Looslea Holstein Dairy

2006 Animal Waste Management Plan

Netty Loos

Verify

Flush with fresh water & gutter water

Cow numbers
- 100 milking
- 50 dry
- 100 heifers
- 50 caives

Crops
- 118.5 acres - of which 94 are farmable
  - 60 orchard grass → grass silage
  - 34 acres → pasture

? Shipping of milk

- Manure application
  - 2 big gun travelers.
- solid manure is composted and used as bedding
  - ½ composted for bedding
- Storage of solid manure
  - concrete slab 50x25 — separator slab. (uncovered?)
  - pole barn covered 47x36x6.

*Emergency Action Plan.
- Field #2
  - #5 → primary field.

~~[illegible]~~

Reception Tank vs underground tank.
- Size of reception tank → above ground 26x4
- AWMP states manure & run off enter underground tank. Purpose of ~~receptiton~~ reception tank. 2122

BGLT
36x8
= 7121 w/freeboard
= 8138
+ 2122
= 10260 CF

Yields
(6) Pasture (fields 3&4)
8 silage (1, 2 & 5) 24 as harvested

Surface area of uncovered concrete that enters liquid manure system. → to run off into fresh H2O pond

Size of bunker silos
- uncovered? ✓

Any liquid manure applied to pasture?
- everything gets liquid manure
8 -

Looslea Holsteins Dairy 2006
Animal Waste Management Plan

Owners
Netty & Tony Loos
35800 River Lane
Scappoose, OR 97056
503-543-2440

Planner
Jim Hendrickson
Date: February 16, 2006

Legal Description
Dairy Facility Location
T 5 S, R 1 E, Sec 4
Farm Fields are located at Tract # 11245
Total cropland and pasture: ~~23.4~~ 94 acres.
Elevation: 222' above sea level.

Objectives
The purpose of this plan is to 1) new manure management practices and 2) to apply manure to the land base in a way that benefits the landowner and the land, ~~4~~ 3) save time, meet ODA regulations, keep water clean.

RECEIVED
JUN 2 8 2006
NATURAL RESOURCES
DIVISION

MA# 62803
AWMP# 06094
Due Date: 8/2/06

Approved 10/27/06 KH

Looslea Holsteins Dairy 2006
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10. 22. 06

Dear Kathryn,

There are 2 corrections to be made.

1) under general descriptions:
The herd consists more of 130 milk cows and 20 dry cows.

2) under manure storage and application.
The order of the manure tanks has to be reversed.
First all run off gets collected in the under ground tank.
After constant agitation this slurry is pumped up into the separator and the extracted water goes to the above ground tank, which then is pumped to the lagoon.

I did go ahead and sign the papers.

Best regards

Nelly Groen

General Description

The Looslea Holstein Dairy is located upon 118.5 acres in Scappoose Oregon. Of the 118.5 acres, 94 are farmable and in available for manure distribution. The dairy consists of 100 milk cows, 50 dry, 100 heifers and 50 calves. The cropping system is based upon 60 acres of orchard grass mixed with some clover, which is chopped and used for grass silage. The other 34 acres are used solely for pasture use. Owner Netty Loos and her son Tony have made the necessary changes for their operation to be considered organic. Their hope is to ship to Horizon Products, Reno, NV. According to the organic milk producer guidelines, their cows are required to be on pasture for a specific amount of time. According to Mrs. Loos, the operation has put in permanent fencing and an alleyway, and has incorporated an intensive grazing program for the paddock style grazing system. Besides producing their feed from the silage, the rest of the organic feed is imported from in and outside of Oregon. The facility was originally constructed for a larger milking herd, but currently the owners only intend to milk ~100 cows and there is ample room for cattle movement and bedding space. Manures are captured in a below ground tank, separated and pumped into a lagoon which is just northwest of the facilities. From the lagoon, the liquid manures are pumped onto the fields using two Bauer big gun travelers, and the solids are dry stacked in a covered manure pole building. Once the manures are composted, they are used for bedding material and then distributed onto the property via the use of a New Holland solid spreader wagon.

None of the fields are tiled and the property is located on a floodplain, (see "Flood Boundary Map Sensitive Manure Application Area" for location) and care must be taken when to apply manures considering time of year, and precipitation amounts for any given year.

Manure Storage & Application

The facility is designed so that all manures solid and liquid and runoff enter an above ground octagonal shaped reception tank measuring ~26'x 4' (1,592 cu.ft) which then is emptied into an underground circular tank measuring 36'x 8'equaling 7,125 cu.ft. ORAWM v.2.4 estimates the above ground tank storage to be ~10 days. From the underground storage tank the manures are pumped over a Hycor screw type solids separator. The separated solids are stored on a 50'x 25' concrete slab and then housed in a covered pole building. The actual stacking size and height of the solid storage is 47'x 36'x 6' or 10,152 cu.ft. ORAWM v.2.4 recommends that the existing solid storage is more than adequate for 90 days of storage. The liquid portion will be stored in a lagoon measuring 155'x 135'x 10' or 3.9 AF of storage. ORAWM v.2.4 estimates the lagoons days storage to be 55 days. Then the liquid is pumped via underground mainline and distributed to the fields using 2 Bauer traveling big guns. Both are 4" hard hose travelers. Separated liquids will be spread on ~94 acres of grass pasture with a traveling big gun or smaller sprinklers in a manner that will avoid having the liquids leave the land on which they are applied. The solid manures after being composted and used for bedding will be spread throughout the property using a New Holland model #308 which has ~267 cu.ft. storage.

All contaminated water from the barns and yard area will be directed to the waste storage collection tank. All barns are guttered to divert clean water away from manure storage

facilities. The operator will contain all wastewater within the facilities, while diverting clean water out of the system. Manure will be applied to the acreage to meet the expected nutrient uptake of the cropping system. A 35' border between application area and field boundary will be incorporated. Application of manure will be done at appropriate times of the year as to utilize nutrients for maximal forage production. Although winter spreading is not anticipated, emergency applications will be made on the most elevated grounds on the property and to be not in close proximity to the awareness zones.

Emergency Action Plan

In an emergency event that would require the dairy to apply stored manures outside of its normal application strategy this farm has 2 target areas to apply these manures. Field #2 and 5. Field #2 has some elevated areas that can be used and also in field #5 the owner states that #5 is adequate for emergency application.

After situation is under control or when time allows, contact the Oregon Department of Agriculture CAFO inspector and inform of situation. Your inspector can be contacted at 503-986-4700.

Soil Sampling

Soil samples will be encouraged every 5 years after crops have been taken off to monitor the application of nutrients. If high levels of any or all nutrients are present, the application plan will be adjusted accordingly.

Operation & Maintenance Plan

Below Ground Liquid Storage Facility

Facility will be pumped out within the first two years following construction to check for structural damage. All damages will be corrected. Thereafter, it will be pumped out at least every five years to check for damages and /or removal of rocks, gravel, wire, and other debris. A one-foot free board will be maintained to prevent spillage. Apply manure to fields when weather and soil conditions are favorable. Care shall be taken in pumping the tank out during periods of a high water table. The liquid tank will not be pumped more than 3.5 feet lower than the surrounding ground water level. Failure to follow these guidelines in pumping the tank could result in catastrophic results. The tank lid will not be subjected to more than two 8,000-pound wheel loads.

Pond

Maintain all pumps, agitator, piping, valves, and other electrical and mechanical equipment in good operating condition following the manufacturer's recommendations. Immediately repair any vandalism, vehicular or livestock damage to any earth fill. Settlement or cracks in the earthen sections should be investigated to cause and immediately repaired. Eradicate or otherwise remove all rodents or burrowing animals and repair any damage caused by their activity.

Prior to the storage season, empty the pond to provide storage capacity for the accumulation of animal wastes and precipitation during the storage period. Maintain vigorous growth of vegetative coverings. Fences and or warning signs shall be

maintained to provide warning and or prevent unauthorized human or livestock entry. Operate systems in a manner that minimizes odor and air drift.

Pipeline
Pipeline route and water line will be inspected periodically for leaks. Any leaks and or broken pipes will be repaired and or replaced. Line will be flushed periodically to assure no sediment buildup in 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.

Agitator
Agitator will be operated and maintained in accordance with the manufacturer's manual. Agitator will be inspected annually. Needed repairs will be made in a timely manner. Bailing twine, wire, and other debris will be removed from the agitator.

Concrete Gutters
Floor gutters and grates will be inspected periodically. All foreign material restricting manure flow will be removed. Broken floor gutters will be repaired and or replaced.

Concrete Curb
Concrete curbs will be inspected periodically. Broken curbs will be repaired. Manure will be prevented from flowing over the curb.

Pump
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.

Waste Transfer Pipeline
Pipeline will be flushed regularly to prevent clogging. Any leaks or broken section will be repaired and or replaced.

Gutters & Downspouts
Gutters will be inspected annually to insure all gutters are free of foreign materials. Broken gutters or downspouts will be replaced and or repaired. All gutters will be connected to downspouts. Leaky gutters and downspouts will be repaired. Weeds and sediment will be removed from outlets. All downspouts will be connected to outlets, which are kept free flowing. Broken rodent guards will be repaired or replaced.

Roof
Roof will be inspected annually. All rusted sections will be repaired and or replaced if needed. Loose sections will be secured. All broken trusses, rafters, beams, poles, gutters and downspouts will be repaired and or replaced.

Trough or Tank
Watering facility will be inspected periodically. Damaged facility will be repaired. Float valves will be maintained in working order. Area immediately around the facility will be maintained in a stable condition.

Access Road
Promptly repair or replace damaged components as needed. Remove debris and litter from roadway surfaces, road ditches and drainage facilities. Maintain drainage facility capacities. Maintain good vegetative cover on all slopes and watercourses.

Traveling Manure Gun
Manure gun will be operated and maintained according to manufacturer's manual. Liquids will be drained from gun during freezing weather. Nozzle will be checked periodically. Worn nozzles and or pipes will be repaired or replaced.

Structure for Water Control

Culvert
Inspect annually. All foreign material restricting water flow will be removed. Damaged sections will be repaired and or replaced. Erosion around inlet or outlet will be corrected.

Pest Management (if applicable)

Operators of equipment must be alert at all times to avoid bodily injury and unnecessary exposure to chemicals. Pesticide users must read and follow label directions, maintain appropriate Material Safety Data Sheets (MSDS), and become certified to apply restricted use pesticides. Apply chemicals during periods of minimum potential for drift. Minimize exposure to chemicals, wear protective clothing, and use safety equipment when appropriately needed. Ensure that the pesticide applicator knows the exact field location to be treated. Post signs according to label directions or state and federal laws around fields that have been treated. Follow the established re-entry time as stated on the MSDS.
Properly locate chemical mixing and equipment rinsing stations relative to potential for contamination of ground or surface water. Extreme care must be taken to follow loading and mixing procedures. Provide for managing accidental spills. Properly rinse equipment and re-use rinse solution for subsequent batches of the same pesticides, where possible. Store pesticides in original containers in a locked, well-ventilated weather resistant building. Post warning signs on or around the building in plain view. Locate the building so that accidental spills will create minimal environmental effects. Dispose of pesticide containers according to label directions and adhere to local or state regulations.

Provide emergency wash stations for personnel who might be accidentally exposed to chemicals, and formulate a safety plan complete with information about locations or emergency treatment centers for personnel exposed to chemicals.

Ensure that back flow prevention devices are installed and operating properly on irrigation systems used for applying pesticides. Recognize the dangers from excessive exposure to take the appropriate precautionary measures. This is especially important for farm workers who spend long hours in the field.

Monitoring and Performance Standards

Looslea Holstein Dairy will follow these recommended practices to monitor the performance of the manure application to the cropland and pasture:

- Test manure in spring, summer, and fall (i.e., just before regular manure spreading period) until results consistently show manure nutrients at each period once every 5 years.
- Calibrate manure application equipment such as the manure spreader at least once every 5 years.
- Test soil phosphorus in manured fields at least once every five years. Over 100 ppm phosphorus as is excessive and the Looslea Holstein Dairy should reduce manure applications, increase crop yields, change crops, or make other adjustments.

Resources

- *All aerial photographs are supplied by Columbia County Farm Service Agency.*
- *Data Supplied by USDA-NRCS ORAWM v.2.4*
- *Soil information provided by Columbia County Natural Resources Conservation Service.*

The landowner acknowledges:

A. Owner has received a copy of this Manure Management Plan and that she has an understanding of the contents and requirements.
B. Maintenance of the structures is necessary for proper performance of the practices.

Netty Loos 10-22-06

Netty Loos Date

Animal Waste Management Plan
Minimum Required Element

Irrigation Water Management

Management of Irrigation Water for:

Looslea Dairy

During the growing season, irrigation water will be applied according to the volume of water to be applied, the frequency of application, soil infiltration and permeability, and the capacity of the irrigation system.

No irrigation water and/or wastewater will be applied to saturated or flooded soils. Special care is needed when irrigation water and/or wastewater is applied to the fields immediately adjacent on either side of waterways because these soils have slow infiltration rates and occasional flooding. Application rates will be no more than 2 inches irrigation water per hour and will be considerably less, particularly in the fields located near open waterways. In all fields, irrigation water and/or wastewater will be applied at rates that minimize transport of sediment, nutrients, and chemicals to surface waters and that minimize leaching of nutrients and chemicals to groundwater.

To maintain manure pond storage capacity, irrigation water may occasionally be added to the storage pond to suspend settled solids and pump the suspended solids onto the fields during the growing season. Application rates shall not exceed soil infiltration rates or crop requirements for nitrogen and shall avoid nutrient leaching to groundwater and runoff to surface water.

Signature of Legally Authorized Representative: Netty Loos

Print Name: Netty Loos Date: 10.22.06

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

RECORD KEEPING AND REPORTING TO OREGON DEPARMENT OF AGRICULTURE

RECORD KEEPING:

a) Applications of manure, litter and process waste will be kept, including the date and the amount of N and P applied during each application.
b) Records of exporting manure, litter and process waste will also be kept.

REPORTING TO OREGON DEPARTMENT OF AGRICULTURE (ODA):

a) 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.
b) The amount of manure, litter and process waste applied will be reported annually.
c) The amount of manure, litter and process waste exported will be reported annually.

Signature of Legally Authorized Representative: Netty Loos

Print Name: Netty Loos Date: 10.22.06

Soil Descriptions
(Please view – "Looslea Holstein Dairy 2006 Soils Map" for soil location)

Rafton Series
The Rafton series consists of deep, *very poorly drained soils* that formed in recent silty alluvium. Rafton soils are on flood plains and have slopes of 0 to 2 percent. The mean annual precipitation is about 50 inches and the mean annual air temperature is about 53 degrees F. The Rafton soils are on broad flood plains of the Columbia River at elevations of 10 to 20 feet. Slopes are 0 to 2 percent. The water holding capacity is 11-13 inches. The water table is at a depth of 0-12 inches in winter and early in spring. This soil is subject to frequent, long periods of flooding in winter and spring. The winters are cool and moist and summers are warm and dry. The mean January temperature is about 40 degrees F.; mean July temperature is about 68 degrees F.; and the mean annual temperature is about 53 degrees F. The frost-free season is about 165 to 210 days. The mean annual precipitation ranges from 40 to 60 inches. These soils are used for improved hay, pasture and truck crops. Areas outside of dikes are in native vegetation or used for pasture and wildlife habitat. Where this soil is not cultivated the vegetation is black cottonwood, willow, rose, common snowberry, sedges, cattails and grasses. If this unit is used for pasture, the main limitations are the hazard of flooding and seasonal wetness. Wetness limits the choice of plants and the period of cutting or grazing. Grazing when the soil is wet results in compaction of the surface layer, poor tilt, and excessive runoff.

Sauvie Series
The Sauvie series consists of deep, poorly drained soils that formed mainly in alluvium. Sauvie soils are on flood plains and have slopes of 0 to 3 percent. The mean annual precipitation is about 50 inches and the mean annual air temperature is about 53 degrees F. The Sauvie soils are on flood plains along the lower Columbia River and its tributaries. Slopes are 0 to 3 percent. Available water capacity is 11-13 inches. The soils formed in recent alluvium with some mixing with volcanic ash. They are at elevations of 10 to 40 feet in a climate with cool dry summers and cool moist winters. Annual precipitation is 40 to 60 inches. Average July temperature is 66 degrees to 68 degrees F., average January temperature is 38 degrees to 40 degrees F., and average annual temperature is 52 degrees to 54 degrees F. The average frost-free period is 165 to 210 days. When diked and drained, the soils are used for improved hay and pasture, small grain, and truck corps. Areas outside of dike are in native vegetation or used for hay and pasture and commercial waterfowl areas. The native vegetation is red alder, ash, willow, cottonwood, grasses and tussocks. If this unit is used for crops, it has few limitations. Root and horticultural crops are suited to the soil in this unit. In most areas drainage ditches and pumps have lowered the water table to a depth of 5 feet or lower year round. Sprinkler irrigation is a suitable method of applying water. Grazing when the soil is wet results in compaction of the surface layer, poor tilt, and excessive runoff.

Sauvie Silty Clay Loam
The Sauvie series consists of deep, poorly drained soils that formed mainly in alluvium. Sauvie soils are on flood plains and have slopes of 0 to 3 percent. Permeability of this Sauvie soil is moderately slow. Available water capacity is about 11-13 inches. The

mean annual precipitation is about 50 inches and the mean annual air temperature is about 53 degrees F. The Sauvie soils are on flood plains along the lower Columbia River and its tributaries. Slopes are 0 to 3 percent. Available water capacity is 11-13 inches. The soils formed in recent alluvium with some mixing with volcanic ash. They are at elevations of 10 to 40 feet in a climate with cool dry summers and cool moist winters. Annual precipitation is 40 to 60 inches. Average July temperature is 66 degrees to 68 degrees F., average January temperature is 38 degrees to 40 degrees F., and average annual temperature is 52 degrees to 54 degrees F. The average frost-free period is 165 to 210 days. When diked and drained, the soils are used for improved hay and pasture, small grain, and truck corps. Areas outside of dike are in native vegetation or used for hay and pasture and commercial waterfowl areas. The native vegetation is red alder, ash, willow, cottonwood, grasses and tussocks. If this unit is used for crops, it has few limitations. Root and horticultural crops are suited to the soil in this unit. In most areas drainage ditches and pumps have lowered the water table to a depth of 5 feet or lower year round. Sprinkler irrigation is a suitable method of applying water. Grazing when the soil is wet results in compaction of the surface layer, poor tilt, and excessive runoff.

Mortalities

Mortalities are handled on this facility by using a rendering company to haul away the deceased animals.
The name of the company is Denley Rendering Company. This company is located in Sherwood, OR and their contact phone number is 503-625-6616.

Land Use Summary

Name: Netty Loos
Date: February 28, 2006

Tract	Field	Land Use	Acres
465	1	Hay/Silage	21
	2	Hay/Silage	17
	3	Pasture	14
	4	Pasture	20
	5	Hay/Silage	22
	F	Farmstead	8.5
	H	Dyke/Homes	16
		Subtotal	**118.5**

Summary

Pasture	94
Farmstead	24.5
Total	**118.5**

Looslea Holsteins 2006
Property Map

Dairy Facility

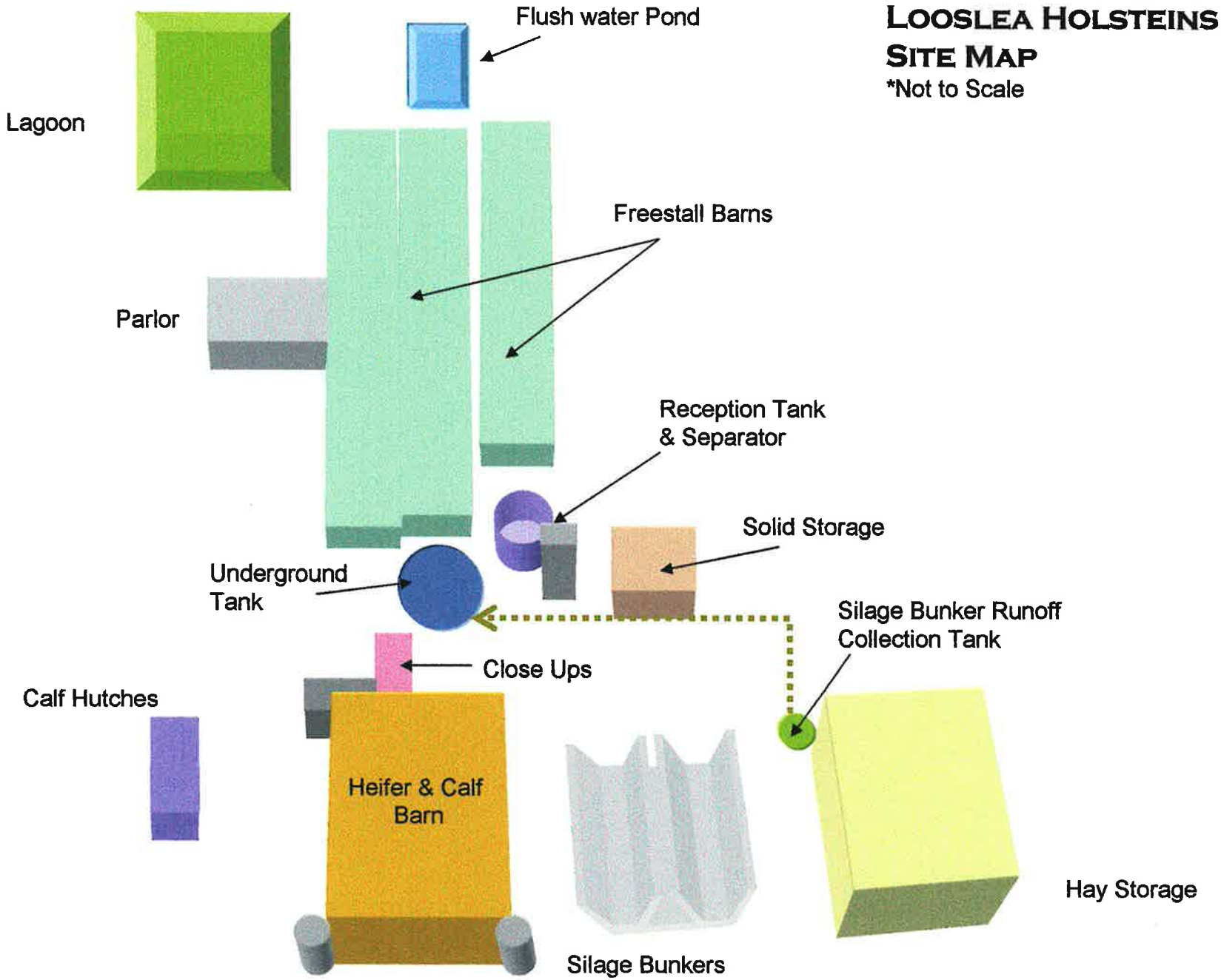
94
Acres of Ag. Land

H - Orchard Grass/Silage

P - Pastureland

*Aerial Photograph Provided by
Columbia County Farm Service Agency.

