (ft/day)
H=depth of liquid (ft)
d=thickness of liner (ft)

Permeability Results

Liner Material	value	units	value	units
k @ 88%	1.13E-06	cm/sec	3.20E-03	ft/day
k @ 95%	2.35E-08	cm/sec	6.66E-05	ft/day
Average	5.77E-07	cm/sec	1.63E-03	ft/day

H	8.00	feet		
d	1.50	feet		
v (initial)	1.04E-02	ft3/ft2/day	3,374	gallons/acre/day
v (final after manure)	1.04E-03	ft3/ft2/day	337	gallons/acre/day

Storage Lagoon

The storage lagoon is partially constructed. The general timeline for each phase of construction is as follows.

- Existing site grading throughout October 2008.
- Berms shaped and constructed October and mid-November 2008.
- Liner started to be placed in late November 2008, currently on hold due to weather conditions

The remaining items are to install the pipes into lagoon, along with some final shaping and cleanup work outside the cell.

Perimeter Drain

The purpose of the perimeter drain is to intercept up gradient and collect local subsurface water at a single sump. The perimeter drain also replaces an old drainage ditch that was about 12 feet deep. The perimeter drain consists of 8" perforated plastic drainpipe surrounded by 6 inches of clean ¾ - ½ inch gravel. The average depth is about 15 feet following natural grades with a minimum slope of 0.1%. The perimeter drain is divided into two parts, with each part draining into the sump. One line extends across the North, East and South sides of the lagoon area. The other line extends primarily along the West side of the lagoon area. The drain sump is a 5-foot metal culvert 20 feet long extending 19 feet into the ground. It is anticipated that this sump will be used for any groundwater monitoring activities. The sump pumps water into a portion of the old ditch still used as a bulge for irrigation pumping activities.

Currently the west drain section is not connected to the collection sump. This will be completed as weather permits.

Please feel free to call if you have any questions or require additional information.

Regards,

John A. Fazio P.E.

cc: Eric Moeggenberg, ODA
Arie DeJong, Windy Ridge, LLC

Lagoon Operation and Maintenance

Routine operations of the storage lagoon cells include directing collected flush water flow into one cell at any given time and moving the floating flush and irrigation pumps. At the start of winter with all lagoon cells clean the first cell receives flush water and may be the source of flush water. Once solids build up in the first cell, the water is allowed to flow from the first cell into the second cell. The second cell becomes the source of flush water. During the spring and throughout the summer months, each lagoon cell is cleaned one at a time while using the other cell for flush water.

Routine maintenance includes the following items.

- Inspect liner cover periodically to verify that soil cover has not eroded or otherwise been removed. Restore all soil cover to original conditions.
- All foreign material such as tumbleweeds and other foreign debris will be removed from the cells and pipes.
- Promptly repair all leaks around valves, fittings, and pipelines.
- Eradicate or otherwise remove all rodents and/or burrowing animals that have or can potentially damage any part of the liner. Immediately repair any damage caused by their activity.
- Do not allow livestock access to the liner. Immediately repair any livestock or vehicular damage.
- Maintain staff gauges and other water level indicators.

MATERIALS TESTING & INSPECTION

MOISTURE DENSITY / PROCTOR TEST REPORT

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☐ Environmental Services ☐ Geotechnical Engineering ☐ Construction Testing ☐ Special Inspections

John Fazio
Fazio Engineering
P.O. Box 246
Medford Or 97862

Project: Bonanza Dairy
Test Date: May 20, 2008

As requested MTI has performed a proctor on the sample referenced below. The testing was performed in accordance with current ASTM standards. The results obtained in our laboratory were as follows:

Source and Description:	Onsite Native 0-3.0'								
Date Obtained:	05-08-08								
Sample ID:	8203								
Sampling and Preparation:	ASTM D75:	X	Moist:	X	Dry:		Manual		Mechanical: X
Test Standard:	AASHTO T 99:		AASHTO T 180:				**Method**		
	ASTM D 698:		ASTM D 1557:	X			A		

Assumed Sp. Gr.	Point Number	Percent Moisture	Dry Density
2.50	1	17.6	96.5
	2	19.9	98.8
	3	21.6	100.2
	4	23.1	96.9

