

Nutrient Management Plan

For Forest Glen Heifer Ranch



OREGON
DEPARTMENT OF
AGRICULTURE

**CONFINED ANIMAL FEEDING OPERATION (CAFO)
ANIMAL WASTE MANAGEMENT PLAN/NUTRIENT
MANAGEMENT PLAN SIGNATURE SHEET**

Facility name: Forest Glen Heifer Ranch

Facility address: 3695 Lafayette Hwy

Dayton, OR 97114

Operator's name: Robert & Stewart Kircher

Mailing address: 5801 SE Bansen Lane

Dayton, OR

Complete if different than the operator

Legal landowner: Dan Bansen

Mailing address: 5801 SE Bansen Lane

Dayton, OR

As the Operator of Forest Glen Oaks Dairy, I agree to manage this facility in accordance with Animal Waste Management Plan (AWMP)/Nutrient Management Plan (NMP) # 26017 on file with ODA and maintain those practices as described in the plan. This signed AWMP is incorporated into the CAFO NPDES and WPCF General Permits by reference (Permit Condition S3.A.2.).

If changes are made to the animal population, facilities or change in the type of manure system of the CAFO, a new AWMP/NMP must be submitted to ODA for approval at least 45 days before the modification is implemented unless a different schedule is allowed by ODA in writing (Permit Condition S3.D.1 and 2).

Operator's signature

Date

ODA USE ONLY

9/2/2026

MA# 161701

AWMP# _____

Operator's name (Please print clearly)

Robert or Stewart Kircher

Received Date _____

Approval Date _____

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SECTION 1 - GENERAL INFORMATION

Operation Information for Forest Glen Heifer Ranch

Calendar Year: Plan

Reporting period:

Name:	Robert & Stewart Kircher	Permit Number:	AG-P0161701CAFG
Business	Forest Glen Heifer Ranch		
Mailing	5801 SE Bansen Ln, Dayton, OR, 97114		
Facility	3695 Lafayette Hwy, Dayton, OR 97114	County:	Yamhill
Telephone	(503)560-4238	Cell Phone	
E-mail	stewart.kircher@gmail.com		

Permitted and Actual number of animals by type at the CAFO averaged over the year [S4.D.2(a)/S4.D.2(a)(ii) of the permit].

Animal Type	Average Weight (Lbs)	Days on Farm		Permitted	Actual
		Start Month	End Month		
Calf	250.0	01/01	12/31	500	100
Bull	618.0	01/01	12/31	40	30
Dairy Heifers	415.0	01/01	12/31	1545	1250
Total Animals -				2,085	1,380
Manure Solids Generated (CF) -				64,583	42,710
Bedding Generated (CF) -				6,350	6,350
Imported Solids (CF) -				0	0
Total Solids Generated (CF) -				70,933	49,060
Total Solids to Store based on a Volume Reduction Factor of 0.0 (CF) -				64,583	42,710
Manure Liquids Generated (CF) -				193,750	128,130
Rainfall-Evaporation on Storage plus Runoff Generated (CF) -				205,772	205,772
Process Water Generated (CF) -				7,200	7,200
Imported Liquids (CF) -				0	0
Total Liquids to Store (CF) -				411,484	345,865
Liquids Applied to Land (CF) -					411,484
Solids Applied to Land (CF) -					0
Grazing Manure Applied to Land (CF) -					24,089
Liquids Exported (CF) -					0
Solids Exported (CF) -					70,933
Solids Recycled for Bedding (CF) -					0
Acres of Land for Land Application Covered by NMP -					82.7 AC
Acres of Land Under Operator Control Used for Manure Applications -					82.7 AC

SECTION 1 - GENERAL INFORMATION

Storage Facilities for Forest Glen Heifer Ranch

Facility Name	Description	Type	Storage Period (days)	Diameter (ft)	Top Length (ft)	Top Width (ft)	Depth (ft)	Side slope Z	Free board (ft)	Volume (CF)	Uncovered Surface Area (SF)
FGH Manure Barn	Solids Storage	Solid	365		180	100	12			216,000	18,000
FGH WSL1	Wastewater Storage Lagoon	Liquid	24		212	60	8	3	1	43,764	12,720
FGH WSL2	Wastewater Storage Lagoon	Liquid	179		450	108	13	3	1	328,320	48,600
FGH WSL3	Wastewater Storage Lagoon	Liquid	162		300	133	14	3	1	298,311	39,900

SECTION 1 - GENERAL INFORMATION

Storage Period Calculations for Forest Glen Heifer Ranch

Solids Storage			
Storage Unroofed Surface Area, SF =	18000	Volume Reduction Factor =	0
Available Storage, CF =	216000	Solids Storage Period, Days =	365

Month	Number Of Days	Manure Lost In Grazing (CF)	Filtered Solids (CF)	Bedding (CF)	Solids Removal Factor (Pct)	Imported Solids (CF)	Solids To Store (CF)	Storage Volume Needed, CF
October	31	2214	5392	400	25	0	5392	5392
November	30	0	5895	950	25	0	5895	11287
December	31	0	6272	950	25	0	6272	17559
January	31	0	6083	950	25	0	6083	23642
February	28	0	5518	950	25	0	5518	29160
March	31	0	6083	950	25	0	6083	35243
April	30	0	5707	200	25	0	5707	40950
May	31	5191	4598	200	25	0	4598	45548
June	30	5191	4410	200	25	0	4410	49958
July	31	3708	4969	200	25	0	4969	54927
August	31	4078	4876	200	25	0	4876	59803
September	30	3708	4780	200	25	0	4780	64583
Annual	365	24089	64583	6350	0	0	64583	

Liquids Storage					Climate Station: MCMINNVILLE	
Storage Unroofed Surface Area, SF =	101220	25Yr-24Hr Storm Precip, In =	4	Total 25Yr-24Hr Storm Storage Needed, CF =	43,744	
Available Liquid Storage, CF =	670395	25Yr-24H4 Storm Runoff, CF =	4,004	Storage Period without 25yr-24hr Storm =	365	
Unroofed Runoff Area, SF =	14000	25Yr-24Hr Storm on Unroofed Storages, CF =	39,740	Storage Period with 25yr-24hr Storm =	365	

Month	Number Of Days	Rainfall (Inches)	Evaporation (Inches)	Rain-Evap on Storages (CF)	Rainfall Runoff (CF)	Manure (CF)	Process Water (CF)	Imported Liquids (CF)	Monthly Liquids to Store (CF)	Total Storage Volume Needed (CF)
October	31	2.76	1.65	13487	2583	16177	600	0	33147	33147
November	30	6.5	0.73	58468	6899	17684	600	0	84364	117511
December	31	7.2	0.42	68036	7712	18816	600	0	95876	213388
January	31	6.38	0.46	59519	6756	18250	600	0	85837	299225
February	28	5.39	0.78	47003	5611	16553	600	0	70480	369704
March	31	4.57	1.52	32580	4660	18250	600	0	56803	426507
April	30	2.76	2.31	7920	2583	17122	600	0	28375	454882
May	31	1.89	3.61	-11635	1613	13794	600	0	4522	459404
June	30	1.11	4.18	-24215	771	13229	600	0	-9465	449939
July	31	0.41	5.22	-39940	132	14907	600	0	-24152	425787
August	31	0.54	4.76	-34833	226	14629	600	0	-19229	406558
September	30	1.61	3.25	-11462	1296	14341	600	0	4925	411484
Annual	365	41.13	28.89	164928	40844	193750	7200	0	411484	

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Annual Nutrient Balance for Forest Glen Heifer Ranch

Nutrient Concentrations:	Nitrogen (Total N)	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)	Units
Liquid Manure -	7.43	1.58	13.70	lbs/1000 Gal
Solid Manure -	8.40	2.83	5.93	lbs/Ton

Nutrients Generated:	N Generated	P ₂ O ₅ Generated	K ₂ O Generated
Liquid Manure -	22869 lbs	4863 lbs	42167 lbs
Solid Manure -	10725 lbs	3613 lbs	7578 lbs
Grazing Manure -	7120 lbs	2790 lbs	4664 lbs
Total -	40714 lbs	11267 lbs	54409 lbs

Exported Nutrients:	N Exported	P ₂ O ₅ Exported	K ₂ O Exported
Liquid Manure -	0 lbs	0 lbs	0 lbs
Solid Manure -	10725 lbs	1577 lbs	6289 lbs
Total -	10725 lbs	1577 lbs	6289 lbs

Crop Nutrient Removal:	N Utilized	P ₂ O ₅ Utilized	K ₂ O Utilized
Total -	32583 lbs	10296 lbs	27078 lbs

Annual Nutrient Budget:	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potassium (K ₂ O)
Nutrients Generated -	40714 lbs	11267 lbs	54409 lbs
Nutrients Removed by Crop and Exported -	43308 lbs	13910 lbs	34655 lbs
Net Annual Nutrient Balance -	-2594 lbs	-2643 lbs	19754 lbs

Note: Total nutrients generated are computed from analytical data by taking the total volume of material applied times the nutrient analysis of the material. The total nutrients utilized are computed using the crop yield data times the crop uptake of nutrients.

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Background and Site Information

Animal Feeding Operation: Large Concentrated CAFO

Master Permit Address Number: AG-P0161701CAFG

Type & Size: Dairy Heifer Farm – 2,085 Animals

Latitude/Longitude: N45.233490, W123.110200

Forest Glen Heifer Ranch is located approximately a 6.2 miles northeast of McMinnville, Oregon in Yamhill County, Oregon near the town of Lafayette, Oregon. It is located in the Lower Willamette Valley region of western Oregon at an elevation of approximately 138 feet. The landscape is generally stream floodplains, broad terraces and rolling hillsides above the streams in valleys along the Willamette River. The annual precipitation varies from 36-40 inches of which 70% falls within a 5 month period from November through March and less than 7% falls from June through August. Winds are generally moderate in the winter (15-30 mph) from the south to southwest and mild in the summer (5-15 mph) from the north to northwest. Humidity usually varies from 60 to 90 percent throughout the year except when dry east winds occur dropping the humidity to 10 to 15 percent. There is approximately 200-210 frost free days and the average annual temperature is 50 to 55 degrees Fahrenheit. Soils Vary from deep to moderately deep clays, silts and sandy loams that are poor to excessively well drained.

Forest Glen Heifer Ranch is owned and managed by Dan Bansen, Stewart Kircher and Robert Kircher and is part of a network of 2 dairy farms, 2 heifer farms and 22 offsite farms that produce crops, hay and pasture where manure can be applied for utilization of nutrients and organics.

Animals

Forest Glen Heifer Ranch raises replacement livestock on the farm for Forest Glen Jerseys Dairy and Forest Glen Oaks Dairy. Currently Forest Glen Heifer Ranch is permitted for 1,750 animals consisting of heifers and calves. A request to modify animal numbers to 2,085 heifers, calves and bulls is included in the Supplemental Documents section with the existing permit..

The heifers raised on the Forest Glen Heifer Ranch are typically confined from December through March and are out on pasture from April through November each year as weather conditions permit. The calves and bulls are confined to the livestock barns the entire year.

Animal Mortality Management

Mortalities that occur during the year on the farm are transferred to the Forest Glen Oaks Dairy composting facility and composted. The material from the composted mortalities are spread on the hay and pasture land fields owned and leased by Forest Glen Oaks Dairy for utilization of the composted material as a nutrient source.

Manure Management

On Forest Glen Heifer Ranch manure, bedding and wasted feed collected on the alleyways of the livestock barns are scraped to an underground liquid collection tank (UCT) shown on the Production Area Map. Some of the manure, bedding and wasted feed collected in the livestock barns is collected and directly transferred to the solids storage barn. Any rainfall runoff from paved areas containing manure drain to the underground collection tank. Liquified manure and rainfall runoff collected in the underground collection tank are pumped through a pipeline to a screw press type separator that separates approximately 30% of the solids from the wastewater. Wastewater drains from the separation facility to the first wastewater storage lagoon shown on the Production Area Map. The first wastewater storage lagoon acts as a settling basin and overflow from the lagoon drains to the second wastewater storage lagoon (WSL). Overflow from the second wastewater storage lagoon drains to the third wastewater storage lagoon (WSL). The solids are transferred to the solids storage barn (SSB) shown

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on the Production Area Map. Solids stored in the solids storage barn and wastewater stored in the wastewater storage lagoons are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics. Wastewater is applied using traveling big gun sprinkler system and the solids are applied using a truck mounted solids spreader.

Manure applications made to sensitive areas will be done with low elevation and low pressure to avoid drift, this can be done via tanker trucks or a drag-line type application systems.

A water supply plan is included in the Supplemental documents that shows the estimated needs for irrigation water, stock water and process water.

Cropping System

Forest Glen Heifer Ranch owns 91.0 acres for the farm facilities described above and the hay and pasture land fields used to produce forage for the livestock. These acres consist of 8.3 acres for the farm facilities, shops and houses and 82.7 acres of irrigated hay and pasture land. Forest Glen Heifer Ranch also has access to 2,409.8 acres of leased and owned offsite irrigated hay and pasture land used to produce forage for the dairy livestock. The crop rotation for the acres owned and leased by Forest Glen Heifer Ranch consists of 5 to 7 years of perennial grass that is harvested by grazing livestock and for hay.

Nutrient Management

Nutrient management is a key element to farming organically. Manure nutrients are the most valuable source of fertility available. The lagoon wastewater and solids are sampled by a third party lab to determine the nutrient content of the wastewater and solids that will be applied. Lagoon sampling is done using a long sample probe to get an adequate profile from the top to the bottom of the lagoon, multiple probes are taken around the lagoon to get an accurate sample. Animal numbers and imports to the lagoon will vary from year to year, therefore the nutrient content of the lagoon wastewater will also vary.

Soil samples are taken every fall from the crop land and analyzed by a third party lab to determine the available nutrient load in the soil.

Determining agronomic application rates of waste water is done by evaluating crop requirements, determining the present nutrient load of the soil, and supplementing the balance with wastewater or imported manure nutrients. If the requirements of the crop can be met with on-site nutrient applications, imported nutrients may not be necessary.

In the case of an over abundance of on-site manure nutrients and a lower crop demand, manure nutrients may be exported off farm either in solid form or liquid in a tanker truck. These exported manure nutrients will be used for off farm crop nutrition.

Nutrient balancing is projected every year based on actual animal numbers, cropping plan, soil analysis, nutrient analysis, and the contribution of manure from grazing animals.

To mitigate any risk to water quality associated with nitrates, soil samples are taken every year, application rates are closely monitored to agronomic rates, imported manure nutrients are only permitted when necessary to maximize crop yield potential, and excess manure nutrients are exported off farm when necessary. Nutrient applications are figured on the basis of lowering the nitrate levels in the particular areas of higher than normal soil nitrates.

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The soil concentration of phosphorus ranges from medium to excessive in the hay and pasture land fields. Applications of wastewater and solids containing manure are planned on a nitrogen basis on all fields and soil phosphorus concentrations will be monitored using soil tests.

It is estimated that the dairy produces enough manure to meet the nutrient demand for the hay and pasture land fields. Any additional nutrient applications should be based on soil tests and fertilizer guides to prevent excess soil nutrient concentrations.

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Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure-

Implement the following first containment steps:

- Stop all other activities to address the spill.
- Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- Call for help and excavator if needed.
- Complete the clean-up and repair the necessary components.
- Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application-

Implement the following first containment steps:

- Stop all other activities to address the spill and stop the flow.
- Call for help if needed.
- If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
- Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
- If flow is coming from a tile, plug the tile with a tile plug immediately.
- Assess the extent of the emergency and request additional help if needed.

Contacts to be made by the owner or operator within 24 hours-

<u>Organization</u>	<u>Phone Number</u>
Oregon Department of Agriculture	(503) 986-4699
Natural Resources Division TTD	(503) 986-4762
635 Capitol St., N.E.	
Salem, OR 97301-2532	

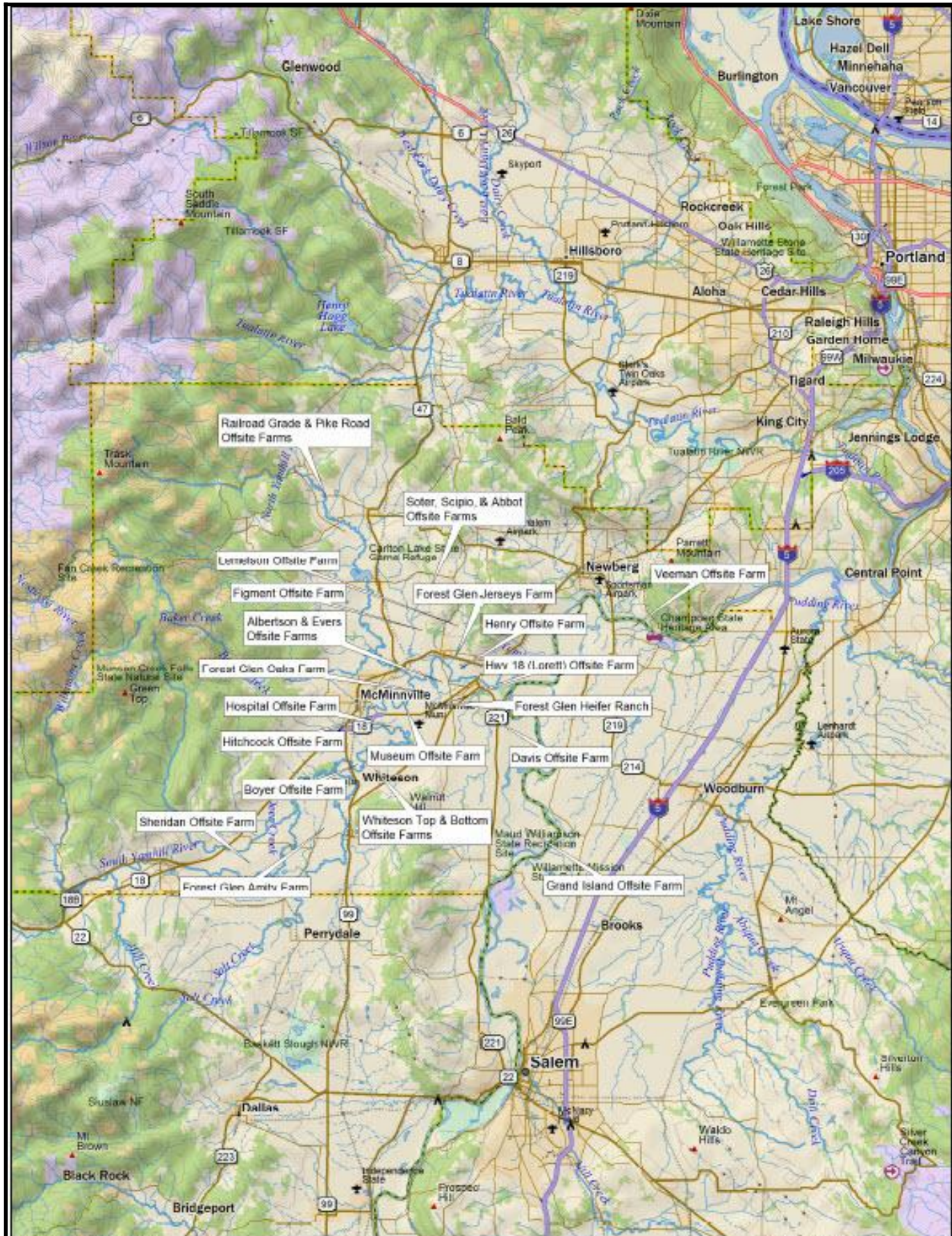
Oregon Emergency Response (System OERS) (800) 452-0311

Be prepared to provide the following information:

- Your name and contact information.
- Farm location (driving directions) and other pertinent information.
- Description of emergency.
- Estimate of the amounts, area covered, and distance traveled.
- Whether manure has reached surface waters or major field drains. Include the name of the surface water source that manure reached. Contact the Oregon Emergency Response System if manure entered a drinking water source.
- Whether there is any obvious damage: employee injury, fish kill, or property damage.
- If a grab sample of the discharge was taken.
- Current status of containment efforts.

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Location Maps for Forest Glen Heifer Ranch

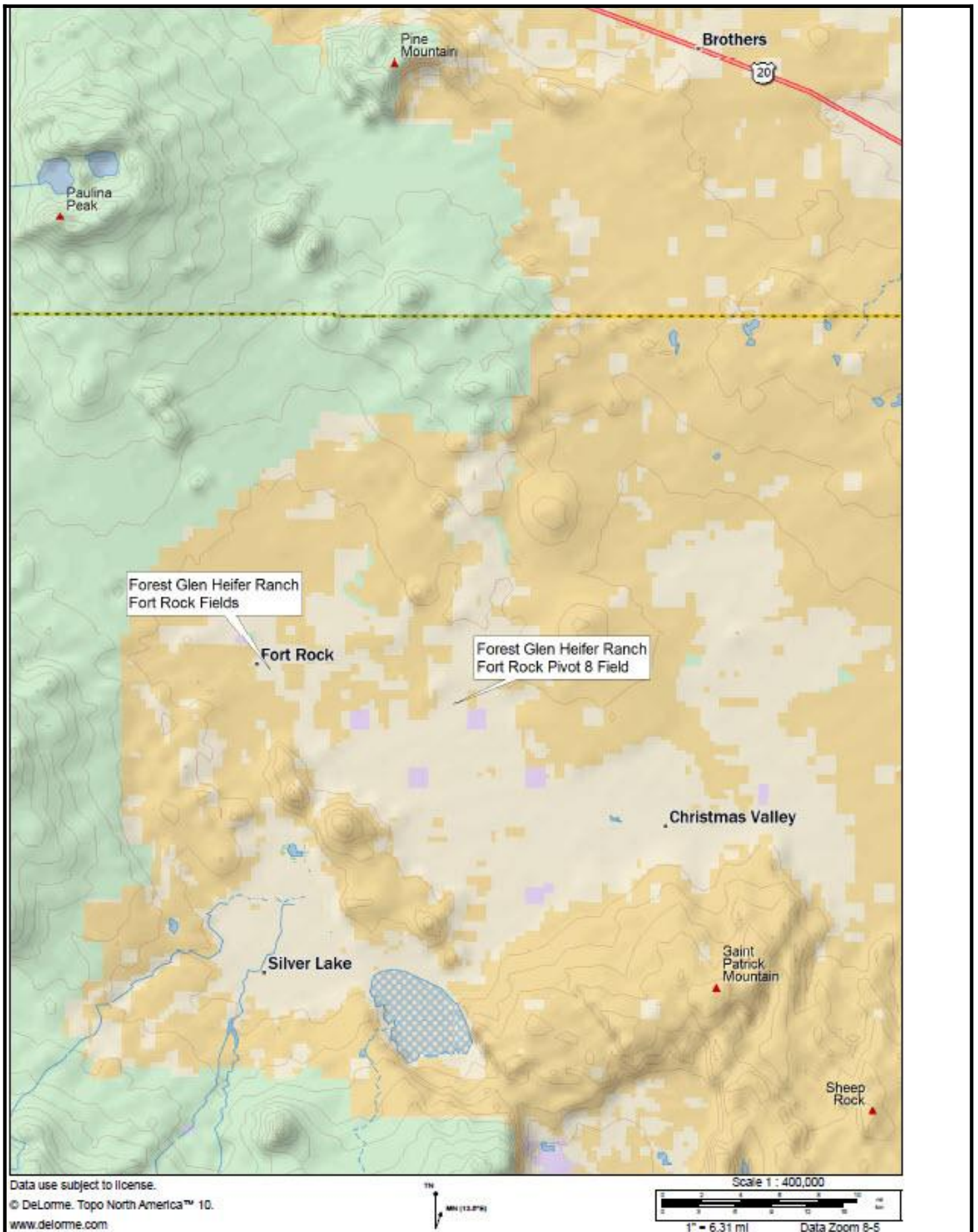


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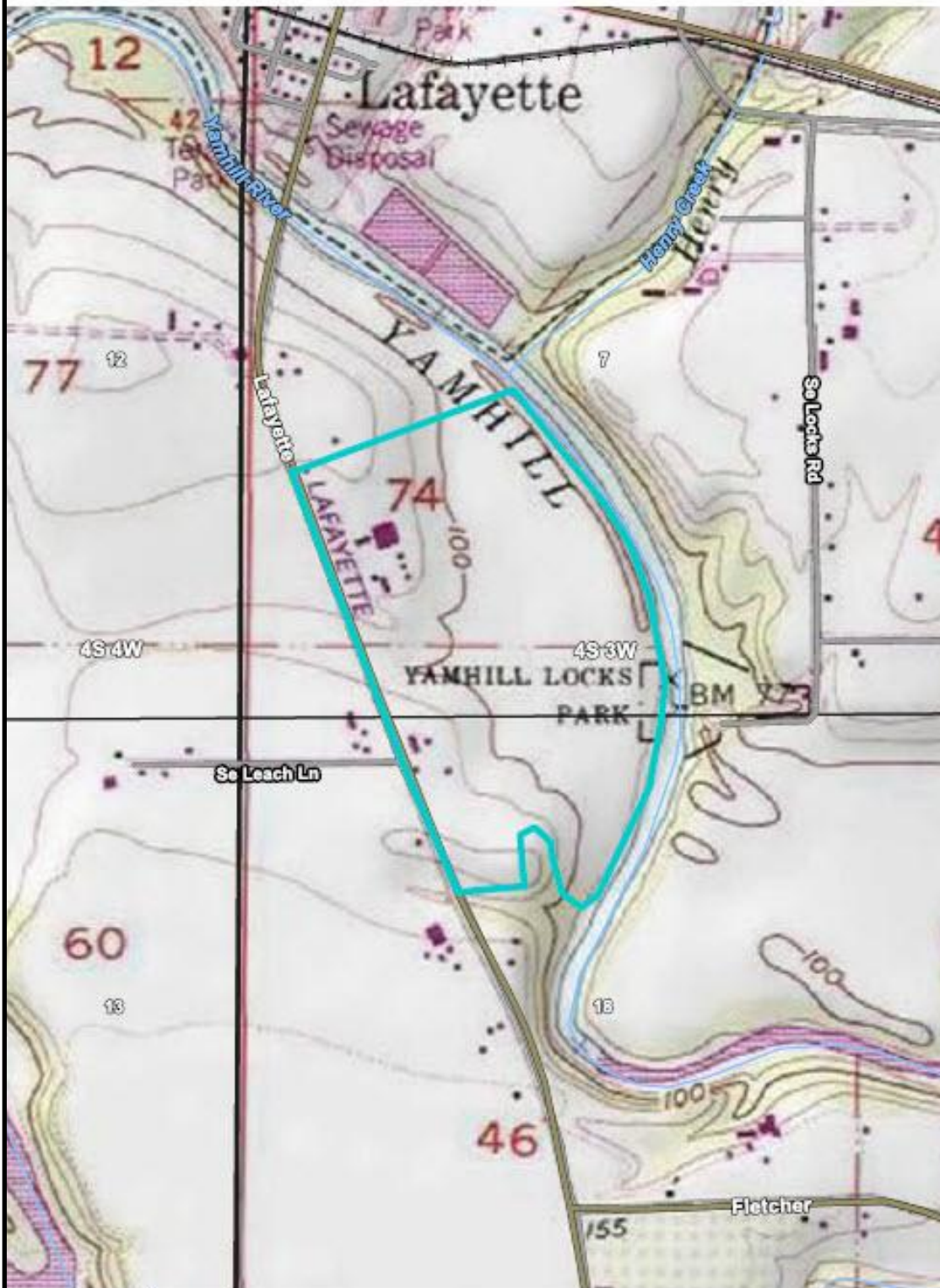
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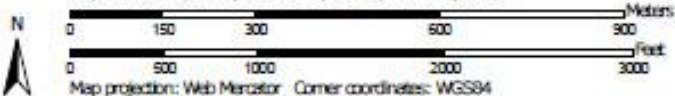
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Topographical Maps for Forest Glen Heifer Ranch

Topography Map—Yamhill County, Oregon
(Forest Glen Heifer Ranch)



Map Scale: 1:12,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84

SECTION 2 - PRODUCTION AREA

Animal Mortality

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses.

Animal mortalities must be handled in accordance to ORS 601.140 to prevent the discharge of pollutants to state waters. Animal mortalities will be managed to ensure that they are not disposed of in a liquid manure, storm water, process waste water storage or treatment system, or that is not specifically designed to treat animal mortalities.

Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.

Guidance for Proper Management of Dead Animals

Refer to Plan for Catastrophic Animal Mortality Handling for guidance on what steps to take for a catastrophic animal mortality event. Having dead animals sent to an acceptable disposal site is the best method to deal with animal mortalities. A list of landfills and phone numbers can be found on the internet at <http://www.deq.state.or.us/lq/sw/disposal/permittedfacilities.html>. If a local landfill is not permitted to accept animal carcasses, the Oregon Department of Environmental Quality (DEQ) may grant an exception. Phone numbers to local DEQ offices can be found in most phone books or on the internet at <http://www.deq.state.or.us/about/locations.html>.

Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.

Acceptable methods and guidance for animal mortality disposal are:

Composting- Composting animal mortalities requires a composting plan be prepared and submitted to the Oregon Department of Agriculture, Natural Resources Division. A composting plan consists of a site plan drawing of the composting facility, a description of how any runoff from the facility will be contained, a description of the composting process to be used and how the compost will be used. The composting facility for animal mortalities must have a concrete floor or similar impervious surface to prevent nutrient leaching. A roof covering the animal mortality composting facility is recommended to control moisture added by rainfall and rainfall runoff. Assistance to develop a composting plan is available from the Natural Resources Division of the Oregon Department of Agriculture, (503) 986-4700. A permit is also needed from the Department of Environmental Quality (DEQ) if animal mortalities will be imported from other farms for composting.

Rapid composting of dead animals occurs when the carbon to nitrogen (C:N) ratio of the compost mix ranges between 10 and 20 to 1. To achieve the recommended C:N ratio, build the initial compost pile by placing 18 inches of sawdust or other bulking agent on the floor of the composting area. The bulking agent should extend beyond the perimeter of the animal to be composted by at least 2 feet. If using a compost bin the bulking material should extend at least 1 foot beyond the perimeter of the animal being composted. Using a bulking agent such as sawdust will absorb any liquids as the animal decomposes during the composting process.

Once the bulking agent has been placed on the floor of the composting area, place the animal carcass on top. To decrease composting time and prevent bloating the body cavity should be cut open. Cover the carcass with 1 to 3 feet of separated manure solids or other material that has a moisture content between 30 to 60 percent and a C:N ratio of not more than 30 to 1. Use 1 foot of material for small carcasses and 3 feet for large carcasses such as cattle. Be careful not to add material that is too wet as it will hinder the composting process and cause odors. Small animals can be layered in a compost pile by placing 12 inches of the bulking agent between layers as shown in the figure below. Be sure the total height of the compost pile does not exceed 7 feet in height as it may spontaneously combust causing a

fire.

The first heating or primary composting cycle will take approximately 15 to 90 days depending on the size of the animal being composted. Refer to the table below for estimated primary composting times. Check pile temperature using thermometer probe on a daily basis. The pile temperature should be checked at multiple points around the compost pile and at a point approximately 3 feet into the pile. The temperature of the compost pile should reach 130 degrees Fahrenheit (F) within a few days.

Temperatures should peak between 130 and 150 degrees F in 3 to 4 days. When the temperature of the compost pile falls below 130 degrees F, the compost needs to be aerated by turning or other means. Be sure carcasses remain covered with the bulking agent after being aerated. It is important to maintain a temperature above 130 degrees F for at least 7 days during the primary composting cycle as failure to do so may result in the incomplete destruction of pathogens and can cause fly and odor problems. After aerating the compost pile, the secondary composting times will be similar to the first.

CAUTION: It is unclear whether prions that are the proteins that cause Bovine Spongiform Encephalitis (BSE or Mad Cow Disease) are destroyed in the composting process. Animals showing signs of Mad Cow Disease and those with anthrax should not be composted and must be reported to the Oregon Department of Agriculture, Animal Health and Identification Division at (503) 986-4680 for guidance on disposal.

After aerating the compost pile by turning or other means, be sure to check the moisture content and add water if necessary being careful not to add too much water. The compost pile should feel moist to the touch but you should not be able to squeeze any water out of it.

Odors given off by the composting operation is a good indicator of how the compost operation is proceeding. Foul odors may mean that the process has turned from aerobic to anaerobic. Anaerobic conditions are the result of insufficient oxygen in the compost. This may be caused by excessive moisture in the compost or the need for turning or aerating of the compost pile.

After the composting process is finished, it may be used as a bulking agent for a new compost pile. A rule of thumb is to use 50 percent of the composted material for a bulking agent but you may want to use more or less depending on how degraded the bulking agent is in the finished compost. Using finished compost in a new compost pile reduces the amount of bulking agent needed for the new pile and provides microbial inoculants to get the composting process started.

Finished compost can also be applied to crop and pasture land fields for utilization of the nutrients and organics in the composted material. Compost from animal mortalities should not be applied to crops that will be consumed directly by humans. The nutrient content of the composted material should be determined and application equipment calibrated to ensure nutrients contained in the composted material are not over applied.

Natural Disposal- To allow nature to take its course the dead animal needs to be transported to a location at least ½ mile from any off-farm dwelling and at least ¼ mile from any water way in accordance with ORS 601.140. Once this criteria is met the carcass can be left to degrade naturally with the help of scavengers. This method is not an acceptable means of disposal for a large number of animal mortalities or for byproducts generated during butchering.

Landfill- Dead animals may be transported to a permitted landfill that accepts animal carcasses for disposal. Be sure to call the chosen landfill first to insure a landfill will accept your animal carcasses. Refer to the website given previously for permitted landfills to call. Contact the landfill operator and the DEQ at (800) 452-4011 if the landfill you would like to use is not a permitted facility to see if an exception may be granted for the disposal of animal carcasses.

Incineration- Dead animals may be burned as a method of disposal and as a method to control diseases. The economics of incineration and availability of incineration units usually make this option undesirable. A permit is needed from the Oregon Department of Environmental Quality (DEQ) Air Quality program to operate an incineration unit. Contact your DEQ at (800) 452-4011 for guidance on incineration of animal carcasses.

Burial- Dead animals may be buried in accordance with ORS 601.090(7) as a method of disposal. Large animals such as an adult cow will require a hole approximately 2 feet by 7 feet by 8 feet deep. Be

sure to select a site that doesn't have a water table to insure the bottom of the hole will be dry. The animal carcass should be covered with hydrated lime and covered with at least 4 feet of soil mounded 2 feet above the natural ground line to allow for settling as the carcass decomposes. Burial sites should be located at least 500 feet down slope from surface waters or wells.

Burial is not an acceptable method of disposal for animal byproducts generated from butchering. Burial of large numbers of animal mortalities is not acceptable unless performed in accordance with a Catastrophic Animal Mortality Management Plan. Burial of imported animal mortalities is subject to disposal regulations and the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Agriculture (ODA) and the local land use planning authority should be contacted.

Plan for Catastrophic Animal Mortality Handling

The following information describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

Guidance in the event of a catastrophic animal mortality event:

Remove animal mortalities from the livestock production area and place in an area designated for mortality storage to be determined at the time of the catastrophic event.

Contact the state veterinarian if animal death is suspicious or animal displayed unusual symptoms before death.

If it is determined that a disease outbreak may be eminent, implement procedures as directed by the State Veterinarian. This may include killing exposed animals, burning carcasses and burial of ashes in a predetermined catastrophic mortality burial areas.

Refer to state guidance regarding appropriate catastrophic animal mortality handling methods.

Contact Information-

<u>Organization</u>	<u>Phone Number</u>
Oregon Department of Agriculture	(503) 986-4699
Natural Resources Division	TTD- (503) 986-4762
635 Capitol St. NE	
Salem, OR 97301-2532	
Oregon Emergency Response System (OERS)	(800) 452-0311
Oregon State Veterinarian	(503) 378-4710
USDA APHIS	(503) 399-5871
530 Center Street NE, Suite 335	Fax- (503) 399-5607
Salem, OR 97301	

SECTION 2 - PRODUCTION AREA

Operation and Maintenance Considerations

WASTEWATER COLLECTION TANK-

The wastewater collection tank shown on the Production Area Map are used to collect and temporarily store wastewater containing manure generated by the Forest Glen Heifer Ranch.

Inspect the tank weekly to ensure structural integrity. If the structural integrity of the tank is compromised, immediately empty the tank to determine the cause and make necessary repairs before putting the tank back into service. Do not allow equipment that exceeds the design limit of the tank on or within 20 feet of the structure.

Keep pumps, agitators, piping, valves and all other electrical and mechanical equipment in good condition by following the manufacturer's recommendations. Maintain grounding rods and wiring for all electrical equipment in good condition. Immediately remove all foreign debris within the structure that may cause damage to pumps or agitators.

Pump the wastewater collection tank completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the tank. Inspect the tank for structural damage and if structural damage to the tank is discovered seek the services of a qualified engineer to assess the damage and recommend necessary repairs before putting the tank back into service. Follow the guidance given in Section 3, Utilization Area, when applying wastewater from the collection tank to fields.

Do not dispose of animal carcasses in any wastewater collection tank. It is against the law to do so. Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances. Maintain lids, grates and shields on openings.

Provide proper ventilation before entering the tank, for any reason what so ever. Provide and use self-contained breathing apparatus (scuba) equipment when entering a tank. No persons should enter the tank unless safety ropes are used and someone else capable of providing rescue assistance is outside the tank.

Do not assume any tank, including open top tanks, are well ventilated.

WASTEWATER STORAGE LAGOONS-

The wastewater storage lagoons shown on the Production Area Map are used to store wastewater containing manure generated by the Forest Glen Heifer Ranch. The storage capacity and estimated storage period for the wastewater storage lagoons are shown in Section 1.

Emptying of the wastewater storage lagoons should begin in the spring and continue through the spring and summer months as weather conditions permit applying wastewater in accordance with the guidance given in Section 3. To function properly and have the greatest management flexibility, the wastewater storage ponds must be as empty as possible in the fall before the fall and winter rainy season begins. Any annual sludge buildup in the wastewater storage ponds must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in Section 3.

Inspect the wastewater storage ponds weekly to ensure structural integrity and that at least 1 foot-6 inches of freeboard is being maintained to accommodate excess rainfall such as a 25 year-24hour storm and prevent overtopping embankment. If the structural integrity of a wastewater storage lagoons embankment is found to be compromised, immediately draw the liquid level down below the damaged area to determine the cause. Seek the services of a qualified engineer to assess the damage and recommend necessary repairs before allowing wastewater levels above the damaged area.

Pump the wastewater storage lagoon to the lowest level possible during the summer months and

SECTION 2 - PRODUCTION AREA

inspect the embankments for structural damage. If structural damage to the embankment of a wastewater storage lagoon is discovered, seek the services of a qualified engineer to assess the damage and recommend necessary repairs before allowing wastewater levels above the damaged area. Follow the guidance given in Section 3 when applying wastewater to fields.

Do not permit livestock access to the lagoon or on lagoon embankments. Control undesirable vegetation growth by spraying or mowing. Control rodents as necessary. Check elevations of earthfills periodically and restored to grade and shape as necessary. Fill and reseed eroded embankment areas or repair with well graded rock riprap. Safety features such as signs and fences should be kept in good repair.

Do not dispose of animal carcasses in any settling basin or wastewater storage lagoon. It is against the law to do so.

SOLIDS STORAGE BARN-

The solids storage barn shown on the Production Area Map on page 2-9 is used to store solids containing manure generated by the Forest Glen Heifer Ranch. The storage capacity and estimated storage period for the solids storage barn are shown on the ORAWM workbook storage worksheet located in Section 5. Emptying of the solids storage barn should begin in the spring and continue through the spring and summer months as weather conditions permit applying solids in accordance with the guidance given in Section 3, Utilization Area. To function properly and have the greatest management flexibility, the solids storage barn must be as empty as possible in the fall before the fall and winter rainy season begins.

Periodically inspect concrete and asphalt slabs, walls and curbs and repair or replace broken sections as needed. Cleanup any spillage of manure and organics from outside of the solids storage barn area and place them back in the solids storage barn.

Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.

BUILDING ROOFS-

Inspect building roofs annually as a minimum. Repair and/or replace all rusted sections and secure loose sections as needed. Immediately replace all broken trusses, rafters, beams, poles as needed. Immediately determining the cause and necessary modification(s) to prevent reoccurring structural failure is essential.

FENCES-

Do not allow livestock access to open water courses and drainageways. Provide off stream watering facilities where possible and limit access to designated watering areas.

Inspect fences periodically and repair or replace broken or decayed posts and tighten sagging wire as needed. Broken wire can be spliced or replaced. Replace broken or missing insulators on electric fences as needed and repair or replace inoperative electric fence controllers.

Insure gates and other appurtenances are in good working order. Replace or repair components as needed.

IRRIGATION SYSTEMS-

Maintain sprinkler irrigation systems in accordance with the manufacturer's recommendations to help ensure trouble free operation. Prevent livestock access to equipment during operation.

Clean plugged nozzles and replace if worn or defective.

Promptly repair all leaks by replacing valves, fittings, gaskets, worn or damaged parts.

Prompt repair or replacement of damaged or worn components is necessary. Check to make sure all application components i.e. water control structures, gates, valves, ditches, etc. are functional and are

SECTION 2 - PRODUCTION AREA

in good operating condition.

Maintain screening and filtering facilities.

Maintain vigorous vegetative growth where applicable.

LIVESTOCK WATERING FACILITIES-

Check all above ground connections, valves, gates, rodent guards, inlets and outlets to make sure they are functioning properly. Check troughs and tanks for leaks or cracks and repair or replace immediately, if necessary.

Make certain the area adjacent to the trough is well protected with gravel, paving, or good cover. Be sure that the outlet pipe has a free outlet and is not causing any serious erosion problems. Check periodically to see if debris has fallen into the trough or tank which may restrict inflow or planned functions of the outflow system.

Clean the entire system periodically and remove moss, algae growth, and/or sludge. Chemicals such as copper sulfate and chlorine can be used to prevent moss and algae growth. Local rules and regulations are to be followed when using chemicals to make sure they are safe for animals.

Where necessary maintain coverings and insulation to prevent damage by freezing.

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

Immediately repair any vandalism, vehicular or livestock damage.

PIPELINES-

Flush pipelines used for liquid waste applications with clean water following waste application, or as needed, to prevent particle buildup.

Drain the pipeline and components in areas that are subject to freezing. If parts of the pipeline cannot be drained, a non-toxic antifreeze solution may be added.

Check to make sure all valves and air vents are set at the proper operating condition so they can provide protection to the pipeline.

Inspect pipelines for signs of failure. Inspect risers and valves periodically for leaks or worn gaskets.

Repair or replace pipeline, risers and valves as needed.

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

PUMPS-

Operate and maintain pumps in accordance with good judgment and manufacture's manuals and recommendations.

Drain liquid manure from pumps during cold weather to prevent freezing. If parts of the system cannot be drained, a non-toxic antifreeze solution may be added.

Inspect pumps periodically and remove debris wrapped around shafts and impellers. Maintain foot valves and check valves for proper operation.

For proper operation of electric motors and controls, maintain lubrication for all bearings, keep electric panel free from obstructions and debris. Maintain electrical safety devices, assure all electrical contacts are tight, and lock main electrical switch to "OFF" position during non-use season. Maintain adequate shade and ventilation for pump motors.

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

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

SECTION 2 - PRODUCTION AREA

Operate and maintain agitators in accordance with the manufacture's manual and recommendations.
Inspect all plumbing annually as a minimum.
Replace, tighten, or repair broken or loose connections and lines as needed.

SOLID/LIQUID SEPARATION FACILITY-

Inspect the solid/liquid separation facility daily to ensure the facility is operating properly and there has been no damage to structural components. Clean screens and outlets if they have become clogged or their capacity is not adequate for proper operation of the facility.
Prevent any spillage or leakage onto roadways when transferring solids from the solid/liquid separation facility to the solids storage barn and to utilization areas.

WELL(S)-

Protect the area immediately surrounding the well from being damaged by agriculture machinery, vehicles, or livestock.
All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
Do not allow any foreign debris to accumulate and maintain soil and vegetative covering in the immediate vicinity of the well.
Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.
Check metal surfaces for rust and other damage especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as a protective covering.
Keep all surface water from entering or accumulating at the immediate vicinity of the well site.
Immediately repair any vandalism, vehicular, or livestock damage.

CHEMICAL HANDLING CHECKLIST-

The following measures shall be taken to prevent chemicals from contaminating process water or storm water storage and treatment systems:

1. Make sure all chemicals are stored in proper containers. Expired chemicals and empty containers are to be properly disposed of in accordance with state and federal regulations. Pesticides and associate refuse are to be disposed of in accordance with the FIFRA label.
2. Chemical storage areas are to be self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
3. Chemical storage areas are to be covered to prevent chemical contact with rain or snow.
4. Emergency procedures and equipment are to be in place to contain and clean up chemical spills.
5. Chemical handling and equipment wash areas are to be designed and constructed to prevent contamination of surface waters, waste water, and storm water storage and treatment systems.

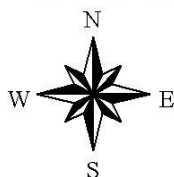
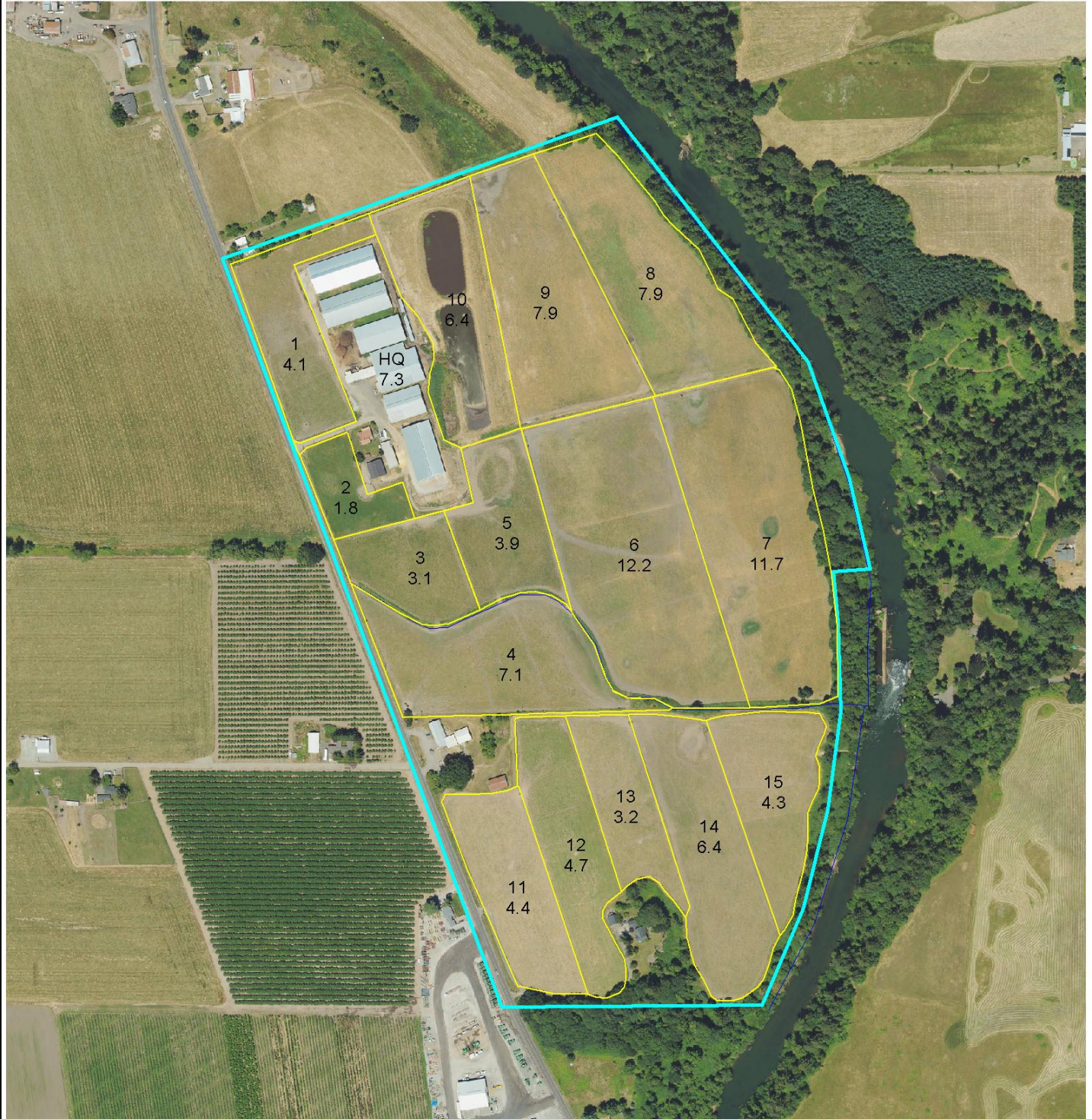
SECTION 2 - PRODUCTION AREA

Production Area Maps for Forest Glen Heifer Ranch



SECTION 3 - UTILIZATION AREA
Field Maps for Forest Glen Heifer Ranch

Forest Glen Heifer Ranch



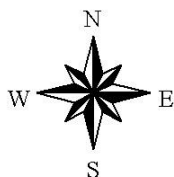
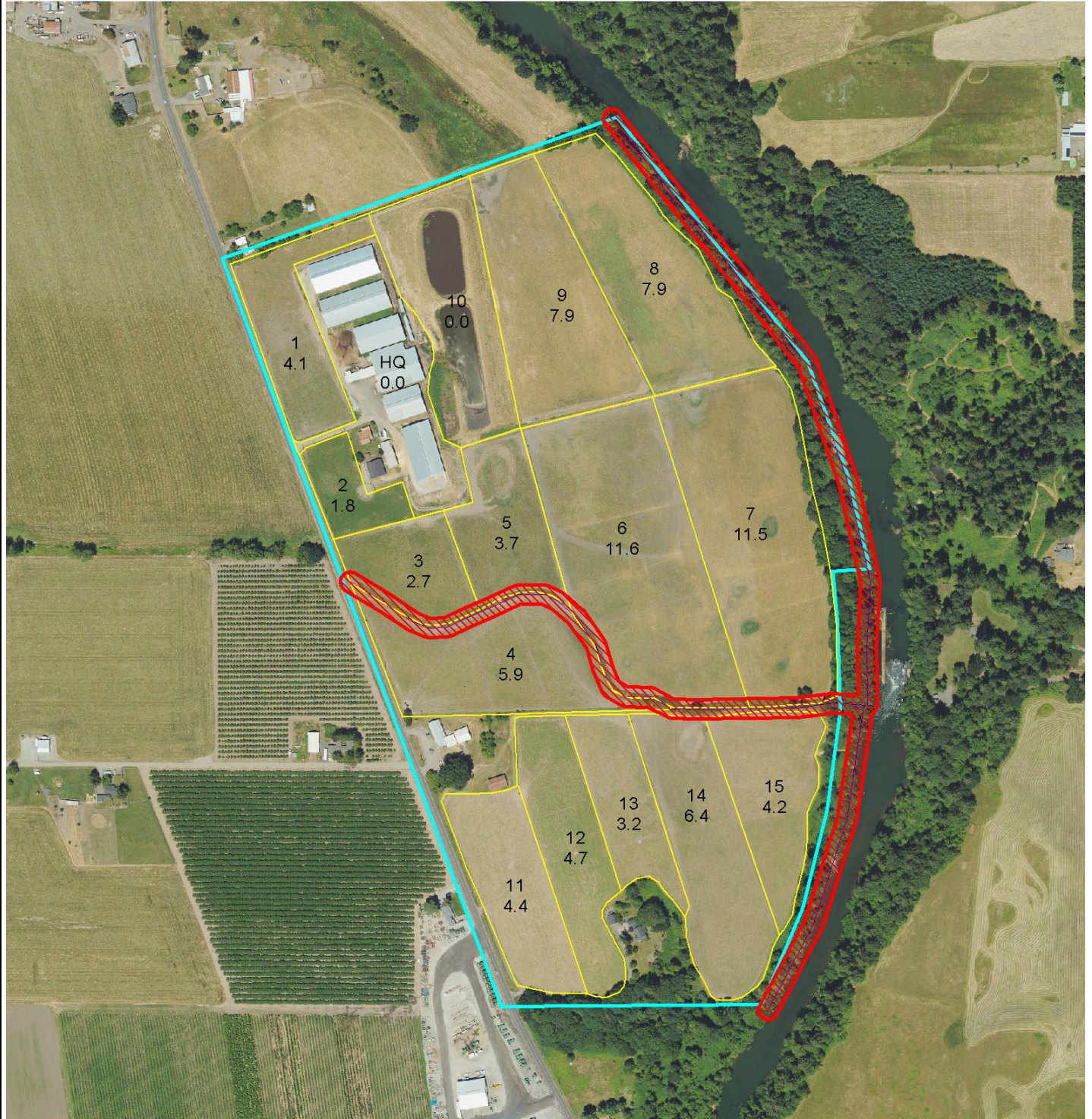
Scale 0 500 1000 1500 Feet

Map Legend

Field Name - Field Boundary, Field Name, Acres

SECTION 3 - UTILIZATION AREA
Setback Maps for Forest Glen Heifer Ranch

Forest Glen Heifer Ranch



Scale 0 500 1000 1500 Feet

Map Legend

- Field Name Spreadable Acres - Field Boundary, Field Name, Spreadable Acres
-  - Setback Areas

SECTION 3 - UTILIZATION AREA

Application Considerations

The manure and irrigation application systems will be calibrated in accordance with guidance in this section to insure the applications of manure, bedding and runoff from the waste storage facilities are in accordance with agronomic rates.