LOOSLEA HOLSTEINS 2006
SITE MAP
*Not to Scale



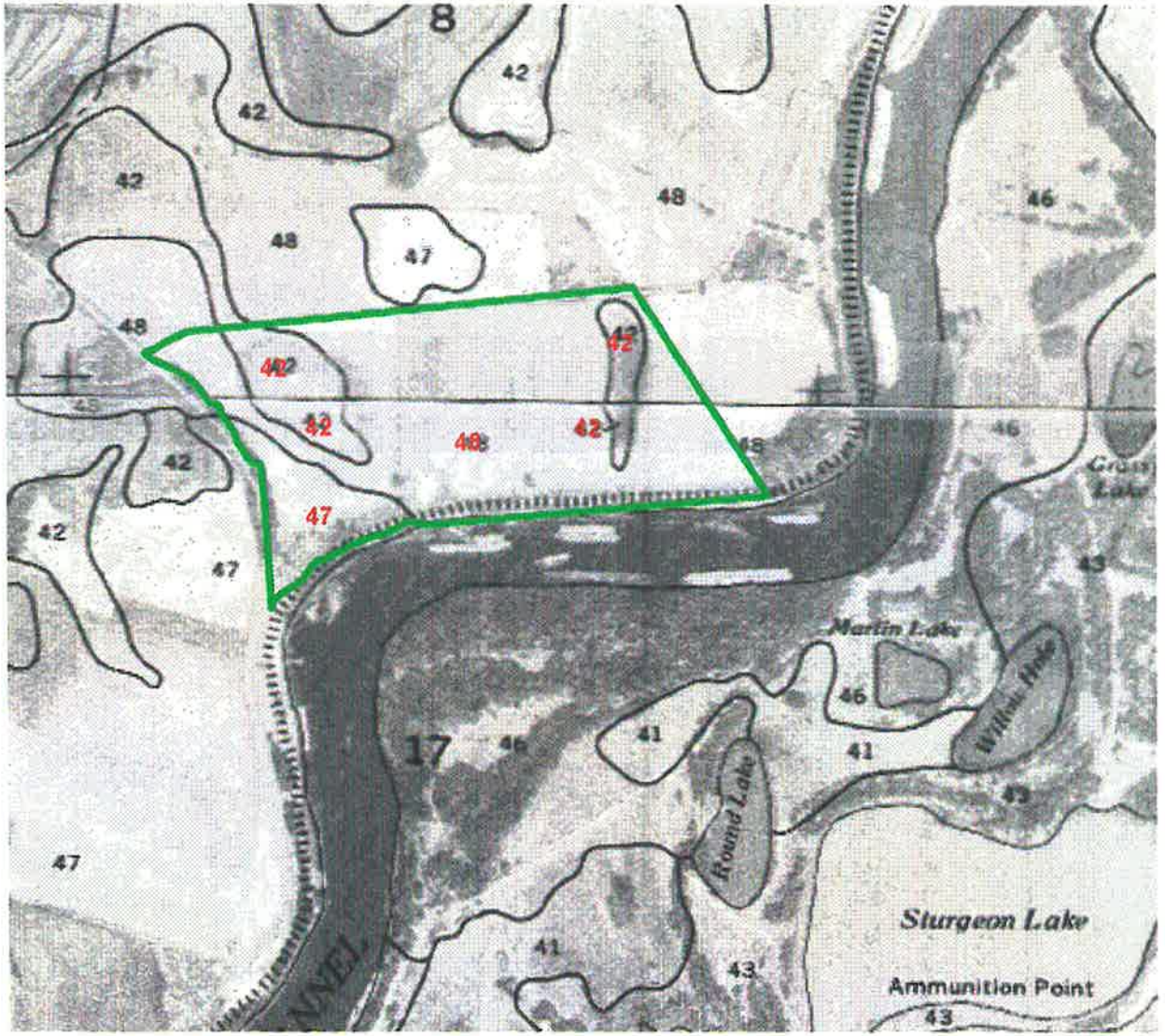
Looslea Holstein Dairy
2006 Soils Map

Sheet # 45,47

42 - Rafton Silt Loam

47 - Sauvie Silt Loam

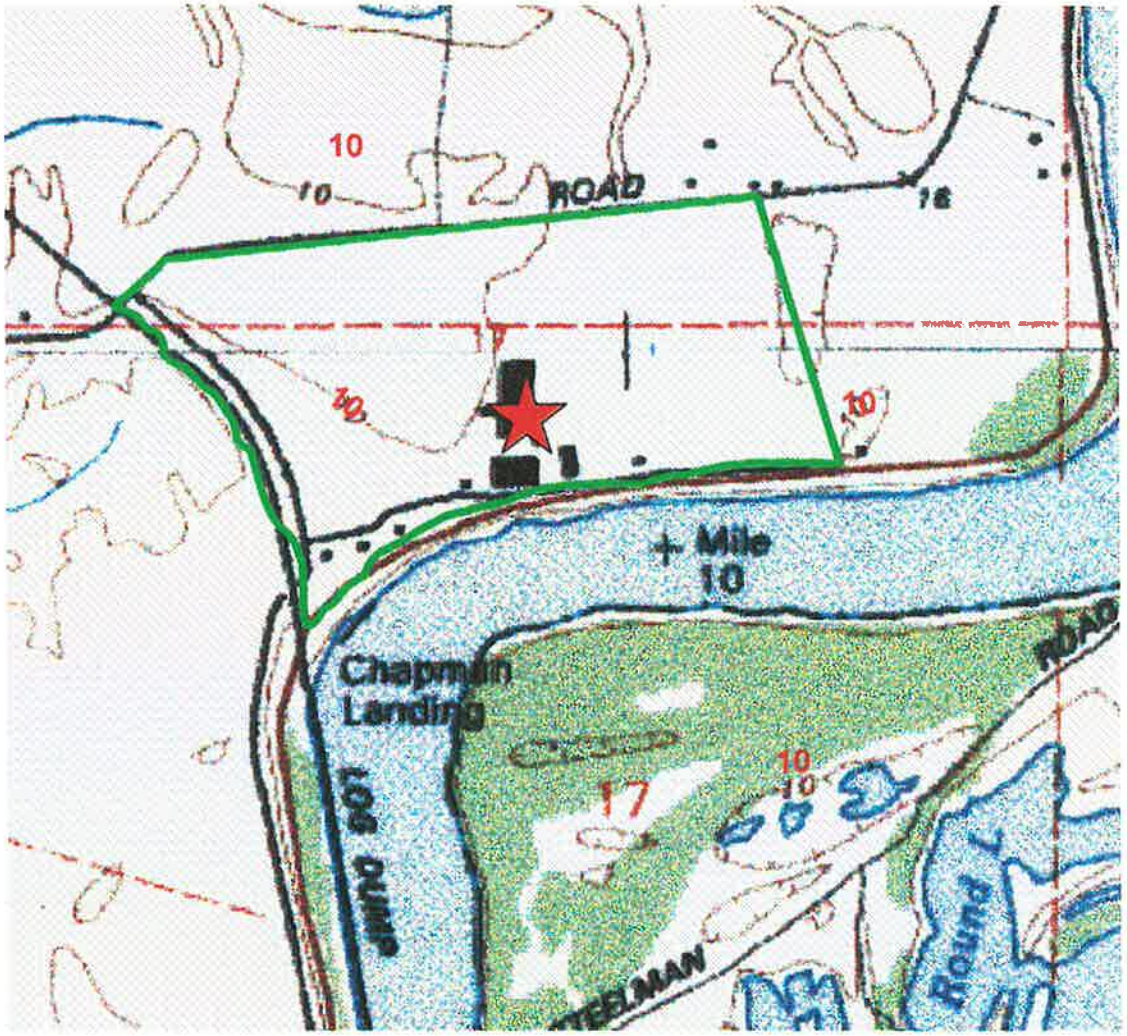
48 - Sauvie Silty Clay Loam



* Soils Map Provided by Columbia County County USDA/NRCS.

Looslea Holstein 2006
Topographical Map

* Average Elevation = 10'



Dairy Facility

Looslea Property

Topographical Map Provided
by *TopoZone.com

FLOOD BOUNDARY MAP
SENSITIVE MANURE
APPLICATION AREA

Dairy Facility

Sensitive Area

Winter Application

*Aerial Photograph Provided by
Columbia County Farm Service Agency

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER

Client No: 99999

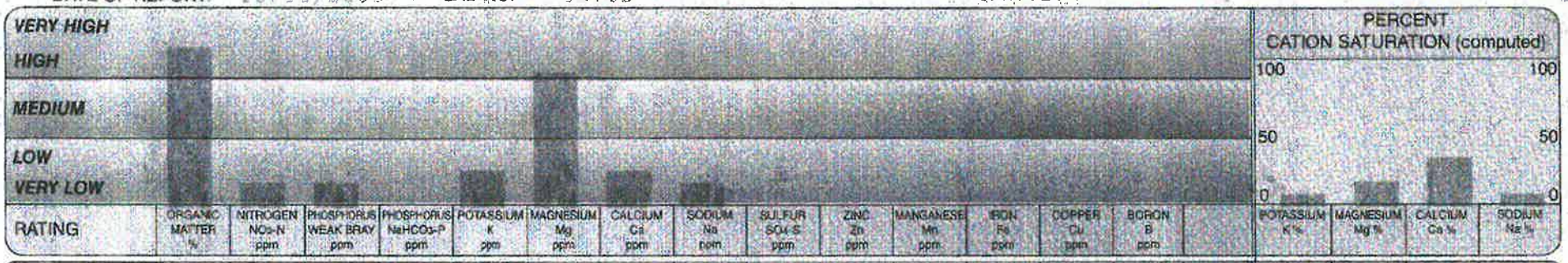
SEND TO: OREGON DAIRY FARMS ASSOCIATION
9665 SW ARDENWOOD ST
PORTLAND, OR 97225-

GROWER: LOOSLEA HOLSTEINS

SUBMITTED BY: JIM HENDRICKSON

GRAPHICAL SOIL ANALYSIS REPORT

DATE OF REPORT: 10/10/2002 LAB NO: 58702 SAMPLE ID: PAGE:



RATING	ORGANIC MATTER %	NITROGEN NO3-N ppm	PHOSPHORUS WEAK BRAY ppm	PHOSPHORUS NaHCO3-P ppm	POTASSIUM K ppm	MAGNESIUM Mg ppm	CALCIUM Ca ppm	SODIUM Na ppm	SULFUR SO4-S ppm	ZINC Zn ppm	MANGANESE Mn ppm	IRON Fe ppm	COPPER Cu ppm	BORON B ppm		POTASSIUM K %	MAGNESIUM Mg %	CALCIUM Ca %	SODIUM Na %
TEST RESULTS	5.3	6	10	11	97	555	1953	56								1.3	22.0	64.9	1.2

LOW AVERAGE HIGH

ECe dS/m — INCREASING SALINITY →

20.7 CEC meq/100g

EX. LIME

5.3 pH

ACIDIC BASIC

← INCREASING NEED FOR LIME

NaHCO3-P unreliable at this soil pH

BUFFER pH: 6.1

SOIL FERTILITY GUIDELINES

CROP: RATE:

DOLOMITE (70 score)	LIME (70 score)	GYPSUM	ELEMENTAL SULFUR	NITROGEN N	PHOSPHATE P_2O_5	POTASH K_2O	MAGNESIUM Mg	SULFUR SO_4-S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	REFER TO BACK

COMMENTS

Darcy Peebles

DARCY PEEBLES, CCA

A & L WESTERN LABORATORIES, INC.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 1 Date: February 28, 2006

Soil Map Unit(s): Rafton Soil Test P: 10 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Grazing, Big Gun

Planner: Jim Hendrickson Notes: Sample #1

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	2	2
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	0	0
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.5	3.5

Tract **465** Fields # 1

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)		(10 - 40) x .10 = -3 Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02		_____ (lbs/ac P_2O_5) x 0.02 = _____			0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02		112 x 0.02 = 2.86 (lbs/ac P_2O_5)			2.24	2.24
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.5	3.5
Source Factors Subtotal (SFS)	10.24	10.24
Total Rating Value (TFS + SFS)	**13.74**	**13.74**
Site Vulnerability Class	**Med**	**Med**

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER
02-203-079

Client No: 99999

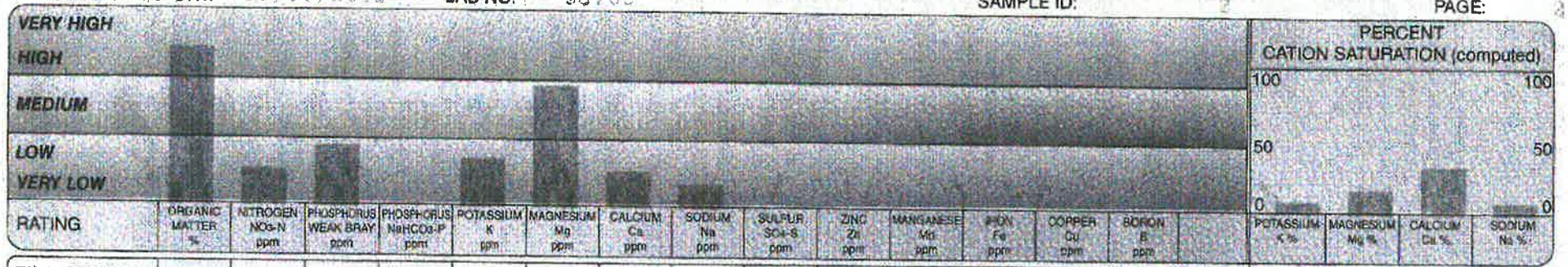
SEND TO: OREGON DAIRY FARMS ASSOCIATION
9665 SW ARDENWOOD ST
PORTLAND, OR 97225-

GROWER: LOOSLEA HOLSTEINS

SUBMITTED BY: JIM HENDRICKSON

GRAPHICAL SOIL ANALYSIS REPORT

DATE OF REPORT: 10/10/2002 LAB NO: 58703 SAMPLE ID: 2 PAGE:



RATING	ORGANIC MATTER %	NITROGEN NO3-N ppm	PHOSPHORUS WEAK BRAY ppm	PHOSPHORUS NaHCO3-P ppm	POTASSIUM K ppm	MAGNESIUM Mg ppm	CALCIUM Ca ppm	SODIUM Na ppm	SULFUR SO4-S ppm	ZINC Zn ppm	MANGANESE Mn ppm	IRON Fe ppm	COPPER Cu ppm	BORON B ppm		POTASSIUM K %	MAGNESIUM Mg %	CALCIUM Ca %	SODIUM Na %
TEST RESULTS	5.8	8	18	10	130	470	1797	44								1.7	20.0	46.3	1.0

ECe dS/m: LOW / AVERAGE / HIGH — INCREASING SALINITY →

CEC meq/100g: 19.4

EX. LIME:

pH: 6.3 — ACIDIC / BASIC — ← INCREASING NEED FOR LIME

NaHCO3-P unreliable at this soil pH

BUFFER pH: 6.9

SOIL FERTILITY GUIDELINES

CROP: RATE:

DOLOMITE (70 score)	LIME (70 score)	GYPSUM	ELEMENTAL SULFUR	NITROGEN N	PHOSPHATE P_2O_5	POTASH K_2O	MAGNESIUM Mg	SULFUR SO_4-S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	REFER TO BACK

COMMENTS

Darcy J. Peebles

DARCY PEEBLES, CCA

A & L WESTERN LABORATORIES, INC.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 2 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 18 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Grazing, Big Gun

Planner: Jim Hendrickson Notes: Sample #2

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.25	3.2.5

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Tract **465** Fields # 2

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)		(18 - 40) x .10 = 0 Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02		_____ (lbs/ac P_2O_5) x 0.02 = _____			0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 (lbs/ac P_2O_5)		213 x 0.02 = 4.26			4.26	4.26
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	12.26	12.26
Total Rating Value (TFS + SFS)	**15.51**	**15.51**
Site Vulnerability Class	**Med**	**Med**

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER
024280-079

Client No: 59999

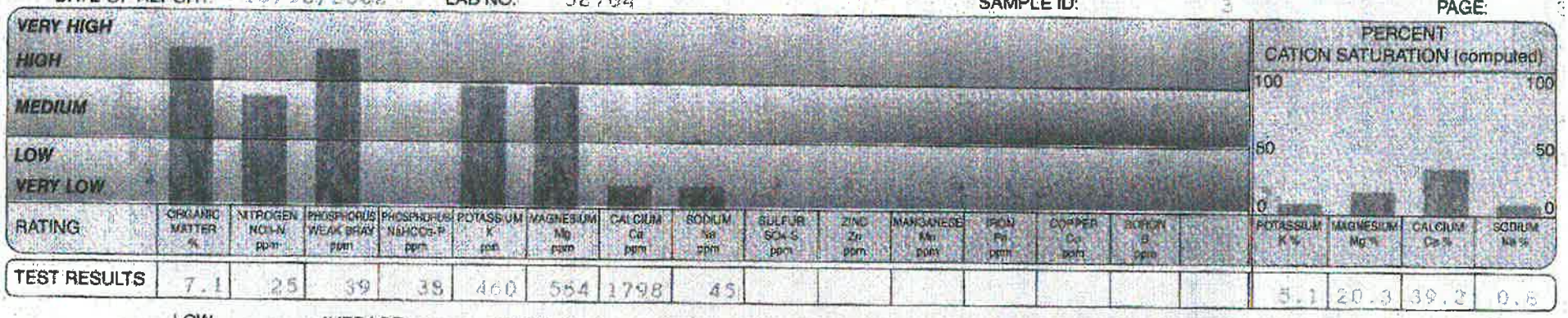
SEND TO: OREGON DAIRY FARMS ASSOCIATION
9665 SW ARDENWOOD ST
PORTLAND, OR 97225-

GROWER: LOOSLEA HOLSTEINS

SUBMITTED BY: JIM HENDRICKSON

GRAPHICAL SOIL ANALYSIS REPORT

DATE OF REPORT: 10/10/2002 LAB NO: 58704 SAMPLE ID: 3 PAGE: 3



RATING	ORGANIC MATTER %	NITROGEN NO3-N ppm	PHOSPHORUS WEAK BRAY ppm	PHOSPHORUS NaHCO3-P ppm	POTASSIUM K ppm	MAGNESIUM Mg ppm	CALCIUM Ca ppm	SODIUM Na ppm	SULFUR SO4-S ppm	ZINC Zn ppm	MANGANESE Mn ppm	IRON Fe ppm	COPPER Cu ppm	BORON B ppm		POTASSIUM K %	MAGNESIUM Mg %	CALCIUM Ca %	SODIUM Na %
TEST RESULTS	7.1	25	39	38	460	554	1798	45								5.1	20.3	39.2	0.6

ECe dS/m: LOW / AVERAGE / HIGH — INCREASING SALINITY →

CEC meq/100g: 22.9

EX. LIME:

pH: 5.2 — ACIDIC / BASIC — ← INCREASING NEED FOR LIME

NaHCO3-P unreliable at this soil pH

BUFFER pH: 5.8

SOIL FERTILITY GUIDELINES

CROP: RATE:

DOLOMITE (70 score)	LIME (70 score)	GYPSUM	ELEMENTAL SULFUR	NITROGEN N	PHOSPHATE P_2O_5	POTASH K_2O	MAGNESIUM Mg	SULFUR SO_4-S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	REFER TO BACK

COMMENTS

Nancy J. Peebles

DARCY PEEBLES, CCA

A & L WESTERN LABORATORIES, INC.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 3 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 39 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Pasture Nutrient Application Method(s) Grazing

Planner: Jim Hendrickson Notes: Sample #3

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	0	0
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	3	3
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	4.75	4.75

Tract **465** Fields # 3

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P) (39 - 40) x .10 = .1 Assign 0 points if Soil Test P < 40 ppm					0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 (lbs/ac P_2O_5) 139 x 0.02 = 2.78					2.78	2.78
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	4.75	4.75
Source Factors Subtotal (SFS)	10.78	10.78
Total Rating Value (TFS + SFS)	**15.53**	**15.53**
Site Vulnerability Class	**Med**	**Med**

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER
02-280-079

Client No: 99999

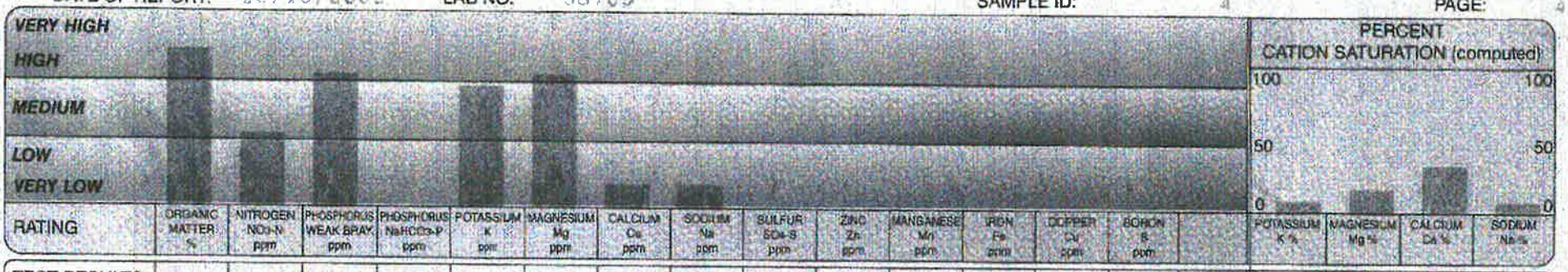
SEND TO: OREGON DAIRY FARMS ASSOCIATION
9665 SW ARDENWOOD ST
PORTLAND, OR 97225-

GROWER: LOOSLEA HOLSTEINS

SUBMITTED BY: JIM HENDRICKSON

GRAPHICAL SOIL ANALYSIS REPORT

DATE OF REPORT: 10/10/2002 LAB NO: 58705 SAMPLE ID: 4 PAGE: 4



RATING	ORGANIC MATTER %	NITROGEN NO3-N ppm	PHOSPHORUS WEAK BRAY ppm	PHOSPHORUS NaHCO3-P ppm	POTASSIUM K ppm	MAGNESIUM Mg ppm	CALCIUM Ca ppm	SODIUM Na ppm	SULFUR SO4-S ppm	ZINC Zn ppm	MANGANESE Mn ppm	IRON Fe ppm	COPPER Cu ppm	BORON B ppm		POTASSIUM K %	MAGNESIUM Mg %	CALCIUM Ca %	SODIUM Na %
TEST RESULTS	5.5	17	33	10	410	574	1840	46								5.0	22.3	43.3	0.9

ECe dS/m: LOW / AVERAGE / HIGH — INCREASING SALINITY

CEC meq/100g: 21.2

EX. LIME

pH: 5.4 — ACIDIC / BASIC — INCREASING NEED FOR LIME

NaHCO3-P unreliable at this soil pH

BUFFER pH: 6.1

SOIL FERTILITY GUIDELINES

CROP: RATE:

DOLOMITE (70 score)	LIME (70 score)	GYPSUM	ELEMENTAL SULFUR	NITROGEN N	PHOSPHATE P_2O_5	POTASH K_2O	MAGNESIUM Mg	SULFUR SO_4-S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	REFER TO BACK

COMMENTS

Darcy Peebles

DARCY PEEBLES, CCA

A & L WESTERN LABORATORIES, INC.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 4 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 33 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Pasture Nutrient Application Method(s) Grazing

Planner: Jim Hendrickson Notes: Sample #4

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	.0	0
						Transport Factors Subtotal (TFS)	3.25	3.25

Tract **465** Fields # 4

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P) (33 - 40) x .10 = -.7 Assign 0 points if Soil Test P < 40 ppm					0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 148 x 0.02 = 2.96 (lbs/ac P_2O_5)					2.96	2.96
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	10.96	10.96
Total Rating Value (TFS + SFS)	**14.21**	**14.21**
Site Vulnerability Class	**Med**	**Med**

A & L WESTERN AGRICULTURAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736

REPORT NUMBER
02-280-079

Client No: 99999

SEND TO: OREGON DAIRY FARMS ASSOCIATION
9655 SW ARDENWOOD ST
PORTLAND, OR 97225-

GROWER: LOOSLEA HOLSTEINS

SUBMITTED BY: JIM HENDRICKSON

GRAPHICAL SOIL ANALYSIS REPORT

DATE OF REPORT: 10/10/2002 LAB NO: 58706 SAMPLE ID: 5 PAGE: 5

RATING	ORGANIC MATTER %	NITROGEN NO3-N ppm	PHOSPHORUS WEAK BRAY ppm	PHOSPHORUS NaHCO3-P ppm	POTASSIUM K ppm	MAGNESIUM Mg ppm	CALCIUM Ca ppm	SODIUM Na ppm	SULFUR SO4-S ppm	ZINC Zn ppm	MANGANESE Mn ppm	IRON Fe ppm	COPPER Cu ppm	BORON B ppm		POTASSIUM K %	MAGNESIUM Mg %	CALCIUM Ca %	SODIUM Na %
TEST RESULTS	7.0	15	21	28	191	557	2207	49								2.3	21.5	51.7	1.0

LOW AVERAGE HIGH

ECe dS/m — INCREASING SALINITY →

21.3 CEC meq/100g

EX. LIME

ACIDIC BASIC

5.6 pH ← INCREASING NEED FOR LIME

NaHCO3-P unreliable at this soil pH

BUFFER pH: 6.1

SOIL FERTILITY GUIDELINES

CROP: RATE:

DOLOMITE (70 score)	LIME (70 score)	GYPSUM	ELEMENTAL SULFUR	NITROGEN N	PHOSPHATE P_2O_5	POTASH K_2O	MAGNESIUM Mg	SULFUR SO4-S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	REFER TO BACK