	Maximum Dry Density	Units	Optimum % Moisture
Uncorrected	100.2	lbs/ft^3	21.4 %
ASTM D 4718 Corrections	N/A	lbs/ft^3	N/A
As Found Corrections	N/A	lbs/ft^3	N/A

Sieve Size	Percent Passing
3.0"	
1.5"	
1.25"	
1.0"	
7/8"	
3/4"	100
5/8"	
1/2"	
3/8"	
1/4"	
#4	
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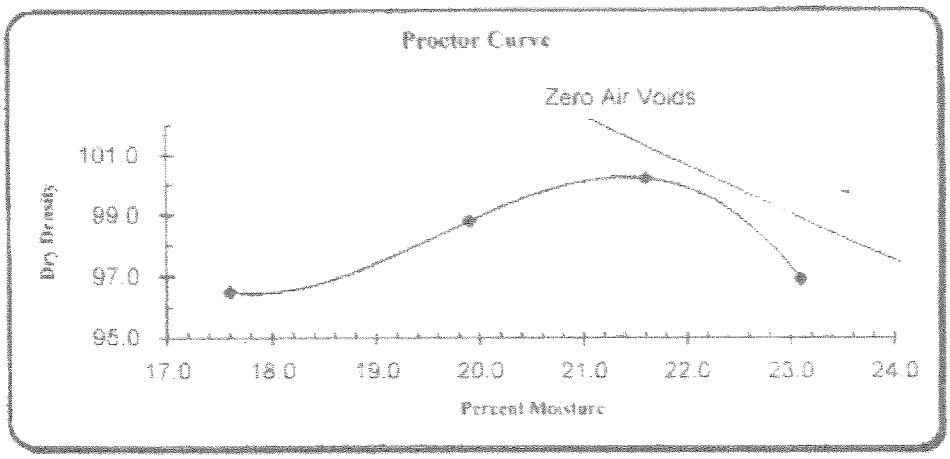
#60	
#80	
#100	
#200	



Note: ASTM D698 and D1557 valid with up to 5% Oversize Particles, correctable up to 30% via ASTM D 4718 and invalid for Oversized Particles greater than 30% retained on the ¾ inch screen.

If you have any questions concerning this report (Document1), please call on us at **(509) 526-2573**.

Respectfully Submitted,

MATERIALS TESTING & INSPECTION

Reviewed by: William B. Russell
Laboratory Supervisor

MATERIALS TESTING & INSPECTION

SIEVE ANALYSIS

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☐ Environmental Services ☐ Geotechnical Engineering ☐ Construction Materials Testing ☐ Special Inspections

John Fazio
Fazio Engineering.
P.O. Box 246
Medford Or 97862

Project: Bonanza Dairy
Test Date:May 19, 2008

As requested MTI has performed sieve analysis testing on the sample referenced below. The testing was performed in accordance with current ASTM AASHTO standards. The results obtained in our laboratory were as follows:

Source:	Onsite Native 0' – 3'							
Date Obtained:	05-08-08							
Sample ID:	8203							
Sampling and Preparation:	ASTM D75:	X	AASHTO T2:		AASHTO 87 T146		ASTM D421/D2217	X
Test Standard:	ASTM C117:	X	AASHTO T11:		ASTM D1140:		ASTM D5444:	
	ASTM C136:	X	AASHTO 127:		ASTM D422:		AASHTO T88:	

Sieve Size	Percent Passing	ODOT Specifications
#4	99	
#10	99	
#40	84	
#100	44	
#200	26.9	

If you have any questions concerning this report (Document1), please call on us at **(509) 526-2573**.

Respectfully submitted,
MATERIALS TESTING & INSPECTION INC.

Reviewed by: William B. Russell
Laboratory Supervisor

Original signed copy to client.
CC:

DATE: JUNE 6, 2008

MATERIALS TESTING & INSPECTION

PERMEABILITY

R:\WALLA WALLA\2008REPORTS\C80055C BONANZA DAIRY\PERM8203.DOC

☐ Environmental Services ☐ Geotechnical Engineering ☐ Construction Materials Testing ☐ Special inspections

John Fazio
Fazio Engineering
P.O. Box 246
Medford Or 97862

Project: Bonanza Dairy
Test Date: June 5, 2008

As requested MTI has performed permeability testing on the sample referenced below. The testing was performed in accordance with current ASTM standards. The results obtained in our laboratory were as follows:

Source:	Native Silt for Permeability 0.0-3.0' Soil Class SM							
Date Obtained:	5-8-08							
Sample ID:	8203							
Sampling and Preparation:	ASTM D75:	X	AASHTO T2:		AASHTO T87:		ASTM D421:	X
Test Standard:	ASTM D5856:	X						

Hydraulic Conductivity (cm/s)	1.130×10^{-6}
Hydraulic Conductivity (m/s)	1.130×10^{-8}
Hydraulic Conductivity (ft/s)	3.708×10^{-8}

NOTE: Molded Material Compacted to 88% of Maximum Dry Density Per ASTM D 1557.

If you have any questions concerning this report (Perm 8203), please call on us at **(509) 526-2573**.

Respectfully submitted,
MATERIALS TESTING & INSPECTION INC.

Reviewed by: William B. Russell
Laboratory Supervisor

John Fazio
Fazio Engineering
P.O. Box 246
Medford Or 97862

Project: Bonanza Dairy
Test Date: June 5, 2008

As requested MTI has performed permeability testing on the sample referenced below. The testing was performed in accordance with current ASTM standards. The results obtained in our laboratory were as follows:

Source:	Native Silt for Permeability 0.0-3.0' Soil Class SM							
Date Obtained:	5-8-08							
Sample ID:	8203							
Sampling and Preparation:	ASTM D75:	X	AASHTO T2:		AASHTO T87:		ASTM D421:	X
Test Standard:	ASTM D5856:	X						

Hydraulic Conductivity (cm/s)	2.349×10^{-8}
Hydraulic Conductivity (m/s)	2.349×10^{-10}
Hydraulic Conductivity (ft/s)	7.706×10^{-10}

NOTE: Molded Material Compacted to **95%** of Maximum Dry Density Per ASTM D 1557.

If you have any questions concerning this report (Perm 8203-A), please call on us at **(509) 526-2573**.

Respectfully submitted,
MATERIALS TESTING & INSPECTION INC.

Charles D. Walker

Reviewed by: Charles D. Walker
Branch Manager

CC:

Klamath Pacific Co.
Base Aggregate
Density Testing

Proctor	D2
Max Density	102.8 pcf
Optimum Moisture	19.5 %
Project	Dairy at Burdorff Road

Project	Date	Station	OFFSET	Wet Density PCF	Moist Density PCF	Dry Density	% Moist	Average Dry Density	% Compaction
Pond #1	12/2/2008	10' W of W Edge	CL	114.0	15.8	98.2	16.1%		
				114.0	15.9	98.1	16.2%	98.2	95.5%
		100'E of W Edge	CL	121.3	17.0	104.3	16.3%		
				121.1	16.9	104.2	16.2%	104.3	101.4%
		100'E of W Edge	30'S of CL	115.8	16.9	98.9	17.1%		
				116.0	16.7	99.3	16.8%	99.1	96.4%
		100' E of W Edge	25' N of CL	111.5	15.1	96.4	15.7%		
				111.7	14.9	96.8	15.4%	96.6	94.0%
		200' E of W Edge	CL	111.6	15.0	96.6	15.5%		
				111.7	15.3	96.4	15.9%	96.5	93.9%
		200' E of W Edge	27' N of CL	116.4	20.1	96.3	20.9%		
				116.2	20.1	96.1	20.9%	96.2	92.6%
		200' E of W Edge	33' S of CL	118.2	18.0	100.2	18.0%		
				118.4	17.9	100.5	17.8%	100.4	97.6%
		300' E of W Edge	CL	114.7	18.0	96.7	18.6%		
				115.1	17.7	97.4	18.2%	97.1	94.4%
		300' E of W Edge	42' N of CL	121.6	17.8	103.8	17.1%		
				121.3	17.9	103.4	17.3%	103.6	100.8%
		300' E of W Edge	39' S of CL	116.4	20.1	96.3	20.9%		
				116.3	19.7	96.6	20.4%	96.5	93.8%
		400' E of W Edge	CL	112.6	15.2	97.4	15.6%		
				112.9	15.6	97.3	16.0%	97.4	94.7%
		400' E of W Edge	30' S of CL	110.4	16.3	94.1	17.3%		
				110.8	16.1	94.7	17.0%	94.4	91.8%
		400' E of W Edge	20' N of CL	115.6	15.2	100.4	15.1%		
				115.1	14.8	100.3	14.8%	100.4	97.6%
		500' E of W Edge	26' S of CL	111.9	16.5	95.4	17.3%		
				111.8	16.4	95.4	17.2%	95.4	92.8%
		500' E of W Edge	24' n of CL	115.6	16.6	99.0	16.8%		
				115.5	17.4	98.1	17.7%	98.6	95.9%
		600' E of W Edge	CL	115.1	17.6	97.5	18.1%		
				115.4	17.6	97.8	18.0%	97.7	95.0%
		600' E of W Edge	27' S of CL	110.1	12.8	97.3	13.2%		
				110.7	12.9	97.8	13.2%	97.6	94.9%
		600' E of W Edge	21' N of CL	118.0	17.1	100.9	16.9%		
				118.2	17.2	101.0	17.0%	101.0	98.2%
		700' E of W Edge	CL	124.8	19.0	105.8	18.0%		
				125.1	19.4	105.7	18.4%	105.8	102.9%
		700' E of W Edge	12' S of CL	114.3	16.2	98.1	16.5%		
				114.0	16.4	97.6	16.8%	97.9	95.2%
		700' E of W Edge	21' N of CL	114.2	15.3	98.9	15.5%		
				114.2	15.7	98.5	15.9%	98.7	96.0%

