Animal Waste Management Plan

May, 1 2023

Operated by:

Henry Silacci /Brownsville Calf Ranch

91760 N. Coburg Rd.

Eugene, OR 97401

County: Lane

RECEIVED 5/10/23

Reviewed by MS

Operation: Heifer Raising/ Feedlot

State CAFO: AGP1000259CAFG

As the owner and operator of Brownsville Calf Ranch, I intend to manage in accordance with the practices described in this Animal Waste Management Plan.

Signature _____ Date: 5-1-23

General Narrative Description

Brownsville Calf Ranch is located at 91760 N. Coburg Rd, Eugene, OR 97401 and is owned and operated by Henry Silacci. The operation is a state CAFO facility in Lane County. This heifer raising/feedlot facility is in operation year-round.

This operation consists of 3000 dairy replacement heifers and/or beef feeder cattle averaging 800 lb. The facility is designed for the occupancy of 3000 head of livestock. We grow our own feed forages on the property. We custom raise cattle for other dairies and cattlemen in the region. We started this operation in 2020.

Manure and bedding collected on the alleyways of the livestock barns are scraped to an underground liquid collection tank waste water from the facility is transferred to the underground liquid collection tank by gravity and/ or scraping. All rainfall runoff from areas containing manure and silage storage are also drained to the underground collection tank. Wastewater from the solid/liquid separation facility are drained to a holding tank. Waste water collected in that tank is periodically pumped to the waste storage pond for storage, the solid manure is then stored on a unroofed concrete slab area for winter storage. The cement slab area used to store the solid manure at the facility are shown on our production area map.

The wastewater from the waste storage ponds and the solids storage area will be applied to cropland fields owned or leased by Brownsville Calf Ranch. What cannot be utilized on our cropland is exported to neighboring farms that grow other crops.

Brownsville Calf Ranch operates approximately 328.2 acres of irrigated cropland fields used to produce silage. The cropland is used for growing corn silage and grass silage for feed for the cattle. The estimated yield for corn silage is 27 tons per acre at 30% dry matter. The estimated yield for grass silage is 16 tons per acre at 25% dry matter. If a crop rotation difference is experienced due to weather related issues that change crops planted, book values for crop nutrient needs will be used to fertilize crop. The wastewater and solid manure from the facility will be used as a nutrient source to grow these crops with the excess being exported to neighboring farms.

We have agreements with two neighboring farms, Bashaw Land and Seed and Jesse Farver Farms. Both farms have approximately 1000 acres within 1-1.5 miles of the facility that we export liquid manure on. Most of the application happens after the grass seed is harvested in July and August. Jesse Farver Farms does spring plant some specialty irrigated crops and will take some liquid manure as a spring application when conditions are conducive to application and tillage for new crops.

Silage & Manure storage facilities and transfer

Liquid manure collected and separated using a solids separator on the farm. The solids are dry stacked on an unroofed cement storage slab (180'X340'), where all run off is collected in underground pit and reintroduced to the liquid manure. All areas of uncovered slab that will receive rain fall and end up collected in our wastewater stream amount to 92805sq ft. All liquid manure is stored in a holding lagoon with 55-acre feet of storage. The silage pits on at Jacks place will be utilized in a manner that no run off of silage juice is allowed to leave the slab.

Manure Utilization

Liquid and Solid manure will be utilized for its nutritional value to grow silage crops for feed on the facilities owned or leased ground. The rest will be utilized by Bashaw land and seed and Jesse Farver

farms on their crop land. Maps for all ground used for manure application are shown in aerial photos included in this animal waste management plan, under utilization area maps.

Land Application Areas

Arial photos showing field locations for all manure application, surface water features, and farm headquarters are included in this animal waste management plan. All fields included are available for manure application for the farm.

Manure and Waste Volumes

Calculated volumes of all manure, bedding, and waste feed have been completed using the Oregon Animal Waste Management worksheet (ORAWM) based from the NRCS agricultural waste field handbook. The worksheet is included in the animal waste management plan.

Nutrient Content of Manure, Bedding and processed Wastewater

Samples of Liquid and solid manure are taken yearly for accurate applications and use. Oregon Animal waste management worksheet was used to estimate volume of manure on farm.

Application schedule and Limitations

Manure from the facility is applied to its own farm ground in spring and summer months. All manure applied at Brownsville Calf Ranch is applicated onto cover crop grass and corn crop. Solid manure is applied to the fields after grass is harvested and before fields are tilled for corn production. Water body setbacks will be utilized along all ditches, streams, and bodies of water within the utilization area. Fields containing the lowest amount of P and K are picked for solid manure application. The remaining liquid/solid manure is applied to neighboring farms in July/August/September.

Animal Mortality Management

Animal Mortality will be handled onsite by composting methods on the manure storage slab. The materials from the composted mortalities are spread on the cropland fields for utilization of the compost material as a nutrient source.

Recordkeeping and Reporting

Soil sample tests are done by Kyle Larkin with Pratum Co-Op in the spring before corn crops are planted and after grass silage is harvested. We also take soil samples after corn crop is harvested in the fall to keep accurate readings and allow us to understand crop needs and utilization better. Application of manure liquid/solid will be recorded and the amount of N and P applied to farm ground will be recorded. We will applicate manure on a P need basis and use commercial N to balance the soils. Our neighbor farms we export manure on use this method as well.

Brownsville Calf Ranch records date and amount of manure exported to neighbors and accounts for manure applied to their own crop ground. Soil samples from their farm will be taken every 5 years by Brownsville Calf Ranch using Pratum Co-Op. If needed they also have every year's soil samples on file which we have access to.

Applications showing any soil amendments, and chemicals used will be kept on record. Pratum Co-Op will give us records for each crop season on fertilizer and chemicals used on our own farm ground. Copies of that will be on file with our CAFO file.

Brownsville Calf Ranch will report any discharge within 24 hours to the Oregon Department of Agriculture. Within 5 days a written statement describing the discharge will be submitted to the ODA. Annual reports of amounts of manure applied and exported will be submitted each year in our annual report in March.

Operation Maintenance

The following maintenance is done as follows.

- Inspection of underground wastewater collection unit weekly
- Keep pumps , agitators, piping, valves and all other electrical and mechanical equipment in good working condition by following the manufacturers recommendations
- Pump the underground water collection tank empty in the summer months and clean out any debris or solid materials which may have accumulated in the tank.
- Inspect the wastewater storage pond weekly to ensure structural integrity and at least 1 foot six inches of freeboard is being maintained
- Pump the wastewater storage pond to the lowest level possible during the summer months. Inspect the embankment for structural damage after pond is emptied.
- Control undesirable vegetation growth by spraying or mowing the banks of the wastewater storage pond.
- Making sure removal of solids stored in the storage area leaving the area as empty as possible in the fall before rainy season begins.
- Periodically inspect concrete slabs. Curbs, and walls on storage slab and replace broken sections as needed.
- Maintain all fences, railings or gates to keep animals contained to structures and out of open water courses and drainage ways.
- Inspect building roofs and gutters monthly for leaks.
- Maintain all irrigation systems including piping, pumps, gaskets, and traveling gun type sprinklers.

Irrigation Transfer Lines

Irrigation lines shall be flushed with clean water periodically to ensure no particle build up or plugging happens. Irrigation lines will be inspected before any manure pumping is started. Checks for leaks, warn out parts, and repairs and replacements are made as needed. Special inspections shall be done to pressure relief valves, risers, and control valves. Shut off valves will be inspected annually. Any equipment found to be broken or warn will be replaced.

Water Troughs

Damaged troughs or floats will be repaired or replaced; float valves used will be maintained in good working order. Maintenance and upkeep will be done weekly.

Washing Machine

Barn closed are washed every three days. Water volumes accounted for in computations.

PRODUCTION AREA

For proper operation of pumps, maintain lubrication for all bearings and pump shafts, assure belts are adjusted properly, maintain safety covering devices on open shafts and belt drives, check to make sure all safety valves and devices are set at proper operating conditions so they may provide protection to the pump and power unit. For centrifugal pumps, periodically measure tolerance between pump impeller and pump casing (i.e. wearing) and replace wear ring as needed to help restore new pump operating characteristics.

Use portable pressure gauge (preferably a liquid filled gauge) to monitor pump performance.

Operate and maintain agitators in accordance with the manufacture's manual and recommendations. Inspect all plumbing annually as a minimum.

Replace, tighten, or repair broken or loose connections and lines as needed.

SOLID/LIQUID SEPARATION FACILITY-

Inspect the solid/liquid separation facility daily to ensure the facility is operating properly and there has been no damage to structural components. Clean screens and outlets if they have become clogged or their capacity is not adequate for proper operation of the facility.