COMMENTS

Darcy Peebles

DARCY PEEBLES, CCA

A & L WESTERN LABORATORIES, INC.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 5 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 21 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Solids, Big Gun

Planner: Jim Hendrickson Notes: Sample #5

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.25	3.25

Tract **465** Fields # 5

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)		(21 - 40) x .10 = 0 Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02		_____ (lbs/ac P_2O_5) x 0.02 = _____			0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 233 x 0.02 = 4.66 (lbs/ac P_2O_5)					4.66	24.66
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	12.66	12.66
Total Rating Value (TFS + SFS)	**15.91**	**15.91**
Site Vulnerability Class	**Med**	**Med**

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ANIMAL WASTE MA[illegible]GEMENT WORKSHEET

Version 2.4

10/18/06
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CLIENT: Netty Loos
ASSISTED BY: Kathryn Higgs (ODA) CHECKED BY:

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 — Nutrient Production (lbs./day/1000 lb. Animal Unit) N	P	K	Nutrient Production (lbs./day) N	P	K	Manure CF/D/AU	Annual Days Confined	Annual Days Grazed
MILKER	130	1,400	182.0	0.57	0.09	0.32	104.60	17.04	57.71	1.57	163	202
MILKER (DRY)	20	1,400	28.0	0.36	0.05	0.23	10.08	1.40	6.44	1.10	136	230
HEIFERS (12-24 Months)	75	800	60.0	0.31	0.04	0.24	18.60	2.40	14.40	1.30	136	230
CALVES (1-12 Months)	75	250	18.8	0.31	0.04	0.24	5.81	0.75	4.50	1.30	365	0
Totals/Averages-	300	963	288.8	0.48	0.07	0.29	139.1	21.6	83.1	1.5		

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	88%	0%	0%	0%	0%	44%	88%	88%	88%	88%	88%	88%	
	130	130	130	130	130	130	130	130	130	130	130	130	1,201
MILKER (DRY)	100%	0%	0%	0%	0%	50%	100%	100%	100%	100%	100%	100%	
	20	20	20	20	20	20	20	20	20	20	20	20	210
HEIFERS (12-24 Months)	100%	0%	0%	0%	0%	50%	100%	100%	100%	100%	100%	100%	
	75	75	75	75	75	75	75	75	75	75	75	75	450
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	75	75	75	75	75	75	75	75	75	75	75	75	0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	99						102	102	102	101	101	101	708
Total AUM's Needed>>>	248	0	0	0	0	124	248	248	248	248	248	248	1,861
Total AUM's>>>>>>>>>>	-149	0	0	0	0	-124	-146	-146	-146	-147	-147	-147	-1,153

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
Version 2.4

10/18/06
STATE: OREGON

CLIENT: Netty Loos
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ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION: ST HELENS R F D

Month	Precipitation	Evaporation	Paved	Unpaved
	25Yr-24Hr: 3.50		Lot Runoff Factors as a Percent of Monthly Precipitation	
	Monthly Average in Inches			
October	2.48	1.71	100%	14%
November	6.09	0.90	100%	19%
December	7.84	0.73	100%	16%
January	4.80	0.58	100%	18%
February	5.12	0.93	100%	18%
March	4.77	1.51	100%	12%
April	3.10	2.29	100%	11%
May	2.85	3.87	100%	10%
June	1.97	4.08	100%	10%
July	0.90	4.70	100%	0%
August	1.48	4.23	100%	10%
September	2.09	3.05	100%	14%
Annual	43.49	28.58		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >> Is paved lot scraped daily? (Y/N) YES	4,290
Unpaved Lot Area >>>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	11,250
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	4,290

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	130.0	2	0.00	0	0.0
Equipment Wash		2	175.00	350	46.8
Flushwater		2	550.00	1100	147.1
Miscellaneous		2	20.00	40	5.3
Total>>				1490	199.2

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P_2O_5	Potassium K_2O
1	21.0	Oats Hay/Pasture	DHM	Ton	8.00	208	187	143
2	17.0	Orchard Grass Hay/Pasture	DHM	Ton	8.00	426	158	179
3	14.0	Hay/Pasture Mix 14% Protein	DHM	Ton	6.00	269	74	205
4	20.0	Hay/Pasture Mix 14% Protein	DHM	Ton	6.00	269	74	205
5	22.0	Orchard Grass Hay/Pasture	DHM	Ton	8.00	426	158	179
Off-Farm								

CLIENT: Netty Loos

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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	Free Stall	Sawdust	6.00	3.10	0.52	94	564
MILKER (DRY)	Free Stall	Sawdust	6.00	3.10	0.52	14	87
HEIFERS (12-24 Months)	Loose Housing	Sawdust	6.00	12.40	2.07	124	744
CALVES (1-12 Months)	Confined	Loose Straw	2.50	2.60	1.04	20	49

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	Press Type (Screw or Roller)	40%	52	78	272	14	114	36	1,869
MILKER (DRY)	Press Type (Screw or Roller)	40%	7	11	29	1	8	36	260
HEIFERS (12-24 Months)	Press Type (Screw or Roller)	40%	53	79	75	3	15	36	1,906
CALVES (1-12 Months)	Dry Scrape System	40%	18	26	15	10	5	36	632
Total Solids>>			130	194	391	29	142		4,667

ANIMAL WASTE MA GEMENT WORKSHEET
Version 2.4

CLIENT: **Netty Loos**
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ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 0	Paved Slab Area Square Feet 4,290	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 11,250	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	0	887	0	326	6,175	214	1,606	954	3,610	737	26,539	1,106	39,809	737	9,632
November	0	2,177	0	1,085	5,976	1,509	11,072	7,560	43,313	3,889	139,997	5,833	209,996	3,889	26,093
December	0	2,803	0	1,176	6,175	1,559	11,441	7,812	44,756	4,018	144,664	6,028	216,996	4,018	27,112
January	0	1,716	0	810	6,175	1,559	11,441	7,812	44,756	4,018	144,664	6,028	216,996	4,018	26,026
February	0	1,830	0	864	5,578	1,408	10,334	7,056	40,425	3,630	130,664	5,444	195,996	3,630	24,959
March	0	1,705	0	537	6,175	887	6,524	4,383	24,183	2,378	85,602	3,567	128,403	2,378	18,233
April	0	1,108	0	320	5,976	207	1,555	924	3,494	713	25,683	1,070	38,525	713	9,619
May	0	1,019	0	267	6,175	214	1,606	954	3,610	737	26,539	1,106	39,809	737	9,765
June	0	704	0	185	5,976	207	1,555	924	3,494	713	25,683	1,070	38,525	713	9,215
July	0	322	0	0	6,175	214	1,606	954	3,610	737	26,539	1,106	39,809	737	9,067
August	0	529	0	139	6,175	214	1,606	954	3,610	737	26,539	1,106	39,809	737	9,275
September	0	747	0	274	5,976	207	1,555	924	3,494	713	25,683	1,070	38,525	713	9,258
Annual	0	15,548	0	5,982	72,707	8,400	61,901	41,211	222,354	23,022	828,798	34,533	1,243,198	23,022	188,255

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
MILKER	62.76	23.42	41.73	41.84	15.62	27.82	104.60	39.04	69.54
MILKER (DRY)	6.05	1.92	4.66	4.03	1.28	3.10	10.08	3.21	7.76
HEIFERS (12-24 Months)	11.16	3.30	10.41	7.44	2.20	6.94	18.60	5.50	17.35
CALVES (1-12 Months)	3.49	1.03	3.25	2.33	0.69	2.17	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CLIENT: **Netty Loos**
ASSISTED BY: **Kathryn Higgs (ODA)**

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ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			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	N	P_2O_5	K_2O
October	342	119	256	228	79	171	3,742	1,335	2,676	0	0	0	4,312	1,533	3,102
November	2,504	890	1,801	1,669	594	1,201	0	0	0	0	0	0	4,173	1,484	3,002
December	2,587	920	1,861	1,725	613	1,241	0	0	0	0	0	0	4,312	1,533	3,102
January	2,587	920	1,861	1,725	613	1,241	0	0	0	0	0	0	4,312	1,533	3,102
February	2,337	831	1,681	1,558	554	1,121	0	0	0	0	0	0	3,894	1,385	2,802
March	1,464	520	1,059	976	346	706	1,871	667	1,338	0	0	0	4,312	1,533	3,102
April	331	115	248	220	77	165	3,622	1,292	2,589	0	0	0	4,173	1,484	3,002
May	342	119	256	228	79	171	3,742	1,335	2,676	0	0	0	4,312	1,533	3,102
June	331	115	248	220	77	165	3,622	1,292	2,589	0	0	0	4,173	1,484	3,002
July	342	119	256	228	79	171	3,742	1,335	2,676	0	0	0	4,312	1,533	3,102
August	342	119	256	228	79	171	3,742	1,335	2,676	0	0	0	4,312	1,533	3,102
September	331	115	248	220	77	165	3,622	1,292	2,589	0	0	0	4,173	1,484	3,002
Annual	**13,837**	**4,903**	**10,032**	**9,224**	**3,269**	**6,688**	**27,706**	**9,882**	**19,808**	**0**	**0**	**0**	**50,767**	**18,054**	**36,529**

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

10/18/06
STATE OREGON

CLIENT: **Netty Loos**
ASSISTED BY: **Kathryn Higgs (ODA)**
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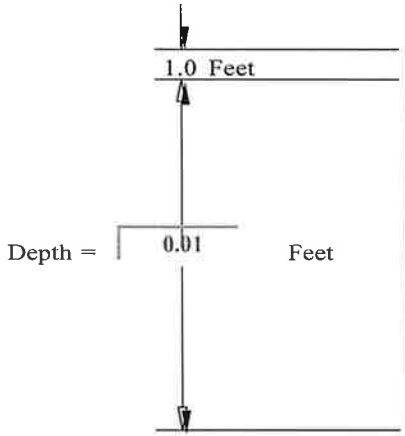
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	8
Tank Diameter, Feet=	80
Existing Storage, Cubic Feet=	8,717.00
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	1,251
Volume Needed, Cubic Feet=	8,792
Design Volume, Cubic Feet=	50
Is Tank Covered?	YES
Tank Dimensions?	Circular

MONTHLY INFLOWS INTO TANK

Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Manure CF
October	31	0	0	887	6,175	1,465
November	30	0	0	2,177	5,976	11,716
December	31	0	0	2,803	6,175	12,107
January	31	0	0	1,716	6,175	12,107
February	28	0	0	1,830	5,578	10,935
March	31	0	0	1,705	6,175	6,786
April	30	0	0	1,108	5,976	1,418
May	31	0	0	1,019	6,175	1,465
June	30	0	0	704	5,976	1,418
July	31	0	0	322	6,175	1,465
August	31	0	0	529	6,175	1,465
September	30	0	0	747	5,976	1,418
Annual	365	0	0	15,548	72,707	63,763



Minimum Freeboard =	1.0 Feet	
25Yr-24Hr Storm Precipitation =	3.5	Inches
25Yr-24Hr Storm Runoff =	1251	Cubic Feet
8 Day Precip - Evap =	1.896	Inches
Runoff from Normal Precipitation =	747	Cubic Feet
Washwater =	1646	Cubic Feet
Manure =	3393	Cubic Feet

Diameter = 80 Feet

CLIENT: **Netty Loos**
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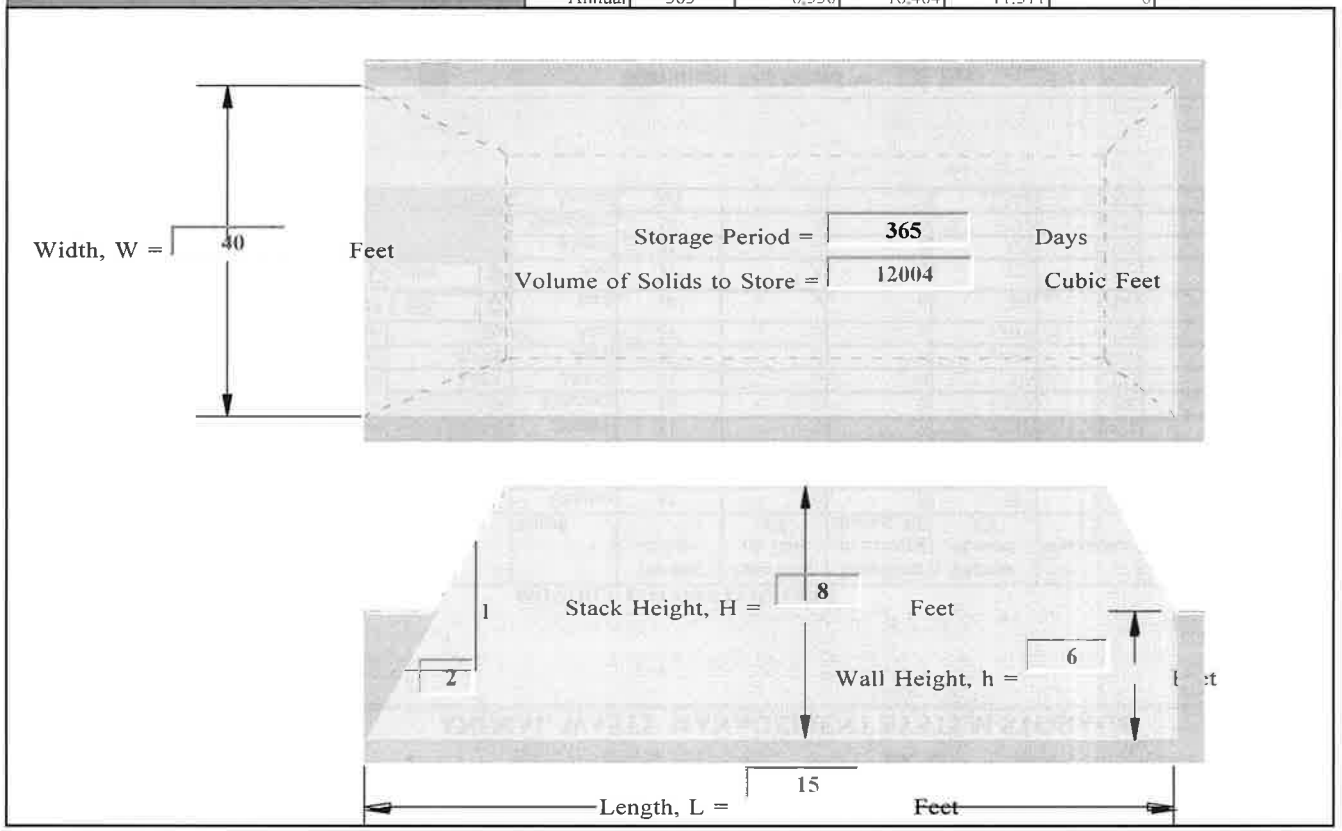
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	365
Stacking Width, W in Feet=	40
Stacking Height, H in Feet=	8.00
Wall Height, h in Feet=	6.00
Stack Side Slope (X:1)=	2.00
Existing Storage, Cubic Feet=	10,152
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	12,004
Design Volume, Cubic Feet=	2,098
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	355	382	369	0
November	30	865	3,024	1,944	0
December	31	894	3,125	2,009	0
January	31	894	3,125	2,009	0
February	28	807	2,822	1,815	0
March	31	625	1,753	1,189	0
April	30	344	369	357	0
May	31	355	382	369	0
June	30	344	369	357	0
July	31	355	382	369	0
August	31	355	382	369	0
September	30	344	369	357	0
Annual	365	6,538	16,484	11,511	0



CLIENT: **Netty Loos**
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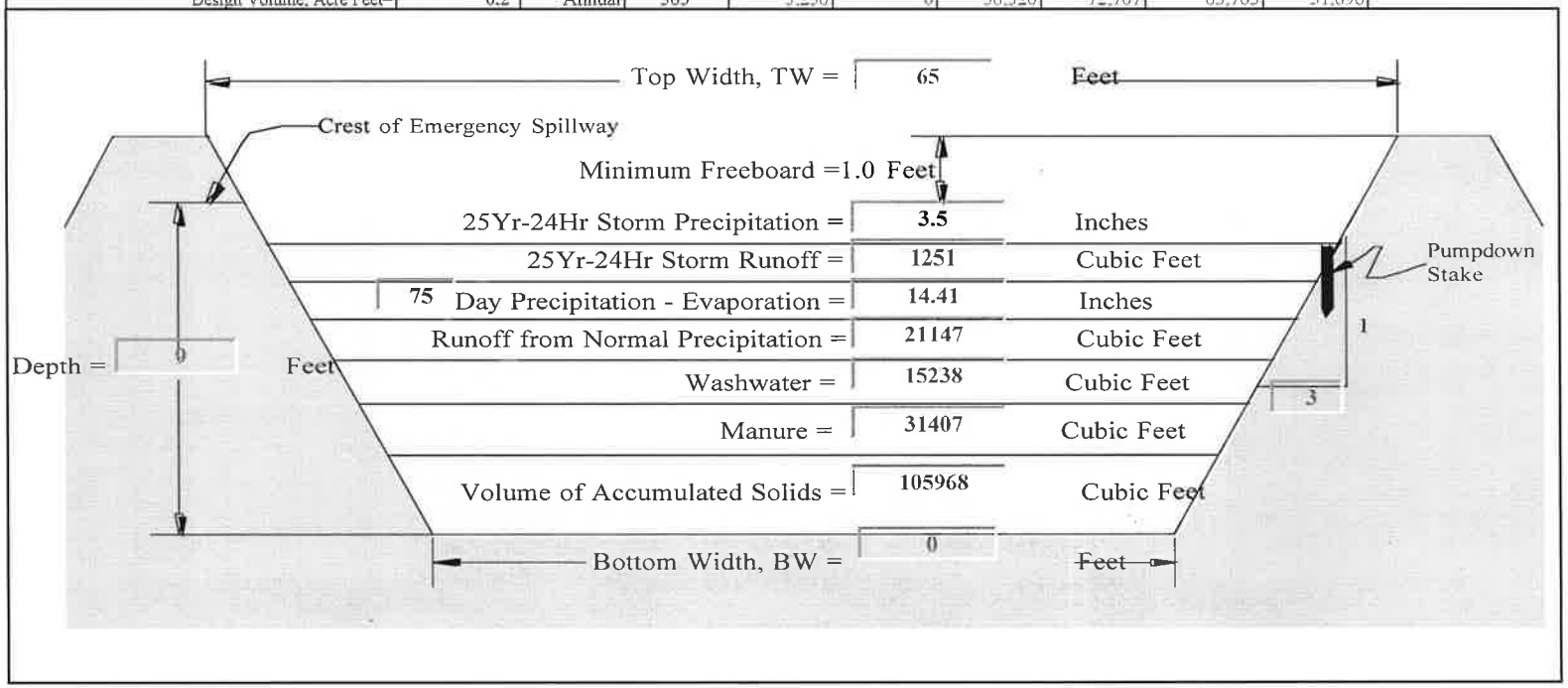
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

WASTE STORAGE POND

Pond Parameters	Value
Storage Period, Days=	75
Side Slope (X:1)=	3.00
Bottom Width, BW, Feet=	0
Bottom Length, BL, Feet=	0
Accumulated Solids Duration, Years=	2
Existing Storage, Acre Feet=	4.00
Surface Area of Existing Storage, SF=	0
Minimum Soil Liner Depth, Feet=	1.00
25 Year-24 Hour Storm Runoff, CF=	1,251
Top Width, TW, Feet=	65
Top Length, TL, Feet=	65
Volume Needed, Acre Feet=	4.0
Design Volume, Acre Feet=	0.2

MONTHLY INFLOWS INTO WASTE STORAGE POND

Month	Number of Days	Rain-Evap on Pond CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Manure CF	Accum Solids CF
October	31	271	0	3,212	6,175	1,465	4,391
November	30	1,827	0	7,887	5,976	11,716	4,249
December	31	2,503	0	10,153	6,175	12,107	4,391
January	31	1,486	0	6,216	6,175	12,107	4,391
February	28	1,475	0	6,630	5,578	10,935	3,966
March	31	1,148	0	6,177	6,175	6,786	4,391
April	30	285	0	4,015	5,976	1,418	4,249
May	31	-359	0	3,691	6,175	1,465	4,391
June	30	-743	0	2,551	5,976	1,418	4,249
July	31	-1,338	0	1,166	6,175	1,465	4,391
August	31	-968	0	1,917	6,175	1,465	4,391
September	30	-338	0	2,707	5,976	1,418	4,249
Annual	365	5,250	0	56,320	72,707	63,763	51,696



U.S. D[illegible]ment of Agriculture
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ANIMAL WASTE MA[illegible]GEMENT WORKSHEET

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ST [illegible] 10/18/06 OREGON

CLIENT: **Netty Loos**
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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 (>50%) Dilution	13,837	4,903	10,032	50%	65%	80%	6,918	3,187	8,026
Solids	Solids Storage Facility (Roofed)	9,224	3,269	6,688	75%	90%	90%	6,918	2,942	6,019
Grazing	NONE	27,706	9,882	19,808	100%	100%	100%	27,706	9,882	19,808

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	6,918	3,187	8,026	75%	100%	100%	5,189	3,187	8,026
Solids	Broadcast (Incorporated 7 or more days after application)	6,918	2,942	6,019	70%	100%	100%	4,843	2,942	6,019
Grazing	Grazing	27,706	9,882	19,808	90%	100%	100%	24,936	9,882	19,808

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		
	Between Coastal and Cascade Mountains / Somewhat Poorly Drained	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Somewhat Poorly Drained	5,189	3,187	8,026	83%	100%	100%	4,307	3,187	8,026
Solids	Somewhat Poorly Drained	4,843	2,942	6,019	83%	100%	100%	4,020	2,942	6,019
Grazing	Somewhat Poorly Drained	24,936	9,882	19,808	83%	100%	100%	20,697	9,882	19,808

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ANIMAL WASTE MANAGEMENT WORKSHEET
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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 Percent to be Applied	LIQUIDS Pounds of Nutrients to be Applied	LIQUIDS Acres Needed for Utilization of Nutrients	SOLIDS Percent to be Applied	SOLIDS Pounds of Nutrients to be Applied	SOLIDS Acres Needed for Utilization of Nutrients	GRAZING Percent to be Applied	GRAZING Pounds of Nutrients to be Applied	GRAZING Acres Needed for Utilization of Nutrients
1	21.0	Oats Hay/Pasture	11%	493	2	24%	952	5	13%	2,696	13
2	17.0	Orchard Grass Hay/Pasture	23%	1,009	2	8%	322	1	27%	5,516	13
3	14.0	Hay/Pasture Mix 14% Protein	9%	388	1	0%	0	0	17%	3,484	13
4	20.0	Hay/Pasture Mix 14% Protein	22%	947	4	20%	804	3	17%	3,484	13
5	22.0	Orchard Grass Hay/Pasture	34%	1,464	3	48%	1,929	5	27%	5,516	13
0											
0											
0											
0											
Off-Farm			0%	5		0%	12		0%	0	
		TOTALS-	100%	4,307	13	100%	4,020	13	100%	20,697	65

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED Nitrogen, N Lbs/Acre	NUTRIENTS APPLIED Phosphorous, P_2O_5 Lbs/Acre	NUTRIENTS APPLIED Potassium, K_2O Lbs/Acre	- NUTRIENTS REMOVED Nitrogen, N Lbs/Acre	- NUTRIENTS REMOVED Phosphorous, P_2O_5 Lbs/Acre	- NUTRIENTS REMOVED Potassium, K_2O Lbs/Acre	= NUTRIENT BALANCE Nitrogen, N Lbs/Acre	= NUTRIENT BALANCE Phosphorous, P_2O_5 Lbs/Acre	= NUTRIENT BALANCE Potassium, K_2O Lbs/Acre
1	21.0	Oats Hay/Pasture	197	112	235	208	187	143	-11	-75	92
2	17.0	Orchard Grass Hay/Pasture	403	213	450	426	158	179	-23	55	270
3	14.0	Hay/Pasture Mix 14% Protein	277	139	290	269	74	205	8	65	84
4	20.0	Hay/Pasture Mix 14% Protein	262	148	315	269	74	205	-7	73	110
5	22.0	Orchard Grass Hay/Pasture	405	233	495	426	158	179	-21	76	316
0											
0											
0											
0											
Off-Farm											

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NUTRIENT MANAGEMENT SPECIFICATION SHEET
CODE 590

Landowner/Operator: Netty Loos

Job Location: T 3N, R 1W, Sec 8

County: Columbia SWCD Columbia County Farm/Tract No. 465

Field No. 1-5

Prepared By: Hendrickson Date: 02/28/06

Purpose:

☐ To budget and supply nutrients for plant production.