Tested By	Card #	Signature	Date
Thomas Stanfield	43825	T. Lindy Stanfield	12/2/08
Gauge	Gauge Serial #		
CPN MC3	M3601108169		

Klamath Pacific Co.
Base Aggregate
Density Testing

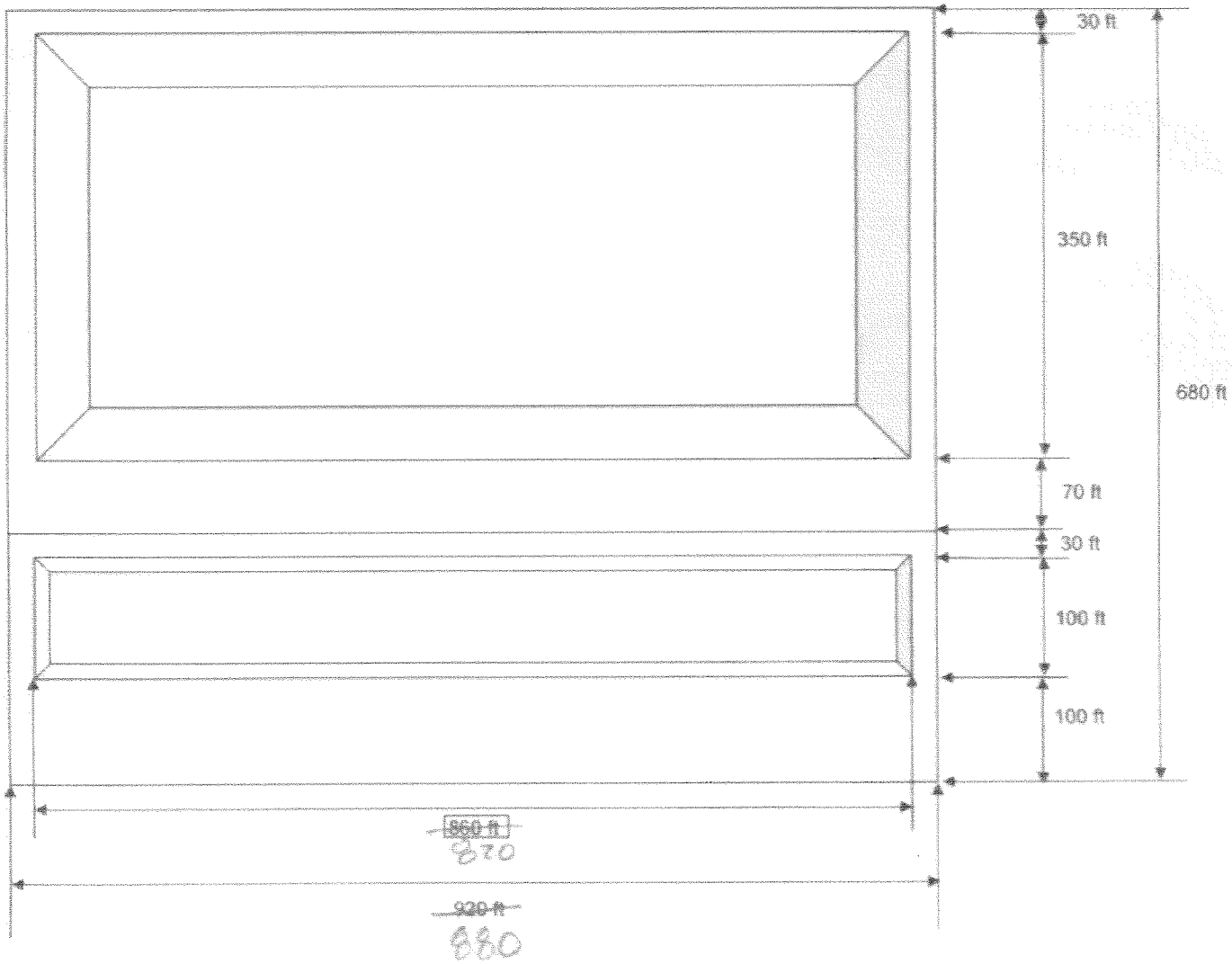
Proctor	D2
Max Density	102.8 pcf
Optimum Moisture	19.5 %
Project	Dairy at Burdorff Road