Prevent any spillage or leakage onto roadways when transferring solids from the solid/liquid separation facility to the solids storage area and to utilization areas.

WELL(S)-

Protect the area immediately surrounding the well from being damaged by agriculture machinery, vehicles, or livestock.

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Do not allow any foreign debris to accumulate and maintain soil and vegetative covering in the immediate vicinity of the well.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

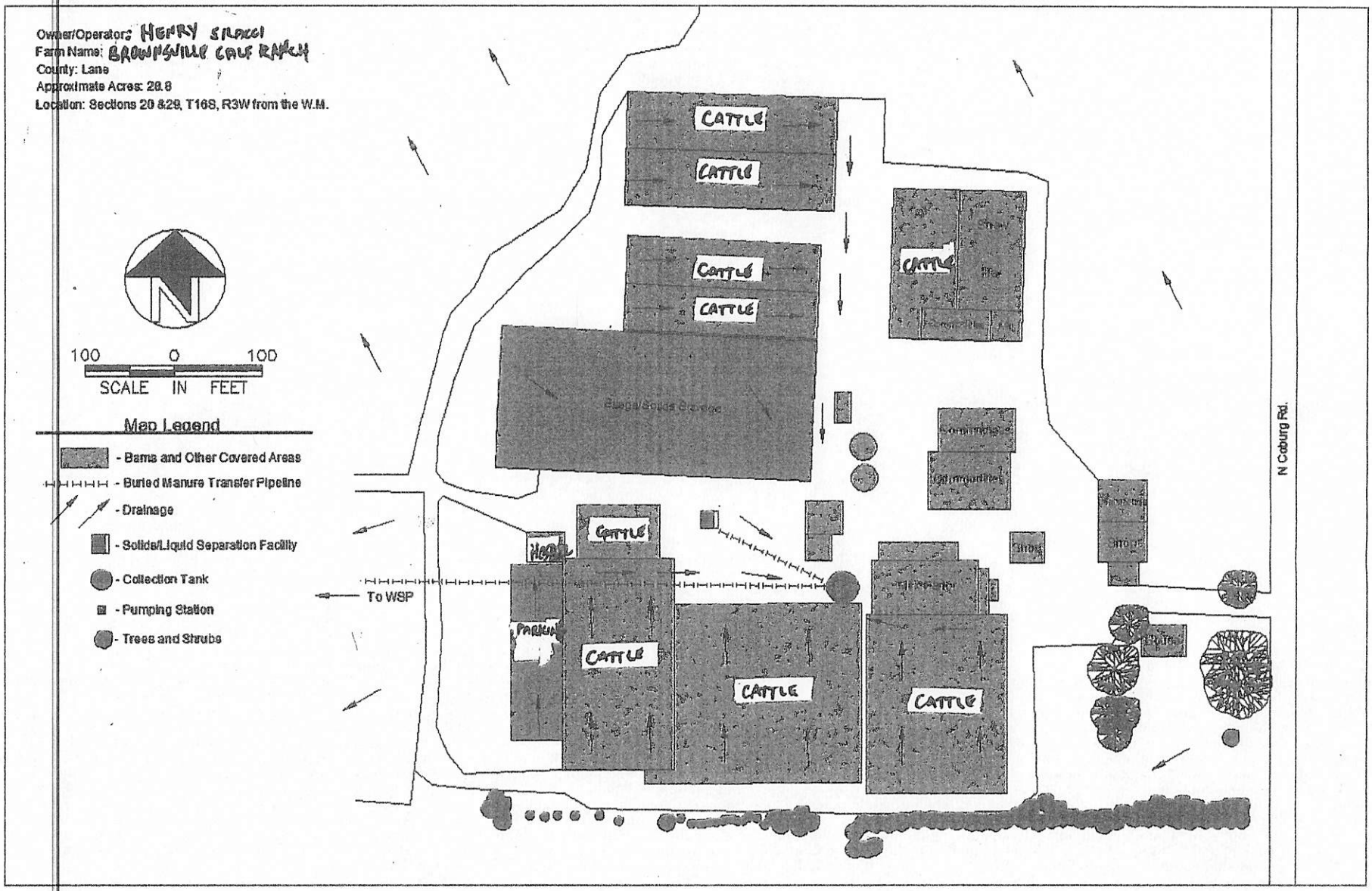
Check metal surfaces for rust and other damage especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as a protective covering.

Keep all surface water from entering or accumulating at the immediate vicinity of the well site.

Immediately repair any vandalism, vehicular, or livestock damage.

PRODUCTION AREA

PRODUCTION AREA MAP



Brownsville Calf Ranch Utilazion Area

(all land is irrigated)