☐ To properly utilize manure and organic by-products as a plant nutrient source.

☐ To minimize agricultural non-point source pollution of surface and ground water resources.

☐ To maintain or improve the physical, chemical and biological condition of soil.

Specifications:

☐ Manure is applied to the surface of permanent pastures in accordance with the enclosed Waste Utilization Conservation Practice Jobsheet.

☐ A target yield of 6 tons of dry matter per acre for pasture and 8 tons per acre for hay and grass silage is planned to utilize the nitrogen in the manure.

☐ Manure is applied in accordance with soil tests.

☐ Manure is applied in split applications.

☐ Soil tests are taken at least every 5 years.

☐ Manure test are taken every 5 years. Samples will be collected from the equipment that applies the manure and wastewater to the fields.

☐ No more than 426 lbs. of nitrogen is applied per acre per year for the orchard grass/haylage in accordance with the below Nutrient Distribution, Soil and forage tests will be used to justify the rates.

Manure Application Equipment to be used:

302-1,000 lb. animal units
Travelling Manure Gun
Solid Manure Spreader

Manure Nutrient Distribution

ndowner: Netty Loos

Date 2/28/06

			Grazing		Solids			Liquids (Spreader)			Liquids (Pumping)			
Tract	Field #	Grazing Cycles /YR	# N supplied by grazing/ field/yr	# of N supplied by grazing/ ac/yr	Loads of solid/yr	# of N per field/yr solids	# of N per from solids	Loads of Liquids/yr	# of N per field/yr liquid	# of N per ac/yr from liquid	Hours of Pumping	# of N per field/yr liquid	# of N per ac/yr from liquid	Total # of N per ac/yr
465	1	10	2899	138	36	2004	95	0	0	0	18	1179	56	290
465	2	10	2071	122	29	1611	95	0	0	0	15	967	57	273
465	3	10	3314	237	0	0	0	0	0	0	0	0	0	237
465	4	10	4349	217	0	0	0	0	0	0	2	121	6	223
465	5	10	8077	367	6	314	14	0	0	0	12	756	34	416
	Totals		20710		70	3930		0	0		47	3022		

NOTE: For Farm Summary of all tracts you must highlight desired cell ranges go to Edit/Copy then click on the Summary Tab and click on Edit/Paste Special/ and under Paste select values/OK

Records are maintained of manure and or/or commmercial fertilizer applications.

Nutrient management plans are reviewed annually and adjustments are made as needed.

Manure is not applied within 35 feet of an open watercourse.

DESIGN APPROVAL:

Practice Code No.	Practice	Leand Discipline	Controlling Factor	Units	Job Class				
					I	II	III	IV	V
590	Nutrient Management	CED-EE& BCSD-Agron	Area	Acres	160	320	640	All	All

This practice is classified as Job Class II

Design approved by: /s/ Date:_____

Job Title:

CLIENTS ACKNOWLEGEMENT STATEMENT:

The client acknowledges that:

a. They have received a copy of this specification and under-stands the contents and requirements.

b. The following information must be provided NRCS by the client before this practice can be certified as applied:

- ☐ Nutrient management application records including soil, water, plant and organic by-product test results.
- ☐ Documentation showing amount, rate, form and application method of nutrient applied
- ☐ Annual review of nutrient management including adjustments made.

c. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

d. Maintain records of nutrient application as required by state and local regulations.

Accepted by:/s/_____ Date: _____

CERTIFICATION;

I have completed a review of the nutrient management and the specification's application and certify this practice has been applied.

Certification by:/s/_____ Date: _____

Job Title: _____

United States Department of Agriculture

NRCS Natural Resources Conservation Service

Waste Utilization

Conservation Practice Jobsheet

633 OR-JS

Natural Resources Conservation Service, Oregon

February 2002

Client Looslea Dairy

Date 2/28/2006

Definition

Waste Utilization is the beneficial use of agricultural wastes such as manure and wastewater or other organic residues.

Purpose

The ultimate purpose of waste utilization is to insure the proper use of agricultural wastes while protecting soil, water, air, plant, and animal resources. Agricultural wastes can be used to provide nutrients for crops, forage, and fiber production and forest products. Agricultural waste also can be used as an amendment to improve or maintain soil structure, provide feedstuff for livestock, or provide a source of energy. The focus of this job sheet will be the use of agricultural wastes to provide fertility for crops, forage, and fiber production and forest products; and to supply organic material to the soil.

Where used

Waste utilization is used where agricultural wastes (primarily animal manure and polluted runoff from livestock and poultry operations) are generated and collected as part of a resource management system. Wastes can be used as a source of fertility on cropland and pastureland, and occasionally on forest land or rangeland. Use of the Soil Condition Index (SCI) can be used to determine the effects of organic material on soil quality.

Conservation Management Systems

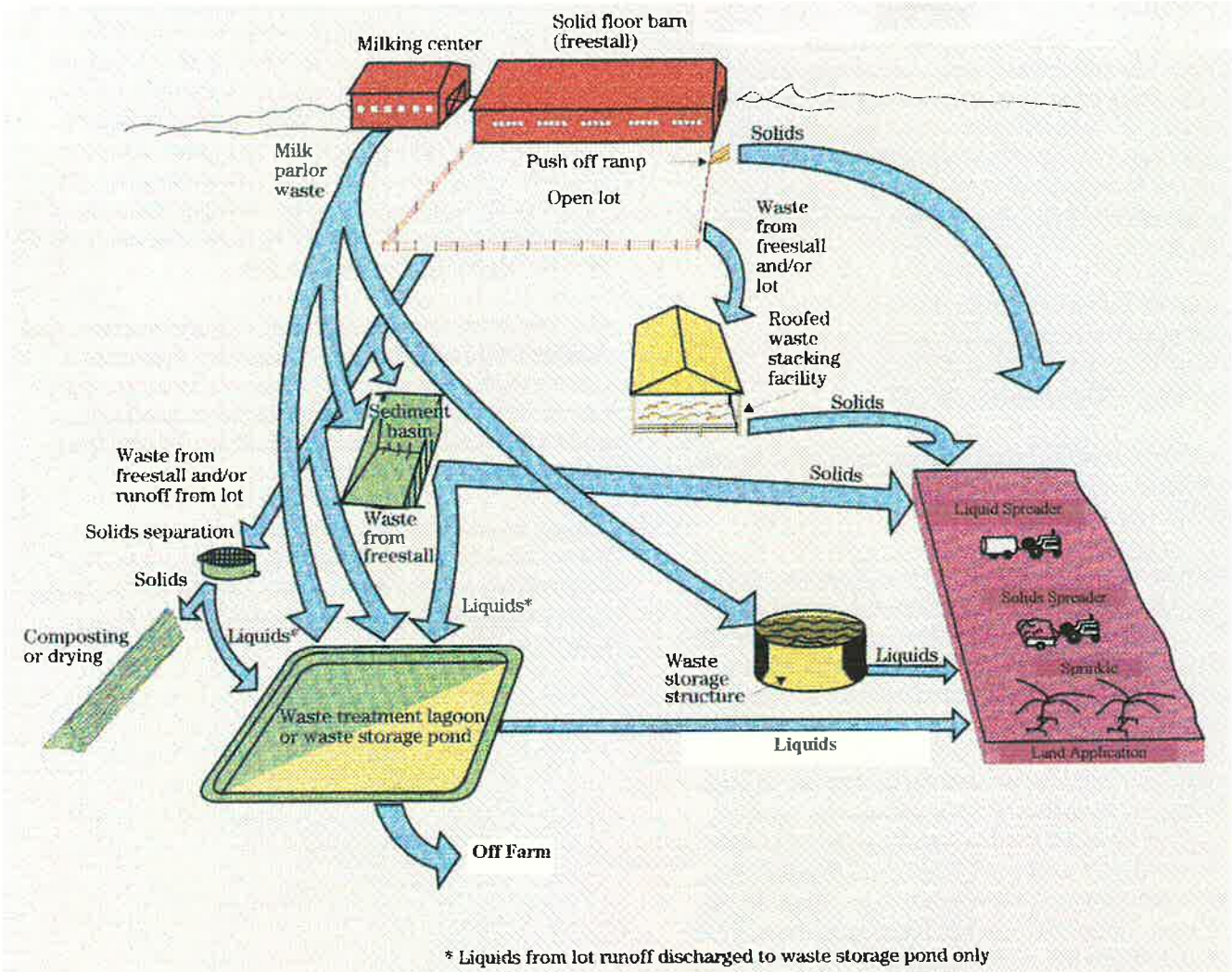
Waste utilization is generally one of several components of a resource management system used to manage manure and polluted water from livestock and poultry operations. Where the wastes are used to supply the fertility needs of crop and pasture, waste utilization is done as part of an overall resource management plan for the enterprise.

Waste Utilization Planning

Waste utilization components of the conservation plan will contain the following information:

- field map and soil map
- crop rotation or sequence
- results of soil, water, plant, and organic material samples analyses
- expected yield
- sources of nutrients to be applied
- nutrient budget, including credits of nutrients available
- recommended nutrient rates, form, timing, and method of application
- location of designated sensitive areas
- guidelines for operation and maintenance

Waste utilization is most effective when used with other conservation practices such as cover crop, residue management, conservation buffers, irrigation water management, nutrient management, pest management, and conservation crop rotation.



Schematic of a Resource Management System for a Dairy

Operation and maintenance

Operation and maintenance activities shall include record keeping for 5 years or longer that includes the following:

- Quantity of manure and other agricultural wastes produced, and their nutrient content.
- Soil test results.
- Dates and rates of waste application where land applied, and the dates and amounts of waste removed from the system due to feeding, energy production, or export from the operation.
- Waste application methods.
- Crops grown and yields (both yield goals and measured yield).
- Other tests as needed, such as determining the nutrient content of the harvested product.
- Calibration of the application equipment.
- Changes in soil condition(SCI).
- Plan map showing fields where waste is applied.

Specifications

Site specific requirements for waste utilization are listed on specification sheets. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See NRCS practice standard, Waste Utilization, code 633. Use NRCS's Agricultural Waste Management Field Handbook or locally accepted references for procedures to calculate values such as residual nitrogen from past waste applications, and to estimate available nutrients in wastes where lab analyses are not available.

Natural Resources Conservation Service, Oregon — February 2002

WASTE UTILIZATION SPECIFICATION SHEET

Client Looslea Dairy

Location T5S, R 1 E, Sec 4 County/SWCD Columbia

Farm/Tract No. 465

Prepared By Jim Hendrickson Date 2/28/2006

Perform the following operations:
❑ Have your technical assistance provider review the resource management system plan for your operation at least once every 5 years.
❑ Maintain records for all waste applications.
❑ Calibrate application equipment to apply wastes in accordance with the recommended amount and timing specified on the nutrient budget specification sheet, NRCS practice code 590, for the crop being grown.
❑ Chemical analysis of soils, plant tissue and waste should be used annually to monitor and adjust amounts of waste applied. Refer to Oregon State University Extension Service publication EC1478, "Soil Test Interpretation Guide" for guidance in getting soil tested and interpreting soil test results. Refer to Oregon State University Extension publication EM8585, "Manure Application Rates for Forage Production" and EM8768, "Calculating Dairy Manure Nutrient Application Rates" for guidance in getting animal waste tested for nutrient concentrations and computing application rates.
❑ Apply waste in a manner that will cover no more than 25 percent of the leaf surface with solids unless clean water applications are planned immediately after wastes are applied. For pasture/hayland it is best to apply waste 7 days after harvesting forage by haying or grazing.
❑ To reduce odor problems, apply waste in mid morning when temperatures are warming and air is rising rather than in the afternoon or evening when air is cooling and settling. Avoid applications during periods of fog.
❑ Do not apply waste directly into an open watercourse or where waste is likely to enter an open watercourse. Observe all waste application setbacks identified in the resource management system plan.
❑ Do not apply waste to fields where there is no growing crop. If applications are needed during fall and winter periods due to unforeseen circumstances, such as the storage facilities being full, use the following guidelines for waste applications: a) Only spread waste on fields that are growing a crop, preferably grass. b) Increase all waste application setbacks identified in the resource management system plan by 50 feet. c) Don't apply waste during any rainfall event that will cause runoff. d) Use maximum travel rates for the traveling big gun sprinkler and solids spreader. e) Use soil tests, such as the Pre-sidedress Soil Nitrate test, to determine if additional applications of waste are needed on those fields receiving emergency winter applications.
❑ Do not apply waste to fields with frozen or snow covered soil conditions unless provisions are made to control runoff.
❑ Do not spread waste on fields where soils are saturated, ponded, flooded and/or during times when waste is likely to runoff into open watercourses.
❑ Be aware of the location of sensitive areas, concerns of neighbors or concerns of the public which require special application procedures
❑ Handle all waste material with caution. Wear appropriate protective clothing.
❑ Clean up residual materials from equipment and dispose of properly.
❑ Equipment used in waste utilization should be regularly inspected and maintained as needed in accordance with equipment operation and maintenance guidelines from the manufacturer or provided by NRCS.
Additional Guidance and Notes:

633 OR-Specification

Natural Resources Conservation Service, Oregon — February 2002

WASTE UTILIZATION SPECIFICATION SHEET

DESIGN APPROVAL:

Practice Code NO.	PRACTICE	LEAD DISCIPLINE	CONTROLLING FACTOR	UNITS	JOB CLASS				
					I	II	III	IV	V
633	Waste Utilization	BCSD-Agron & CED-EE	Area	Acres	20	40	80	180	All

This practice is classified as Job Class _____

Design Approved by:/s/_____ Date:_____

Job title:_____

CLIENTS ACKNOWLEDGEMENT STATEMENT:

The Client acknowledges that:

a. They have received a copy of the specification and understand the contents and requirements.

b. The following information must be provided to NRCS by the client before this practice can be certified as applied:
   - ☐ Waste application records which include the date, crop, type of waste applied, and amount of waste applied.
   - ☐ Calibration records for waste application equipment.
   - ☐ Analysis of nutrient concentrations in solid and liquid wastes.

c. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

Accepted by:/s/_____ Date:_____

CERTIFICATION:

I have completed a review of the information provided by the client and certify this practice has been applied.

Certification by:/s/_____ Date:_____

Job title:_____

EC 1478 • Reprinted August 1999
$1.50

Soil Test Interpretation Guide

E.S. Marx, J. Hart, and R.G. Stevens

Regular soil testing is an important element in nutrient management. You can use soil tests as a diagnostic tool or to identify trends through time. To obtain meaningful test results, you must sample soil correctly, at the same time each year, and you must maintain records. For more information, see EC 628, *How to take a soil sample. . .and why* (see "For more information," page 7).

Soil testing laboratories use different test methods, which may influence results and sufficiency ranges. Therefore, the sufficiency ranges in this publication are accurate only for the test methods listed.

Soil tests used to evaluate fertility measure the soil nutrients that are expected to become plant-available. They do not measure total amounts of nutrients in the soil. Measurements of total nutrient content are not useful indicators of sufficiency for plant growth, because only a small portion of the nutrients are plant-available.

Adequate soil nutrient levels vary depending on plant species. Similarly, plant tolerance of excessive nutrient levels, nutrient imbalances, or less-than-optimum growing conditions varies. If excessive nutrient levels exist, review management to determine the cause.

Nutrient concentrations vary with soil depth. Depth of sampling, therefore, affects test results. To determine the proper sampling depth, you must consider the purpose of the soil test. To estimate nutrient availability for a crop prior to planting, sample soil to the depth where most root activity will occur. Shallow sampling sometimes is used to evaluate surface conditions in perennial crops where fertilizers have been applied to the soil surface. Deep sampling may be necessary to diagnose problems in orchards.

Soil test values do not vary greatly from year to year. Drastic changes in test values may indicate an unrepresentative soil sample or a laboratory error. When in doubt, submit a new sample or ask the lab to repeat the analysis.

This publication provides general guidelines for interpreting soil test results. Fertilizer guides for many individual crops are available from your county office of the OSU Extension Service or Washington State University Cooperative Extension, or from Extension and Experiment Station Communications, Oregon State University (see "For more information").

Nitrogen (N)

Plant-available nitrogen (nitrate and ammonium)

Plant-available forms of nitrogen are nitrate (NO_3^--N) and ammonium (NH_4^+-N). Soil concentrations of NO_3^--N and NH_4^+-N depend on biological activity, and therefore fluctuate with changes in conditions such as temperature and moisture. Nitrate is easily leached from the soil with high rainfall or excessive irrigation. Soil tests can determine NO_3^--N and NH_4^+-N concentrations at the time of sampling, but do not reflect future conditions.

When you collect samples for nitrogen testing, keep them cold, or dry them immediately to prevent NO_3^--N and NH_4^+-N concentrations from changing.

E.S. Marx, former research assistant in soil science, and John Hart, Extension soil scientist, Oregon State University;
and Bob Stevens, Extension soil scientist, Washington State University.

OREGON STATE UNIVERSITY EXTENSION SERVICE

Ammonium-nitrogen (NH_4^+-N)

Ammonium-nitrogen does not accumulate in the soil, as soil temperature and moisture conditions suitable for plant growth also are ideal for conversion of NH_4^+-N to NO_3^--N. Ammonium-nitrogen concentrations of 2–10 ppm are typical. Soil NH_4^+-N levels above 10 ppm may occur in cold or extremely wet soils, or if the soil contains fertilizer residue.

Nitrate-nitrogen (NO_3^--N)

West of the Cascades. Soil nitrate-nitrogen measurements are most useful as a post-harvest "report card" to evaluate N management. Nitrate remaining in the soil after harvest can leach during winter rains, contaminating surface and groundwater. If residual nitrate levels are consistently high, reduce fertilizer N inputs in future growing seasons.

Table 1.—Residual soil nitrate-nitrogen for evaluating N management.

	NO_3^--N in surface foot (ppm)*	#/Ac
low	<10	<36
medium	10–20	36.5 - 73.0
high	20–30	73.0 - 109.5
excessive	>30	>109.5

*See Table 13 (page 7) for conversion of ppm to lb/acre.

Mid-season measurement of soil nitrate is used for field corn production. See EM 8650, *The Pre-sidedress Soil Nitrate Test (PSNT) for Western Oregon and Western Washington*, for more information.

East of the Cascades. In arid regions, soil nitrate (NO_3^--N) is evaluated by measuring NO_3^--N to the expected rooting depth of the crop to be grown. If test results are reported in ppm, convert to lb/acre using Table 13 (page 7). Then subtract the soil nitrate from the crop requirement to determine a fertilizer rate.

Failure to account for NO_3^--N in the soil can lead to over-application of nitrogen fertilizers. Also, irrigation water should be analyzed for NO_3^--N content, and fertilizer rates reduced accordingly. Proper irrigation increases N use efficiency and reduces nitrate leaching.

Total nitrogen

Total nitrogen analysis measures N in all organic and inorganic forms. Total nitrogen does *not* indicate plant-available N, and is not included in standard soil testing programs.

A typical agricultural soil in the Willamette Valley contains about 0.10 to 0.15 percent N, or approximately 5,000 lb N/acre in the surface foot. Only 1 to 4 percent of this total N becomes plant-available during a growing season. East of the Cascades, soils tend to have smaller amounts of total N.

Total N analysis, while not recommended as part of a standard soil testing program, may be better than organic matter analysis for estimating soil N supplying capability.

Phosphorus (P)

The Bray P1 (for acid soils) and the Olsen sodium bicarbonate ($NaHCO_3$) (for alkaline soils) tests estimate plant-available phosphorus. Soil testing laboratories also use several other extraction methods. For interpretation of results from other extraction methods, contact the laboratory that performed the analysis.

Phosphorus soil tests are an index of P availability. The test values cannot be used to calculate available lb P_2O_5/acre.

When sampling soil, you must be aware of previous P management. Phosphorus is relatively immobile in soil. If phosphorus has been applied in a fertilizer band, concentrations of P may persist where the band was placed. Avoid fertilizer bands when collecting soil samples.

Table 2.—Phosphorus soil test.

	West of Cascades (Bray P1 test) ppm P	East of Cascades (Olsen test) ppm P
low	<20	<10
medium	20–40	10–20
high	40–100	20–40
excessive	>100	>40

The phosphorus application rate necessary to correct P deficiencies varies depending on soil properties. Phosphorus availability decreases in cool, wet soils. In many situations, banded phosphorus applications are more effective than broadcast applications.

Phosphorus applications generally are not recommended if tests are high or excessive. High soil phosphorus combined with surface runoff can cause excessive growth of plants and algae in surface waters, damaging aquatic ecosystems.

Cations

Of the three primary cations (potassium, calcium, and magnesium), potassium requires the most management attention. Few crops have responded to calcium and magnesium in the Pacific Northwest.

If extremely high levels of a single cation exist, plant deficiencies of other cations may occur due to competition for plant uptake.

The soil test ranges in Tables 3, 4, and 5 are for the ammonium acetate extraction method. If a sodium bicarbonate ($NaHCO_3$) extraction is used, test values may be slightly lower.

Potassium (K)

Excessive soil potassium levels can result in elevated K levels in grass forage crops, which may be detrimental to animal health.

Table 3.—Extractable potassium (K).

	K
low	<150 ppm* <0.4 meq/100 g soil
medium	150–250 ppm 0.4–0.6 meq/100 g soil
high	250–800 ppm 0.6–2.0 meq/100 g soil
excessive	>800 ppm >2.0 meq/100 g soil

*See Table 13 (page 7) for conversions from ppm to meq/100 g soil.

Calcium (Ca)

Calcium deficiencies usually are found only on very acid soils. They can be corrected by liming with calcium carbonate ($CaCO_3$).

Table 4.—Extractable calcium (Ca).

	Ca
low	<1,000 ppm* <5 meq/100 g soil
medium	1,000–2,000 ppm 5–10 meq/100 g soil
high	>2,000 ppm >10 meq/100 g soil

*See Table 13 (page 7) for conversions from ppm to meq/100 g soil.

Magnesium (Mg)

Magnesium deficiencies on acid soils can be corrected by liming with dolomitic lime.

Magnesium toxicity can occur on serpentine soils in southwest Oregon.

Table 5.—Extractable magnesium (Mg).

	Mg
low	<60 ppm* <0.5 meq/100 g soil
medium	60–180 ppm 0.5–1.5 meq/100 g soil
high	>180 ppm > 1.5 meq/100 g soil

*See Table 13 (page 7) for conversions from ppm to meq/100 g soil.

Sulfate-sulfur (SO_4^{2-}-S)

Plants absorb sulfur in the sulfate (SO_4^{2-}-S) form. In high rainfall areas west of the Cascades, SO_4^{2-} is readily leached, and soil test data are not well correlated with plant growth. In arid regions east of the Cascades, soil test information may be useful. Also, irrigation water may contain significant amounts of sulfate-sulfur. Plant analysis often is useful for diagnosing sulfur deficiency.

Table 6.—Sulfate-sulfur, east of the Cascades.

	SO_4^{2-}-S (ppm)
low	<2
medium	2–10
sufficient	>10

Micronutrients

Deficiencies of micronutrients other than boron and zinc are uncommon. Availability of most micronutrients is largely pH-dependent; availability decreases as pH increases (except for molybdenum, which becomes more available as pH increases). Deficiencies rarely occur in soils with pH below 6.5.

Soil testing for micronutrients other than boron and zinc is recommended only when a deficiency is suspected. If you suspect a micronutrient deficiency, plant tissue testing may be a better diagnostic tool than soil testing.

Boron (B)

Crops such as alfalfa, table beets, brassicas, caneberries, and root crops have responded to boron fertilization on B-deficient soils in western Oregon. Tree fruits and alfalfa are examples of crops sensitive to low boron levels east of the Cascades.

While low levels of boron may limit plant growth, high concentrations can be toxic. When applying boron, apply uniformly and mix thoroughly with the soil.

Table 7.—Boron by the hot water extraction method.*

	B (ppm)
low	<0.5
medium	0.5–2
high	>2

*The hot water extraction method for boron may result in incorrectly high values on soils with high organic matter content.