Project	Date	Station	OFFSET	Wet Density PCF	Moist Density PCF	Dry Density	% Moist	Average Dry Density	% Compaction
Pond #1	12/2/2008	742' E of W Edge	CL	116.5	18.7	97.8	19.1%		
				116.8	18.7	98.1	19.1%	98.0	95.3%

Tested By	Card #	Signature	Date
Thomas Stanfield	43825	T. [signature]	12/2/08
Gauge	Gauge Serial #		
CPN MC3	M360108169		

WINDY RIDGE
POND CALCULATIONS

LAGOON	SLOPE	BOTTOM WIDTH	BOTTOM LENGTH	TOP WIDTH	TOP LENGTH	ACTUAL TOP WIDTH	ACTUAL TOP LENGTH	WATER DEPTH	STORAGE	
CELL A	3.5	30	790	86	846	100	860	8	385824	
CELL B	3.5	280	790	336	846	350	860	8	2021824	2407648
CELL C	0	0	0	0	0	0	0	8	0	
								TOTAL:	2407648	



REGISTERED PROFESSIONAL ENGINEER
18152PE
John A Fazio
OREGON
DEC. 6, 1995
JOHN A. FAZIO
exp 12/31/09

N

Road

Sump

30'

3.5:1 Side Slopes

46.3 Acre-feet Storage at 8' depth. 2' freeboard

280'

350'

Storage Lagoon

8" Perforated Perimeter Drain

750'

820'

Manure Handling Area

100'

8.8 Acre-feet Storage at 8' depth. 2' freeboard

100'

Settling Cell

30'

Manure Handling Area

36" Drain

24" Drain

100'

Existing Concrete Feed Slab

1% Average

24" Drain

36" Drain

18" Drain

18" Drain

Commodities Roof

1%

1%

3%

3%

West Loafing Shed

East Loafing Shed

400'

800'

100'

100'

Parlor

100'

100'

800'

14'

380'

50'

240'

200'

Small Pens

Small Pens

Calf Hutch Area

150'

290'

290'

300'

300'

125'

125'

300'

300'

290'

290'

140'

140'

65'

65'

20'

Upgradient Diversion Ditch

Gravel Road

Concrete Alley with Curb

NO.	DATE	REVISION	BY

0 125' 250' 500'

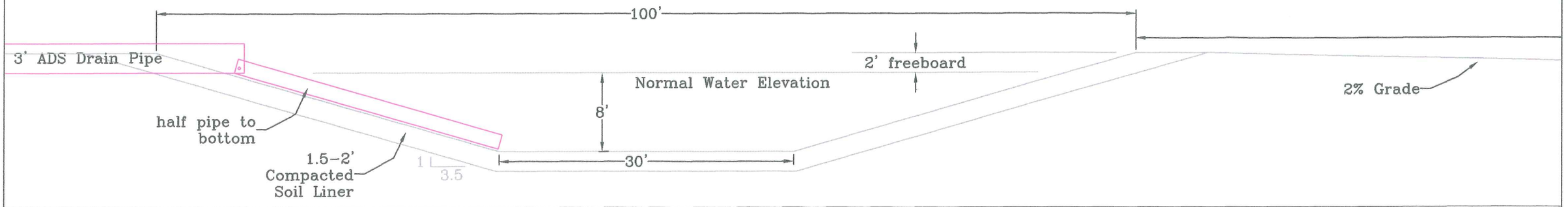
FAZIO ENGINEERING
P.O. BOX 246
MILTON-FREEWATER, OR 98762
(541) 938-6084