Home Place

Field 1 27 Acres

Field 2 32.2 acres

Field Lagoon 8 acres

Home Place Total 67.2 acres

Jacks Place

Jacks West Field 47 acres

Jacks Field East 39 acres

Jacks Place Total 86 acres

Wilkins Place

Pivot Filed 88 acres

East Field 62 acres

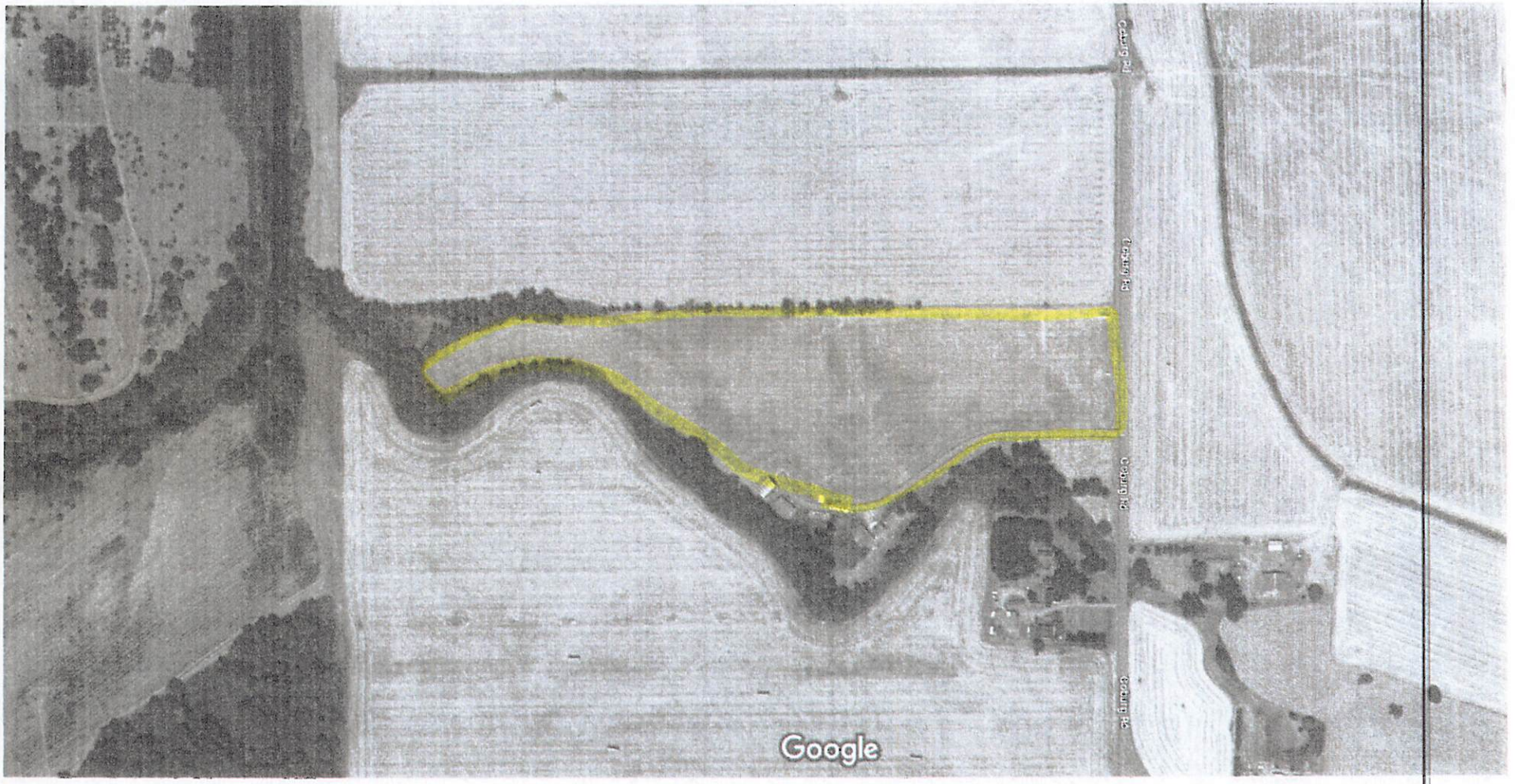
Wilkins Place Total acres 150

Craigs Place

Craigs Place Total 25 acres

Total of all acres 328.2

Google Maps Craigs Place



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UTILIZATION AREA PERIMETER

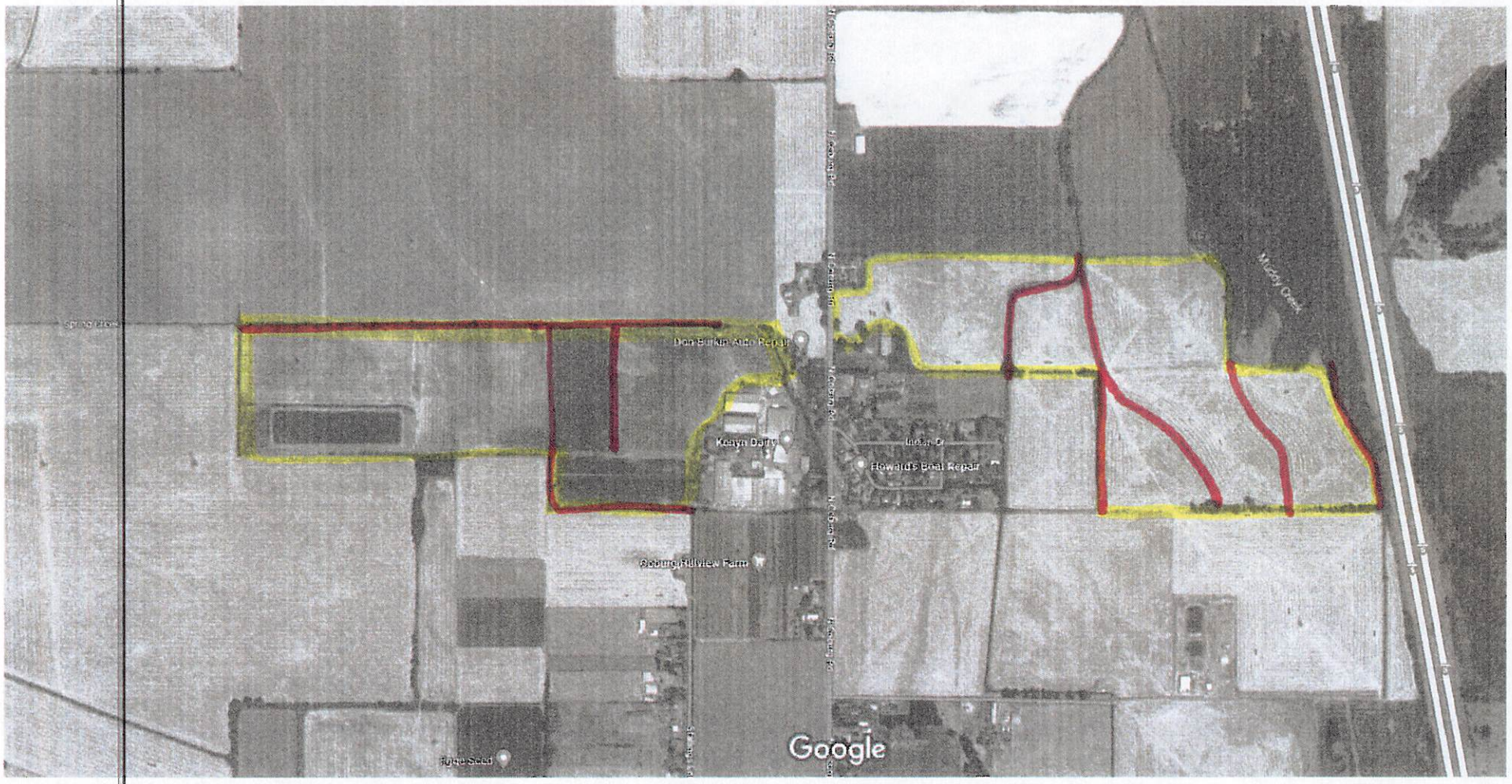
Google Maps Wilkins

Imagery ©2023 CNES / Airbus, Maxar Technologies, State of Oregon, Map data ©2023 500 ft

WATER WAY SET BACKS

UTILIZATION AREA PERIMETER

Google Maps Dairy & Jacks Place



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WATER WAY SET BACKS

UTILAZATION ARE PERIMETER

UTILIZATION AREA

HOW TO CALIBRATE APPLICATION EQUIPMENT

Calibration of application equipment is a critical part of nutrient management. Calibration should be completed at least annually to insure manure and fertilizer will be uniformly applied. There are two basic approaches for calibrating a manure spreader – the load area and the weight area methods. The load area method is more accurate and can be used for both liquid and solid manure. The weight area method works only with solid or semi-solid manure.

Irrigation System Calibration

Place 3-5 buckets throughout the irrigation spray pattern and collect samples while operating the pump at a given rpm and pressure (for a traveling gun record the travel speed also). At the end of the planned sample period measure the amount of liquid collected in inches (average the samples). The following chart shows how many gallons per acre applied per inch of liquid applied:

Inches Liquid Manure Applied via Irrigation:	Gallons per Acre:
0.20	5,431
0.30	8,146
0.40	10,862
0.50	13,577
0.75	20,366
1.00	27,154
1.25	33,943
1.50	40,731

Soft Hose Injection System with Irrigation Hose:

Alternative 1. Use a flow meter mounted on the injector system and calculate the distance and width to determine amount applied over a measured area. Example the flow meter measures 1,000 gallons over a distance of 600 feet and 10 feet wide.

Formula:

Application Rate (7,260 gallons/acre) = (Gallons Applied (1,000 gal) X 43,560 sq. ft/acre) divided by (Distance traveled (600 ft) X Application width (10 ft))

Alternative 2. (Requires a 10-20 gallon graduated measuring container)

Step 1) In the field, measure the flow out of one injector for 5 seconds into the graduated measuring container and record gallons, repeat three (3) times and average the results.

Step 2) Multiply the average amount collected from one injector by the number of injectors (equals amount applied for the whole system for 5 seconds).

Step 3) Multiply the results of Step 2 times 12 to get gallons per minute.

Step 4) Place the injector in the soil at the planned depth and operating speed and record the distance traveled in 1 minute (average 3 different measurements).

Step 5) Determine the effective application width (number of injectors X injector spacing in feet).

Step 6) Multiply the effective width times the distance traveled in 1 minute (this gives the square feet covered in 1 minute).

Step 7) Divide the result of Step 6 by 43,560 (this gives the acres covered in 1 minute).

Step 8) Divide the results of Step 3 (gallons per minute) by the results of Step 7 (acres covered in 1 minute) - (this gives the gallons applied per acre.

For example:
Step 1) Collect an average of 6 gallons from one injector for 5 seconds.

Step 2) Applicator has 8 injectors (8 injectors X 6 gallons per injector = 48 gallons for 5 seconds)

Step 3) 48 gallons in 5 seconds X 12 = 576 gallons/minute applied

Step 4) Average distance covered in 1 minute was 250 feet

Step 5) Average width of the applicator is 12 feet.

Step 6) 12 feet wide X 250 feet long = 3000 square feet

Step 7) 3000 square feet divided by 43,560 square feet/acre = .0688 acres covered in 1 minute

Step 8) 576 gallons/minute divided by .0688 acres/minute = 8,372 gallons/acre.

Manure Spreader/Tanker Calibration
There are several methods that can be used to calibrate the application rate of a manure spreader. The two best methods are the load-area method and the weight-area method. It is desirable to repeat the calibration procedure 2 to 3 times and average the results to establish a more accurate calibration.

Before calibrating a manure spreader, the spreader settings such as splash plates should be adjusted so that the spread is uniform. Most spreaders tend to deposit more manure near the middle than at the edge of the spread pattern. Overlapping can make the overall application more uniform. Calibrating application rates when overlapping is involved requires measuring the width of two spreads and dividing by two to get the effective spread width.

Calibration should take place annually or whenever manure is being applied from a different source or consistency.

UTILIZATION AREA

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

The timing and frequency of applications of wastewater and solids containing manure for utilization by crops shown in the table below are based on information provided in Oregon State University Extension publications listed in Section 5.