No application of wastewater or solids containing manure is to be made to the field buffer areas shown on the Setback Map in Section 3-2. Applications of wastewater and solids containing manure should be made in accordance with guidance in this section to reduce the risk of contaminated runoff to surface water sources and leaching of contaminants to ground water sources.

The phosphorus runoff rating for each of the farm fields is based on the Oregon Natural Resources Conservation Service Phosphorus Index and is shown in the table in Section 4-3. Wastewater, solids and commercial fertilizer for any field with a LOW runoff rating can be applied on a nitrogen basis. Wastewater, solids and commercial fertilizer for any field with a MEDIUM or HIGH runoff rating must be applied on a phosphorus basis. No applications of manure or commercial fertilizer containing phosphorus are to be made on a field with a ZERO OUT phosphorus runoff rating.

Manure applications may be made at any time of the year provided certain factors have been considered. However, the overriding factor one should use in considering whether or not to apply nutrients to a crop, irrespective of the nutrient source, is the agronomic need of the crop at the time of application. The following guidelines are to be considered once the decision has been made to make a manure application.

Consider using T-Sum 200 to determine when manure applications are to begin as long as you can comply with all other permit and AWMP requirements. Calculations for T-Sum 200 are outlined in OSU Extension Fertilizer Guide for Pastures (OSU FG63, 2000). T-Sum 200 is based on accumulated heat units and is an accurate guide to estimate plant activity. Research has shown that T-Sum 200 is the earliest date when plant roots begin to grow in the spring and thus are receptive to applied nutrients.

T-Sum 200 is determined by monitoring surface air temperature and summing the daily minimum and maximum air temperatures and dividing the sum by two to get the average daily air temperature then converting that to centigrade ($F \text{ degrees minus } 32 \text{ times } 0.556$). Manure applications may begin once 200 heat units have been accumulated. However, one must still apply manure at agronomic rates based on the estimated growth potential of the crop and anticipated climatic events.

Based on crop nutrient uptake patterns, manure applications should stop when the crop is done growing for the year and before the first significant rainfall event that is expected to result in saturated soils or surface runoff.

Fields that are subsurface (TILE) drained require additional precautions when manure is applied. Any pre-application tillage should leave as much residue as possible on the soil surface. Water control structures installed in subsurface drainage systems should be managed to prevent discharge of manure and wastewater during periods of application.

Be aware of the location of sensitive areas, concerns of neighbors or concerns of the public, which require special application procedures. To reduce odor problems, apply wastewater and solids containing manure 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.

SECTION 3 - UTILIZATION AREA

Calibrate application equipment to insure uniform distribution and accurate application rates in accordance with guidance given in the Considerations for Manure Applications and with guidance on the calibration of application equipment.

Maintain setbacks for manure application from any surface waters. The management goal is not to allow manure to enter surface waters at any time. The following table shows **minimum setback requirements** for manure applications:

Manure Type	Application Equipment	Month and Setback Distance in Feet ^{a, b, d}											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Liquid	Big gun	100	100	100	35	35	35	35	35	35	100	100	100
Liquid	Spreader Bar	100	100	35	35	35/15 ^c	15	15	15	35	100	100	100
Liquid	Tank Wagon	100	100	35	35	35/15 ^c	15	15	15	35	100	100	100
Liquid	Tanker Truck	100	100	35	35	35/15 ^c	15	15	15	35	100	100	100
Solid	Spreader	100	100	35	35	35/15 ^c	15	15	15	35	100	100	100

Note:

- Setbacks are the distance between open waterways and manure application area.
- Setback requirements will generally increase for manures which are applied aerially (such as a traveling big gun) versus manures applied lower to the ground (such as a splash bar) due to potential for drift from wind or splashing.
- This is a floating date and should be evaluated based on current weather conditions and forecast information.
- Fifteen (15) feet is the suggested setback distance during summer months, however larger and/or smaller distances may be set depending on conversations with the ODA.

Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

Apply wastewater and solids containing manure at agronomic rates using the following guidelines:

- Consider using T-Sum 200 as a guideline to begin making manure applications.
- Do not apply to soils immediately before or during rainfall events that are expected to result in saturated soils or surface runoff.
- Apply to land being prepared for crops. Till manure into soil within 3 days of application if possible or apply to actively growing crops such as grass, clover or alfalfa after cutting.
- Maintain the setback buffer distances described in this section and shown on the Setback Map when making applications of liquids or solids containing manure.
- Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR WET SEASON MANURE APPLICATIONS:

Only apply manure during this time period if the following guidelines CAN be met. Call the ODA CAFO Program at (503) 986-4700 for guidance if a manure application is needed and the following guidelines CANNOT be met:

- Apply manure only to actively growing crops such as grass, clover or alfalfa.
- Minimize application rates by using the maximum travel rates for the application equipment.
- Maintain the setback buffer distances described in this section and shown on the Setback Map when making applications of liquids or solids containing manure.
- Do not apply to soils immediately before or during rainfall events that are expected to result in saturated soils or surface runoff.
- Do not apply to saturated or flooded soils. It is recommended that application(s) be limited to soils

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(areas) where the flooding frequency class rating is None, Very Rare or Rare.

- Do not apply to slopes greater than 5%. See the Soil Map in Section 4-1 for the location of soil map units with slopes greater than 5%.

Applications of wastewater or solids containing manure to frozen soils should be avoided. Do the following if an application of wastewater or solids containing manure is to be made to frozen soils:

- Apply only enough wastewater or solids containing manure to address storage limitations until suitable soil conditions for application are available.
- Minimize applications to 5 wet tons per acre or less of solids containing manure and 6,788 gallons (0.25 inches) per acre or less of wastewater.
- Apply to alternating strips to reduce the risk of contaminated runoff reaching surface water sources.
- Apply to fields of established hay, pasture or fields containing at least 90% cover and are the furthest from open water sources.
- Do not apply wastewater or solids containing manure within 200 feet of surface water sources, drainageways, wells, or inlets to subsurface drainage systems.
- Runoff control systems such as earthen dikes must be in place where applications will be made to fields with slopes greater than 5%.

Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

Do not apply manure or commercial fertilizer to fields receiving applications unless the nutrients applied in the manure are less than the annual application of nutrients planned in the nutrient budget for the fields.

HOW TO CALIBRATE APPLICATION EQUIPMENT

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

Irrigation System Calibration

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

<u>Inches Liquid Manure Applied</u>	<u>Gallons per Acre</u>
0.20	5,431
0.30	8,146
0.40	10,862
0.50	13,577
0.75	20,366
1.00	27,152
1.25	33,943
1.50	40,731

Soft Hose Injection System with Irrigation Hose:

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

SECTION 3 - UTILIZATION AREA

over a distance of 600 feet and 10 feet wide.

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

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

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

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

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

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

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

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

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

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

For example:

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

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

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

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

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

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

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

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

Manure Spreader/Tanker Calibration

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

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

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

Load-Area Method:

The load-area method is the most accurate and can be used for both liquid and solid manure. The load area method is a 3-step process:

Step 1) Determine the amount of manure in the spreader. The most accurate way to determine the amount of manure in a spreader is weighting the spreader when it is empty and again when it is full. For a reliable estimate of spreader capacity, weigh several representative loads (at least five) to determine the average gross weight. Subtract the empty spreader weight. Then, calculate the average net loaded weight.

Step 2) Determine the area of spread using the method at the right. Width measurements near the

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beginning and end of the spread pattern should be avoided because the spreader may not be operating at full capacity.

Step 3) Calculate the application rate. The application rate is calculated using the formula for either liquid or solid manure.

Formula for Solid Manure Equals Tons/Acre

(Average Loaded Weight (lbs) x 21.81) divided by (Distance Traveled (ft) x Width of Spread (ft))

Formula for Liquid Manure Equals Gal/Acre

(Tank Volume (gal) x 43,560) divided by (Distance Traveled (ft) x Width of Spread (ft))

Weight-Area Method:

The weight-area method can only be used with solid or semi-solid manure. When a scale is not available, the application rate of a box spreader can be determined by collecting manure on a tarp or piece of heavy material. The weight area method is less accurate than the load area method.

This method consists of eight steps:

Step 1) Prepare/cut three 56-inch square tarps or pieces of heavy material (this size equals 1/2,000 of an acre). The pounds of manure collected on 56 inches square equals tons applied per acre.

Step 2) Weigh one of the clean tarps and a large bucket on a platform scale. Record the weight.

Step 3) Anchor the three tarps in the field ahead of the spreader near the beginning, middle, and end of the area that will be spread with one load.

Step 4) Drive over the three tarps at a normal speed to collect a representative manure sample.

Step 5) Fold and place the first tarp into the empty bucket without spilling the manure.

Weigh the bucket, tarp, and manure. Subtract the weight of the clean tarp and bucket recorded in step 2.

Step 6) Repeat the process for each of the two remaining tarps.

Calculate the average weight (pounds) of the manure collected. This value equals tons of manure applied per acre.

Factor for converting pounds to tons and square feet to acres ($21.8 = 43,560 \text{ sq ft per acre divided by } 2,000 \text{ lbs/ton}$).

The factor for converting square feet to acres = 43,560 sq ft per acre.

Step 7) Determining Area of Spread.

The "area of spread" is the length and width of the ground covered with one load of manure. The area of spread is affected by speed and equipment settings. Spreaders discharge manure at varying rates depending on travel and PTO speed, gear box settings, and discharge openings. It is important to adjust the spreader so the pattern is as uniform as possible. Accurately measuring the length and width of this area is essential. To determine width, measure two adjacent spreads and divide by two to find the "effective" spread width. This accounts for overlap, which is often needed for a more uniform application. The length of spread is determined using the following three values:

Desired manure application rate based on soil and manure tests,

Width of the manure spread, and

Manure spreader holding capacity (weight and/or volume).

From these values, calculate the distance or lengths of spread using these formulas:

Formula: Solid Manure Equals Feet/Load

(Average Load Weight (lbs) x 21.81) divided by (Spread Width (ft) x App. Rate (tons/ac))

Formula: Liquid Manure Equals Feet/Load

(Tank Volume (gal) x 43,560) divided by (Spread Width (ft) x Desired App. Rate (gal/ac))

Step 8) Spread a load. If the distance traveled does not equal the calculated distance, adjust the speed or equipment settings.

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

The formulas for determining the total nutrient application rate per unit yield for each crop shown in the

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table below are as follows:

Total N to apply in pounds = N in pounds per yield unit from the table for the crop grown X Yield Units per Acre X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total P₂O₅ to apply in pounds = P in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 2.291 P₂O₅/P X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total K₂O to apply in pounds = K in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 1.205 K₂O/K X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Example- for a field with 5 tons per acre of grass/legume hay harvested at 90% dry matter:

Total N to apply in pounds per acre = (33.92 lb N / ton) X (5 tons / acre) X (90%DM / 100% DM) = 153 lbs N / acre

The following tables show the crops that may be grown on this farm:

FRUIT OR VEGETABLES

	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	13.93	1.30	11.57
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	20.67	5.60	13.66
Grapes	ton	2000	100	11.39	1.07	20.43
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.18	0.04	0.13
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	30.0	5.45	47.27
Squash	ton	2000	100	21.33	6.80	11.40

GRAIN, SEED OR OIL CROPS

	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
Bluegrass, Seed	cwt	100	100	2.88	0.43	1.98
Canola	ton	2000	100	70.00	12.00	18.00
Corn, grain shelled	bushels	56	100	0.90	0.16	0.22
Crimson Clover seed	lb	1	100	0.05	0.01	0.02
Fescue Seed, Straw Removed	cwt	100	100	1.97	0.20	2.00
Fescue, seed (Fine or Tall)	lb	1	100	1.47	0.31	1.67
Oats, grain	bushels	32	100	0.62	0.11	0.16
Orchardgrass seed	lb	1	100	0.016	0.002	0.004
Peppermint for Oil	ton	2000	100	4.20	1.80	2.80
Peppermint for Oil, Leaves & Stems Removed	ton	2000	100	87.23	36.80	57.80
Pumpkins	ton	2000	100	4.00	1.40	6.60
Rapeseed	bushels	50	100	1.38	0.30	0.30
Red Clover seed	cwt	100	100	4.55	1.00	2.00
Ryegrass seed	cwt	100	100	1.67	0.27	1.42

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Ryegrass Seed,						
Straw Removed	ton	2000	100	30.00	18.80	37.60
Ryegrass, Perennial seed	lb	1	100	0.02	0.002	0.004
Wheat, Soft White for grain	bushels	60	100	1.00	0.24	0.21
Wheat, Soft White,						
Straw Removed	ton	2000	100	43.40	8.90	20.90
Wheat, Hard Red for grain	bushels	60	100	1.60	0.37	0.31
Wheat, Hard Red,						
Straw Removed	ton	2000	100	53.36	10.96	23.76

HAY AND PASTURE CROPS

				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa, Hay	ton	2000	100	54.40	6.83	35.70
Alfalfa, Seed	cwt	100	100	6.12	0.70	2.34
Alta Fescue Hay/Pasture	ton	2000	100	32.98	6.88	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.92	5.30	7.56
Meadow Fescue Hay/Pasture	ton	2000	100	41.56	8.70	47.43
Oats Hay/Pasture	ton	2000	100	26.01	10.20	14.79
Orchardgrass Hay/Pasture	ton	2000	100	53.21	8.58	18.62
Perennial Grass Hay/Pasture	ton	2000	100	58.00	8.00	40.00
Reed Canary Grass	ton	2000	100	27.00	3.57	41.57
Ryegrass Hay	ton	2000	100	33.41	5.44	28.39
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Sorghum-Sudan Haylage	ton	2000	100	54.40	6.40	58.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00
Vetch Hay	ton	2000	100	51.93	7.20	44.76

SILAGE AND HAYLAGE CROPS

				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa/Grass Haylage	ton	2000	100	15.60	1.02	6.84
Corn for Silage	ton	2000	100	25.00	4.00	20.00
Crimson Clover forage	ton	2000	100	40.00	4.48	33.28
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Mustard, White	ton	2000	100	38.55	0.0	0.0
Oat haylage	ton	2000	100	26.0	10.2	14.8
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Perennial Grass Haylage	ton	2000	100	15.00	2.40	12.78
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	15.00	2.40	12.78
Sorghum-Sudan Haylage	ton	2000	100	16.32	1.92	17.40
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Vetch Haylage	ton	2000	100	59.67	6.57	50.00
Wheat Haylage	ton	2000	100	41.30	5.00	57.30
Wheatgrass Hay/Pasture	ton	2000	100	49.59	6.21	68.76

OTHER CROPS

				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Filberts	ton	2000	100	41.70	7.30	39.29
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees & Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20
Poplars, Pulpwood	ton	2000	100	0.30	0.09	0.12
Hemp/Cannabis	ton	2000	100	31.09	3.37	36.23

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Note: Nutrient uptake values are taken from the NRCS National Agricultural Waste Management Field Handbook and updated with more current information from the Extension Service when available. When nutrient uptake values are not available from NRCS or Extension references, then nutrient uptake data from the NRCS Plant Database or other approved data sources is used.

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Nutrient Applications



Nutrient Applications Report

Forest Glen Heifer Ranch

Dayton

FGH1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/05	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	257 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	257 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	184 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	202 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	184 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	100 CF	7	6	5
10/18	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
FGH1 Totals:					331	129	508

FGH11

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/07	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	275 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	275 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	196 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	216 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	196 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	118 CF	8	7	5
10/19	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/02	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH11 Totals:					392	142	621

FGH12

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/08	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	296 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	296 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	211 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	232 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	211 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	127 CF	8	7	5
10/20	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/03	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH12 Totals:					393	143	622

Nutrient Applications Report - Forest Glen Heifer Ranch

FGH13

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/09	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	202 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	202 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	144 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	159 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	144 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	86 CF	8	7	5
10/21	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/04	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH13 Totals:					393	143	622

FGH14

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/12	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	400 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	400 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	286 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	314 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	286 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	171 CF	8	7	5
10/21	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/05	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH14 Totals:					392	142	621

FGH15

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/13	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	268 CF	18	17	12
06/01	Grazing activity	Dairy Heifers	100	268 CF	18	17	12
07/01	Grazing activity	Dairy Heifers	100	192 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	211 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	192 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	115 CF	8	7	5
10/22	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/08	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH15 Totals:					392	142	621

Nutrient Applications Report - Forest Glen Heifer Ranch

FGH2

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/06	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	111 CF	18	16	12
06/01	Grazing activity	Dairy Heifers	100	111 CF	18	16	12
07/01	Grazing activity	Dairy Heifers	100	79 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	87 CF	14	13	9
09/01	Grazing activity	Dairy Heifers	100	79 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	47 CF	8	7	5
10/25	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/09	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH2 Totals:					392	142	621

FGH3

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/14	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	194 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	194 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	139 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	153 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	139 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	83 CF	8	7	5
10/25	FGH WSL3	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
11/10	FGH WSL3	Hard Hose Big Gun	100	8,250 Gal/Ac	61	13	113
FGH3 Totals:					393	143	622

FGH4

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/15	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	446 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	446 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	318 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	350 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	318 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	191 CF	8	7	5
10/26	FGH WSL3	Hard Hose Big Gun	100	25,336 Gal/Ac	188	40	347
FGH4 Totals:					397	143	630

Nutrient Applications Report - Forest Glen Heifer Ranch

FGH5

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/16	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	244 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	244 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	174 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	192 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	174 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	104 CF	8	7	5
10/27	FGH WSL3	Hard Hose Big Gun	100	24,336 Gal/Ac	181	38	333
11/12	FGH WSL3	Hard Hose Big Gun	100	1,066 Gal/Ac	8	2	15
FGH5 Totals:					397	143	630

FGH6

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/16	FGH WSL2	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	766 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	766 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	547 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	602 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	547 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	328 CF	8	7	5
10/28	FGH WSL3	Hard Hose Big Gun	100	25,336 Gal/Ac	188	40	347
FGH6 Totals:					397	144	630

FGH7

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/19	FGH WSL1	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	735 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	735 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	525 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	578 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	525 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	315 CF	8	7	5
10/28	FGH WSL2	Hard Hose Big Gun	100	13,350 Gal/Ac	99	21	183
FGH7 Totals:					308	125	465

FGH8

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/20	FGH WSL1	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	494 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	494 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	353 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	388 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	353 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	212 CF	8	7	5
10/29	FGH WSL2	Hard Hose Big Gun	100	13,350 Gal/Ac	99	21	183
FGH8 Totals:					308	124	465

FGH9

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/22	FGH WSL1	Hard Hose Big Gun	100	16,500 Gal/Ac	123	26	226
05/01	Grazing activity	Dairy Heifers	100	494 CF	19	17	12
06/01	Grazing activity	Dairy Heifers	100	494 CF	19	17	12
07/01	Grazing activity	Dairy Heifers	100	353 CF	13	12	9
08/01	Grazing activity	Dairy Heifers	100	388 CF	15	13	10
09/01	Grazing activity	Dairy Heifers	100	353 CF	13	12	9
10/01	Grazing activity	Dairy Heifers	100	212 CF	8	7	5
11/01	FGH WSL2	Hard Hose Big Gun	100	13,350 Gal/Ac	99	21	183
FGH9 Totals:					308	124	465

SECTION 3 - UTILIZATION AREA

Sampling Guidance

Manure and Soil Sampling Frequency

For large concentrated animal feeding operations, sample liquids and solids containing manure during applications in early spring annually and have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen ($\text{NH}_4\text{-N}$), Phosphorus (P_2O_5) and Potassium (K_2O) plus percent moisture. Ask the lab to report results in pounds per ton for the solids containing manure and in pounds per thousand gallons for liquids containing manure. Analyses of solids and liquids containing manure should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program

(MTLCP), <http://www2.mda.state.mn.us/webapp/lis/manurelabs.jsp>.

For small and medium animal feeding operations, if no samples of liquids and solids containing manure have been taken, take a sample of liquids and solids during applications in early spring once a year for three consecutive years to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields. If there is a sampling history of liquids and solids containing manure, take a sample of liquids and solids during applications in early spring once every 5 years or whenever a significant change in animal numbers or in the manure handling system occurs. Have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen ($\text{NH}_4\text{-N}$), Phosphorus (P_2O_5) and Potassium (K_2O) plus percent moisture. Ask the lab to report results in pounds per ton for the solids containing manure and in pounds per thousand gallons for liquids containing manure. Analyses of solids and liquids containing manure should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program

(MTLCP), <http://www2.mda.state.mn.us/webapp/lis/manurelabs.jsp>.

Large CAFO's are required to test a minimum of 20 percent of their fields annually which would result in all of the fields being tested once every 5 years. Small and Medium CAFO's are only required to test all of their fields once every 5 years. However, from a management standpoint, more frequent soil testing offers good information on the nutrient status of your soils.

Collect soil samples from 20 percent of the fields receiving solids or liquids containing manure **annually** in the fall after harvest or before rains begin (typically September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"**, <https://catalog.extension.oregonstate.edu/pnw570>. Have the soil samples analyzed for Total Nitrogen (TKN) and Phosphorus (P) and ask the lab to report results in parts per million (ppm). Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP); <http://www.naptprogram.org/pap/>.

How to Sample Liquid Manure

Obtain a composite following one of the procedures listed below and thoroughly mix. Using a plunger, an up-and-down action works well for mixing liquid manure in a five-gallon bucket. Fill a one-quart plastic bottle not more than three-quarters full with the composite sample. Store sample in freezer if not delivered to the lab immediately.

Procedure 1. Sampling from storage- Agitate storage facility thoroughly before sampling. Collect at least five samples from the storage facility or during loading using a five-gallon bucket. Place a sub sample of the composite sample in a one-quart plastic container. Sampling a liquid manure storage facility without proper agitation (2-4 hrs. minimum) is not recommended due to nutrient stratification, which occurs in liquid systems. If manure is sampled from a lagoon that was not properly agitated, typically the nitrogen and potassium will be more concentrated in the top liquid, while the phosphorus will be more concentrated in the bottom solids.

Procedure 2. Sampling during application- Place buckets around field to catch manure from spreader or irrigation equipment. Combine and mix samples into one composite sub sample in a one-quart plastic container.

How to Sample Solid Manure

Collect a composite sample by following one of the procedures listed below. A method for mixing a composite sample is to pile the manure and then shovel from the outside to the inside of the pile until well mixed. Fill a one-gallon plastic heavy-duty zip lock bag approximately one-half full with the composite sample, squeeze out excess air, close and seal. Store sample in freezer if not delivered to the laboratory immediately.

Procedure 1. Sampling while loading - Recommended method for sampling from a stack or bedded pack. Take at least ten samples while loading several spreader loads and combine to form one composite sample. Thoroughly mix the composite sample and take an approximately one pound sub sample using a one-gallon plastic bag. Sampling directly from a stack or bedded pack is not recommended.

Procedure 2. Sampling during spreading - Spread a tarp in field and catch the manure from one pass. Sample from several locations and create a composite sample. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag.

Procedure 3. Sampling daily haul - Place a five-gallon bucket under the barn cleaner 4-5 times while loading a spreader. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag. Repeat sampling 2-3 times over a period of time and test separately to determine variability.

Procedure 4. Sampling poultry in-house - Collect 8-10 samples from throughout the house to the depth the litter will be removed. Samples near feeders and waterers may not be indicative of the entire house and sub samples taken near here should be proportionate to their space occupied in the whole house. Mix the samples well in a five-gallon pail and take a one-pound sub sample, place it in a one-gallon zip lock bag.

Procedure 5. Sampling stockpiled litter - Take ten sub samples from different locations around the pile at least 18 inches below the surface. Mix in a five-gallon pail and place a one-pound composite sample in a gallon zip lock bag.

Sample Identification and Delivery

Identify the sample container with information regarding the farm, animal species and date. This information should also be included on the sample information sheet along with application method, which is important in determining first year availability of nitrogen.

Keep all manure samples frozen until shipped or delivered to a laboratory. Ship early in the week (Mon.-Wed.) and avoid holidays and weekends.

How to Sample Soils

Current soil tests must be used in the development and editing of nutrient management plans. A current soil test is one that is no older than 5 years that is used to represent the nutrient status of the entire field. Soil analysis must be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP). Results of these analysis will be used to determine application rates for manure, litter, and process wastewater. Guidance for soil sampling can be found in the **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"**, <https://catalog.extension.oregonstate.edu/pnw570>. **Oregon State University Extension publication EC1478, "Soil Test Interpretation Guide"**, <https://catalog.extension.oregonstate.edu/ec1478> provides guidance on how to determine soil nutrient concentrations and how to adjust soil pH to improve nutrient availability.

Field Area. A composite soil sample should represent a uniform field area. Each area should have similar crop and fertility history. Soil characteristics (color, slope, texture, drainage) should be

similar. Exclude small areas within a field that are obviously different. The field area represented by a single composite sample should represent no more than 40 irrigated acres or 100 dry land acres.

Sampling Depth. Laboratory tests are calibrated to specific depths. It is vital to collect samples from appropriate depths. Sampling depth for most soils is the rooting depth in 6-inch intervals. In Oregon, as a minimum, soil samples should be collected from the 0-12" depth. The 0-6" surface soil samples are normally used for conventional tests of organic matter, nitrogen, phosphorus, potassium, pH and salt levels. Additionally, subsurface samples from the 6-24" depth are needed to estimate nitrogen availability for crops grown in dry land areas.

Post Harvest Soil Testing for Evaluating Nutrient Applications. Refer to **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"**, <https://catalog.extension.oregonstate.edu/pnw570>, for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

SECTION 3 - UTILIZATION AREA

Manure Tests



Nutrient Analysis Report

Forest Glen Heifer Ranch

Dayton

Sample Date	Storage Name	Units	Total N	P ₂ O ₅	K ₂ O	NH ₄ -N	NO ₃ -N	Org N	Density Lbs/CF
02/01/2025	FGH Manure Barn	lbs/Ton	7.72	2.15	6.25	0.01	0.0	7.71	36.0
09/02/2024	FGH WSL1	lbs/1000gal	7.43	1.58	13.7	3.59	0.05	3.79	62.0
09/02/2024	FGH WSL2	lbs/1000gal	7.43	1.58	13.7	3.59	0.05	3.79	62.0
09/02/2024	FGH WSL3	lbs/1000gal	7.43	1.58	13.7	3.59	0.05	3.79	62.0
11/19/2022	FGH Manure Barn	lbs/Ton	9.08	3.51	5.62	0.76	0.02	8.3	36.0

SECTION 3 - UTILIZATION AREA

Soil Tests



Soils Testing Report

Forest Glen Heifer Ranch

3695 Lafayette Hwy, Dayton

Soils Testing Report - Forest Glen Heifer Ranch

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
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FGH1

2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		10124.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH11

2/12/2024	2477	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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FGH12

2/12/2024	2477	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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FGH13

2/12/2024	2477	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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FGH14

2/12/2024	2477	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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FGH15

2/12/2024	2477	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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FGH2

2/12/2024	104225	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH3

2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH4

Soils Testing Report - Forest Glen Heifer Ranch

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					

FGH5

2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH6

2/12/2024	104425	FGH	12.0	6.4			3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0		6.7					
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FGH7

2/12/2024	104425	FGH	12.0	6.4			3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH8

2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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FGH9

2/12/2024	104425	FGH	12.0	6.4		0.14	3.78		99.0		1024.0				4.3 ppm	7.6 ppm	9.0	0.72	6.7					
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Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP);
<http://www.naptprogram.org/pap/>

SECTION 3 - UTILIZATION AREA

Nutrient Balances



Nutrient Balances Report

Forest Glen Heifer Ranch

Dayton

Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac)			Nutrient Applied (lbs/ac)			Nutrient Balance (lbs/ac)		
				N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
FGH1	4.1	Grass Hay/Pasture	6.1 Ton	355	112	295	331	129	508	(-24)	17	213
FGH11	4.4	Grass Hay/Pasture	6.9 Ton	399	126	331	392	142	621	(-6)	16	290
FGH12	4.7	Grass Hay/Pasture	6.9 Ton	401	127	333	393	143	622	(-8)	16	289
FGH13	3.2	Grass Hay/Pasture	6.9 Ton	401	127	334	393	143	622	(-8)	16	288
FGH14	6.4	Grass Hay/Pasture	6.9 Ton	399	126	332	392	142	621	(-7)	16	290
FGH15	4.3	Grass Hay/Pasture	6.9 Ton	398	126	331	392	142	621	(-6)	16	290
FGH2	1.8	Grass Hay/Pasture	6.8 Ton	396	125	329	392	142	621	(-5)	16	292
FGH3	3.1	Grass Hay/Pasture	6.9 Ton	401	127	333	393	143	622	(-8)	16	289
FGH4	7.1	Grass Hay/Pasture	6.9 Ton	400	126	332	397	143	630	(-3)	17	297
FGH5	3.9	Grass Hay/Pasture	6.9 Ton	399	126	331	397	143	630	(-1)	17	299
FGH6	12.2	Grass Hay/Pasture	6.9 Ton	400	126	332	397	144	630	(-3)	17	297
FGH7	11.7	Grass Hay/Pasture	6.7 Ton	388	123	323	308	125	465	(-80)	2	143
FGH8	7.9	Grass Hay/Pasture	6.8 Ton	392	124	326	308	124	465	(-85)	0	139
FGH9	7.9	Grass Hay/Pasture	6.7 Ton	388	122	322	308	124	465	(-80)	2	143

SECTION 3 - UTILIZATION AREA

Transferred Nutrients



Transfers Report Forest Glen Heifer Ranch Dayton

Exported from	Date Transferred	Quantity	Analysis Available	Total N lbs	P ₂ O ₅ lbs	K ₂ O lbs	Exported to
FGH Manure Barn	10/04	426 Ton	Yes	3,578.4	526.22	2,098.18	Offsite Farms
FGH Manure Barn	10/11	426 Ton	Yes	3,578.4	526.22	2,098.18	Offsite Farms
FGH Manure Barn	10/18	425 Ton	Yes	3,568.32	524.74	2,092.27	Offsite Farms
Sub Totals:		70,933 CF		10,725.12	1,577.19	6,288.64	
Imported from	Date Transferred	Quantity	Analysis Available	Total N lbs	P ₂ O ₅ lbs	K ₂ O lbs	Imported to
No Imports.				0	0	0	
Sub Totals:		CF		0	0	0	
Totals:		70,933 CF		10,725	1,577	6,289	

SECTION 3 - UTILIZATION AREA

Grazing History



Grazing Report Forest Glen Heifer Ranch - Dayton

NMPT

04/19/2025

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
10/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	87.0 Hours	3,552	25	3	17
	FGH1 Totals:			74	87.0 Hours	3,552	25	3	17
10/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	96.0 Hours	1,536	25	3	17
	FGH2 Totals:			32	96.0 Hours	1,536	25	3	17
10/01	FGH3	Grass Hay/Pasture	Dairy Heifers	56	96.0 Hours	2,688	25	3	17
	FGH3 Totals:			56	96.0 Hours	2,688	25	3	17
10/01	FGH4	Grass Hay/Pasture	Dairy Heifers	128	96.0 Hours	6,144	25	3	17
	FGH4 Totals:			128	96.0 Hours	6,144	25	3	17
10/01	FGH5	Grass Hay/Pasture	Dairy Heifers	70	96.0 Hours	3,360	25	3	17
	FGH5 Totals:			70	96.0 Hours	3,360	25	3	17
10/01	FGH6	Grass Hay/Pasture	Dairy Heifers	220	96.0 Hours	10,560	25	3	17
	FGH6 Totals:			220	96.0 Hours	10,560	25	3	17
10/01	FGH7	Grass Hay/Pasture	Dairy Heifers	211	96.0 Hours	10,128	25	3	17

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
10/01	FGH7 Totals:			211	96.0 Hours	10,128	25	3	17
	FGH8	Grass Hay/Pasture	Dairy Heifers	142	96.0 Hours	6,816	25	3	17
	FGH8 Totals:			142	96.0 Hours	6,816	25	3	17
10/01	FGH9	Grass Hay/Pasture	Dairy Heifers	142	96.0 Hours	6,816	25	3	17
	FGH9 Totals:			142	96.0 Hours	6,816	25	3	17
10/01	FGH11	Grass Hay/Pasture	Dairy Heifers	79	96.0 Hours	3,792	25	3	17
	FGH11 Totals:			79	96.0 Hours	3,792	25	3	17
10/01	FGH12	Grass Hay/Pasture	Dairy Heifers	85	96.0 Hours	4,080	25	3	17
	FGH12 Totals:			85	96.0 Hours	4,080	25	3	17
10/01	FGH13	Grass Hay/Pasture	Dairy Heifers	58	96.0 Hours	2,784	25	3	17
	FGH13 Totals:			58	96.0 Hours	2,784	25	3	17
10/01	FGH14	Grass Hay/Pasture	Dairy Heifers	115	96.0 Hours	5,520	25	3	17
	FGH14 Totals:			115	96.0 Hours	5,520	25	3	17
10/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	96.0 Hours	3,696	25	3	17
	FGH15 Totals:			77	96.0 Hours	3,696	25	3	17
09/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	160.0 Hours	3,552	25	3	17
	FGH1 Totals:			74	160.0 Hours	3,552	25	3	17

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
09/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	160.0 Hours	2,560	41	6	28
	FGH2 Totals:			32	160.0 Hours	2,560	41	6	28
09/01	FGH3	Grass Hay/Pasture	Dairy Heifers	56	160.0 Hours	4,480	42	6	29
	FGH3 Totals:			56	160.0 Hours	4,480	42	6	29
09/01	FGH4	Grass Hay/Pasture	Dairy Heifers	128	160.0 Hours	10,240	42	6	29
	FGH4 Totals:			128	160.0 Hours	10,240	42	6	29
09/01	FGH5	Grass Hay/Pasture	Dairy Heifers	70	160.0 Hours	5,600	42	6	29
	FGH5 Totals:			70	160.0 Hours	5,600	42	6	29
09/01	FGH6	Grass Hay/Pasture	Dairy Heifers	220	160.0 Hours	17,600	42	6	29
	FGH6 Totals:			220	160.0 Hours	17,600	42	6	29
09/01	FGH7	Grass Hay/Pasture	Dairy Heifers	211	160.0 Hours	16,880	42	6	29
	FGH7 Totals:			211	160.0 Hours	16,880	42	6	29
09/01	FGH8	Grass Hay/Pasture	Dairy Heifers	142	160.0 Hours	11,360	42	6	29
	FGH8 Totals:			142	160.0 Hours	11,360	42	6	29
09/01	FGH9	Grass Hay/Pasture	Dairy Heifers	142	160.0 Hours	11,360	42	6	29
	FGH9 Totals:			142	160.0 Hours	11,360	42	6	29
09/01	FGH11	Grass Hay/Pasture	Dairy Heifers	79	160.0 Hours	6,320	42	6	29

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
	FGH11 Totals:			79	160.0 Hours	6,320	42	6	29
09/01	FGH12	Grass Hay/Pasture	Dairy Heifers	85	160.0 Hours	6,800	42	6	29
	FGH12 Totals:			85	160.0 Hours	6,800	42	6	29
09/01	FGH13	Grass Hay/Pasture	Dairy Heifers	58	160.0 Hours	4,640	42	6	29
	FGH13 Totals:			58	160.0 Hours	4,640	42	6	29
09/01	FGH14	Grass Hay/Pasture	Dairy Heifers	115	160.0 Hours	9,200	42	6	29
	FGH14 Totals:			115	160.0 Hours	9,200	42	6	29
09/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	160.0 Hours	6,160	42	6	29
	FGH15 Totals:			77	160.0 Hours	6,160	42	6	29
08/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	176.0 Hours	5,920	42	6	29
	FGH1 Totals:			74	176.0 Hours	5,920	42	6	29
08/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	176.0 Hours	2,848	46	6	32
	FGH2 Totals:			32	176.0 Hours	2,848	46	6	32
08/01	FGH3	Grass Hay/Pasture	Dairy Heifers	56	176.0 Hours	4,984	47	6	32
	FGH3 Totals:			56	176.0 Hours	4,984	47	6	32
08/01	FGH4	Grass Hay/Pasture	Dairy Heifers	128	176.0 Hours	11,392	47	6	32
	FGH4 Totals:			128	176.0 Hours	11,392	47	6	32

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
08/01	FGH5	Grass Hay/Pasture	Dairy Heifers	70	176.0 Hours	6,230	46	6	32
	FGH5 Totals:			70	176.0 Hours	6,230	46	6	32
08/01	FGH6	Grass Hay/Pasture	Dairy Heifers	220	176.0 Hours	19,580	47	6	32
	FGH6 Totals:			220	176.0 Hours	19,580	47	6	32
08/01	FGH7	Grass Hay/Pasture	Dairy Heifers	211	176.0 Hours	18,779	47	6	32
	FGH7 Totals:			211	176.0 Hours	18,779	47	6	32
08/01	FGH8	Grass Hay/Pasture	Dairy Heifers	142	176.0 Hours	12,638	46	6	32
	FGH8 Totals:			142	176.0 Hours	12,638	46	6	32
08/01	FGH9	Grass Hay/Pasture	Dairy Heifers	142	176.0 Hours	12,638	46	6	32
	FGH9 Totals:			142	176.0 Hours	12,638	46	6	32
08/01	FGH11	Grass Hay/Pasture	Dairy Heifers	79	176.0 Hours	7,031	46	6	32
	FGH11 Totals:			79	176.0 Hours	7,031	46	6	32
08/01	FGH12	Grass Hay/Pasture	Dairy Heifers	85	176.0 Hours	7,565	47	6	32
	FGH12 Totals:			85	176.0 Hours	7,565	47	6	32
08/01	FGH13	Grass Hay/Pasture	Dairy Heifers	58	176.0 Hours	5,162	47	6	32
	FGH13 Totals:			58	176.0 Hours	5,162	47	6	32
08/01	FGH14	Grass Hay/Pasture	Dairy Heifers	115	176.0 Hours	10,235	46	6	32

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
	FGH14 Totals:			115	176.0 Hours	10,235	46	6	32
08/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	176.0 Hours	6,853	46	6	32
	FGH15 Totals:			77	176.0 Hours	6,853	46	6	32
07/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	160.0 Hours	6,586	47	6	32
	FGH1 Totals:			74	160.0 Hours	6,586	47	6	32
07/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	160.0 Hours	2,560	41	6	28
	FGH2 Totals:			32	160.0 Hours	2,560	41	6	28
07/01	FGH3	Grass Hay/Pasture	Dairy Heifers	56	160.0 Hours	4,480	42	6	29
	FGH3 Totals:			56	160.0 Hours	4,480	42	6	29
07/01	FGH4	Grass Hay/Pasture	Dairy Heifers	128	160.0 Hours	10,240	42	6	29
	FGH4 Totals:			128	160.0 Hours	10,240	42	6	29
07/01	FGH5	Grass Hay/Pasture	Dairy Heifers	70	160.0 Hours	5,600	42	6	29
	FGH5 Totals:			70	160.0 Hours	5,600	42	6	29
07/01	FGH6	Grass Hay/Pasture	Dairy Heifers	220	160.0 Hours	17,600	42	6	29
	FGH6 Totals:			220	160.0 Hours	17,600	42	6	29
07/01	FGH7	Grass Hay/Pasture	Dairy Heifers	211	160.0 Hours	16,880	42	6	29
	FGH7 Totals:			211	160.0 Hours	16,880	42	6	29

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
07/01	FGH8	Grass Hay/Pasture	Dairy Heifers	142	160.0 Hours	12,638	46	6	32
	FGH8 Totals:			142	160.0 Hours	12,638	46	6	32
07/01	FGH9	Grass Hay/Pasture	Dairy Heifers	142	160.0 Hours	11,360	42	6	29
	FGH9 Totals:			142	160.0 Hours	11,360	42	6	29
07/01	FGH11	Grass Hay/Pasture	Dairy Heifers	79	160.0 Hours	6,320	42	6	29
	FGH11 Totals:			79	160.0 Hours	6,320	42	6	29
07/01	FGH12	Grass Hay/Pasture	Dairy Heifers	85	160.0 Hours	6,800	42	6	29
	FGH12 Totals:			85	160.0 Hours	6,800	42	6	29
07/01	FGH13	Grass Hay/Pasture	Dairy Heifers	58	160.0 Hours	4,640	42	6	29
	FGH13 Totals:			58	160.0 Hours	4,640	42	6	29
07/01	FGH14	Grass Hay/Pasture	Dairy Heifers	115	160.0 Hours	9,200	42	6	29
	FGH14 Totals:			115	160.0 Hours	9,200	42	6	29
07/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	160.0 Hours	6,160	42	6	29
	FGH15 Totals:			77	160.0 Hours	6,160	42	6	29
06/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	224.0 Hours	5,920	42	6	29
	FGH1 Totals:			74	224.0 Hours	5,920	42	6	29
06/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	224.0 Hours	3,584	58	8	40

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
06/01	FGH2 Totals:			32	224.0 Hours	3,584	58	8	40
	FGH3	Grass Hay/Pasture	Dairy Heifers	56	224.0 Hours	6,272	59	8	40
	FGH3 Totals:			56	224.0 Hours	6,272	59	8	40
06/01	FGH4			128	224.0 Hours	14,336	59	8	40
	FGH4 Totals:			128	224.0 Hours	14,336	59	8	40
	FGH5	Grass Hay/Pasture	Dairy Heifers	70	224.0 Hours	7,840	58	8	40
06/01	FGH5 Totals:			70	224.0 Hours	7,840	58	8	40
	FGH6	Grass Hay/Pasture	Dairy Heifers	220	224.0 Hours	24,640	59	8	40
	FGH6 Totals:			220	224.0 Hours	24,640	59	8	40
06/01	FGH7			211	224.0 Hours	23,632	59	8	40
	FGH7 Totals:			211	224.0 Hours	23,632	59	8	40
	FGH8	Grass Hay/Pasture	Dairy Heifers	142	224.0 Hours	15,904	58	8	40
06/01	FGH8 Totals:			142	224.0 Hours	15,904	58	8	40
	FGH9	Grass Hay/Pasture	Dairy Heifers	142	224.0 Hours	15,904	58	8	40
	FGH9 Totals:			142	224.0 Hours	15,904	58	8	40
06/01	FGH11			79	224.0 Hours	8,848	58	8	40
	FGH11 Totals:			79	224.0 Hours	8,848	58	8	40

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
06/01	FGH12	Grass Hay/Pasture	Dairy Heifers	85	224.0 Hours	9,520	59	8	41
	FGH12 Totals:			85	224.0 Hours	9,520	59	8	41
06/01	FGH13	Grass Hay/Pasture	Dairy Heifers	58	224.0 Hours	6,496	59	8	41
	FGH13 Totals:			58	224.0 Hours	6,496	59	8	41
06/01	FGH14	Grass Hay/Pasture	Dairy Heifers	115	224.0 Hours	12,880	58	8	40
	FGH14 Totals:			115	224.0 Hours	12,880	58	8	40
06/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	224.0 Hours	8,624	58	8	40
	FGH15 Totals:			77	224.0 Hours	8,624	58	8	40
05/01	FGH1	Grass Hay/Pasture	Dairy Heifers	74	224.0 Hours	8,288	59	8	40
	FGH1 Totals:			74	224.0 Hours	8,288	59	8	40
05/01	FGH2	Grass Hay/Pasture	Dairy Heifers	32	224.0 Hours	3,584	58	8	40
	FGH2 Totals:			32	224.0 Hours	3,584	58	8	40
05/01	FGH3	Grass Hay/Pasture	Dairy Heifers	56	224.0 Hours	6,272	59	8	40
	FGH3 Totals:			56	224.0 Hours	6,272	59	8	40
05/01	FGH4	Grass Hay/Pasture	Dairy Heifers	128	224.0 Hours	14,336	59	8	40
	FGH4 Totals:			128	224.0 Hours	14,336	59	8	40
05/01	FGH5	Grass Hay/Pasture	Dairy Heifers	70	224.0 Hours	7,840	58	8	40

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
05/01	FGH5 Totals:			70	224.0 Hours	7,840	58	8	40
	FGH6	Grass Hay/Pasture	Dairy Heifers	220	224.0 Hours	24,640	59	8	40
	FGH6 Totals:			220	224.0 Hours	24,640	59	8	40
05/01	FGH7			211	224.0 Hours	23,632	59	8	40
	FGH7 Totals:			211	224.0 Hours	23,632	59	8	40
	FGH8	Grass Hay/Pasture	Dairy Heifers	142	224.0 Hours	15,904	58	8	40
05/01	FGH8 Totals:			142	224.0 Hours	15,904	58	8	40
	FGH9	Grass Hay/Pasture	Dairy Heifers	142	224.0 Hours	15,904	58	8	40
	FGH9 Totals:			142	224.0 Hours	15,904	58	8	40
05/01	FGH11			79	224.0 Hours	8,848	58	8	40
	FGH11 Totals:			79	224.0 Hours	8,848	58	8	40
	FGH12	Grass Hay/Pasture	Dairy Heifers	85	224.0 Hours	9,520	59	8	41
05/01	FGH12 Totals:			85	224.0 Hours	9,520	59	8	41
	FGH13	Grass Hay/Pasture	Dairy Heifers	58	224.0 Hours	6,496	59	8	41
	FGH13 Totals:			58	224.0 Hours	6,496	59	8	41
05/01	FGH14			115	224.0 Hours	12,880	58	8	40
	FGH14 Totals:			115	224.0 Hours	12,880	58	8	40

Date	Field	Crop	Animals	Count	Grazing Time	Forage Removed (lbs)	Nutrient Removed (lbs/ac)		
							N	P ₂ O ₅	K ₂ O
05/01	FGH15	Grass Hay/Pasture	Dairy Heifers	77	224.0 Hours	8,624	58	8	40
	FGH15 Totals:			77	224.0 Hours	8,624	58	8	40

SECTION 3 - UTILIZATION AREA

Cropping History



Cropping Report

Forest Glen Heifer Ranch
Dayton

Planted	Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac)		
					N	P ₂ O ₅	K ₂ O
01/01	FGH1	4.1	Grass Hay/Pasture	2 Ton	58	18	48
	FGH1 Totals:				58	18	48
01/01	FGH11	4.4	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH11 Totals:				58	18	48
01/01	FGH12	4.7	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH12 Totals:				58	18	48
01/01	FGH13	3.2	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH13 Totals:				58	18	48
01/01	FGH14	6.4	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH14 Totals:				58	18	48
01/01	FGH15	4.3	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH15 Totals:				58	18	48
01/01	FGH2	1.8	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH2 Totals:				58	18	48
01/01	FGH3	3.1	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH3 Totals:				58	18	48
01/01	FGH4	7.1	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH4 Totals:				58	18	48
01/01	FGH5	3.9	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH5 Totals:				58	18	48
01/01	FGH6	12.2	Grass Hay/Pasture	2.2 Ton	58	18	48
	FGH6 Totals:				58	18	48
01/01	FGH7	11.7	Grass Hay/Pasture	2 Ton	58	18	48
	FGH7 Totals:				58	18	48
01/01	FGH8	7.9	Grass Hay/Pasture	2 Ton	58	18	48
	FGH8 Totals:				58	18	48
01/01	FGH9	7.9	Grass Hay/Pasture	2 Ton	58	18	48
	FGH9 Totals:				58	18	48

SECTION 3 - UTILIZATION AREA

Irrigation Water Management

The application of Irrigation Water Management to the irrigated fields as shown on the Field Map will manage soil moisture to promote the desired crop response, optimize the available water supplies, minimize irrigation induced erosion, decrease non-point source pollution of surface and groundwater sources, manage salts in the crop root zone and manage the crop micro climate.

Permits: Under Oregon law all water is publicly owned, and anyone planning to store or divert surface or groundwater for the purpose of irrigation must obtain a permit or water right from the Oregon Water Resources Department. These permits or water rights must be obtained prior to the use of the water. It is the responsibility of the Farmer to file for the necessary permits or water rights. More information about Oregon water rights can be found at <http://www.oregon.gov/owrd/Pages/wr/index.aspx>.

The irrigation system used to irrigate crops should be adapted for site conditions (soil, slope, crop grown, climate, water quantity and quality, etc.) and capable of applying water and wastewater to meet the consumptive use of the crop. The following table shows the estimated Available Water Holding Capacity (AWHC) and sprinkler intake rates by soil texture that should be considered in the design of the irrigation system.^{1/}

<u>Symbol</u>	<u>Soil Texture</u>	AWHC Range	Sprinkler Intake Rate
		<u>(in/in)</u>	<u>Range (in/hour)</u>
COS	Coarse Sand	0.01-0.03	1.0+
S	Sand	0.01-0.03	0.5+
FS	Fine Sand	0.05-0.07	0.5+
VFS	Very Fine Sand	0.05-0.07	0.5+
LCOS	Loamy Coarse Sand	0.06-0.08	1.0+
LS	Loamy Sand	0.06-0.08	0.4-1.5
LFS	Loamy Fine Sand	0.09-0.11	0.4-1.5
LVFS	Loamy Very Fine Sand	0.10-0.12	0.3-1.25
COSL	Coarse Sandy Loam	0.10-0.12	0.3-1.25
SL	Sandy Loam	0.11-0.13	0.3-1.25
FSL	Fine Sandy Loam	0.13-0.15	0.3-1.0
VFSL	Very Fine Sandy Loam	0.15-0.17	0.3-1.0
L	Loam	0.16-0.18	0.6-0.7
SIL	Silt Loam	0.19-0.21	0.5-0.7
SI	Silt Loam	0.16-0.18	0.5-0.7
SCL	Sandy Clay Loam	0.14-0.16	0.1-0.5
CL	Clay Loam	0.19-0.21	0.1-0.5
SICL	Silty Clay Loam	0.19-0.21	0.1-0.4
SC	Sandy Clay	0.15-0.17	0.1-0.4
SIC	Silty Clay	0.15-0.17	0.1-0.2
C	Clay	0.14-0.16	0.1-0.2

^{1/} Values in this table are taken from the Natural Resources Conservation Service National Engineering Handbook, Part 652, Irrigation Guide and are estimates based on soil texture and should only be used where local data is unavailable.

Irrigation water management requires knowledge, skills, and desire to determine when irrigation water should be applied. The main factors influencing IWM are irrigation interval (time between irrigations), irrigation set time (time water is applied), and application rate (rate at which water is applied). These parameters define the timing and duration of irrigation and the amount of water applied. System design and maintenance are also important factors influencing irrigation water management.