GENERAL SITE LAYOUT

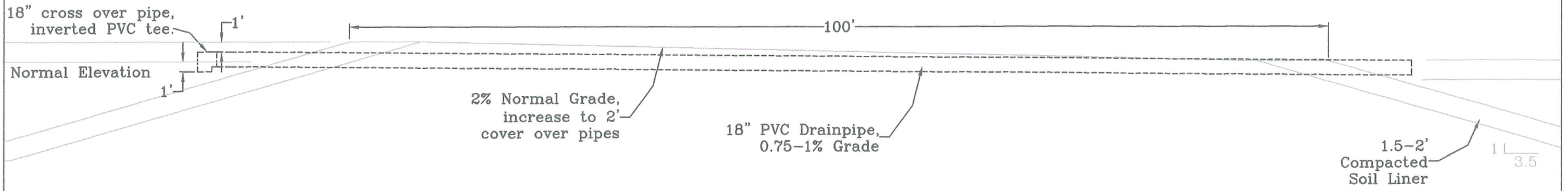
Windy Ridge, LLC
Bonanza, Oregon

DATE 12/23/08	PROJ. NO.
DESIGN BY Owner	DWG NO. layout
FILE layoutdrawing	SCALE 1" = 250'

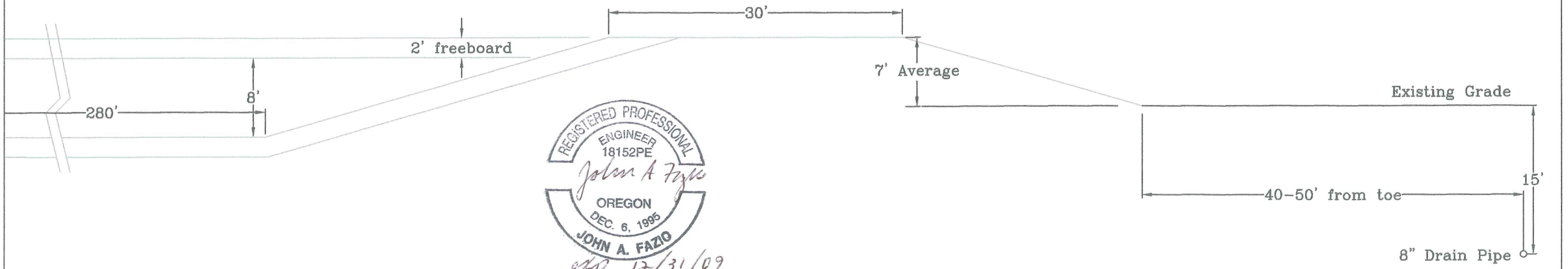