The formulas for determining the total nutrient application rate per unit yield for each crop shown in the table below are as follows:

Total N to apply in pounds = N in pounds per yield unit from the table for the crop grown X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total P_2O_5 to apply in pounds = P in pounds per yield unit from the table for the crop grown X 2.291 P_2O_5/P X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total K_2O to apply in pounds = K in pounds per yield unit from the table for the crop grown X 1.205 K_2O/K X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

The following table shows the crops that may be grown on this farm:

				Nutrient Removal (lb/yield unit)		
FRUIT OR VEGETABLES	Yield Unit	lb/Unit	% DM	N	P	K
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	2.14	0.20	3.54
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	17.80	4.8	11.6
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.30	0.06	0..22
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	6.60	1.20	10.33

UTILIZATION AREA

HAY AND PASTURE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit) N	P	K
Alfalfa, Hay	ton	2000	100	64.00	8.00	42.00
Alta Fescue Hay/Pasture	ton	2000	100	33.00	6.90	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.90	5.50	34.40
Meadow Fescue Hay/Pasture	ton	2000	100	41.60	8.80	47.40
Oats Hay/Pasture	ton	2000	100	60.00	10.20	14.80
Orchardgrass Hay/Pasture	ton	2000	100	53.20	8.60	18.60
Perennial Hay/Pasture (Low Intensity)	ton	2000	100	32.00	6.00	38.00
Perennial Hay/Pasture (Low-Med Intensity)	ton	2000	100	38.00	6.00	38.00
Perennial Hay/Pasture (Medium Intensity)	ton	2000	100	48.00	7.00	38.00
Perennial Hay/Pasture (Med- High Intensity)	ton	2000	100	58.00	8.00	40.00
Perennial Hay/Pasture (High Intensity)	ton	2000	100	64.00	8.00	40.00
Ryegrass Hay	ton	2000	100	33.40	5.40	28.40
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00

SILAGE AND HAYLAGE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit) N	P	K
Corn for Silage	ton	2000	100	7.50	1.20	6.00
Crimson Clover forage	ton	2000	100	40.00	4.41	32.98
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Oat haylage	ton	2000	100	60.00	10.20	14.80
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	50.00	8.00	42.67
Sorghum-Sudan Haylage	ton	2000	100	54.33	6.33	58.00
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Wheatgrass Hay/Pasture	ton	2000	100	28.40	5.40	53.60

UTILIZATION AREA

GRAIN, SEED OR OIL CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
Canola	ton	2000	100	70.00	12.00	18.00
Corn, grain shelled	bushels	56	100	0.90	0.16	0.22
Crimson Clover seed	lb	1	100	0.05	0.01	0.02
Fescue Seed, Straw Removed	cwt	100	100	10.03	1.08	8.33
Fescue, seed (Fine or Tall)	lb	1	100	0.02	0.00	0.00
Grass Seed	cwt	100	100	1.60	0.20	0.40
Grass Seed, Straw Removed	ton	2000	100	33.90	5.50	34.40
Oats, grain	bushels	32	100	0.62	0.11	0.16
Orchardgrass seed	lb	1	100	0.016	0.002	0.004
Peppermint for Oil	ton	2000	100	4.20	1.80	2.80
Peppermint for Oil, Leaves and Stems Removed	ton	2000	100	87.2	36.8	57.8
Pumpkins	ton	2000	100	4.00	1.40	6.60
Red Clover seed	lb	1	100	0.05	0.01	0.02
Ryegrass Seed	cwt	100	100	1.60	0.20	0.40
Ryegrass, Perennial Seed	lb	1	100	0.02	0.002	0.004
Wheat, Soft White for grain	bushels	60	100	1.00	0.24	0.21
Wheat, Soft White Straw Removed	ton	2000	100	43.40	8.90	20.90
Wheat, Hard Red for grain	bushels	60	100	1.60	0.37	0.31
Wheat, Soft White Straw Removed	ton	2000	100	83.40	17.10	37.10

UTILIZATION AREA

SOILS-

Based on the Natural Resources Conservation Service National Engineering Handbook, Part 652, National Irrigation Guide, the irrigated soils on this farm have an average water holding capacity of 0.15 inches per inch of soil depth and a soil intake rate of 0.25 inches per hour.

CROPS-

CROP	MATURE ROOT DEPTH (INCHES)	MAXIMUM ALLOWED DEPLETION	CRITICAL PERIOD
Grass Hay/Pasture	**30**	**50%**	**July**
Corn for Silage	**48**	**50%**	**July**

Above data are from EM8713, *Western Oregon Irrigation Guides*, June 1998, OSU: Corvallis, OR and NRCS *Irrigation Guide (National Engineering Handbook, Part 652)*.

IRRIGATION WATER SUPPLY-

Description of Oregon Water Right:	Certificate #84796
Description of Irrigation Water Supply (Well, Stream, Irrigation District, etc.):	Muddy Creek Irrigation District
Supply Flowrate (gpm or cfs):	1,665gpm or 3.71cfs
Annual Volume Available (Acre-ft.):	742 AF
Water Delivery Schedule:	On Demand
Method(s) of Water Measurement:	NA

IRRIGATION SYSTEM-

System	System Capacity (gpm)	Nozzle Size (in)	Pressure (psi)	Spacing (ft)	Application Rate (in/hr)	System Efficiency (%)
Traveling Big Gun Sprinkler	335	1.1	80 to 90	180 to 240	0.4 to 0.5	65

Irrigation Water Flows, Volumes, and Relationships

Equation 1-

$$Q \times T = D \times A$$

where:

Q = flow rate (acre-in/hr or cfs)
T = time (hr)
D = gross depth applied (in)
A = area (acres)

Equation 2-

$$Q = \frac{453 \times A \times D}{F \times H}$$

where:

Q = flow rate (gpm)
A = area (acres)
D = gross application depth (in)
F = irrigation period (days)
H = hours of operation per day

Water Flow Rates:

1 cubic foot per second (cfs)
= 448.8 gallons per minute
1 cfs for 1 hour = 0.99 acre-inch
1 cfs for 24 hr = 1.98 acre-ft
1,000 gpm = 2.23 cfs
1,000 gpm for 24 hr = 4.42 ac-ft
1 gpm/acre = 0.053 ac-in/ac/day
1 cfs = 40 miner's inches in OR, No CA
1 cfs = 50 miner's inches in ID, WA
1 miner's inch = 11.22 gpm in OR
1 miner's inch = 9 gpm in ID, WA
1 cfs = 28.32 liters/sec
1 cubic meter/sec = 35.3 cfs
1 liter/sec = 15.85 gpm

Q x T = D x A *where:*

Q = cfs, T = hr; D = inches depth; A = acres

Gpm for 5 ft/s velocity in PVC pipe:

6"	8"	10"	12"	14"
480	800	1250	1750	2150

NRCS *Natural Resources Conservation Service*

Water Volumes & Weights:

1 cubic foot = 7.48 gallons
= 62.4 lb = 28.3 liters
1 acre-foot = 43,560 cubic feet
(1 acre covered 1 ft deep)
12 acre-in = 1 acre-ft = 325,829 gal
1 million gallons = 3.07 acre-ft
1 acre-ft = 1,234 cubic meters
1 cu meter = 1,000 liters = 35.3 cu ft

Pressure and Pressure Head:

1 psi = 2.31 ft of pressure head
1 atmosphere (sea level)
= 14.7 psi = 33.9 ft of head

Lengths and Areas:

1 mile = 5,280 ft = 1.61 km
1 meter = 3.28 ft = 39.37 inches
1 acre = 43,560 square ft
1 hectare = 2.47 acres

Pump Power Requirement

$$Horsepower = \frac{Pump\ Head\ in\ ft \times gpm}{39.6 \times \%\ Pump\ Efficiency}$$