Zinc (Zn)

Zinc values above 1.0 ppm using the DTPA extraction method are sufficient. Zinc deficiencies have been identified in some crops in certain regions. Corn, beans, grapes, hops, onions, and deciduous fruit trees are especially sensitive to low levels of available zinc. Deficiencies sometimes are associated with high soil P concentrations, soils high in fine clay and silt, or soils with high pH.

Copper (Cu)

Copper values above 0.6 ppm using the DTPA extraction method are sufficient. Copper deficiencies are uncommon. Deficiencies have been identified on muck soils such as those in the Klamath area in Oregon and the Colville area in Washington.

Manganese (Mn)

Manganese values above 1.5 ppm using the DTPA extraction method are sufficient. Manganese deficiencies generally occur only in soils with pH 7.0 or above. Manganese toxicity may occur on acid soils. On alkaline soils east of the Cascades, Mn availability may increase in acidified microzones where fertilizers have been placed. These acidified microzones can alleviate Mn deficiencies sometimes encountered on high pH soils. In some instances, however, acidic microzones can result in Mn toxicity.

Iron (Fe)

Soil testing for iron is not recommended. Most test methods do not discern between forms of iron, and therefore have little meaning for plant nutrition.

Iron deficiencies are uncommon on acid soils in the Pacific Northwest. Where deficiencies occur, they often are associated with acid soil plants, such as azaleas or rhododendrons, growing on soils with unsuitably high pH. Acidifying fertilizers such as ammonium sulfate will help correct problems.

Iron applications on alkaline soils are inefficient unless a chelated form is used. Lowering soil pH to increase iron availability on a field scale is not economical. However, adding acidifying materials such as elemental sulfur to fertilizer mixes can acidify microzones around the fertilizer material and increase Fe availability.

Foliar applications of Fe sometimes are used to correct deficiencies in fruit, turf, and other high-value crops.

Molybdenum (Mo)

Soil Mo concentrations are too low for most labs to evaluate. Molybdenum deficiencies are rare, and are of concern mostly for leguminous crops. Molybdenum-deficient legumes appear chlorotic. Liming to raise soil pH may alleviate deficiencies. Molybdenum-coated seed also can be used.

Excessive molybdenum in forage can harm animal health. If you suspect excessive molybdenum in your forage, determine Mo content by forage analysis.

Chloride (Cl^-)

Soil testing for chloride is not a common practice, and little data exists for interpretation of test results. Evidence indicates that wheat sometimes benefits from chloride applications. The values in Table 8 are based on wheat research in Montana and South Dakota. Little information exists on chloride soil testing in Washington and Oregon.

Table 8.—Chloride soil test ranges for wheat in Montana and South Dakota, 2-foot sampling depth.

	ppm	lb/acre
low	0–4	0–32
medium	4–8	32–64
high	>8	>64

pH, lime requirement (LR)

Soil pH is a measure of soil acidity. Most crops grow best if the soil pH is between 6.0 and 7.5.

Table 9.—Soil pH ranges.

	pH
strongly acid	below 5.1
moderately acid	5.2–6.0
slightly acid	6.1–6.5
neutral	6.6–7.3
moderately alkaline	7.4–8.4
strongly alkaline	above 8.5

Soil pH can be increased by liming. The soil pH test indicates *if* lime is needed. The lime requirement test determines *how much* lime is needed. Accurate lime recommendations cannot be made without performing an SMP or similar test.

SMP* lime requirement test

The SMP lime requirement test is used to estimate the amount of lime required to raise the pH of 6 inches of soil. The SMP test is performed by mixing soil with a buffered pH 7.5 solution and determining the pH of the mixture. During the reaction, the soil's reserve acidity lowers the pH of the SMP solution. Soils with low SMP values have high reserve acidity and high lime requirements.

Some soils may have a low pH (<5.3) and a fairly high SMP buffer value (>6.2). This condition can be caused by the application of fertilizer. In this case, the low pH value is temporary, and the pH of the soil will increase as the fertilizer completes its reaction with the soil.

Sandy soils also may have a low pH and high SMP buffer value. This condition occurs because sandy soils have low amounts of reserve acidity due to low cation exchange capacity (CEC). In such cases, a light application of lime (1 to 2 t/a) should suffice to neutralize soil acidity.

Table 10 is used to determine the amount of lime required, based on the SMP test, to raise soil pH to a desired level. The target pH is determined by the crop to be grown and possibly by other factors.

*SMP stands for Shoemaker, MacLean, and Pratt—the people who developed the test.

Without an SMP or similar test, there is no way to know how much lime is required to adjust soil pH to a desired level. Accurate lime recommendations cannot be made solely on the basis of soil pH.

Table 10.—SMP lime requirement—field scale.

SMP buffer	Tons/acre of 100-score lime needed to raise pH of surface 6 inches of soil to the following pH's			
	5.3	5.6	6.0	6.4
6.7	—	—	—	—
6.6	—	—	—	1.1
6.5	—	—	1.0	1.7
6.4	—	—	1.1	2.2
6.3	—	—	1.5	2.7
6.2	—	1.0	2.0	3.2
6.1	—	1.4	2.4	3.7
6.0	1.0	1.7	2.9	4.2
5.9	1.4	2.1	3.3	4.7
5.8	1.7	2.5	3.7	5.3
5.7	2.0	2.8	4.2	5.8
5.6	2.3	3.2	4.6	6.3
5.5	2.6	3.6	5.1	6.8
5.4	2.9	3.9	5.5	7.3
5.3	3.2	4.3	6.0	7.8
5.2	3.6	4.7	6.4	8.3
5.1	3.9	5.0	6.9	8.9
5.0	4.2	5.4	7.3	9.4
4.9	4.5	5.8	7.7	9.9
4.8	4.8	6.2	8.2	10.4

Example: If the "SMP buffer" value is 5.9, the amount of lime needed to raise the pH to 6.0 is 3.3 tons of 100-score lime/acre.

Table 11.—SMP lime requirement—gardens.

If the SMP lime requirement test is	Apply this amount of lime (lb/1,000 ft²)
5.4 or below	250
5.5–6.0	150–250
6.0–6.5	100–150
above 6.5	0

Some plants, such as blueberries, rhododendrons, azaleas, and cranberries, grow best in acid soils. Fertilizers such as ammonium sulfate can help maintain acidic conditions.

Sodium (Na)

Sodium is not a plant nutrient and therefore is not necessary for plant growth. High levels of sodium are detrimental to soil tilth and plant growth.

Sodium levels are evaluated based on Exchangeable Sodium Percentage (ESP). The ESP is the percent of the cation exchange capacity (CEC) occupied by Na.

ESP values above 10 percent are of concern. Excessive sodium levels can occur naturally or can result from irrigation with high-sodium water. Reclamation involves establishment of drainage followed by gypsum application and leaching with low-sodium water.

Soluble salts (SS)

Soluble salt problems usually are associated with arid regions such as eastern Oregon and Washington. Soils with high levels of soluble salts are called saline soils. Soils high in sodium are called sodic soils (see "Sodium"). Saline-sodic soils are high in both soluble salts and sodium. Soluble salts are measured by electrical conductivity (EC) of a saturated paste soil extract.

Table 12.—Soluble salts.

	Conductivity (mmhos/cm*)	ppm salt**
low	<1.0	<640
medium	1.0–2.0	640–1,280
high	>2.0	>1,280

*mmhos/cm is equivalent to decisiemen/m.

**Multiply mmhos/cm by 640 to estimate ppm salt.

Because salts move readily with water, salt problems often are transient. Salt toxicity can occur, and salts may leach before soil is tested. Low salt values, therefore, do not always rule out salt toxicity as a cause of problems.

Salt tolerance varies greatly among plant species. Seedlings are especially sensitive to high salt concentrations. Excessive salts may inhibit seed germination. Excessive fertilization and poor irrigation water quality are sources of salts.

Organic matter

Maintenance of soil organic matter is one of the most important goals of soil management. Accurate measurement of soil organic matter is difficult.

Many laboratory methods are used. Most methods are indirect; they measure soil carbon and make an assumption about the percent carbon content of organic matter. The Walkley-Black method is common and gives consistent results. The loss on ignition method can give inconsistent results and tends to overestimate organic matter.

When estimating potential nitrogen release of a soil, total N testing is preferred to organic matter determination. Neither approach provides accurate estimates of soil N availability. If you are monitoring changes in organic matter over time, use the same lab for all analyses.

Cation exchange capacity (CEC)

CEC is a measure of a soil's capacity to retain and release elements such as K, Ca, Mg, and Na. Soils with high clay or organic matter content tend to have a high CEC. Sandy soils have a low CEC. Soil CEC is relatively constant over time, so there is no need for repeated analyses.

CEC often is determined by the ammonium acetate (NH_4OAc) or sodium acetate (NaOAc) methods. While these methods are standard in many regions, there are potential sources of error. Errors are most likely to occur for soils containing appreciable amounts of $CaCO_3$ or gypsum.

Some labs estimate CEC based on soil texture, organic matter content, cations, and pH. Such estimates often are inaccurate. The "sum of bases" method for calculating CEC of alkaline soils can give inaccurate results, especially if there are significant amounts of free $CaCO_3$.

CEC determination can be important for predicting behavior of pesticides and other chemicals in soils.

Base saturation

Base saturation is the percentage of the CEC that is occupied by cations other than hydrogen (H) and aluminum (Al). Soils with low base saturation generally are acidic. Base saturation and pH increase together.

For more information

Hart, J. *Analytical Laboratories Serving Oregon*, FG 74 (Oregon State University, Corvallis, reprinted 1997). No charge

Hart, J. *How to take a soil sample. . .and why*, EC 628 (Oregon State University, Corvallis, revised 1995). No charge

Marx, E.S., N.W. Christensen, J. Hart, M. Gangwer, C.G. Cogger, and A.I. Bary, *The Pre-sidedress Soil Nitrate Test (PSNT) for Western Oregon and Western Washington*, EM 8650 (Oregon State University, Corvallis, reprinted 1997). 75¢

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Table 13.—Conversions.

To convert column 1 into column 2, *divide* by	**Column 1**	**Column 2**	**To convert column 2 into column 1, *multiply* by**
390	ppm K	meq K/100 g soil	390
200	ppm Ca	meq Ca/100 g soil	200
121	ppm Mg	meq Mg/100 g soil	121
230	ppm Na	meq Na/100 g soil	230
1	meq/100 g soil	cmol/kg soil	1
2*	lb/acre (7 inch depth)	ppm	2*
3.65*	lb/acre (1 foot depth)	ppm	3.65*
43.56	lb/acre	lb/1,000 sq ft	43.56
43,560	square feet	acres	43,560
2.471	acres	hectares	2.471

*These values vary with soil bulk density.

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August 2001

Keeping Track of Manure Nutrients in Dairy Pastures

T. Downing

Keeping track of nutrient levels in dairy pastures has become an important part of farm management plans. The current recommendation is to fertilize pastures at a level to replace, in equal measure, the nutrients removed through grazing or cutting each year.

The Confined Animal Feeding Operations Program (CAFO) run by the Oregon Department of Agriculture assumes that most livestock facilities apply manure at agronomic rates for nitrogen. Thus, they expect CAFO operations to make sure the amount of nitrogen applied to a field each year equals the amount removed.

For operations with grazing animals, determining manure application rates and forage consumption can be challenging. This publication will help you work through this process.

In concept, tracking nitrogen balance is simple: the grazing animal adds nitrogen in the form of manure and urine and removes it in the form of protein in the grass grazed. To quantify these values, you need to determine both how much manure was applied and the amount and quality (percentage nitrogen content) of grass grazed.

The variables include:

- Manure generated: number of animals and the amount of time spent in each field
- Quantity of forage removed through grazing and cutting
- Quality of forage removed: percent protein (i.e., percent nitrogen)
- Amount of manure stored and spread from the confinement facility
- Acreage of each pasture unit
- Calibration of waste-handling equipment

Estimating manure generated

The nitrogen content of dairy manure is well documented, but these values vary depending on feed intake. Table 1 shows the direct relationship between nutrient intake and excretion.

By estimating the percentage of the day cows spend in the field, you can calculate the amount of the day's waste applied as fertilizer. Note in Table 1 that the amount of nutrients excreted by a cow can be estimated based on her milk production or feed intake.

Table 1. – Estimated daily nitrogen (N) and phosphorus (P) excretion.

Milk Production	100 lb/day	70 lb/day	50 lb/day	Dry
Intake/day	56 lb	46 lb	39 lb	25 lb
Total N, lb/day waste	0.9 lb/day	0.8 lb/day	0.65 lb/day	0.4 lb/day
Total P, lb/day (diet 0.45% P)	0.151 lb/day	0.138 lb/day	0.126 lb/day	0.113 lb/day

Source: H.H. Van Horn et al., 1999.

Troy Downing, Extension agent, Tillamook County, Oregon State University.

For example, if a Holstein cow is grazed for 9 hours at night and 9 hours during the day, she spends 75 percent of her time in the field and deposits 75 percent of her daily waste production there. If she excretes 0.8 lb of nitrogen per day, she applies 0.6 lb of nitrogen to the field. The remaining 25 percent, or 0.2 lb, is deposited in the confinement facility.

If you graze 100 Holstein cows in Field 1, a 4-acre field, for 2 days at 18 hours per day, they will apply 120 lb of nitrogen to the field, or 30 lb per acre.

Measuring quantity and quality of grass consumed by the animals

There are four common ways to measure standing grass volume before and after grazing to determine the amount of nutrient removed.

Clipping and weighing

The most accurate method is to clip a small subsample of the field before grazing. Use a hoop to calculate how many square feet you are clipping; throw the hoop at random, then clip the standing forage inside the ring down to the ground. Figure 1 shows a hoop that measures 1 square foot. Cut at least 10 to 15 sample plots per field, depending on the size of the field and the variation in the height of existing forage. The larger the field, or the greater the variation in forage height, the more samples you need. The more uniform your forage height, the more accurate your estimate.

By calculating the total square feet clipped and weighing the forage, you can determine how many pounds of total feed were standing per acre before grazing. An acre is 43,560 sq ft. Divide your total clipped area into 43,560; then multiply the answer times the weight of the forage clipped to determine your estimated pounds of standing wet grass per acre. Measuring again after grazing tells you how much forage was removed.

To determine pounds of dry matter (DM) per acre, however, you need to know what percentage of the forage is dry matter versus moisture. A commercial forage lab can analyze the forage, but the following process lets you perform a quick moisture test at home with a small scale and a microwave oven.

1. Weigh a paper bag large enough to hold 4 ounces of the clipped forage. Write down the weight as value "A."
2. Place about 4 ounces, or 100 grams, of your forage into the bag and weigh again. This becomes value "B."
3. Place a cup of water in the corner of the microwave oven and the filled bag in the center. Dry the sample at a medium power setting for 3 minutes. Remove the sample and stir gently, then dry for another 1½ minutes. Stir again, then dry for another minute.
4. The sample should be getting dry and crisp. Weigh the sample and bag, stir again gently, then dry for another 30 seconds. Continue 30-second drying and weighing intervals until the weight measurement reads the same twice. Record the final weight as value "C." If the sample begins to char, use the previous measurement.
5. Calculate the dry matter content using this formula:

$$\%DM = \frac{\text{Total dry weight "C"} - \text{bag weight "A"} \times 100}{\text{Total wet weight "B"} - \text{bag weight "A"}}$$

Now you can calculate the total dry matter in the field before and after grazing by multiplying the percent dry matter times the forage removed by grazing. In our example, the calculations show 2,400 lb of dry matter per acre before and 1,200 lb after grazing 100 cows for 2 days at 18 hours per day. Therefore, for 4-acre Field 1, the cows removed a total of 4,800 lb of dry matter.

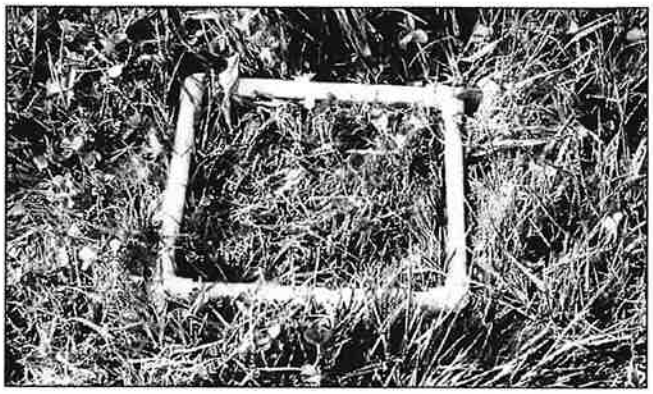

Figure 1.—By clipping several 1-square-foot samples of forage before and after grazing, you can estimate the amount of forage removed by grazing.

Rising plate meter

The second most common method of measuring forage in the field involves a rising plate meter (Figure 2). This device estimates standing forage dry matter by accounting for pasture height and density. The electronic meter pictured allows the operator to select the "cover equations" that most closely represent existing pasture conditions. To determine the correct cover equation, take 30 to 50 pasture clipping samples per paddock to establish an average reading. Once calibrated, the device will provide standing forage measurements in pounds of dry matter per acre or kilograms per hectare. Most commercially available rising plate meters are made in New Zealand.

Yard stick

The third method for calculating standing forage uses a yardstick. By measuring the standing height of the forage, you can make an educated estimate of the total pounds of dry matter. This method does not account for stand density, so the more uniform your pastures, the more accurate your estimate will be.

To use this method, measure the height of the pasture (Figure 3). Use the clipping and weighing method to determine how many pounds of dry matter are in the standing forage per acre. Divide this value by the number of inches in height to calculate an estimated per-inch value. For example, if your pasture measures on average 12 inches tall and you calculate that there are 3,000 lb of dry matter per acre, your pasture averages 250 lb of dry matter per acre-inch.

It is important to complete these steps several times to account for variations in your technique and in the fields. Common values for good ryegrass pastures range from 250 to 300 lb DM per inch for well-established pastures. In our clipping and weighing example, Field 1 had 2,400 lb of dry matter per acre before grazing, so the pasture would have been around 8 inches tall. After grazing, we had 1,200 lb of dry matter left, so the pasture should have been around 4 inches tall.

Capacitance meter

The fourth method for calculating standing forage is with a capacitance meter (Figure 4), an electronic device that measures dry matter in standing forage as you walk across the field. Take at least 30 to 40 measurements before turning the animals into the field and immediately after the period of grazing. Like the rising plate meter, the capacitance meter provides measurements in pounds of dry matter per acre or kilograms per hectare. This equipment also is available from many New Zealand companies.

Testing protein levels

If you periodically test the protein level of the forage grazed, you can use this value to determine nitrogen content. For example, if Field 1 tests 20 percent protein, a ton of dry matter (2,000 lb) contains 400 lb of protein.

Nitrogen is a significant component of protein, and nitrogen levels can be determined with a simple calculation. If you divide the protein content (in this case, 400 lb) by 6.25, the resulting figure represents the approximate amount of nitrogen removed per dry matter ton, or 64 lb. Therefore, extending our earlier example of 4,800 lb of forage dry matter removed, we can make the following calculation: 2.4 tons x 64 lb nitrogen per ton = 154 lb of nitrogen removed from the 4-acre Field 1, or 38 lb of nitrogen per acre. Table 2 (page 4) shows the relationship between percentage of protein and pounds of nitrogen content in dry matter.

Determining the net N balance

In our example, the grazing cows deposited 120 lb of nitrogen and removed 154 lb in the 4-acre field. Therefore, there was a net loss of 34 lb of nitrogen from the field during this grazing session, an 8.5-lb loss per acre.

Figure 2.—The electronic rising plate meter estimates standing forage dry matter, accounting for pasture height and density.

Figure 3.—By measuring the height of forage, you can estimate the total pounds of dry matter in a pasture.

Figure 4.—A capacitance meter measures dry matter in standing forage as you walk across the field.

Table 2. – Pounds of nitrogen removed as crude protein increases.

Protein	8%	12%	16%	20%	24%	28%
Pounds of N per ton of dry matter	25.6	38.4	51.2	64	76.8	89.6

Table 3.—Example record keeping system (Field 1, 4 acres).

Date	Action	DM removed/ per acre	N removed/ field	N removed/ acre	N applied to field	N applied/ acre	N balance for field	N balance/ acre
6/6	Grazed 100 cows	1,200	-154	-38	120	30.0	-34	-8.5
6/9	Pumped manure	—	—	—	150	37.5	116	29.5

Adding nutrients from the confinement facility

The last component to account for are the nutrients applied from the confinement facility, including parlor waste and all other manure gathered throughout the year. By calibrating your waste-handling equipment and determining the nutrient content of the waste applied, you can successfully account for the application of manure in your field's nutrient balance.

For example, if you pump 25,000 gallons of manure evenly over Field 1 and your manure has 6 lb of nitrogen per 1,000 gallons, you would apply 150 lb of nitrogen to the 4-acre field, or 37.5 lb N/acre. Since the net balance after grazing in Field 1 was -8.5 lb N/acre, you would have restored the nutrient balance to a positive 29.5 lb N/acre.

Conclusions

You can determine the net balance of nitrogen in grazing situations by calculating the quantity applied and subtracting the quantity removed. It is important to realize the numbers you generate are based on estimates; exact values aren't possible when dealing with nitrogen in dairy pastures. Soil sampling in the fall is an excellent way to monitor success of a balanced fertilization program. See EC 628, *Soil Sampling for Home Gardens and Small Acreages.*

Measuring application and removal of nutrients is important in an effective manure fertilization program. Achieving balance using this method will move you toward agronomic application rates and should both increase productivity and protect the environment from over-application of manure nutrients.

For more information

Downing, T. *Calculating Dairy Manure Nutrient Application Rates,* EM 8768 (2000).

Gardner, E. Hugh and J. Hart. *Soil Sampling for Home Gardens and Small Acreages,* EC 628 (1995).

Hart, J., M. Gangwer, M. Graham, and E. Marx. *Dairy Manure as a Fertilizer Source,* EM 8586 (1996).

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Calculating Dairy Manure Nutrient Application Rates

T. Downing

Whether your goal is to manage manure application to balance for nitrogen or for phosphorus, knowing how much nutrient you are applying is a crucial step toward ideal manure management. Determining the relationship between volume of waste and the amount of nutrients applied is essential.

This publication describes how to calibrate waste handling equipment and to calculate nutrient application rates. It covers typical equipment found on dairies and uses nitrogen in the examples. The same techniques can be used with phosphorus.

Generally, it is desirable to apply no more than 100 pounds N per acre at a time. See the publications listed under "For more information" on page 6 to learn how to determine appropriate nutrient application rates for your situation.

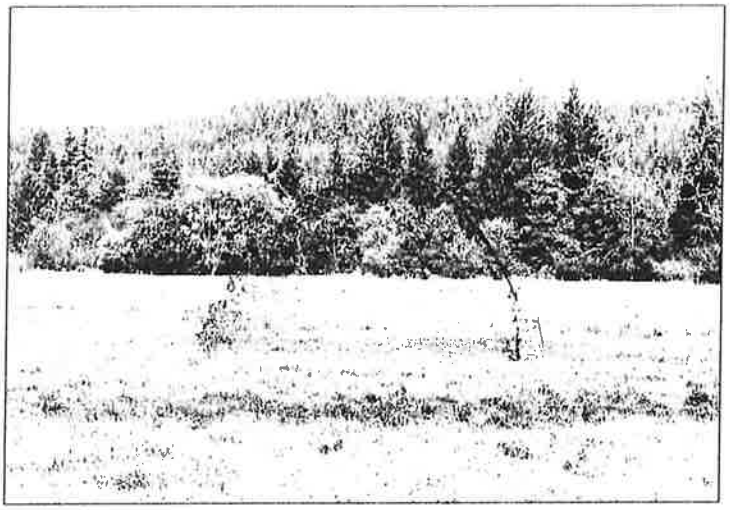

Figure 1. Place several straight sided, flat bottom buckets in the area where the gun is to apply liquid.

Doing the calculations

To calculate nutrient application rates, you need to know three things:

- The concentration of nitrogen in the manure For example, if you apply 100 pounds or 100 gallons of manure, you must know how much nitrogen is in each pound or gallon. Having a sample analyzed by a lab is the best way to determine nutrient concentration, but using book values usually puts you in the ballpark.
- How much manure (pounds or gallons) you have applied
- The area (square feet or acres) that received the application

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Calculating rates with a stationary gun

1. ***Measure the amount of manure applied.*** Place several straight sided, flat bottom buckets in the area where the gun is to apply liquid (Figure 1). Run the gun for a predetermined amount of time (for example, 30 minutes) and then turn off the pump. Pour the contents of all the buckets into one bucket and measure the depth of the liquid. Divide the depth by the number of buckets. The result is the inches of liquid manure applied in 30 minutes. Let's say you applied ½ inch in 30 minutes.