Section A



Section B



Section C



REGISTERED PROFESSIONAL ENGINEER 18152PE John A Fazio OREGON DEC. 6, 1995 JOHN A. FAZIO 12/31/09

NO.	DATE	REVISION	BY

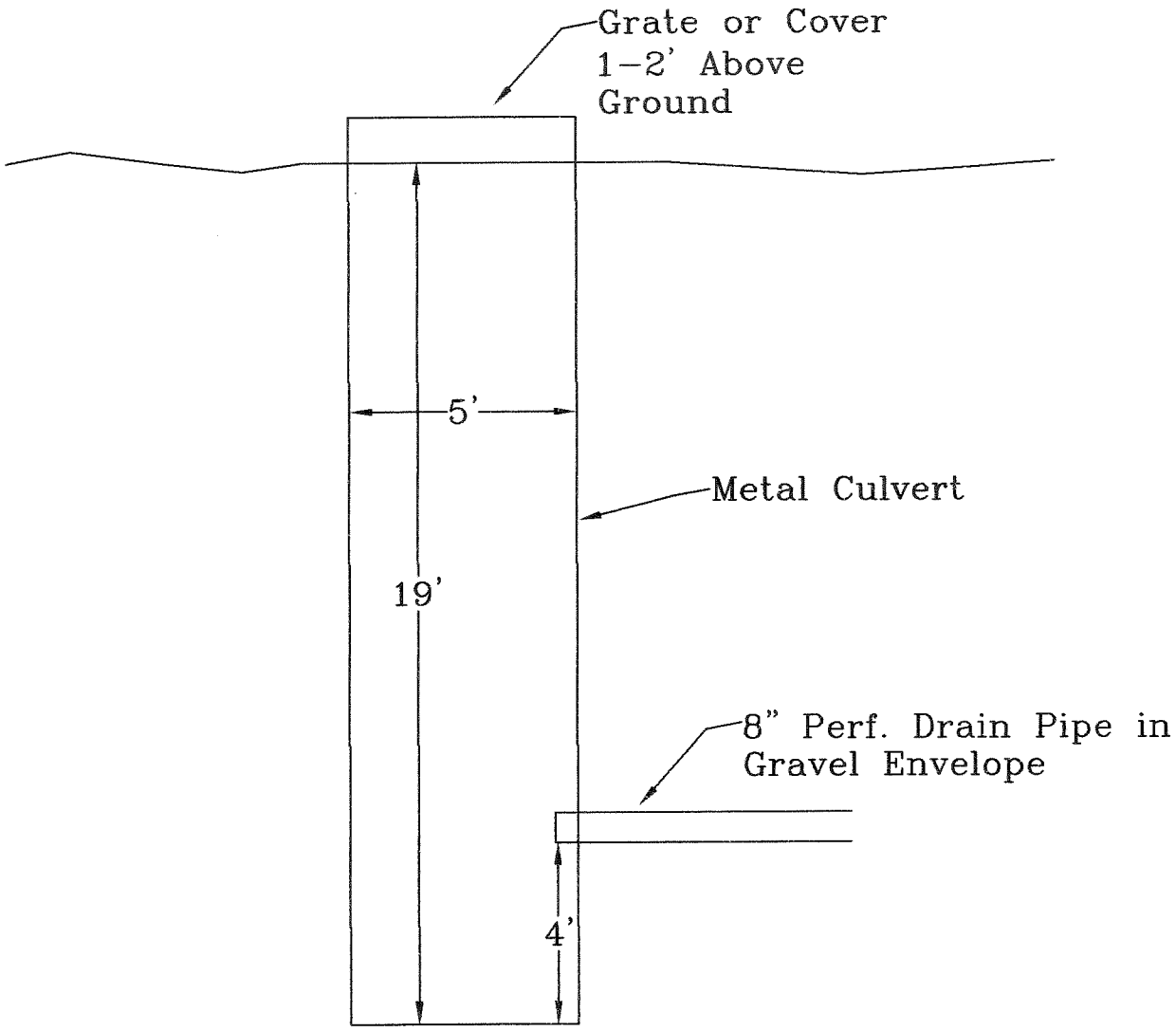
0 5' 10' 20'