Guidance given in the irrigation water requirements worksheets was developed based on Oregon State

SECTION 3 -

University Extension Miscellaneous 8530, Oregon Crop Water Use and Irrigation Requirements publication. For additional information on irrigation water management contact a professional with the required knowledge and skill. The following average monthly evapotranspiration and precipitation graphs can be used to estimate when to irrigate and how much to apply:

SECTION 3 - UTILIZATION AREA

Irrigation Water Flows, Volumes, and Relationships

Equation 1 -

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

where:

Q = flow rate (acre-in/hr or cfs)

T = time (hr)

D = gross depth applied (in)

A = area (acres)

Equation 2 -

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

where:

Q = flow rate (acre-in/hr or cfs)

A = area (acres)

D = gross depth applied (in)

F = irrigation period (days)

H = Hours of operation per day

Water Flow Rates:

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

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

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

Gpm for 5 ft/s velocity in PVC pipe:

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

Water Volumes & Weights:

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

Pressure and Pressure Head:

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

Lengths and Areas:

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

Pump Power Requirement

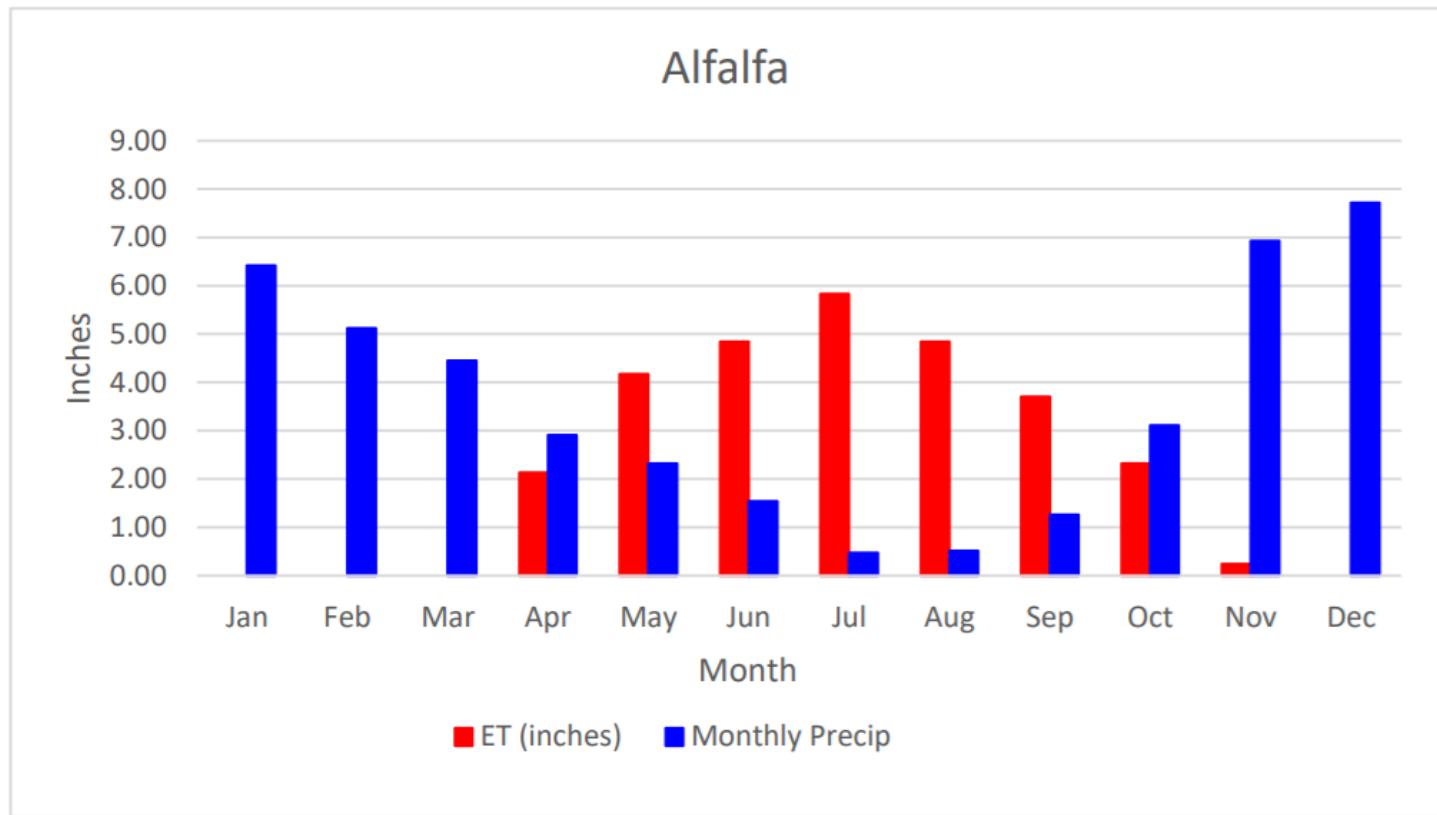
$$\text{Horsepower} = \frac{\text{Pump Head in ft} \times \text{gpm}}{39.6 \times \% \text{ Pump Efficiency}}$$

SECTION 3 - UTILIZATION AREA

Crop- Alfalfa

Region- Willamette Valley

Total Seasonal Evapotranspiration-	28.07 Inches
Peak Evapotranspiration Rate-	0.19 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul

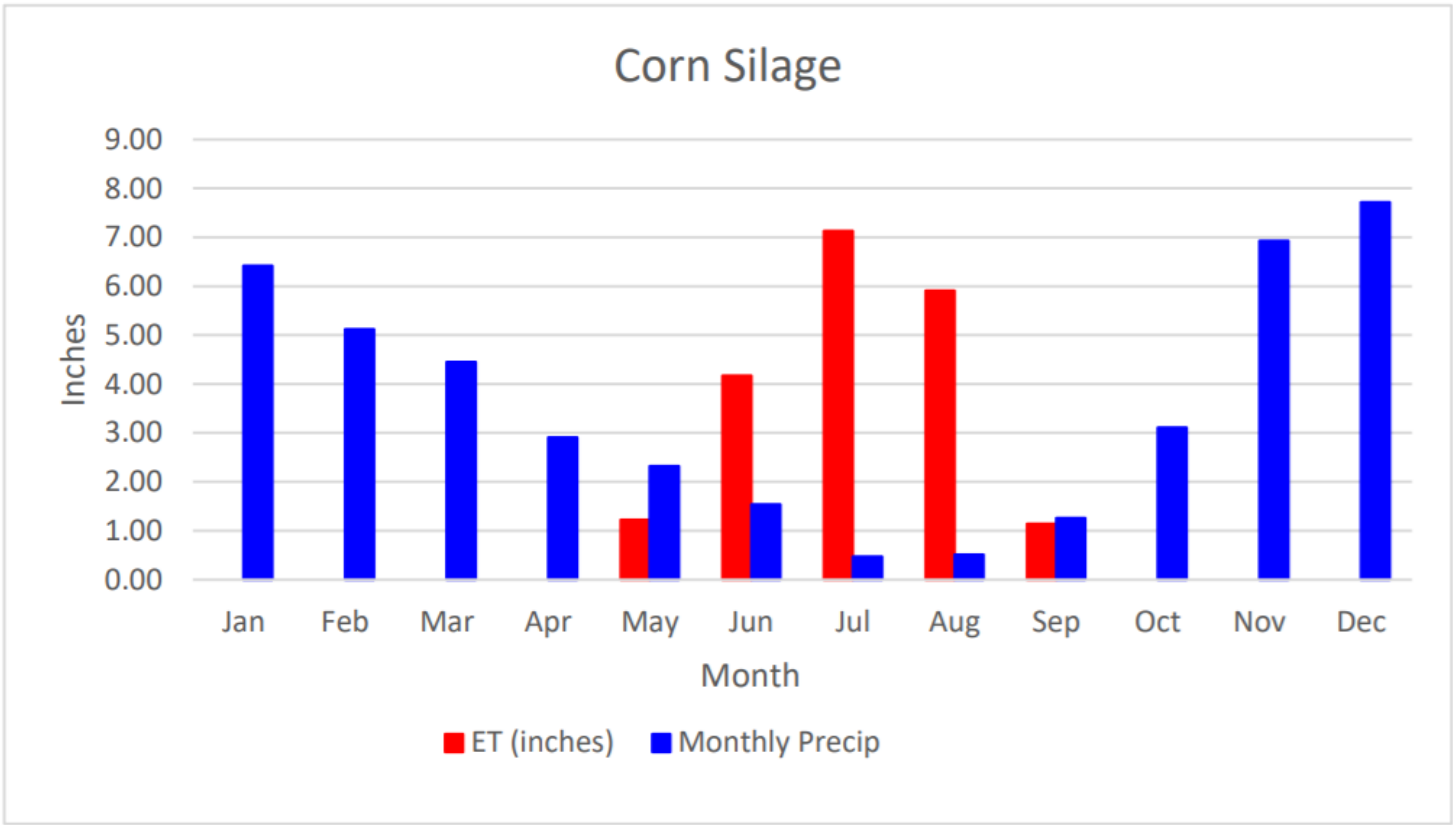


SECTION 3 - UTILIZATION AREA

Crop- Corn Silage

Region- Willamette Valley

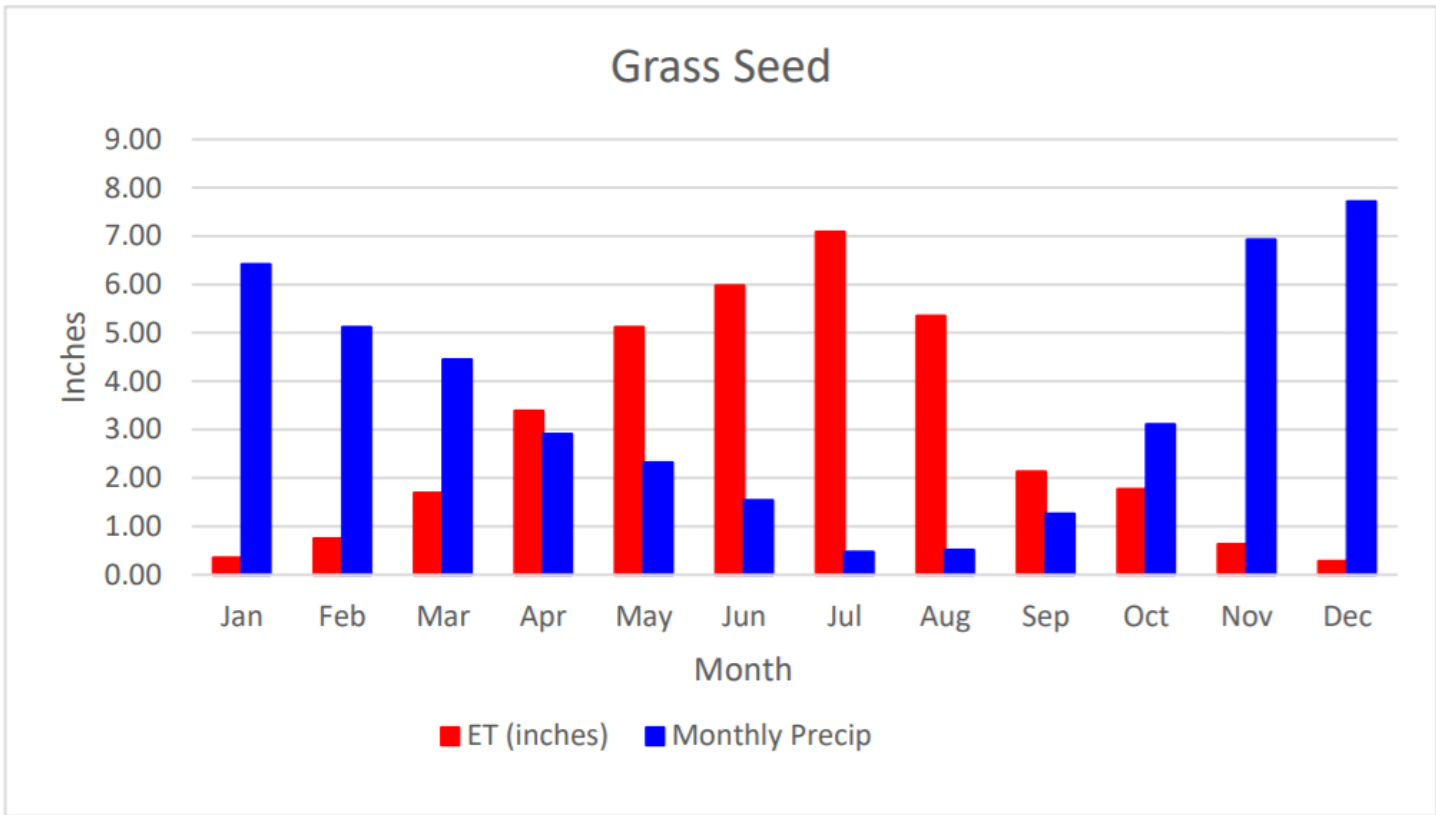
Total Seasonal Evapotranspiration-	19.57 Inches
Peak Evapotranspiration Rate-	0.24 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul



SECTION 3 - UTILIZATION AREA

Crop- Grass Seed
Region- Willamette Valley

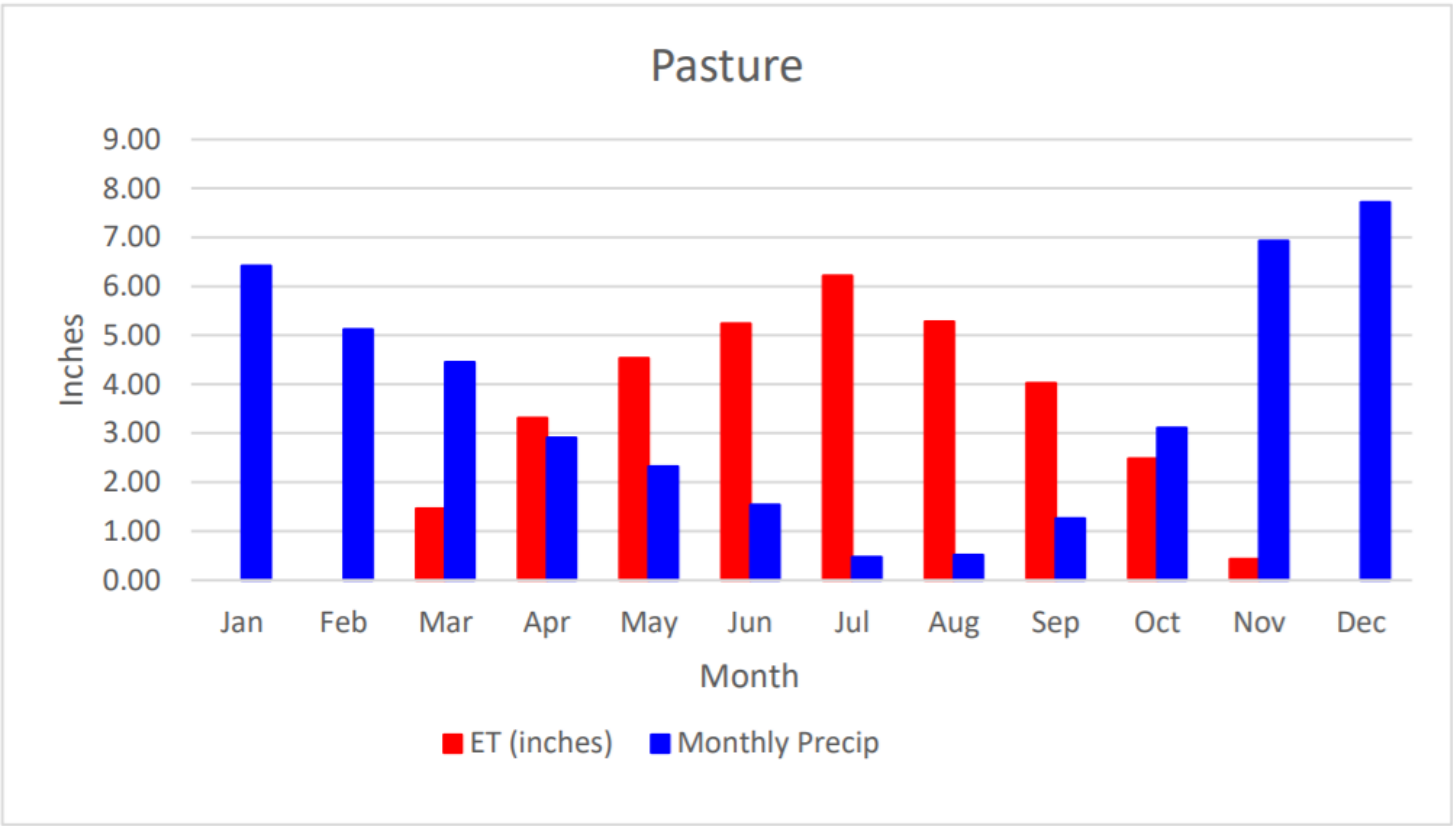
Total Seasonal Evapotranspiration-	34.53 Inches
Peak Evapotranspiration Rate-	0.24 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul



SECTION 3 - UTILIZATION AREA

Crop- Pasture
Region- Willamette Valley

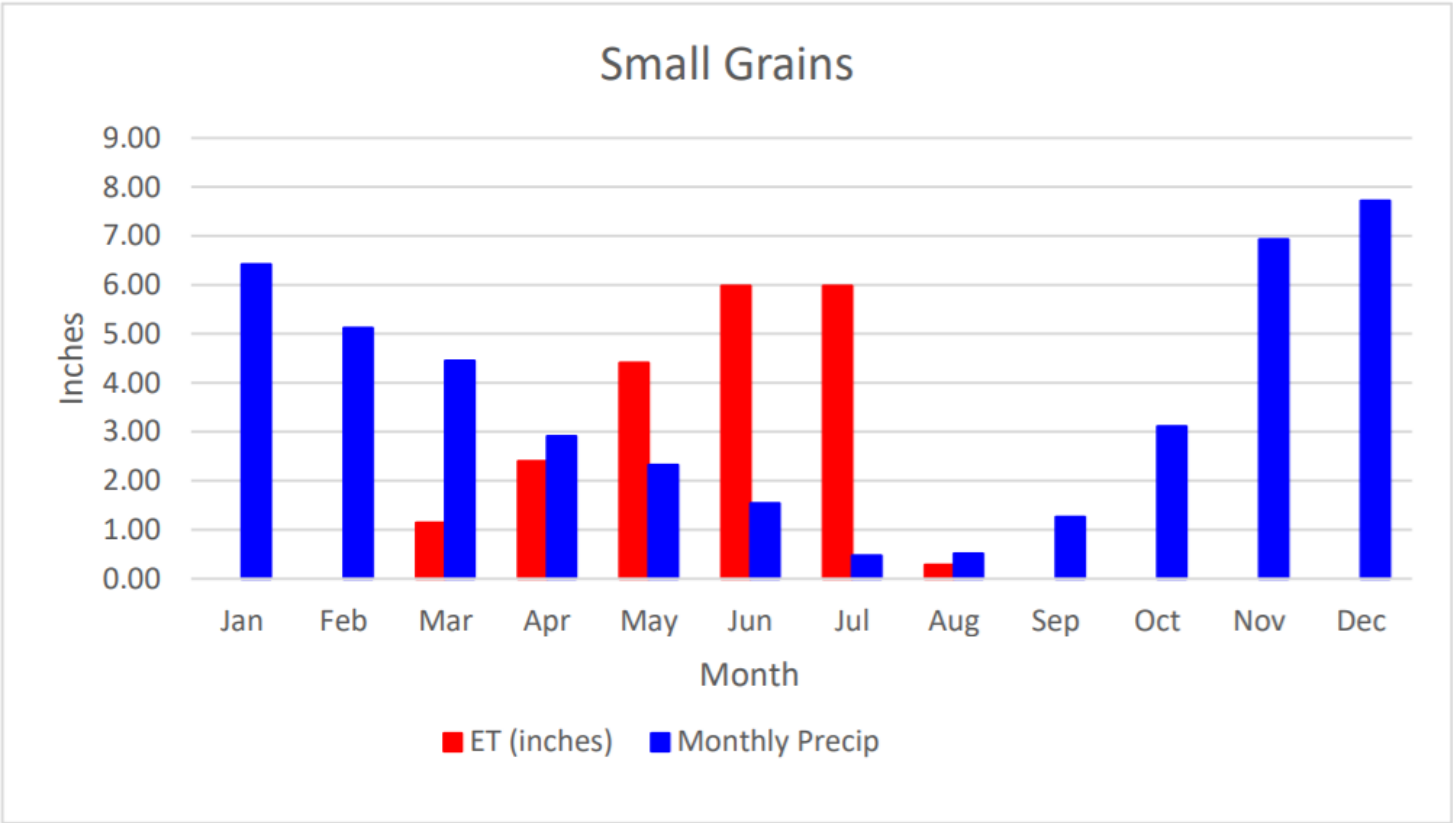
Total Seasonal Evapotranspiration-	32.97 Inches
Peak Evapotranspiration Rate-	0.21 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul



SECTION 3 - UTILIZATION AREA

Crop- Small Grains
Region- Willamette Valley

Total Seasonal Evapotranspiration-	20.19 Inches
Peak Evapotranspiration Rate-	0.20 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jun

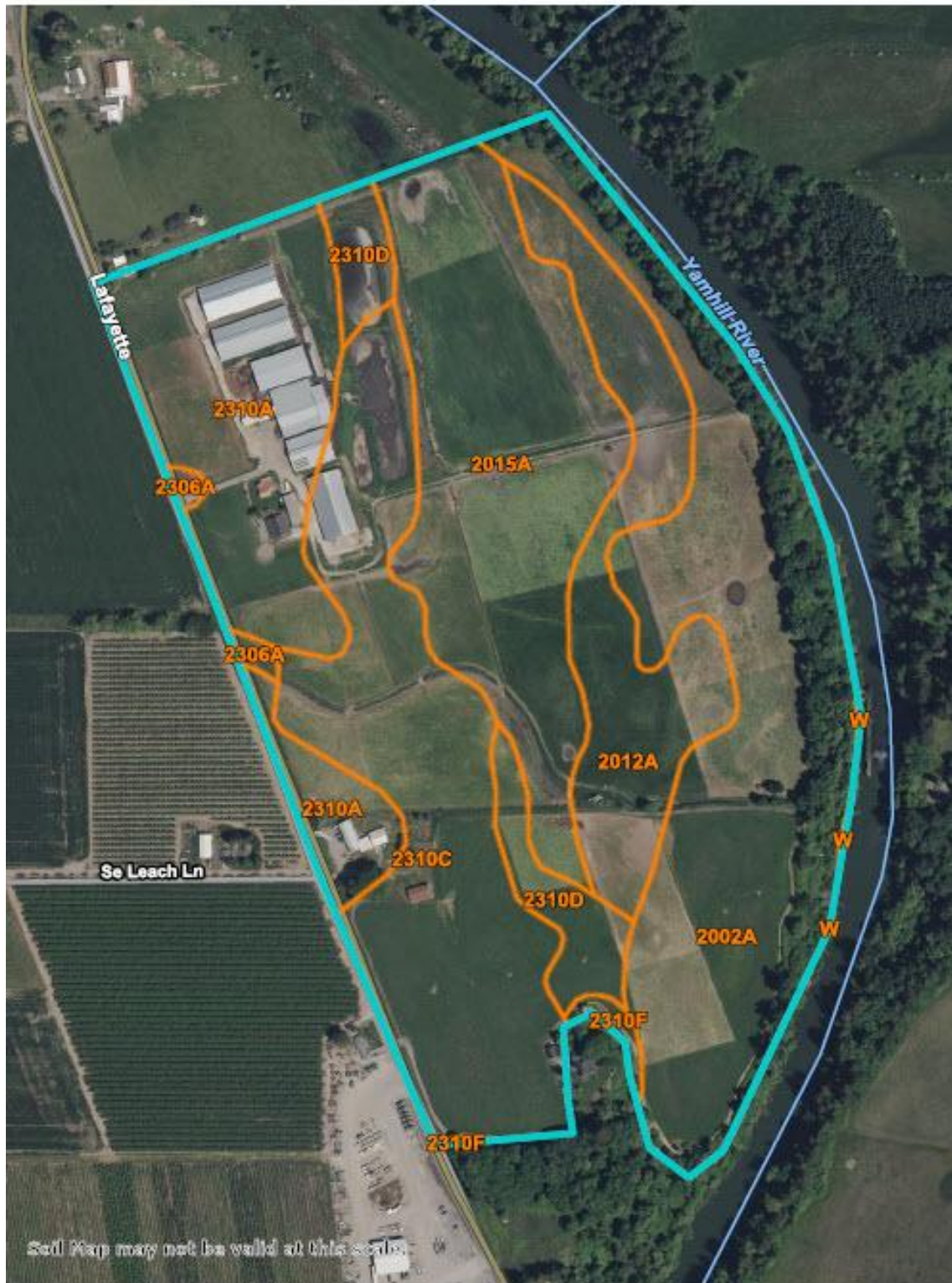


SECTION 4 - SOIL AND RISK ASSESSMENT

Soil Maps for Forest Glen Heifer Ranch

Soils Map #1

Soil Map—Yamhill County, Oregon
(Forest Glen Heifer Ranch)



Map Scale: 1:5,820 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters
0 250 500 1000 1500 Feet

Map projection: Web Mercator Corner coordinates: WGS84

SECTION 4 - SOIL AND RISK ASSESSMENT

Soil Reports

Map Unit Description

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

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

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

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

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

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

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

SECTION 4 - SOIL AND RISK ASSESSMENT

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

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

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

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

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

Report Map Unit Description Yamhill County, Oregon

2002A Chehalis silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2dgl4

Elevation: 30 to 1,000 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Chehalis and similar soils: 91 percent

Minor components: 9 percent

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

Description of Chehalis

Setting

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave, convex

Parent material: Silty and loamy alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

A - 8 to 16 inches: silty clay loam

Bw1 - 16 to 38 inches: silty clay loam

Bw2 - 38 to 45 inches: silty clay loam

C - 45 to 60 inches: stratified fine sandy loam to silty clay loam

SECTION 4 - SOIL AND RISK ASSESSMENT

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:Occasional

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

Ecological site: F002XC003OR - Low Flood Plain Group

Forage suitability group: Well drained < 15% Slopes (G002XY002OR)

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Minor Components

Mcbee

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Wapato

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Newberg

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Hydric soil rating: No

Camas

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Convex, linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

SECTION 4 - SOIL AND RISK ASSESSMENT

2012A Waldo silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1lym1

Elevation: 100 to 900 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Waldo and similar soils:86 percent

Minor components:14 percent

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

Description of Waldo

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Clayey alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

A2 - 8 to 13 inches: silty clay loam

B_{Ag} - 13 to 19 inches: silty clay

B_g - 19 to 40 inches: silty clay

B_{Cg} - 40 to 50 inches: silty clay

C_g - 50 to 60 inches: silty clay

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (K_{sat}):Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table:About 0 to 8 inches

Frequency of flooding:Occasional

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: R002XC005OR - High Flood Plain Group

Forage suitability group: Poorly Drained (G002XY006OR)

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Minor Components

Chehalem, occasionally flooded

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

SECTION 4 - SOIL AND RISK ASSESSMENT

Across-slope shape:Convex, linear

Hydric soil rating: No

Wapato

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Mcbee

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Waldo, nonflooded

Percent of map unit:1 percent

Landform:Alluvial fans

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Chehalis

Percent of map unit:1 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

2015A Cove silty clay loam, flooded, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1qkw9

Elevation: 90 to 570 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Cove, flooded, and similar soils:92 percent

Minor components:8 percent

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

Description of Cove, Flooded

Setting

Landform:Flood plains

SECTION 4 - SOIL AND RISK ASSESSMENT

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Parent material:Clayey alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

Bg1 - 8 to 16 inches: silty clay

Bg2 - 16 to 41 inches: clay

Cg - 41 to 60 inches: clay

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table:About 0 to 8 inches

Frequency of flooding:Occasional

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: R002XC005OR - High Flood Plain Group

Hydric soil rating: Yes

Minor Components

Bashaw

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Concave, linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Wapato

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Labish

Percent of map unit:1 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

SECTION 4 - SOIL AND RISK ASSESSMENT

2306A Dayton silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1j8b3

Elevation: 150 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Dayton and similar soils:92 percent

Minor components:8 percent

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

Description of Dayton

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Silty and clayey glaciolacustrine deposits

Typical profile

A - 0 to 9 inches: silt loam

E1 - 9 to 12 inches: silt loam

E2 - 12 to 15 inches: silt loam

2Bt1 - 15 to 22 inches: silty clay

2Bt2 - 22 to 29 inches: silty clay

3BCt1 - 29 to 40 inches: silty clay loam

3BCt2 - 40 to 53 inches: silt loam

3C1 - 53 to 64 inches: silt loam

3C2 - 64 to 76 inches: silt loam

Properties and qualities

Slope:0 to 2 percent

Depth to restrictive feature:12 to 24 inches to abrupt textural change

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table:About 0 to 9 inches

Frequency of flooding:None

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: R002XC007OR - Valley Swale Group

Hydric soil rating: Yes

Minor Components

Amity

Percent of map unit:5 percent

Landform:Terraces

Landform position (three-dimensional):Tread

SECTION 4 - SOIL AND RISK ASSESSMENT

Down-slope shape:Linear
Across-slope shape:Linear
Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Woodburn
Percent of map unit:2 percent
Landform:Terraces
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Willamette
Percent of map unit:1 percent
Landform:Terraces
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2310A Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 1j8b4
Elevation: 100 to 290 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Woodburn and similar soils:93 percent
Minor components:7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Woodburn
Setting
Landform:Terraces
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex, linear
Parent material:Silty glaciolacustrine deposits
Typical profile
Ap - 0 to 9 inches: silt loam
A - 9 to 17 inches: silt loam
2Bt1 - 17 to 25 inches: silty clay loam
2Bt2 - 25 to 32 inches: silty clay loam
2BCt1 - 32 to 39 inches: silt loam
2BCt2 - 39 to 54 inches: silt loam
2C1 - 54 to 68 inches: silt loam
2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam
3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

SECTION 4 - SOIL AND RISK ASSESSMENT

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 25 to 32 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Minor Components

Amity

Percent of map unit:5 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Dayton

Percent of map unit:2 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

2310C Woodburn silt loam, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1j8b5

Elevation: 100 to 350 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodburn and similar soils:93 percent

Minor components:7 percent

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

Description of Woodburn

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Convex, linear

SECTION 4 - SOIL AND RISK ASSESSMENT

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope:3 to 12 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 25 to 32 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Minor Components

Amity

Percent of map unit:5 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Dayton

Percent of map unit:2 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

2310D Woodburn silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: 1j8b6

Elevation: 100 to 380 feet

SECTION 4 - SOIL AND RISK ASSESSMENT

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodburn and similar soils: 95 percent

Minor components: 5 percent

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

Description of Woodburn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2Bc1 - 32 to 39 inches: silt loam

2Bc2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope: 12 to 20 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 25 to 32 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Forage suitability group: Moderately Well Drained >15% Slopes (G002XY003OR)

Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)

Hydric soil rating: No

Minor Components

Amity

Percent of map unit: 4 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave, linear

Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

SECTION 4 - SOIL AND RISK ASSESSMENT

Hydric soil rating: No

Dayton

Percent of map unit: 1 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: Yes

2310F Woodburn silt loam, 20 to 55 percent slopes

Map Unit Setting

National map unit symbol: 1j8b7

Elevation: 100 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Woodburn and similar soils: 100 percent

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

Description of Woodburn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope: 20 to 55 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 25 to 32 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

SECTION 4 - SOIL AND RISK ASSESSMENT

Ecological site: R002XC008OR - Valley Terrace Group

Hydric soil rating: No

W Water

Map Unit Composition

Water:100 percent

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

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Yamhill County, Oregon

Survey Area Data: Version 12, Sep 8, 2023

SECTION 4 - SOIL AND RISK ASSESSMENT



Phosphorus Index Report

Forest Glen Heifer Ranch -
Dayton

Phosphorus Index is included for advisement puposes and is not (yet) currently a regulary tool.

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
FGH15	4.3	2002A, Chehalis	02/12/2024	93.0		177.0	5.9	3.25	16.143	19.39	Low
FGH14	6.4	2002A, Chehalis	02/12/2024	93.0		177.0	5.9	3.25	16.146	19.4	Low
FGH13	3.2	2015A, Cove	02/12/2024	93.0		177.0	5.9	4.25	16.162	20.41	Low
FGH12	4.7	2310A,	02/12/2024	93.0		177.0	5.9	2.75	16.157	18.91	Low
FGH11	4.4	2310A,	02/12/2024	93.0		177.0	5.9	2.75	16.146	18.9	Low
FGH9	7.9	2015A, Cove	02/12/2024	99.0		1024.0	6.4	4.25	16.386	20.64	Low
FGH8	7.9	2013A, Wapato	02/12/2024	99.0		1024.0	6.4	5.75	16.386	22.14	Low
FGH7	11.7	2002A, Chehalis	02/12/2024	99.0		1024.0	6.4	3.25	16.392	19.64	Low
FGH6	12.2	2013A, Wapato	02/12/2024	99.0		1024.0	6.4	5.75	16.770	22.52	Low
FGH5	3.9	2013A, Wapato	02/12/2024	99.0		1024.0	6.4	5.75	16.768	22.52	Low
FGH4	7.1	2310A,	02/12/2024	99.0		1024.0	6.4	2.75	16.769	19.52	Low
FGH3	3.1	2310C,	02/12/2024	99.0		1024.0	6.4	6.25	16.752	23.0	Low
FGH2	1.8	2310A,	02/12/2024	99.0		1024.0	6.4	2.75	16.732	19.48	Low
FGH1	4.1	2310A,	02/12/2024	99.0		10124.0	6.4	2.75	16.479	19.23	Low

SECTION 4 - SOIL AND RISK ASSESSMENT

PI Interpretations

<u>P-Index Rating</u>	<u>Interpretation for Oregon</u>	<u>Recommended Nutrient Limitation</u>
West PI Score ≤ 25 or East PI Score ≤ 100	The site has a LOW potential for P movement from the site. If farming practices are maintained at current levels, the probability of an adverse impact to surface water resources from P losses from this site are low. Phosphorus can be applied at rates greater than crop requirement	Nitrogen
West PI Score 25.1 to 50 or East PI Score 100.1 to 400	The site has a MEDIUM potential for P movement from the site. The probability for an adverse impact to surface water resources is greater than that from a LOW vulnerability rated site. Some remedial action should be taken to lessen the probability of P movement. Phosphorus can be applied not to exceed the crop requirement rate for phosphorus.	Phosphorus
West PI Score 50.1 to 75 or East PI Score 400.1 to 600	The site has a HIGH potential for P movement from the site. There is a high probability for an adverse impact to surface water resources unless action is taken to reduce the risk of P movement and probable water quality degradation. Phosphorus can be applied not to exceed the crop removal rate of phosphorus if the following requirements are met: A soil phosphorus drawdown strategy has been implemented, and a site assessment for nutrients and soil loss has been conducted to determine if mitigation practices are required to protect water quality.	Phosphorus
West PI Score > 75 or East PI Score > 600	ZERO OUT- The environmental threshold above which the risk of P loss from a field is too great to warrant the application of phosphorus for plant production.	No Manure

SECTION 5 - SUPPLEMENTAL DOCUMENTS

Supplemental Documents



OREGON
DEPARTMENT OF
AGRICULTURE

CONFINED ANIMAL FEEDING OPERATION
MODIFICATION OF ANIMAL NUMBERS
NATIONAL POLLUTION DISCHARGE
ELIMINATION SYSTEM (NPDES PERMIT)

Statutory Authority

Oregon Revised Statutes (ORS) 468B.050 When permit required
ORS 468B.210 Maximum numbers of animals based on ability to contain, treat, hold and dispose of wastes as necessary to comply with all conditions of the permit.

A. General Information

Master Address #AG-P0161701CAFG

Name or Business Name – Forest Glen Heifer Ranch

Facility Location Address – 3695 Lafayette Hwy

City – Dayton, OR

Zip Code - 97114

County - Yamhill

B. Livestock Type: Circle the item that best represents your operation.

1. Beef Feedlot (Fattening) 2. Beef Cattle (Cow/calf) 3. Hogs 4. Sheep and Goats
5. Dairy Farm, Heifer Replacement Farm 6. Poultry/Broiler 7. Poultry/Eggs
7. Mink/Rabbits 8. Horses and Other Equine 9. Other _____

C. Current Permitted Animal Numbers: In the space below please describe your number of animals by herd composition or class.

Dairy is currently permitted for 1,100 heifers, 350 calves and 300 bulls.

D. Current Permitted CAFO Designation: Circle one. See reverse side for table.

Large Tier1 Large Tier2 Medium Tier Small Tier

E. Proposed change in permitted animal numbers: In the space below please describe your proposed animal numbers by herd composition or class.

Dairy is requesting to be permitted for 1,545 heifers, 500 calves and 40 bulls.

F. New CAFO Designation based on increase / decrease in animal numbers. Circle one. See reverse side for table.

Large Tier1 Large Tier2 Medium Tier Small Tier

G. Certification:

I understand that an approved animal waste management plan is required prior to permit increase. I agree to prepare and implement an animal waste management plan in accordance with the requirements and timelines specified in the permit.


Signature (operator or owner)

9/2/2026
Date

STEWART KIRCHER
Print Name

Signature (operator or owner)

Date

Print Name

Nutrients generated and losses

This plan was based on manure volume and nutrient content estimates developed by NRCS and the Land grant university system. (Animal waste management field handbook)

The volumes are based on book production values, that are then used with real world nutrient concentrations derived by sampling to determine nutrients available for application in the manure in storage.

This means the plan does not try to estimate nutrients generated, only the volumes of manure produced. Sampling once materials are in storage and ready to apply establishes how much nutrient we have to apply. This eliminates the need to try to estimate losses between the rear of the animal and the stored materials. (estimates and losses can vary widely 0-70%)

Using this value in planning application rates is more protective than estimating application and denitrification losses then dividing up the volume based on those estimates. The application rates used in this NMP being based on concentrations in storage means that manure application rates determined are resulting in applications of nutrients below that target nutrient rate. Actual nutrients applied per acre = Manure volume applied X concentration of nutrients in manure storage – (application losses+ denitrification losses), so as long as manure application is planned according to the NMP guidance and is applied at the target rate the resulting nutrient application should be at or below the target pounds per acre of nutrient.

CAFO NPDES General Permit #01-2016
Issuance Date: March 31, 2016
Effective Date: April 20, 2016
Expiration Date: February 28, 2021

OREGON CONFINED ANIMAL FEEDING OPERATION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT NUMBER 01-2016



Oregon
Department
of Agriculture

State of Oregon
Department of Agriculture
Confined Animal Feeding Operation Program
and
Department of Environmental Quality
Water Quality Division



In compliance with the provisions of Oregon Revised Statutes (ORS) Chapter 468B,
Oregon Administrative Rules (OAR) Chapter 340, Divisions 40, 45 and 51 and Chapter 603, Division 74,
the Federal Water Pollution Control Act as amended (The Clean Water Act),
Title 33 United States Code, Section 1251 et seq., and
the National Pollutant Discharge Elimination System (NPDES) program.

Until this permit expires or is modified or revoked, permit registrants who have properly obtained coverage under this permit are authorized to discharge to waters of the state in accordance with the special and general conditions that follow.

Ray Jaundt, Director
Natural Resources and Pesticides
Oregon Department of Agriculture

Lydia Emer
Operations Division Administrator
Oregon Department of Environmental Quality

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NATURAL RESOURCES

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SPECIAL CONDITIONS

DEFINITIONS

1. "25-year, 24-hour rainfall event" means an event with a probable recurrence interval of once in twenty-five years as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, or equivalent regional or state rainfall probability information developed from this source.
2. "40 CFR" means Title 40 of the Code of Federal Regulations (2014).
3. "Agency" means Oregon Department of Environmental Quality or Oregon Department of Agriculture.
4. "Agricultural stormwater" is defined at 40 CFR § 122.23(e).
5. "Animal waste management plan" or "AWMP" or "waste management plan" means a written document containing the minimum elements necessary to manage manure, litter, and process wastewater from operations covered by this permit in accordance with the terms and conditions of this permit.
6. "Agronomic application rate" means the rate or amount of nutrients applied to the soil for utilization by growing or planned crops such that the crops remove the same or greater amount of nutrients provided by the agronomic application.
7. "Bedding" means any absorbent material that is used to provide animal cleanliness and comfort in a confinement system. Bedding materials include but are not limited to: straw; sawdust; wood shavings; grass seed cleanings; recycled, composted, or dried manure solids; and recycled paper products. Bedding that comes into contact with animals, manure, litter, or process wastewater is determined to be manure, litter, or process wastewater for purposes of this permit.
8. "Confined animal feeding operation" or "CAFO" as defined in OAR 603-074-0010(3) and OAR 340-051-0010(2) means:
 - (a) The concentrated confined feeding or holding of animals or poultry, including but not limited to horse, cattle, sheep, or swine feeding areas, dairy confinement areas, slaughterhouse or shipping terminal holding pens, poultry and egg production facilities and fur farms:
 - (i) In buildings or in pens or lots where the surface has been prepared with concrete, rock or fibrous material to support animals in wet weather; or
 - (ii) That have wastewater treatment works; or
 - (iii) That discharge any wastes into waters of the state; or
 - (b) An animal feeding operation that is subject to regulation as a concentrated animal feeding operation pursuant to 40 CFR § 122.23.
9. "Director" means the director of the State of Oregon Department of Environmental Quality or director of the State of Oregon Department of Agriculture or their authorized designee(s).
10. "Discharge" when used without qualification means the "discharge of a pollutant." "Discharge of a pollutant" is defined at 40 CFR § 122.2.
11. "Dry waste" means any solid manure, litter, bedding, or waste feed that cannot be transferred or applied with a pump or pipe system. Precipitation that comes into contact with dry waste does not change dry waste into wet waste. Dry waste may contain urine, manure, leachate or incidental process wastewater that has been absorbed into the feces, and used bedding materials in amounts that allow the waste to retain the dry characteristic so that the material cannot be transferred or applied with a pump or through a pipe.
12. "Dry waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes as a dry, solid substance. Dry waste treatment works for purposes of this permit do not utilize pumps or pipes to transfer or apply dry waste and typically do not need any added water or liquid to transfer or apply dry waste. Dry waste treatment works include but are not limited to manure piles and covered dry manure stack storage facilities.
13. "Dry-weather discharge" means a discharge of manure, litter or process wastewater from a land application area that is not defined as Agricultural Stormwater (40 CFR 122.23(e)) and where the land application of manure, litter, or process wastewater has not met all the site-specific nutrient management practices contained in the department-approved Animal Waste Management Plan and specified in 40 CFR 122.42(e)(1)(vi)-(xi). Dry weather discharges include but are not limited to: discharges through tile drains, discharges combined with irrigation water, infiltration of nutrients below the crop root zone, discharges due to failure of manure application or irrigation equipment.
14. "Frozen soil" means soil that has a soil temperature of 32° F (or 0° C) or less in any three (3) continuous inches of the top 12 inches of soil.

15. "Groundwater" means water in a saturated zone or stratum beneath the surface of land or below a surface water body.
16. "Manure" means solids or liquids excreted from an animal or other material (for example, bedding, compost, litter, feed waste, silage leachate, raw materials such as feed or silage) that comes into contact with solid or liquid excreted from an animal .
17. "OAR" means Oregon Administrative Rule.
18. "ORS" means Oregon Revised Statute.
19. "Overflow" means the discharge of manure or process wastewater resulting from the filling of wastewater or manure storage structures beyond the point at which no more manure, process wastewater, or stormwater can be contained by the structure.
20. "Person" is defined at 40 CFR § 122.2.
21. "Point source" is defined at 40 CFR § 122.2.
22. "Pollutant" is defined at 40 CFR § 122.2.
23. "Pollution" or "water pollution" is defined at ORS 468B.005(5).
24. "Process wastewater" or "process wastes" means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning or flushing pens, barns, manure pits, or other CAFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater or process wastes also includes any water that comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding. OAR 340-051-0010(5) and OAR 603-074-0010(17)
25. "Production area" means that part of a CAFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment areas include but are not limited to settling basins, and areas within berms and diversions that separate uncontaminated stormwater. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of animal mortalities. OAR 340-051-0010(6) and OAR 603-074-0010(18)
26. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).
27. "Saturated soil" means soil with all available pore space filled that has reached its maximum retentive capacity as defined in "Qualitative Description of Soil Wetness" (Brady, N. and Weil, R., p. 201, 2007).
28. "Setback" as defined at 40 CFR §412.4(b)(1) means a specified distance from surface water or potential conduits to surface water where manure, litter, and process wastewater may not be land applied. Examples of conduits to surface water include but are not limited to: Open tile line intake structures, sinkholes, and agricultural well heads.
29. "Treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes. ORS 468B.005(8)

30. "Vegetative buffer" as defined at 40 CFR §412.4(b)(2) means a narrow, permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching surface water.
31. "Waste storage facilities" means the physical system used for the isolation and retention of process wastes on the confined animal feeding operation until their ultimate utilization.
32. "Wastes" is defined at ORS 468B.005(9).
33. "Water" or "waters of the state" is defined at ORS 468B.005(10).
34. "Waters of the U.S." is defined at 40 CFR § 122.2.
35. "Wet waste" means any liquid manure, contaminated stormwater, process wastewater, liquid feed waste and silage or manure leachate. Wet waste may include solid material particles that are suspended or dissolved in the liquid.
36. "Wet waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wet wastes. Wet waste treatment works for purposes of this permit include, but are not limited to: tanks or lagoons to store wet waste; pumps, pipes, curbs, gutters, and collection sumps to direct, collect, transfer, or apply wet wastes; and any system that separates dry waste from wet waste.

S1. PERMIT COVERAGE

S1.A. When is a permit required and which CAFOs are covered by this permit?

1. Any person who owns or operates a confined animal feeding operation (CAFO) that discharges to surface water of the state is required to obtain NPDES permit coverage. NPDES General Permit #01 provides coverage for the types of CAFOs listed in Table 1 below that discharge to surface water of the state. This includes concentrated animal feeding operations defined at 40 CFR § 122.23 that discharge to waters of the U.S.
2. Any person not wishing to be covered by this permit may apply for an NPDES individual permit in accordance with OAR 340-045-0030. In addition, the director may require coverage under an NPDES individual permit pursuant to the provisions in OAR 340-045-0033 and OAR 603-074-0012.

S1.B. Can I elect coverage under this permit even if my CAFO does not discharge to surface water?

Any person who owns or operates a CAFO that does not discharge to surface water of the state may voluntarily elect to be covered under this permit. Any person making such an election is subject to all applicable requirements of this permit.

Table 1: Classification of CAFOs that require coverage by NPDES General Permit #01

Type of CAFO discharging to surface water of the state	Small	Medium	Large
mature dairy cows ¹	<200	200-699	≥700
veal calves	<300	300-999	≥1,000
cattle ²	<300	300-999	≥1,000
swine ≥ 55 lbs	<750	750-2,499	≥2,500
swine < 55 lbs	<3,000	3,000-9,999	≥10,000
horses	<150	150-499	≥500
sheep or lambs	<3,000	3,000-9,999	≥10,000
turkeys	<16,500	16,500-54,999	≥55,000
chickens, including laying hens or broilers w/wet waste system	<9,000	9,000-29,999	≥30,000
laying hens w/dry waste system	<25,000	25,000-81,999	≥82,000
broiler chickens w/dry waste system	<37,500	37,500-124,999	≥125,000
ducks w/other than wet waste system	<10,000	10,000-29,999	≥30,000
ducks w/wet waste system	<1,500	1,500-4,999	≥5,000
other animal type ³	Designated by director.	Designated by director.	Designated by director.

¹ Whether milked or dry.

² Other than mature dairy cows or veal calves; cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.

³ To determine the number of animals that require permit coverage, ODA will compare the operation to the most similar animal type in the table.

S1.C. How do I apply for permit coverage?

1. New Application

To obtain permit coverage for the first time, a person must submit to ODA an ODA *Application to Register (ATR)*, Land Use Compatibility Statement (LUCS), Animal Waste Management Plan (AWMP), and application fee. The application, LUCS, AWMP, and fee must be submitted to ODA at least 180 days prior to the time permit coverage is needed or as specified by ODA in writing. For information on AWMP requirements, see S3, p. 13.

2. Renewal of Permit Coverage

To renew permit coverage, the permit registrant must submit an ODA renewal application at least 180 days before the expiration date of this permit or as specified by ODA in the renewal notice but no later than the expiration date of this permit. Applicants must certify on their renewal application whether an AWMP is new, updated or current and on file. New and updated animal waste management plans must be submitted with the application.

3. Notification of Permit Coverage

ODA will review the application and notify the applicant in writing when permit coverage is approved or denied. Permit coverage does not begin until written notice is issued by ODA to the applicant. Written notification will include a *Notice of Registration* that will include the following information:

- (a) The owner and operator's legal name;
- (b) Facility name and location;
- (c) Contact information, including mailing address and telephone number;
- (d) Effective date of permit coverage;
- (e) Maximum number of animals allowed at the facility; and
- (f) Regulatory status of the operation. ODA will use the following classifications for regulatory status:
 - (i) *Large concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(4);
 - (ii) *Medium concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(6);
 - (iii) *Small concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(9) and designated by the director pursuant to OAR 603-074-0012;
 - (iv) *Elective large, medium, or small CAFO* sized according to Table 1, p. 6.

S1.D. How do I transfer permit coverage to a new owner or operator?

The permit registrant must complete an ODA transfer form and submit it to ODA for approval at least 30 days before transfer of the CAFO is scheduled to occur or as specified by ODA. The form must be signed by the previous owner or operator as well as the new owner or operator. ODA will respond to the request for transfer by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant and transferee in writing of transfer of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.E. What activities are covered by this permit?

1. This permit covers the discharge of pollutants resulting from processes, wastes, and operations that are properly identified by the registrant through its AWMP approved by ODA.
2. This permit does not cover disposal of human wastes or treatment works that mix human and animal wastes. Any person owning or operating such a system must apply to DEQ for coverage under an individual or general permit issued pursuant to ORS 468B.050. This general permit may be used in addition to an individual or general permit issued by DEQ pursuant to ORS 468B.050 that covers some other type of wastewater at this same facility, for example, septic system wastewater.
3. Pursuant to 40 CFR § 122.23(e), precipitation-related discharges that qualify as agricultural stormwater discharges from land application areas are not subject to NPDES permit requirements. For discharges from the land application area to meet the definition of agricultural stormwater, manure and wastewater must be applied in accordance with site specific practices listed in the ODA-approved AWMP that ensure appropriate agricultural utilization of nutrients.

S1.F. How do I cancel permit coverage?

1. ODA will cancel coverage under this permit upon issuance of an appropriate individual permit by ODA and DEQ or coverage under WPCF General Permit #01 is granted by ODA.

2. Any permit registrant may request in writing to ODA that coverage under this permit be cancelled if any one of the following applies:
 - (a) Conditions or standards have changed so that the CAFO no longer qualifies for or is required to have coverage under this permit.
 - (b) The permit registrant no longer has animals on site and all waste storage and control facilities have been cleaned and re-purposed or decommissioned in accordance with the following requirements:
 - (i) Cleaning/Re-purposing Requirements
 - (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the ODA-approved AWMP or exported according to S2.K, p. 12.
 - (2) All liquid storage facilities that could fill with rain water must be flushed with clean water, the flush water land applied or exported according to S2.K, p. 12 and the remaining liquid in the structure tested to confirm the *E. coli* level is at or below the water quality standard of 406 Colony Forming Units/100ml of sample.
 - (3) All liquid transfer systems are cleaned and modified so that they are not a conduit for any pollutant to enter surface water or groundwater.
 - (ii) Decommissioning Requirements
 - (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the approved AWMP or exported according to S2.K, p. 12.
 - (2) If the structure has a synthetic liner, the liner must be removed and disposed or recycled in a lawful manner.
 - (3) After completion of [(ii)(1)] above, any earthen structure must be filled with soil and returned to the grade matching the surrounding area. All soil fill and remaining exposed soil must be seeded to site-appropriate grass or ground cover to prevent erosion.
3. The permit registrant must also certify that it will not commence operation of a regulated CAFO at the same location until the appropriate NPDES or WPCF permit coverage has been obtained.
4. ODA will respond to the request for cancellation by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant in writing of termination of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.G. Will my information be kept confidential?

Information, including the name and address of an NPDES permit applicant or permit registrant, NPDES permit applications (for example, ODA ATRs) and their attachments (for example, AWMPs), NPDES permits, and NPDES permit discharge data cannot be kept confidential pursuant to 40 CFR § 122.7(b) and (c), ORS 468.095(1), and ORS 192.410 to 192.505. The applicant or permittee may request that director classify other records as confidential upon a proper showing that the record is a trade secret pursuant to ORS 468.095(2).

S1.H. What are the public notice and participation requirements of this permit?

1. Prior to approving new permit coverage, renewing permit coverage, or approving proposed substantial changes to an AWMP, ODA will provide public notice and participation as detailed in Table 2, p. 9.
2. ODA may batch multiple notices as regionally appropriate.
3. Application and permit documents (for example, Application to Register, renewal application, AWMP, Land Use Compatibility Statement) will be available for public review at ODA headquarters and appropriate field offices. If available, electronic copies of documents will be provided upon request.
4. ODA will schedule public hearings if written requests for public hearing are received during the comment period from at least 10 persons or from an organization or organizations representing at least ten persons. If a hearing is scheduled, ODA will provide at least 30 days notice before the hearing is held. The public comment period will remain open for additional comments for at least seven (7) days after the public hearing.

S1.I.

Table 2: NPDES Public Notice Requirements

	New Application	Renewal Application	AWMP Changes
Permit Action	(a) Receipt of ODA <i>ATR (Application to Register)</i> for existing operation not currently under an NPDES permit or new proposed operation	(b) Receipt of renewal application	(c) Receipt of proposed substantial change to CAFO's AWMP (See S3.D, p. 14)
Public Participation Process	(i) Public notice of a comment period of at least 35 days provided as follows: • Published in regional newspaper; • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.
Contents of Public Notice	• Name of operation • Name of operator or owner if different than operator, mailing address, and telephone number • Physical address of operation • Type of operation • Number of animals proposed • Land Use Compatibility Statement (LUCS) • Summary of AWMP	• Name of operation • City, county, and zip code • Permit registration number • Type of operation	• Name of operation • City, county, and zip code • Permit registration number • Type of operation • Overview of proposed substantial change

S2. DISCHARGE LIMITATIONS AND OPERATING REQUIREMENTS

S2.A. Prohibitions and Discharge Limitations

1. The permit registrant must not discharge manure, litter, or process wastewater to surface water and groundwater of the state except as allowed in S2.B and S2.C and provided these surface water discharges do not exceed the following effluent limits.
 - (a) *E. coli* must not exceed zero organisms/100 mL or quantitation limit of 2 Colony Forming Units/100 mL or 0.0 most probable number/100 mL;
 - (b) Nitrate plus Nitrite Nitrogen ($\text{NO}_3 + \text{NO}_2$) must not exceed zero mg/L or quantitation limit of 0.1 mg/L;
 - (c) Total Phosphorus (P) must not exceed zero mg/L or quantitation limit of 0.1 mg/L.

Types of discharge that are prohibited include but are not limited to: contaminated runoff from confinement or waste accumulation areas; overflow or discharges from waste storage facilities; discharges due to improper land application activities from seepage below the root zone, surface drainages or field tile outlets; dry-weather discharges, discharges due to equipment failure; leakage or seepage from facilities in the production area in excess of approved designs; and discharges to underground injection control (UIC) systems.

2. Compliance with the effluent limits above must be determined by laboratory test results of a representative grab sample of the discharge taken at the time of occurrence. If a grab sample is not taken, then the permit registrant is in violation of the effluent limits.