UTILIZATION AREA

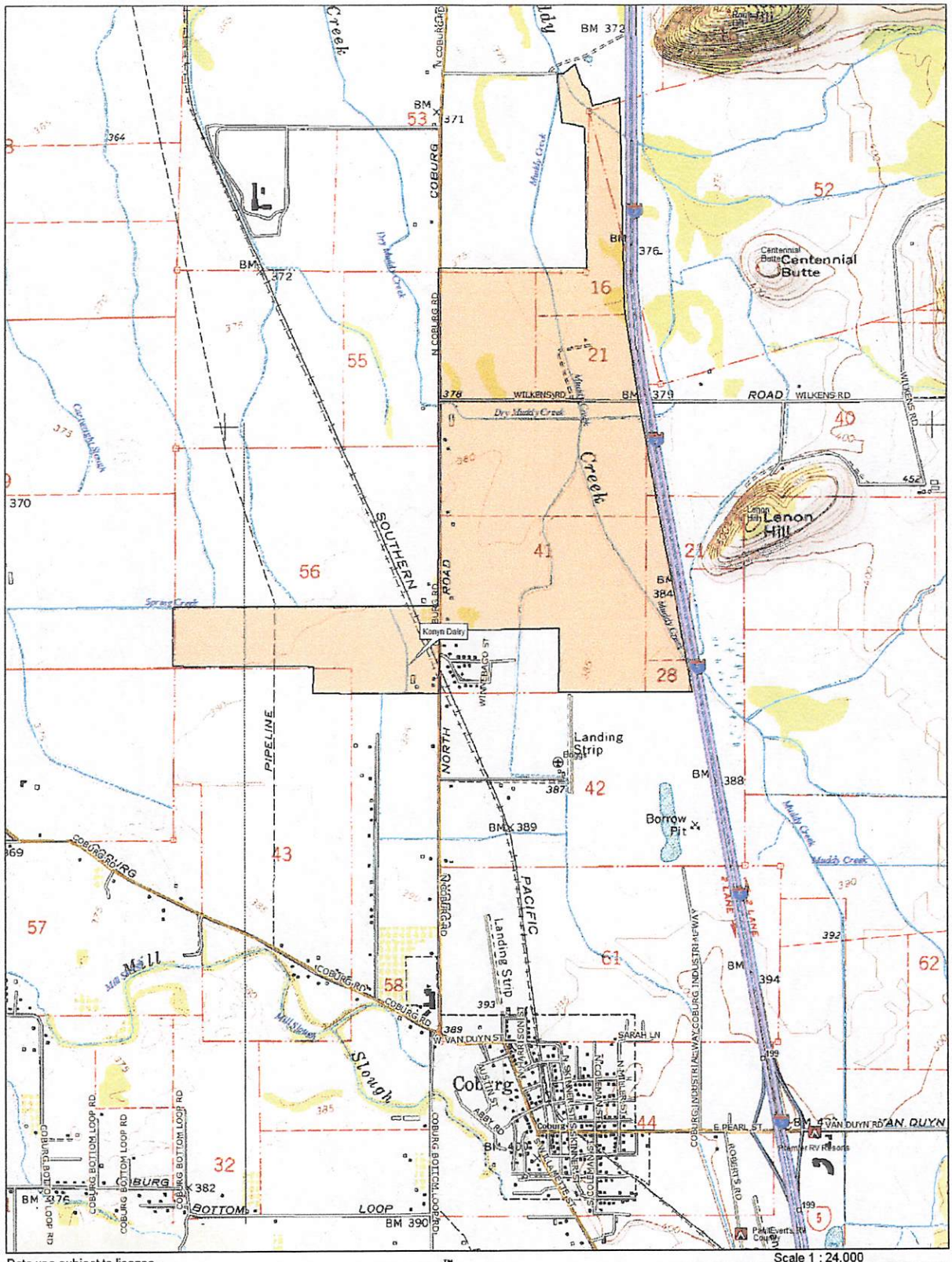
Irrigation Water Management Worksheet						
Crop Name:	**Corn for Silage**					
Managed Rooting Depth (inches):	**48**					
Management Allowed Depletion, MAD:	**50%**					
Irrigated Acres:	**297**					
Soil Name:	**Awbrig, Bashaw, Coburg, Salem**					
Soil Depth (inches):	**60**					
Available Water Capacity (in/in):	**0.15**					
Soil Intake Rate (in/hr) :	**0.25**					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	**Month**					
	April	**May**	**June**	**July**	**August**	**Sept**
Total Plant Available Water Capacity (in): Soil or Root Depth * Available Water Capacity	7.2	7.2	7.2	7.2	7.2	7.2
Net Irrigation Application (in): Total Plant Available Water Capacity * MAD	3.6	3.6	3.6	3.6	3.6	3.6
Irrigation System Application Rate (in/hr): Determined based on the type of Irrigation System	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): (From OSU Extension Miscellaneous Pub 8530, 1992)	**0.00**	**0.47**	**3.62**	**7.13**	**5.83**	**1.06**
Average Daily Crop Water Use (in/day):	0.00	0.02	0.12	0.23	0.19	0.04
Irrigation Frequency (days): Net Irrigation Application / Daily Crop Water Use	30	31	30	16	19	30
Irrigation System Set Time (hours):	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**
Actual Net Irrigation Application (in): Gross Application * System Application Efficiency	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**
Actual Irrigation Frequency (days): Actual Net Irrigation Application / Daily Crop Water Use	**30**	**31**	**17**	**9**	**11**	**30**
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): Water Required / Water Applied	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**
Gross Irrigation Application (in): System Application Rate * System Set Time	2.85	2.85	2.85	2.85	2.85	2.85
Volume of Water per Irrigation (acre-in): Gross Irrigation Application * Irrigated Acres	846	846	846	846	846	846
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): (Equation 2)	**799**	**773**	**1,450**	**2,763**	**2,259**	**799**
Compare **Required** system flow rate with **Measured** flow noted on **Irrigation Application Record**						

UTILIZATION AREA

Irrigation Water Management Worksheet						
Crop Name:	Grass Hay/Pasture Land					
Managed Rooting Depth (inches):	30					
Management Allowed Depletion, MAD:	50%					
Irrigated Acres:	296.8					
Soil Name:	Awbrig, Bashaw, Coburg, Salem					
Soil Depth (inches):	60					
Available Water Capacity (in/in):	0.15					
Soil Intake Rate (in/hr) :	0.25					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	Month					
	April	May	June	July	August	Sept
Total Plant Available Water Capacity (in): Soil or Root Depth * Available Water Capacity	4.5	4.5	4.5	4.5	4.5	4.5
Net Irrigation Application (in): Total Plant Available Water Capacity * MAD	2.3	2.3	2.3	2.3	2.3	2.3
Irrigation System Application Rate (in/hr): Determined based on the type of Irrigation System	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): (From OSU Extension Miscellaneous Pub 8530, 1992)	**1.57**	**3.15**	**4.57**	**6.22**	**5.12**	**3.46**
Average Daily Crop Water Use (in/day):	0.05	0.10	0.15	0.20	0.17	0.12
Irrigation Frequency (days): Net Irrigation Application / Daily Crop Water Use	30	22	15	11	14	20
Irrigation System Set Time (hours):	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**
Actual Net Irrigation Application (in): Gross Application * System Application Efficiency	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**
Actual Irrigation Frequency (days): Actual Net Irrigation Application / Daily Crop Water Use	**30**	**20**	**13**	**10**	**12**	**17**
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): Water Required / Water Applied	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**
Gross Irrigation Application (in): System Application Rate * System Set Time	2.85	2.85	2.85	2.85	2.85	2.85
Volume of Water per Irrigation (acre-in): Gross Irrigation Application * Irrigated Acres	846	846	846	846	846	846
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): (Equation 2)	**798**	**1,220**	**1,829**	**2,409**	**1,983**	**1,385**
Compare **Required** system flow rate with **Measured** flow noted on **Irrigation Application Record**						

GENERAL INFORMATION

TOPOGRAPHY MAP



Data use subject to license.

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Scale 1 : 24,000

1" = 2,000.0 ft

Data Zoom 13-4

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:
Application Plan by:
Date:

Field								
Acres								
Soil								
Soil test date								
Bray 1 P (ppm)								
Acetate K (ppm)								
pH								
SMP								
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)								
Irrigation erosion (tons/ac-yr)								
Runoff Class	medium	medium	medium	medium	medium	medium	medium	medium
Flooding Frequency	none	rare	rare	none	rare	rare	occa	rare
Distance to stream (ft)								
Buffers								
Drainage								
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)								
Commercial P2O5 method								
Commercial P2O5 timing								
Organic P2O5 rate (lbs/ac)								
Organic P2O5 method								
Organic P2O5 timing								
SCORE	13.0	15.0	11.4	7.8	15.6	7.5	6.8	7.5
P RUNOFF RISK RATING	Low	Medium	Low	Low	Medium	Low	Low	Low

COMMENTS

DO NOT EDIT GREEN CELLS

Field Numbers

Sheet & Rill	Irrigation	Runoff	Buffer	Drains	Method	Timing
<1	not irrigated	>500 ft	> 30 ft or	no tiles	None applied	None applie
1-3	no irrig. runoff	300-500 ft	20-30 ft	tiles	Incorp. in 5 d	No app. Sep
4-6	little irrig. runoff	200-299 ft	10-19 ft		Not incorp. in	No app. No
7-15	medium irrig. runoff	100-199 ft	<10 ft			All months
>15	high irrig. runoff	<100 ft	none			