FAZIO ENGINEERING
P.O. BOX 246
MILTON–FREEWATER, OR 98762
(541) 938–6084

SECTION DETAIL

Windy Ridge, LLC
Bonanza, Oregon

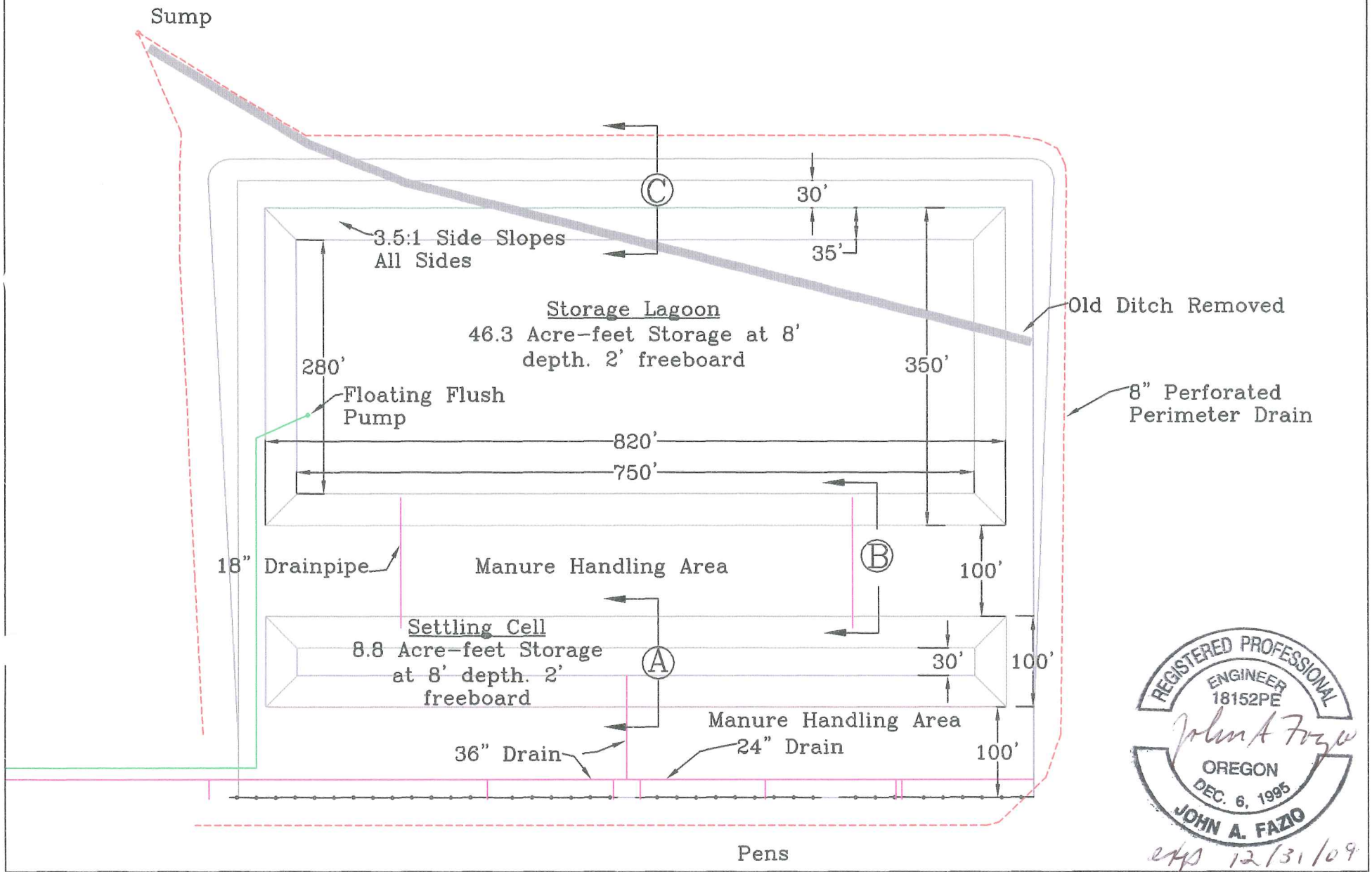
DATE 12/29/08	PROJ. NO.
DRAWN BY JAF	DWG NO. SectionABC
FILE layoutdrawing	SCALE 1" = 10'



REGISTERED PROFESSIONAL ENGINEER
18152PE
OREGON
DEC. 6, 1995
JOHN A. FAZIO

exp 12/31/09

FAZIO ENGINEERING P.O. BOX 246 MILTON–FREEWATER, OR 98762 (541) 938–6084	SUMP DIMENSIONS WINDY RIDGE, LLC BONANZA, OREGON	DATE Dec. 29, 2008	PROJ. NO.
		DRAWN BY JAF	DWG NO. drainsump
		FILE layoutdrawing	SCALE: 1" = 4'



REGISTERED PROFESSIONAL ENGINEER 18152PE John A Fazio OREGON DEC. 6, 1995 JOHN A. FAZIO

12/31/09

FAZIO ENGINEERING P.O. BOX 246 MILTON-FREEWATER, OR 98762 (541) 938-6084	0' 75' 150' 300'	LAGOON LAYOUT WINDY RIDGE, LLC BONANZA, OREGON	DATE Dec. 29, 2008	PROJ. NO.
			DESIGN BY JAF	DWG NO. LagoonDetail
			FILE layoutdrawing	SCALE: 1" = 150'