2. ***Measure the area covered.*** To calculate the area of a circle, multiply the radius squared by 3.14. (The radius is half the diameter.) For example, if your big gun covers a circle 180 feet across, the radius is 90 feet. Multiply 90 ft x 90 ft x 3.14 to get the total area in square feet (25,434 square feet). There are 43,560 square feet in an acre, so 25,434 square feet is approximately 0.58 acres:

$$\frac{25{,}434\ \text{ft}^2}{43{,}560\ \text{ft}^2\ \text{per acre}} = 0.58\ \text{acre}$$

3. ***Convert the inches applied to gallons.*** If you had an average of ½ inch of liquid manure in your buckets, you can assume you applied ½ inch over the 25,434 square feet.

   a. **First,** convert the square feet to cubic feet by dividing 25,434 by 24 (½ inch in the bucket is 1/24 of a foot). This is equivalent to 1,059 cubic feet of liquid manure.

$$\frac{25{,}434\ \text{ft}^2}{24} = 1{,}059\ \text{ft}^3$$

   b. **Now,** convert the cubic feet to gallons. There are 7.5 gallons per cubic foot, so multiply 1,059 cubic feet by 7.5. The result is 7,948 gallons pumped in 30 minutes.

4. ***Determine the pumping rate.*** Divide 7,948 gallons by 30 minutes. Your pumping rate is 265 gallons per minute.

5. ***Calculate the total amount of nitrogen applied.*** If the nitrogen concentration of the manure is 10 pounds per 1,000 gallons, and you applied 7,948 gallons, then you applied 79 pounds of nitrogen.

$$\frac{7{,}948\ \text{gal} \times 10\ \text{lb N}}{1{,}000\ \text{gal}} = 79\ \text{lb N}$$

6. ***Calculate the amount of nitrogen applied per acre.*** Since you covered 0.58 acres, you applied the equivalent of 137 pounds of nitrogen per acre.

$$\frac{79\ \text{lb N}}{0.58\ \text{acres}} = 137\ \text{lb per acre}$$

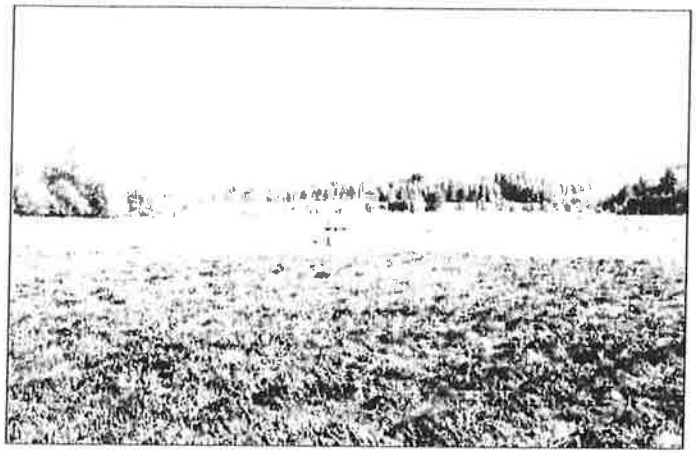

Figure 2. Calibrating a traveler involves the same principles described for the stationary gun, but you adjust for the speed of the traveler.

Calculating rates with a traveling gun

Calibrating a traveler involves the same principles described for the stationary gun, but you adjust for the speed of the traveler (Figure 2).

You need to know the width of application, the number of feet of hose pulled out (the distance covered by a single pass), and the speed at which the gun is moving. Let's say, for example, that your application is 240 feet wide, each pass is 1,000 feet, and the traveler moves at 6 feet per minute.

1. ***Calculate the area covered.*** Multiply the 240 foot width by the 1,000 foot pass to determine that you covered 240,000 square feet. This represents 5.5 acres.

$$\frac{240{,}000\ \text{ft}^2}{43{,}560\ \text{ft}^2\ \text{per acre}} = 5.5\ \text{acres}$$

2. ***Measure the amount of liquid applied.*** During the application, place several buckets throughout the pass area. Combine the liquid waste collected in all the buckets into one bucket and measure the depth of the liquid. Divide this amount by the number of buckets to determine how many inches you applied. For example, let's say your application averaged ⅓ inch.

3. ***Convert the inches applied to gallons.***

   a. **First,** convert the square inches to cubic feet by dividing 240,000 by 36 (⅓ inch in the bucket is 1/36 of a foot). This is equivalent to 6,667 cubic feet of manure.

$$\frac{240{,}000\ \text{ft}^2}{36} = 6{,}667\ \text{ft}^3$$

   b. **Now,** convert the cubic feet to gallons. There are 7.5 gallons in a cubic foot, so multiply 6,667 cubic feet by 7.5. The result is 50,002 gallons.

4. ***Calculate the total amount of nitrogen applied.*** If the manure contains 8 pounds of nitrogen (N) per 1,000 gallons, and you applied 50,002 gallons, then you applied 400 pounds N.

$$\frac{50{,}002\ \text{gal} \times 8\ \text{lb N}}{1{,}000\ \text{gal}} = 400\ \text{lb N}$$

5. ***Calculate the amount of N applied per acre.*** Four hundred pounds of N applied over 5.5 acres equals around 73 pounds per acre.

$$\frac{400\ \text{lb N}}{5.5\ \text{acres}} = 73\ \text{lb N per acre}$$

6. ***Calculate application rates at various speeds.*** From these calculations, you can generate a table that easily demonstrates the amount of nitrogen applied at various speeds (see Table 1 for an example). In the example above, the speed was 6 feet per minute. At 3 feet per minute, the application rate would be twice that at 6 feet, or 146 pounds N per acre.

7. ***Estimate the pump rate per minute.*** At 6 feet per minute, it takes 166 minutes to complete a 1,000 foot pass.

$$\frac{1{,}000\ \text{ft}}{6\ \text{ft per minute}} = 166\ \text{minutes}$$

Divide the total gallons pumped by the total minutes pumped. For this example, 50,002 gallons divided by 166 minutes equals 301 gallons per minute.

Table 1.—Example calibration chart.

Traveler speed (feet/minute)	Inches applied	N applied per acre (lb) (if 8 lb N/ 1,000 gal)	Total N applied (lb)		
			500 ft hose pulled	1,000 ft hose pulled	1,500 ft hose pulled
2.0	1	219	600	1,200	1,800
4.0	0.5 inches	109	300	600	900
6.0	**0.33 inches**	**73**	200	**400**	600
8.0	0.25 inches	55	150	300	450
10.0	0.20 inches	44	120	240	360

Fill in your own farm's numbers here.

Traveler speed (feet/minute)	Inches applied	N applied per acre (lb) (if 8 lb N/ 1,000 gal)	Total N applied (lb)		
			500 ft hose pulled	1,000 ft hose pulled	1,500 ft hose pulled
2.0					
4.0					
6.0					
8.0					
10.0					

Calculating rates with a liquid wagon

The following are two ways to calibrate liquid wagons to determine nutrient appli cation rates.

The most common method

Determine the total volume of liquid applied to a field, and then calculate the nutrients applied. For example:

1. ***Measure the amount of liquid applied.*** If you hauled 30 loads of liquid with a wagon that holds 3,000 gallons, you hauled 90,000 gallons of liquid.

30 loads x 3,000 gal = 90,000 gal

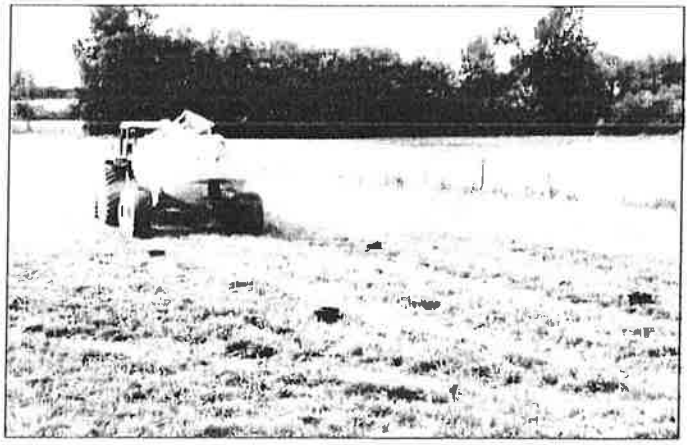

Figure 3. Place several trays, pans, or short buckets in the field to catch liquid applied with one pass.

It is important to realize that although most liquid wagons are rated for a specific volume, the actual working volume is less. For example, a 3,000 gallon wagon might deliver only 2,700 gallons to the field.

2. ***Calculate the per-acre manure application rate.*** If the manure is applied to a 10 acre field, this is equivalent to 9,000 gallons per acre.

$$\frac{\textbf{90,000 gal}}{\textbf{10 acres}} = \textbf{9,000 gal per acre}$$

3. ***Calculate the per-acre N application rate.*** If the manure has a nitrogen con centration of 10 pounds N per 1,000 gal lons, you applied 90 pounds of N per acre.

$$\frac{\textbf{9,000 gal x 10 lb N}}{\textbf{1,000 gal}} = \textbf{90 lb N}$$

A second method

This method measures the volume of liquid applied to a small area and uses that quantity to calculate the volume applied over the entire field. It assumes that the application rate is constant. For example:

1. ***Measure the amount of liquid applied.*** Place several trays, pans, or short buckets in the field to catch liquid applied with one pass (Figure 3). Pour the contents of all the pans into one pan and measure the depth of the liquid.

Divide this number by the number of pans. The result is the inches of liquid manure applied. Let's assume you applied ½ inch.

2. ***Convert the inches applied to gallons applied per acre.***

   a. **First,** convert the inches to cubic feet per acre by dividing 43,560 (the number of square feet in an acre) by 24 (½ inch in the bucket is 1/24 of a foot). This is equivalent to 1,815 cubic feet of liquid manure per acre.

$$\frac{43{,}560\ \text{ft}^2}{24} = 1{,}815\ \text{ft}^3\ \text{per acre}$$

   b. **Now,** convert the cubic feet per acre to gallons per acre. There are 7.5 gallons per cubic foot, so multiply 1,815 cubic feet by 7.5. The result is 13,612 gallons per acre.

3. ***Calculate the nitrogen application rate.*** If the concentration of nitrogen is 10 pounds per 1,000 gallons, the rate of N applied is 136 pounds per acre.

$$\frac{13{,}612\ \text{gal/a} \times 10\ \text{lb N}}{1{,}000\ \text{gal}} = 136\ \text{lb N/a}$$

Calculating rates with a solids spreader

The following are two ways to calibrate solids spreaders.

The most common method

Calculate the nutrient (e.g., nitrogen) content of each spreader load and multiply that number by loads per acre or per field.

1. ***Calculate the capacity (in cubic feet) of your spreader.*** If your spreader is 16 feet long, 5 feet wide, and 5 feet deep, it holds 400 cubic feet per load.

$$16\ \text{ft} \times 5\ \text{ft} \times 5\ \text{ft} = 400\ \text{ft}^3$$

2. ***Calculate the nitrogen application rate.*** If your solid manure has a concentration of 10 pounds N per 100 cubic feet, you are applying 40 pounds of N per load of solids.

$$\frac{400\ \text{ft}^3 \times 10\ \text{lb N}}{100\ \text{ft}^3} = 40\ \text{lb N}$$

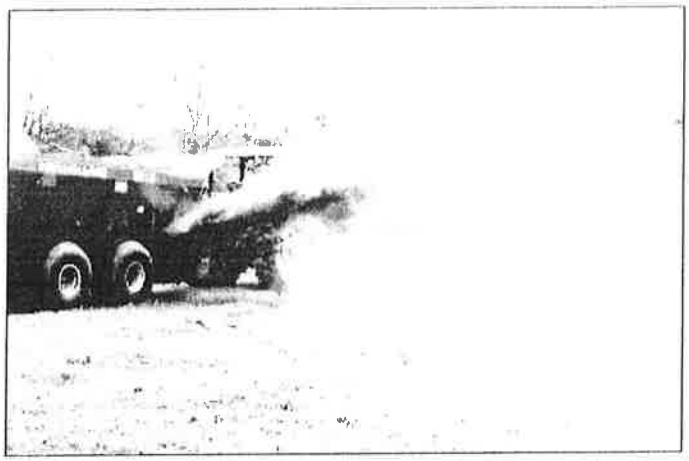

Figure 4. Place a tarp or piece of plastic in the field and apply solids over the area.

3. ***Calculate the amount of N applied to the field.*** Record the number of loads hauled on each field. Multiply the number of loads by the amount of N per load. For example, if you hauled 25 loads of solids, multiply 25 loads by 40 pounds N per load, for a total application of 1,000 pounds N.

4. ***Calculate the number of pounds of N applied per acre.*** Divide the total amount of N applied by the number of acres, in this example 10 acres.

$$\frac{1{,}000\ \text{lb total N}}{10\ \text{acres}} = 100\ \text{lb N per acre}$$

A second method

This method measures the pounds of solids applied to a small area and uses that quantity to calculate the volume applied over the entire field. It assumes that the application rate is constant. For example:

1. ***Measure the amount of solids applied.*** Place a tarp or piece of plastic in the field and apply solids over the area (Figure 4). A 10' x 10' tarp measures 100 square feet, which represents 1/435 of an acre.

$$\frac{100\ \text{ft}^2}{43{,}560\ \text{ft}^2\ \text{per acre}} = 1/435\ \text{acre}$$

After spreading across the sample area, fold the tarp and weigh the solids collected on it. Let's assume the solids on the tarp weigh 110 pounds.

2. ***Convert the pounds to wet tons per acre.***

   a. **First,** convert the pounds collected to pounds per acre by multiplying 110 by 435. This is equivalent to 47,850 lb per acre.

   110 lb x 435 = 47,850 lb per acre

   b. **Now,** convert the pounds per acre to wet tons per acre by dividing 47,850 by 2,000 (the number of pounds per ton). The result is 23.9 wet tons per acre.

   $$\frac{\text{47,850 lb/acre}}{\text{2,000}} = \text{23.9 wet tons/acre}$$

3. ***Calculate the nitrogen application rate.*** If the concentration of nitrogen is 5 pounds per wet ton, the rate of N applied is 119 pounds N per acre.

   23.9 wet tons/acre x 5 lb N/wet ton = 119 lb N/acre

Manure sampling and testing

Testing manure for nutrient content is relatively easy. However, it can be a major problem to get one sample that represents the nutrient concentration of the manure. Nutrient content can vary considerably within a load, and agitation usually is inadequate to achieve thorough mixing. Analyzing the samples taken during the calibration process is the most desirable method, especially when testing for nitrogen, because these values should represent what actually reaches the soil. This method accounts for nutrient losses that occur during storage and application.

Take samples from a liquid tank or lagoon only after agitation.

Book values are a reasonable approach if testing is not feasible, but actual values vary from operation to operation depending on water added, feed composition (both quality and quantity), age and stage of lactation of the cattle, and the manure storage system.

For more information

Hart, J., *A List of Analytical Laboratories Serving Oregon,* EM 8677 (Oregon State University, Corvallis, revised 2000). No charge.

Hart, J., M. Gangwer, M. Graham, and E. Marx, *Dairy Manure as a Fertilizer Source,* EM 8586 (Oregon State University, Corvallis, published 1995, reprinted 1997). 75¢

Hart, J., E.S. Marx, and M. Gangwer, *Manure Application Rates for Forage Production,* EM 8585 (Oregon State University, Corvallis, published 1996, reprinted 1997). $1.50

To order copies of the above publications, send the complete title and series number, along with a check or money order for the amount listed, to:

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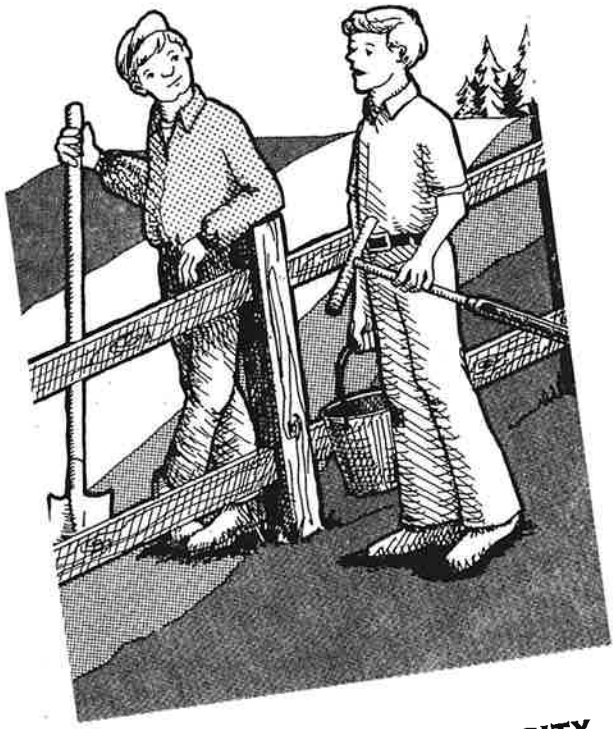
Soil Sampling

for Home Gardens and Small Acreages



OREGON STATE UNIVERSITY
EXTENSION SERVICE

Take the soil sample to the correct depth

- Sample the part of the soil where the plant roots will grow. For most annual and perennial crops, sample from the surface down to about 6 to 9 inches.

Carefully mix the soil sample

Place all of the soil subsamples from a single sampling area in a clean container and mix thoroughly.

Forwarding the soil sample

- A list of laboratories that perform soil tests is available on the Web (http://eesc.oregonstate.edu) or from your county office of the OSU Extension Service.
- Call one or more labs to determine the cost of the soil test you need.
- After choosing a lab, request any necessary paperwork (such as an information sheet), find out how you should prepare and submit the sample, and obtain the address where you should send the sample.
- Prepare and submit the sample according to the instructions. Plastic zipper bags work best; do not use a paper bag. Most laboratories ask you to label the sample bag with identifying information and to fill out and include an information sheet with the sample. Don't forget to include payment.
- Number each sample and keep a record of the fields and areas sampled.

General Description

The Looslea Holstein Dairy is located upon 118.5 acres in Scappoose Oregon. Of the 118.5 acres, 94 are farmable and in available for manure distribution. The dairy consists of 100 milk cows, 50 dry, 100 heifers and 50 calves. The cropping system is based upon 60 acres of orchard grass mixed with some clover, which is chopped and used for grass silage. The other 34 acres are used solely for pasture use. Owner Netty Loos and her son Tony have made the necessary changes for their operation to be considered organic. Their hope is to ship to Horizon Products, Reno, NV. According to the organic milk producer guidelines, their cows are required to be on pasture for a specific amount of time. According to Mrs. Loos, the operation has put in permanent fencing and an alleyway, and has incorporated an intensive grazing program for the paddock style grazing system. Besides producing their feed from the silage, the rest of the organic feed is imported from in and outside of Oregon. The facility was originally constructed for a larger milking herd, but currently the owners only intend to milk ~100 cows and there is ample room for cattle movement and bedding space. Manures are captured in a below ground tank, separated and pumped into a lagoon which is just northwest of the facilities. The owners have been accepted for a cost share program with the local soil and water district for improvements on the facility dealing with the new lagoon construction. From the lagoon, the liquid manures are pumped onto the fields using two Bauer big gun travelers, and the solids are dry stacked in a covered manure pole building. Once the manures are composted, they are used for bedding material and then distributed onto the property via the use of a New Holland solid spreader wagon.

completed in 2002

None of the fields are tiled and the property is located on a floodplain, (see "Flood Boundary Map Sensitive Manure Application Area" for location) and care must be taken when to apply manures considering time of year, and precipitation amounts for any given year.

Manure Storage & Application

The facility is designed so that all manures solid and liquid and runoff enter an underground circular tank equaling 32,555 cu.ft. From the underground storage tank the manures are pumped over a Hycor screw type solids separator. The separated solids are stored on a 50'x 25' concrete slab and then housed in a covered pole building. The actual stacking size and height of the solid storage is 47'x 36'x 6' or 10,152 cu.ft. ORAWM v.2.4 recommends that the existing solid storage is more
storage. The liquid portion will be stored in a lagoon me
AF of storage. ORAWM v.2.4 estimates the lagoons day
the liquid is pumped via underground mainline and distri
traveling big guns. Both are 4" hard hose travelers. Sepa
~94 acres of grass pasture with a traveling big gun or sma
will avoid having the liquids leave the land on which they
after being composted and used for bedding will be sprea
a New Holland model #308 which has ~267 cu.ft. storage
All contaminated water from the barns and yard area will
collection tank. All barns are guttered to divert clean wat
facilities. The operator will contain all wastewater withir

Documents from AWMP that are no longer included in approved plan because these documents are incorrect.

flushes with fresh water & plan to collect roof water

clean water out of the system. Manure will be applied to the acreage to meet the expected nutrient uptake of the cropping system. Application of manure will be done at appropriate times of the year as to utilize nutrients for maximal forage production. Although winter spreading is not anticipated, emergency applications will be made on the most elevated grounds on the property and to be not in close proximity to the awareness zones.

Emergency Action Plan

In an emergency event that would require the dairy to apply stored manures outside of its normal application strategy this farm has 2 target areas to apply these manures. Field #2 and 5. Field #2 has some elevated areas that can be used and also in field #5 the owner states that #5 is adequate for emergency application.
After situation is under control or when time allows, contact the Oregon Department of Agriculture CAFO inspector and inform of situation. Your inspector can be contacted at 503-986-4700.

Soil Sampling

Soil samples will be encouraged every 5 years after crops have been taken off to monitor the application of nutrients. If high levels of any or all nutrients are present, the application plan will be adjusted accordingly.

Monitoring and Performance Standards

Looslea Holstein Dairy will follow these recommended practices to monitor the performance of the manure application to the cropland and pasture:

- Test manure in spring, summer, and fall (i.e., just before regular manure spreading period) until results consistently show manure nutrients at each period once every 5 years.
- Calibrate manure application equipment such as the manure spreader at least once every 5 years.
- Test soil phosphorus in manured fields at least once every five years. Over 100 ppm phosphorus as is excessive and the Looslea Holstein Dairy should reduce manure applications, increase crop yields, change crops, or make other adjustments.

The landowner acknowledges:

A. Owner has received a copy of this Manure Management Plan and that she has an understanding of the contents and requirements.
B. Maintenance of the structures is necessary for proper performance of the practices.

Netty Loos Date

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 1 Date: February 28, 2006

Soil Map Unit(s): Rafton Soil Test P: 10 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Grazing, Big Gun

Planner: Jim Hendrickson Notes: Sample #1

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	2	2
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	0	0
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.5	3.5

Tract **465** Fields # 1

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P) (10 - 40) x .10 = -3 Assign 0 points if Soil Test P < 40 ppm					0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 119 x 0.02 = 2.38 (lbs/ac P_2O_5)					2.38	2.38
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.5	3.5
Source Factors Subtotal (SFS)	10.38	10.38
Total Rating Value (TFS + SFS)	**13.88**	**13.88**
Site Vulnerability Class	**Med**	**Med**

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 2 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 18 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Grazing, Big Gun

Planner: Jim Hendrickson Notes: Sample #2

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.25	3.25 ~~3.2.5~~

Tract **465** Fields # 2

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)		(18 - 40) x .10 = 0 Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02		_____ (lbs/ac P_2O_5) x 0.02 = _____			0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 (lbs/ac P_2O_5)		120 x 0.02 = 2.4			2.4	2.4
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	10.4	10.4
Total Rating Value (TFS + SFS)	**13.65**	**13.65**
Site Vulnerability Class	**Med**	**Med**

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 3 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 39 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Pasture Nutrient Application Method(s) Grazing

Planner: Jim Hendrickson Notes: Sample #3

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	0	0
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	3	3
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	4.75	4.75

Tract **465** Fields # 3

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)	(39 - 40) x .10 = .1	Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02	_____ (lbs/ac P_2O_5) x 0.02 = _____				0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02	171 (lbs/ac P_2O_5) x 0.02 = 3.42				3.42	3.42
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	4.75	4.75
Source Factors Subtotal (SFS)	11.42	11.42
Total Rating Value (TFS + SFS)	**16.17**	**16.17**
Site Vulnerability Class	**Med**	**Med**

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 4 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 33 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Pasture Nutrient Application Method(s) Grazing

Planner: Jim Hendrickson Notes: Sample #4

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	.0	0
						Transport Factors Subtotal (TFS)	3.25	3.25

Tract **465** Fields # 4

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P) (33 - 40) x .10 = -.7 Assign 0 points if Soil Test P < 40 ppm					0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 (lbs/ac P_2O_5) 164 x 0.02 = .3.28					3.28	3.28
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	11.28	11.28
Total Rating Value (TFS + SFS)	**14.53**	**14.53**
Site Vulnerability Class	**Med**	**Med**

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Loos County: Columbia Tract No. 465 Field No(s). 5 Date: February 28, 2006

Soil Map Unit(s): Sauvie Soil Test P: 21 ppm Lab. Method: Weak Bray Sample Depth: 1'

Crop Rotation: Hay/Grass Silage Nutrient Application Method(s) Solids, Big Gun

Planner: Jim Hendrickson Notes: Sample #5

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	0	0
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	.75	.75
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	1	1
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	.75	.75
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	.75	.75
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	0
						Transport Factors Subtotal (TFS)	3.25	3.25

Tract **465** Fields # 5

SOURCE FACTORS	Fact Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	(4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) / 10 (Soil Test P)		(21 - 40) x .10 = 0 Assign 0 points if Soil Test P < 40 ppm			0	0
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02		_____ (lbs/ac P_2O_5) x 0.02 = _____			0	0
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	0
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 (lbs/ac P_2O_5)		11 x 0.02 = 4.5			4.5	4.5
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	8	8

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	3.25	3.25
Source Factors Subtotal (SFS)	12.5	12.5
Total Rating Value (TFS + SFS)	**15.75**	**15.75**
Site Vulnerability Class	**Med**	**Med**

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

9/2006
STATE: OREGON

CLIENT: Looslea Holsteins
ASSISTED BY: Hendrickson CHECKED BY:

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)				Days Confined	Days Grazed
				N	P	K	N	P	K			
MILKER	100	1,400	140.0	0.57	0.09	0.32	80.46	13.11	44.39	1.57	163	202
MILKER (DRY)	50	1,400	70.0	0.36	0.05	0.23	25.20	3.50	16.10	1.10	136	230
HEIFERS (12-24 Months)	100	800	80.0	0.31	0.04	0.24	24.80	3.20	19.20	1.30	136	230
CALVES (1-12 Months)	50	250	12.5	0.31	0.04	0.24	3.88	0.50	3.00	1.30	365	0
Totals/Averages-	300	963	302.5	0.44	0.07	0.27	134.3	20.3	82.7	1.4		

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	88%	0%	0%	0%	0%	44%	88%	88%	88%	88%	88%	88%	
	100	100	100	100	100	100	100	100	100	100	100	100	924
MILKER (DRY)	100%	0%	0%	0%	0%	50%	100%	100%	100%	100%	100%	100%	
	50	50	50	50	50	50	50	50	50	50	50	50	525
HEIFERS (12-24 Months)	100%	0%	0%	0%	0%	50%	100%	100%	100%	100%	100%	100%	
	100	100	100	100	100	100	100	100	100	100	100	100	600
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	50	50	50	50	50	50	50	50	50	50	50	50	0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	99						102	102	102	101	101	101	708
Total AUM's Needed>>>	273	0	0	0	0	137	273	273	273	273	273	273	2,049
Total AUM's>>>>>>>>>>	-174	0	0	0	0	-137	-171	-171	-171	-172	-172	-172	-1,341

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Natural [illegible]urces Conservation Service

ANIMAL WASTE MAN[illegible]EMENT WORKSHEET
Versi[illegible] 2.4

[illegible]9/2006
STATE[illegible]EGON

CLIENT: Looslea Holsteins
ASSISTED BY: Hendrickson CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION

ST HELENS R F D

Month	25Yr-24Hr	3.50	Lot Runoff Factors as a Percent of Monthly Precipitation	
	Monthly Average in Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	2.48	1.71	100%	14%
November	6.09	0.90	100%	19%
December	7.84	0.73	100%	16%
January	4.80	0.58	100%	18%
February	5.12	0.93	100%	18%
March	4.77	1.51	100%	12%
April	3.10	2.29	100%	11%
May	2.85	3.87	100%	10%
June	1.97	4.08	100%	10%
July	0.90	4.70	100%	0%
August	1.48	4.23	100%	10%
September	2.09	3.05	100%	14%
Annual	43.49	28.58		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >> Is paved lot scraped daily? (Y/N) YES	4,290
Unpaved Lot Area >>>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	11,250
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	4,290

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	100.0	0	0.00	0	0.0
Equipment Wash		2	175.00	350	46.8
Flushwater		0	0.00	0	0.0
Miscellaneous		2	20.00	40	5.3
Total>>				390	52.1

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P_2O_5	Potassium K_2O
1	21.0	Orchard Grass Hay/Pasture	DHM	Ton	8.00	426	158	179
2	17.0	Orchard Grass Hay/Pasture	DHM	Ton	8.00	426	158	179
3	14.0	Hay/Pasture Mix 14% Protein	DHM	Ton	6.00	269	74	205
4	20.0	Hay/Pasture Mix 14% Protein	DHM	Ton	6.00	269	74	205
5	22.0	Orchard Grass Hay/Pasture	DHM	Ton	8.00	426	158	179
Off-Farm								

ANIMAL WASTE MAN EMENT WORKSHEET
Version 2.4

CLIENT: Looslea Holsteins
ASSISTED BY: Hendrickson CHECKED BY:

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	Free Stall	Sawdust	12.00	3.10	0.26	36	434
MILKER (DRY)	Free Stall	Sawdust	12.00	3.10	0.26	18	217
HEIFERS (12-24 Months)	Loose Housing	Sawdust	12.00	12.40	1.03	83	992
CALVES (1-12 Months)	Confined	Loose Straw	2.50	2.60	1.04	13	33

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	Press Type (Screw or Roller)	40%	25	38	209	11	87	36	917
MILKER (DRY)	Press Type (Screw or Roller)	40%	11	16	73	4	19	36	389
HEIFERS (12-24 Months)	Press Type (Screw or Roller)	40%	38	56	100	4	21	36	1,351
CALVES (1-12 Months)	Dry Scrape System	75%	22	7	4	12	1	36	790
Total Solids>>			96	118	386	31	129		3,446

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ANIMAL WASTE MAN[illegible]EMENT WORKSHEET

Versi[illegible] 2.4

[illegible]9/2006
STAT[illegible]REGON

CLIENT: Looslea Holsteins
ASSISTED BY: Hendrickson

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

	Runoff in Cubic Feet					Manure									
	Roof Area Square Feet 0	Paved Slab Area Square Feet 4,290	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 11,250	Facility Water Use	Solids	Liquids	Bedding		Solids Separated		Solids in Liquids		Total Solids	Total Liquids
Month					Cubic Feet	Cubic Feet	Cubic Feet	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
October	0	887	0	326	1,616	156	1,166	538	2,622	775	27,894	369	13,278	775	3,776
November	0	2,177	0	1,085	1,564	1,480	11,042	4,498	50,265	2,872	103,395	3,540	127,451	2,872	19,253
December	0	2,803	0	1,176	1,616	1,529	11,411	4,647	51,941	2,968	106,841	3,658	131,699	2,968	20,049
January	0	1,716	0	810	1,616	1,529	11,411	4,647	51,941	2,968	106,841	3,658	131,699	2,968	18,962
February	0	1,830	0	864	1,460	1,381	10,306	4,198	46,914	2,681	96,502	3,304	118,954	2,681	18,566
March	0	1,705	0	537	1,616	843	6,288	2,592	27,281	1,871	67,367	2,014	72,488	1,871	11,773
April	0	1,108	0	320	1,564	151	1,129	520	2,537	750	26,994	357	12,850	750	3,933
May	0	1,019	0	267	1,616	156	1,166	538	2,622	775	27,894	369	13,278	775	3,908
June	0	704	0	185	1,564	151	1,129	520	2,537	750	26,994	357	12,850	750	3,529
July	0	322	0	0	1,616	156	1,166	538	2,622	775	27,894	369	13,278	775	3,211
August	0	529	0	139	1,616	156	1,166	538	2,622	775	27,894	369	13,278	775	3,418
September	0	747	0	274	1,564	151	1,129	520	2,537	750	26,994	357	12,850	750	3,572
Annual	0	15,548	0	5,982	19,031	7,839	58,511	24,293	246,441	18,708	673,502	18,721	673,952	18,708	113,951

DAILY NUTRIENT PRODUCTION

	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING		
Type of Animal	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
MILKER	48.27	18.02	32.10	32.18	12.01	21.40	80.46	30.03	53.50
MILKER (DRY)	15.12	4.81	11.64	10.08	3.21	7.76	25.20	8.02	19.40
HEIFERS (12-24 Months)	14.88	4.40	13.88	9.92	2.93	9.25	24.80	7.33	23.14
CALVES (1-12 Months)	0.97	0.29	0.90	2.91	0.86	2.71	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			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	N	P_2O_5	K_2O
October	210	76	147	210	71	164	3,745	1,295	2,778	0	0	0	4,164	1,442	3,089
November	2,377	825	1,756	1,653	570	1,234	0	0	0	0	0	0	4,030	1,396	2,989
December	2,457	853	1,814	1,708	589	1,275	0	0	0	0	0	0	4,164	1,442	3,089
January	2,457	853	1,814	1,708	589	1,275	0	0	0	0	0	0	4,164	1,442	3,089
February	2,219	770	1,639	1,543	532	1,151	0	0	0	0	0	0	3,761	1,303	2,790
March	1,333	464	981	959	330	719	1,872	648	1,389	0	0	0	4,164	1,442	3,089
April	203	73	143	203	69	158	3,624	1,253	2,688	0	0	0	4,030	1,396	2,989
May	210	76	147	210	71	164	3,745	1,295	2,778	0	0	0	4,164	1,442	3,089
June	203	73	143	203	69	158	3,624	1,253	2,688	0	0	0	4,030	1,396	2,989
July	210	76	147	210	71	164	3,745	1,295	2,778	0	0	0	4,164	1,442	3,089
August	210	76	147	210	71	164	3,745	1,295	2,778	0	0	0	4,164	1,442	3,089
September	203	73	143	203	69	158	3,624	1,253	2,688	0	0	0	4,030	1,396	2,989
Annual	**12,289**	**4,290**	**9,021**	**9,018**	**3,104**	**6,784**	**27,724**	**9,588**	**20,566**	**0**	**0**	**0**	**49,032**	**16,982**	**36,371**

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**
CHECKED BY:

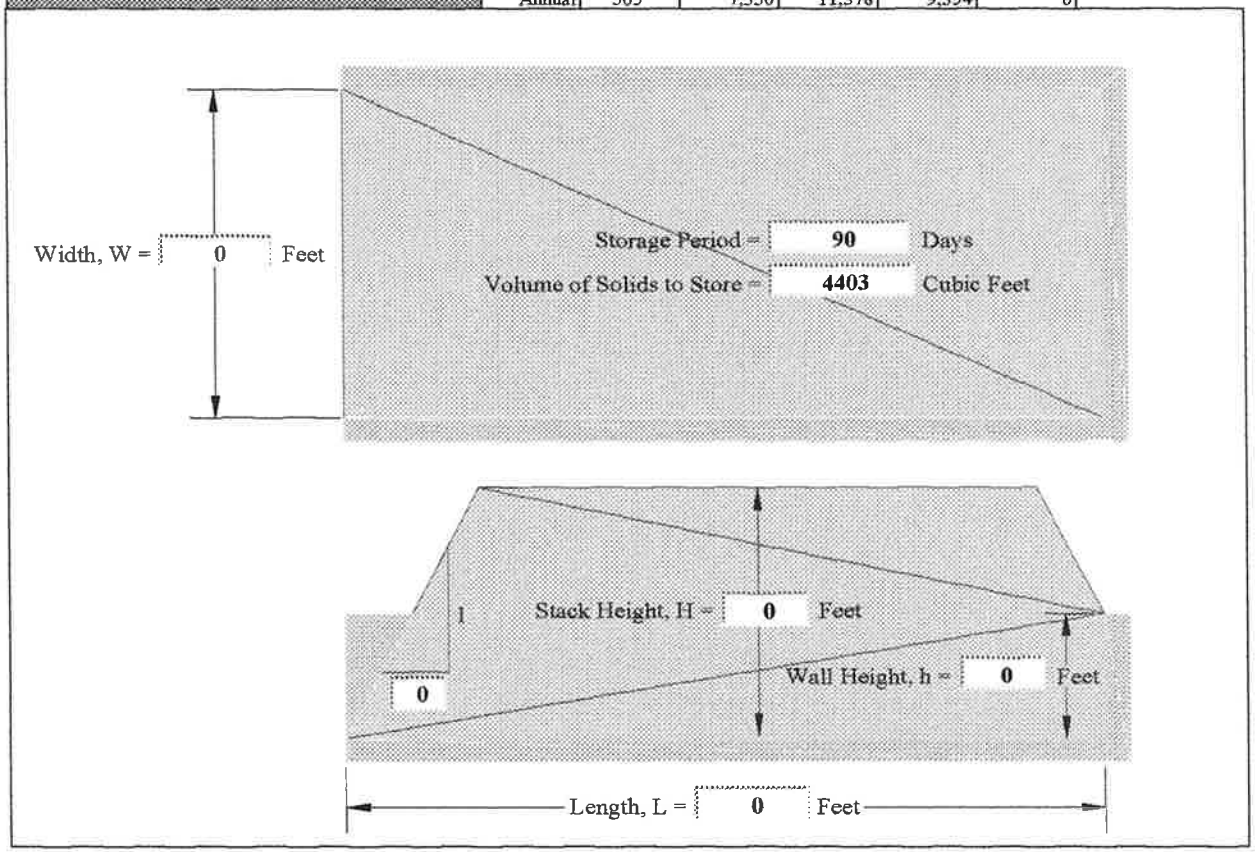
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	90
Stacking Width, W in Feet=	0
Stacking Height, H in Feet=	0.00
Wall Height, h in Feet=	0.00
Stack Side Slope (X:1)=	0.00
Existing Storage, Cubic Feet=	10,152
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	4,403
Design Volume, Cubic Feet=	0
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	419	356	387	0
November	30	937	1,936	1,436	0
December	31	968	2,000	1,484	0
January	31	968	2,000	1,484	0
February	28	874	1,806	1,340	0
March	31	693	1,178	936	0
April	30	405	345	375	0
May	31	419	356	387	0
June	30	405	345	375	0
July	31	419	356	387	0
August	31	419	356	387	0
September	30	405	345	375	0
Annual	365	7,330	11,378	9,354	0



CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson** CHECKED BY:

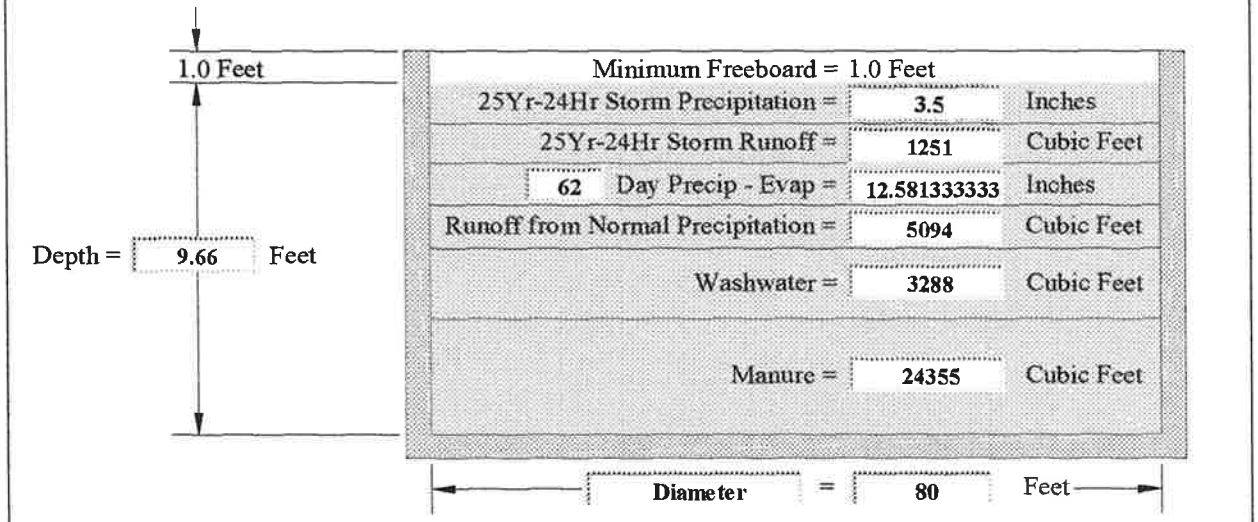
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	62
Tank Diameter, Feet=	80
Existing Storage, Cubic Feet=	0.00
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	1,251
Volume Needed, Cubic Feet=	48,549
Design Volume, Cubic Feet=	48,531
Is Tank Covered?	NO
Tank Dimensions?	Circular

MONTHLY INFLOWS INTO TANK

Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Manure CF
October	31	322	0	887	1,616	904
November	30	2,173	0	2,177	1,564	11,585
December	31	2,977	0	2,803	1,616	11,972
January	31	1,767	0	1,716	1,616	11,972
February	28	1,754	0	1,830	1,460	10,813
March	31	1,365	0	1,705	1,616	6,438
April	30	339	0	1,108	1,564	875
May	31	-427	0	1,019	1,616	904
June	30	-883	0	704	1,564	875
July	31	-1,591	0	322	1,616	904
August	31	-1,151	0	529	1,616	904
September	30	-402	0	747	1,564	875
Annual	365	6,242	0	15,548	19,031	59,020



CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**

CHECKED BY:

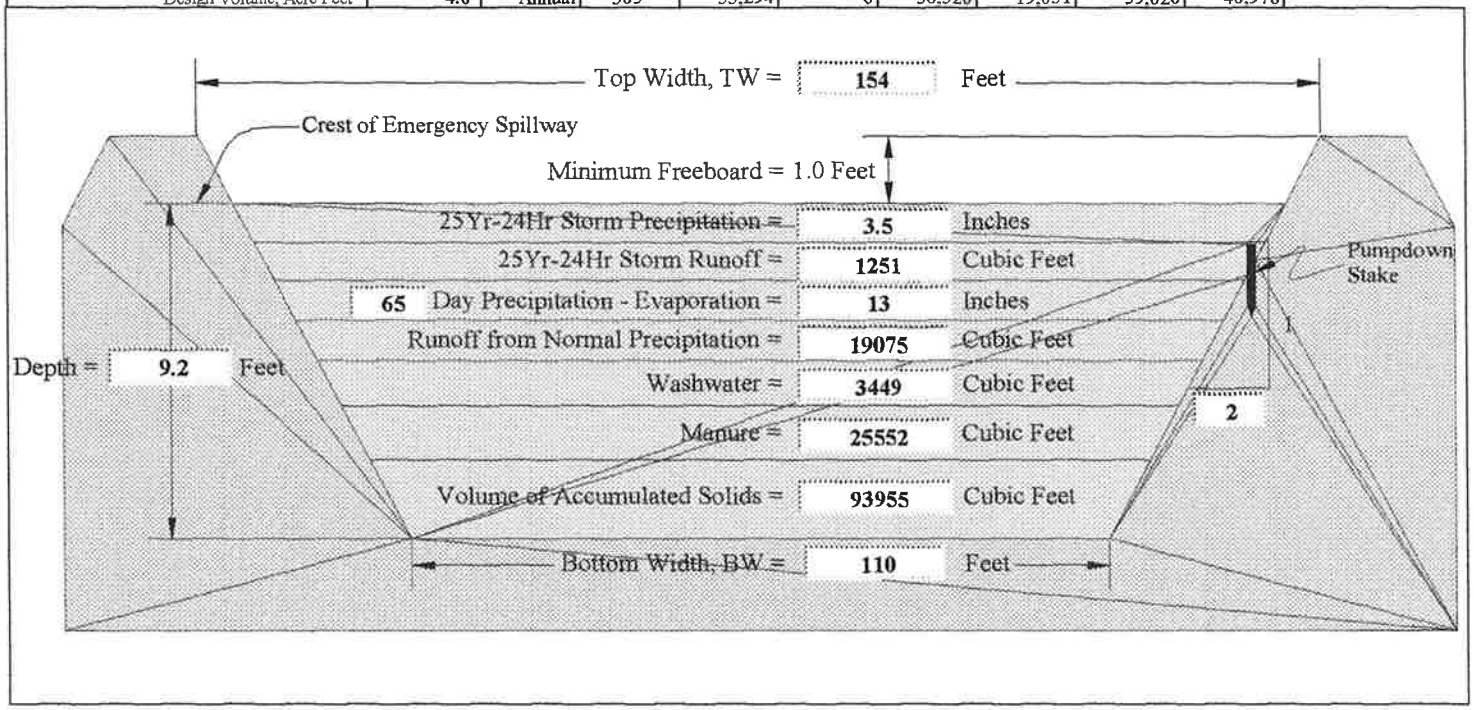
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

WASTE STORAGE POND

Pond Parameters	Value
Storage Period, Days=	65
Side Slope (X:1)=	2.00
Bottom Width, BW, Feet=	110
Bottom Length, BL, Feet=	130
Accumulated Solids Duration, Years=	2
Existing Storage, Acre Feet=	0.00
Surface Area of Existing Storage, SF=	0
Minimum Soil Liner Depth, Feet=	1.00
25 Year-24 Hour Storm Runoff, CF=	1,251
Top Width, TW, Feet=	154
Top Length, TL, Feet=	174
Volume Needed, Acre Feet=	4.0
Design Volume, Acre Feet=	4.0

MONTHLY INFLOWS INTO WASTE STORAGE POND

Month	Number of Days	Rain-Evap on Pond CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Manure CF	Accum Solids CF
October	31	1,719	0	3,212	1,616	904	3,990
November	30	11,589	0	7,887	1,564	11,585	3,861
December	31	15,877	0	10,153	1,616	11,972	3,990
January	31	9,423	0	6,216	1,616	11,972	3,990
February	28	9,356	0	6,630	1,460	10,813	3,604
March	31	7,280	0	6,177	1,616	6,438	3,990
April	30	1,809	0	4,015	1,564	875	3,861
May	31	-2,278	0	3,691	1,616	904	3,990
June	30	-4,712	0	2,551	1,564	875	3,861
July	31	-8,485	0	1,166	1,616	904	3,990
August	31	-6,141	0	1,917	1,616	904	3,990
September	30	-2,144	0	2,707	1,564	875	3,861
Annual	365	33,294	0	56,320	19,031	59,020	46,978



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ANIMAL WASTE MAN[ ]MENT WORKSHEET

Versi[ ]2.4

[ ]19/2006
STA[ ]REGON

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**
CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply **18,708** cubic feet of solids generated from the operation it will take approximately **70** 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 Bushels	Tractor Spreader Capacity CF	Spread Width Feet	NITROGEN, N Concentration in Storage Facility PPM	NITROGEN, N Concentration in Storage Facility Lbs/100CF	Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
1	21	Orchard Grass Hay/Pasture	**215**	**268**	**15**	**5,794**	**36.15**	**426**	1.00	0.6	383	8
2	17	Orchard Grass Hay/Pasture	**215**	**268**	**15**	**5,794**	**36.15**	**426**	1.00	0.6	383	8
3	14	Hay/Pasture Mix 14% Protein	**215**	**268**	**15**	**5,794**	**36.15**	**269**	1.00	0.4	607	5
4	20	Hay/Pasture Mix 14% Protein	**215**	**268**	**15**	**5,794**	**36.15**	**269**	1.00	0.4	607	5
5	22	Orchard Grass Hay/Pasture	**215**	**268**	**15**	**5,794**	**36.15**	**426**	1.00	0.6	383	8
0												
0												
0												
0												

MANAGEMENT CRITERIA FOR BIG GUN SPRINKLER APPLICATION OF LIQUIDS

To apply **852,354** gallons of liquids generated from the operation it will take approximately **47** 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 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	Application Rate in Inches/Hour	Set Time Needed in Hours	Travel Rate Needed in Feet/Minute
1	21	Orchard Grass Hay/Pasture	**300**	**250**	1/2 Circle	**324**	**2.70**	**426**	1.00	9.32	1.45	15.80	0.21
2	17	Orchard Grass Hay/Pasture	**300**	**250**	1/2 Circle	**324**	**2.70**	**426**	1.00	9.32	1.45	15.80	0.21
3	14	Hay/Pasture Mix 14% Protein	**300**	**250**	1/2 Circle	**324**	**2.70**	**269**	1.00	5.88	1.45	9.98	0.33
4	20	Hay/Pasture Mix 14% Protein	**300**	**250**	1/2 Circle	**324**	**2.70**	**269**	1.00	5.88	1.45	9.98	0.33
5	22	Orchard Grass Hay/Pasture	**300**	**250**	1/2 Circle	**324**	**2.70**	**426**	1.00	9.32	1.45	15.80	0.21
0													
0													
0													
0													

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TANK WAGON APPLICATION OF LIQUIDS

To apply **852,354** gallons of liquids generated from the operation it will take approximately **213** 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		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
					PPM	Lbs/1000Gal					
1	21	Orchard Grass Hay/Pasture	**4,000**	**15**	**682**	**5.70**	**426**	1.00	1.71	250	11.6
2	17	Orchard Grass Hay/Pasture	**4,000**	**15**	**682**	**5.70**	**426**	1.00	1.71	250	11.6
3	14	Hay/Pasture Mix 14% Protein	**4,000**	**15**	**682**	**5.70**	**269**	1.00	1.08	395	7.3
4	20	Hay/Pasture Mix 14% Protein	**4,000**	**15**	**682**	**5.70**	**269**	1.00	1.08	395	7.3
5	22	Orchard Grass Hay/Pasture	**4,000**	**15**	**682**	**5.70**	**426**	1.00	1.71	250	11.6
0											
0											
0											
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ANIMAL WASTE MAN[illegible]MENT WORKSHEET

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STA[illegible]REGON

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation: Dairy Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Storage Pond (>50%) Dilution	12,289	4,290	9,021	**40%**	**65%**	**80%**	4,854	2,789	7,217
Solids	Solids Storage Facility (Roofed)	9,018	3,104	6,784	**75%**	**90%**	**90%**	6,763	2,794	6,105
Grazing	NONE	27,724	9,588	20,566	**100%**	**100%**	**100%**	27,724	9,588	20,566

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	4,854	2,789	7,217	**75%**	**80%**	**100%**	3,641	2,231	7,217
Solids	Broadcast (Incorporated 7 or more days after application)	6,763	2,794	6,105	**70%**	**80%**	**100%**	4,734	2,235	6,105
Grazing	Grazing	27,724	9,588	20,566	**90%**	**80%**	**100%**	24,952	7,670	20,566

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location: Between Coastal and Cascade Mountains Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Somewhat Poorly Drained	3,641	2,231	7,217	**83%**	**100%**	**100%**	3,022	2,231	7,217
Solids	Somewhat Poorly Drained	4,734	2,235	6,105	**83%**	**100%**	**100%**	3,930	2,235	6,105
Grazing	Somewhat Poorly Drained	24,952	7,670	20,566	**83%**	**100%**	**100%**	20,710	7,670	20,566

CLIENT: **Looslea Holsteins**
ASSISTED BY: **Hendrickson**

CHECKED BY:

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
1	21.0	Orchard Grass Hay/Pasture	**39%**	1,179	3	**51%**	2,004	5	**14%**	2,899	7
2	17.0	Orchard Grass Hay/Pasture	**32%**	967	2	**41%**	1,611	4	**10%**	2,071	5
3	14.0	Hay/Pasture Mix 14% Protein	**0%**	0	0	**0%**	0	0	**16%**	3,314	12
4	20.0	Hay/Pasture Mix 14% Protein	**4%**	121	0	**0%**	0	0	**21%**	4,349	16
5	22.0	Orchard Grass Hay/Pasture	**25%**	755	2	**8%**	314	1	**39%**	8,077	19
0											
0											
0											
0											
Off-Farm			**0%**	0		**0%**	0		**0%**	0	
		TOTALS-	**100%**	**3,022**	**7**	**100%**	**3,930**	**9**	**100%**	**20,710**	**59**

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
1	21.0	Orchard Grass Hay/Pasture	290	147	419	426	158	179	-136	-11	240
2	17.0	Orchard Grass Hay/Pasture	273	141	404	426	158	179	-152	-17	225
3	14.0	Hay/Pasture Mix 14% Protein	237	88	235	269	74	205	-32	13	30
4	20.0	Hay/Pasture Mix 14% Protein	223	85	230	269	74	205	-45	11	25
5	22.0	Orchard Grass Hay/Pasture	416	169	469	426	158	179	-10	12	289
0											
0											
0											
0											
Off-Farm											

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer: Looslea Holsteins	Tract(s): 465	Field(s): 1
Assisted by: Hendrickson		Date: June 19, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Orchard Grass Hay/Pasture	8

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC
6	10	97	5.3		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
426		158		179		2.4		

Table 2. Nutrient Sources

Credits			N		P_2O_5		K_2O	
			pounds per acre					
1. Nitrogen credits from previous legume crop								
2. Residual from long-term manure application								
3. Irrigation water								
4. Other (e.g., atmospheric deposition)								
5. Total Credits-			0		0		0	
Plant-Available Nutrients Applied to Field			N		P_2O_5		K_2O	
(Circle column that is landuser's decision)			Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)			0	0	0	0	0	0
7. Fertilizer	Starter							
	Other							
8. Manure / Organic Materials (Source-)		Dairy	290	0	147	0	419	0
9.		Subtotal (sum of lines 6, 7 and 8)	290	0	147	0	419	0
10.		Nutrients Recommended (from Table 1)	426	0	158	0	179	0
11.		Nutrient Status (subtract line 10 from line 9)	-136	0	-11	0	240	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N	290	P_2O_5	147	K_2O	419

Method, Form, and Timing of Application

Soil test indicate low levels on Nitrongen, (6 ppm) and low levels of Phosphorus, (10 ppm). Potasium soil test levels are low (97 ppm) medium levels of potassium are 150-250 ppm so no commercial fertilizer is reccomended. Increased levels of potassium could lead to herd health problems. Manure application should be applied in split applications between late February to late September. Apply 60lbs of Nitrogen/Acre per application. *Manure should be applied to the acreage evenly during the application season. A soil test is reccomended in late October* every 5 years to evaluate the bio solid application rate matches the nitrogen requirements of the soil.
Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension EC 1478, "Soil test interpretation guide".

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	Looslea Holsteins	Tract(s): 465	Field(s): 2
Assisted by:	Hendrickson	Date:	June 19, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Orchard Grass Hay/Pasture	8

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC
8	18	130	5.3		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
426		158		179		3.3		

Table 2. Nutrient Sources

Credits			N		P_2O_5		K_2O	
			pounds per acre					
1. Nitrogen credits from previous legume crop								
2. Residual from long-term manure application								
3. Irrigation water								
4. Other (e.g., atmospheric deposition)								
5. Total Credits-			0		0		0	
Plant-Available Nutrients Applied to Field			N		P_2O_5		K_2O	
(Circle column that is landuser's decision)			Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)			0	0	0	0	0	0
7. Fertilizer	Starter							
	Other							
8. Manure / Organic Materials (Source-)		Dairy	273		141		404	
9.		Subtotal (sum of lines 6, 7 and 8)	273	0	141	0	404	0
10.		Nutrients Recommended (from Table 1)	426	0	158	0	179	0
11.		Nutrient Status (subtract line 10 from line 9)	-153	0	-17	0	225	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS

Amount to be Applied (lb/ac)	N	273	P_2O_5	141	K_2O	404

Method, Form, and Timing of Application

Soil test indicate low levels on Nitrongen, (8 ppm) and low levels of Phosphorus, (18 ppm). Potasium soil test levels are low (130 ppm) medium levels of potassium are 150-250 ppm so no commercial fertilizer is reccomended. Increased levels of potassium could lead to herd health problems. Manure application should be applied in split applications between late February to late September. Apply 60lbs of Nitrogen/Acre per application. Manure should be applied to the acreage evenly during the application season. A soil test is reccomended in late October every 5 years to evaluate the bio solid application rate matches the nitrogen requirements of the soil.
Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension EC 1478, "Soil test interpretation guide".

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	Looslea Holsteins	Tract(s): 465	Field(s): 3
Assisted by:	Hendrickson		Date: June 19, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 14% Protein	6

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC
25	39	460	5.2		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
269		74		205		3.7		

Table 2. Nutrient Sources

Credits			N		P_2O_5		K_2O	
			pounds per acre					
1. Nitrogen credits from previous legume crop								
2. Residual from long-term manure application								
3. Irrigation water								
4. Other (e.g., atmospheric deposition)								
5. Total Credits-			0		0		0	
Plant-Available Nutrients Applied to Field			N		P_2O_5		K_2O	
(Circle column that is landuser's decision)			Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)			0	0	0	0	0	0
7. Fertilizer	Starter							
	Other							
8. Manure / Organic Materials (Source-)		Dairy	237		88		235	
9.		Subtotal (sum of lines 6, 7 and 8)	237	0	88	0	235	0
10.		Nutrients Recommended (from Table 1)	269	0	74	0	205	0
11.		Nutrient Status (subtract line 10 from line 9)	-32	0	14	0	30	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N	237	P_2O_5	88	K_2O	235

Method, Form, and Timing of Application

Soil test indicate low levels on Nitrongen, (25 ppm) and medium levels of Phosphorus, (39 ppm). Potasium soil test levels are high (460 ppm) medium levels of potassium are 150-250 ppm so no commercial fertilizer is reccomended. Increased levels of potassium could lead to herd health problems. Manure application should be applied in split applications between late February to late September. Apply 60lbs of Nitrogen/Acre per application. Manure should be applied to the acreage evenly during the application season. A soil test is reccomended in late October every 5 years to evaluate the bio solid application rate matches the nitrogen requirements of the soil.

Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension EC 1478, "Soil test interpretation guide".

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer: Looslea Holsteins	Tract(s): 465	Field(s): 4
Assisted by: Hendrickson		Date: June 19, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 14% Protein	6

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC
17	33	410	5.4		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
269		74		205		5.5		

Table 2. Nutrient Sources

Credits			N		P_2O_5		K_2O	
			pounds per acre					
1. Nitrogen credits from previous legume crop								
2. Residual from long-term manure application								
3. Irrigation water								
4. Other (e.g., atmospheric deposition)								
5. Total Credits-			0		0		0	
Plant-Available Nutrients Applied to Field			N		P_2O_5		K_2O	
(Circle column that is landuser's decision)			Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)			0	0	0	0	0	0
7. Fertilizer	Starter							
	Other							
8. Manure / Organic Materials (Source-)		Dairy	223		85		230	
9.		Subtotal (sum of lines 6, 7 and 8)	223	0	85	0	230	0
10.		Nutrients Recommended (from Table 1)	269	0	74	0	205	0
11.		Nutrient Status (subtract line 10 from line 9)	-46	0	11	0	25	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N	223	P_2O_5	85	K_2O	230

Method, Form, and Timing of Application

Soil test indicate low levels on Nitrongen, (17 ppm) and medium levels of Phosphorus, (33 ppm). Potasium soil test levels are high (410 ppm) medium levels of potassium are 150-250 ppm so no commercial fertilizer is reccomended. Increased levels of potassium could lead to herd health problems. Manure application should be applied in split applications between late February to late September. Apply 60lbs of Nitrogen/Acre per application. Manure should be applied to the acreage evenly during the application season. A soil test is reccomended in late October every 5 years to evalnate the bio solid application rate matches the nitrogen requirements of the soil.

Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension EC 1478, "Soil test interpretation guide".

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	Looslea Holsteins	Tract(s): 465	Field(s): 5
Assisted by:	Hendrickson	Date:	June 19, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Orchard Grass Hay/Pasture	8

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC
15	21	191	5.6		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
426		158		179		2.4		

Table 2. Nutrient Sources

Credits			N		P_2O_5		K_2O	
			pounds per acre					
1. Nitrogen credits from previous legume crop								
2. Residual from long-term manure application								
3. Irrigation water								
4. Other (e.g., atmospheric deposition)								
5. Total Credits-			0		0		0	
Plant-Available Nutrients Applied to Field			N		P_2O_5		K_2O	
(Circle column that is landuser's decision)			Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)			0	0	0	0	0	0
7. Fertilizer	Starter							
	Other							
8. Manure / Organic Materials (Source-)		Dairy	416		169		469	
9.		Subtotal (sum of lines 6, 7 and 8)	416	0	169	0	469	0
10.		Nutrients Recommended (from Table 1)	426	0	158	0	179	0
11.		Nutrient Status (subtract line 10 from line 9)	-10	0	11	0	290	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N	416	P_2O_5	169	K_2O	469

Method, Form, and Timing of Application

Soil test indicate low levels on Nitrongen, (15 ppm) and low levels of Phosphorus, (21 ppm). Potasium soil test levels are high (191 ppm) medium levels of potassium are 150-250 ppm so no commercial fertilizer is reccomended. Increased levels of potassium could lead to herd health problems. Manure application should be applied in split applications between late February to late September. Apply 60lbs of Nitrogen/Acre per application. Manure should be applied to the acreage evenly during the application season. A soil test is reccomended in late October every 5 years to evaluate the bio solid application rate matches the nitrogen requirements of the soil.
Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension EC 1478, "Soil test interpretation guide".

DESIGN REPORT
for
Looslea Dairy Waste Storage Pond
Scappoose, OR

SUMMARY: This project is authorized for technical assistance by NRCS through the conservation operations program and is funded under EQIP. It is located between Honeyman Road and Multnomah Channel east of Scappoose. The project consists of constructing a waste storage pond with a compacted soil liner that will store manure and contaminated water from a dairy operation during the fall and winter months. The project also involves a small amount of work in redirecting roof runoff, installing a replacement pump to discharge from the collection tank to the manure transfer pipe, and adding a 200' extension to the existing transfer pipe to get it to the new waste storage pond.

REFERENCES:
1. NRCS Engineering Field Manual
2. NRCS Agricultural Waste Management Field Handbook
3. NRCS Practice Standards 313-Waste Storage Facility, 558-Roof Runoff Management
4. NRCS Oregon Engineering Handbook – Hydrology Guide
5. CNMP Element Training – Compacted Clay Liner Class Notes

Job Class: I Hazard Class a
Max embankment height = 8.9 ft
Effective embankment height = 7.9 ft
Storage = 4.0 ac-ft

Location: The project is located in the NE1/4 of Section 17, T 3 N, R 1 W from the Willamette Meridian. It is east of Scappoose, situated between the Multnomah Channel and Dike Road.

Project Description: The dairy has traditionally utilized a waste storage pond located on adjacent leased property and now needs to develop onsite storage. The proposed waste storage pond is one component of an overall Resource Management Plan developed for the operation. The pond will store manure and wastewater for 90 days for 215 Holstein milk cows. The pond will have a total capacity of 4.0 acre-feet. Construction of the pond is planned for fall of 2002.

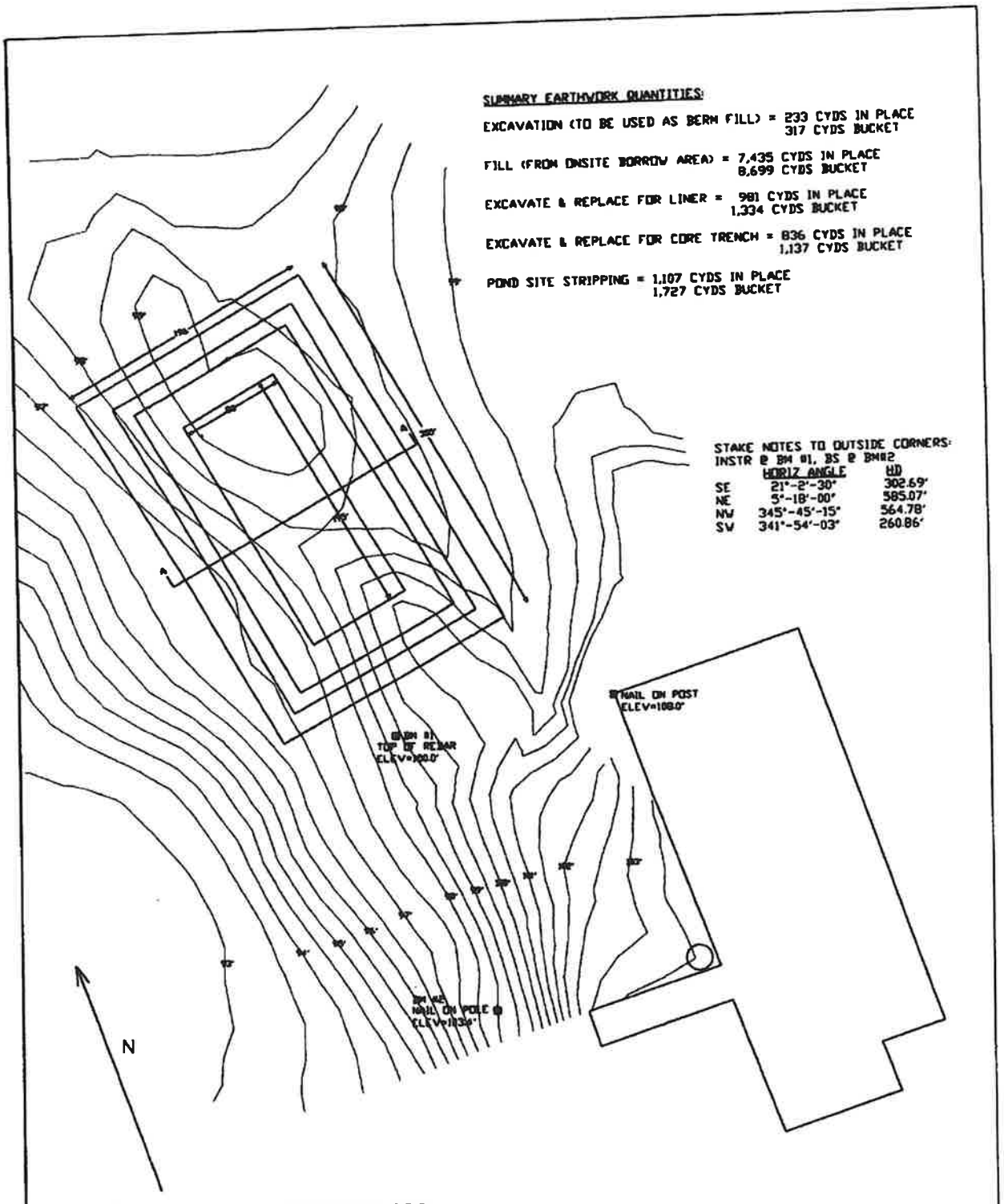
Proposed Work: The pond will be built by constructing an embankment 8.9 ft high, with a 12 foot top width, 3:1 inside side slopes, and 2:1 outside side slopes. Fill material for the embankment will come from a borrow area +/- 800 feet from the pond site. The bottom of the pond will be over excavated by 1 foot and the material will be replaced and compacted to form a clay liner for seepage control. A core trench will be constructed below the embankment by excavating 1.5-3 ft and replacing and compacting onsite material. The core trench will be a minimum of 10 ft wide and have 1:1 side slopes.

18"

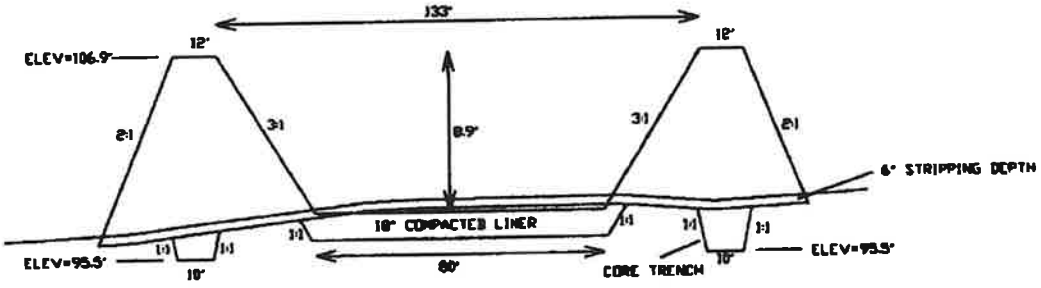
1

Mr Edwards,

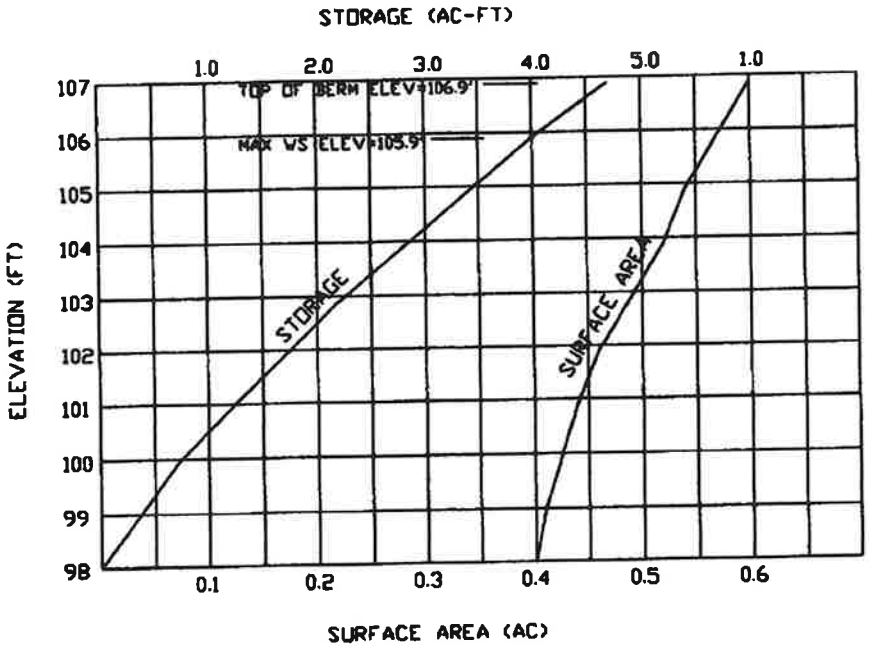
Hope these pages will give you the information you needed. in your records.
We are glad that everything looked in order. Thank you


SUMMARY EARTHWORK QUANTITIES:
EXCAVATION (TO BE USED AS BERM FILL) = 233 CYDS IN PLACE
317 CYDS BUCKET
FILL (FROM ONSITE BORROW AREA) = 7,435 CYDS IN PLACE
8,699 CYDS BUCKET
EXCAVATE & REPLACE FOR LINER = 981 CYDS IN PLACE
1,334 CYDS BUCKET
EXCAVATE & REPLACE FOR CORE TRENCH = 836 CYDS IN PLACE
1,137 CYDS BUCKET
POND SITE STRIPPING = 1,107 CYDS IN PLACE
1,727 CYDS BUCKET
STAKE NOTES TO OUTSIDE CORNERS:
INSTR @ BM #1, BS @ BM#2
HORIZ ANGLE HD
SE 21°-2'-30" 302.69'
NE 5°-18'-00" 585.07'
NW 345°-45'-15" 564.78'
SW 341°-54'-03" 260.86'
BM #1
TOP OF REBAR
ELEV=100.0'
BM #2
NAIL ON POST
ELEV=108.0'
BM #3
NAIL ON POLE @
ELEV=113.6'
N
NOTE: ELEVATIONS LISTED ARE OFF AN ASSUMED DATUM
USDA NRCS
Natural Resources Conservation Service
LOOSLEA DAIRY WASTE STORAGE POND
SCAPPOOSE, OR
Scale: 1" = 100' CI = 5'
Sheet : 2 of 5
Location : NE1/4 Sec 17 T3N R1W
Designed C. Fisher 6/02
Drawn C. Fisher 6/02
Approved

TYPICAL SECTION A-A'



WASTE STORAGE POND AREA-CAPACITY CHART



USDA NRCS Natural Resources Conservation Service	ELLIS SURFACE WATER MGT PROJECT SCAPPOOSE, OR	Scale: 1"= 80' Sheet : 3 of 5 Location : NE1/4 Sec 17 T3N R1W	Designed C. Fisher 9/02 Drawn C. Fisher 9/02 Approved