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

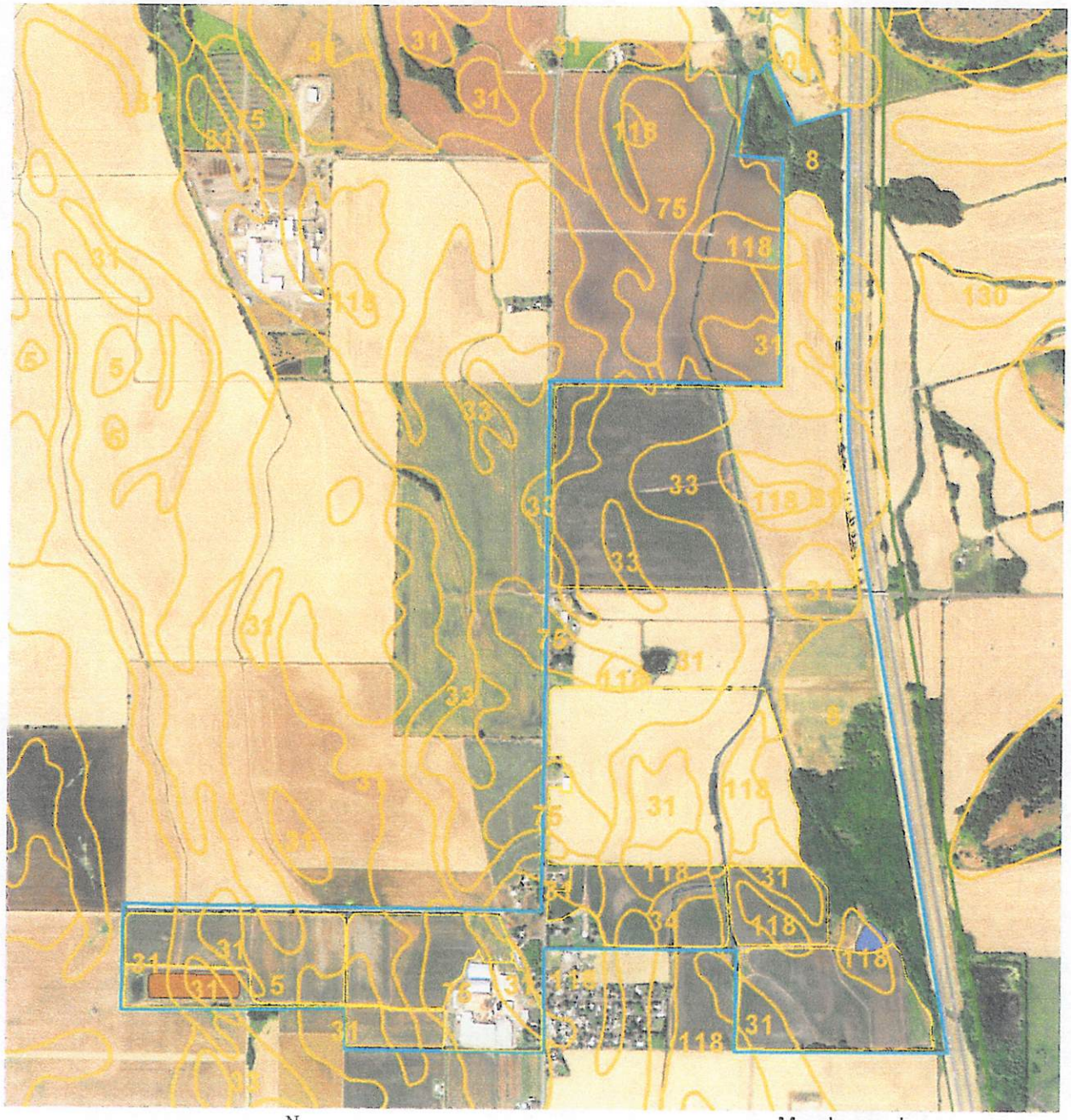
Grower:
Application Plan by:
Dates

Field																	
Acres																	
Soil																	
Soil test date																	
Bray 1 P (ppm)																	
Acetate K (ppm)																	
pH																	
SMP																	

	Weight Factor	1 Dairy		2 Dairy		Horse		Jocko West		Jocko East		Willow pivot		Willow east		Orchard place	
		Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score	Index	Unweighted P Score
Soil		40		40		3		40		40		40		40		40	
Runoff class	0.75	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Erosion class	0.75	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
Drain class	1		2		2		2		2		2		2		2		2
Flooding frequency	0.75		0		0		0		0		0		0		0		0
Irrigation type		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Buffer Indicator		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Phosphorus	2.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical application		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Soil test P	0.5		0		0		0		0		0		0		0		0
Soil P	1		6.7		7.5		3.5		1		8.1		0		0		0
Soil test K	1		0		0		0		0		0		0		0		0
Commercial fertilizer		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Soil chemical (crop rotation)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Commercial P rate	1	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0
Irrigation rate		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Irrigation type		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Other P	1		2		2		2		2		2		2		2		2
Organic P	1		2.00		2.00		2.00		2.00		2.00		2.00		2.00		2.00
			12.37		15.00		11.45		7.77		15.07		7.24		8.77		7.25

SOIL AND RISK ASSESSMENT

SOIL MAP(S)



SOIL AND RISK ASSESSMENT

SOIL REPORTS

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.

SOIL AND RISK ASSESSMENT

Typical profile
0 to 7 inches: Silty clay loam
7 to 29 inches: Clay
29 to 60 inches: Silty clay loam

Minor Components

Bashaw
Percent of map unit: 4 percent
Landform: Terraces

Conser
Percent of map unit: 4 percent
Landform: Stream terraces

Dayton
Percent of map unit: 4 percent
Landform: Terraces

8—Bashaw clay

Map Unit Setting
Elevation: 100 to 1,300 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 235 days

Map Unit Composition
Bashaw and similar soils: 85 percent
Minor components: 12 percent

Description of Bashaw

Setting
Landform: Alluvial fans, terraces, flood plains *Landform position (three-dimensional):* Tread *Down-slope shape:* Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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 0 to 2 inches *Frequency of flooding:* Occasional *Frequency of ponding:* Frequent
Available water capacity: Moderate (about 9.0 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): 4w *Land capability (nonirrigated):* 4w *Hydrologic Soil Group:* D

Typical profile
0 to 41 inches: Clay
41 to 63 inches: Silty clay

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

Lane County Area, Oregon

5—Awbrig silty clay loam

Map Unit Setting
Elevation: 90 to 1,300 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 235 days

Map Unit Composition
Awbrig and similar soils: 85 percent
Minor components: 12 percent

Description of Awbrig

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Silty and clayey alluvium derived from mixed sources

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: 5 to 12 inches to abrupt textural change
Drainage class: 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 0 to 11 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water capacity: Very low (about 1.4 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): 4w *Land capability (nonirrigated):* 4w *Hydrologic Soil Group:* D

Minor Components

Conser
Percent of map unit: 4 percent
Landform: Stream terraces

33—Conser silty clay loam

Map Unit Setting
Elevation: 90 to 1,000 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 235 days

Map Unit Composition
Conser and similar soils: 85 percent
Minor components: 10 percent

Description of Conser

Setting
Landform: Drainageways on stream terraces, depressions on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium from mixed sources

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly 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: About 0 to 18 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water capacity: High (about 9.8 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): 3w *Land capability (nonirrigated):* 3w *Hydrologic Soil Group:* C/D

Typical profile
0 to 9 inches: Silty clay loam
9 to 41 inches: Silty clay
41 to 60 inches: Sandy loam

Minor Components

Awbrig
Percent of map unit: 5 percent
Landform: Terraces

Bashaw
Percent of map unit: 5 percent
Landform: Terraces

SOIL AND RISK ASSESSMENT

Minor Components

Awbrig
Percent of map unit: 3 percent
Landform: Terraces

Conser
Percent of map unit: 3 percent
Landform: Stream terraces

Courtney
Percent of map unit: 3 percent
Landform: Terraces

Natroy
Percent of map unit: 3 percent
Landform: Flood plains

31—Coburg silty clay loam

Map Unit Setting
Elevation: 100 to 1,300 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 235 days

Map Unit Composition
Coburg and similar soils: 85 percent
Minor components: 4 percent

Description of Coburg

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium over clayey alluvium

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr) *Depth to water table:* About 18 to 30 inches *Frequency of flooding:* None
Frequency of ponding: None
Available water capacity: High (about 11.0 inches)

Interpretive groups
Farmland classification: All areas are prime farmland
Land capability classification (irrigated): 2w *Land capability (nonirrigated):* 2w *Hydrologic Soil Group:* C

Typical profile
0 to 18 inches: Silty clay loam
18 to 53 inches: Silty clay
53 to 65 inches: Fine sandy loam