S2.B. Production Area Limitations

1. For all CAFOs (except swine, poultry, and veal *large* CAFOs, the construction of which commenced after April 14, 2003):
The permit registrant must not discharge manure, litter, or process wastewater to surface water of the state from the production area, except when:
 - (a) Rainfall events cause an overflow of waste management and storage facilities designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater, including the runoff and direct precipitation, from a 25-year, 24-hour rainfall event; and
 - (b) The production area is operated in accordance with the applicable inspection, maintenance, recordkeeping, and reporting requirements of this permit.
2. For swine, poultry, and veal *large* CAFOs the construction of which commenced after April 14, 2003:
The permit registrant must not discharge manure, litter, or process wastewater from the production area to surface water of the state.
3. The permit registrant must properly land apply manure, litter, and wastewater from the production area in a manner consistent with S2.C. All other authorized discharges from the production area must be managed to minimize impacts on surface water and groundwater of the state and meet the effluent limits in S2.A above.
4. The permit registrant must not exceed the seepage design rates approved by ODA for waste storage or animal confinement facilities in the production area and seepage to groundwater from these facilities must not violate state groundwater quality protection standards.
5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.C. Land Application Limitations

1. To prevent discharges to waters of the state, the permit registrant must apply manure, litter, or process wastewater to land application areas at agronomic rates in accordance with the permit registrant's ODA-approved AWMP. Land application areas include land under the control of the permit registrant, to which manure, litter, or process wastewater from the production area is or may be applied.
2. The permit registrant's discharges to groundwater due to seepage below the root zone of the crop or by other means must not violate state groundwater quality protection standards.

3. The permit registrant is allowed to apply manure, litter, or process wastewater to frozen soil provided:
 - (a) The AWMP addresses such applications [see S3.C.2(k), p. 14];
 - (b) The application does not result in a discharge to surface water or groundwater, except as allowed in S2.B and S2.C; and
 - (c) Land applications do not cause or contribute to a violation of state water quality standards.
4. The permit registrant must not apply manure, litter, or process wastewater to saturated soils immediately before or during rainfall events that are expected to result in surface runoff. If the permit registrant makes such an application because it is a desired alternative to allowing waste storage or treatment works to overflow (for example, land application to saturated soils to pond wastewater onsite provides for greater protection of surface water than a direct overflow of a waste storage tank to surface water), the application will be considered a violation of this permit.
5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.D. Direct Access by Animals to Surface Water of the State in the Production Area Prohibited

The permit registrant must prevent direct animal contact with surface water of the state in the production area of its CAFO. Direct animal contact means any situation where animals in the production area have free access and are allowed to loiter or drop waste in surface water. Direct contact with surface water of the state by animals on pasture or rangeland is not, by itself, a violation of this permit.

S2.E. Waste Storage Facilities

1. The permit registrant must provide adequate storage capacity for solid and liquid wastes at all times so that land application occurs only during periods when soil and weather conditions allow for agronomic application and are in compliance with the Land Application Limitations in S2.C, p. 10 of this permit.
2. The permit registrant must site, design, construct, operate, and maintain all waste storage facilities to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event for the storage period established in the ODA-approved AWMP. New and modified construction of waste facilities must be approved in advance and prior to construction by ODA in conformance with ORS 468B.055 and OARs 340-051 and 603-074.
3. Permit registrants with a *large* CAFO must also have depth markers in all surface liquid impoundments (for example, lagoons, ponds, tanks) designed to clearly indicate the:
 - (a) Maximum design volume,
 - (b) Minimum capacity necessary to contain the 25-year, 24-hour rainfall event, including additional freeboard requirements, and
 - (c) Depth of manure and process wastewater.

S2.F. Prevention of System Overloading

1. The permit registrant may not increase the number of animals over 10% or 25 animals, whichever is greater, of the maximum number assigned by ODA in the *Notice of Registration and General Permit Summary* until an updated plan is approved in writing by ODA (see S3.B AWMP Submittal, p. 13, and S3.D Requirements for AWMP Updates and Changes, p. 14).
2. The permit registrant must ensure that animal numbers do not exceed the capacity of the waste storage facilities described in the ODA-approved AWMP.

S2.G. Handling of Animal Mortalities

The permit registrant must not dispose of animal mortalities in liquid manure or treatment works. Animal mortality composting is allowed and must be described in the Animal Waste Management Plan. The permit registrant must handle animal mortalities in such a way as to prevent discharge of pollutants to waters of the state (surface water and groundwater).

S2.H. Proper Operation and Maintenance

The permit registrant must at all times properly operate and maintain all facilities and systems used for process wastewater collection, storage and utilization, and correct any deficiencies found as soon as possible.

S2.I. Maintaining Compliance if System Fails

The permit registrant must control all applications and discharges upon reduction, loss, or failure of the waste storage or utilization facilities until the facilities are restored or an alternative method of storage or utilization is provided. This requirement also applies when the primary source of power is reduced, lost, or fails.

S2.J. Setback Requirement

The permit registrant must develop and maintain setbacks or vegetated buffers when manure, litter, or process wastewater application occur adjacent to any surface water, open tile intake structures, sinkholes, well heads, or other conduits to surface water or groundwater. The permit registrant must also include descriptions of setbacks, vegetated buffers, and/or equivalent measures in its AWMP. Compliant setbacks, vegetated buffers, or equivalent measures include the following:

1. 100 ft. setbacks (non-vegetated, non-managed buffers).
2. 35 ft. vegetated, managed buffers.
3. If approved by ODA, variable-width, seasonal setbacks determined by the type of manure, litter or process wastewater and application method used.
4. If approved by ODA, a demonstration that a setback or vegetated buffer is not necessary or may be reduced in size because implementation of alternative conservation practices or field-specific conditions will provide equivalent or better environmental protection than [1., 2. and 3.] above.

S2.K. Manure, Litter, or Process Wastewater Transfers

1. The permit registrant retains responsibility of the manure, litter, or process wastewater until the transfer or export is completed with the required documentation.
2. The permit registrant must maintain manure, litter, or process wastewater transfer or export records as required by S4.C.2(d), p. 19.
3. Prior to transferring manure, litter, or process wastewater to other persons, the permit registrant with a *large* CAFO must provide the recipient of manure, litter, or process wastewater with a manure nutrient analysis conducted within the previous 12 months.

S2.L. Proper Disposal of Other Wastes

The permit registrant must dispose of any chemicals or other wastes in accordance with applicable state regulation. The permit registrant must manage chemicals and wastes to prevent their disposal in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat these wastes and the wastes and treatment systems are identified in the AWMP. The permit registrant must not dispose of chemicals or other wastes to any system used for the control of uncontaminated stormwater.

S3. ANIMAL WASTE MANAGEMENT PLAN

S3.A. Animal Waste Management Plan (AWMP) Implementation and Compliance

1. Upon registration to this permit, the permit registrant must implement its current ODA-approved AWMP developed for its CAFO.
2. The permit registrant's ODA-approved AWMP is incorporated into this permit by reference. The permit registrant must comply with all terms and conditions of its ODA-approved AWMP. Failure to comply with the ODA-approved AWMP constitutes a violation of the terms and conditions of this permit.

S3.B. AWMP Submittal and Public Notice

1. The applicant applying for permit coverage for the first time must submit its AWMP with the ATR to ODA for review and approval according to the schedule provided in S1.C, p. 7.
2. The existing permit registrant with coverage under NPDES General Permit #01 or another permit may submit its AWMP previously approved by ODA with the *Application to Register or Renewal Application* for review and approval according to the requirements in S1.C, p.7
3. AWMPs are subject to public notice requirements detailed in S1.H, p. 8.

S3.C. AWMP Elements

1. The permit registrant must ensure that its AWMP is adequate for the proposed or existing population of animals, reflective of the proposed or existing facility operation, and prepared in accordance with the terms and conditions of this permit, OAR 340-051, and OAR 603-074.
2. The AWMP must to the extent applicable include the following:
 - (a) Procedures to ensure collection, handling, and storage of contaminated stormwater runoff from the production area, manure, litter, and process wastewater in compliance with the requirements of S2. Discharge Limitation and Operating Requirements. Calculations used to determine that storage capacity exists must be provided, including a demonstration that facilities are at least designed and constructed to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event.
 - (b) Procedures to ensure proper operation and maintenance of the storage facilities.
 - (c) Procedures for proper management of animal mortalities. The procedures must ensure that animal mortalities are disposed of legally and are not disposed of in any storage or treatment system that is not specifically designed to treat animal mortalities.
 - (d) Procedures to ensure that clean water is diverted, as appropriate, from the production area.
 - (e) Procedures to prevent direct contact of confined animals with surface water.
 - (f) Identification of appropriate site-specific conservation practices to be implemented, including buffers, setback areas, or equivalent practices, to control runoff of pollutants to surface water and groundwater.
 - (g) Protocols to land apply manure, litter, or process wastewater in accordance with site-specific nutrient management practices that ensure: 1) appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, and 2) application of nutrient at rates not to exceed the maximum agronomic application rate included in the ODA-approved AWMP. The protocols must include the following:
 - (i) The NRCS Phosphorous Index, USDA/NRCS Oregon Agronomy Technical Note #26, revised October 2008 or equivalent calculation must be completed for all fields or management units that receive manure, litter or process wastewater to determine if nitrogen or phosphorous is the most limiting nutrient. The maximum nutrient application rate must be calculated for the most limiting nutrient and must account for all other nitrogen and phosphorus sources.
 - (ii) Expected crop yields.
 - (iii) Calculations showing the total nitrogen and phosphorus to be applied annually to each field from manure, litter, process wastewater, and other sources.
 - (iv) Annual manure application rates and an explanation of the basis for determining these rates. For *large* CAFOs, these rates must be based on actual test data. For other operations, data or "book values" from established reference sources (for example, Oregon Animal Waste Management program) may be used instead of actual testing.
 - (v) Method(s) used to apply manure, litter, or process wastewater

- (vi) Timing of manure, litter, and process wastewater applications.
- (h) For all operations, protocols for soil testing. For *large* CAFOs, protocols for testing of manure, litter, and process wastewater. For other operations that are not required to test manure, litter, or process wastewater, test protocols are not required but the references that are used to characterize manure, litter, or process wastewater must be included.
- (i) If applicable, an Agricultural Compost Management Plan must be included as required by OAR 340-096 for composting activities.
- (j) If applicable, a Solid Waste Conversion Technology Plan must be included as required by OAR 340-096.
- (k) Frozen soil application procedures if applications of manure, litter, or process wastewater will be made to frozen soil. At a minimum, the following must be included:
 - (i) Description of the potential receiving field(s), estimates of waste amounts and types, and estimated timing of applications.
 - (ii) Aerial photo(s) identifying all areas and surface water bodies within 1,000 ft. of the boundaries of the receiving field(s).
 - (iii) Soil map(s) identifying soil types for receiving field(s).
 - (iv) Topographic map(s) for receiving field(s).
 - (v) Description of the structural practices in place to ensure that no discharges to surface water occur during application and after the soil thaws.
 - (vi) Description of the method used to determine when soil is frozen and management practices to be followed when planning an application and during and after an application to frozen soil.
 - (vii) Description of monitoring and reporting requirements to ensure that the permit registrant is in compliance with frozen soil application procedures.
 - (viii) Procedures for transfer or export of manure, litter, or process wastewater.
 - (ix) Identification of specific records that will be maintained to document the implementation and management of the minimum elements described above.

S3.D. Requirements for AWMP Updates and Changes

(See Table 3, p.16, for an overview of the following requirements.)

1. Requirements for *small or medium* CAFOs electing permit coverage (see Table 3, p. 16, for an overview)
 - (a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 45 days in advance of implementation of the proposed changes. ODA will public notice the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:
 - (i) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.
 - (ii) An increase in maximum allowed animal numbers such that the operation becomes defined as a *large* CAFO.
 - (b) *Non-substantial changes.* Public notice of non-substantial changes (described below) to an AWMP is not required; however, the permit registrant must submit its proposal to make such a change to ODA for approval at least 45 days in advance of implementation of the proposed change unless a different timeframe is allowed by ODA. ODA will notify the permit registrant of its final decision concerning the proposed change after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:
 - (i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers provided the increase does not change the operation into a *large* CAFO.
 - (ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

2. Requirements for all other CAFOs (see Table 3, p. 16, for an overview)

- (a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes. ODA will provide public notice on the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:
 - (i) Addition of new land application areas not previously included in the AWMP, unless the land application area is covered by an existing AWMP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit.
 - (ii) Any changes to the field-specific maximum annual rates for land application.
 - (iii) Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop.
 - (iv) Addition of any crop or other uses not included in the AWMP and corresponding field-specific rates of application.
 - (v) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.
 - (vi) Any changes that are likely to increase the risk of pollutant transport to surface water or groundwater.
- (b) *Non-substantial changes.* The permit registrant must submit any proposal to make non-substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes unless a different timeframe is allowed by ODA. A proposal for a non-substantial change is not subject to public notice. ODA will notify the permit registrant of its final decision concerning the proposed changes after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:
 - (i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers.
 - (ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

Table 3: Overview of Requirements for Proposed Changes to AWWPs

	Small or Medium CAFO Electing Coverage		All Other CAFOs	
	<i>Substantial Change</i>	<i>Non-Substantial Change</i>	<i>Substantial Change</i>	<i>Non-Substantial Change</i>
Description of proposed change	1. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWWP. 2. An increase in maximum allowed animal numbers such that the operation becomes defined as a large CAFO.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWWP.	1. Addition of new land application areas not previously included in the AWWP, unless the land application area is covered by an existing AWWP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit. 2. Any changes to the field-specific maximum annual rates for land application. 3. Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop. 4. Addition of any crop or other uses not included in the AWWP and corresponding field-specific rates of application. 5. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWWP. 6. Any changes that are likely to increase the risk of nitrogen and phosphorus transport to surface water or groundwater.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWWP.
Timeline to submit proposal to ODA	Submit at least 45 days in advance of proposed change(s).	Submit at least 45 days in advance of proposed change(s) unless a different timeframe allowed by ODA.	Submit at least 60 days in advance of proposed change(s).	Submit at least 60 days in advance of proposed change(s) unless a different timeframe is allowed by ODA.
Public notice process	ODA will public notice as described in S1.H, p. 8.	Not required.	ODA will public notice as described in S1.H, p. 8.	Not required.
ODA approval	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.

S4. MONITORING, INSPECTION, RECORDKEEPING, AND REPORTING REQUIREMENTS

S4.A. Monitoring Requirements

1. Prohibited Discharges

If a prohibited discharge to surface water or groundwater that is not allowed by S2.B or S2.C, p. 10 occurs, the permit registrant must record the following information and notify ODA within 24 hours (see S4.D, p. 19 for written reporting requirements):

- (a) A description and cause of the discharge;
- (b) The period of discharge including exact date(s), time(s), and duration of discharge;
- (c) An estimate of discharge volume;
- (d) Name or location of receiving water;
- (e) If a grab sample was taken of the discharge;
- (f) Corrective steps taken, if appropriate, to reduce, eliminate, or prevent reoccurrence of the discharge;
- (g) For any unauthorized discharge that may have come in contact with a drinking water intake, confirmation that Oregon Emergency Response System (OERS) was notified.

2. Soil, Manure, Litter, and Process Wastewater Monitoring for Large CAFOs

The permit registrant with a *large* CAFO must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
- Liquid manure - Process wastewater (if handled separately from liquid manure) - Solid manure	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Exported manure, litter, and process wastewater	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Soil from land application area(s)	Total nitrogen Total phosphorus Nitrate-nitrogen	Annually on a minimum of 20% of the fields or management units that receive manure, litter or process wastewater applications each year. All fields or management units must be sampled at least once every 5 years.	Sample according to guidance contained in PNW 570-E, EM 8832-E for post-harvest nitrate-nitrogen
Grab sample of effluent discharge from production or land application area	<i>E. coli</i> , Nitrate plus Nitrite Nitrogen (NO ₃ +NO ₂), Total Phosphorus (P)	Upon occurrence see S2.A.2, p.10.	Grab sample analyzed using test methods in 40 CFR Part 136

3. Soil, Manure, Litter, and Process Wastewater Monitoring for all Other Operations

The permit registrant must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
Soil from land application area(s)	Total nitrogen Total phosphorus	Once every 5 years from all fields or management units where manure, litter, or	Sample according to guidance contained in PNW 570-E, EM

		process wastewater is applied.	8832-E.
Grab sample of effluent discharge from production or land application area	<i>E. coli</i> , Nitrate plus Nitrite Nitrogen (NO ₃ +NO ₂), Total Phosphorus (P)	Upon occurrence see S2.A.2, p.10.	Grab Sample analyzed using test methods in 40 CFR Part 136

S4.B. Inspection Requirements

1. The permit registrant must conduct the following inspections:

Item	Large CAFO	All Other Operations
(a) Stormwater diversion devices, runoff diversion structures, animal waste storage structures, and devices channeling contaminated stormwater to wastewater and manure storage and containment structures	Weekly and record results	At least once every six months
(b) Water lines, including drinking water or cooling water lines	Daily and record results	At least once every six months
(c) Equipment used for land application of manure, litter, or process wastewater	Daily when equipment is in use and record results	At least once every six months when equipment is in use
(d) Liquid impoundments for manure and process wastewater	Weekly and record depth of manure and process wastewater according to depth marker required by S2.E.3, p. 11	At least once every six months

2. The permit registrant must correct any deficiencies found as a result of these inspections as soon as possible. The permit registrant with a *large* CAFO must record any actions taken to correct these deficiencies and, if deficiencies are not corrected within 30 days, provide an explanation of the factors preventing immediate correction.

S4.C. Recordkeeping and Availability Requirements

1. The permit registrant must maintain all information required by this permit at the facility for at least five (5) years and make this information available to ODA upon request.
2. Upon obtaining permit coverage, the permit registrant must record the following information:

Item or Parameter	Large CAFO	All Other Operations
(a) Date, amount, and nutrient loading of manure, litter, or process wastewater applied to each field.	Required	Required
(b) Weather conditions at the time of application and 24 hours before and after application.	Required	Not required
(c) Total amount of nitrogen and phosphorus actually applied annually to each field, including documentation of calculations of the total amount applied.	Required	Required

Item or Parameter	Large CAFO	All Other Operations
(d) Total amount of manure or wastewater transferred or exported to other persons.	Required. Also include: (i) Date and amount of each transfer or export (ii) Name and address of each recipient (iii) Copy of the manure nutrient analysis conducted provided to the recipient (See S2.K.3, p. 12)	Required
(e) Description of actions taken to correct deficiencies discovered during inspections.	Required (See S4.B.2, p. 18)	Not required

S4.D. Reporting Requirements

1. Reporting to ODA and Oregon Emergency Response System (OERS)
 - (a) If a discharge to surface water or groundwater occurs that is not allowed by S2.B and S2.C, p. 10, the permit registrant must notify ODA within 24 hours of the discharge. The permit registrant must submit a written report within five (5) days to ODA. The information to be submitted is listed in the monitoring requirements (See S4.A, p. 17) of this permit.
 - (b) The permit registrant must notify ODA within 24 hours of becoming aware of any significant physical failure at any time of treatment works required under this permit.
 - (c) The permit registrant must notify ODA within 24 hours of any permit noncompliance that may endanger health or the environment as described in G13.6, p. 23.
 - (d) In addition to complying with [1.(c)] above, the permit registrant must notify Oregon Emergency Response System (OERS) of any unauthorized discharge that may come in contact with a surface water or groundwater drinking water system intake within 24 hours. Notification must be made by calling OERS at 1-800-452-0311
2. Reporting of Monitoring Results of a prohibited effluent discharge
 - (a) The permit registrant must submit monitoring information for an effluent grab sample no later than one month from the date the sample was taken unless a different schedule is established by an administrative order as described in S4.E, p. 20.
 - (b) Reporting of monitoring information must include:
 - (i) The date, exact place, and time of sampling or measurements;
 - (ii) The individual(s) who performed the sampling or measurements;
 - (iii) The date(s) analyses were performed;
 - (iv) The individual(s) who performed the analyses;
 - (v) The analytical techniques or methods used; and
 - (vi) The results of such analyses that includes the sample result and quantitation limit of the analysis.
3. Annual Report
 - (a) The permit registrant must submit an annual report to ODA by March 15 of each year. The annual report must include the following for the previous calendar year :
 - (i) Maximum number and type of animals approved by ODA in the permittee's *Notice of Registration*, whether in open confinement or housed under roof (for example, beef cattle, broilers, layers, swine weighing 55 pounds or more, swine weighing less than 55 pounds, mature dairy cows, dairy heifers, veal calves, sheep and lambs, horses, ducks, turkeys, other).
 - (ii) Actual number of animals by type averaged over the year.
 - (iii) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure generated (tons, gallons, cubic feet, or cubic yards).
 - (iv) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure transferred to other persons by the permittee (tons, gallons, cubic feet, or cubic yards).
 - (v) Estimated amount of manure, bedding, litter, process wastewater, and other material that comes in contact with manure applied to land by the permittee (tons, gallons, cubic feet, or cubic yards).
 - (vi) Total number of acres for land application covered by the AWMP developed in accordance with

the terms of this permit.

- (vii) Total number of acres under control of the permittee that were used for land application of manure, litter, and process wastewater in the previous 12 months.
 - (viii) Summary of all manure, litter, and process wastewater discharges from the production area that have occurred, including date, time and approximate volume.
 - (ix) A statement indicating whether the AWMP was developed or approved by a certified waste management planner.
 - (x) Any Concentrated Animal Feeding Operation that discharges to surface waters must also report the following items (xi) through (xvi). (40 CFR 122.42(e)(4)(viii))
 - (xi) Actual crop(s) planted and actual yield(s) for each field.
 - (xii) Actual nitrogen and phosphorus content of the manure, litter, and process wastewater.
 - (xiii) Data used and results of calculations based on protocol in the ODA-approved AWMP.
 - (xiv) Amount of manure, litter, and process wastewater applied to each field during the previous 12 months.
 - (xv) Results of soil testing for nitrogen and phosphorus if testing was performed.
 - (xvi) Amount of any supplemental fertilizer applied.
- (b) The annual report must be signed and certified by the permittee or permittee's authorized representative with the following statement: "I certify, under penalty of law, that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

S4.E. Additional Monitoring

1. ODA may establish specific monitoring requirements in addition to those contained in this permit by administrative order. An administrative order is an agency action expressed in writing directed to a named person or named persons (ORS 183.310).
2. If a permittee experiences two or more discharges within a 24-month period that are not associated with a 25-year, 24-hour or greater rainfall event, ODA may require surface water and/or groundwater quality monitoring or transfer the permittee to an individual permit. Monitoring for the following parameters may be required: bacteria, total suspended solids, total kjeldahl nitrogen, biochemical oxygen demand, and other nutrient indicators. If ODA waives the additional monitoring requirements because such monitoring would be impracticable or not likely to produce useful information, ODA will set out the basis for the decision in writing and make the decision available to interested persons.

GENERAL CONDITIONS

The general conditions in this schedule apply only to the extent they do not conflict with the requirements contained in special conditions S1 through S4. If the permit requirements in special conditions S1 through S4 conflict with these general conditions, the permit requirements in special conditions S1 through S4 will control.

G1. Compliance with other laws and statutes

Nothing in the permit will be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G2. Duty to comply [40 CFR § 122.41(a)]

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

1. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
2. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed \$25,000 per day for each violation. The Clean Water Act provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than \$50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of \$5,000 to \$50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than \$100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than \$250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than \$500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than \$1,000,000 and can be fined up to \$2,000,000 for second or subsequent convictions.
3. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed \$10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$25,000. Penalties for Class II violations are not to exceed \$10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$125,000.

G3. Duty to reapply [40 CFR § 122.41(b)]

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

G4. Need to halt or reduce activity not a defense [40 CFR § 122.41(c)]

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G5. Duty to mitigate [40 CFR § 122.41(d)]

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G6. Proper operation and maintenance [40 CFR § 122.41(e)]

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

G7. Permit actions

1. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR § 122.41(f)]
2. After notice, registration under this permit may be modified or revoked as it applies to any person for cause as follows:
 - (a) Violation of any terms or conditions of the permit,
 - (b) Failure of the permittee to disclose fully all relevant facts, or misrepresentations of any relevant facts by the permittee during the permit issuance process and during the life of the permit;
 - (c) Failure to pay permit fees required by Oregon Administrative Rule when due;
 - (d) Information indicating that the permitted operation poses a threat to human health or welfare;
 - (e) A change in ownership or control of the operation, or
 - (f) Other causes listed in 40 CFR § 122.62 and 122.63.
3. Modification or revocation of coverage under this permit as it applies to any person may be initiated by ODA.
4. Issuance of coverage under an individual permit may be initiated by ODA in accordance with S1.A.2.

G8. Property rights [40 CFR § 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

G9. Duty to provide information [40 CFR § 122.41(h)]

The permittee shall furnish to the director, within a reasonable time, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the director, upon request, copies of records required to be kept by this permit.

G10. Inspection and entry [40 CFR § 122.41(i)]

The permittee shall allow the director or an agency authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act or state law, any substances or parameters at any location.

G11. Monitoring and records [40 CFR § 122.41(j)]

1. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.
2. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which must be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a

period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the director at any time.

3. Records of monitoring information must include:
 - (a) The date, exact place, and time of sampling or measurements;
 - (b) The individual(s) who performed the sampling or measurements;
 - (c) The date(s) analyses were performed;
 - (d) The individual(s) who performed the analyses;
 - (e) The analytical techniques or methods used; and
 - (f) The results of such analyses.
4. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless another method is required under 40 CFR subchapters N or O.
5. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

G12. Signatory requirement [40 CFR § 122.21(k)]

1. All applications, reports, or information submitted to the director shall be signed and certified. (See § 122.22)
2. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

G13. Additional reporting requirements [40 CFR § 122.41(l)]

1. *Planned changes.* The permittee shall give notice to the director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
 - (a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in § 122.29(b); or
 - (b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under § 122.42(a)(1).
 - (c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
2. *Anticipated noncompliance.* The permittee shall give advance notice to the director of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.
3. *Transfers.* This permit is not transferable to any person except after notice to the director. The director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See § 122.61; in some cases, modification or revocation and reissuance is mandatory.)
4. *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit.
 - (a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the director for reporting results of monitoring of sludge use or disposal practices.
 - (b) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the director.
 - (c) Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean unless otherwise specified by the director in the permit.
5. *Compliance schedules.* Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.
6. *Twenty-four hour reporting.*
 - (a) The permittee shall report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the permittee becomes aware of the

- circumstances. A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- (b) The following must be included as information that must be reported within 24 hours under this paragraph.
 - (i) Any unanticipated bypass that exceeds any effluent limitation in the permit. (See § 122.41(g) or G14, p. 24.)
 - (ii) Any upset which exceeds any effluent limitation in the permit. (See § 122.41(n) or G15, p. 24.)
 - (iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the director in the permit to be reported within 24 hours. (See § 122.44(g).)
 - (c) The director may waive the written report on a case-by-case basis for reports under G13.6(b) of this section if the oral report has been received within 24 hours.
7. *Other noncompliance.* The permittee shall report all instances of noncompliance not reported under G13.4, 5, and 6 of this section, at the time monitoring reports are submitted. The reports must contain the information listed in G13.6 of this section.
8. *Other information.* Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the director, it shall promptly submit such facts or information.

G14. Bypass [40 CFR § 122.41(m)]

- 1. *Definitions.*
 - (a) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.
 - (b) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- 2. *Bypass not exceeding limitations.* The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of G14.3 and 4 of this section.
- 3. *Notice*
 - (a) *Anticipated bypass.* If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
 - (b) *Unanticipated bypass.* The permittee shall submit notice of an unanticipated bypass as required in G13.6 of this section (24-hour notice).
- 4. *Prohibition of bypass.*
 - (a) Bypass is prohibited, and the director may take enforcement action against a permittee for bypass, unless:
 - (i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (iii) The permittee submitted notices as required under G14.3 of this section.
 - (b) The director may approve an anticipated bypass, after considering its adverse effects, if the director determines that it will meet the three conditions listed above in G14.4(a) of this section.

G15. Upset [40 CFR § 122.41(n)]

- 1. *Definition.* *Upset* means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- 2. *Effect of an upset.* An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of G15.3 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

3. *Conditions necessary for a demonstration of upset.* A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - (a) An upset occurred and that the permittee can identify the cause(s) of the upset;
 - (b) The permitted facility was at the time being properly operated; and
 - (c) The permittee submitted notice of the upset as required in G13.6(b)(ii) of this section (24 hour notice).
 - (d) The permittee complied with any remedial measures required under G5 of this section.
4. *Burden of proof.* In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

**Notice of Registration and Oregon Confined Animal Feeding Operation (CAFO)
National Pollutant Discharge Elimination System (NPDES) General Permit Summary**

Overview of CAFO General Permit Summary	The Oregon CAFO General Permit No. 01-2016 (permit) was issued by the Oregon Department of Agriculture (ODA) and Department of Environmental Quality (DEQ) on March 31, 2016 and became effective on April 20, 2016. The permit expires on May 31, 2021. A copy of the permit is enclosed. This Notice of Registration describes your specific permit registration information and an overview of permit requirements. Your large concentrated CAFO was registered to CAFO Permit No. 1-2016 on July 18, 2016 based on information provided by you as follows:
--	--

Master Address No. AG-P0161701CAFG

EPA Registration No. ORG010267

	Operator	Legal owner, if different
Name	Jamie and Dan Bansen	
Business Name	Forest Glen Heifer Ranch	
Mailing Address	5801 SE Bansen Ln., Dayton, OR 97114	
Facility Address	3695 SE Lafayette Hwy. Dayton, OR 97114	
Phone	503/472/4614	
Cell/Dan	971/237/4166	
Cell/Jamie	971/237/4164	
E-mail Address	jbansen@gmail.com	
Maximum Number of Animals	The maximum number of animals that may be held at this dairy CAFO is 1,750 based on a herd composition of 1,100 heifers, 350 calves and 300 bulls . You may not exceed this number by more than 10% or 25 animals; whichever is greater, without first providing ODA with a revised Animal Waste Management Plan (AWMP) and receiving written ODA approval.	
Facility Classification	Based on the type and size of your operation, ODA has determined that you operate a Large Concentrated CAFO . <i>Note: Large Concentrated CAFOs have additional requirements. Please see general permit.</i>	

Yamhill County

Annual Permit Fee	Each fiscal year, you will be assessed an annual compliance fee of \$300.00 to maintain this registration under the general permit.
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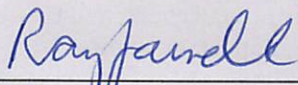
For Questions/ Additional Information	If you have questions, call your regional livestock water quality specialist at (541) 673-0805 or the Salem office at (503) 986-4699 . Additional CAFO program information is available on the internet at http://oregon.gov/ODA/NRD/cafo_front.shtml
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General Permit Conditions	The operator must be in compliance with <u>all</u> terms and conditions of the permit (not only this summary of the permit) at all times.
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Prohibited Discharges See permit section S2.A, pg. 10 for full text.	The following types of discharges are prohibited: - Contaminated runoff from confinement or waste accumulation areas; - Overflow or discharges from waste storage facilities; - Discharges due to improper land application activities from seepage below the root zone, surface drainages or field tile outlets; - Discharges due to equipment failure; and - Leakage or seepage from facilities in the production area in excess of approved designs
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When Discharge is Allowed Permit sections S2.B, pg. 10; G14, Pg. 24, S2.C, Pg. 10, 11	Production Area: Discharges of process waste water to surface waters of the state are generally prohibited except: - When rainfall events cause an overflow of waste management and storage facilities designed, constructed, operated, and maintained to contain all manure, litter and process wastewaters including the runoff and direct precipitation from a 25-year, 24-hour rainfall event; and the production area is operated in accordance with the applicable inspection, maintenance, recordkeeping, and reporting requirements of this permit. - All authorized discharges from the production area must be properly land applied or otherwise handled in a way that minimizes impacts on surface water and groundwater sources.
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	Land Application Area: Registrant must apply manure, litter and process wastewater to land at agronomic rates in accordance with the permit registrant's ODA-approved AWMP.
Animal Waste Management Plan (AWMP) Requirement Permit section S3, pg. 13-16.	The permit requires that each permitted operation have a current AWMP approved by ODA. An AWMP describes how a CAFO is managed with respect to containment, treatment, storage, and utilization of manure, litter, and process wastewater in order to remain in compliance with permit conditions and water quality laws. The AWMP must accurately represent current land base, manure storage, herd/flock size, and current management practices used at the livestock operation. The AWMP must reflect production practices and be implemented accordingly.
Storage Requirement Permit section S2.E, pg. 11.	You must provide adequate storage capacity for solid and liquid wastes at all times so that land application occurs only during periods when soil and weather conditions allow for agronomic application and are in compliance with the Land Application Limitations in S2.C.
Monitoring, Recordkeeping & Reporting Permit section S4, pg. 17-20.	Monitoring, recordkeeping and reporting of waste applications, and inspection requirements must occur as described in an AWMP approved by ODA and requirements in section S4. of the permit. <i>Note: Large concentrated CAFOs have additional requirements.</i>
Land Application Rates & Timing Permit sections S2.C, pg. 10 & 11; S3.C, pg. 13 & 14.	You must apply manure, litter and process wastes to lands at agronomic rates in accordance with the permit registrant's ODA-approved AWMP. Waste applications must not exceed the capacity of the soil and crops to assimilate nutrients and minimize water pollution, must be quantifiable, and based on the NRCS Phosphorous Index, Agronomy Technical Note #26, revised June 2008, and must account for all other nitrogen and phosphorus. Prohibitions: If discharge to surface water or groundwater will result, application to flooded and saturated land is prohibited. Proposed waste and wastewater application to frozen soil must be included in an AWMP. Land application of wastes or wastewater during rainfall events that are expected to result in saturated soils or surface runoff is prohibited.
Duty to Report Noncompliance Permit section S4.D.1, pg. 19.	If at any time you are unable to comply with any permit conditions, you have a duty to contact ODA immediately so the situation can be assessed and remedial actions taken if necessary. <i>Note: If you have a discharge to surface water or groundwater that is not allowed by the permit, you must notify ODA within 24 hours of the discharge. Please call your area livestock water quality specialist (see page 1 for phone number) at or CAFO Program support in Salem at (503) 986-4699.</i>
Annual Report Permit section S4.D.2, pg. 19.	You must submit an annual report to ODA by March 15th of each year.
Construction of Waste Storage and Waste Water Control Facilities Permit section S2.E.2, pg. 11.	S2.E. 2 of the permit states that you "must site, design, construct, operate, and maintain all waste storage facilities consistent with the AWMP approved by ODA. New and modified construction of waste facilities must be approved in advance and prior to construction by ODA in conformance with ORS 468B.055 and OARs 340-051 and 603-074." Experimental or unproven technologies must receive prior approval from ODA. For all other modifications or new construction, no approval will be required. Certification forms are available from ODA.
Public Noticing & Participation Permit section S1.H, pg. 8 & 9	Prior to approving new permit coverage, renewing permit coverage, or approving proposed substantial changes to an AWMP, ODA will provide public notice and participation.



Ray Jaendl, Director
Natural Resources and Pesticide Programs



Farmland NMP Report

For Forest Glen Oaks Offsite Farms

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SECTION 1 - GENERAL INFORMATION

Background and Site Information

Offsite Farms are located in the Lower Willamette region of Western Oregon. The landscape is generally stream floodplains, broad terraces and rolling hillsides above the streams in valleys along the Willamette River. The annual precipitation varies from 40-44 inches of which 70% falls within a 5 month period from November through March and less than 7% falls from June through August. Winds are generally moderate in the winter (15-30 mph) from the south to southwest and mild in the summer (5-15 mph) from the north to northwest. Humidity usually varies from 60 to 90 percent throughout the year except when dry east winds occur dropping the humidity to 10 to 15 percent. There are approximately 200-210 frost free days and the average annual temperature is 50 to 55 degrees Fahrenheit. Soils vary from deep to moderately deep clays, silts and sandy loams that are poor to excessively well drained.

Offsite Farms are owned and managed by various owners and their families

Cropping System

Offsite Farms consist of 2,409.8 acres of irrigated and non irrigated cropland where a crop rotation consisting of various seed crops, corn for silage, alfalfa hay, and grain crops. The acres of each crop will vary by year as crops are rotated through the farm fields. These crops will be fertilized based on soil tests and Oregon State University fertilizer guides.

Soil erosion is excessive on some fields based on conservative parameters but are within the allowable soil loss for the crop rotation.

Nutrient Management

Nutrient management is a key element to farming organically. Manure nutrients are the most valuable source of fertility available. The lagoon wastewater and solids are sampled by a third party lab to determine the nutrient content of the wastewater and solids that will be applied. Lagoon sampling is done using a long sample probe to get an adequate profile from the top to the bottom of the lagoon, multiple probes are taken around the lagoon to get an accurate sample. Animal numbers and imports to the lagoon will vary from year to year, therefore the nutrient content of the lagoon wastewater will also vary.

Soil samples are taken every fall from the crop land and analyzed by a third party lab to determine the available nutrient load in the soil.

Determining agronomic application rates of wastewater and solids is done by evaluating crop requirements, determining the present nutrient load of the soil, and supplementing the balance with wastewater or imported manure nutrients. If the requirements of the crop can be met with on-site nutrient applications, imported nutrients may not be necessary.

In the case of an over abundance of on-site manure nutrients and a lower crop demand, manure nutrients may be exported off farm either in solid form or liquid in a tanker truck. These exported manure nutrients will be used for off farm crop nutrition.

Nutrient balancing is projected every year based on the cropping plan, soil analysis, and nutrient analysis.

To mitigate any risk to water quality associated with nitrates, soil samples are taken every year, application rates are closely monitored to agronomic rates, imported manure

SECTION 1 - GENERAL INFORMATION

nutrients are only permitted when necessary to maximize crop yield potential, and excess manure nutrients are exported off farm when necessary. Nutrient applications are figured on the basis of lowering the nitrate levels in the particular areas of higher than normal soil nitrates.

The soil concentration of phosphorus ranges from medium to excessive in the offsite farm fields. Applications of wastewater and solids containing manure are planned on a nitrogen basis unless the phosphorus index risk assessment indicates that applications should be made on a phosphorus basis. Soil phosphorus concentrations will be monitored using soil tests. Setbacks are planned to protect sensitive areas and surface water sources shown on the field and setback maps.

SECTION 1 - GENERAL INFORMATION

Nutrient Balance Summary



Nutrient Balances Report

Forest Glen Oaks Offsite Farms

Dayton

Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac)			Nutrient Applied (lbs/ac)			Nutrient Balance (lbs/ac)		
				N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Abbot Claim	40.2	Grass Hay/Pasture	5 Ton	290	92	241	208	164	380	(-82)	73	139
Albertson	44.2	Alfalfa/Grass Haylage	5 Ton	260	39	137	105	93	78	(-155)	54	(-59)
Boyer	105.6	Grass Haylage / Grass Haylage / Corn, Silage	12.5 Ton	478	160	422	199	79	251	(-279)	(-81)	(-170)
Davis	7.5	Grass Hay/Pasture	5 Ton	290	92	241	201	294	153	(-89)	202	(-88)
Duniway Rd(Lemelson)	52.5	Grass Hay/Pasture	5 Ton	290	92	241	230	64	304	(-60)	(-28)	63
Evers	129.1	Alfalfa/Grass Haylage	5 Ton	260	39	137	247	68	326	(-13)	29	189
FRHR-Pivot 1	126.5	Alfalfa Hay	5 Ton	272	78	215	93	115	70	(-179)	37	(-145)
FRHR-Pivot 2	129.7	Alfalfa Hay	5 Ton	272	78	215	244	358	186	(-28)	280	(-29)
FRHR-Pivot 3	133.9	Alfalfa Hay	5 Ton	272	78	215	35	31	26	(-237)	(-47)	(-189)
FRHR-Pivot 4	73.9	Alfalfa Hay	5 Ton	272	78	215	0	0	0	(-272)	(-78)	(-215)
FRHR-Pivot 5	119.4	Alfalfa Hay	5 Ton	272	78	215	0	0	0	(-272)	(-78)	(-215)
FRHR-Pivot 6	56.9	Triticale	5 Ton	245	78	69	0	0	0	(-245)	(-78)	(-69)
FRHR-Pivot 8	129.1	Alfalfa Hay	5 Ton	272	78	215	0	0	0	(-272)	(-78)	(-215)
Figment	53.8	Grass Hay/Pasture	5 Ton	290	92	241	200	293	152	(-90)	202	(-89)
Grand Island	81.7	Grass Haylage / Corn, Silage / Grass Haylage	12.5 Ton	478	160	422	13	6	29	(-464)	(-154)	(-392)
Henry	157.1	Grass Hay/Pasture	5 Ton	290	92	241	115	77	102	(-175)	(-15)	(-139)
Hitchcock	19.4	Grass Hay/Pasture	5 Ton	290	92	241	218	60	288	(-72)	(-31)	47
Hospital	177.2	Alfalfa/Grass Haylage	5 Ton	260	39	137	229	64	303	(-31)	25	166
Hwy 18 (Lorett)	35.7	Grass Hay/Pasture	5 Ton	290	92	241	193	153	354	(-97)	61	113
Museum	11.1	Grass Hay/Pasture	5 Ton	290	92	241	230	64	304	(-60)	(-28)	63
Pike Road	56.7	Grass Haylage / Corn, Silage / Grass Haylage	12.5 Ton	478	160	422	321	132	238	(-157)	(-29)	(-183)
Railroad Grade	55.6	Grass Hay/Pasture	5 Ton	290	92	241	39	19	87	(-251)	(-73)	(-154)
Scipio	31.6	Grass Hay/Pasture	5 Ton	290	92	241	196	155	358	(-94)	63	117
Sheridan	182.4	Corn, Silage / Grass	12.5 Ton	478	160	422	272	398	207	(-205)	238	(-215)

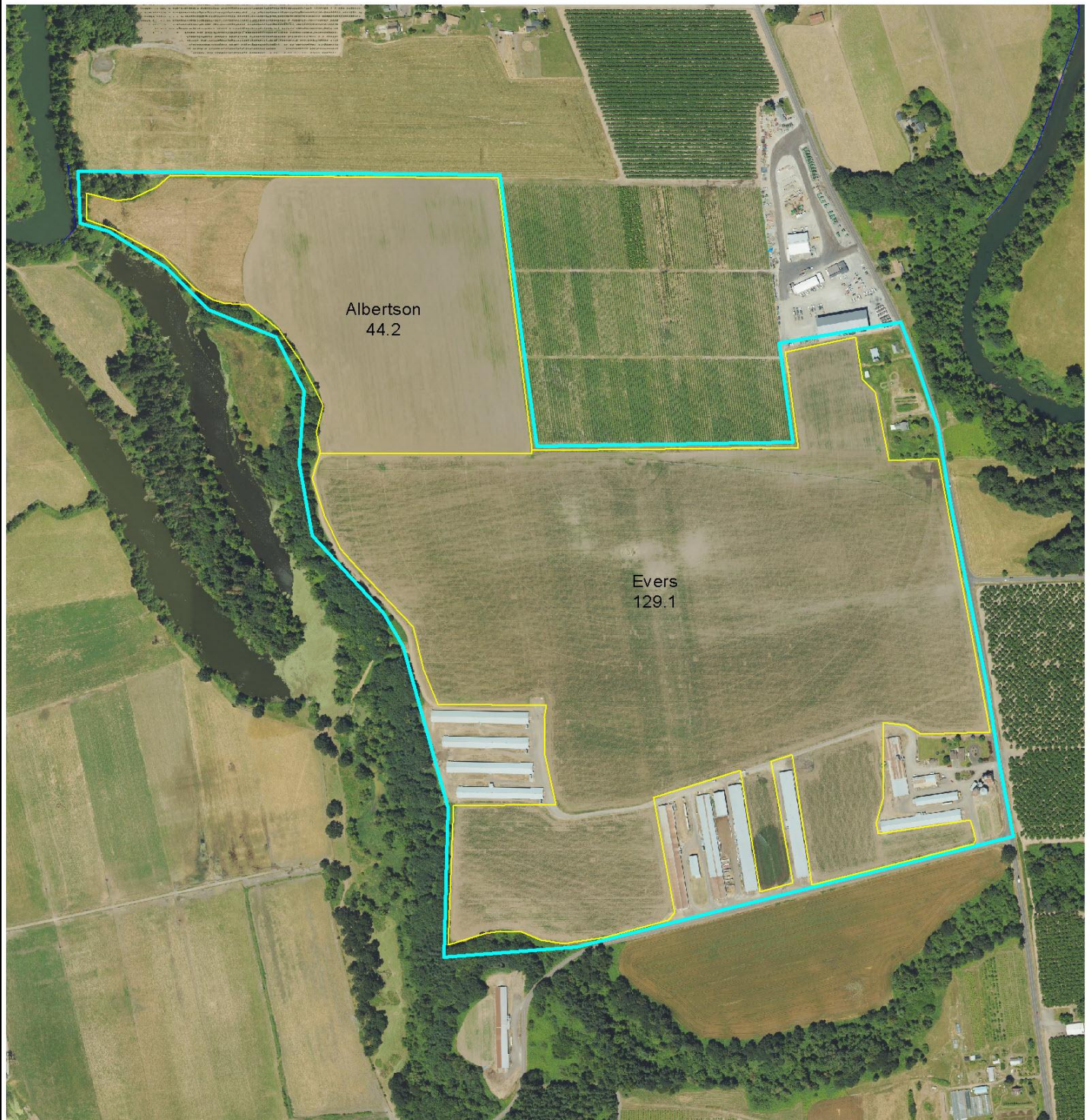
Nutrient Balances Report - Forest Glen Oaks Offsite Farms

		Haylage / Grass Haylage										
Soter	23.8	Grass Hay/Pasture	5 Ton	290	92	241	0	0	0	(-290)	(-92)	(-241)
Veeman	217.5	Grass Haylage / Corn, Silage / Grass Haylage	12.5 Ton	478	160	422	104	152	79	(-374)	(-9)	(-343)
Whiteson Bottom	116.4	Grass Haylage / Corn, Silage / Grass Haylage	12.5 Ton	478	160	422	0	0	0	(-478)	(-160)	(-422)
Whiteson Top	41.3	Barley, Grain Straw Removed	4 Ton	240	95	189	0	0	0	(-240)	(-95)	(-189)

SECTION 2 - CROPLAND

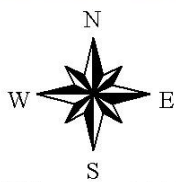
Field Maps for Forest Glen Oaks Offsite Farms

Forest Glen Oaks Inc Evers-Albertson Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres



Scale 0 500 1000 1500 Feet

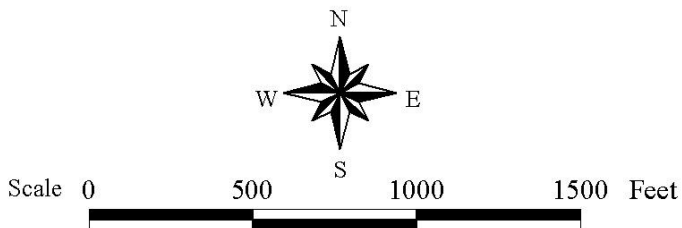
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Boyer Offsite Farm



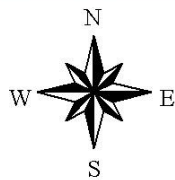
Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres



SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Davis Offsite Farm



Scale 0 250 500 750 Feet

Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

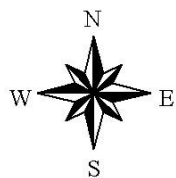
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Duniway Rd (Lemelson) Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

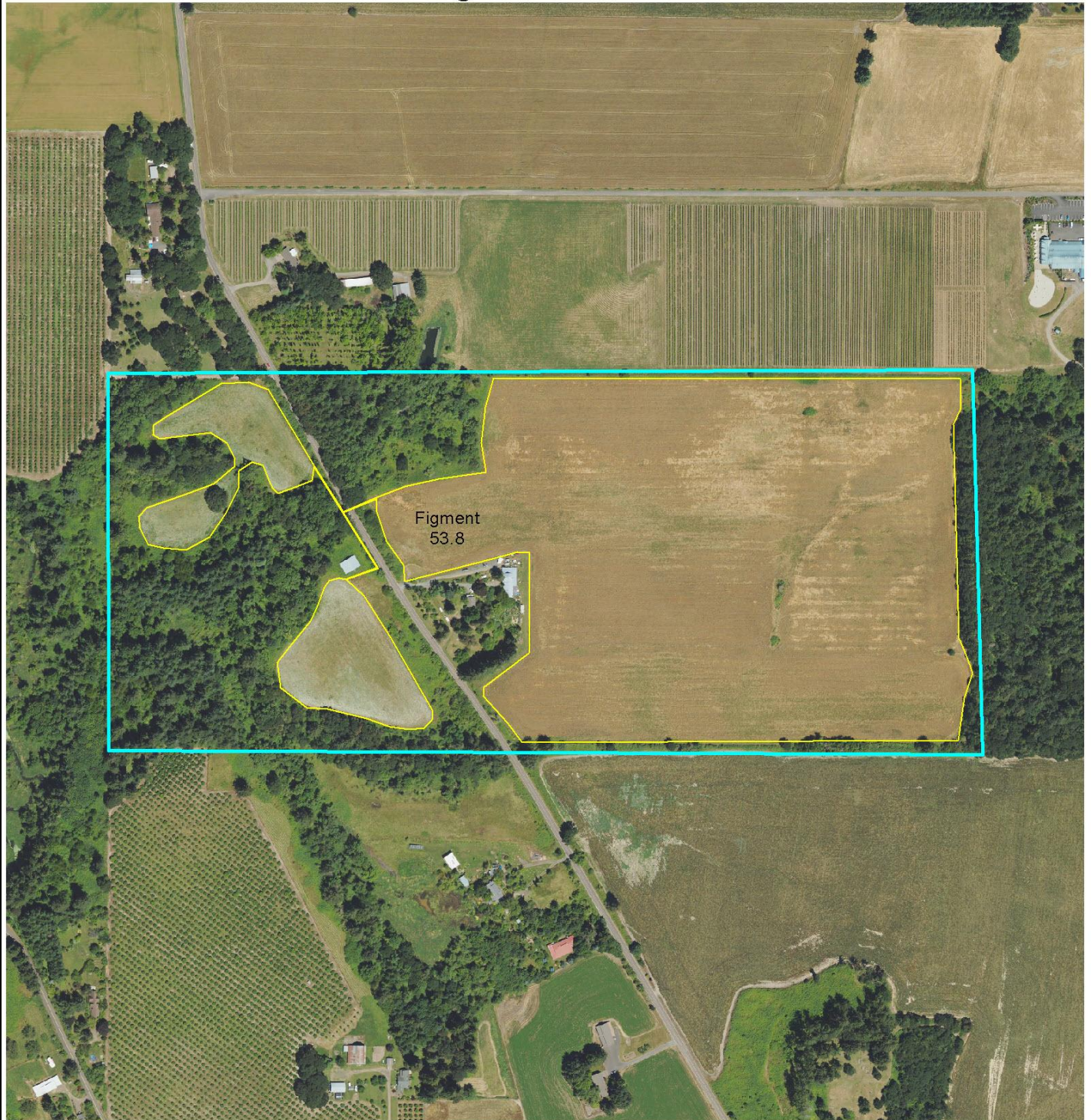


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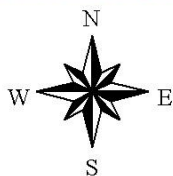
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Figment Farm



Map Legend

Field Name - Field Boundary, Field Name, Acres
Acres



Scale 0 500 1000 1500 Feet



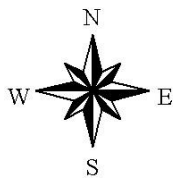
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Fort Rock Offsite Hay Ranch

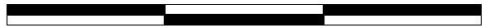


Map Legend

Field Name
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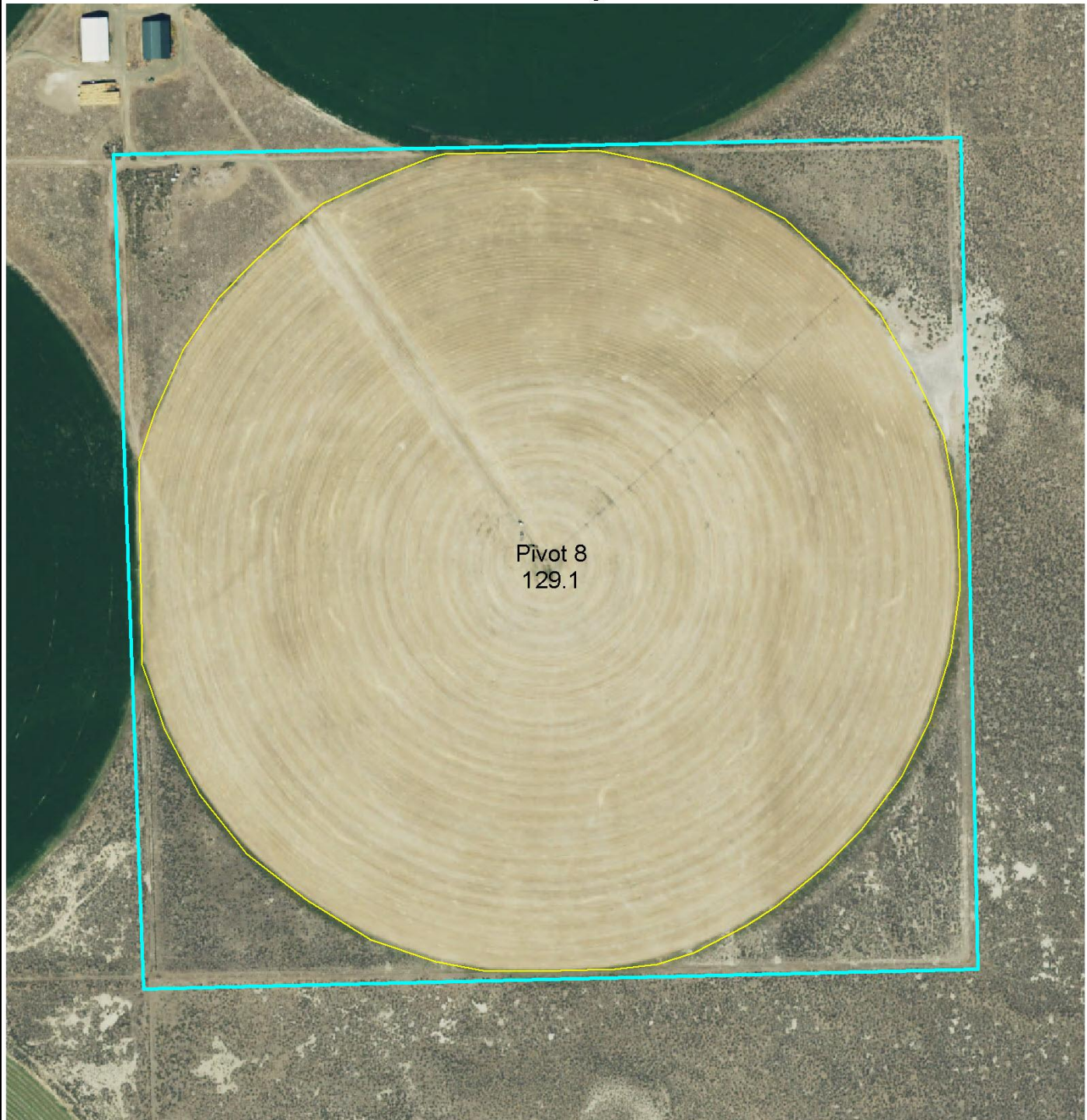


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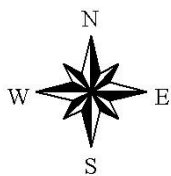
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Fort Rock Offsite Hay Ranch Pivot 8



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

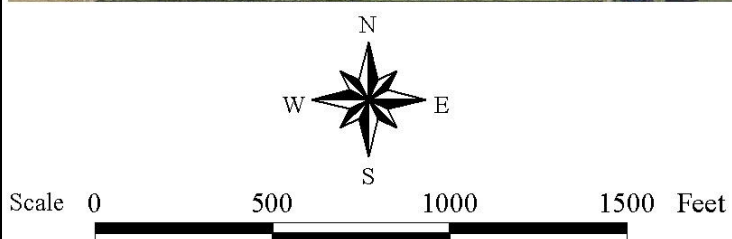
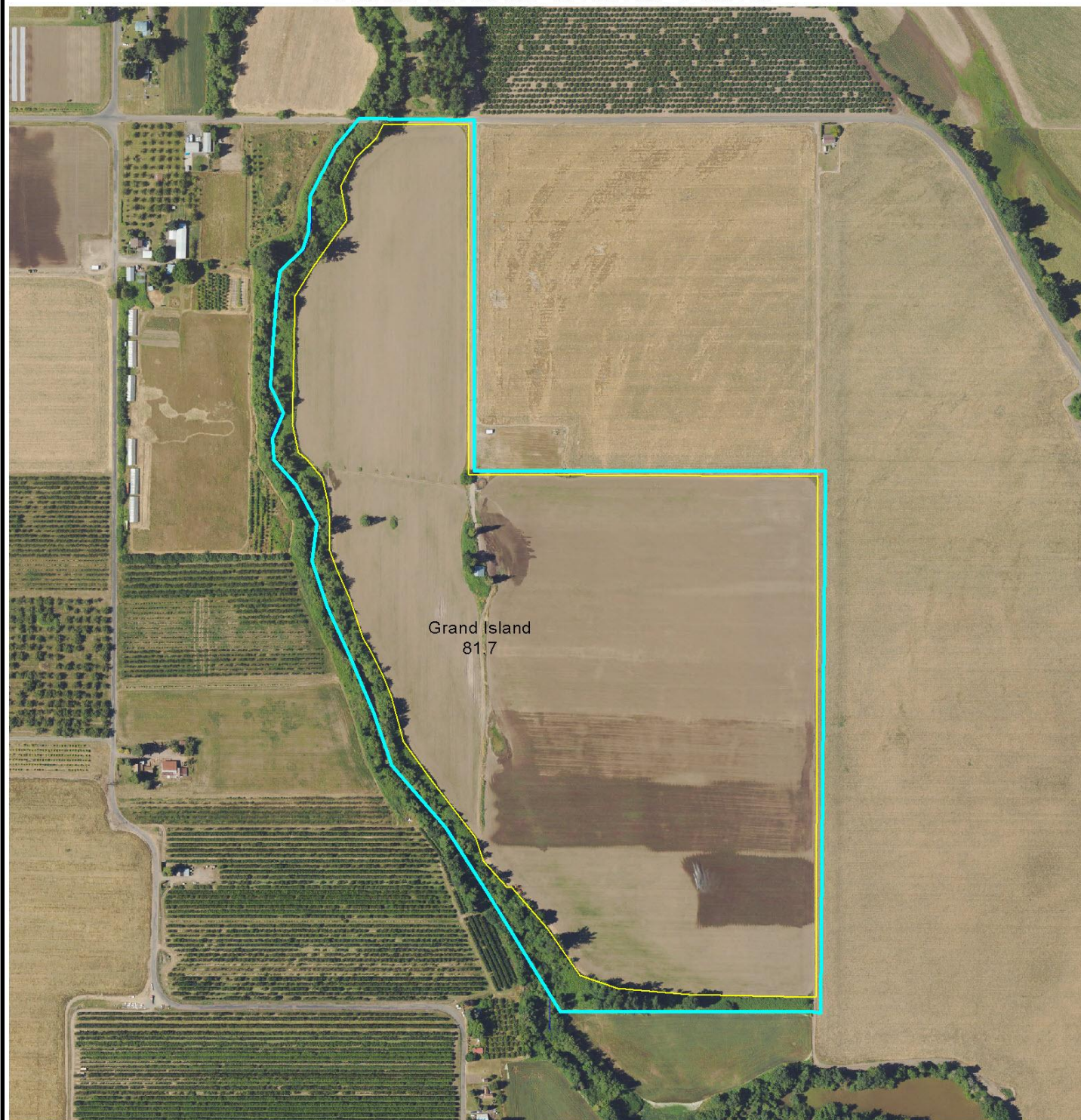


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SECTION 2 - CROPLAND

Forest Glen Oaks Inc Grand Island Offsite Farm

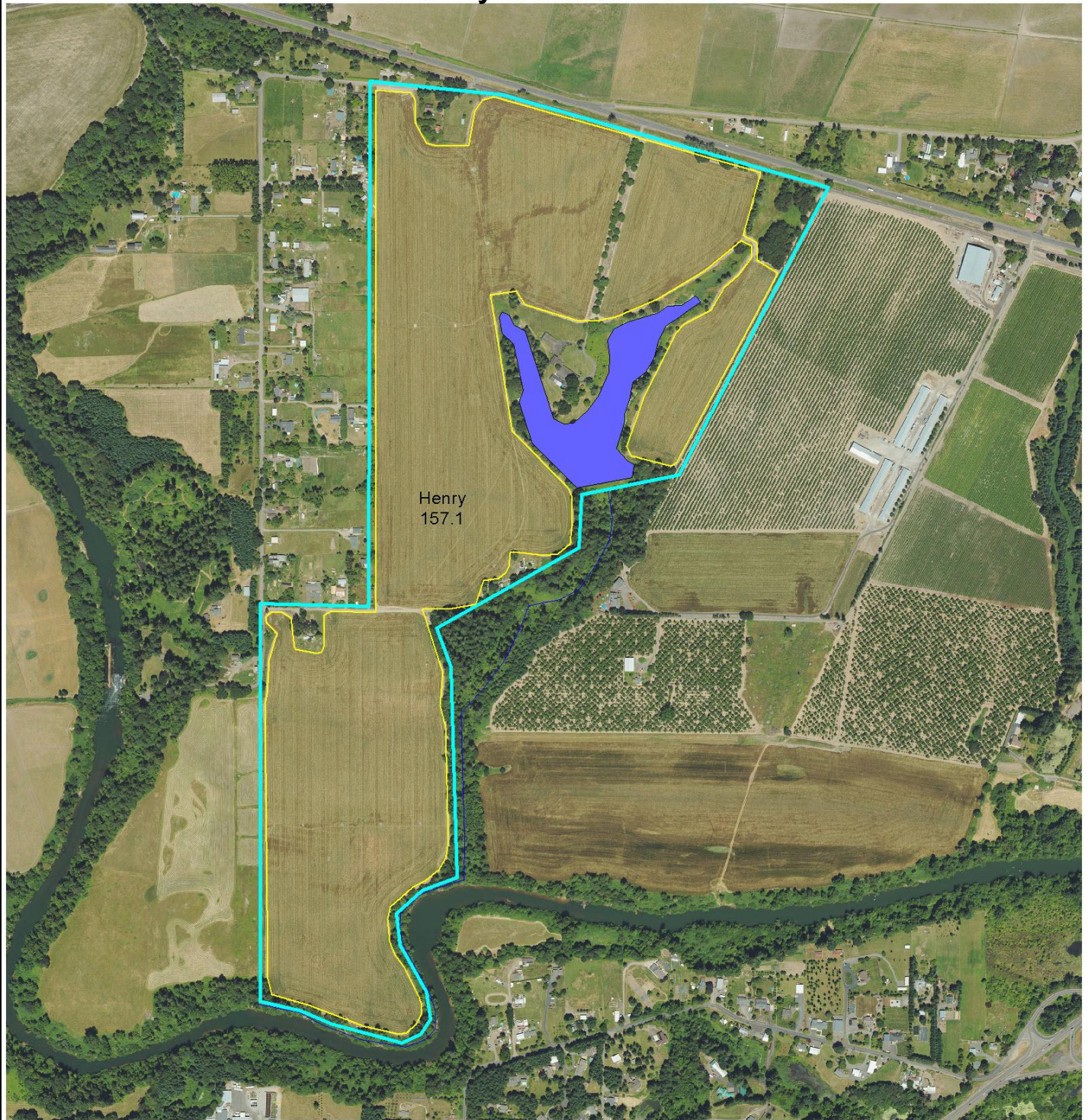


Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

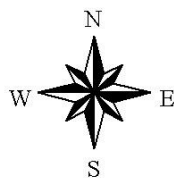
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Henry Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres



Scale 0 1000 2000 3000 Feet



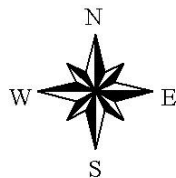
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Hitchcock Offsite Farm



Map Legend

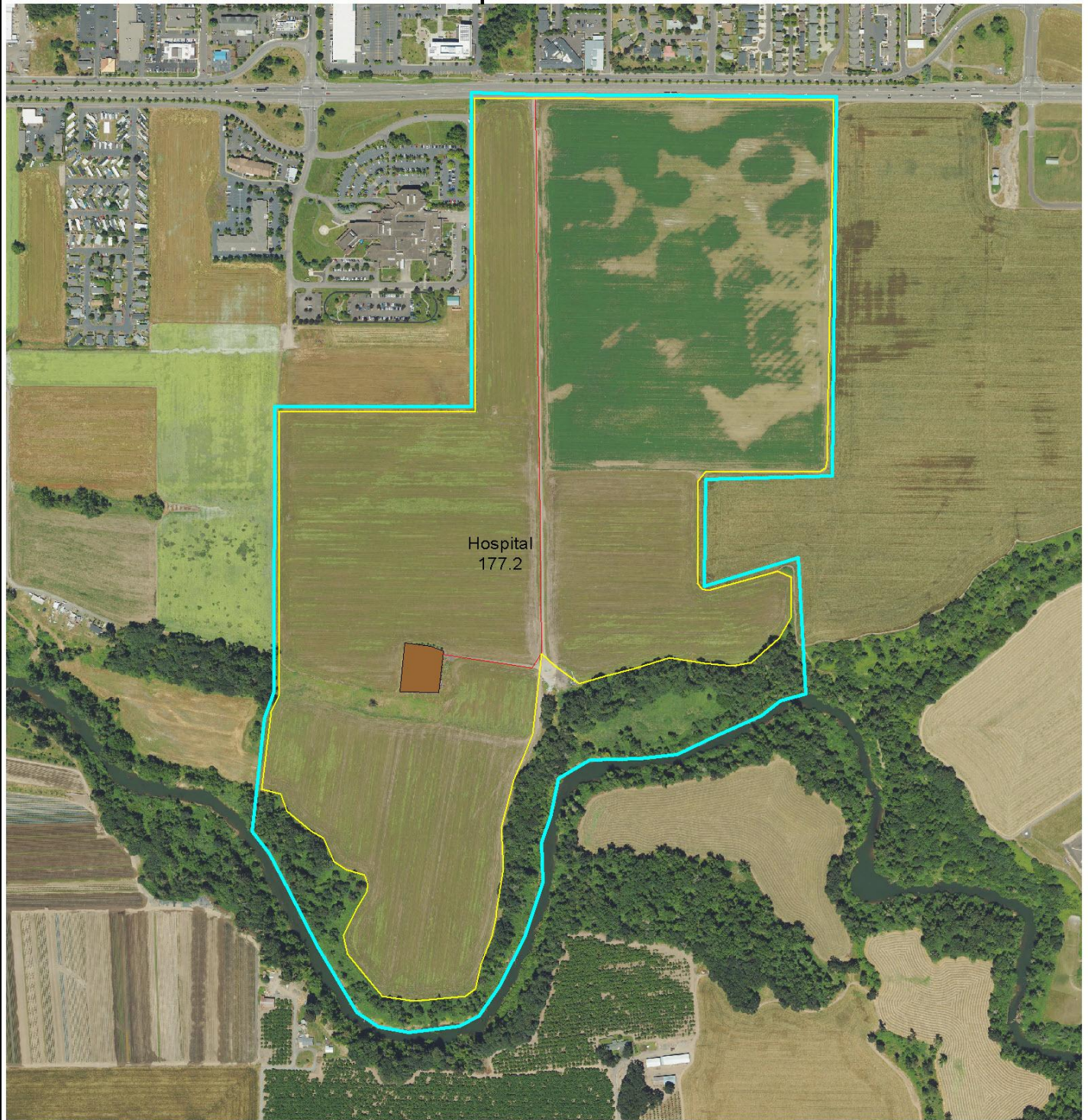
Field Name
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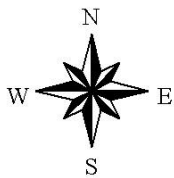
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Hospital Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

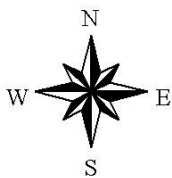


Scale 0 500 1000 1500 Feet



SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Hwy 18 (Lorett) Offsite Farm



Scale 0 250 500 750 Feet

Map Legend

Field Name Acres - Field Boundarty, Field Name, Acres

SECTION 2 - CROPLAND

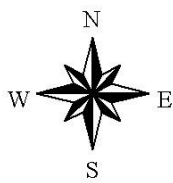
Forest Glen Oaks Inc
Museum Offsite Farm



Map Legend

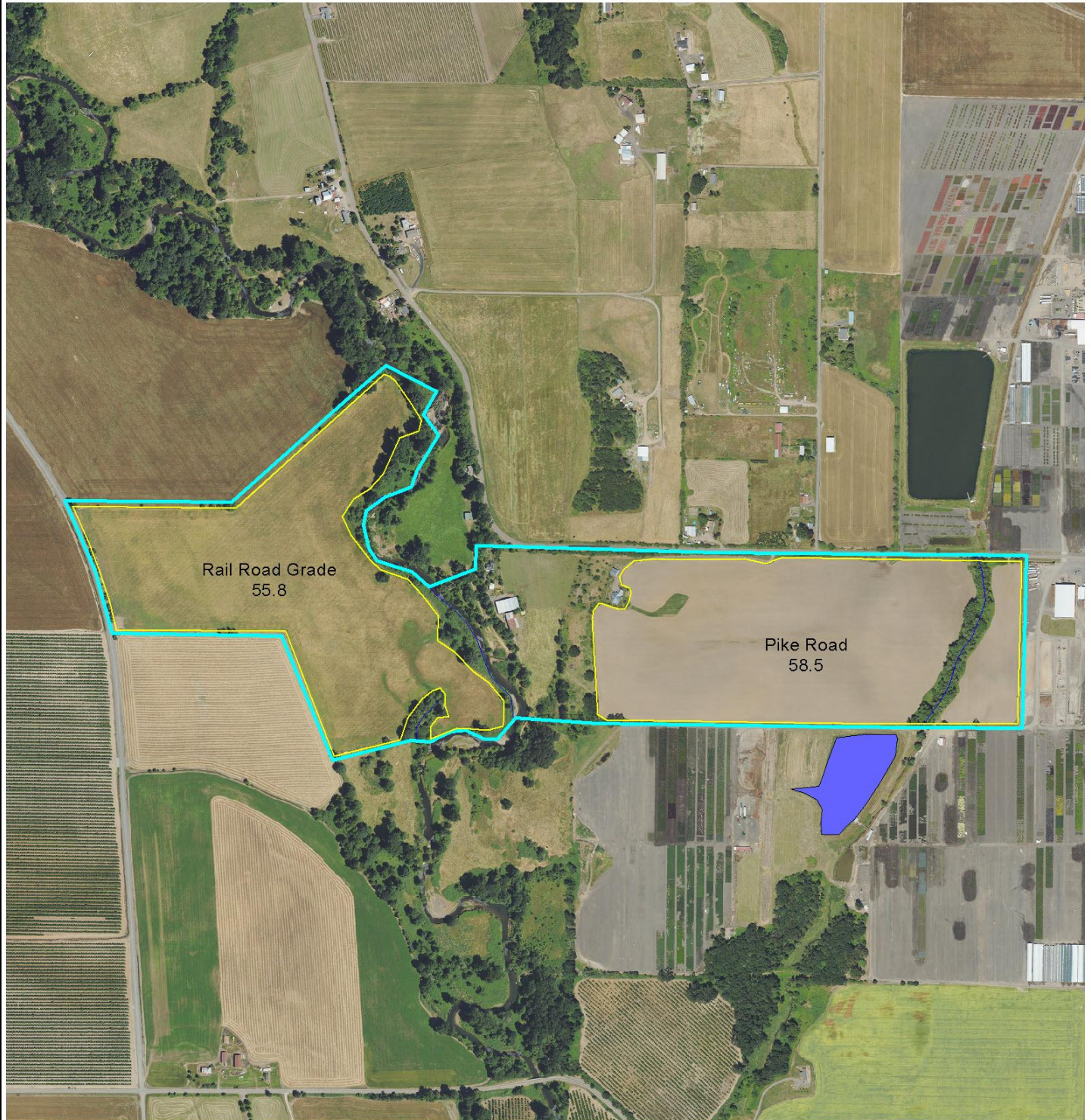
Field Name
Acres - Field Boundary, Field Name, Acres

Scale 0 250 500 750 Feet



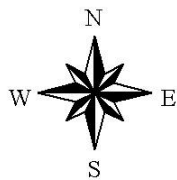
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Railroad Grade-Pike Road Offsite Farm



Map Legend

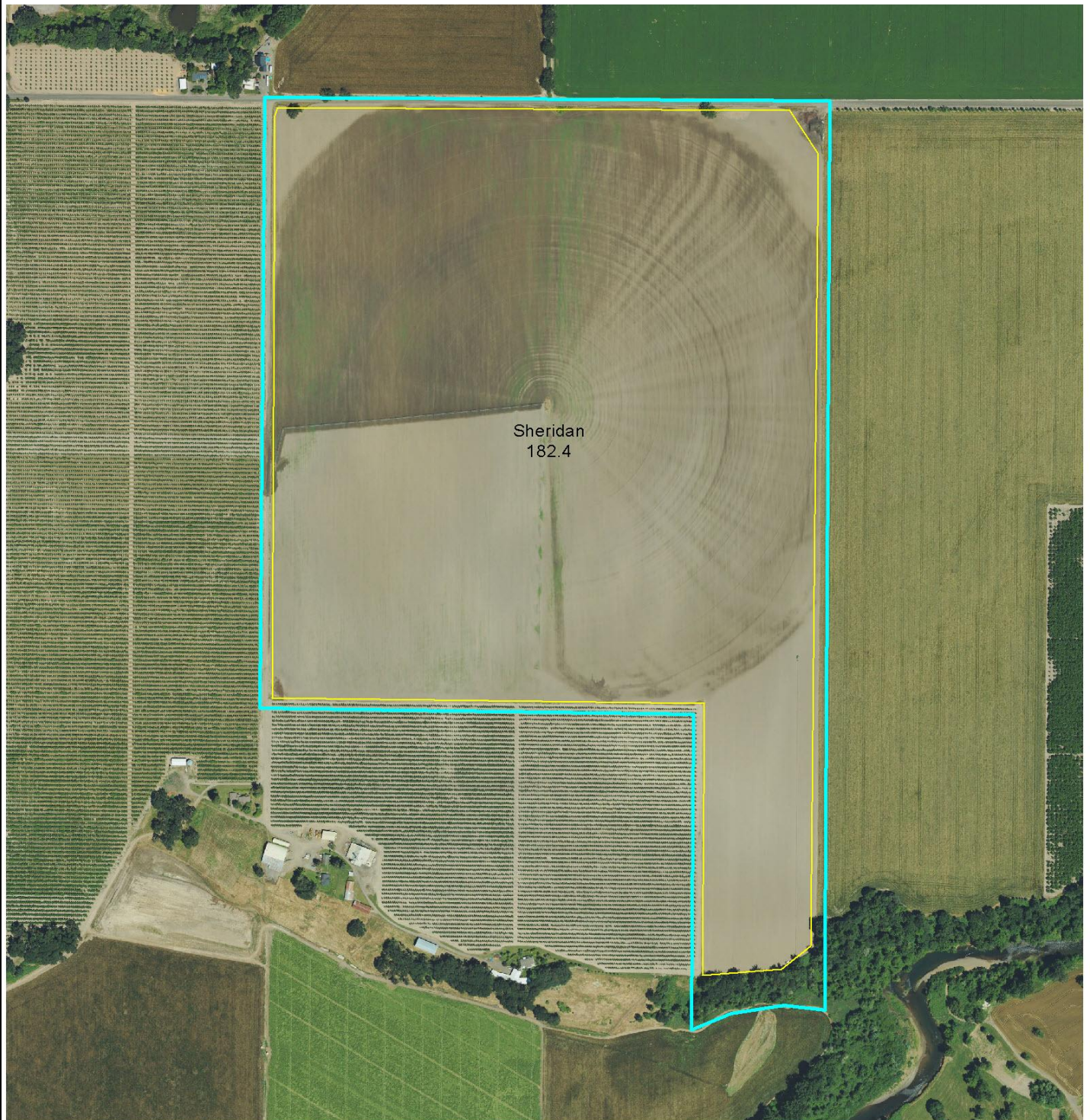
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Acres - Field Boundary, Field Name, Acres



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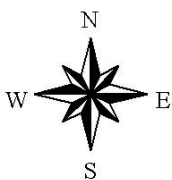
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Sheridan Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres

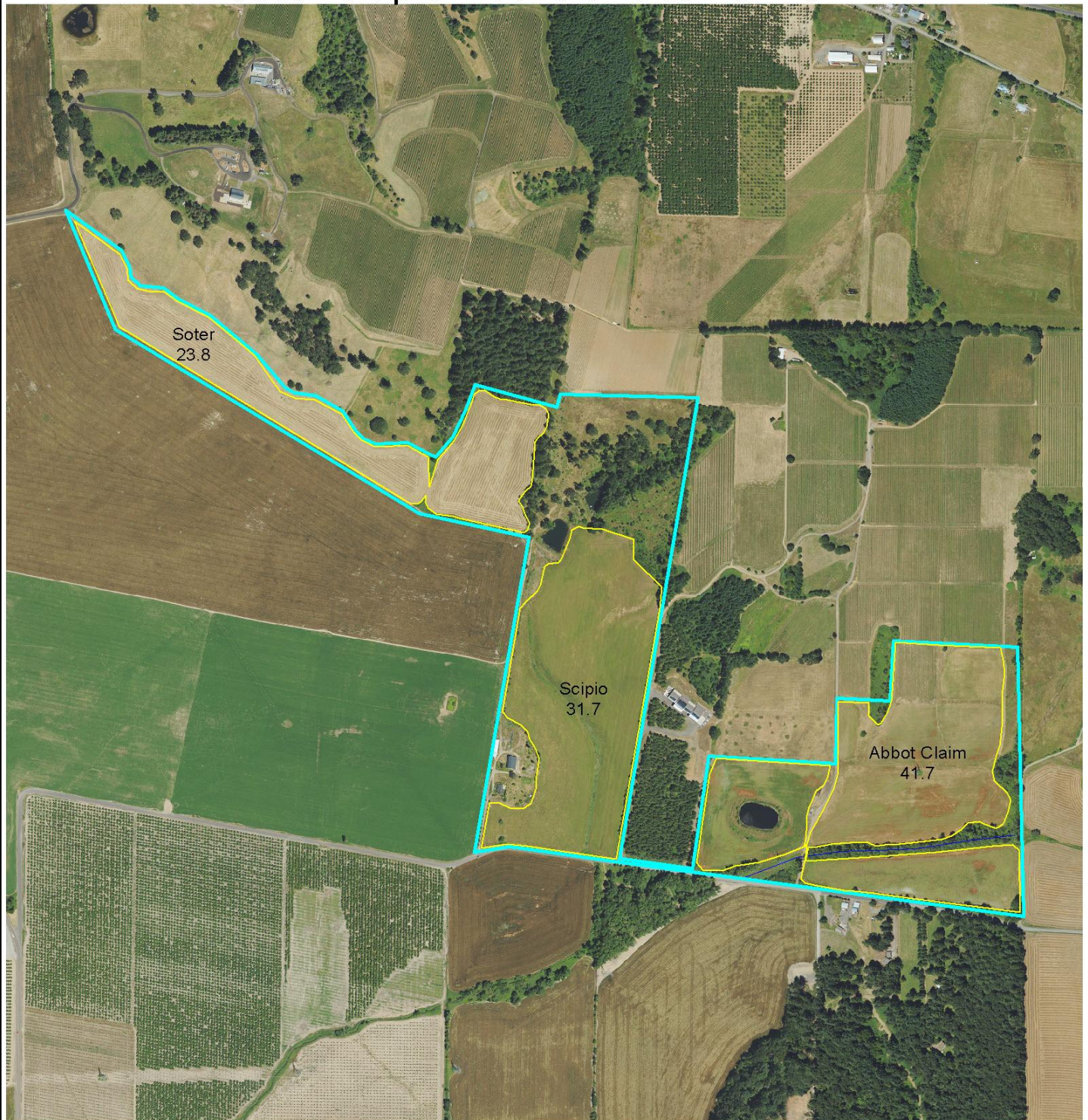


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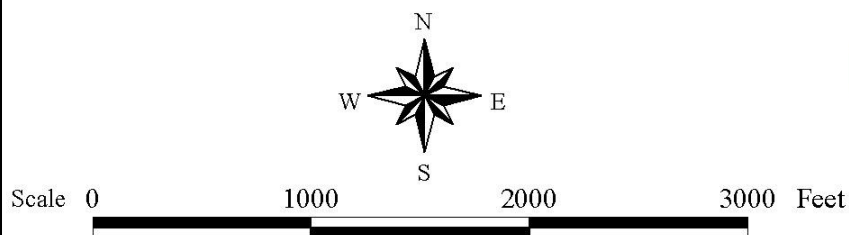
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Suter-Scipio-Abbot Offsite Farms



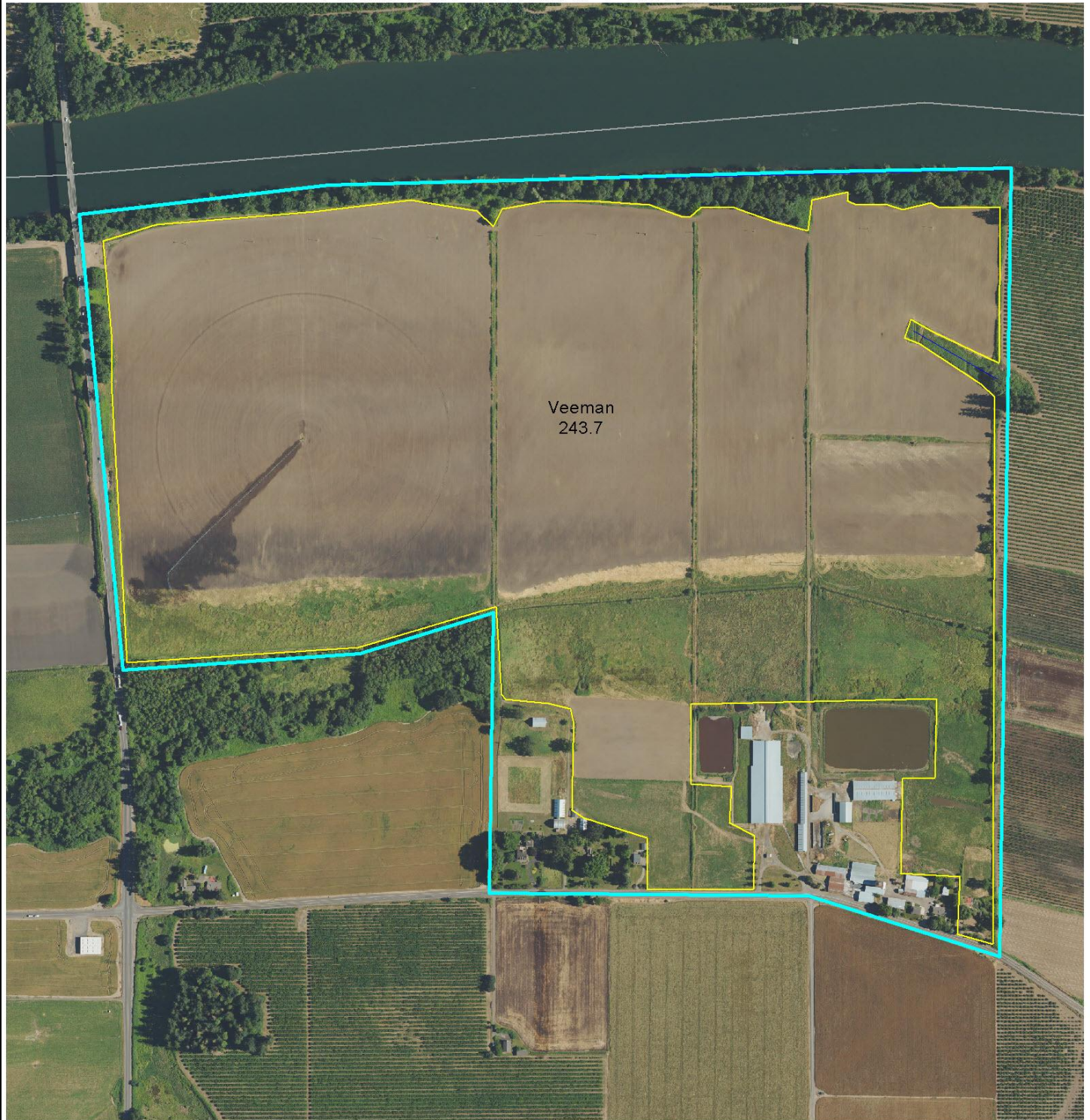
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Field Name
Acres - Field Boundary, Field Name, Acres



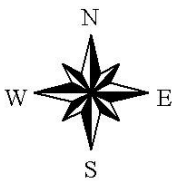
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Veeman Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres



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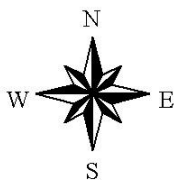
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Whiteson Offsite Farm



Map Legend

Field Name
Acres - Field Boundary, Field Name, Acres



Scale 0 500 1000 1500 Feet



SECTION 2 - CROPLAND

Application Considerations

Applications of fertilizer should be made in accordance with guidance in this section to reduce the risk of contaminated runoff to surface water sources and leaching of nutrients to ground water sources.

The phosphorus runoff rating for each of the farm fields is based on the Oregon Natural Resources Conservation Service Phosphorus Index and is shown in the table in Section 3-3. For any field with a LOW runoff rating commercial fertilizer can be applied on a nitrogen basis. For any field with a MEDIUM or HIGH runoff rating commercial fertilizer should be applied on a phosphorus basis. No applications of commercial fertilizer containing phosphorus should not be made on a field with a ZERO OUT phosphorus runoff rating.

A factor one should use in considering whether or not to apply nutrients to a crop, irrespective of the nutrient source, is the agronomic need of the crop at the time of application. The following guidelines are to be considered once the decision has been made to make a nutrient application.

Consider using T-Sum 200 to determine when nutrient applications are to begin. T-Sum 200 is based on accumulated heat units and is an accurate guide to estimate plant activity. Research has shown that T-Sum 200 is the earliest date when plant roots begin to grow in the spring and thus are receptive to applied nutrients.

T-Sum 200 is determined by monitoring surface air temperature and summing the daily minimum and maximum air temperatures and dividing the sum by two to get the average daily air temperature then converting that to centigrade (F degrees minus 32 times 0.556). Manure applications may begin once 200 heat units have been accumulated. However, one must still apply manure at agronomic rates based on the estimated growth potential of the crop and anticipated climatic events.

Based on crop nutrient uptake patterns, nutrient applications should stop when the crop is done growing for the year and before the first significant rainfall event that is expected to result in saturated soils or surface runoff.

Fields that are subsurface (TILE) drained require additional precautions when nutrients are applied. Any pre-application tillage should leave as much residue as possible on the soil surface. Water control structures installed in subsurface drainage systems should be managed to prevent discharge of rainfall runoff during periods of nutrient applications.

Calibration of application equipment is a critical part of nutrient management. Calibration should be completed at least annually to ensure fertilizer will be uniformly applied. The management goal is not to allow nutrients to enter surface or ground water at any time.

AMOUNT OF NUTRIENTS TO APPLY FOR CROPS GROWN

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

Total N to apply in pounds = N in pounds per yield unit from the table for the crop grown X Yield Units per Acre X actual percent (%) dry matter (DM) of harvested crop/percent (%)

SECTION 2 - CROPLAND

dry matter (DM) from table

Total P₂O₅ to apply in pounds = P in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 2.291 P₂O₅/P X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total K₂O to apply in pounds = K in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 1.205 K₂O/K X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Example- for a field with 5 tons per acre of grass/legume hay harvested at 90% dry matter:

Total N to apply in pounds per acre = (33.92 lb N / ton) X (5 tons / acre) X (90%DM / 100% DM) = 153 lbs N / acre

The following tables show the crops that may be grown and the nutrient uptake per yield unit:

FRUIT OR VEGETABLES

	Yield Unit	Nutrient Removal (lb/yield unit)				
		lb/Unit	% DM	N	P	K
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	13.93	1.30	11.57
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	20.67	5.60	13.66
Grapes	ton	2000	100	11.39	1.07	20.43
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.18	0.04	0.13
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	30.0	5.45	47.27
Squash	ton	2000	100	21.33	6.80	11.40

GRAIN, SEED OR OIL CROPS

	Yield Unit	Nutrient Removal (lb/yield unit)				
		lb/Unit	% DM	N	P	K
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
Bluegrass, Seed	cwt	100	100	2.88	0.43	1.98
Canola	ton	2000	100	70.00	12.00	18.00
Corn, grain shelled	bushels	56	100	0.90	0.16	0.22
Crimson Clover seed	lb	1	100	0.05	0.01	0.02
Fescue Seed, Straw Removed	cwt	100	100	1.97	0.20	2.00
Fescue, seed (Fine or Tall)	lb	1	100	1.47	0.31	1.67
Oats, grain	bushels	32	100	0.62	0.11	0.16
Orchardgrass seed	lb	1	100	0.016	0.002	0.004
Peppermint for Oil	ton	2000	100	4.20	1.80	2.80
Peppermint for Oil, Leaves & Stems Removed	ton	2000	100	87.23	36.80	57.80
Pumpkins	ton	2000	100	4.00	1.40	6.60
Rapeseed	bushels	50	100	1.38	0.30	0.30
Red Clover seed	cwt	100	100	4.55	1.00	2.00
Ryegrass seed	cwt	100	100	1.67	0.27	1.42
Ryegrass Seed, Straw Removed	ton	2000	100	30.00	18.80	37.60
Ryegrass, Perennial seed	lb	1	100	0.02	0.002	0.004

SECTION 2 - CROPLAND

Wheat, Soft White for grain	bushels	60	100	1.00	0.24	0.21
Wheat, Soft White, Straw Removed	ton	2000	100	43.40	8.90	20.90
Wheat, Hard Red for grain	bushels	60	100	1.60	0.37	0.31
Wheat, Hard Red, Straw Removed	ton	2000	100	53.36	10.96	23.76

HAY AND PASTURE CROPS

	Yield Unit	Nutrient Removal (lb/yield unit)				
		lb/Unit	% DM	N	P	K
Alfalfa, Hay	ton	2000	100	54.40	6.83	35.70
Alfalfa, Seed	cwt	100	100	6.12	0.70	2.34
Alta Fescue Hay/Pasture	ton	2000	100	32.98	6.88	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.92	5.30	7.56
Meadow Fescue Hay/Pasture	ton	2000	100	41.56	8.70	47.43
Oats Hay/Pasture	ton	2000	100	26.01	10.20	14.79
Orchardgrass Hay/Pasture	ton	2000	100	53.21	8.58	18.62
Perennial Grass Hay/Pasture	ton	2000	100	58.00	8.00	40.00
Reed Canary Grass	ton	2000	100	27.00	3.57	41.57
Ryegrass Hay	ton	2000	100	33.41	5.44	28.39
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Sorghum-Sudan Haylage	ton	2000	100	54.40	6.40	58.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00
Vetch Hay	ton	2000	100	51.93	7.20	44.76

SILAGE AND HAYLAGE CROPS

	Yield Unit	Nutrient Removal (lb/yield unit)				
		lb/Unit	% DM	N	P	K
Alfalfa/Grass Haylage	ton	2000	100	15.60	1.02	6.84
Corn for Silage	ton	2000	100	25.00	4.00	20.00
Crimson Clover forage	ton	2000	100	40.00	4.48	33.28
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Mustard, White	ton	2000	100	38.55	0.0	0.0
Oat haylage	ton	2000	100	26.0	10.2	14.8
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Perennial Grass Haylage	ton	2000	100	15.00	2.40	12.78
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	15.00	2.40	12.78
Sorghum-Sudan Haylage	ton	2000	100	16.32	1.92	17.40
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Vetch Haylage	ton	2000	100	59.67	6.57	50.00
Wheat Haylage	ton	2000	100	41.30	5.00	57.30
Wheatgrass Hay/Pasture	ton	2000	100	49.59	6.21	68.76

OTHER CROPS

	Yield Unit	Nutrient Removal (lb/yield unit)				
		lb/Unit	% DM	N	P	K
Filberts	ton	2000	100	41.70	7.30	39.29
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees & Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20
Poplars, Pulpwood	ton	2000	100	0.30	0.09	0.12
Hemp/Cannabis	ton	2000	100	31.09	3.37	36.23

SECTION 2 - CROPLAND

Nutrient Applications



Nutrient Applications Report

Forest Glen Oaks Offsite Farms

Dayton

Abbot Claim

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
05/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	251,188 Gal	54	43	99
07/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	251,188 Gal	54	43	99
08/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	211,364 Gal	46	36	83
08/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	251,188 Gal	54	43	99
Abbot Claim Totals:					208	164	380

Albertson

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
10/11	Forest Glen Heifer Ranch (9.1-3.5-5.6)	Transfer Equip	100	510 Ton	105	93	78
Albertson Totals:					105	93	78

Boyer

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/14	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	1,521,890 Gal	179	50	236
10/27	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	265 Ton	20	29	15
Boyer Totals:					199	79	251

Davis

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
09/01	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	188 Ton	201	294	153
Davis Totals:					201	294	153

Duniway Rd(Lemelson)

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
05/17	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	972,439 Gal	230	64	304
Duniway Rd(Lemelson) Totals:					230	64	304

Nutrient Applications Report - Forest Glen Oaks Offsite Farms

Evers

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
05/03	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	2,571,100 Gal	247	68	326
Evers Totals:					247	68	326

FRHR-Pivot 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
10/04	Forest Glen Heifer Ranch (9.1-3.5-5.6)	Transfer Equip	100	510 Ton	37	32	27
10/18	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	893 Ton	57	83	43
FRHR-Pivot 1 Totals:					93	115	70

FRHR-Pivot 2

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
10/04	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	3,654 Ton	226	330	172
10/09	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	300 Ton	19	27	14
FRHR-Pivot 2 Totals:					244	358	186

FRHR-Pivot 3

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
10/18	Forest Glen Heifer Ranch (9.1-3.5-5.6)	Transfer Equip	100	510 Ton	35	31	26
FRHR-Pivot 3 Totals:					35	31	26

Figment

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
10/11	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	1,345 Ton	200	293	152
Figment Totals:					200	293	152

Grand Island

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/14	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,590 Gal	7	3	15
05/19	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,950 Gal	7	3	15
Grand Island Totals:					13	6	29

Nutrient Applications Report - Forest Glen Oaks Offsite Farms

Henry

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
03/24	Chicken Manure (57.7-16.8-42.3)	Transfer Equip	100	314 Ton	115	77	102
Henry Totals:					115	77	102

Hitchcock

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
09/14	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	341,016 Gal	218	60	288
Hitchcock Totals:					218	60	288

Hospital

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/07	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	1,174,800 Gal	82	23	109
09/29	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	2,102,980 Gal	147	41	194
Hospital Totals:					229	64	303

Hwy 18 (Lorett)

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	199,249 Gal	48	38	88
05/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	199,249 Gal	48	38	88
06/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	199,249 Gal	48	38	88
07/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	199,249 Gal	48	38	88
Hwy 18 (Lorett) Totals:					193	153	354

Museum

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
09/22	Forest Glen Oaks (12.4-1.5-13.6)	Transfer Equip	100	206,200 Gal	230	64	304
Museum Totals:					230	64	304

Nutrient Applications Report - Forest Glen Oaks Offsite Farms

Pike Road

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
03/03	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
04/07	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
05/05	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
06/02	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
07/07	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
08/04	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
09/01	Forest Glen Amity (2.4-0.4-1.5)	Transfer Equip	100	1,082,680 Gal	46	19	34
Pike Road Totals:					321	132	238

Railroad Grade

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
06/16	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,950 Gal	10	5	22
07/21	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,950 Gal	10	5	22
08/18	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,950 Gal	10	5	22
09/22	Forest Glen Heifer Ranch (7.4-1.6-13.7)	Transfer Equip	100	72,950 Gal	10	5	22
Railroad Grade Totals:					39	19	87

Scipio

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
04/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	251,188 Gal	69	54	126
05/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	251,188 Gal	69	54	126
08/01	Forest Glen Jerseys (8.7-3-13.2)	Transfer Equip	100	211,364 Gal	58	46	106
Scipio Totals:					196	155	358

Sheridan

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
09/27	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	6,195 Ton	272	398	207
Sheridan Totals:					272	398	207

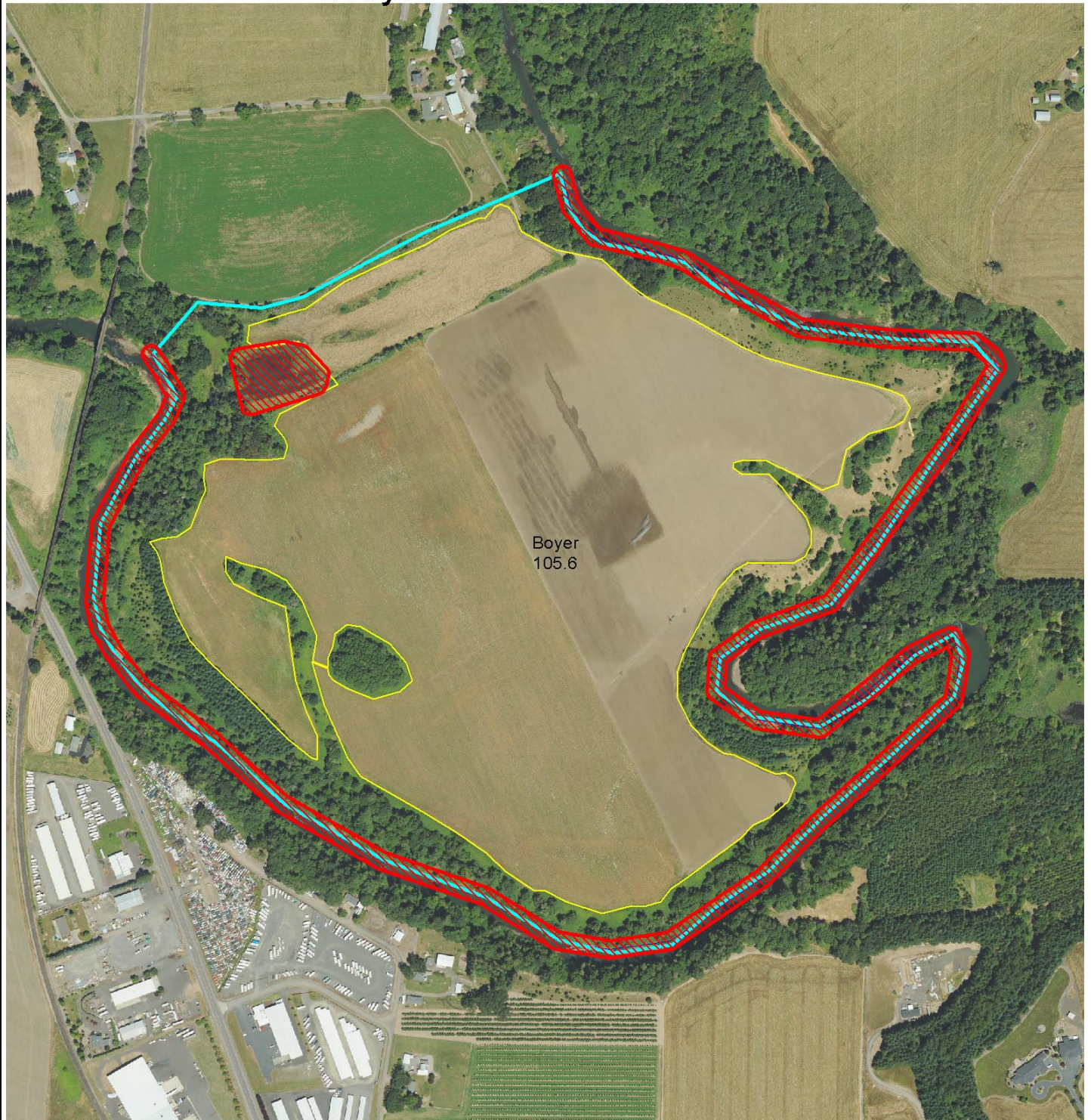
Veeman

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
09/20	Forest Glen Oaks (8-5.1-5.1)	Transfer Equip	100	2,810 Ton	104	152	79
Veeman Totals:					104	152	79

SECTION 2 - CROPLAND

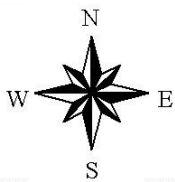
Setback Maps for Forest Glen Oaks Offsite Farms

Forest Glen Oaks Inc Boyer Offsite Farm



Map Legend

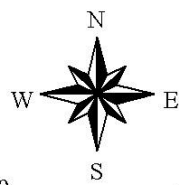
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- Setback Areas - Setback Areas



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SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Davis Offsite Farm



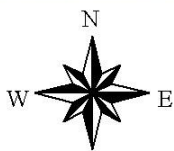
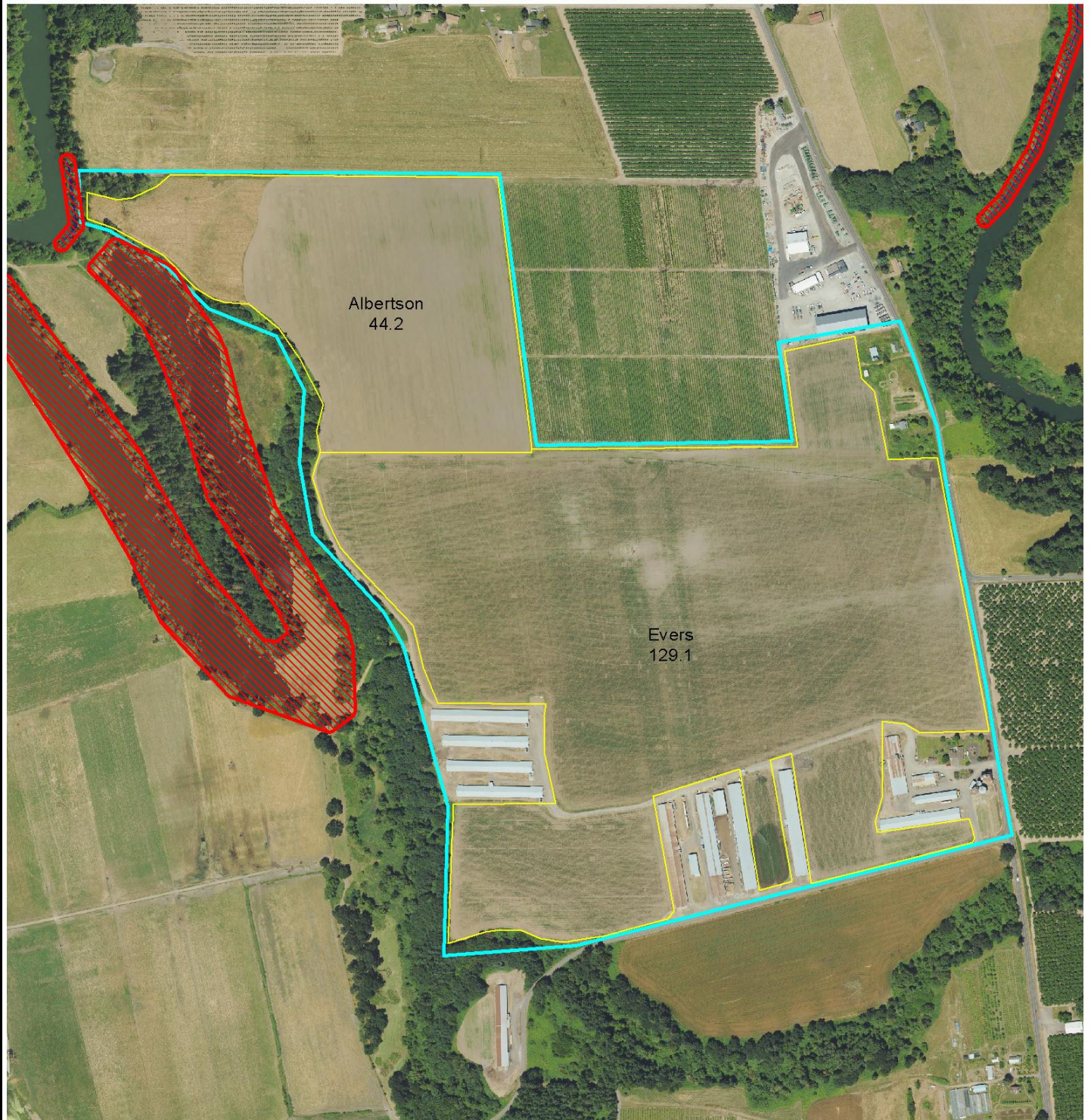
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Map Legend

- Field Name
Spreadable Acres - Field Boundary, Field Name,
Spreadable Acres
- Setback Areas - Setback Areas

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Evers-Albertson Setback Map



Scale 0 500 1000 1500 Feet

Map Legend

- Field Name Spreadable Acres - Field Boundary, Field Name, Spreadable Acres
-  - Setback Areas

SECTION 2 - CROPLAND

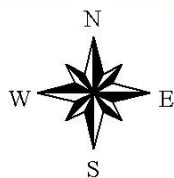
Forest Glen Oaks Inc Duniway Rd (Lemelson) Offsite Farm



Map Legend

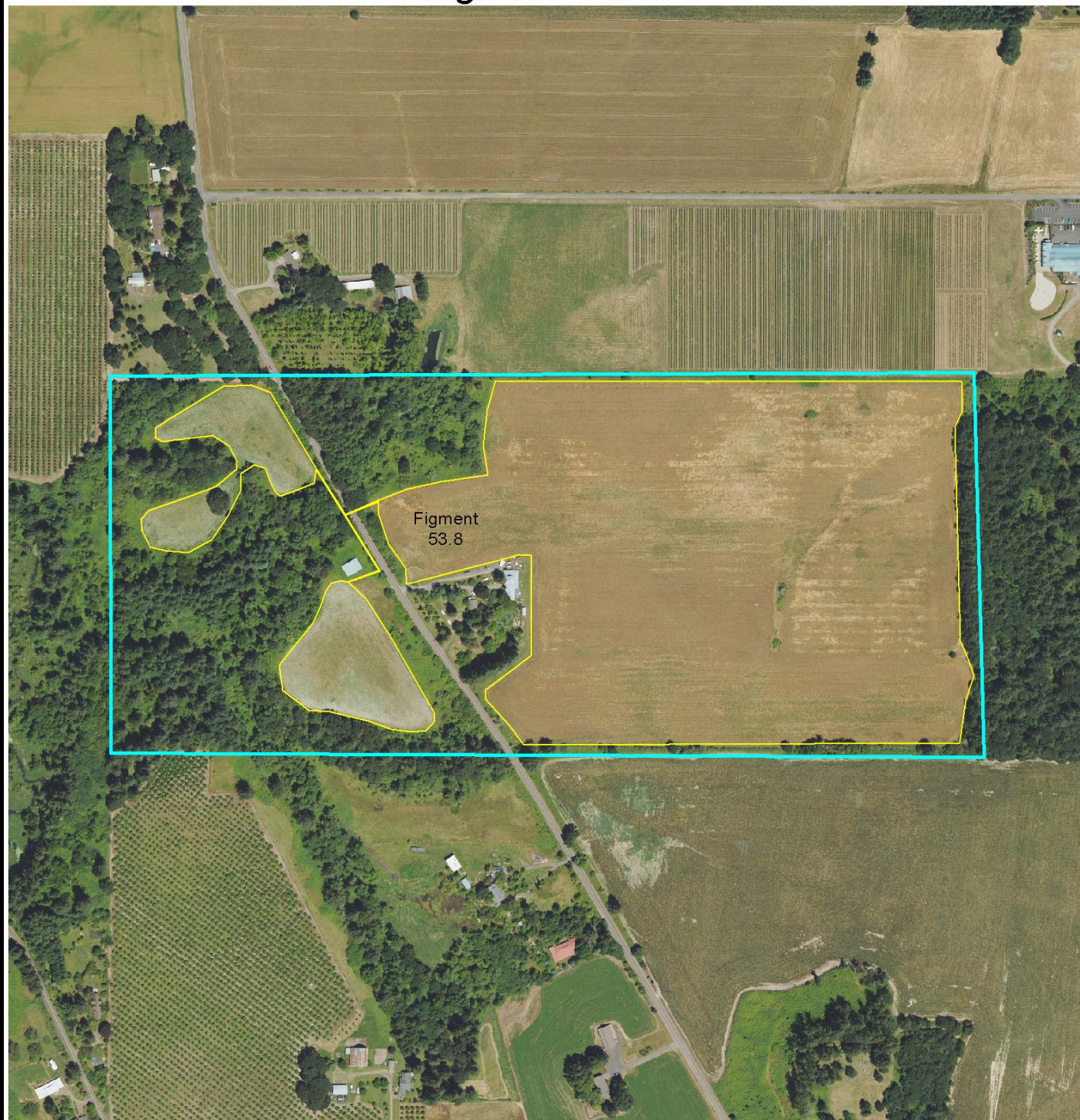
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|  | - Setback Areas |

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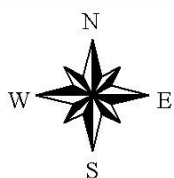
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Figment Farm



Map Legend

- Field Name
Spreadable Acres - Field Boundary, Field Name,
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- Setback Areas - Setback Areas



Scale 0 500 1000 1500 Feet



SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Fort Rock Offsite Hay Ranch



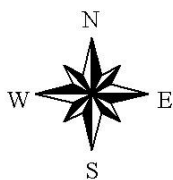
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Field Name
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- Field Boundary, Field Name,
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- Setback Areas

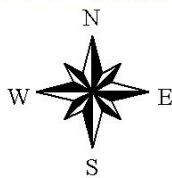
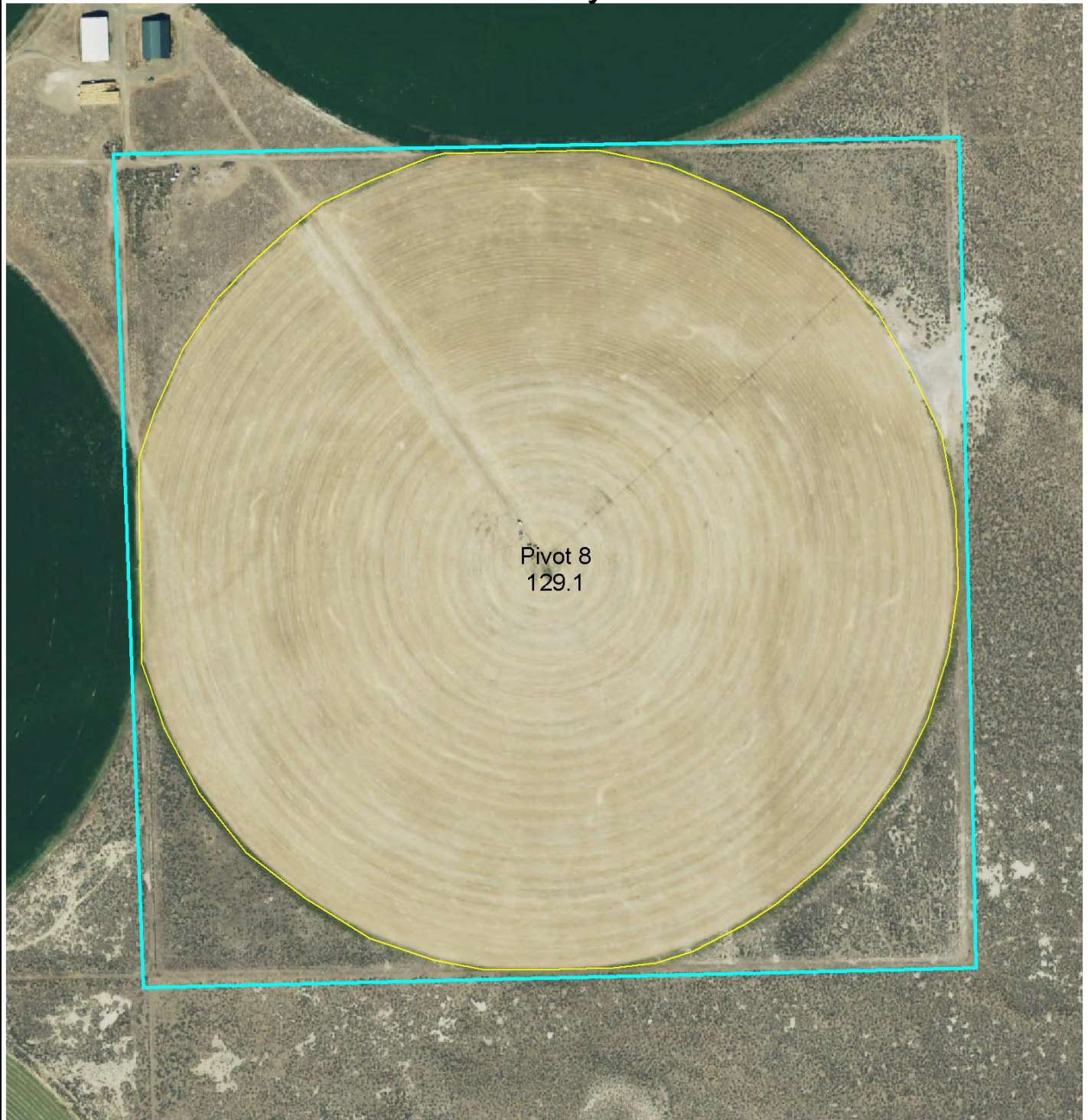


Scale 0 1000 2000 3000 Feet



SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Fort Rock Offsite Hay Ranch Pivot 8



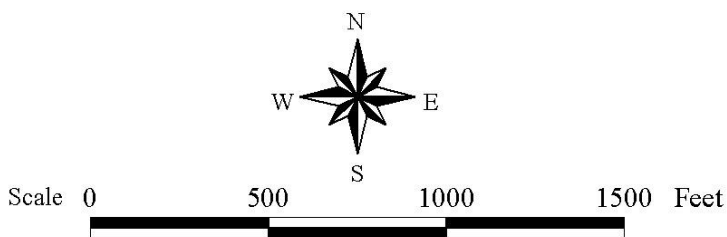
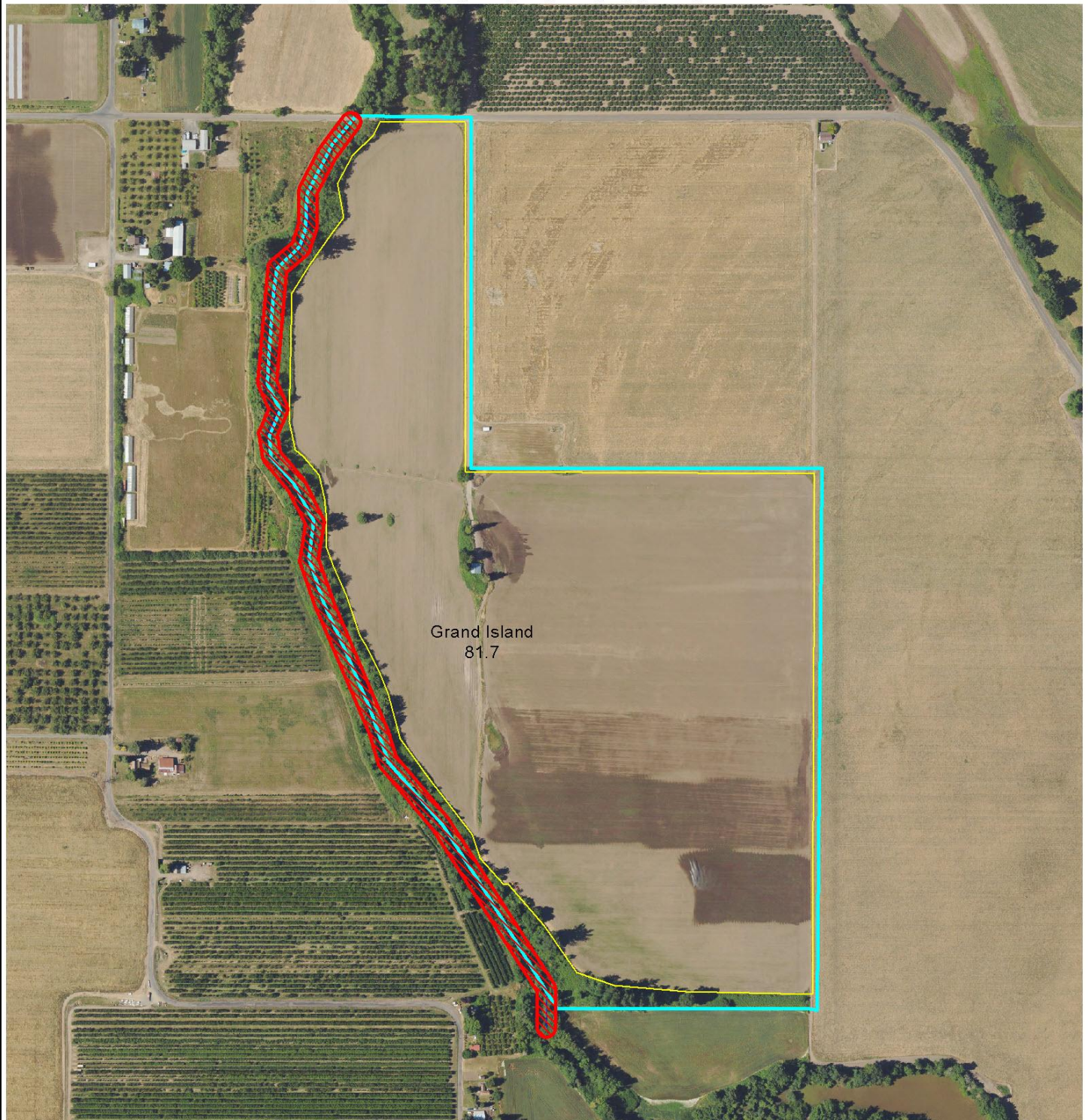
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Map Legend

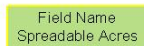
- | | |
|---------------------|---|
| Field Name
Acres | - Field Boundary, Field Name,
Spreadable Acres |
| | - Setback Areas |

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Grand Island Offsite Farm

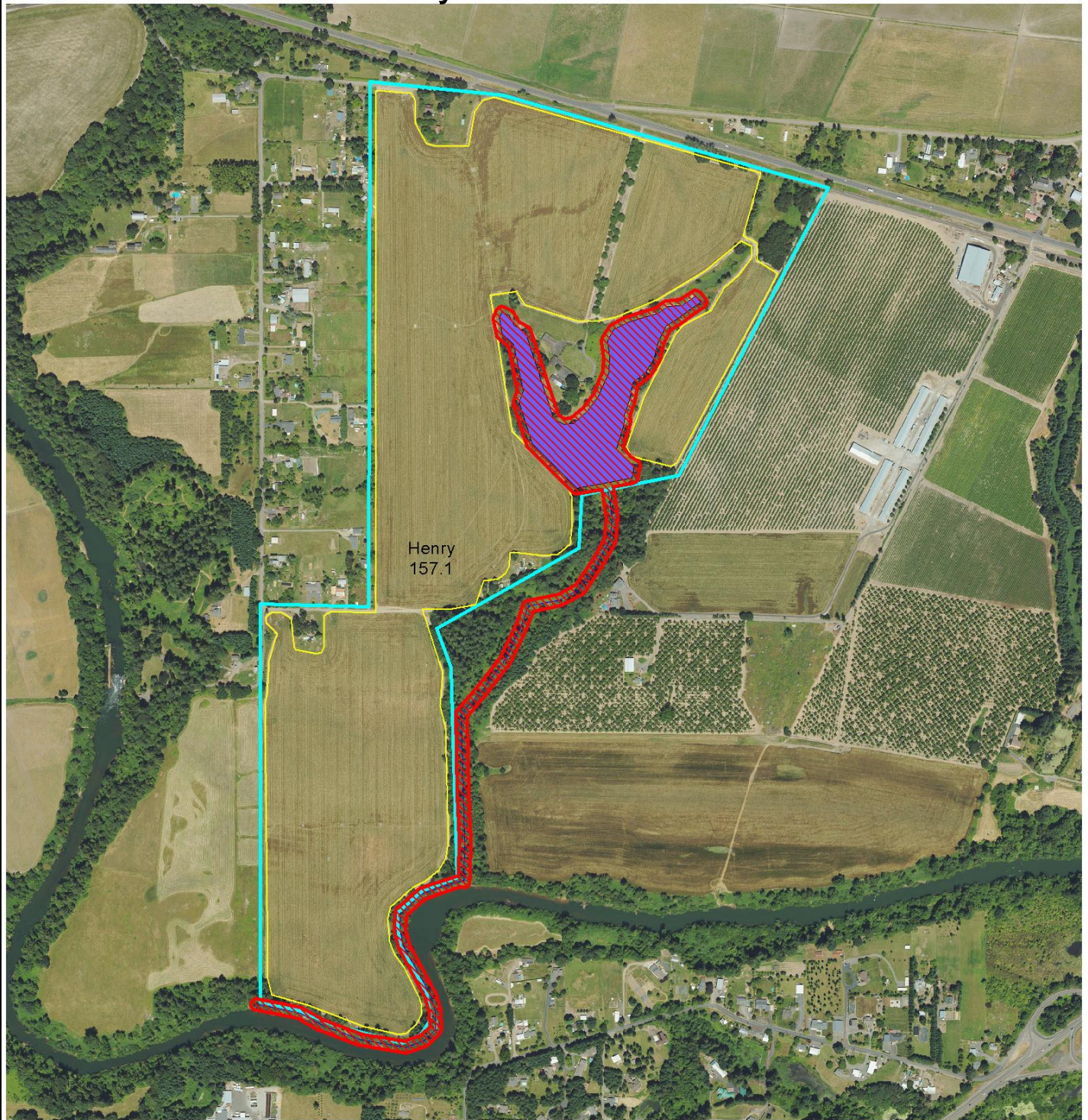


Map Legend

- | | |
|---|--|
|  | - Field Boundary, Field Name, Spreadable Acres |
|  | - Setback Areas |

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Henry Offsite Farm



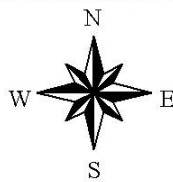
Map Legend

- Field Name Acres - Field Boundary, Field Name, Spreadable Acres
- Setback Areas

Scale 0 1000 2000 3000 Feet

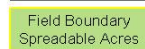
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Hitchcock Offsite Farm



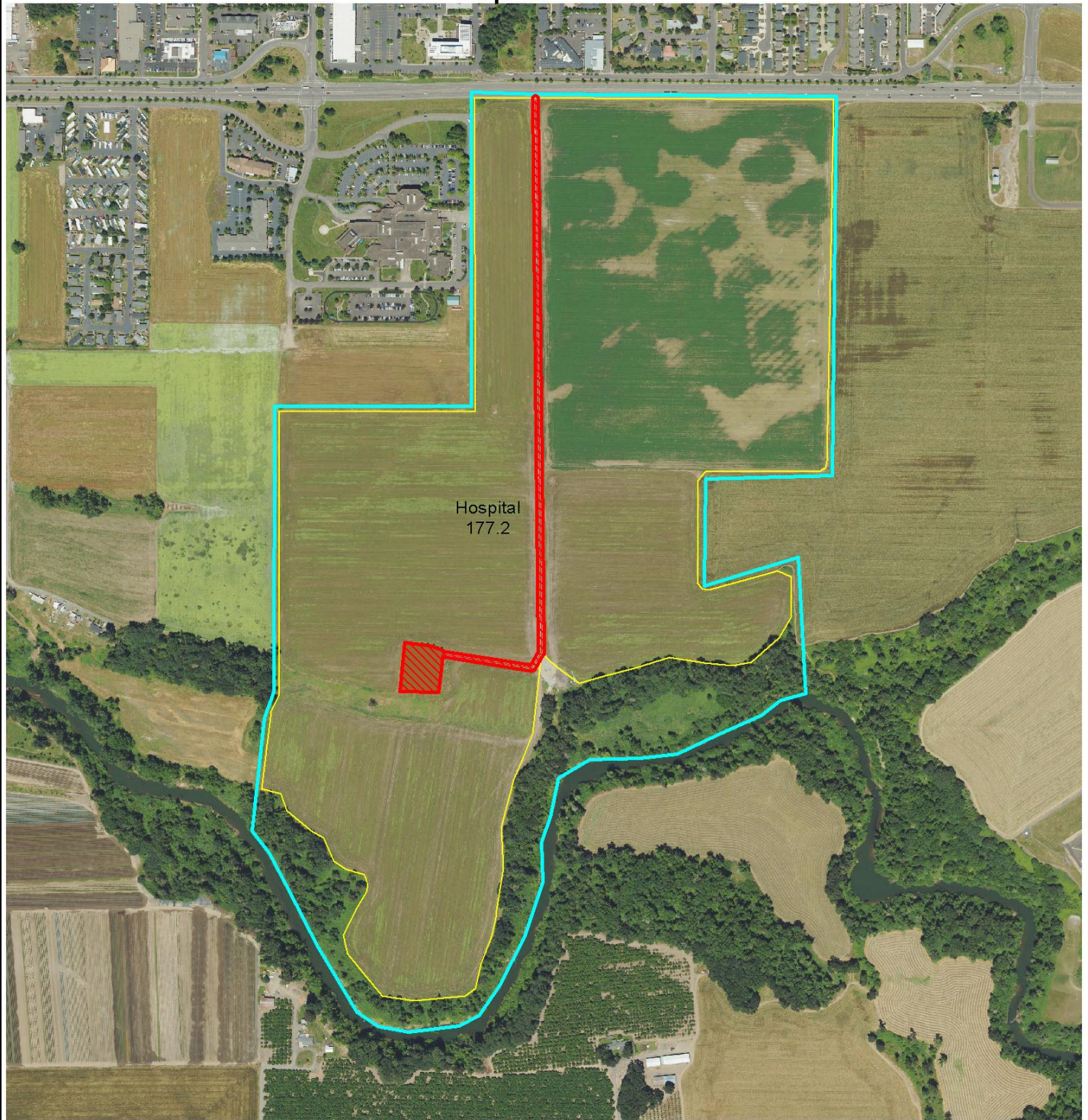
Scale 0 500 1000 1500 Feet

Map Legend

-  - Field Boundary, Field Name, Spreadable Acres
-  - Setback Areas

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Hospital Farm



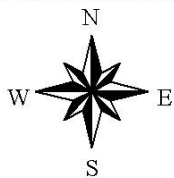
Map Legend

Field Name
Spreadable Acres

- Field Boundary, Field Name,
Spreadable Acres



- Setback Areas



Scale 0 500 1000 1500 Feet



SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Hwy 18 (Lorett) Offsite Farm



Hwy 18 (Lorett)
35.7

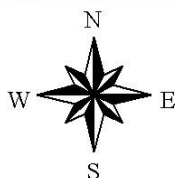
Map Legend

Field Name
Spreadable Acres

- Field Boundary, Field Name,
Spreadable Acres



- Setback Areas

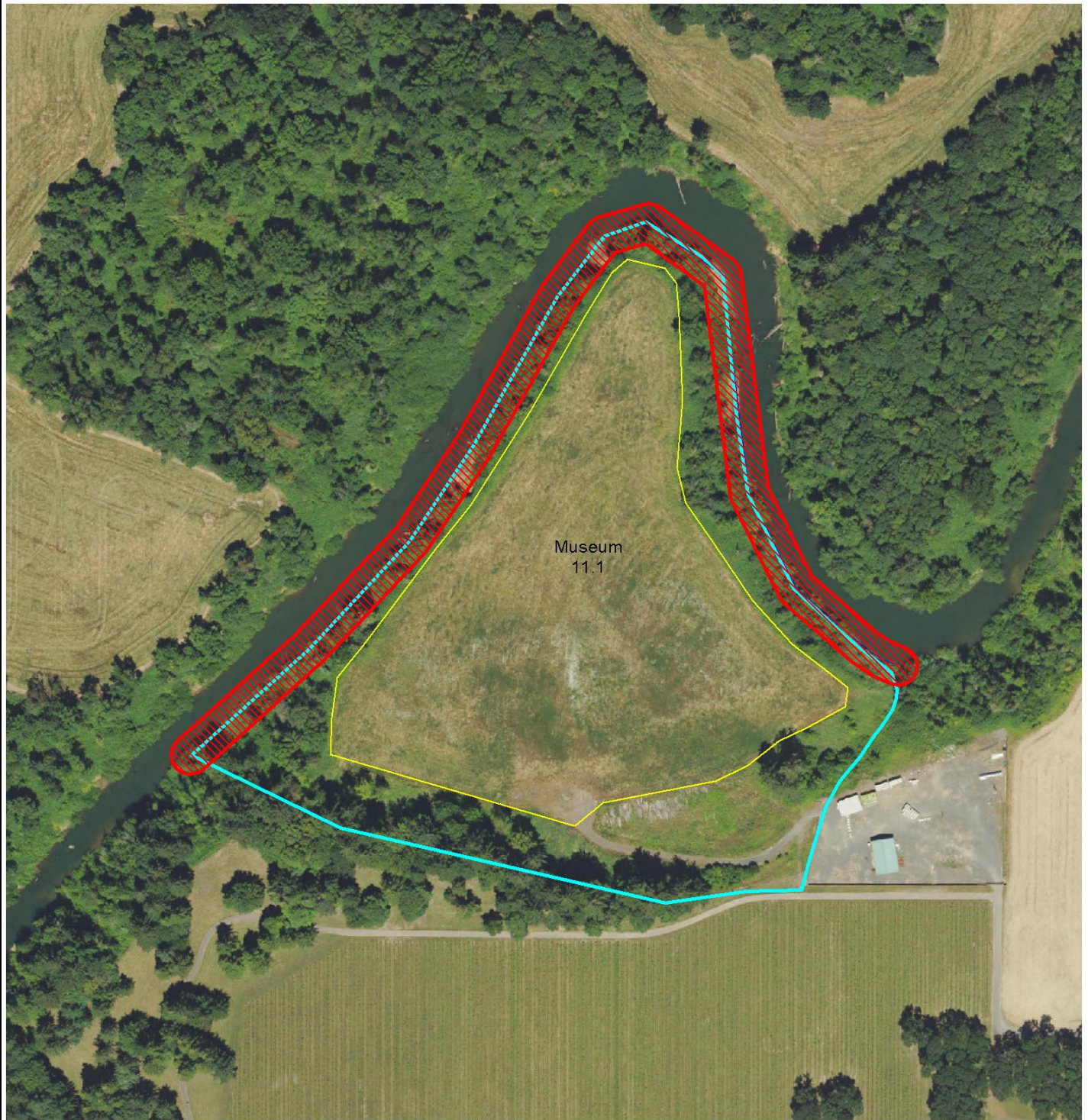


Scale 0 250 500 750 Feet



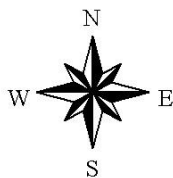
SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Museum Offsite Farm



Map Legend

- Field Name
Spreadable Acres - Field Boundary, Field Name,
Spreadable Acres
-  - Setback Areas

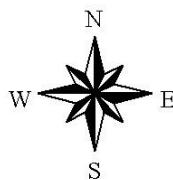
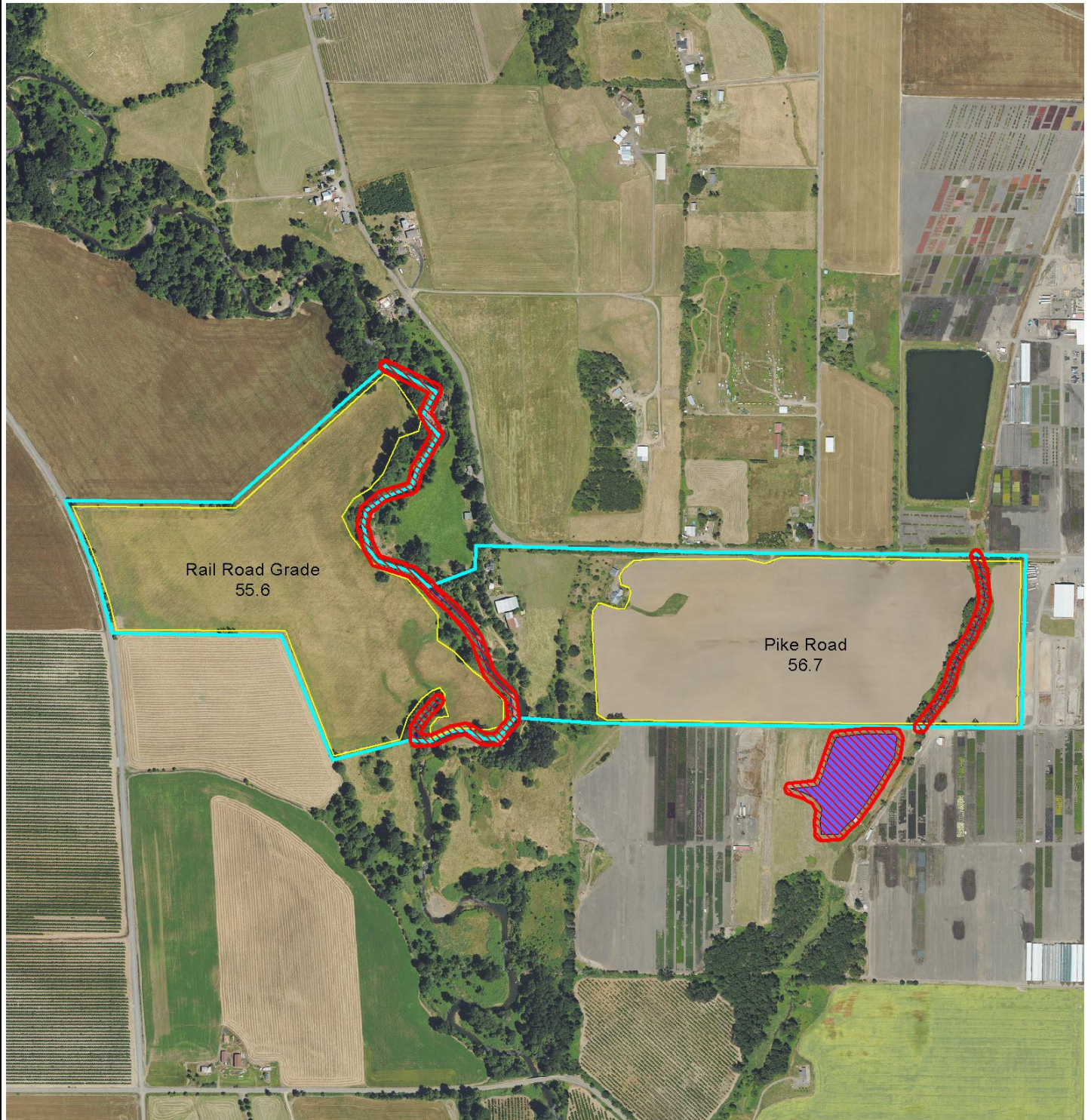


Scale 0 250 500 750 Feet



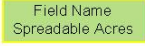
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Railroad Grade-Pike Road Offsite Farm



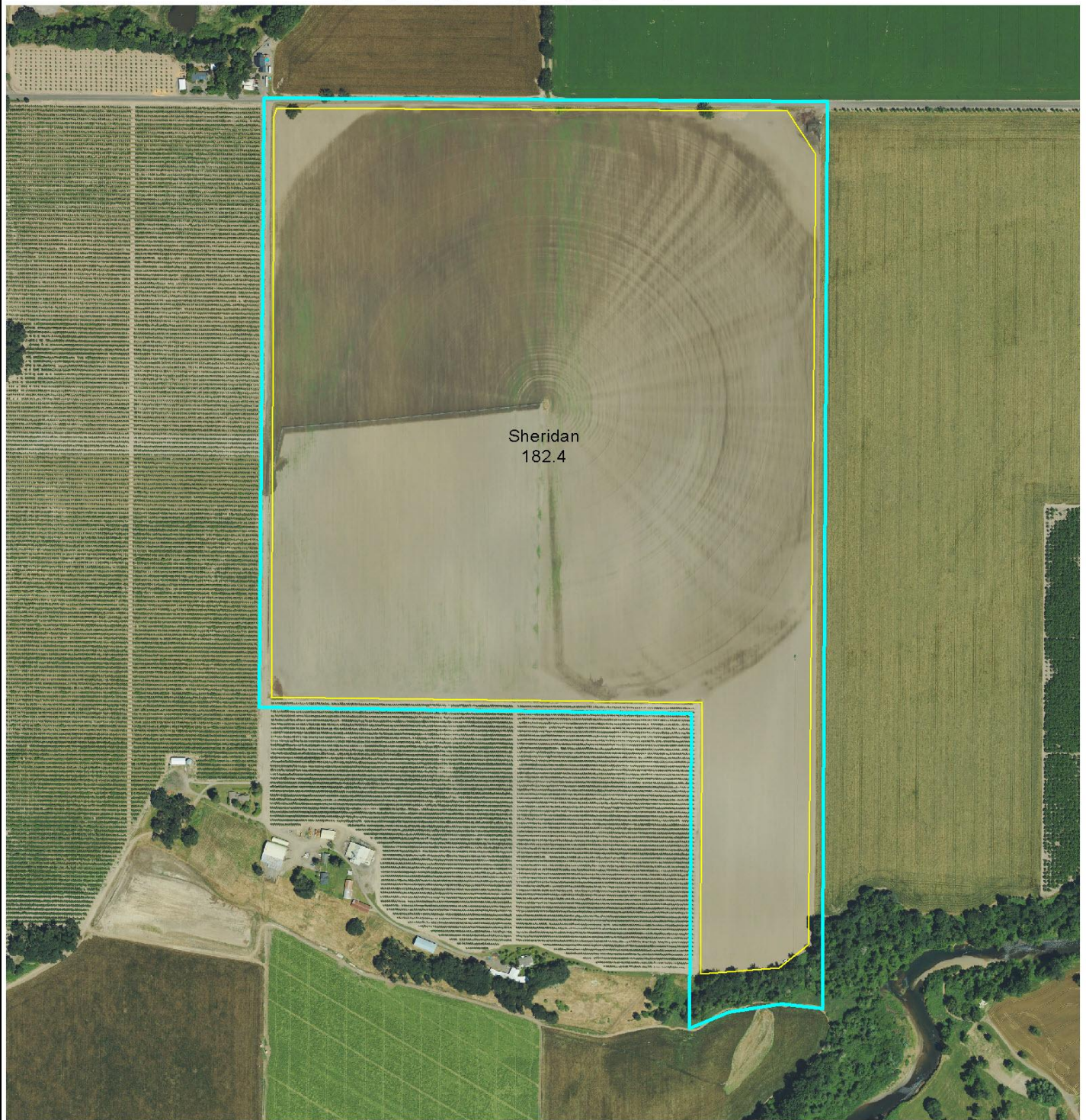
Scale 0 1000 2000 3000 Feet

Map Legend

-  Field Name Spreadable Acres - Field Boundary, Field Name, Spreadable Acres
-  - Setback Areas

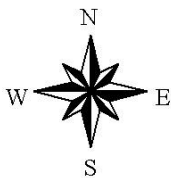
SECTION 2 - CROPLAND

Forest Glen Oaks Inc Sheridan Offsite Farm



Map Legend

- | | |
|---|---|
| Field Name
Spreadable Acres | - Field Boundary, Field Name,
Spreadable Acres |
|  | - Setback Areas |



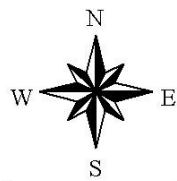
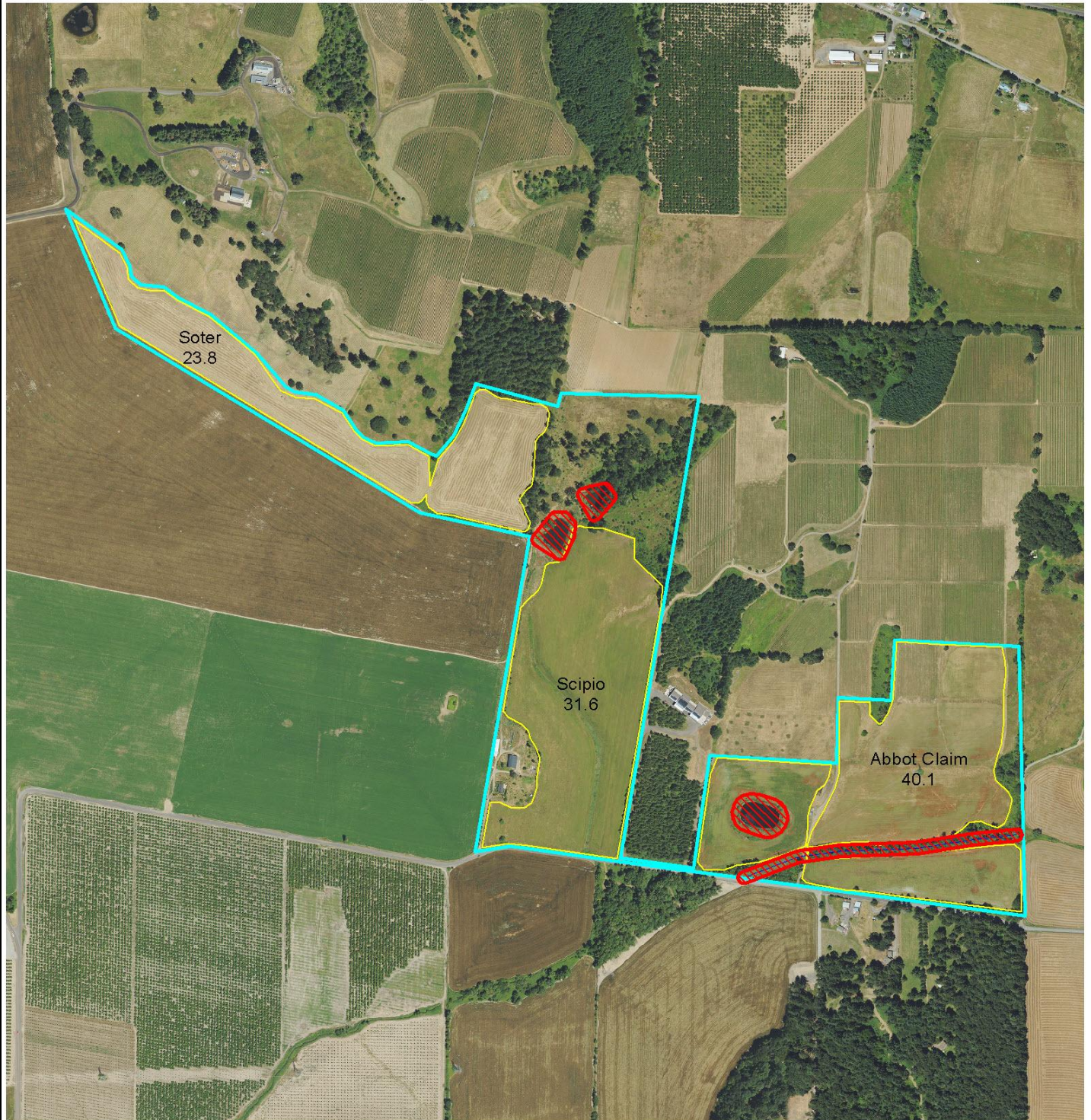
Scale 0 500 1000 1500 Feet



A horizontal scale bar with markings at 0, 500, 1000, and 1500 feet.

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Suter-Scipio-Abbot Offsite Farms



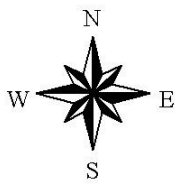
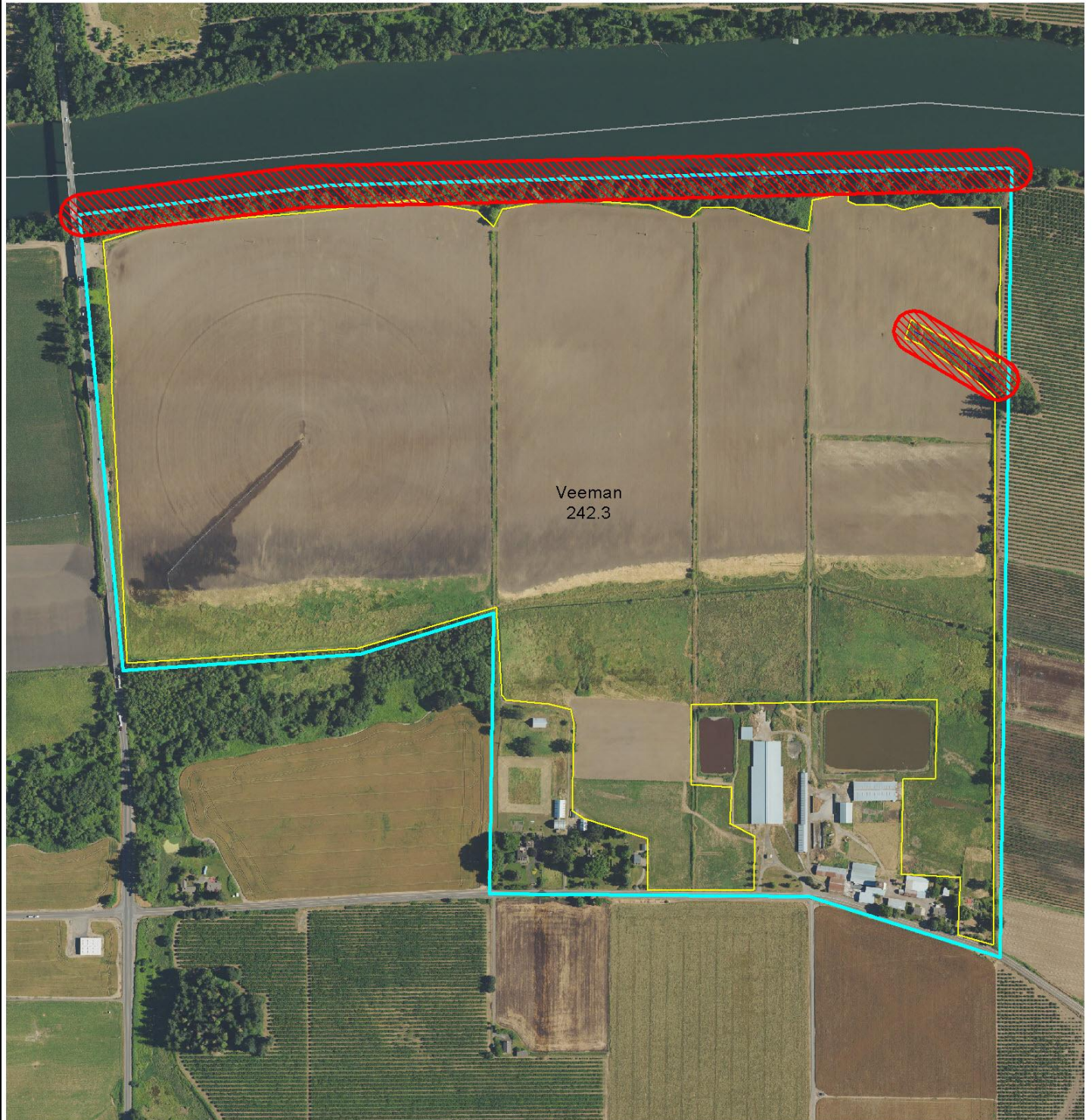
Scale 0 1000 2000 3000 Feet

Map Legend

- Field Name
Spreadable Acres - Field Boundary, Field Name, Spreadable Acres
-  - Setback Areas

SECTION 2 - CROPLAND

Forest Glen Oaks Inc
Veeman Offsite Farm



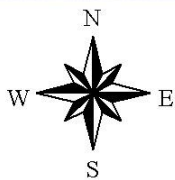
Scale 0 500 1000 1500 Feet

Map Legend

- | | |
|---|---|
| Field Name
Spreadable Acres | - Field Boundary, Field Name,
Spreadable Acres |
|  | - Setback Areas |

SECTION 2 - CROPLAND

Forest Glen Oaks Inc Whiteson Offsite Farm



Scale 0 500 1000 1500 Feet

Map Legend

- | | |
|--|--|
| | - Field Boundary, Field Name, Spreadable Acres |
| | - Setback Areas |

SECTION 2 - CROPLAND

How To Sample Soils

Current soil tests must be used in the development and editing of nutrient management plans. A current soil test is one that is no older than 5 years that is used to represent the nutrient status of the entire field. Soil analysis should be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP). Guidance for soil sampling can be found in the **Pacific Northwest (PNW) Extension publication 570-E, “Monitoring Soil Nutrients Using a Management Unit Approach”**, <https://catalog.extension.oregonstate.edu/pnw570> **Oregon State University Extension publication EC1478, “Soil Test Interpretation Guide”**, <https://catalog.extension.oregonstate.edu/ec1478> provides guidance on how to determine soil nutrient concentrations and how to adjust soil pH to improve nutrient availability.

Field Area. A composite soil sample should represent a uniform field area. Each area should have similar crop and fertility history. Soil characteristics (color, slope, texture, drainage) should be similar. Exclude small areas within a field that are obviously different. The field area represented by a single composite sample should represent no more than 40 irrigated acres or 100 dry land acres.

Sampling Depth. Laboratory tests are calibrated to specific depths so it is vital to collect samples from appropriate depths. Sampling depth for most soils is the rooting depth in 6-inch intervals. In Oregon, as a minimum, soil samples should be collected from the 0-12” depth. The 0-6” surface soil samples are normally used for conventional tests of organic matter, nitrogen, phosphorus, potassium, pH and salt levels. Additionally, subsurface samples from the 6-24” depth are needed to estimate nitrogen availability for crops grown in dry land areas.

Post Harvest Soil Testing for Evaluating Nutrient Applications. Refer to **Pacific Northwest (PNW) Extension publication 570-E, “Monitoring Soil Nutrients Using a Management Unit Approach”**, <https://catalog.extension.oregonstate.edu/pnw570>, for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

SECTION 2 - CROPLAND

Soil Tests



Soils Testing Report

Forest Glen Oaks Offsite Farms
Various, Dayton

Soils Testing Report - Forest Glen Oaks Offsite Farms

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
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Abbot Claim

2/12/2024	104425	ABBY Claim	12.0	5.3		0.08	2.32		11.0		168.0				3.3 ppm	3.9 ppm	8.0	0.29	0.8					
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Albertson

2/12/2024	104425	Albertsons	12.0	5.8		0.1	2.29		71.0		155.0				3.3 ppm	4.6 ppm	15.0	0.52	3.2					
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Boyer

2/12/2024	104425	Boyers	12.0	5.6		0.12	3.34		8.0		122.0				3.4 ppm	5.3 ppm	11.0	0.29	1.6					
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Davis

2/12/2024	104425	Davis	12.0	5.7		0.08	2.7		36.0		137.0				2.7 ppm	4.2 ppm	6.0	0.47	1.8					
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Duniway Rd(Lemelson)

2/12/2024	104425	Lemirsons	12.0	5.2		0.18	2.51		19.0		193.0				3.6 ppm	3.3 ppm	11.0	0.32	1.4					
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Evers

2/12/2024	104425	Evers	12.0	6.0		0.12	2.56		138.0		153.0				2.9 ppm	4.4 ppm	10.0	0.6	6.1					
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FRHR-Pivot 1

2/27/2024	4562	Pivot 1	12.0	6.9		0.14	1.06			14.0	81.0	2.0 meq	5.7 meq	0.38 meq	8.1 ppm	5.0 ppm	3.0	0.19	1.9	0.2	1.5	18.0		
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FRHR-Pivot 2

2/27/2024	4563	Pivot 2	12.0	7.3		0.18	1.16			24.0	123.0	2.6 meq	5.6 meq	0.42 meq	8.3 ppm	5.3 ppm	4.0	0.31	1.8	4.6	1.4	12.0		
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FRHR-Pivot 3

Soils Testing Report - Forest Glen Oaks Offsite Farms

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
2/27/2024	4564	Pivot 3	12.0	7.0		0.18	1.32			19.0	116.0	2.1 meq	5.7 meq	0.35 meq	7.4 ppm	4.6 ppm	5.0	0.34	4.0	6.3	1.2	18.0		

FRHR-Pivot 4

2/27/2024	4565	Pivot 4	12.0	6.7		0.18	1.28			25.0	156.0	2.0 meq	5.4 meq	0.21 meq	11.5 ppm	5.1 ppm	4.0	0.24	6.1	9.2	1.9	20.0		
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FRHR-Pivot 5

2/27/2024	4566	Pivot 5	12.0	7.1		0.22	1.27			25.0	111.0	2.4 meq	6.7 meq	0.5 meq	12.9 ppm	4.3 ppm	7.0	0.26	4.3	5.0	1.9	16.0		
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FRHR-Pivot 6

2/27/2024	4567	Pivot 6	12.0	7.0		0.3	1.18			15.0	115.0	2.4 meq	6.6 meq	0.6 meq	28.5 ppm	5.5 ppm	6.0	0.19	2.4	7.5	1.4	17.0		
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FRHR-Pivot 8

2/27/2024	4565	Pivot 4	12.0	6.7		0.18	1.28			25.0	156.0	2.0 meq	5.47 meq	0.21 meq	11.5 ppm	5.1 ppm	4.0	0.24	6.1	9.2	1.9	20.0		
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Figment

2/12/2024	104425	Figment	12.0	5.7		0.1	2.31		33.0		333.0				2.9 ppm	3.9 ppm	7.0	0.3	11.0					
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Grand Island

2/12/2024	104425	Grand Island	12.0	6.3		0.12	1.88		79.0		227.0				3.1 ppm	4.0 ppm	4.0	0.48	2.7					
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Henry

2/12/2024	104425	Hwy 18 (Lorett)	12.0	5.9		0.12	2.68		56.0		177.0				1.7 ppm	3.5 ppm	10.0	0.77	2.3					
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Hitchcock

2/12/2024	104425	Hitchcock	12.0	5.3		0.1	1.92		34.0		150.0				3.6 ppm	4.0 ppm	9.0	0.25	0.7					
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Hospital

2/12/2024	104425	Hospital	12.0	5.8		0.12	2.68		64.0		206.0				2.6 ppm	4.4 ppm	10.0	0.78	3.6					
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Hwy 18 (Lorett)

2/12/2024	104425	HWY 18	12.0	5.9		0.12	2.68		56.0		177.0				1.7 ppm	3.5 ppm	10.0	0.77	2.3					
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Museum

2/12/2024	104425	Museum	12.0	5.5		0.1	1.71		71.0		121.0				2.3 ppm	2.4 ppm	4.0	0.36	1.9					
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Soils Testing Report - Forest Glen Oaks Offsite Farms

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
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Pike Road

2/12/2024	104425	Pike Rd	12.0	5.3		0.18	2.8		9.0		106.0				6.9 ppm	3.0 ppm	14.0	0.2	0.6					
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Railroad Grade

2/12/2024	104425	Railroad Grade	12.0	6.1		0.08	3.0		9.0		63.0				5.1 ppm	5.0 ppm	3.0	0.3	1.6					
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Scipio

2/12/2024	104425	Sherics	12.0	5.9		0.1	2.02		93.0		177.0				1.3 ppm	4.2 ppm	6.0	0.42	3.0					
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Sheridan

2/12/2024	104425	Sheridan	12.0	5.7		0.14	3.01		79.0		183.0				1.2 ppm	4.6 ppm	12.0	0.74	4.7					
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Soter

2/12/2024	104425	Soter	12.0	5.6		0.06	1.78		9.0		270.0				0.5 ppm	2.7 ppm	3.0	0.11	1.1					
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Veeman

2/12/2024	104425	St Paul Veeman	12.0	6.2		0.32	3.39		136.0		832.0				5.4 ppm	5.5 ppm	20.0	0.92	7.2					
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Whiteson Bottom

2/12/2024	104425	Whiteson	12.0	5.7		0.16	2.99		54.0		204.0				5.2 ppm	3.6 ppm	16.0	0.3	5.5					
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Whiteson Top

2/12/2024	104425	Whiteson	12.0	5.7		0.16	2.99		54.0		204.0				5.2 ppm	3.6 ppm	16.0	0.3	5.5					
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Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP);

<http://www.naptprogram.org/pap/>

SECTION 2 - CROPLAND

Irrigation Water Management

The application of Irrigation Water Management to the irrigated fields as shown on the Field Map will manage soil moisture to promote the desired crop response, optimize the available water supplies, minimize irrigation induced erosion, decrease non-point source pollution of surface and groundwater sources, manage salts in the crop root zone and manage the crop micro climate.

Permits: Under Oregon law all water is publicly owned, and anyone planning to store or divert surface or groundwater for the purpose of irrigation must obtain a permit or water right from the Oregon Water Resources Department. These permits or water rights must be obtained prior to the use of the water. It is the responsibility of the Farmer to file for the necessary permits or water rights. More information about Oregon water rights can be found at <http://www.oregon.gov/owrd/Pages/wr/index.aspx>.

The irrigation system used to irrigate crops should be adapted for site conditions (soil, slope, crop grown, climate, water quantity and quality, etc.) and capable of applying water and wastewater to meet the consumptive use of the crop. The following table shows the estimated Available Water Holding Capacity (AWHC) and sprinkler intake rates by soil texture that should be considered in the design of the irrigation system.^{1/}

<u>Symbol</u>	<u>Soil Texture</u>	<u>AWHC Range (in/in)</u>	<u>Sprinkler Intake Rate Range (in/hour)</u>
COS	Coarse Sand	0.01-0.03	1.0+
S	Sand	0.01-0.03	0.5+
FS	Fine Sand	0.05-0.07	0.5+
VFS	Very Fine Sand	0.05-0.07	0.5+
LCOS	Loamy Coarse Sand	0.06-0.08	1.0+
LS	Loamy Sand	0.06-0.08	0.4-1.5
LFS	Loamy Fine Sand	0.09-0.11	0.4-1.5
LVFS	Loamy Very Fine Sand	0.10-0.12	0.3-1.25
COSL	Coarse Sandy Loam	0.10-0.12	0.3-1.25
SL	Sandy Loam	0.11-0.13	0.3-1.25
FSL	Fine Sandy Loam	0.13-0.15	0.3-1.0
VFSL	Very Fine Sandy Loam	0.15-0.17	0.3-1.0
L	Loam	0.16-0.18	0.6-0.7
SIL	Silt Loam	0.19-0.21	0.5-0.7
SI	Silt Loam	0.16-0.18	0.5-0.7
SCL	Sandy Clay Loam	0.14-0.16	0.1-0.5
CL	Clay Loam	0.19-0.21	0.1-0.5
SICL	Silty Clay Loam	0.19-0.21	0.1-0.4
SC	Sandy Clay	0.15-0.17	0.1-0.4
SIC	Silty Clay	0.15-0.17	0.1-0.2
C	Clay	0.14-0.16	0.1-0.2

^{1/} Values in this table are taken from the Natural Resources Conservation Service National Engineering Handbook, Part 652, Irrigation Guide and are estimates based on soil texture and should only be used where local data is unavailable.

Irrigation water management requires knowledge, skills, and desire to determine when irrigation water should be applied. The main factors influencing IWM are irrigation interval (time between irrigations), irrigation set time (time water is applied), and application rate (rate at which water is applied). These parameters define the timing and duration of irrigation and the amount of water applied. System design and maintenance are also important factors influencing irrigation water management.

SECTION 2 - CROPLAND

Guidance given in the irrigation water requirements worksheets was developed based on Oregon State University Extension Miscellaneous 8530, Oregon Crop Water Use and Irrigation Requirements publication. For additional information on irrigation water management contact a professional with the required knowledge and skill. The following average monthly evapotranspiration and precipitation graphs can be used to estimate when to irrigate and how much to apply:

SECTION 2 - CROPLAND

Irrigation Water Flows, Volumes, and Relationships

Equation 1 -

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

wher

Q = flow rate (acre-in/hr or cfs)

T = time (hr)

D = gross depth applied (in)

A = area (acres)

Equation 2 -

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

wher

Q = flow rate (acre-in/hr or cfs)

A = area (acres)

D = gross depth applied (in)

F = irrigation period (days)

H = Hours of operation per

Water Flow

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

1 miner's inch = 11.22 gpm in OR
1 miner's inch = 9 gpm in ID, WA
1 cfs = 28.32 liters/sec
1 cubic meter/sec = 35.3 cfs
1 liter/sec = 15.85 gpm

$Q \times T = D \times$ where:

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

Gpm for 5 ft/s velocity in PVC pipe:

6"	8"	10"	12"	14"
480	800	125	175	215

Water Volumes & Weights:

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

Pressure and Pressure Head:

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

Lengths and Areas:

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

Pump Power Requirement

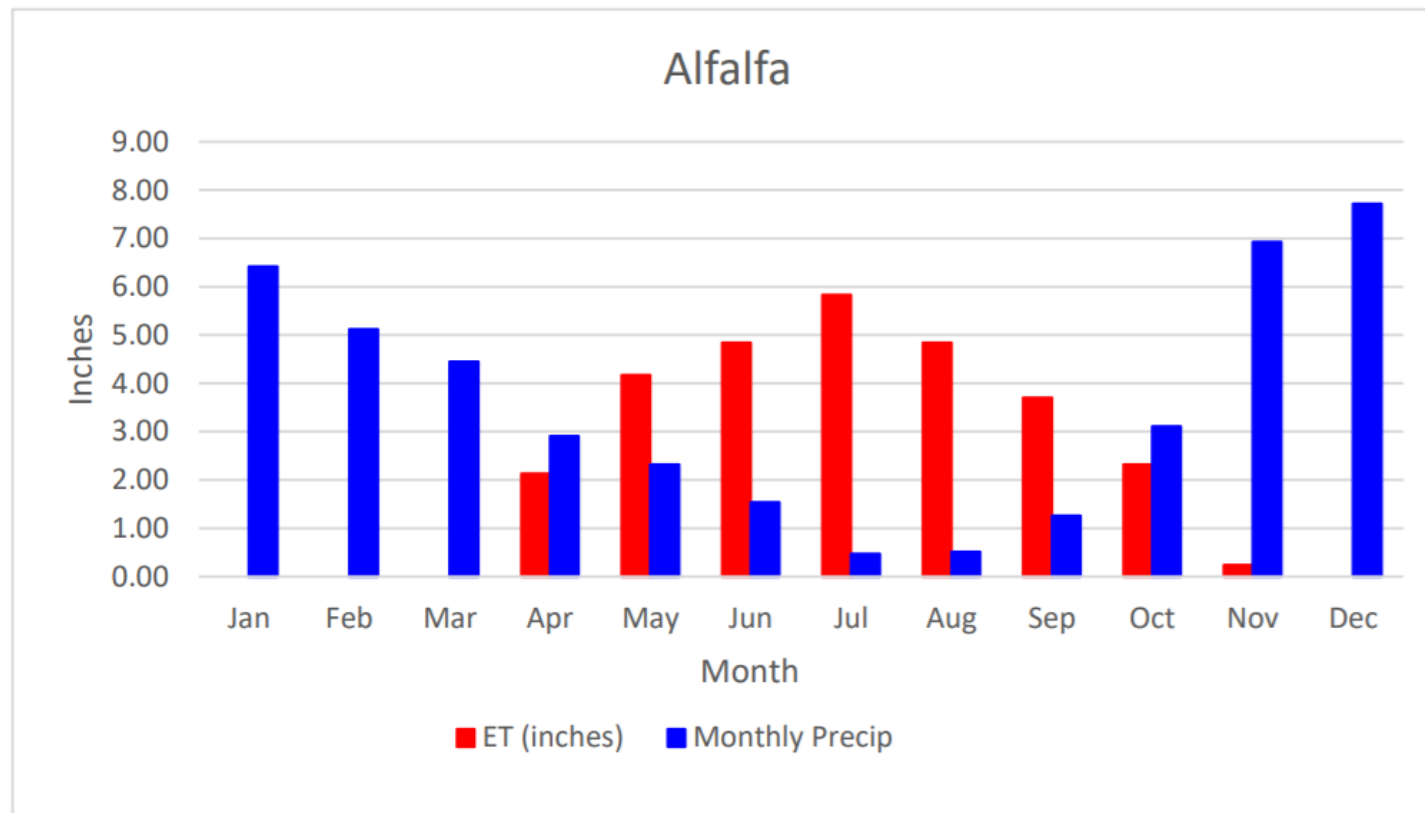
$$\text{Horsepower} = \frac{\text{Pump Head in ft} \times \text{gpm}}{39.6 \times \% \text{ Pump Efficiency}}$$

SECTION 2 - CROPLAND

Crop- Alfalfa

Region- Willamette Valley

Total Seasonal Evapotranspiration-	28.07 Inches
Peak Evapotranspiration Rate-	0.19 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul

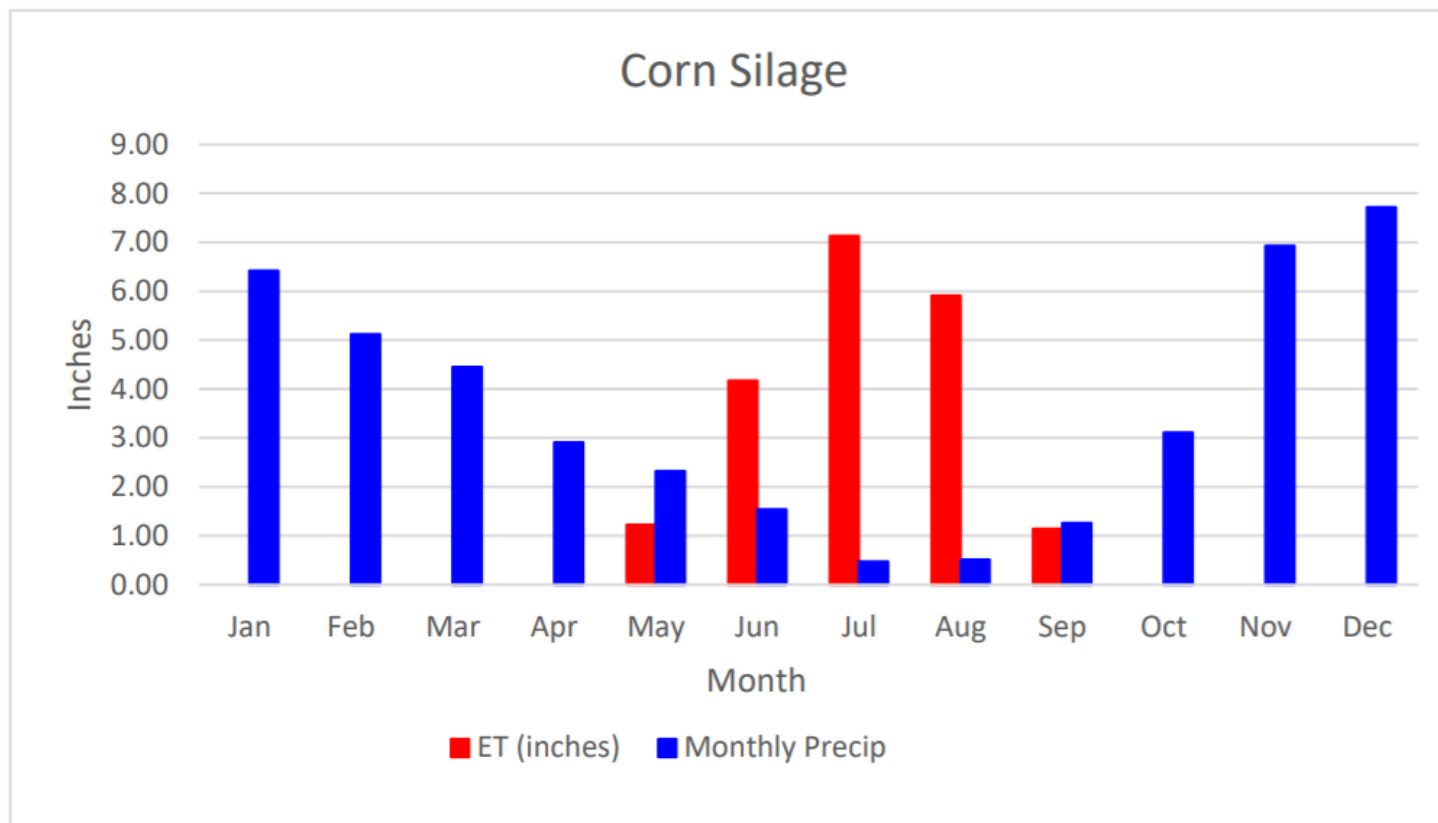


SECTION 2 - CROPLAND

Crop- Corn Silage

Region- Willamette Valley

Total Seasonal Evapotranspiration-	19.57 Inches
Peak Evapotranspiration Rate-	0.24 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul

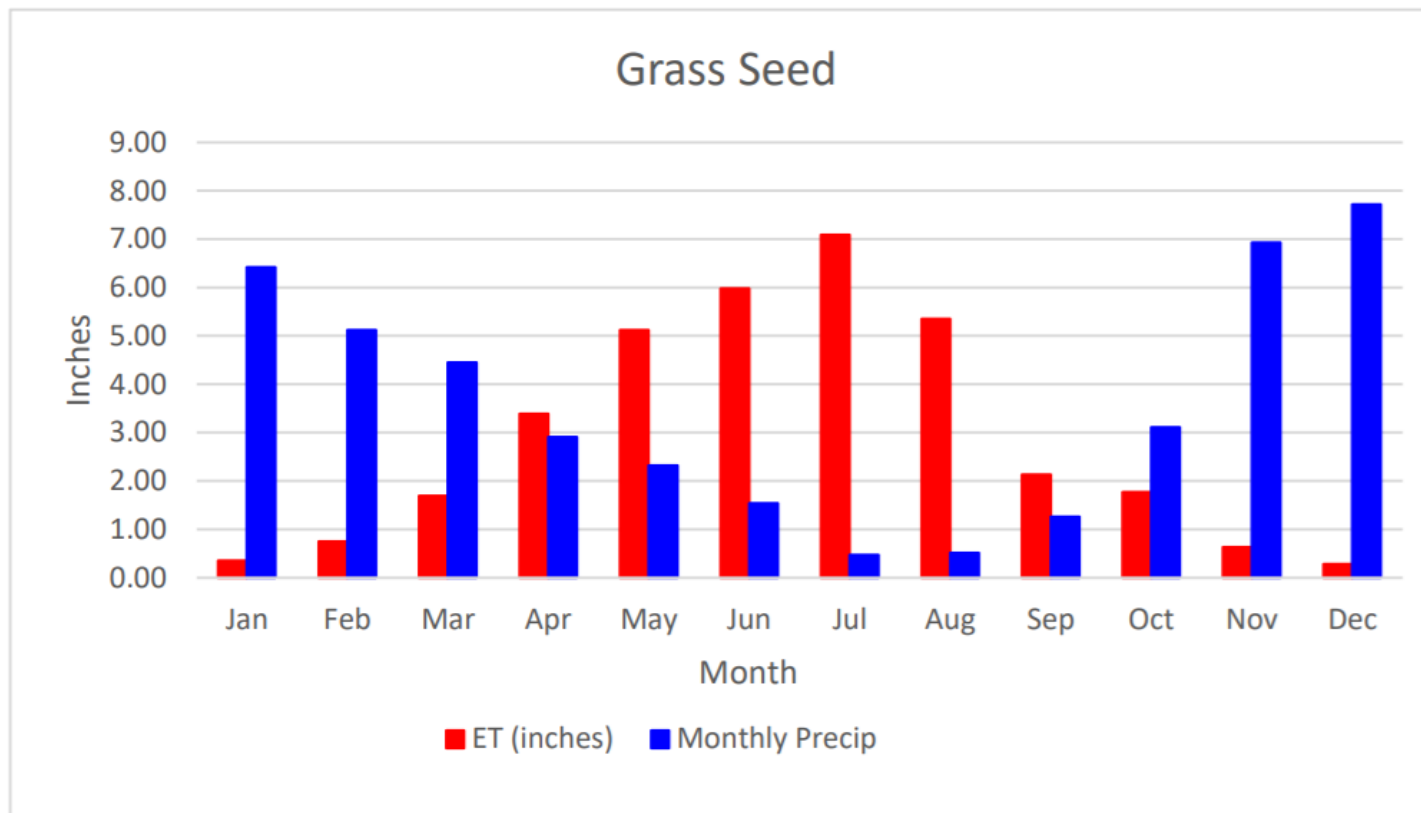


SECTION 2 - CROPLAND

Crop- Grass Seed

Region- Willamette Valley

Total Seasonal Evapotranspiration-	34.53 Inches
Peak Evapotranspiration Rate-	0.24 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul

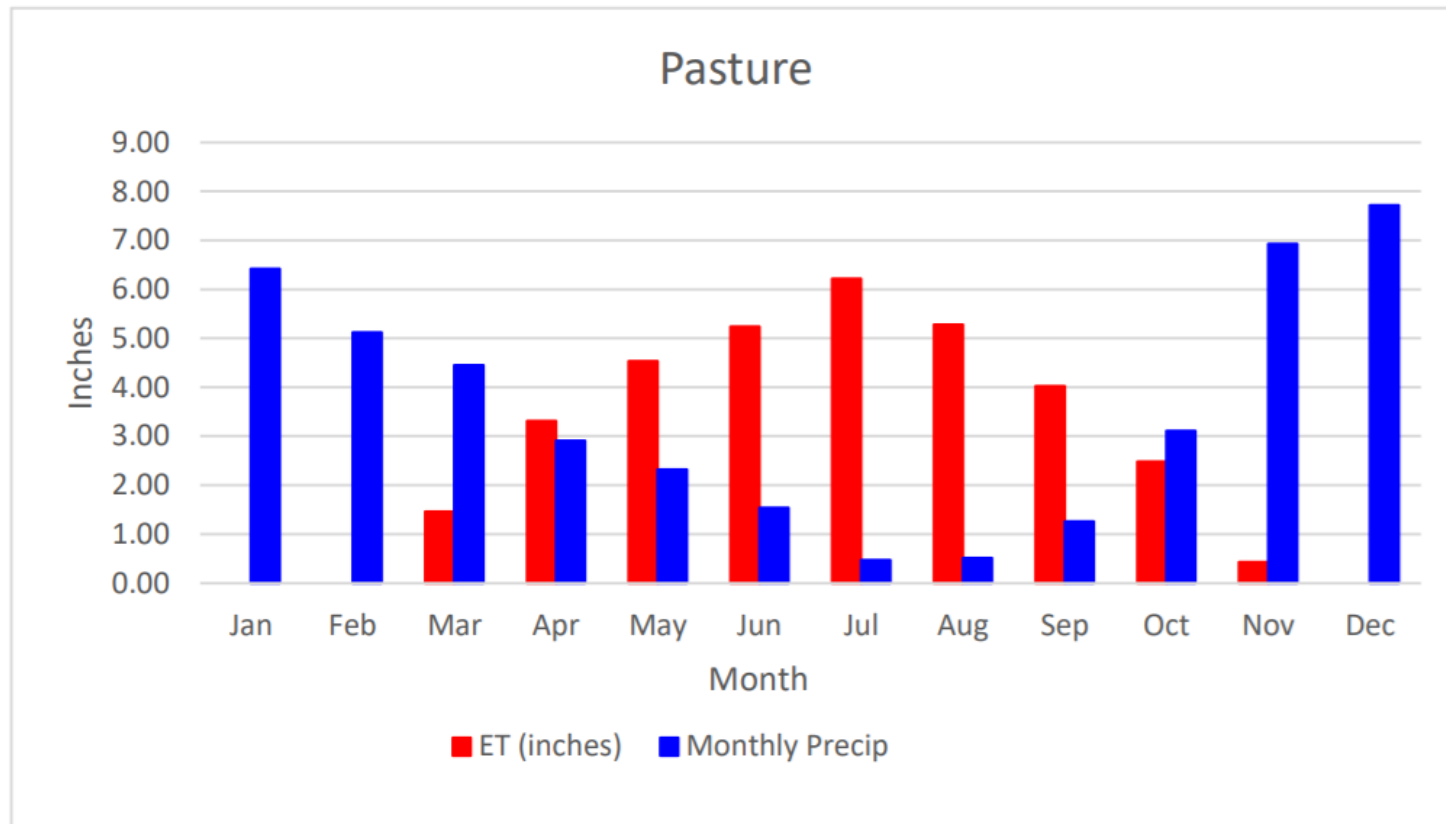


SECTION 2 - CROPLAND

Crop- Pasture

Region- Willamette Valley

Total Seasonal Evapotranspiration-	32.97 Inches
Peak Evapotranspiration Rate-	0.21 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul

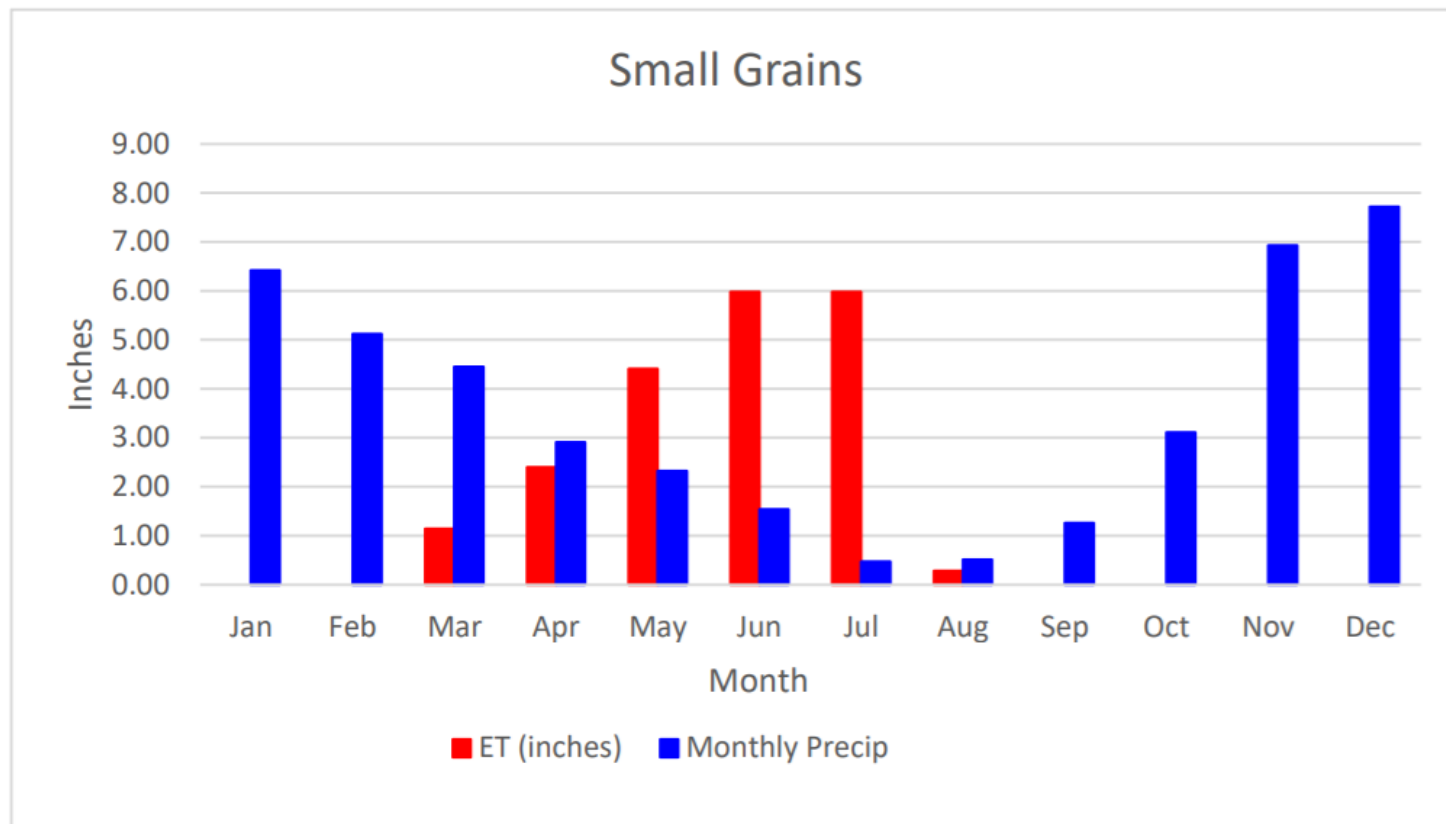


SECTION 2 - CROPLAND

Crop- Small Grains

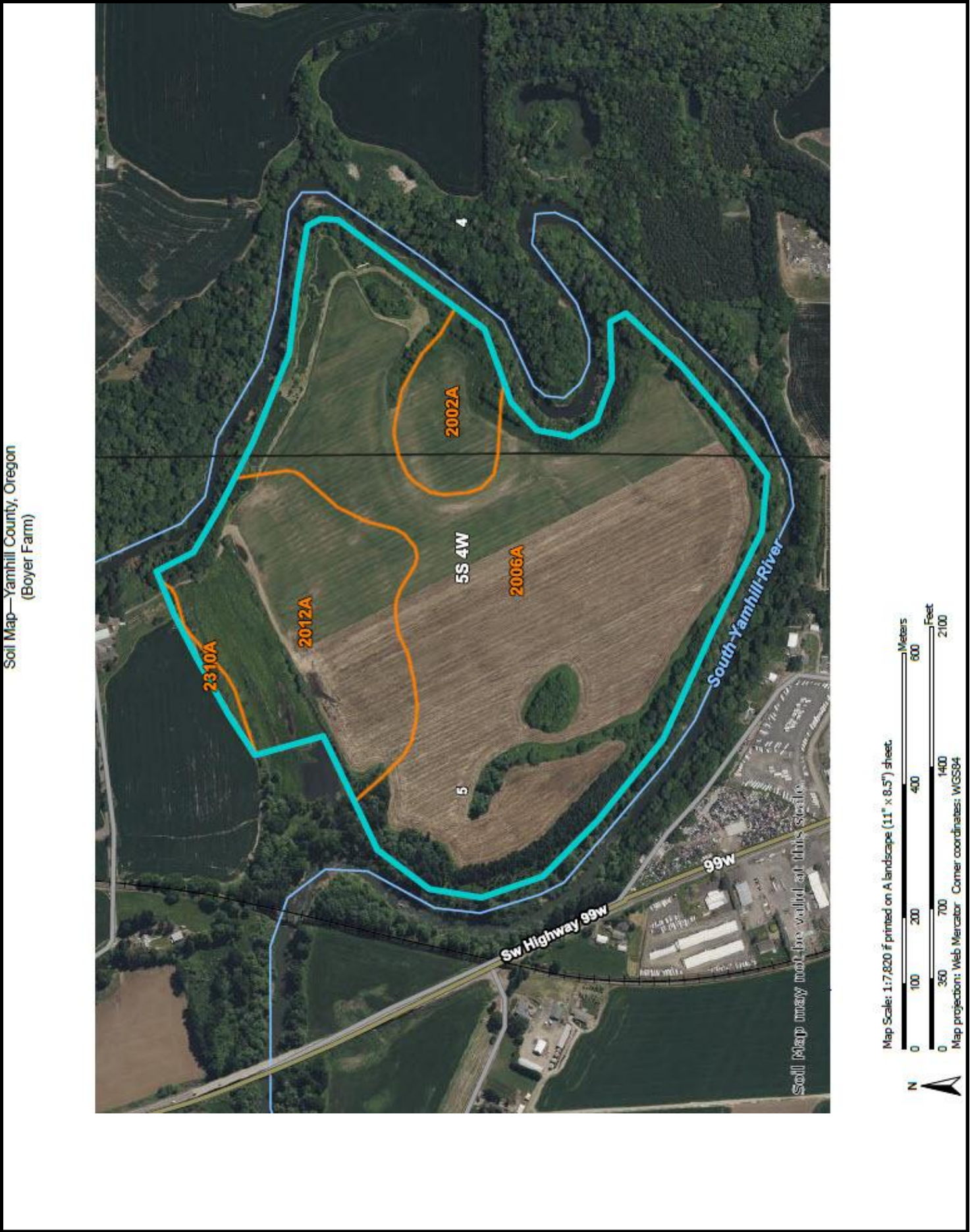
Region- Willamette Valley

Total Seasonal Evapotranspiration-	20.19 Inches
Peak Evapotranspiration Rate-	0.20 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jun



SECTION 3 - SOIL AND RISK ASSESSMENT
Soil Maps for Forest Glen Oaks Offsite Farms

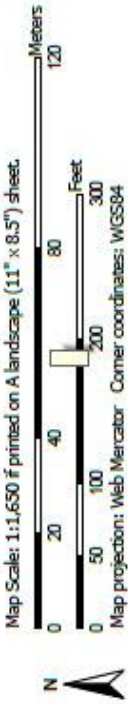
Soils Map #1



SECTION 3 - SOIL AND RISK ASSESSMENT

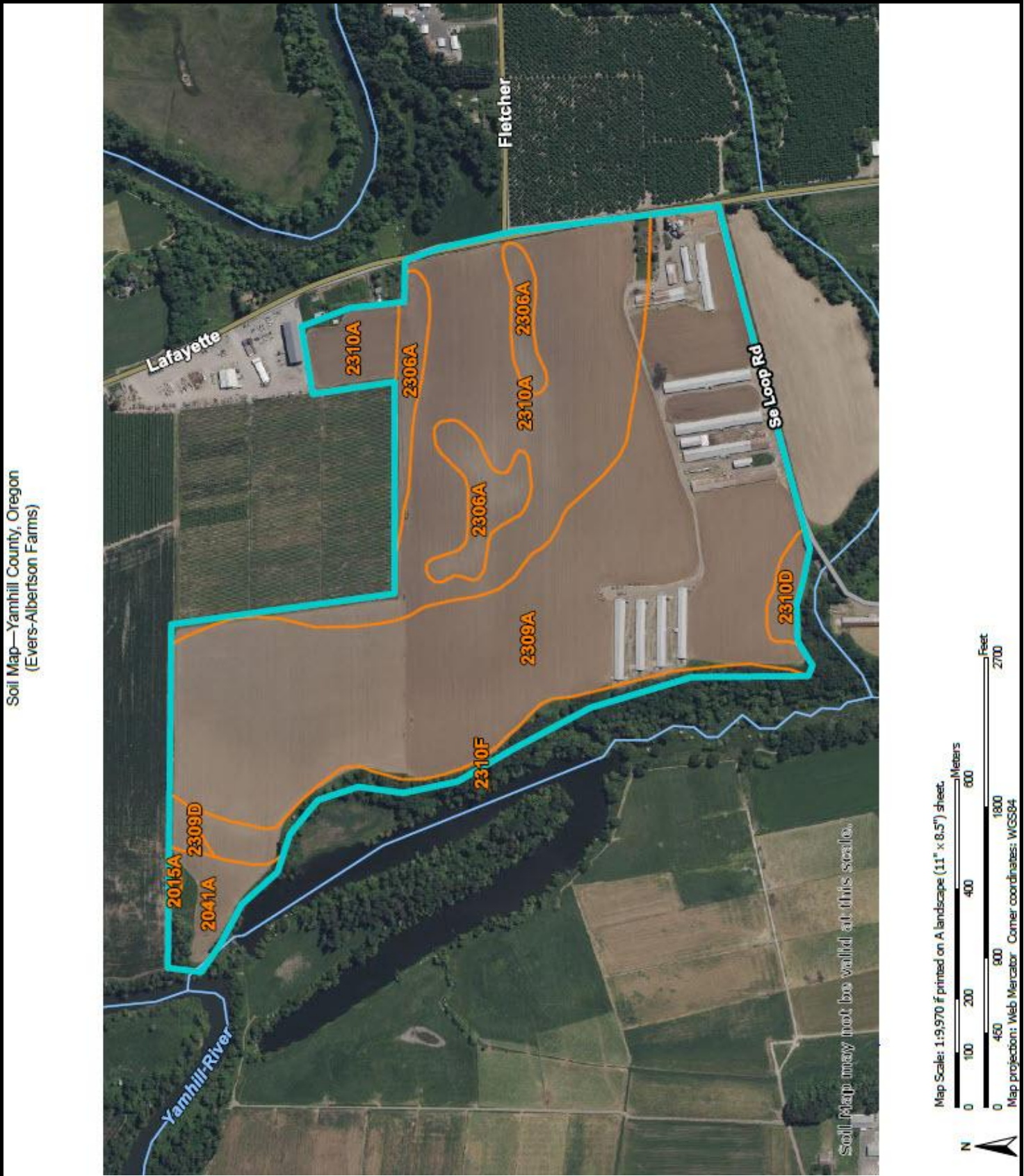
Soils Map #2

Soil Map—Yamhill County, Oregon
(Davis Farm)



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #3



SECTION 3 - SOIL AND RISK ASSESSMENT

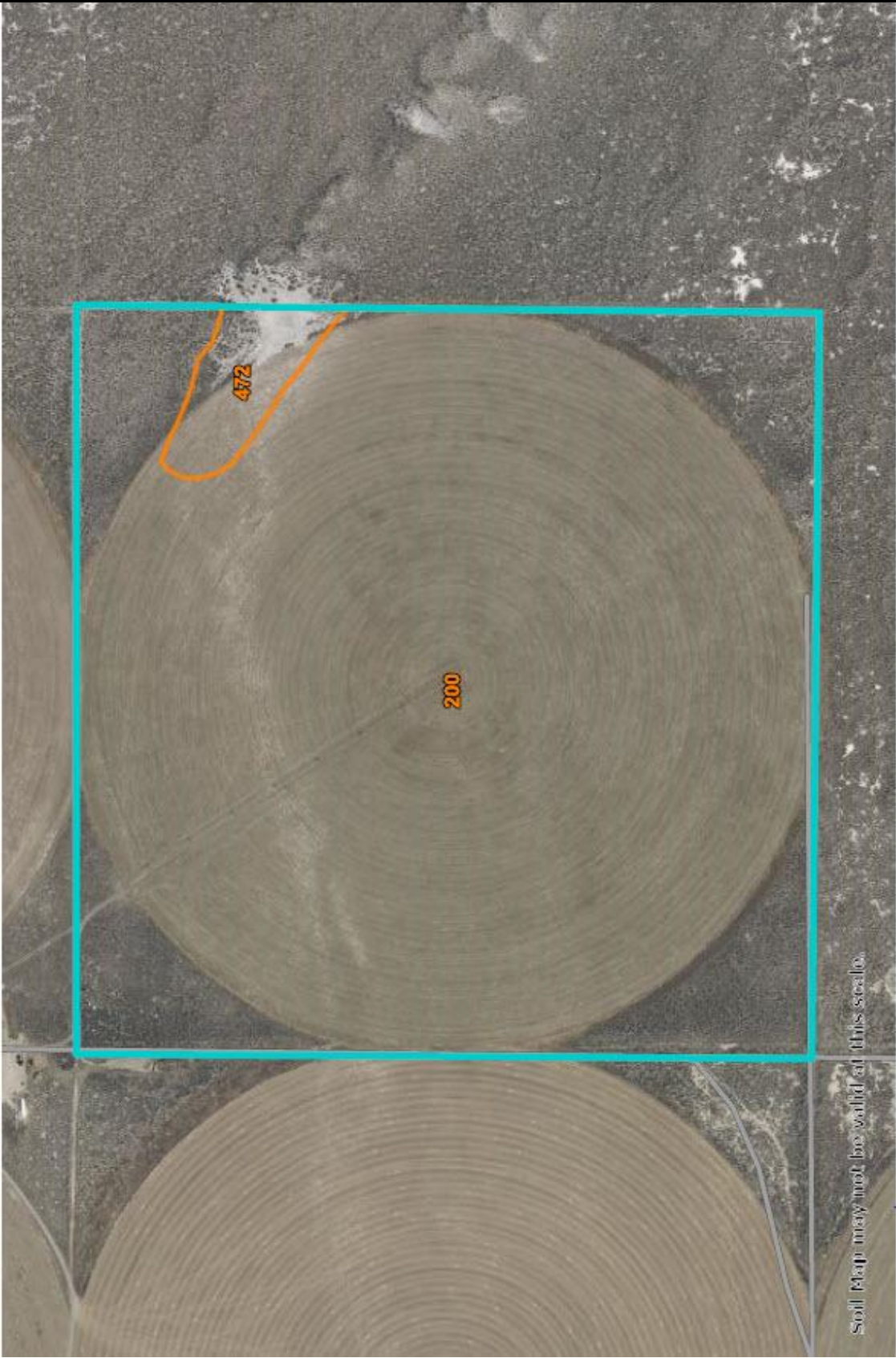
Soils Map #4



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #5

Soil Map—Lake County, Oregon, Northern Part, Parts of Lake and Klamath Counties
(Forest Glen Oaks Inc- Fort Rock Hay Ranch Pivot 8)



SECTION 3 - SOIL AND RISK ASSESSMENT

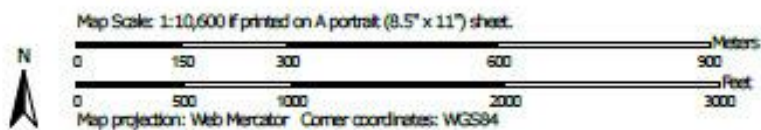
Soils Map #6



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #7

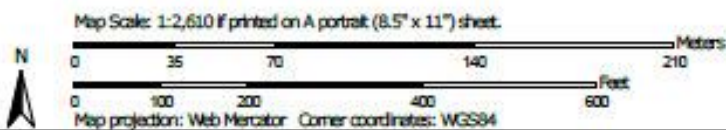
Soil Map—Yamhill County, Oregon
(Henry Farm)



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #8

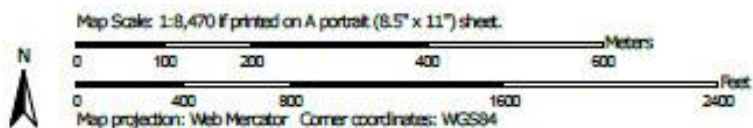
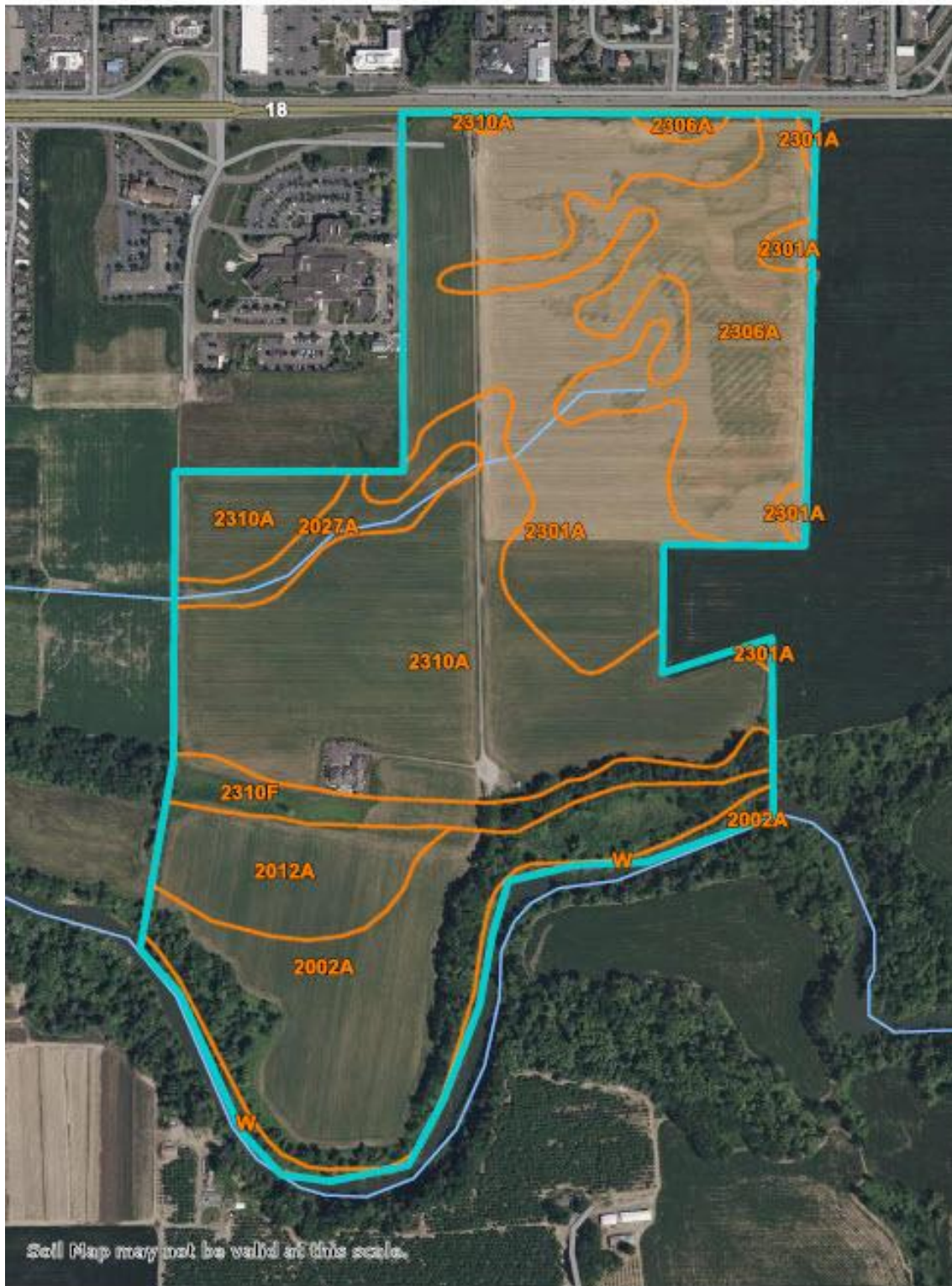
Soil Map—Yamhill County, Oregon
(Hitchcock Farm)



SECTION 3 - SOIL AND RISK ASSESSMENT

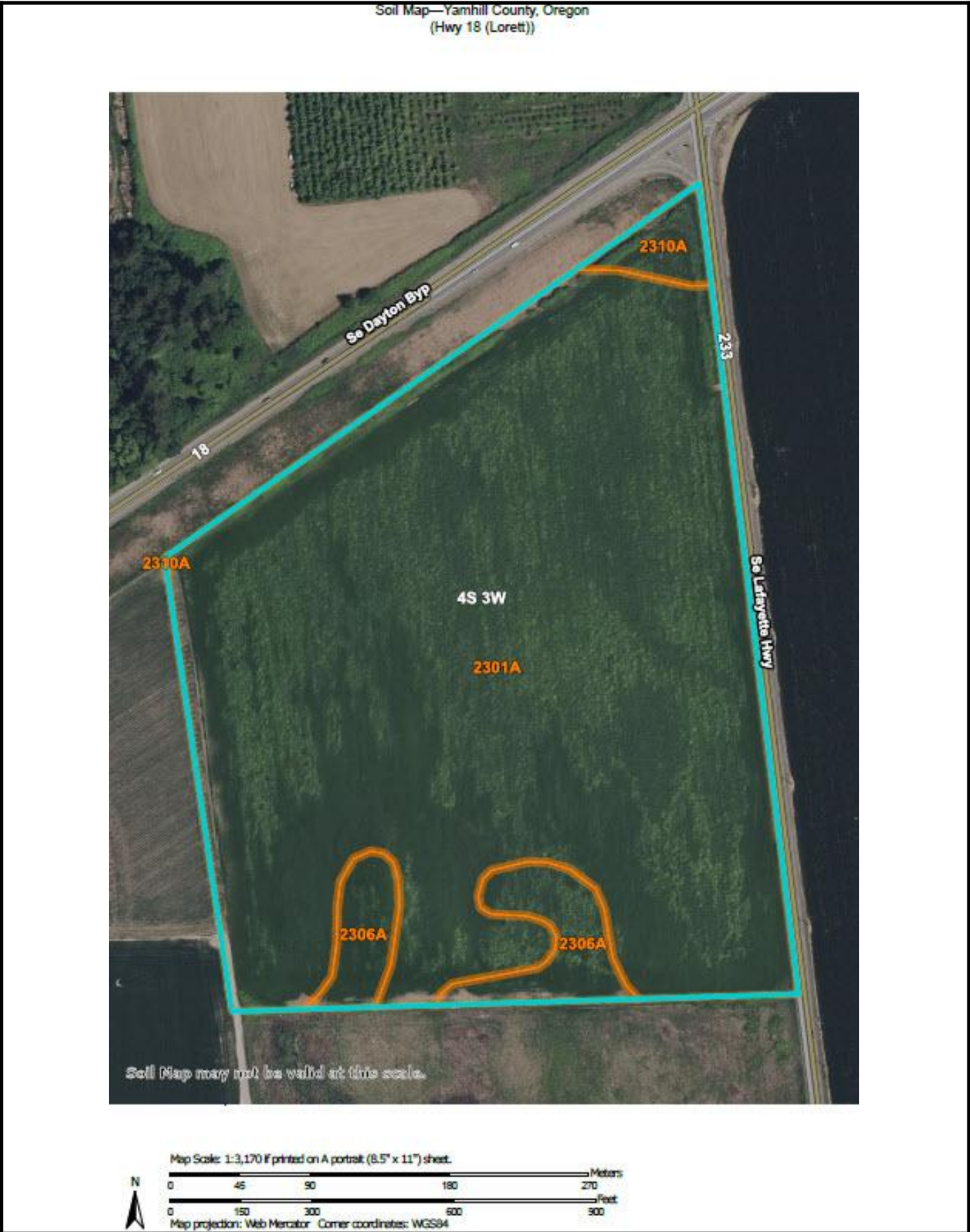
Soils Map #9

Soil Map—Yamhill County, Oregon
(Forest Glen Oaks Inc- Hospital Farm)



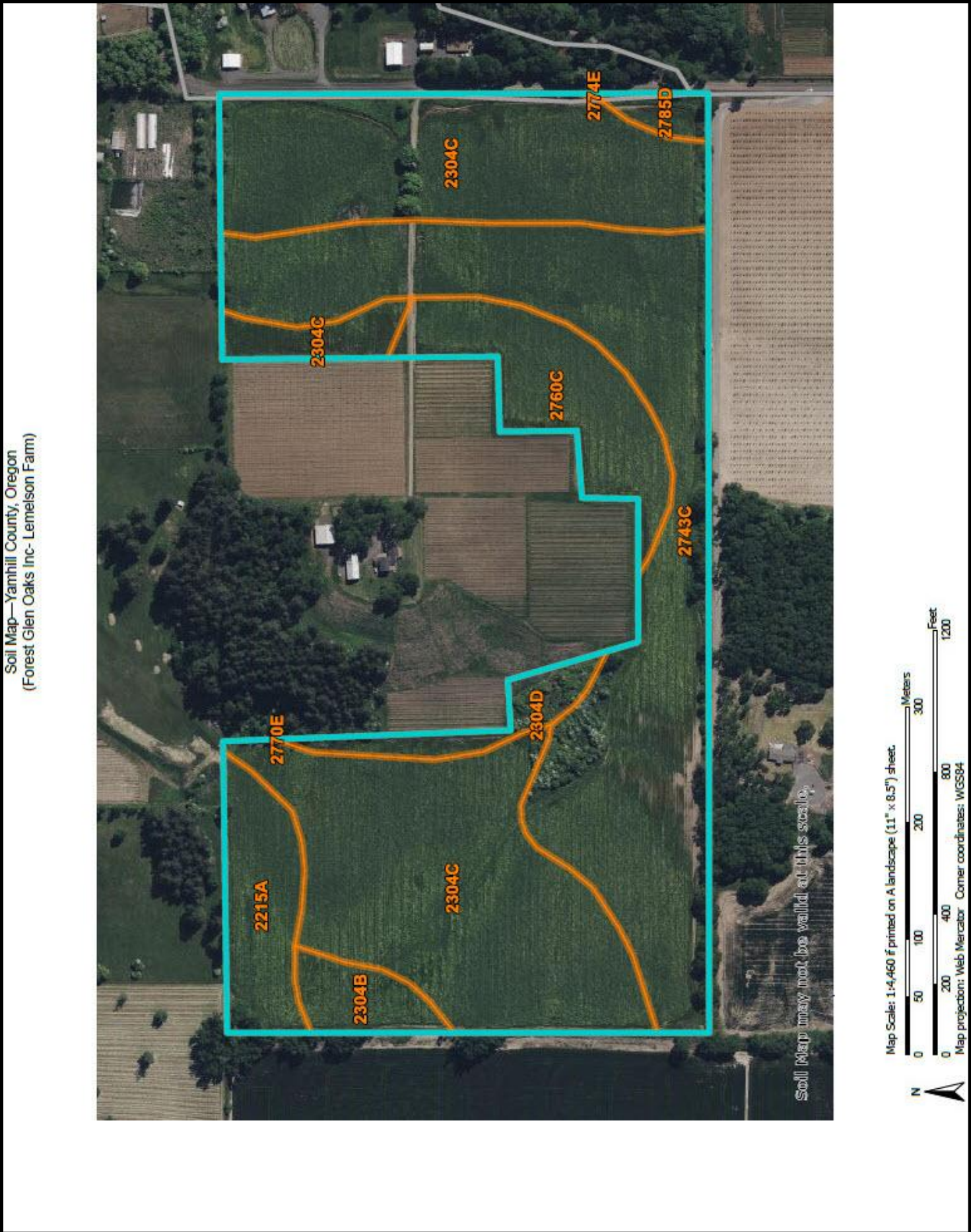
SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #10



SECTION 3 - SOIL AND RISK ASSESSMENT

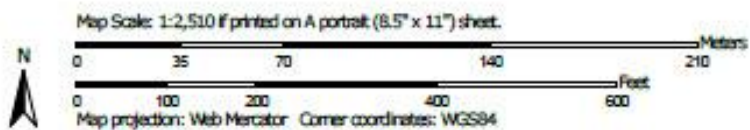
Soils Map #11



SECTION 3 - SOIL AND RISK ASSESSMENT

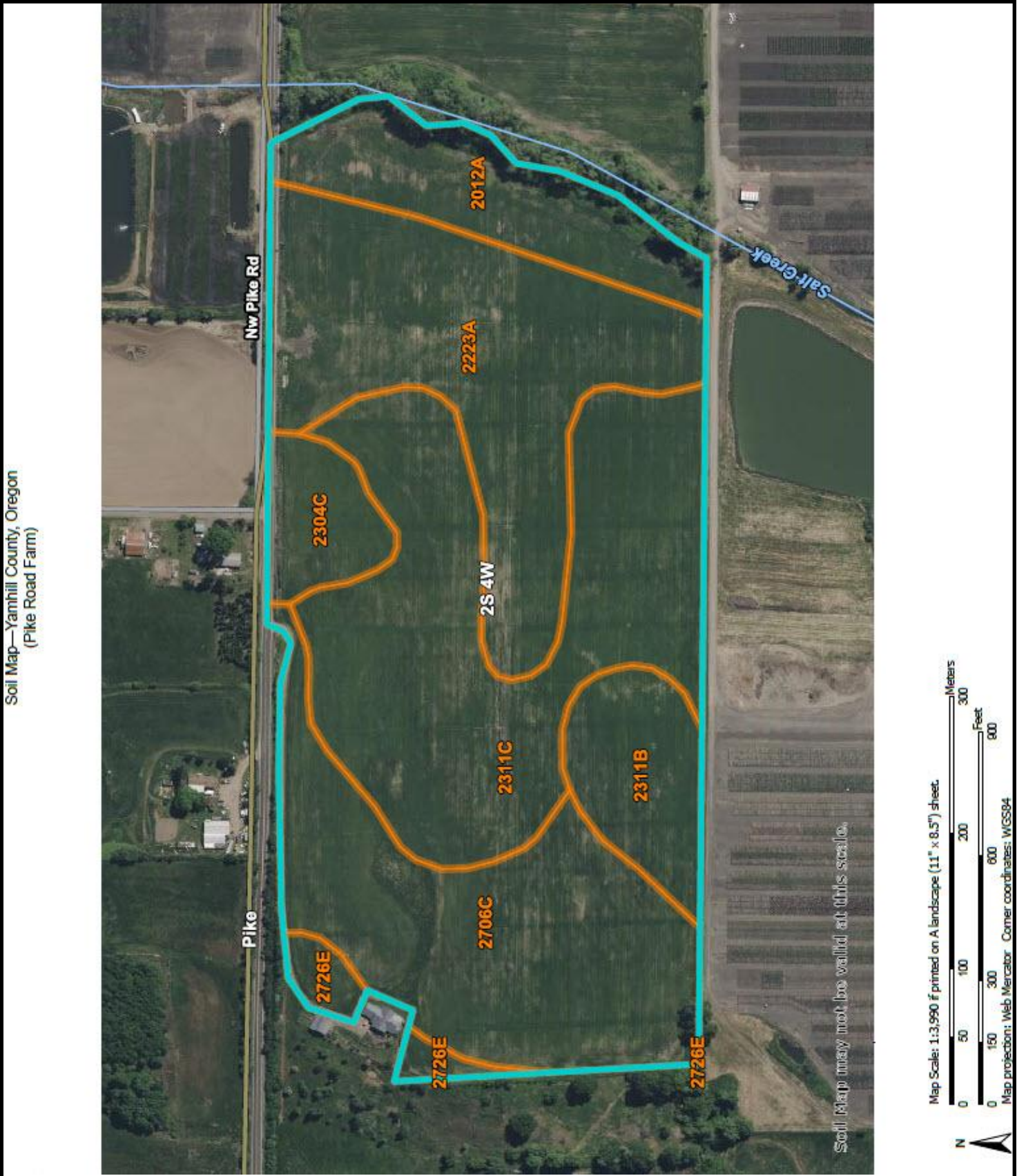
Soils Map #13

Soil Map—Yamhill County, Oregon
(Forest Glen Oaks Inc- Museum Farm)



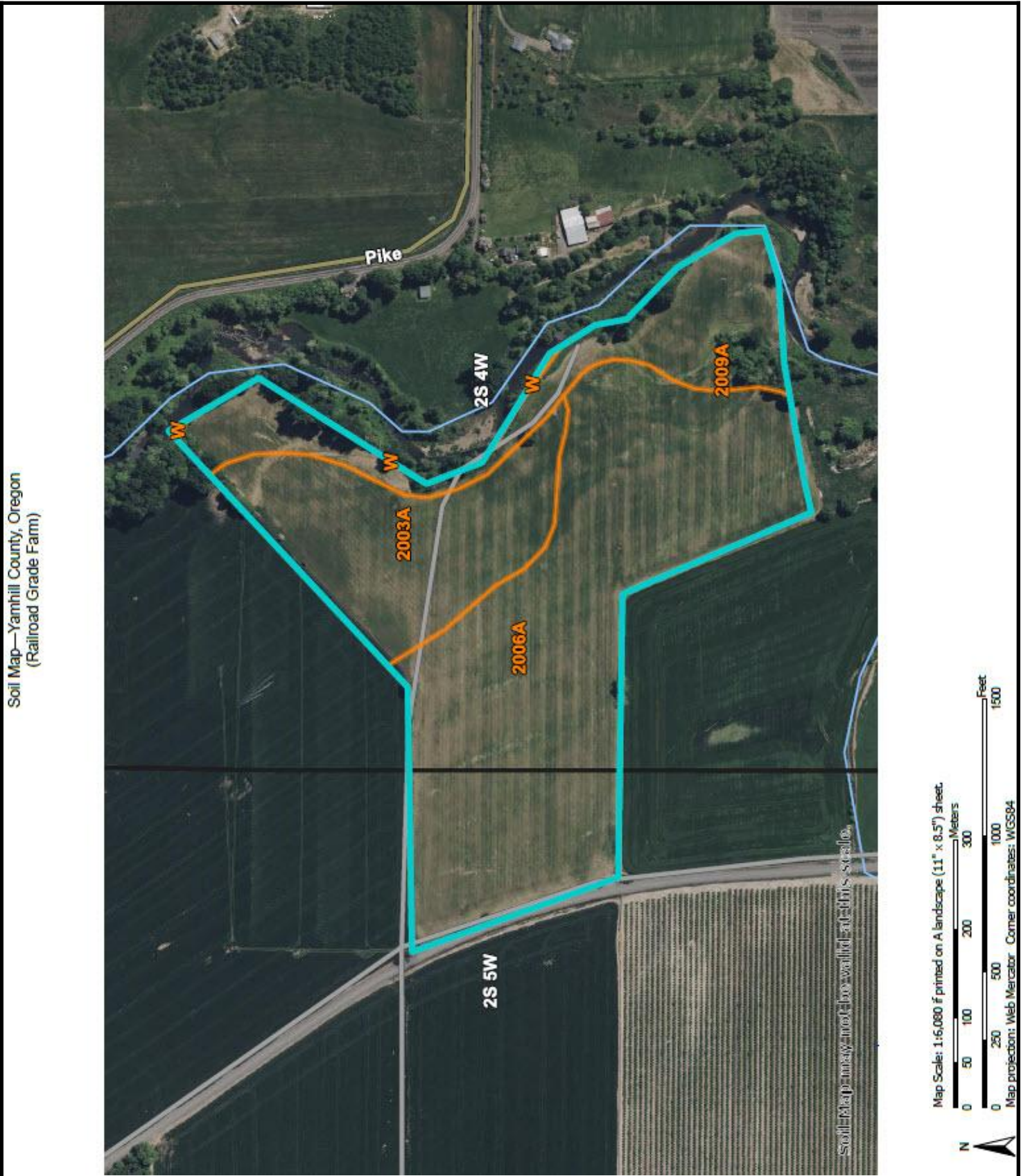
SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #14



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #16



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #17

Soil Map—Yamhill County, Oregon
(Forest Glen Oaks Inc- Sheridan Farm)



Map Scale: 1:7,430 if printed on A portrait (8.5" x 11") sheet.

N

0 100 200 400 600 Meters

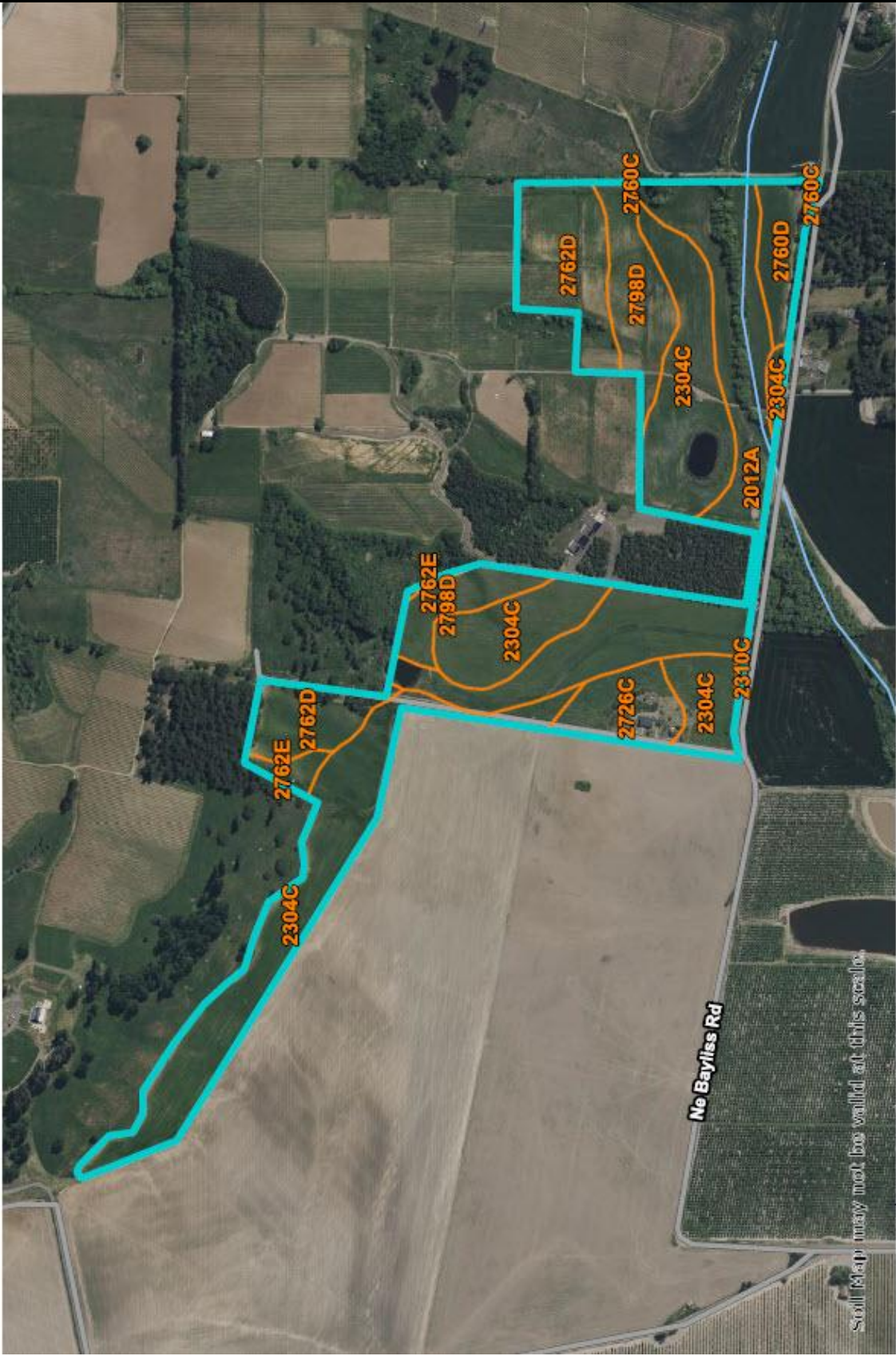
0 350 700 1400 2100 Feet

Map projection: Web Mercator Corner coordinates: WGS84

SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #18

Soil Map—Yamhill County, Oregon
(Soter-Scipio-Abbot Farms)



Map Scale: 1:10,800 if printed on A landscape (11" x 8.5") sheet.



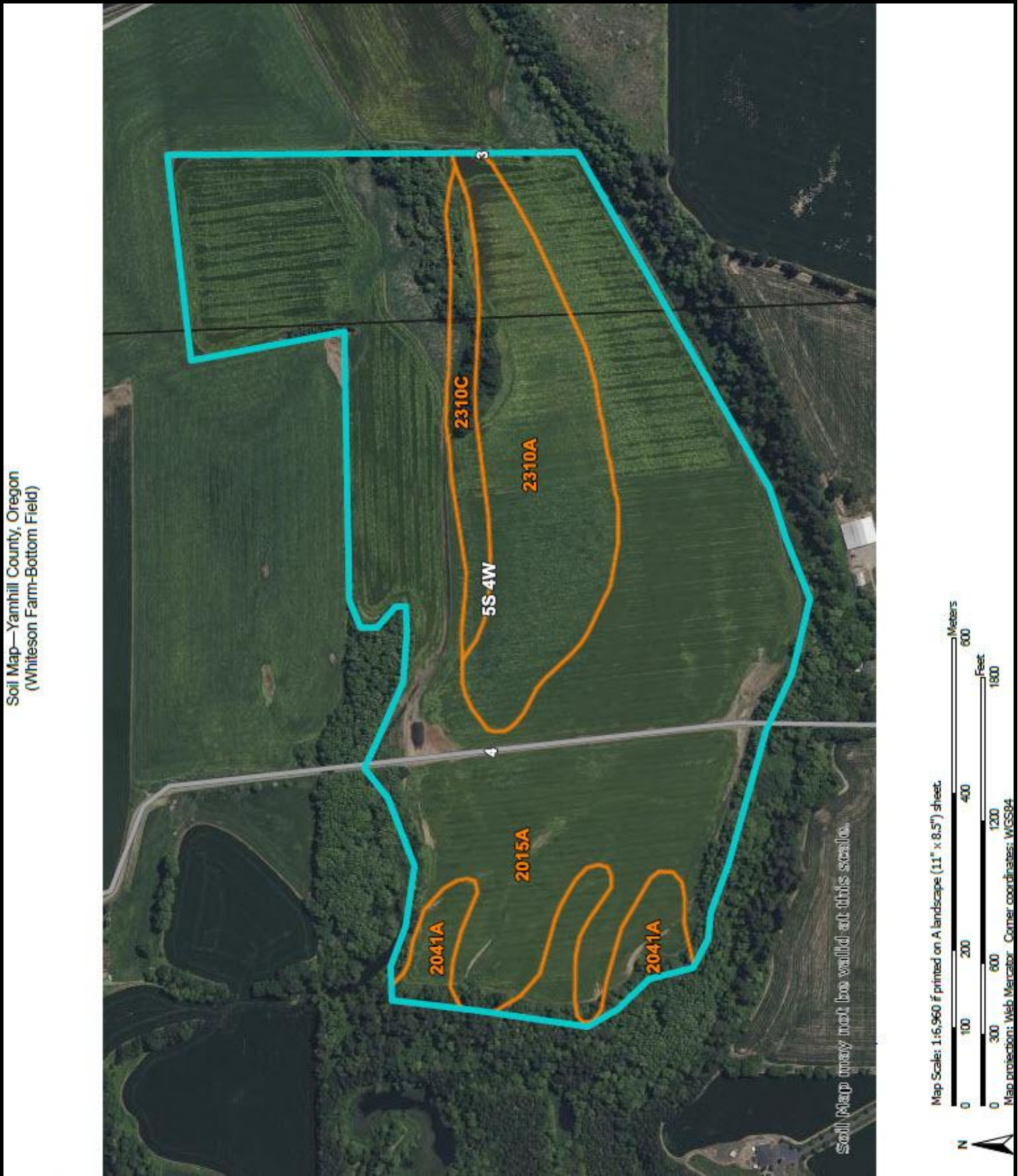
SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #19



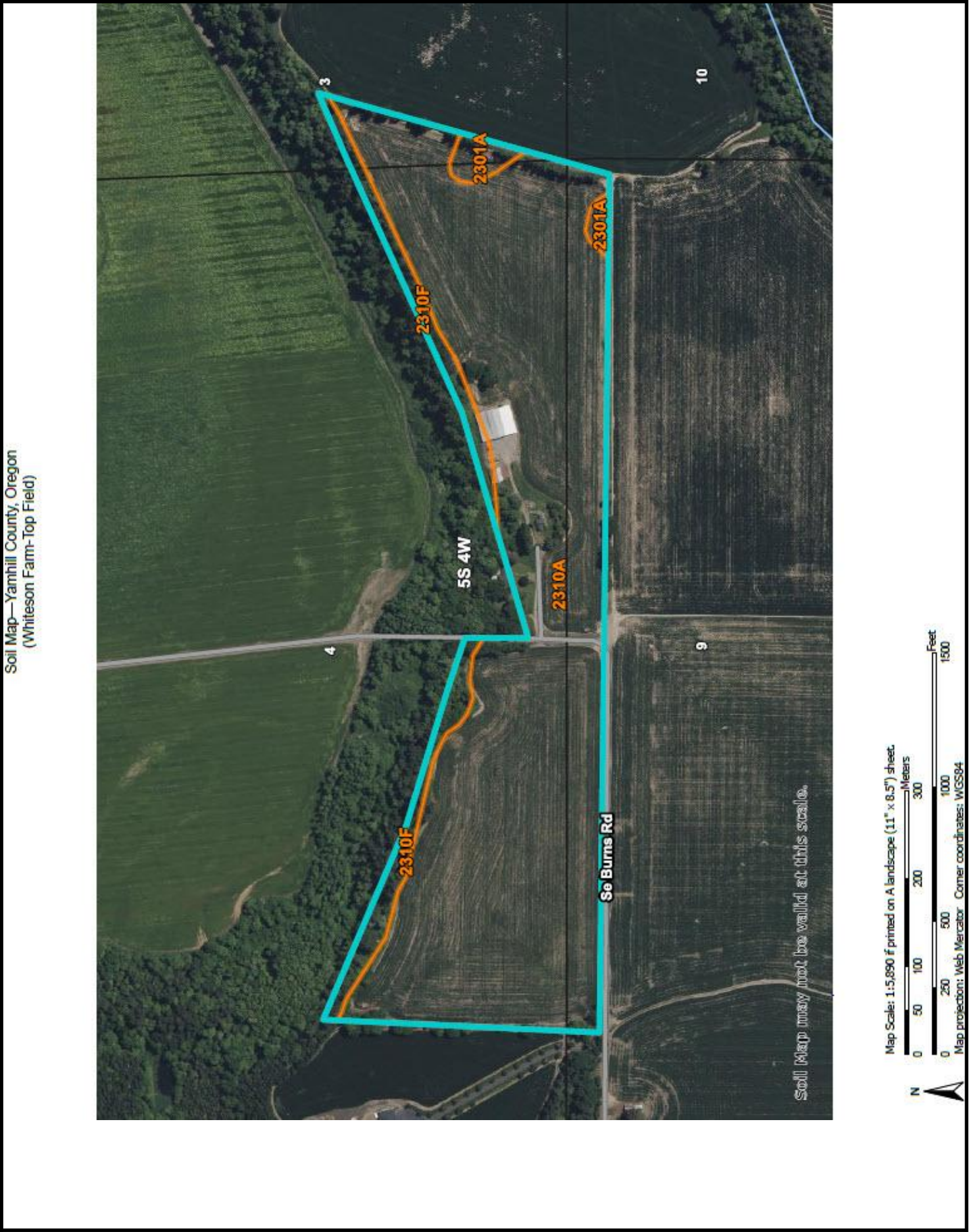
SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #20



SECTION 3 - SOIL AND RISK ASSESSMENT

Soils Map #21



SECTION 3 - SOIL AND RISK ASSESSMENT

Soil Reports

Map Unit Description

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

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

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

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

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

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

SECTION 3 - SOIL AND RISK ASSESSMENT

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

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

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

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

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

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

Report- Map Unit Description Yamhill County, Oregon

2041A- Abiqua silty clay loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2lkhb

Elevation: 100 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Abiqua, occasionally flooded, and similar soils:92 percent

Minor components:8 percent

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

Description of Abiqua, Occasionally Flooded

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, convex

Parent material:Loamy and clayey alluvium

Typical profile

Ap - 0 to 12 inches: silty clay loam

AB - 12 to 20 inches: silty clay loam

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BA - 20 to 28 inches: silty clay

Bw - 28 to 40 inches: silty clay

BC - 40 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: R002XC006OR - Stream Terrace Group

Hydric soil rating: No

Minor Components

Chehalis

Percent of map unit: 4 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Convex

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Chehalem, occasionally flooded

Percent of map unit: 3 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Waldo

Percent of map unit: 1 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave, linear

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

2301A, Am- Amity silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1j8b1

Elevation: 150 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Amity and similar soils: 96 percent

SECTION 3 - SOIL AND RISK ASSESSMENT

Minor components:4 percent

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

Description of Amity

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 7 inches: silt loam

A - 7 to 16 inches: silt loam

E - 16 to 22 inches: silt loam

Bt1 - 22 to 28 inches: silty clay loam

Bt2 - 28 to 35 inches: silty clay loam

C - 35 to 72 inches: silt loam

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 16 to 22 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D

Ecological site: R002XC007OR - Valley Swale Group

Forage suitability group: Somewhat Poorly Drained (G002XY005OR)

Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Minor Components

Dayton

Percent of map unit:3 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

Willamette

Percent of map unit:1 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Ba- Bashaw clay

Map Unit Setting

National map unit symbol: 24nt

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Elevation: 100 to 400 feet

Mean annual precipitation: 40 to 45 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 200 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Bashaw and similar soils:85 percent

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

Description of Bashaw

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear, concave

Across-slope shape:Linear

Parent material:Alluvium

Typical profile

H1 - 0 to 14 inches: clay

H2 - 14 to 48 inches: clay

H3 - 48 to 60 inches: clay

Properties and qualities

Slope:0 to 1 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table:About 0 to 12 inches

Frequency of flooding:Frequent

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 4w

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Ecological site: R002XC005OR - High Flood Plain Group

Forage suitability group: Poorly Drained (G002XY006OR)

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

2304C- Carlton silt loam, 2 to 12 percent slopes

Map Unit Setting

National map unit symbol: 20b3l

Elevation: 140 to 380 feet

Mean annual precipitation: 40 to 55 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Carlton and similar soils:93 percent

Minor components:7 percent

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

Description of Carlton

Setting

Landform:Hillslopes

Landform position (two-dimensional):Toeslope

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Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Silty glaciolacustrine deposits over loamy and clayey colluvium derived from sedimentary rock

Typical profile

Ap - 0 to 8 inches: silt loam

A2 - 8 to 12 inches: silt loam

BA - 12 to 22 inches: silt loam

Bw1 - 22 to 31 inches: silty clay loam

Bw2 - 31 to 42 inches: silty clay loam

2BC - 42 to 60 inches: silty clay

Properties and qualities

Slope:2 to 12 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table:About 22 to 31 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D

Ecological site: R002XC011OR - Low Hill Group

Hydric soil rating: No

Minor Components

Chehalem, sedimentary

Percent of map unit:3 percent

Landform:Alluvial fans

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Linear

Hydric soil rating: No

Pengra

Percent of map unit:2 percent

Landform:Fan aprons

Landform position (two-dimensional):Toeslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: Yes

Hazelair

Percent of map unit:2 percent

Landform:Hillslopes

Landform position (two-dimensional):Toeslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

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2002A, Ch- Chehalis silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2dgl4

Elevation: 30 to 1,000 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Chehalis and similar soils: 91 percent

Minor components: 9 percent

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

Description of Chehalis

Setting

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave, convex

Parent material: Silty and loamy alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

A - 8 to 16 inches: silty clay loam

Bw1 - 16 to 38 inches: silty clay loam

Bw2 - 38 to 45 inches: silty clay loam

C - 45 to 60 inches: stratified fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

Ecological site: F002XC003OR - Low Flood Plain Group

Forage suitability group: Well drained < 15% Slopes (G002XY002OR)

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Minor Components

Mcbee

Percent of map unit: 3 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Wapato

SECTION 3 - SOIL AND RISK ASSESSMENT

Percent of map unit:2 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Newberg
Percent of map unit:2 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Hydric soil rating: No
Camas
Percent of map unit:2 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Convex, linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2040A- Chehalis silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2lkh8
Elevation: 70 to 220 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Chehalis and similar soils:95 percent
Minor components:5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Chehalis
Setting
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, convex
Parent material:Silty and loamy alluvium
Typical profile
Ap - 0 to 7 inches: silt loam
A - 7 to 24 inches: silty clay loam
Bw - 24 to 44 inches: silty clay loam
C - 44 to 60 inches: stratified fine sandy loam to silty clay loam
Properties and qualities
Slope:0 to 3 percent
Depth to restrictive feature:More than 80 inches
Drainage class:Well drained
Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table:More than 80 inches

SECTION 3 - SOIL AND RISK ASSESSMENT

Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.2 inches)
Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F002XC003OR - Low Flood Plain Group
Hydric soil rating: No
Minor Components
Newberg
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No
Mcbee
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Wapato
Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

2003A, Cm- Cloquato silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2dgl3
Elevation: 30 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Cloquato and similar soils: 89 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Cloquato
Setting
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave, convex
Parent material: Silty alluvium over sandy alluvium
Typical profile

SECTION 3 - SOIL AND RISK ASSESSMENT

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: silt loam
A2 - 12 to 40 inches: silt loam
2C1 - 40 to 52 inches: stratified sandy loam to silt loam
2C2 - 52 to 72 inches: stratified sand to fine sandy loam
Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.6 inches)
Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F002XC003OR - Low Flood Plain Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Minor Components
Newberg
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Mcbee
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Camas
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Wapato
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave

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Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

2015A- Cove silty clay loam, flooded, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1qkw9

Elevation: 90 to 570 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Cove, flooded, and similar soils: 92 percent

Minor components: 8 percent

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

Description of Cove, Flooded

Setting

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Clayey alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

Bg1 - 8 to 16 inches: silty clay

Bg2 - 16 to 41 inches: clay

Cg - 41 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 0 to 8 inches

Frequency of flooding: Occasional

Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: R002XC005OR - High Flood Plain Group

Hydric soil rating: Yes

Minor Components

Bashaw

Percent of map unit: 5 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Concave, linear

Across-slope shape: Concave

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Wapato

Percent of map unit: 2 percent

SECTION 3 - SOIL AND RISK ASSESSMENT

Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, linear
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Labish
Percent of map unit:1 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave
Hydric soil rating: Yes

2306A- Dayton silt loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 1j8b3
Elevation: 150 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance
Map Unit Composition
Dayton and similar soils:92 percent
Minor components:8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Dayton
Setting
Landform:Terraces
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, linear
Parent material:Silty and clayey glaciolacustrine deposits
Typical profile
A - 0 to 9 inches: silt loam
E1 - 9 to 12 inches: silt loam
E2 - 12 to 15 inches: silt loam
2Bt1 - 15 to 22 inches: silty clay
2Bt2 - 22 to 29 inches: silty clay
3BCt1 - 29 to 40 inches: silty clay loam
3BCt2 - 40 to 53 inches: silt loam
3C1 - 53 to 64 inches: silt loam
3C2 - 64 to 76 inches: silt loam
Properties and qualities
Slope:0 to 2 percent
Depth to restrictive feature:12 to 24 inches to abrupt textural change
Drainage class:Poorly drained
Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table:About 0 to 9 inches
Frequency of flooding:None
Frequency of ponding:Frequent
Available water supply, 0 to 60 inches: Low (about 3.1 inches)
Interpretive groups

SECTION 3 - SOIL AND RISK ASSESSMENT

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: R002XC007OR - Valley Swale Group
Hydric soil rating: Yes
Minor Components
Amity
Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Woodburn
Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Willamette
Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2311C- Helvetia silt loam, 2 to 12 percent slopes

Map Unit Setting
National map unit symbol: 1j8b9
Elevation: 200 to 390 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Helvetia and similar soils: 91 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Helvetia
Setting
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Silty glaciolacustrine deposits over silty and clayey alluvium
Typical profile
Ap1 - 0 to 5 inches: silt loam
Ap2 - 5 to 10 inches: silty clay loam

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BAt - 10 to 16 inches: silty clay
Bt1 - 16 to 28 inches: silty clay
Bt2 - 28 to 48 inches: silty clay
BC - 48 to 60 inches: silty clay loam
Properties and qualities
Slope: 2 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 30 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)
Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R002XC011OR - Low Hill Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Minor Components
Helmick
Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Woodburn
Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

2706C Hazelair silty clay loam, 2 to 12 percent slopes

Map Unit Setting
National map unit symbol: 1j8bg
Elevation: 200 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance
Map Unit Composition
Hazelair and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Hazelair

SECTION 3 - SOIL AND RISK ASSESSMENT

Setting
Landform:Hillslopes
Landform position (two-dimensional):Toeslope, summit
Landform position (three-dimensional):Interfluve, base slope
Down-slope shape:Linear
Across-slope shape:Convex, linear
Parent material:Silty glaciolacustrine deposits and colluvium over clayey residuum derived from sandstone and siltstone
Typical profile
Ap - 0 to 7 inches: silty clay loam
A - 7 to 11 inches: silty clay loam
Bw - 11 to 18 inches: silty clay
2Bg - 18 to 24 inches: clay
2C - 24 to 30 inches: clay
2Cr - 30 to 40 inches: weathered bedrock
Properties and qualities
Slope:2 to 12 percent
Depth to restrictive feature:20 to 39 inches to paralithic bedrock
Drainage class:Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table:About 11 to 18 inches
Frequency of flooding:None
Frequency of ponding:None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)
Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R002XC010OR - Claypan Low Hill Group
Forage suitability group: Somewhat Poorly Drained (G002XY005OR)
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Minor Components
Helmick
Percent of map unit:10 percent
Landform:Hillslopes
Landform position (two-dimensional):Toeslope, summit
Landform position (three-dimensional):Base slope, interfluve
Down-slope shape:Linear
Across-slope shape:Concave, linear
Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Chehulpum
Percent of map unit:3 percent
Landform:Hillslopes
Landform position (two-dimensional):Summit, toeslope
Landform position (three-dimensional):Base slope, interfluve
Down-slope shape:Convex, linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Goodin
Percent of map unit:3 percent

SECTION 3 - SOIL AND RISK ASSESSMENT

Landform:Hillslopes
Landform position (two-dimensional):Toeslope, summit
Landform position (three-dimensional):Interfluve, base slope
Down-slope shape:Convex, linear
Across-slope shape:Linear, convex
Hydric soil rating: No
Melbourne
Percent of map unit:2 percent
Landform:Hillslopes
Landform position (two-dimensional):Toeslope, summit
Landform position (three-dimensional):Interfluve, base slope
Down-slope shape:Linear
Across-slope shape:Linear
Hydric soil rating: No
Panther, hummocky
Percent of map unit:1 percent
Landform:Earthflows
Landform position (two-dimensional):Footslope
Landform position (three-dimensional):Base slope
Down-slope shape:Concave, linear
Across-slope shape:Concave
Hydric soil rating: Yes

2006A, Mb- McBee silty clay loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2dgl5
Elevation: 50 to 1,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Mcbee and similar soils:87 percent
Minor components:13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Mcbee
Setting
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, linear
Parent material:Silty and loamy alluvium
Typical profile
Ap - 0 to 7 inches: silty clay loam
A - 7 to 10 inches: silty clay loam
BA - 10 to 22 inches: silty clay loam
Bw - 22 to 35 inches: silty clay loam
BCg - 35 to 42 inches: clay loam
Cg - 42 to 65 inches: clay loam
Properties and qualities
Slope:0 to 3 percent
Depth to restrictive feature:More than 80 inches
Drainage class:Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.57)

SECTION 3 - SOIL AND RISK ASSESSMENT

to 1.98 in/hr)

Depth to water table:About 20 to 30 inches

Frequency of flooding:Occasional

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B/D

Ecological site: F002XC003OR - Low Flood Plain Group

Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Minor Components

Chehalis

Percent of map unit:7 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Wapato

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Newberg

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex, linear

Hydric soil rating: No

2007A- Newberg fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2dgl7

Elevation: 30 to 700 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Newberg and similar soils:90 percent

Minor components:10 percent

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

Description of Newberg

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

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Down-slope shape:Linear

Across-slope shape:Convex, linear

Parent material:Loamy and sandy alluvium derived from igneous rock

Typical profile

Ap - 0 to 7 inches: fine sandy loam

AC - 7 to 19 inches: fine sandy loam

C1 - 19 to 28 inches: coarse sandy loam

C2 - 28 to 48 inches: stratified loamy fine sand to fine sandy loam

C3 - 48 to 64 inches: stratified very gravelly sand to fine sandy loam

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat):High (1.98 to 5.95 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:Occasional

Frequency of ponding:None

Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Ecological site: F002XC001OR - Riparian Group

Forage suitability group: Well drained < 15% Slopes (G002XY002OR)

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Minor Components

Pilchuck

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Chehalis

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, convex

Hydric soil rating: No

Mcbee

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Camas

Percent of map unit:1 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

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Down-slope shape:Convex, linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Wapato
Percent of map unit:1 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

2009A- Newberg silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2dgl8
Elevation: 100 to 170 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if irrigated
Map Unit Composition
Newberg and similar soils:90 percent
Minor components:10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Newberg
Setting
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex, linear
Parent material:Loamy and sandy alluvium derived from igneous rock
Typical profile
A - 0 to 12 inches: silt loam
AC - 12 to 18 inches: fine sandy loam
C1 - 18 to 30 inches: coarse sandy loam
C2 - 30 to 60 inches: stratified fine sand to fine sandy loam
Properties and qualities
Slope:0 to 3 percent
Depth to restrictive feature:More than 80 inches
Drainage class:Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table:More than 80 inches
Frequency of flooding:Occasional
Frequency of ponding:None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)
Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F002XC001OR - Riparian Group
Hydric soil rating: No
Minor Components

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Pilchuck

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Chehalis

Percent of map unit:3 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, convex

Hydric soil rating: No

Mcbee

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Wapato

Percent of map unit:1 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Camas

Percent of map unit:1 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Convex, linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

2726E- Steiwer-Chehulpum complex, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1j8bt

Elevation: 180 to 900 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Steiwer and similar soils:49 percent

Chehulpum and similar soils:41 percent

Minor components:10 percent

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

Description of Steiwer

SECTION 3 - SOIL AND RISK ASSESSMENT

Setting

Landform:Hillslopes

Landform position (two-dimensional):Shoulder, footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits over loamy residuum weathered from sandstone and siltstone

Typical profile

A1 - 0 to 7 inches: silt loam

A2 - 7 to 15 inches: silt loam

Bw1 - 15 to 19 inches: silty clay loam

Bw2 - 19 to 26 inches: silty clay loam

2Cr - 26 to 36 inches: weathered bedrock

Properties and qualities

Slope:12 to 30 percent

Depth to restrictive feature:20 to 39 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)

Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)

Hydric soil rating: No

Description of Chehulpum

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope, shoulder

Landform position (three-dimensional):Nose slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Convex

Parent material:Silty glaciolacustrine deposits mixed with loamy colluvium derived from sandstone and siltstone

Typical profile

A1 - 0 to 4 inches: silt loam

A2 - 4 to 12 inches: paragravelly silt loam

2Cr - 12 to 22 inches: weathered bedrock

Properties and qualities

Slope:12 to 30 percent

Depth to restrictive feature:10 to 20 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

SECTION 3 - SOIL AND RISK ASSESSMENT

Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R002XC009OR - Bald Group

Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)

Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)

Hydric soil rating: No

Minor Components

Hazelair

Percent of map unit:3 percent

Landform:Hillslopes

Landform position (two-dimensional):Footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Witham, hummocky

Percent of map unit:3 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Convex, linear

Across-slope shape:Linear, convex

Hydric soil rating: No

Wellsdale

Percent of map unit:2 percent

Landform:Hillslopes

Landform position (two-dimensional):Backslope, footslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Concave, linear

Across-slope shape:Linear

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Panther, hummocky

Percent of map unit:2 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Concave, linear

Across-slope shape:Concave

Hydric soil rating: Yes

2012A- Waldo silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1lym1

Elevation: 100 to 900 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

SECTION 3 - SOIL AND RISK ASSESSMENT

Waldo and similar soils:86 percent

Minor components:14 percent

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

Description of Waldo

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Clayey alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam

A2 - 8 to 13 inches: silty clay loam

B_{Ag} - 13 to 19 inches: silty clay

B_g - 19 to 40 inches: silty clay

B_{Cg} - 40 to 50 inches: silty clay

C_g - 50 to 60 inches: silty clay

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (K_{sat}):Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table:About 0 to 8 inches

Frequency of flooding:Occasional

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: R002XC005OR - High Flood Plain Group

Forage suitability group: Poorly Drained (G002XY006OR)

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Minor Components

Chehalem, occasionally flooded

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex, linear

Hydric soil rating: No

Wapato

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Mcbee

Percent of map unit:2 percent

Landform:Flood plains

SECTION 3 - SOIL AND RISK ASSESSMENT

Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Waldo, nonflooded
Percent of map unit:1 percent
Landform:Alluvial fans
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Chehalis
Percent of map unit:1 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2223A- Waldo silty clay loam, 0 to 3 percent slopes, nonflooded

Map Unit Setting
National map unit symbol: 2p8v7
Elevation: 140 to 400 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance
Map Unit Composition
Waldo, nonflooded, and similar soils:84 percent
Minor components:16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Waldo, Nonflooded
Setting
Landform:Alluvial fans
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave
Parent material:Clayey alluvium
Typical profile
Ap - 0 to 6 inches: silty clay loam
A2 - 6 to 14 inches: silty clay loam
BAg - 14 to 28 inches: silty clay
Bg - 28 to 45 inches: silty clay
BCg - 45 to 60 inches: silty clay
Properties and qualities
Slope:0 to 3 percent
Depth to restrictive feature:More than 80 inches
Drainage class:Poorly drained
Capacity of the most limiting layer to transmit water (Ksat):Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table:About 0 to 6 inches

SECTION 3 - SOIL AND RISK ASSESSMENT

Frequency of flooding:None
Frequency of ponding:Frequent
Available water supply, 0 to 60 inches: High (about 10.6 inches)
Interpretive groups
Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: R002XC005OR - High Flood Plain Group
Forage suitability group: Poorly Drained (G002XY006OR)
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Minor Components
Chehalem, sedimentary
Percent of map unit:5 percent
Landform:Alluvial fans
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex, linear
Hydric soil rating: No
Waldo
Percent of map unit:5 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, linear
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Wapato
Percent of map unit:3 percent
Landform:Flood plains
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Concave, linear
Other vegetative classification:Poorly Drained (G002XY006OR)
Hydric soil rating: Yes
Carlton
Percent of map unit:2 percent
Landform:Hillslopes
Landform position (two-dimensional):Toeslope
Landform position (three-dimensional):Base slope
Down-slope shape:Linear
Across-slope shape:Convex, linear
Hydric soil rating: No
Abiqua
Percent of map unit:1 percent
Landform:Alluvial fans
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex
Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2013A, Wc- Wapato silty clay loam, 0 to 3 percent slopes

Map Unit Setting

SECTION 3 - SOIL AND RISK ASSESSMENT

National map unit symbol: 2dgl9

Elevation: 50 to 1,200 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wapato and similar soils:90 percent

Minor components:10 percent

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

Description of Wapato

Setting

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Loamy alluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam

A - 9 to 16 inches: silty clay loam

Bg1 - 16 to 22 inches: silty clay loam

Bg2 - 22 to 32 inches: silty clay loam

BCg - 32 to 60 inches: silty clay

Properties and qualities

Slope:0 to 3 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 0 to 9 inches

Frequency of flooding:Occasional

Frequency of ponding:Frequent

Available water supply, 0 to 60 inches: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F002XC002OR - Backswamp Group

Forage suitability group: Poorly Drained (G002XY006OR)

Other vegetative classification: Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

Minor Components

Chehalis

Percent of map unit:5 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Mcbee

Percent of map unit:3 percent

Landform:Flood plains

SECTION 3 - SOIL AND RISK ASSESSMENT

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Convex

Other vegetative classification:Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Waldo

Percent of map unit:2 percent

Landform:Flood plains

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Poorly Drained (G002XY006OR)

Hydric soil rating: Yes

2760C- Wellsdale-Willakenzie-Dupee complex, 2 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1j8c2

Elevation: 200 to 660 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Wellsdale and similar soils:58 percent

Willakenzie and similar soils:29 percent

Dupee and similar soils:10 percent

Minor components:3 percent

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

Description of Wellsdale

Setting

Landform:Hillslopes

Landform position (two-dimensional):Summit, toeslope

Landform position (three-dimensional):Interfluve, base slope

Down-slope shape:Linear

Across-slope shape:Concave, linear

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

A1 - 0 to 2 inches: loam

A2 - 2 to 8 inches: loam

BA - 8 to 24 inches: loam

Bt1 - 24 to 34 inches: loam

Bt2 - 34 to 57 inches: clay loam

BCt - 57 to 65 inches: clay loam

Properties and qualities

Slope:2 to 12 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 24 to 34 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

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Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Description of Willakenzie

Setting

Landform:Hillslopes

Landform position (two-dimensional):Summit, toeslope

Landform position (three-dimensional):Interfluve, base slope

Down-slope shape:Convex, linear

Across-slope shape:Linear, convex

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

Ap - 0 to 5 inches: loam

A - 5 to 11 inches: loam

Bt1 - 11 to 19 inches: clay loam

Bt2 - 19 to 32 inches: paragravelly clay loam

Cr - 32 to 42 inches: weathered bedrock

Properties and qualities

Slope:2 to 12 percent

Depth to restrictive feature:20 to 39 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Well drained < 15% Slopes (G002XY002OR)

Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Description of Dupee

Setting

Landform:Hillslopes

Landform position (two-dimensional):Toeslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Concave

Parent material:Loamy colluvium over clayey residuum weathered from sandstone and siltstone

Typical profile

A1 - 0 to 4 inches: silt loam

A2 - 4 to 9 inches: silt loam

AB - 9 to 17 inches: silty clay loam

BA - 17 to 24 inches: silty clay loam

Bt1 - 24 to 34 inches: silty clay

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Bt2 - 34 to 42 inches: silty clay
BCt - 42 to 51 inches: silty clay
Cg - 51 to 62 inches: clay
Properties and qualities
Slope: 2 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 9 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.6 inches)
Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R002XC010OR - Claypan Low Hill Group
Forage suitability group: Somewhat Poorly Drained (G002XY005OR)
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Minor Components
Panther, hummocky
Percent of map unit: 1 percent
Landform: Earthflows
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes
Hazelair
Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Base slope, interfluvium
Down-slope shape: Linear
Across-slope shape: Convex, linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Chehulpum
Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Interfluvium, base slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

2760D- Wellsdale-Willakenzie-Dupee complex, 12 to 20 percent north slopes

Map Unit Setting
National map unit symbol: 1j8c3
Elevation: 200 to 580 feet
Mean annual precipitation: 40 to 50 inches

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Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wellsdale, north slopes, and similar soils:60 percent

Willakenzie, north slopes, and similar soils:27 percent

Dupee, north slopes, and similar soils:10 percent

Minor components:3 percent

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

Description of Wellsdale, North Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope, shoulder, footslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Concave, linear

Across-slope shape:Linear

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

A1 - 0 to 2 inches: loam

A2 - 2 to 8 inches: loam

BA - 8 to 24 inches: loam

Bt1 - 24 to 34 inches: loam

Bt2 - 34 to 57 inches: clay loam

BCt - 57 to 65 inches: clay loam

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 24 to 34 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Moderately Well Drained >15% Slopes (G002XY003OR)

Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)

Hydric soil rating: No

Description of Willakenzie, North Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope, shoulder, footslope

Landform position (three-dimensional):Nose slope, base slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Linear, convex

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

Ap - 0 to 5 inches: loam

A - 5 to 11 inches: loam

Bt1 - 11 to 19 inches: clay loam

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Bt2 - 19 to 32 inches: paragravelly clay loam

Cr - 32 to 42 inches: weathered bedrock

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:20 to 39 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)

Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)

Hydric soil rating: No

Description of Dupee, North Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Concave, linear

Across-slope shape:Concave

Parent material:Loamy colluvium over clayey residuum weathered from sandstone and siltstone

Typical profile

A1 - 0 to 4 inches: silt loam

A2 - 4 to 9 inches: silt loam

AB - 9 to 17 inches: silty clay loam

BA - 17 to 24 inches: silty clay loam

Bt1 - 24 to 34 inches: silty clay

Bt2 - 34 to 42 inches: silty clay

BCt - 42 to 51 inches: silty clay

Cg - 51 to 62 inches: clay

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 9 to 17 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: R002XC010OR - Claypan Low Hill Group

Forage suitability group: Somewhat Poorly Drained (G002XY005OR)

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Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Minor Components

Chehulpum

Percent of map unit:1 percent

Landform:Hillslopes

Landform position (two-dimensional):Shoulder, backslope

Landform position (three-dimensional):Nose slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Panther, hummocky

Percent of map unit:1 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Concave, linear

Across-slope shape:Concave

Hydric soil rating: Yes

Hazelair

Percent of map unit:1 percent

Landform:Hillslopes

Landform position (two-dimensional):Footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

2762D- Willakenzie-Wellsdale complex, 12 to 20 percent south slopes

Map Unit Setting

National map unit symbol: 1j8c5

Elevation: 200 to 660 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Willakenzie, south slopes, and similar soils:78 percent

Wellsdale, south slopes, and similar soils:15 percent

Minor components:7 percent

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

Description of Willakenzie, South Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope, shoulder, footslope

Landform position (three-dimensional):Nose slope, base slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Linear, convex

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

Ap - 0 to 5 inches: loam

A - 5 to 11 inches: loam

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Bt1 - 11 to 19 inches: clay loam

Bt2 - 19 to 32 inches: paragravelly clay loam

Cr - 32 to 42 inches: weathered bedrock

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:20 to 39 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)

Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)

Hydric soil rating: No

Description of Wellsdale, South Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope, footslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Concave, linear

Across-slope shape:Linear

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

A1 - 0 to 2 inches: loam

A2 - 2 to 8 inches: loam

BA - 8 to 24 inches: loam

Bt1 - 24 to 34 inches: loam

Bt2 - 34 to 57 inches: clay loam

BCt - 57 to 65 inches: clay loam

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 24 to 34 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Moderately Well Drained >15% Slopes (G002XY003OR)

Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)

Hydric soil rating: No

SECTION 3 - SOIL AND RISK ASSESSMENT

Minor Components

Dupee

Percent of map unit:3 percent

Landform:Hillslopes

Landform position (two-dimensional):Footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Chehulpum

Percent of map unit:2 percent

Landform:Hillslopes

Landform position (two-dimensional):Shoulder, backslope

Landform position (three-dimensional):Nose slope, side slope

Down-slope shape:Convex, linear

Across-slope shape:Convex

Other vegetative classification:Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Panther, hummocky

Percent of map unit:1 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Concave, linear

Across-slope shape:Concave

Hydric soil rating: Yes

Hazelair

Percent of map unit:1 percent

Landform:Hillslopes

Landform position (two-dimensional):Footslope, backslope

Landform position (three-dimensional):Base slope, side slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

2762E Willakenzie-Wellsdale complex, 20 to 30 percent south slopes

Map Unit Setting

National map unit symbol: 1j8c6

Elevation: 200 to 640 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Willakenzie, south slopes,, South Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope

Landform position (three-dimensional):Nose slope, side slope

Down-slope shape:Linear

Across-slope shape:Convex

Parent material:Loamy colluvium derived from sandstone and siltstone

SECTION 3 - SOIL AND RISK ASSESSMENT

Typical profile

Ap - 0 to 5 inches: loam

A2 - 5 to 11 inches: loam

Bt1 - 11 to 19 inches: clay loam

Bt2 - 19 to 32 inches: paragravelly clay loam

Cr - 32 to 42 inches: weathered bedrock

Properties and qualities

Slope:20 to 30 percent

Depth to restrictive feature:20 to 39 inches to paralithic bedrock

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:More than 80 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)

Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)

Hydric soil rating: No

Description of Wellsdale, South Slopes

Setting

Landform:Hillslopes

Landform position (two-dimensional):Backslope

Landform position (three-dimensional):Side slope

Down-slope shape:Linear

Across-slope shape:Concave

Parent material:Loamy colluvium and residuum derived from sandstone and siltstone

Typical profile

A1 - 0 to 2 inches: loam

A2 - 2 to 8 inches: loam

BA - 8 to 24 inches: loam

Bt1 - 24 to 34 inches: loam

Bt2 - 34 to 57 inches: clay loam

BCt - 57 to 65 inches: clay loam

Properties and qualities

Slope:20 to 30 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high (0.20 to 0.57 in/hr)

Depth to water table:About 24 to 34 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: R002XC011OR - Low Hill Group

SECTION 3 - SOIL AND RISK ASSESSMENT

Forage suitability group: Moderately Well Drained >15% Slopes (G002XY003OR)
Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)
Hydric soil rating: No
Minor Components
Dupee
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Chehulpum
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Panther, hummocky
Percent of map unit: 1 percent
Landform: Earthflows
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes
Hazelair
Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No

2798D Witham silty clay loam, hummocky, 2 to 25 percent slopes

Map Unit Setting
National map unit symbol: 1vkrf
Elevation: 210 to 1,170 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance
Map Unit Composition
Witham, hummocky, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the map unit.
Description of Witham, Hummocky
Setting

SECTION 3 - SOIL AND RISK ASSESSMENT

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Convex, linear

Parent material:Loamy earthflow deposits derived from volcanic and sedimentary rock over clayey earthflow deposits derived from sandstone and siltstone

Typical profile

A - 0 to 11 inches: silty clay loam

2Bss1 - 11 to 31 inches: clay

2Bssg2 - 31 to 43 inches: clay

2C - 43 to 61 inches: paragravelly silty clay

Properties and qualities

Slope:2 to 25 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat):Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table:About 10 to 20 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Ecological site: R002XC010OR - Claypan Low Hill Group

Hydric soil rating: No

Minor Components

Panther, hummocky

Percent of map unit:10 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Concave, linear

Across-slope shape:Concave

Hydric soil rating: Yes

Melbourne

Percent of map unit:5 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Convex

Hydric soil rating: No

Saum

Percent of map unit:5 percent

Landform:Earthflows

Landform position (two-dimensional):Footslope

Landform position (three-dimensional):Base slope

Down-slope shape:Linear

Across-slope shape:Convex

Hydric soil rating: No

Gellatly

SECTION 3 - SOIL AND RISK ASSESSMENT

Percent of map unit:5 percent
Landform:Earthflows
Landform position (two-dimensional):Footslope
Landform position (three-dimensional):Base slope
Down-slope shape:Linear
Across-slope shape:Convex
Hydric soil rating: No

2309A- Willamette silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2lkgz
Elevation: 140 to 230 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Willamette and similar soils:96 percent
Minor components:4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Willamette
Setting
Landform:Terraces
Landform position (three-dimensional):Tread
Down-slope shape:Linear
Across-slope shape:Convex, linear
Parent material:Silty glaciolacustrine deposits
Typical profile
Ap - 0 to 6 inches: silt loam
A - 6 to 13 inches: silt loam
AB - 13 to 24 inches: silt loam
BA - 24 to 33 inches: silt loam
2Bt - 33 to 45 inches: silty clay loam
2BCt - 45 to 53 inches: silty clay loam
2C - 53 to 60 inches: silty clay loam
Properties and qualities
Slope:0 to 3 percent
Depth to restrictive feature:More than 80 inches
Drainage class:Well drained
Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table:About 45 to 53 inches
Frequency of flooding:None
Frequency of ponding:None
Available water supply, 0 to 60 inches: Very high (about 12.2 inches)
Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No
Minor Components

SECTION 3 - SOIL AND RISK ASSESSMENT

Amity

Percent of map unit:3 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Dayton

Percent of map unit:1 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

2309D- Willamette silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2lkh1

Elevation: 140 to 190 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Willamette and similar soils:97 percent

Minor components:3 percent

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

Description of Willamette

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Convex

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: silt loam

A - 6 to 13 inches: silt loam

AB - 13 to 24 inches: silt loam

BA - 24 to 33 inches: silt loam

2Bt - 33 to 45 inches: silty clay loam

2BCt - 45 to 53 inches: silty clay loam

2C - 53 to 60 inches: silty clay loam

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 45 to 53 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

SECTION 3 - SOIL AND RISK ASSESSMENT

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Well Drained > 15% Slopes (G002XY001OR)
Other vegetative classification: Well Drained > 15% Slopes (G002XY001OR)
Hydric soil rating: No
Minor Components
Amity
Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Dayton
Percent of map unit: 1 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

2310A, WuA- Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 1j8b4
Elevation: 100 to 290 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland
Map Unit Composition
Woodburn and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Woodburn
Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Silty glaciolacustrine deposits
Typical profile
Ap - 0 to 9 inches: silt loam
A - 9 to 17 inches: silt loam
2Bt1 - 17 to 25 inches: silty clay loam
2Bt2 - 25 to 32 inches: silty clay loam
2BCt1 - 32 to 39 inches: silt loam
2BCt2 - 39 to 54 inches: silt loam
2C1 - 54 to 68 inches: silt loam
2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam
3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam
Properties and qualities

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Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.2 inches)
Interpretive groups
Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No
Minor Components
Amity
Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)
Hydric soil rating: No
Dayton
Percent of map unit: 2 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

2310C- Woodburn silt loam, 3 to 12 percent slopes

Map Unit Setting
National map unit symbol: 1j8b5
Elevation: 100 to 350 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance
Map Unit Composition
Woodburn and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the map unit.
Description of Woodburn
Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Silty glaciolacustrine deposits
Typical profile

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Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope: 3 to 12 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 25 to 32 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Minor Components

Amity

Percent of map unit: 5 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave, linear

Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Dayton

Percent of map unit: 2 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: Yes

2310D, WuD- Woodburn silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: 1j8b6

Elevation: 100 to 380 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodburn and similar soils: 95 percent

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Minor components:5 percent

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

Description of Woodburn

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Convex

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope:12 to 20 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 25 to 32 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Forage suitability group: Moderately Well Drained >15% Slopes (G002XY003OR)

Other vegetative classification: Moderately Well Drained >15% Slopes (G002XY003OR)

Hydric soil rating: No

Minor Components

Amity

Percent of map unit:4 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave, linear

Other vegetative classification:Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Dayton

Percent of map unit:1 percent

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Linear

Across-slope shape:Concave

Hydric soil rating: Yes

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2310F Woodburn silt loam, 20 to 55 percent slopes

Map Unit Setting

National map unit symbol: 1j8b7

Elevation: 100 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Woodburn and similar soils:100 percent

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

Description of Woodburn

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Convex

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope:20 to 55 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 25 to 32 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Hydric soil rating: No

2310F- Woodburn silt loam, 20 to 55 percent slopes

Map Unit Setting

National map unit symbol: 1j8b7

Elevation: 100 to 400 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 165 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

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Woodburn and similar soils:100 percent

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

Description of Woodburn

Setting

Landform:Terraces

Landform position (three-dimensional):Tread

Down-slope shape:Convex

Across-slope shape:Linear

Parent material:Silty glaciolacustrine deposits

Typical profile

Ap - 0 to 9 inches: silt loam

A - 9 to 17 inches: silt loam

2Bt1 - 17 to 25 inches: silty clay loam

2Bt2 - 25 to 32 inches: silty clay loam

2BCt1 - 32 to 39 inches: silt loam

2BCt2 - 39 to 54 inches: silt loam

2C1 - 54 to 68 inches: silt loam

2C2 - 68 to 80 inches: stratified fine sandy loam to silt loam

3C3 - 80 to 92 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope:20 to 55 percent

Depth to restrictive feature:More than 80 inches

Drainage class:Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table:About 25 to 32 inches

Frequency of flooding:None

Frequency of ponding:None

Available water supply, 0 to 60 inches: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group

Hydric soil rating: No

W- Water

Map Unit Composition

Water:100 percent

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

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Yamhill County, Oregon

Survey Area Data: Version 12, Sep 8, 2023

SECTION 3 - SOIL AND RISK ASSESSMENT



Phosphorus Index Report

Forest Glen Oaks Offsite Farms -

Dayton

Phosphorus Index is included for advisement puposes and is not (yet) currently a regulary tool.

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
Henry	157.1	2310A,	02/12/2024	56.0		177.0	5.9	4.25	11.13	15.39	Low
Hospital	177.2	2310A,	02/12/2024	64.0		206.0	5.8	4.25	11.67	15.92	Low
Sheridan	182.4	2301A, Amity	02/12/2024	79.0		183.0	5.7	4.25	19.86	24.12	Low
Figment	53.8	2310A,	02/12/2024	33.0		333.0	5.7	4.25	13.86	18.11	Low
Duniway Rd	52.5	2304C, Carlton	02/12/2024	19.0		193.0	5.2	6.25	9.272	15.52	Low
FRHR-Pivot 8	129.1	200, Abert	02/27/2024		25.0	156.0	6.7	3.25	0.0	0.0	Low
FRHR-Pivot 6	56.9	200, Abert	02/27/2024		15.0	115.0	7.0	3.25	0.0	0.0	Low
FRHR-Pivot 5	119.4	217, Bonnick	02/27/2024		25.0	111.0	7.1	2.25	0.0	0.0	Low
FRHR-Pivot 4	73.9	217, Bonnick	02/27/2024		25.0	156.0	6.7	2.25	0.0	0.0	Low
FRHR-Pivot 3	133.9	216, Bonnick	02/27/2024		19.0	116.0	7.0	3.25	8.612	27.99	Low
FRHR-Pivot 2	129.7	200, Abert	02/27/2024		24.0	123.0	7.3	3.25	15.15	49.24	Low
FRHR-Pivot 1	126.5	200, Abert	02/27/2024		14.0	81.0	6.9	3.25	10.30	33.49	Low
Whiteson Top	41.3	2310A,	02/12/2024	54.0		204.0	5.7	3.5	1.400	4.9	Low
Whiteson Bottom	116.4	2015A, Cove	02/12/2024	54.0		204.0	5.7	3.5	1.400	4.9	Low
Veeman	217.5	2002A,	02/12/2024	136.0		832.0	6.2	4.75	20.63	25.38	Medium
Soter	23.8	2304C, Carlton	02/12/2024	9.0		270.0	5.6	7.0	0.0	7.0	Low
Scipio	31.6	2304C, Carlton	02/12/2024	93.0		177.0	5.9	7.75	16.39	24.14	Low
Railroad Grade	55.6	2006A, McBee	02/12/2024	9.0		63.0	6.1	4.25	8.379	12.63	Low
Pike Road	56.7	2311C,	02/12/2024	9.0		106.0	5.3	7.75	10.63	18.38	Low
Museum	11.1	2002A,	02/12/2024	71.0		121.0	5.5	4.75	12.37	17.13	Low
Hwy 18 (Lorett)	35.7	2301A, Amity	02/12/2024	56.0		177.0	5.9	4.25	12.65	16.91	Low
Hitchcock	19.4	2310C,	02/12/2024	34.0		150.0	5.3	7.75	9.208	16.96	Low
Grand Island	81.7	2009A,	02/12/2024	79.0		227.0	6.3	4.75	12.02	16.78	Low
Evers	129.1	2309A,	02/12/2024	138.0		153.0	6.0	3.25	19.16	22.42	Low
Davis	7.5	2301A, Amity	02/12/2024	36.0		137.0	5.7	4.25	13.88	18.13	Low
Boyer	105.6	2006A, McBee	02/12/2024	8.0		122.0	5.6	4.25	9.579	13.83	Low
Albertson	44.2	2309A,	02/12/2024	71.0		155.0	5.8	3.25	12.95	16.21	Low

Phosphorus Index is included for advisement puposes and is not (yet) currently a regulary tool.

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
Abbot Claim	40.2	2304C, Carlton	02/12/2024	11.0		168.0	5.3	7.75	11.28	19.04	Low

SECTION 4 - REFERENCES

Supplemental Documents