SOIL AND RISK ASSESSMENT

34—Courtney gravelly silty clay loam

Map Unit Setting
Elevation: 90 to 1,000 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 235 days

Map Unit Composition
Courtney and similar soils: 85 percent
Minor components: 12 percent

Description of Courtney

Setting
Landform: Drainageways on stream terraces, depressions on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly and clayey alluvium from mixed sources

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 19 inches to abrupt textural change
Drainage class: 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 0 to 18 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups
Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): 4w *Land capability (nonirrigated):* 4w *Hydrologic Soil Group:* D

Typical profile
0 to 15 inches: Gravelly silty clay loam
15 to 28 inches: Gravelly clay
28 to 41 inches: Very gravelly clay loam
41 to 60 inches: Very gravelly sand

Minor Components

Bashaw
Percent of map unit: 4 percent
Landform: Terraces

Awbrig
Percent of map unit: 4 percent
Landform: Terraces

Natroy
Percent of map unit: 4 percent
Landform: Terraces

75—Malabon silty clay loam

Map Unit Setting
Elevation: 300 to 650 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days

Map Unit Composition
Malabon and similar soils: 90 percent

Description of Malabon

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr) *Depth to water table:* More than 80 inches *Frequency of flooding:* None
Frequency of ponding: None
Available water capacity: High (about 11.4 inches)

Interpretive groups
Farmland classification: All areas are prime farmland
Land capability classification (irrigated): 1
Land capability (nonirrigated): 1
Hydrologic Soil Group: C

Typical profile
0 to 12 inches: Silty clay loam
12 to 42 inches: Silty clay
42 to 60 inches: Clay loam

118—Salem gravelly silt loam

Map Unit Setting
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days

Map Unit Composition
Salem and similar soils: 85 percent

SOIL AND RISK ASSESSMENT

Oregon Phosphorus Index Risk Interpretation

P Index rating	Interpretation	Recommended Nutrient Limitation
West PI Score<13 East PI Score<30	Low potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses on this site. Soil test P and P losses are likely to increase in future due to N-based nutrient management from animal manure.	Nitrogen
West PI Score 13-25 East PI Score 30-100	Medium potential for P movement from this site given current management practices and site characteristics. Practices should be introduced to reduce P losses by surface runoff, subsurface flow, and erosion. Soil test P and P losses are likely to increase in future due to N-based nutrient management from animal manure.	Nitrogen
West PI Score >25-50 East PI Score >100-400	High potential for P movement from this site given current management practices and site characteristics. All practicable management practices to reduce P losses through surface runoff, subsurface flow, or erosion should be implemented.	Phosphorus
West PI Score >50 East PI Score >400	Very high potential for P movement from this site given current management practices and site characteristics. Active remediation techniques should be implemented in an effort to reduce the P loss potential from this site.	No manure

DESIGN USE:

This design aid has been developed for planning animal waste management systems. The following NRCS Practice Standards (PS) for Oregon were used to develop the design aid;

(PS) 313, Waste Storage Facility
(PS) 590, Nutrient Management
(PS) 633, Waste Utilization

LIMITATIONS:

This design aid does not address the structural design of waste storage structures but provides storage volumes needed in accordance with (PS) 313, Waste Storage Facility design criteria. Additional documentation is needed to meet the requirements of (PS) 590, Nutrient Management and (PS) 633, Waste Utilization. This spreadsheet is a read only file and should be saved to a new filename before use.

WORKSHEET TABS:

ReadMe Spreadsheet documentation for all information regarding the use of this spreadsheet.

Inventory Start with this tab to inpute all of the inventory information for the client and their operation. The Animal Feeding Operation Inventory Worksheet in Agronomy Technical Note 20 can be used to record data collected in the field and/or from interviews with the client.

Production This worksheet will display monthly volumes of liquids and solids produced from the operation. Daily and monthly nutrient production from the operation are also displayed. The information displayed on this worksheet is for use in planning and is used for computations made in other worksheets. No inputs are required on this worksheet.

Storage The type of storage facility for solids and liquids can be selected and sized based on the number of days of storage desired using this worksheet.

Application This worksheet allows the user to determine the amounts of nutrients from liquid manure to be applied based on "Big Gun" travel rates and set times and for tank wagons based on travel length and spread width. The worksheet also allows the user to compute the amounts of nutrients from solid manure to be applied based on travel lengths and spread width of tractor spreader equipment.

Utilization This worksheet allows the user to determine the approximate amount of nutrients lost during storage, application, and denitrification. The worksheet also allows the

cell above for an example.

RESOURCE DATA:

A field visit is required to obtain physical information about the site and interview the landowner/operator. The Animal Feeding Operation Inventory Worksheet in Agronomy Technical Note 20 can be used to record data collected in the field and/or from interviews with the client. The use of some kind of photo base to make notes on is recommended.

Data to Collect:

>> Clients name, address, phone number, facsimile number, and email.
>> Type of operation(Dairy, Beef, Swine, Poultry, etc)
>> Description of livestock, number to utilize facility, average weight, dates confined, and dates animals grazed for current and planned operation. If the operation is a dairy then include the average daily milk production per cow in pounds.
>> Type of bedding &volume used per day.
>> Solids separation system planned and efficiency of system.
>> Dimensions of existing solids & liquid storage facilities.
>> Roofed and unroofed areas that contribute rainwater to storage facilities.
>> Roofed areas that are guttered or drain clean water away from storage facilities.
>> Clients desired solid and liquid storage time.
>> Water use that contributes gray water to storage facility, e.g. milkhouse washwater.
>> Planned location of storage facility.
>> Location of domestic wells, streams, lakes and other sensitive water bodies.
>> Climatic station to use to retrieve needed climatic data.
>> Topographic information from surveys or USGS Quadrangle maps or other maps or
>> shallow bedrock, unsuitable soils, coarse gravel subsoil, slide areas, wetlands, sharp breaks in slope, floodplains, etc.
>> Property lines and ownership considerations that may effect location of planned

OTHER DESIGN RESOURCES:

For additional information on wastewater production from confined animal facilities and other manure management issues, refer to the Oregon State University Extension homepage for publications at http://extension.oregonstate.edu/catalog/.

Other computer programs and spreadsheet design aids that might assist you in developing specific design information for planned facilities can be found on the Oregon NRCS website at http://www.or.nrcs.usda.gov/technical/engineering/environmental_engineering/index.html. If you have not had training and/or experience with the use of computer programs and spreadsheet design aids, you should contact the appropriate NRCS basin or state office

Standard drawings and forms associated with the design of waste management systems can be found in the Oregon NRCS Standard Drawings and Forms Catalog and on the Oregon NRCS website at http://www.or.nrcs.usda.gov/technical/engineering/eng-cad-drawings.html. Use of standard drawings requires appropriate review of foundation and site conditions before they are used for a final design and should be approved by someone with appropriate job approval authority.

Notes, standards and specifications that are applicable to the development of agricultural waste management systems to address site specific resource problems can be found in

user to determine what crops the manure is to be applied to and the amount of manure to apply based on the nutrient application desired. The worksheet also computes a nutrient balance based on available acres and crop uptake of nutrients.

SPWK10A-7 This worksheet allows the user to determine the recommended storage period to use when sizing waste storage facilities. The calculated storage period is based on the weather station data and crop data entered on the Inventory worksheet and the

VTA This worksheet allows the user to determine the size of a Vegetated Treatment Area based on user inputs. Weather station data input on the Inventory worksheet and crop data are used to compute the Vegetated Treatment Area size.

INPUT & OUTPUT:

Input cells will be shaded gray with **red text/numbers**. Output cells will be formatted with **blue text/numbers** with white background. Cells where data is inserted, from a database, will be **black text/numbers** with white background. Cells will be formatted the same as input cells where cells contain data from a database that can be changed by the user. Errors will be indicated with red text that says **ERROR** on a white background.

QUESTIONS: Direct all questions regarding this design aid to the following person who developed the workbook.

Develop Bruce D. Wilson, Professional Engineer, Keizer, Oregon
Version of spreadsheet: Version 4.9 June 2014
Phone: (866) 493-3243 email: BDWEng@comcast.net

REFERENCE MATERIAL

In addition to the applicable NRCS Practice Standards listed under DESIGN USE and OTHER DESIGN RESOURCES;

NRCS National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook (AWMFH)
Manure application rates for forage production, EM8585, OSU Extension Service, July 2007

NRCS National Engineering Handbook, Part 652, Irrigation Guide

NRCS Practice Planning and Design Guide for practice standard 313, Waste Storage Facility.

NRCS Nutrient Management Jobsheet for practice standard 590, Nutrient Management.

NRCS Waste Utilization Jobsheet for practice standard 633, Waste Utilization.

cell will reveal references used in the development of the worksheet. See Reference Material

conservation system guidesheets (CSG) which are located on the NRCS eFOTG website for Oregon at http://www.nrcs.usda.gov/technical/efotg/.

PRINT & PROTECTION:

Each individual spreadsheet (tab) within this Excel Design Aid is set to print with enough margin to fit on 8 1/2 x 11 paper. All pages are designed to print on HP Deskjet and Lazerjet printers. All worksheets are protected so the formulas and certain text cannot be edited. Contact the developer with any requests for changes to the ORAWM Design Aid.

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DEPARTMENT OF AGRICULTURE — Certified Manure Testing Program

PRATUM CO-OP
8955 SUNNYVIEW RD NE
SALEM , OR 97302
Field I.D. LIQUID

Date Received: *4/25/2023*
Lab Sample ID: M23-00441
Grower: BROWNVILLE CALF RANCH
Grower Account #:
Grower Sample ID

Liquid

	g/cc	lb/gal
Density:	1.02	8.512

TOTAL ELEMENTS	As Analyzed mg/kg	Density Corrected ppm(mg/L)	lbs/1000 gal	lbs/gal	lbs/ton
TN	1313	1340	11.17	0.0112	2.63
TC	9737	9932	82.80	0.0828	19.47
P	194	198	1.65	0.0017	0.39
P205	447	456	3.80	0.0038	0.89
K	1178	1201	10.01	0.0100	2.36
K20	1413	1442	12.02	0.0120	2.83
S					
Ca					
Mg					
Na					
Zn					
Mn					
Cu					
Fe					
B					
Cl					
AVAILABLE					
NH4-N	393.8	402	3.35	0.0033	0.79
NO3-N	5.4	6	0.05	0.0000	0.01
C:N		7.4			

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of manure, our liability is limited to the price of the tests. Note: "u" indicates that the element was analyzed for but not detected

This is your Invoice #: M23-00441 Account #: 274500 Reviewed by: K. Bair, PhD, CPSS List Cost:

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DEPARTMENT OF AGRICULTURE
Certified Manure Testing Program

PRATUM CO-OP
8955 SUNNYVIEW RD NE
SALEM , OR 97302
Field I.D. SOLID

Date Received: *4/25/2023*
Lab Sample ID: M23-00440
Grower: BROWNVILLE CALF RANCH
Grower Account #:
Grower Sample ID

Solid

	% SOLIDS	% WATER
As Received:	18.39	81.61

TOTAL ELEMENTS	100% DRY %	100% DRY lbs/ton	AS RECEIVED %	AS RECEIVED lbs/ton
TN	1.08	21.60	0.20	4.00
TC	48.98	979.70	9.01	180.10
P	0.22	4.30	0.04	0.80
P205	0.50	10.00	0.09	1.80
K	0.84	16.80	0.15	3.10
K20	1.01	20.20	0.19	3.70
S				
Ca				
Mg				
Na				
	mg/kg	lbs/ton	mg/kg	lbs/ton
Zn				
Mn				
Cu				
Fe				
B				
Cl				
AVAILABLE				
NH4-N	1345	2.691	247	0.49
NO3-N	38	0.076	7	0.01
C:N			45.3	

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This is your Invoice M23-00440 **Account #: 274500** **Reviewed by: K. Bair, PhD, CP** **List Cost**

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PRATUM CO-OP
3955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11283

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: LAGOON FIELD
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	79
Potassium	NH4OAc	mg/kg	1312
Magnesium	NH4OAc	meq/100g	5.7
Buffer pH	SMP		6.6
Total Bases	NH4OAc	meq/100g	5.7

pH 1:1 6.4
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	9.2	29		
Totals	**9.2**	**29**		
Sum of Tested N:		**29**	**lbs/acre N**	

Other Tests:

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of soil, our liability is limited to the price of the tests. Recommendations are to be used as general guides and should be modified for specific field conditions and situations. Note: "u" indicates that the element was analyzed for but not detected

This is your Invoice #: S22-11283 Account #: 274500 Reviewed by: James Graff List Cost:

Soil PAP NAPT 2022

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Soil & Plant Program 2022 NAPT Participating Laboratory

PRATUM CO-OP
3955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11289

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: MUDDY CREEK 40
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	121
Potassium	NH4OAc	mg/kg	1292
Magnesium	NH4OAc	meq/100g	7.8
Buffer pH	SMP		6.7
Total Bases	NH4OAc	meq/100g	7.8

pH 1:1 6.6
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	7.1	23		
Totals	**7.1**	**23**		
Sum of Tested N:		**23**	**lbs/acre N**	

Other Tests:

JACKS EAST CREEK

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of soil, our liability is limited to the price of the tests. Recommendations are to be used as general guides and should be modified for specific field conditions and situations. Note: "u" indicates that the element was analyzed for but not detected

This is your invoice #: S22-11289 Account #: 274500 Reviewed by: James Graff List Cost:

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Soil & Plant Program 2022 — Participating Laboratory

PRATUM CO-OP
8955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11287

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: EAST COBURG RD 13
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	50
Potassium	NH4OAc	mg/kg	233
Magnesium	NH4OAc	meq/100g	2.7
Buffer pH	SMP		6.2
Total Bases	NH4OAc	meq/100g	2.7

pH 1:1 5.7
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. % ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	11.5	37		
Totals	**11.5**	**37**		

Sum of Tested N: 37 lbs/acre N

Other Tests:

JACKS WEST CREEK

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of soil, our liability is limited to the price of the tests. Recommendations are to be used as general guides and should be modified for specific field conditions and situations. Note: "u" indicates that the element was analyzed for but not detected

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Soil & Plant Program 2022 NAPT Participating Laboratory

PRATUM CO-OP
8955 SUNNYVIEW RD NE

SALEM , OR 97302

Laboratory #: S22-11279

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: DAIRY 1
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	102
Potassium	NH4OAc	mg/kg	1095
Magnesium	NH4OAc	meq/100g	4.8
Buffer pH	SMP		6.6
Total Bases	NH4OAc	meq/100g	4.8

pH 1:1 6.3
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	10.3	33		
Totals	**10.3**	**33**		
Sum of Tested N:		**33**	**lbs/acre N**	

Other Tests:

This is your Invoice #: S22-11279 Account #: 274500 Reviewed by: James Graff List Cost:

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Soil & Plant Program 2022 NAPT Participating Laboratory

PRATUM CO-OP
8955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11280

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: DAIRY 2
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	115
Potassium	NH4OAc	mg/kg	1517
Magnesium	NH4OAc	meq/100g	5.9
Buffer pH	SMP		6.8
Total Bases	NH4OAc	meq/100g	5.9

pH 1:1 6.5
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	4.1	13		
Totals	**4.1**	**13**		
Sum of Tested N:		**13**	**lbs/acre N**	

Other Tests:

This is your Invoice #: S22-11280 Account #: 274500 Reviewed by: James Graff List Cost:

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Soil & Plant Program 2022 NAPT Participating Laboratory

PRATUM CO-OP
3955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11291

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: COBURG RD
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	33
Potassium	NH4OAc	mg/kg	193
Magnesium	NH4OAc	meq/100g	3.5
Buffer pH	SMP		6.3
Total Bases	NH4OAc	meq/100g	3.5

pH 1:1 6.0
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	11.3	36		
Totals	**11.3**	**36**		
Sum of Tested N:		**36**	**lbs/acre N**	

Other Tests:

WILKINS PIVOT

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of soil, our liability is limited to the price of the tests. Recommendations are to be used as general guides and should be modified for specific field conditions and situations. Note: "u" indicates that the element was analyzed for but not detected

This is your Invoice #: S22-11291 Account #: 274500 Reviewed by: James Graff List Cos :

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Soil & Plant Program 2022 NAPT Participating Laboratory

PRATUM CO-OP
8955 SUNNYVIEW RD NE

SALEM , OR 97302
Laboratory #: S22-11290

Date Received: 6/21/2022
Grower: BROWNSVILLE CALF RANCH
Field: WILKINS 65
Sampled By:
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	99
Potassium	NH4OAc	mg/kg	792
Magnesium	NH4OAc	meq/100g	5.1
Buffer pH	SMP		6.1
Total Bases	NH4OAc	meq/100g	5.1

pH 1:1 5.7
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. %
ENR:

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg	Moisture Inches
0 - 12	9.9	32		
Totals	**9.9**	**32**		
Sum of Tested N:		**32**	**lbs/acre N**	

Other Tests:

This is your Invoice #: S22-11290 Account #: 274500 Reviewed by: James Graff List Cost: