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Animal Waste Management Plan for H3 Feeders LLC

c/o Lee Homer
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Hermiston, OR 97838
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Prepared by:
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**H3
Feeders
LLC
2016**

**Animal Waste
Management Plan**

**H3
Feeders
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2016**

**Animal Waste
Management Plan**

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GENERAL INFORMATION**Oregon Department of Agriculture
CAFO Division
Animal Waste Management Plan
Signature Sheet**

ODA USE ONLY

MA# _____

AWMP# _____

Approved Date _____

Received Date _____

Facility Name: H3 Feeders LLCFacility Address: 76122 Col Jordan Road
Hermiston, OR 97838Operated by: Lee HomerMailing Address: 76122 Col Jordan Road
Hermiston, OR 97838*Complete if different than the Operator*Owned by: Lee HomerMailing Address: 76122 Col Jordan Road
Hermiston, OR 97838

☒ As the Operator of H3 Feeders, I agree to manage this facility in accordance with the existing Animal Waste Management Plan (AWMP) # 13059 on file with ODA and maintain those practices as described in the plan. This signed AWMP is incorporated into the CAFO NPDES General Permit by reference (Permit Condition S3.A.2.).

☐ If changes are made to the animal population, facilities and/or management of the CAFO, a new AWMP 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

Operator's Name (Please Print)

Lee Homer

GENERAL INFORMATION

GENERAL INFORMATION

BACKGROUND AND SITE INFORMATION

Animal Feeding Operation: Large Concentrated CAFO

Type & Size: Beef Feeders – 8,000 animals

Latitude/Longitude: N45.7756⁰, W119.4052⁰

H3 Feeders LLC is located approximately a 200 miles east of Portland, Oregon in Umatilla County, Oregon near the town of Hermiston. It is located in the Columbia Plateau region of eastern Oregon at an elevation of approximately 560 feet. The annual precipitation varies from 8-10 inches of which 70% falls within a 6 month period from November through April and less than 10% falls from June through August. Total average annual snowfall depth is 7 inches. Winds are generally moderate from the west with an average annual wind speed of 9mph. There is approximately 190 to 230 frost free days and the average annual mean temperature is 54 degrees Fahrenheit. Soils vary from deep to moderately deep silt loam, fine sandy loam, very fine sandy loam and loam fine sand that well to excessively drained.

H3 Feeders LLC is owned and managed by the Homer family and consists of approximately 41 acres used for a feedlot, which includes receiving and hospital pens, dry lot pens, silage bunkers, a feed mill, commodity barn, vegetated treatment area, mortality handling site, shop and office building. Adjacent to the feedlot facilities are approximately 53 acres of irrigated cropland. The feedlot was built in approximately 1970 and has been operated by the current owner since 2013. H3 feeders also leases a pivot corner to the north and east of the feedlot that adds 9 acres of pens which allows more room at maximum capacity. At maximum capacity, 8,000 livestock can be housed at the feedlot year round. The owner raises a maximum of 7,000 feeder cattle which are usually brought in weighing approximately 450 pounds and leave weighing approximately 1,200 pounds. The owner also raises a maximum of 1,000 dairy heifers weighing approximately 500 pounds. Animal inventory fluctuates throughout the year depending on market conditions, animal performance and needs of the owner.

Mortalities that occur during the year on H3 Feeders LLC are disposed of by burial.

Adjacent to the feedlot facilities are approximately 53 acres of irrigated cropland consisting of continuous corn planted each spring and harvested in late summer for silage. A cover crop of triticale or similar crop is planted in the fall after the corn has been harvested to protect the soil from erosion and utilize excess nutrients. There is also 17.7 acres of irrigated permanent grass hay/pasture land adjacent to the feedlot facilities that is utilized for forage for the livestock. If solids containing manure, bedding and wasted feed will be made to the cropland fields they will be made in the fall after the corn has been harvested. Any rainfall runoff from the feedlot area containing nutrients and organics from the manure will be captured by a planned concrete sump and pumped to the Hay/Pasture field for utilization of the nutrients and organics contained in the runoff.

GENERAL INFORMATION

The soil concentration of phosphorus is excessive in the H3 Feeders LLC crop and hay/pasture land fields. Due to varying annual rainfall runoff and amounts for solids removed from the feedlot, applications of rainfall runoff from the feedlot and solids containing manure are planned on a nitrogen basis on all fields. Soil phosphorus concentrations will be monitored using soil tests to insure they do not increase significantly in the future. It is estimated that the operation produces enough manure to meet the nutrient demand for the crop and hay/pasture land fields. Any applications of nutrients in the form of commercial fertilizer to the crop and hay/pasture land fields should be based on soil tests and fertilizer guides for the crops being grown.

GENERAL INFORMATION

MANURE STORAGE AND NUTRIENT BALANCE SUMMARY

Manure Storage-

Storage Type:	Capacity	Estimated Storage Period
Pump Sump-	18,480 CF	30 Days
Feedlot Pens-	1,693,770 CF	>365 Days

Nutrient Balance-

Nutrients Generated:	N Generated (lbs) after Losses	P₂O₅ Generated (lbs) after Losses
Solid Manure-	262,181 lbs	171,187 lbs
Liquid Manure-	4,517 lbs	2,373 lbs
Pasture Manure-	1,939 lbs	951 lbs
Total-	268,637 lbs	174,511 lbs

Exported Nutrients:	N Exported (lbs) after Losses	P₂O₅ Exported (lbs) after Losses
Solid Manure-	246,450 lbs	160,915 lbs
Liquid Manure-	0 lbs	0 lbs
Total-	246,450 lbs	160,915 lbs

Crop Nutrient Removal:	N Utilized (lbs)	P₂O₅ Utilized (lbs)
Total-	26,041 lbs	8,816 lbs

Net Nutrients:	Nutrients Generated after Losses(lbs.)	Nutrients Removed by Crop and Exported after Losses (lbs)	Net Nutrient Balance after Losses (lbs)
Nitrogen (N)-	268,637 lbs	272,491 lbs	-3,853 lbs
Phosphate (P ₂ O ₅)-	174,511 lbs	169,731 lbs	4,780 lbs

System Losses:	Nutrients Generated (lbs)	Nutrients Remaining after Losses (lbs)	Nutrients Lost in System (lbs)
Nitrogen (N)-	808,483 lbs	268,637 lbs	539,846 lbs
Phosphate (P ₂ O ₅)-	231,992 lbs	174,511 lbs	57,481 lbs

GENERAL INFORMATION

EMERGENCY RESPONSE PLAN

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

Implement the following first containment steps:

- a. Stop all other activities to address the spill.
- b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- c. Call for help and excavator if needed.
- d. Complete the clean-up and repair the necessary components.
- e. 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:

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

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

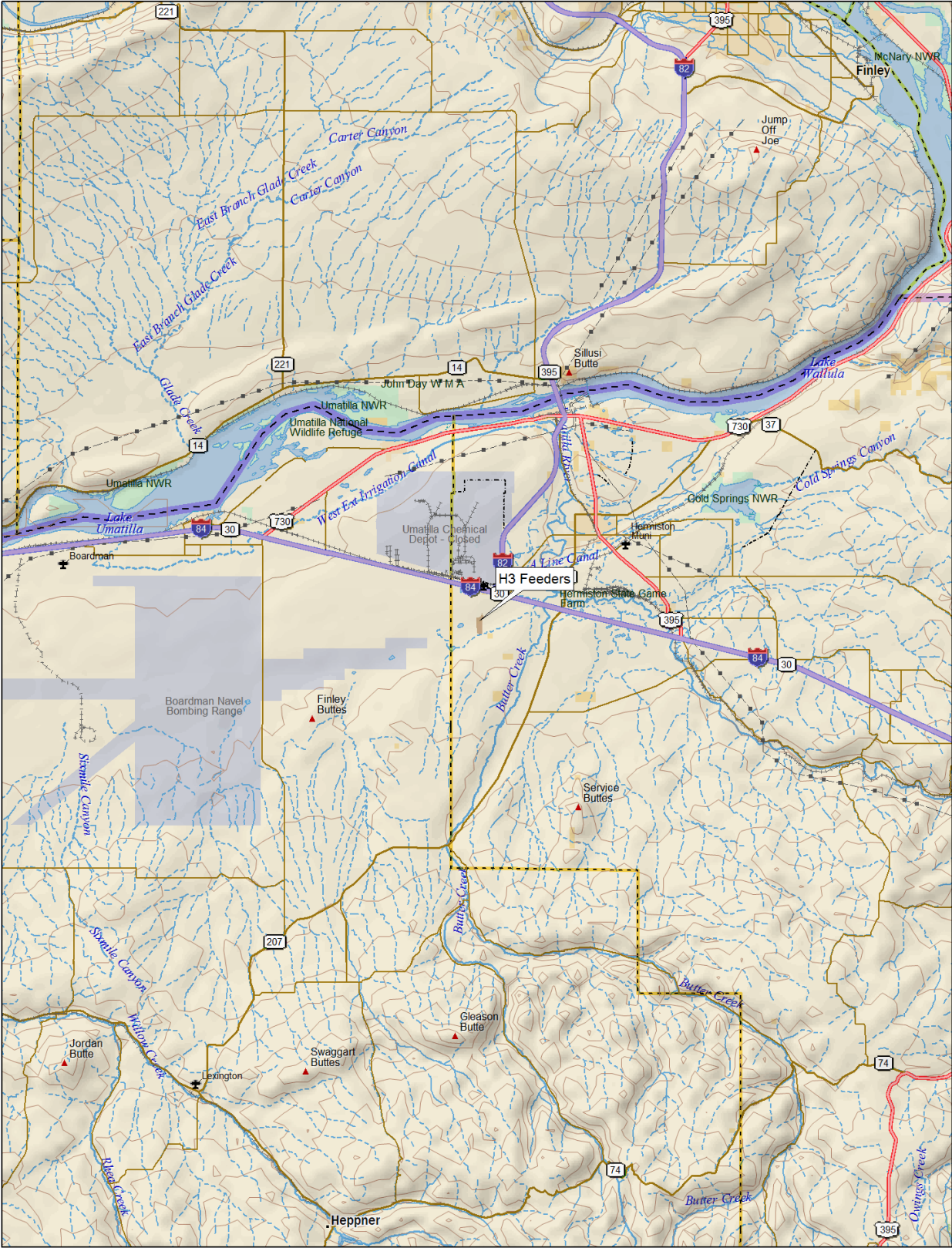
Organization	Phone Number
Oregon Dept. of Agriculture Natural Resources Division 635 Capitol St., N.E. Salem, OR 97301-2532	(503) 986-4700 TTD (503) 986-4762
Oregon Emergency Response (System OERS)	(800) 452-0311
County Environmental Health Department	(541) 278-5432
County Roads Department	(541) 278-5432

Be prepared to provide the following information:

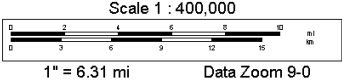
- a. Your name and contact information.
- b. Farm location (driving directions) and other pertinent information.
- c. Description of emergency.
- d. Estimate of the amounts, area covered, and distance traveled.
- e. Whether manure has reached surface waters or major field drains.
- f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
- g. Current status of containment efforts.

GENERAL INFORMATION

LOCATION MAP FOR H3 FEEDERS LLC

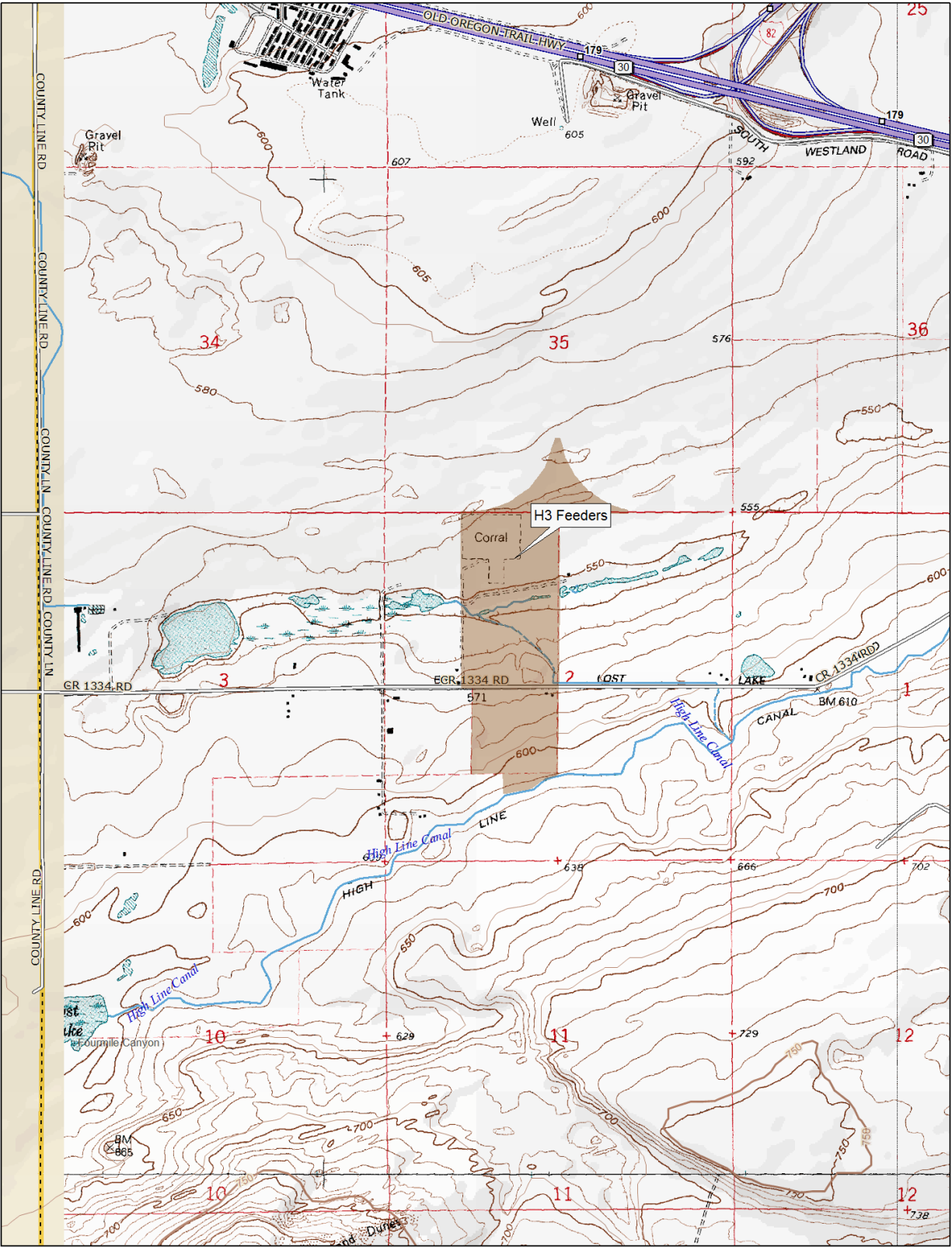


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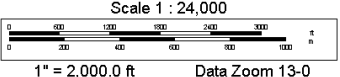


GENERAL INFORMATION

TOPOGRAPHY MAP FOR H3 FEEDERS LLC



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PRODUCTION AREA

ANIMAL NUMBERS

H3 Feeders LLC is planning to raise a maximum of 7,000 beef feeders and 1,000 heifers. Varying numbers of beef feeders and heifers will be confined year round in the feedlot.

This plan was written based on the maximum number of livestock and land base described herein.

ANIMAL MORTALITY MANAGEMENT

Currently animal mortalities for the H3 Feeders LLC are being disposed of by burial. Other methods of dealing with mortalities may be employed by H3 Feeders LLC as needed.

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.

COLLECTION OF MANURE, PROCESS WATER AND RUNOFF

Manure and wasted feed is collected in the feedlot pens where it is stored and utilized as bedding mounds until the feedlot pens are cleaned. Normally the manure and wasted feed disintegrates due to livestock activity and environmental conditions so the amount of manure and wasted feed generated in the feedlot pens varies greatly from year to year.

There is no process water generated by the facility. Leachate and rainfall runoff from the silage and feedlot area is directed to a concrete pump sump where normal rainfall runoff will be captured and pumped to the irrigation systems on the adjacent hay/pasture land fields. Approximately 88 percent of the runoff from the feedlot area is directed to a culvert that drains to the pump sump and 12 percent will drain directly to a diked area where it will drain to the pump sump or evaporate. Any 24 hour rainfall event producing more than 0.54 inches of rainfall will exceed the pumping capacity of 600 gallons per minute and will flow out of the pump sump into the diked area along with the 12 percent that drains directly to the diked area until it can be pumped to the hay/pasture area or evaporate. The estimated volume of Manure bedding and wasted feed and rainfall runoff that will be collected annually was generated using the ORAWM workbook located in Section 5.

PRODUCTION AREA

TREATMENT FACILITIES

There are no treatment facilities for H3 Feeders.

STORAGE FACILITIES

Manure and wasted feed collected in the feedlot pens are stored in the feedlot pens and utilized as bedding mounds. There is adequate capacity in the feedlot pens to store manure and wasted feed generated from the operation for more than a year.

Rainfall runoff from the feedlot areas that exceeds the pump and storage capacity of the pump sump is stored in the diked area until it drains to the pump sump and is pumped to the hay/pasture area or evaporates. A dike downslope of the feedlot prevents runoff from reaching downstream water sources and provides 365 days or more of capacity for normal rainfall runoff and the 25 year-24 hour storm runoff. The storage and treatment facilities are shown on the Production Area Map on page 2-9 and the capacities and estimate volumes to store for the waste storage facilities can be found on the storage worksheet in the ORAWM workbook located in Section 5.

TRANSFER OF MANURE, PROCESS WATER AND RUNOFF

Manure and wasted feed collected in the feedlot pens is transferred to the fields using a manure spreader during cleanouts of the feedlot pens shown on the Production Area Map on page 2-9 or exported off farm.

Rainfall runoff collected in the pump sump is pumped to the hay/pasture land fields using underground pipelines to be utilized as a source of nutrients. Center pivot and side roll (wheel lines) irrigation systems are used to apply rainfall runoff captured in the pump sump to the hay/pasture land fields.

PRODUCTION AREA

OPERATION AND MAINTENANCE CONSIDERATIONS

PUMP SUMP-

The pump sump shown on the Production Area Map on page 2-9 is used to capture and temporarily store rainfall runoff from the feedlot feedlots containing manure generated by H3 Feeders LLC. The pump sump is a temporary storage facility and should be pumped down immediately after each significant rainfall event that produces runoff. Any annual buildup of solids in the pump sump must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in Section 3, Utilization Area.

Inspect the pump sump weekly to insure structural integrity. If the structural integrity of the pump sump is compromised, immediately empty the pump sump to determine the cause and make necessary repairs before putting it back into service. Do not allow equipment that exceeds the design limit of the pump sump walls 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 pump sump completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the sump. Inspect the pump sump for structural damage and if structural damage is discovered seek the services of a qualified engineer to assess the damage and recommend necessary repairs before putting the pump sump back into service. Follow the guidance given in Section 3, Utilization Area, when applying rainfall runoff to fields.

Do not dispose of animal carcasses in the pump sump. 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 pump sump, for any reason what so ever. Provide and use self - contained breathing apparatus (scuba) equipment when entering the pump sump. No persons should enter the pump sump unless safety ropes are used and someone else capable of providing rescue assistance is outside the pump sump.

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

FEEDLOT PENS-

The feedlot pens shown on the Production Area Map on page 2-9 are used to store solids containing manure generated by the H3 Feeders LLC. The storage capacity and estimated storage period for the feedlot pens are shown on the ORAWM workbook storage worksheet located in Section 5. Any cleanout of the feedlot pens should begin in the spring and continue through the spring and summer months as weather

PRODUCTION AREA

conditions permit applying solids in accordance with the guidance given in Section 3, Utilization Area or exporting them off farm. To function properly and have the greatest management flexibility, any cleanout of the feedlot pens must be completed 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 feedlot pens and place them back in the feedlot pens.

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.

DIKES AND BERMS-

Periodically check elevations of earthfills and restore to grade and shape, if necessary. All settlement or cracks in the dike should be investigated to determine the cause and immediately repaired.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Fertilize the established stand with at least 200 pounds of 21-0-0 per acre or equivalent annually or as needed to maintain a uniform vigorous stand. Avoid excess travel and uncontrolled grazing on any portion of the dike system that will harm or destroy vegetative cover. Periodic mowing or controlled grazing may also be needed to control height.

Maintain installed fences to prevent unauthorized human access or uncontrolled grazing of dike surfaces. Livestock can be used to control vegetation height, providing grazing is controlled to short periods of time when damage to the dike surface and vegetation will not result.

Check all erosion control sections for accelerated weathering and displacement of materials. Replace to original shape and grade if necessary.

Immediately repair any vandalism, vehicular, or livestock damage to the dike or other appurtenance.

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

PRODUCTION AREA

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 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.

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-

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.

PRODUCTION AREA

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.

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

WELL(S)-

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

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

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

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

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

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

Immediately repair any vandalism, vehicular, or livestock damage.

PRODUCTION AREA

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.

PRODUCTION AREA

PRODUCTION AREA

PRODUCTION AREA MAP FOR H3 FEEDERS LLC

Farm Name: H3 Feeders

Owner/Operator: Homer Family

County: Umatilla State: Oregon

Approximate Acres: 63.4 Date: February 2016

Location: Section 2, T3N, R27E from the W.M.

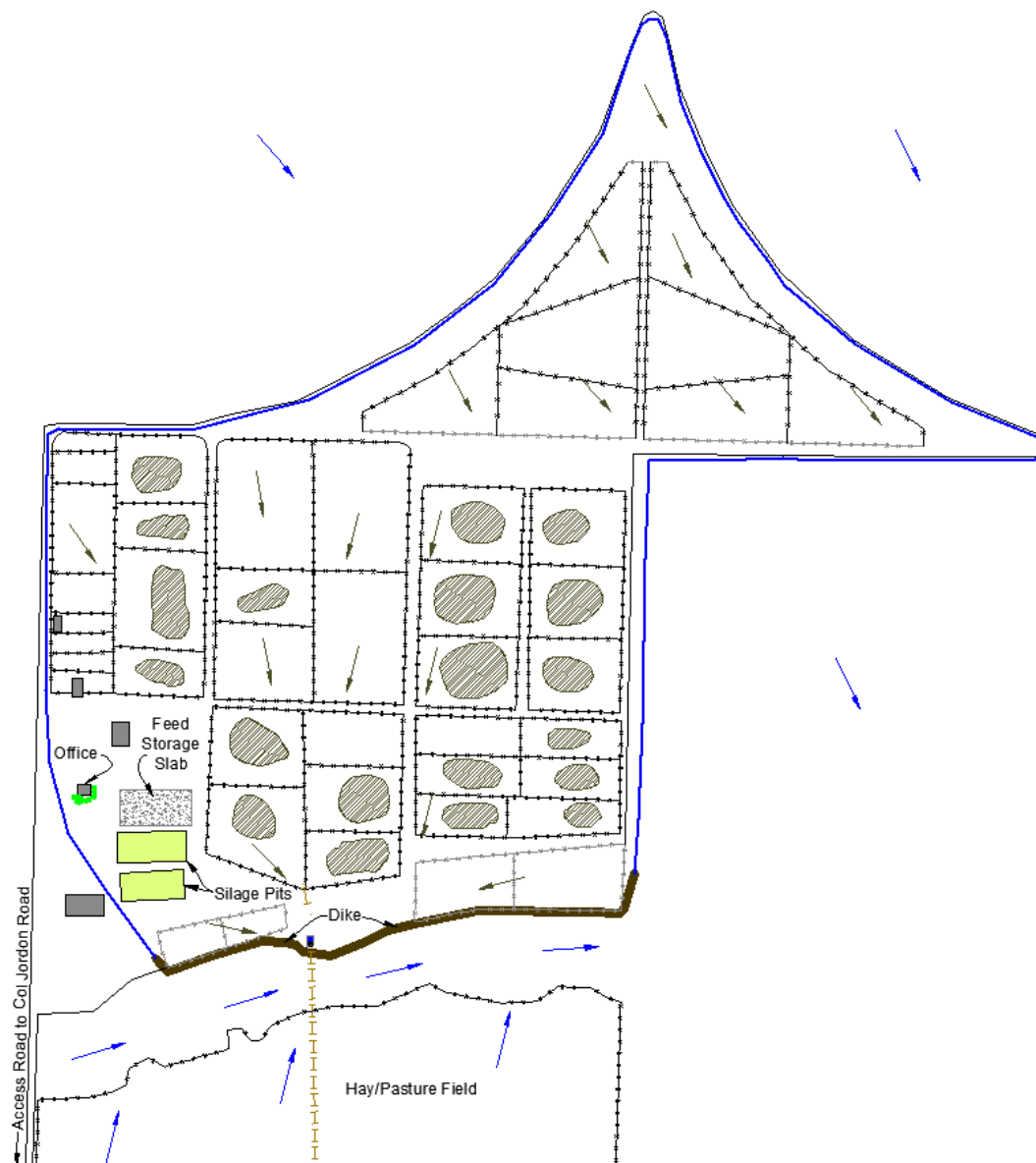
Assisted By: Bruce D. Wilson, H&R Engineering LLC



300 0 300
SCALE IN FEET

Map Legend

- Buildings
- Pens
- Planned Pens
- Bedding Mounds
- Concrete Pump Sump
- 63.4 Acres - Runoff Area Boundary
- Drainage
- Fence
- Culvert Under Access Road
- 8" Underground PVC Pipeline
- Pumping Station
- Trees and Shrubs



PRODUCTION AREA

UTILIZATION AREA

CROPPING SYSTEM

The acres of crop and hay/pasture land area available for utilization of the nutrients and organics contained in the wastewater and solids produced from the H3 Feeders LLC is shown on the utilization worksheet in ORAWM located in Section 5. Yield data and nutrient utilization rates for the crops grown are also shown on the inventory worksheet in ORAWM located in Section 5.

Irrigated and nonirrigated crop yield data from the Umatilla County Soil Survey referenced in Section 5 indicates the yield data used in developing this plan is within the range of the given crop yields for well managed fields.

Center Pivot irrigation systems are used to irrigate the crop and hay land fields for H3 Feeders LLC. These systems use single boom with sprinkler nozzles mounted below the boom and apply water depending on the nozzle size, operating pressure and travel speed used with an efficiency of 80 to 90 percent. Center Pivot sprinkler systems must be well managed to prevent excess percolation, surface runoff and erosion, wind drift and evaporation losses.

Side roll (wheeline) irrigation systems are used to irrigate the hay/pasture land field for H3 Feeders LLC. These systems use single boom with sprinkler nozzles mounted above the boom and apply water depending on the nozzle size, operating pressure and set time used with an efficiency of 65 to 75 percent. Side roll sprinkler systems must be well managed to prevent excess percolation, surface runoff and erosion, wind drift and evaporation losses.

Other types of irrigation systems will be used to irrigate the crops that must be well managed to prevent excess percolation, surface runoff and erosion, wind drift and evaporation losses.

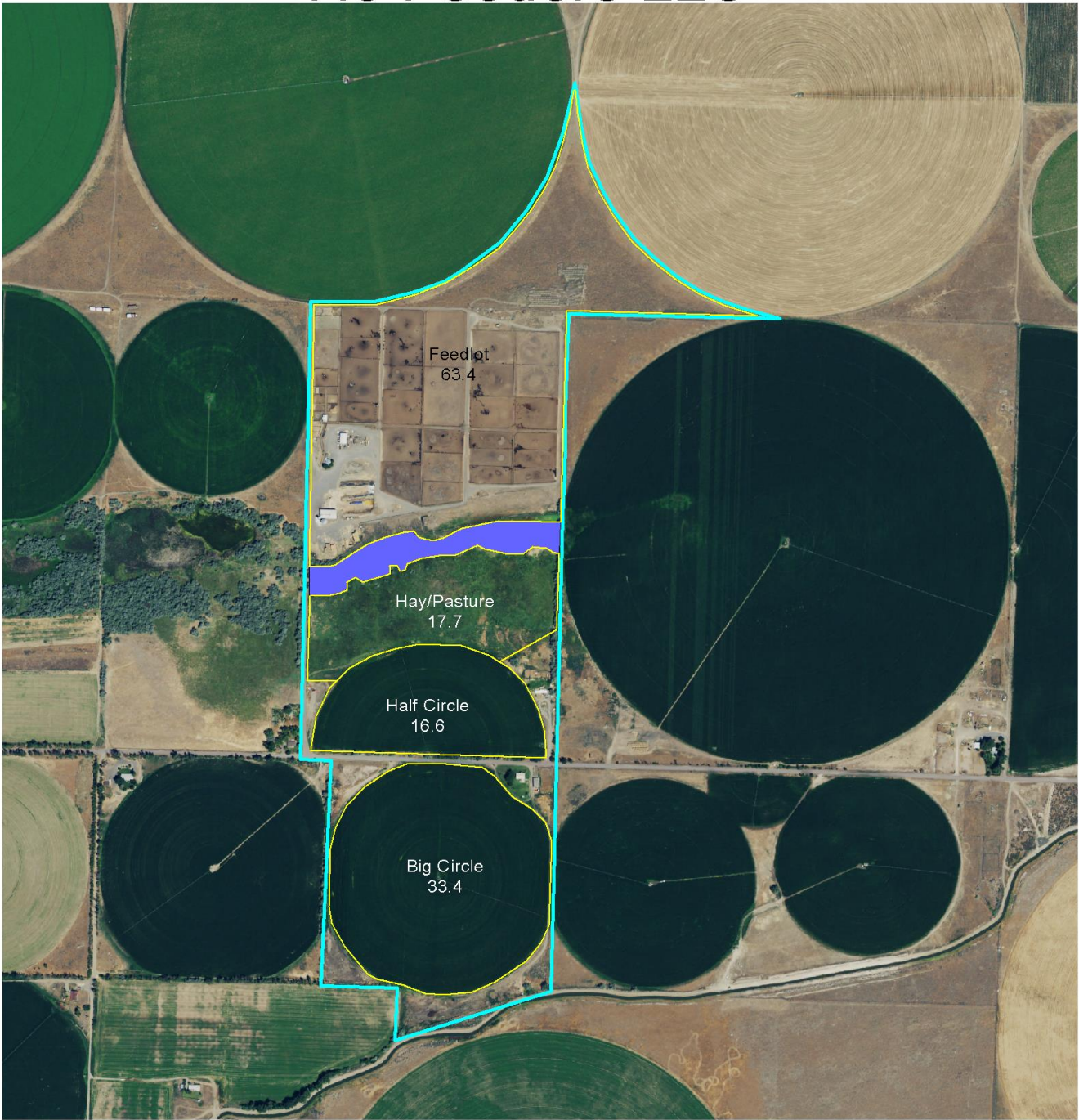
The amount of irrigation water to apply based on the net irrigation requirements for the crop being grown can be found in the tables starting on page 3-27.

UTILIZATION AREA

UTILIZATION AREA

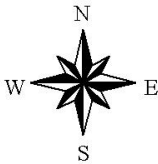
FIELD MAP(S)

H3 Feeders LLC



Map Legend

Field Name
Acres - Field Boundary, Field Name and Acres



Scale 0 1000 2000 3000 Feet

UTILIZATION AREA

UTILIZATION AREA

APPLICATION

The manure and irrigation application systems will be calibrated in accordance with guidance starting on page 3-5 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 on page 3-9. Applications of wastewater and solids containing manure should be made in accordance with guidance starting on page 3-5 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 Eastern Oregon Phosphorus Index and is shown in the table on page 4-12. Wastewater, solids and commercial fertilizer for any field with a high runoff rating must be applied on a phosphorus basis. Wastewater, solids and commercial fertilizer for any field with a low or medium runoff rating can be applied on a nitrogen basis. No applications manure or commercial fertilizer containing phosphorus are to be made on a field with a very high phosphorus runoff rating.

GENERAL CONSIDERATIONS FOR MAKING MANURE APPLICATIONS

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.

- **Manure applications may be done** as long as you can comply with all permit conditions and can meet the conditions outlined on page 3-8 to 3-10 in the AWMP. 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.
- **Calibrate application equipment** to insure uniform distribution and accurate application rates in accordance with guidance given in the Considerations for Manure Applications starting on page 3-8. Refer to page 3-14 for guidance on the calibration of application equipment.

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- **Maintain setbacks for manure application from any surface waters.** The management goal is to allow no manure to enter surface waters at any time. The following table shows minimum setback requirements for manure applications:

Manure type	Application Equipment	Season	
		Wet	Dry
Liquid	Big gun	70 feet	35 feet
Solid	Spreader	70 feet	20 feet
Rainfall Runoff	Sideroll Sprinkler	100 feet	35 feet

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.
- **Record applications, transfers or exports of nutrients (manure and fertilizer)** and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or the tools and forms referenced in Section 5 may be used to record this information.

UTILIZATION AREA

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CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

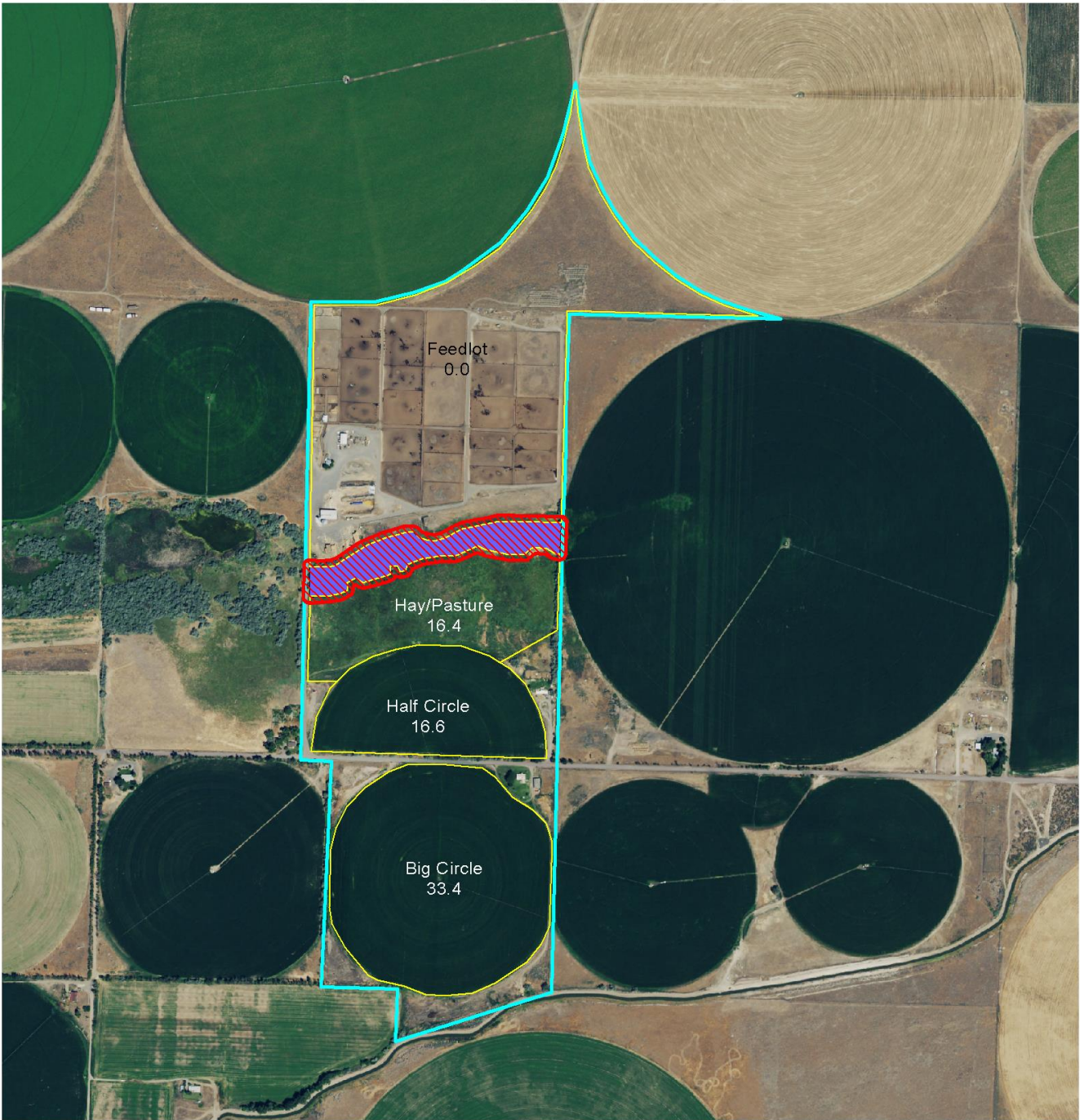
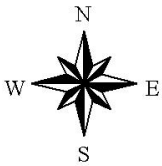
Apply wastewater and solids containing manure at **agronomic rates** shown on the table on page 3-18 using the following guidelines:

- Apply to land being prepared for crops and till manure into soil within 3 days of application if possible or apply to actively growing crops such as grass, clover or alfalfa.
- ***Do not apply*** during rainfall events that are expected to result in saturated soils or surface runoff.
- ***Maintain the setback buffer distances*** described on page 3-6 and shown on the Setback Map on page 3-9 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 the tools and forms referenced in Section 5 may be used to record this information.

UTILIZATION AREA

SETBACK MAP(S) FOR H3 FEEDERS LLC

H3 Feeders LLC



Map Legend

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

UTILIZATION AREA

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 CAN NOT 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 the table on page 3-6 and shown on the Setback Map on page 3-9 when making applications of liquids or solids containing manure.
- **Do not apply** 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 (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 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 the tools and forms referenced in Section 5 may 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.

UTILIZATION AREA

MANURE AND SOIL SAMPLING FREQUENCY

Sample liquids and solids containing manure during applications in early spring **annually** and have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH₄-N), Phosphorus (P) and Potassium (K) 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://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm>.

Collect soil samples from all fields receiving solids or liquids containing manure **within a 5 year period** in the fall (September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, “Monitoring Soil Nutrients Using a Management Unit Approach”** referenced in Section 5. 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

UTILIZATION AREA

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.

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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". Oregon State university Extension publication EC1478, "Soil Test interpretation Guide" 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 and from the 12-24" 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.

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" in Section 5 for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

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HOW TO CALIBRATE APPLICATION EQUIPMENT

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

Irrigation System Calibration

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

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

Soft Hose Injection System with Irrigation Hose:

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

Formula:

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

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

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

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

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

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

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

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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.

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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 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.

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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 = $43,560 \text{ sq ft per acre}$.

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:

1. Desired manure application rate based on soil and manure tests,
2. Width of the manure spread, and
3. 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.

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AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

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

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

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

Total P₂O₅ to apply in pounds = P in pounds per yield unit from the table for the crop grown X 2.291 P₂O₅/P X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total K₂O to apply in pounds = K in pounds per yield unit from the table for the crop grown X 1.205 K₂O/K X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

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

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	2.14	0.20	3.54
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	17.80	4.8	11.6
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.30	0.06	0.22
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	6.60	1.20	10.33

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

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

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

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OTHER CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees and Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20

UTILIZATION AREA

MANURE TESTS

Manure Nutrient Analyses

Manure Source	Dry Matter (%)	Total N	NH ₄ -N	Total P ₂ O ₅	Total K ₂ O	Avail. P ₂ O ₅	Avail. K ₂ O	Units	Analysis Source and Date
Feedlot Pens	66.2	20.8	5.2	25.7	23.9	25.7	23.9	Lb/Ton	Agri-Check Laboratory- June 1, 2012
Rainfall Runoff		2.7	0.7	1.0	8.6	1.0	8.6	Lb/1000Gal	NRCS AWMFH

(1) Entered analysis may be the average of several individual analyses.

(2) Oregon assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Oregon, see Waste Utilization Jobsheet 633 OR-JS, Oregon USDA-NRCS, May 2003 (<http://efotg.sc.egov.usda.gov/references/public/OR/633js042707.pdf>).

Manure analyses should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), <http://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm>.

Manure should be analyzed annually for a minimum of three (3) consecutive years to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields.

UTILIZATION AREA

H3 Feeders

SOLID MANURE APPLICATION CHART

		MANURE ANALYSIS (As received lb/ton)			
		Total N	NH ₄ -N	P ₂ O ₅	K ₂ O
		20.80	5.20	25.70	23.90
Test Date: 06/01/12					
Type: Solids in Pens					
		Manure Nutrient Content			
Thickness to apply	Manure Applied	Total N	Available N	P ₂ O ₅	K ₂ O
(in)	(T/A)	(lb/A)	(lb/A)	(lb/A)	(lb/A)
0.013	1.00	21	5	26	24
0.026	2.00	42	10	51	48
0.039	3.00	62	16	77	72
0.052	4.00	83	21	103	96
0.066	5.00	104	26	129	120
0.079	6.00	125	31	154	143
0.092	7.00	146	36	180	167
0.105	8.00	166	42	206	191
0.118	9.00	187	47	231	215
0.131	10.00	208	52	257	239
CUSTOM:					
Spreader 1	8.00	166	42	205	191
Spreader 2	2	42	10	51	48
Spreader 3	3	62	16	77	72

SOLID MANURE SPREADER CALIBRATION

SPREADER VOLUME AND WEIGHT CALCULATIONS

Stack height above sideboard = 1 ft

Length = 15.3 ft

Depth = 2 ft

Width = 5.4 ft

Spreader Volume = 231 ft³

Weight of Manure = 8,260 lbs

MANURE DENSITY CALCULATIONS

BUCKET

Top Diam 11

Height 13.75

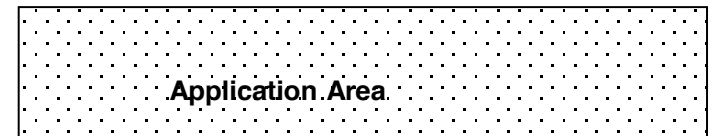
Volume 0.756 ft³

Weight 27 lbs

Manure Density = 36 lbs/ft³

SPREAD AREA CALCULATIONS

Spread Width = 15 ft



Spread Length = 1500 ft

Area Spread = 22,500 ft² or 0.52 acre

Manure Rate Spread = 0.37 lbs/ft²
 15,991 lbs/acre
 8.0 ton/acre

UTILIZATION AREA

H3 Feeders

LIQUID MANURE APPLICATION CHART

MANURE ANALYSIS

(As received lb/1000 gal)

	Total N	NH ₄ -N	P ₂ O ₅	K ₂ O
Test Date: <u>NRCS AWMFH</u>	2.70	0.70	1.00	8.60

Location: RO Tank

Manure Nutrient Content

Thickness to apply	Manure Applied	Total N	Available N	P ₂ O ₅	K ₂ O
(inch)	(gallons)	(lb/A)	(lb/A)	(lb/A)	(lb/A)
0.25	6,789	18	5	7	58
0.50	13,577	37	10	14	117
0.75	20,366	55	14	20	175
1.00	27,154	73	19	27	234
1.25	33,943	92	24	34	292
1.50	40,731	110	29	41	350
CUSTOM:					
Tank Wagon	3,630	10	3	4	31
Sprinkler	27,152	73	19	27	234

EQUIPMENT CALIBRATION CALCULATIONS

TANK WAGON MANURE SPREADER CALIBRATION

Volume of Wagon = 3000 gallons OR 401 ft³

Spread Length = 600 ft

Spread Width =

60 ft

Application Area

Area Spread = 36,000 ft² OR 0.83 acre

APPLICATION RATE = 3630 gal/acre OR 0.13 in/acre

SPRINKLER APPLICATION RATE CALCULATIONS

Nozzle Diameter 3/16 inch

Pump Pressure 60 psi

Flowrate 230 gpm

Spread Width =

992 ft

Application Area

Length of Pull = 1450 ft

Area Spread = 1,438,400 ft² OR 33.02 acre

NOTE: Area spread is the area covered by the gun in 1 hour

APPLICATION RATE = 27,152 gal/acre OR = 1.00 inch/acre

NOTE: Inch/acre should be close to amount collected in rain gauge or pan

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. Irrigation water is supplied by wells and surface water sources using pumps through an underground pvc pipelines to sprinkler irrigation systems. The average amount of irrigation water to be applied per application and total annual amount needed for irrigated crops with guidance on when and how much irrigation water to apply can be found starting on page 3-27.

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.

Permits or water rights are not needed to apply wastewater as a nutrient source.

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 (gpm)

A = area (acres)

D = gross application depth (in)

F = irrigation period (days)

H = hours of operation per day

Water Flow Rates:

1 cubic foot per second (cfs)

= 448.8 gallons per minute

1 cfs for 1 hour = 0.99 acre-inch

1 cfs for 24 hr = 1.98 acre-ft

1,000 gpm = 2.23 cfs

1,000 gpm for 24 hr = 4.42 ac-ft

1 gpm/acre = 0.053 ac-in/ac/day

1 cfs = 40 miner's inches in OR, No CA

1 cfs = 50 miner's inches in ID, WA

1 miner's inch = 11.22 gpm in OR

1 miner's inch = 9 gpm in ID, WA

1 cfs = 28.32 liters/sec

1 cubic meter/sec = 35.3 cfs

1 liter/sec = 15.85 gpm

Q x T = D x A where:

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

Gpm for 5 ft/s velocity in PVC pipe:

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



Natural Resources
Conservation Service

Water Volumes & Weights:

1 cubic foot = 7.48 gallons

= 62.4 lb = 28.3 liters

1 acre-foot = 43,560 cubic feet

(1 acre covered 1 ft deep)

12 acre-in = 1 acre-ft = 325,829 gal

1 million gallons = 3.07 acre-ft

1 acre-ft = 1,234 cubic meters

1 cu meter = 1,000 liters = 35.3 cu ft

Pressure and Pressure Head:

1 psi = 2.31 ft of pressure head

1 atmosphere (sea level)

= 14.7 psi = 33.9 ft of head

Lengths and Areas:

1 mile = 5,280 ft = 1.61 km

1 meter = 3.28 ft = 39.37 inches

1 acre = 43,560 square ft

1 hectare = 2.47 acres

Pump Power Requirement

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

UTILIZATION AREA

SOILS-

Based on the Natural Resources Conservation Service National Engineering Handbook, Part 652, National Irrigation Guide, the irrigated soils on this farm have an average water holding capacity of 0.14 inches per inch of soil depth and a soil intake rate of 1.0 inches per hour.

CROPS-

CROP	MATURE ROOT DEPTH (INCHES)	MAXIMUM ALLOWED DEPLETION	CRITICAL PERIOD
Triticale	30	50%	July
Corn Silage	48	50%	July

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

IRRIGATION WATER SUPPLY-

Description of Oregon Water Right:	Unknown
Description of Irrigation Water Supply (Well, Stream, Irrigation District, etc.):	Unknown
Supply Flowrate (gpm or cfs):	Unknown
Annual Volume Available (Acre-ft.):	Unknown
Water Delivery Schedule:	On Demand
Method(s) of Water Measurement:	Unknown

IRRIGATION SYSTEM-

System	System Capacity (gpm)	Nozzle Size (in)	Pressure (psi)	Spacing (ft)	Application Rate (in/hr)	System Efficiency (%)
Side Roll (Wheel Line) Sprinkler	231	11/64 and 3/16	50 to 60	60	0.26 to 0.3	75
Center Pivot Sprinkler	800	1/4	50 to 60	NA	0.7 to 0.8	80

UTILIZATION AREA

Irrigation Water Management Worksheet						
Crop Name:	Hay/Pasture Land					
Managed Rooting Depth (inches):	30					
Management Allowed Depletion, MAD:	50%					
Irrigated Acres:	16					
Soil Name:	Adkins					
Soil Depth (inches):	60					
Available Water Capacity (in/in):	0.14					
Soil Intake Rate (in/hr) :	1.00					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	Month					
	April	May	June	July	August	Sept
Total Plant Available Water Capacity (in): <small>Soil or Root Depth * Available Water Capacity</small>	4.2	4.2	4.2	4.2	4.2	4.2
Net Irrigation Application (in): <small>Total Plant Available Water Capacity * MAD</small>	2.1	2.1	2.1	2.1	2.1	2.1
Irrigation System Application Rate (in/hr): <small>Determined based on the type of Irrigation System</small>	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): <small>(From OSU Extension Miscellaneous Pub 8530, 1992)</small>	4.13	6.02	6.97	7.83	6.93	4.61
Average Daily Crop Water Use (in/day):	0.14	0.19	0.23	0.25	0.22	0.15
Irrigation Frequency (days): <small>Net Irrigation Application / Daily Crop Water Use</small>	15	11	9	8	9	14
Irrigation System Set Time (hours):	8	8	8	8	8	8
Actual Net Irrigation Application (in): <small>Gross Application * System Application Efficiency</small>	2.13	2.13	2.13	2.13	2.13	2.13
Actual Irrigation Frequency (days): <small>Actual Net Irrigation Application / Daily Crop Water Use</small>	15	11	9	8	10	14
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): <small>Water Required / Water Applied</small>	70%	70%	70%	70%	70%	70%
Gross Irrigation Application (in): <small>System Application Rate * System Set Time</small>	3.04	3.04	3.04	3.04	3.04	3.04
Volume of Water per Irrigation (acre-in): <small>Gross Irrigation Application * Irrigated Acres</small>	49	49	49	49	49	49
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): <small>(Equation 2)</small>	89	126	150	163	145	99
Compare Required system flow rate with Measured flow noted on Irrigation Application Record						

UTILIZATION AREA

Irrigation Water Management Worksheet						
Crop Name:	Ryegrass					
Managed Rooting Depth (inches):	30					
Management Allowed Depletion, MAD:	50%					
Irrigated Acres:	50					
Soil Name:	Adkins, Taunton					
Soil Depth (inches):	60					
Available Water Capacity (in/in):	0.14					
Soil Intake Rate (in/hr) :	1.00					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	Month					
	April	May	June	July	August	Sept
Total Plant Available Water Capacity (in): <small>Soil or Root Depth * Available Water Capacity</small>	4.2	4.2	4.2	4.2	4.2	4.2
Net Irrigation Application (in): <small>Total Plant Available Water Capacity * MAD</small>	2.1	2.1	2.1	2.1	2.1	2.1
Irrigation System Application Rate (in/hr): <small>Determined based on the type of Irrigation System</small>	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): <small>(From OSU Extension Miscellaneous Pub 8530, 1992)</small>	4.13	6.02	6.97	7.83	6.93	4.61
Average Daily Crop Water Use (in/day):	0.14	0.19	0.23	0.25	0.22	0.15
Irrigation Frequency (days): <small>Net Irrigation Application / Daily Crop Water Use</small>	15	11	9	8	9	14
Irrigation System Set Time (hours):	12	12	12	12	12	12
Actual Net Irrigation Application (in): <small>Gross Application * System Application Efficiency</small>	3.19	3.19	3.19	3.19	3.19	3.19
Actual Irrigation Frequency (days): <small>Actual Net Irrigation Application / Daily Crop Water Use</small>	23	16	14	13	14	21
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): <small>Water Required / Water Applied</small>	70%	70%	70%	70%	70%	70%
Gross Irrigation Application (in): <small>System Application Rate * System Set Time</small>	4.56	4.56	4.56	4.56	4.56	4.56
Volume of Water per Irrigation (acre-in): <small>Gross Irrigation Application * Irrigated Acres</small>	228	228	228	228	228	228
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): <small>(Equation 2)</small>	278	393	470	511	452	311
Compare Required system flow rate with Measured flow noted on Irrigation Application Record						

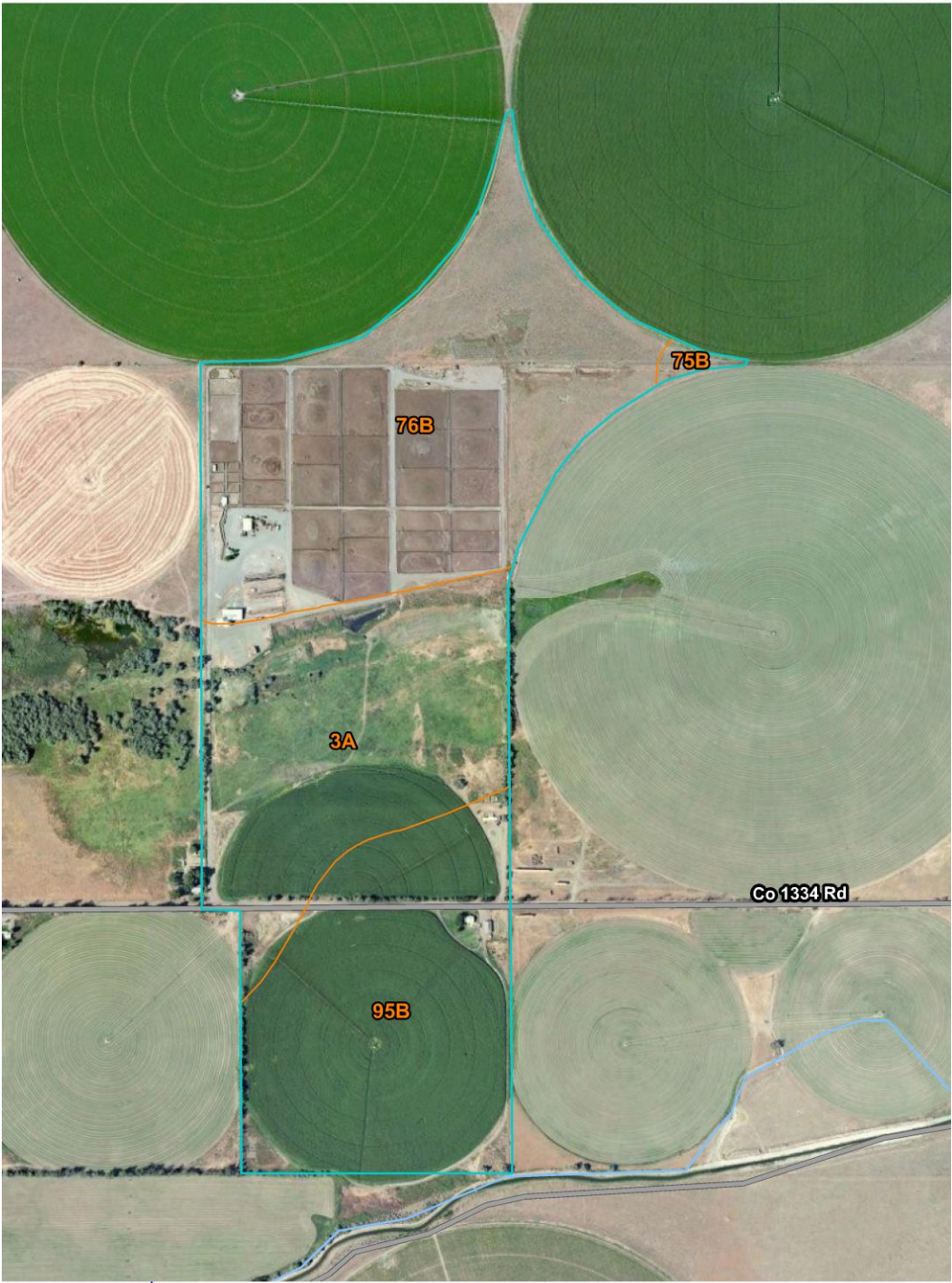
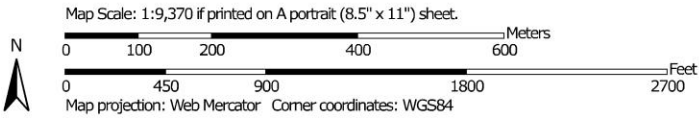
UTILIZATION AREA

Irrigation Water Management Worksheet						
Crop Name:	Corn Silage					
Managed Rooting Depth (inches):	48					
Management Allowed Depletion, MAD:	50%					
Irrigated Acres:	50					
Soil Name:	Adkins, Taunton					
Soil Depth (inches):	60					
Available Water Capacity (in/in):	0.14					
Soil Intake Rate (in/hr) :	1.00					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	Month					
	April	May	June	July	August	Sept
Total Plant Available Water Capacity (in): <small>Soil or Root Depth * Available Water Capacity</small>	6.7	6.7	6.7	6.7	6.7	6.7
Net Irrigation Application (in): <small>Total Plant Available Water Capacity * MAD</small>	3.4	3.4	3.4	3.4	3.4	3.4
Irrigation System Application Rate (in/hr): <small>Determined based on the type of Irrigation System</small>	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): <small>(From OSU Extension Miscellaneous Pub 8530, 1992)</small>	0.00	2.56	5.67	8.86	7.99	3.90
Average Daily Crop Water Use (in/day):	0.00	0.08	0.19	0.29	0.26	0.13
Irrigation Frequency (days): <small>Net Irrigation Application / Daily Crop Water Use</small>	30	31	18	12	13	26
Irrigation System Set Time (hours):	12	12	12	12	12	12
Actual Net Irrigation Application (in): <small>Gross Application * System Application Efficiency</small>	3.19	3.19	3.19	3.19	3.19	3.19
Actual Irrigation Frequency (days): <small>Actual Net Irrigation Application / Daily Crop Water Use</small>	30	31	17	11	12	25
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): <small>Water Required / Water Applied</small>	70%	70%	70%	70%	70%	70%
Gross Irrigation Application (in): <small>System Application Rate * System Set Time</small>	4.56	4.56	4.56	4.56	4.56	4.56
Volume of Water per Irrigation (acre-in): <small>Gross Irrigation Application * Irrigated Acres</small>	228	228	228	228	228	228
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): <small>(Equation 2)</small>	0	208	382	578	521	263
Compare Required system flow rate with Measured flow noted on Irrigation Application Record						

SOIL AND RISK ASSESSMENT

SOIL MAP(S)

Soil Map—Umatilla County Area, Oregon
(H3 Feeders)



SOIL AND RISK ASSESSMENT

Soil Map—Umatilla County Area, Oregon

H3 Feeders

Map Unit Legend

Umatilla County Area, Oregon (OR667)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3A	Adkins fine sandy loam, wet, 0 to 3 percent slopes	46.6	28.8%
75B	Quincy loamy fine sand, 0 to 5 percent slopes	1.1	0.7%
76B	Quincy loamy fine sand, gravelly substratum, 0 to 5 percent slopes	66.7	41.2%
95B	Taunton fine sandy loam, 1 to 7 percent slopes	47.6	29.4%
Totals for Area of Interest		162.0	100.0%

SOIL AND RISK ASSESSMENT

SOIL REPORTS

Map Unit Description

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

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

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

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

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

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

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

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

SOIL AND RISK ASSESSMENT

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

Umatilla County Area, Oregon

3A—Adkins fine sandy loam, wet, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 253j

Elevation: 400 to 1,200 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 160 to 190 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Adkins, wet, and similar soils: 80 percent

Minor components: 4 percent

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

Description of Adkins, Wet

Setting

Landform: Depressions on strath terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Eolian sands

Typical profile

H1 - 0 to 12 inches: fine sandy loam

H2 - 12 to 60 inches: fine sandy loam

SOIL AND RISK ASSESSMENT

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

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

Depth to water table: About 18 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 30 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

Minor Components

Wanser

Percent of map unit: 4 percent

Landform: Depressions

Ecological site: SODIC BOTTOM (R010XY007OR)

75B—Quincy loamy fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 255d

Elevation: 300 to 1,100 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 160 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Quincy and similar soils: 85 percent

Minor components: 2 percent

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

Description of Quincy

Setting

Landform: Strath terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Eolian sands

Typical profile

H1 - 0 to 4 inches: loamy fine sand

H2 - 4 to 60 inches: fine sand

SOIL AND RISK ASSESSMENT

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 3 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Ecological site: SANDY 8-10 PZ (R007XY012OR)

Minor Components

Wanser

Percent of map unit: 2 percent

Landform: Depressions

Ecological site: SODIC BOTTOM (R010XY007OR)

76B—Quincy loamy fine sand, gravelly substratum, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 255g

Elevation: 300 to 1,100 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 160 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Quincy, gravelly substratum, and similar soils: 85 percent

Minor components: 5 percent

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

Description of Quincy, Gravelly Substratum

Setting

Landform: Strath terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Eolian sands over gravelly alluvium

Typical profile

H1 - 0 to 4 inches: loamy fine sand

H2 - 4 to 41 inches: loamy fine sand

H3 - 41 to 60 inches: very gravelly fine sand

SOIL AND RISK ASSESSMENT

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Ecological site: SANDS 8-10 PZ (R007XY011OR)

Minor Components

Wanser

Percent of map unit: 5 percent

Landform: Depressions

Ecological site: SODIC BOTTOM (R010XY007OR)

95B—Taunton fine sandy loam, 1 to 7 percent slopes

Map Unit Setting

National map unit symbol: 256j

Elevation: 400 to 1,100 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 160 to 190 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Taunton and similar soils: 80 percent

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

Description of Taunton

Setting

Landform: Strath terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Eolian sands over strongly cemented alluvium

Typical profile

H1 - 0 to 6 inches: fine sandy loam

H2 - 6 to 11 inches: fine sandy loam

H3 - 11 to 26 inches: fine sandy loam

H4 - 26 to 67 inches: cemented material

SOIL AND RISK ASSESSMENT

Properties and qualities

Slope: 1 to 7 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Natural drainage class: Well 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: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 25 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: SANDY LOAM 8-10 PZ (R007XY013OR)

Data Source Information

Soil Survey Area:

Umatilla County Area, Oregon

Survey Area Data:

Version 11, Sep 18, 2015

SOIL AND RISK ASSESSMENT

PREDICTED SOIL EROSION



RUSLE2 Worksheet Erosion Calculation Record

Info:

Tract #: 2951

Owner name: Reata Ranches LLC

Field name: Big Circle

Location: Oregon\Umatilla County\OR_Umatilla_R10

Soil: 95B TAUNTON FINE SANDY LOAM, 1 TO 7 PERCENT SLOPES\TAUNTON fine sandy loam 80%

T value: 2.0 t/ac/yr

Slope length (horiz): 900 ft

Avg. slope steepness: 2.0 %

Alternatives:

<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>
d.Construction Site Templates\Temporary Seed Annual Ryegrass	default	(none)	(none)	0.89	0.08	25.84
a.Single Year/Single Crop Templates\Corn, silage; clean till, fall disk/mb plow, Z49	default	(none)	(none)	0.32	-0.1	185.6

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

Tract #: 2951

Owner name: Reata Ranches LLC

Field name: Half Circle

Location: Oregon\Umatilla County\OR_Umatilla_R10

Soil: 3A ADKINS FINE SANDY LOAM, WET, 0 TO 3 PERCENT SLOPES\ADKINS fine sandy loam 80%

T value: 5.0 t/ac/yr

Slope length (horiz): 900 ft

Avg. slope steepness: 2.0 %

Alternatives:

<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>
d.Construction Site Templates\Temporary Seed Annual Ryegrass	default	(none)	(none)	0.76	0.09	25.84
a.Single Year/Single Crop Templates\Corn, silage; clean till, fall disk/mb plow, Z49	default	(none)	(none)	0.28	-0.1	185.6

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

Tract #: 2951

Owner name: Reata Ranches LLC

Field name: VTA, Hay/Pasture

Location: Oregon\Umatilla County\OR_Umatilla_R10

Soil: 3A ADKINS FINE SANDY LOAM, WET, 0 TO 3 PERCENT SLOPES\ADKINS fine sandy loam 80%

T value: 5.0 t/ac/yr

Slope length (horiz): 150 ft

Avg. slope steepness: 2.0 %

Alternatives:

<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>
a.Single Year/Single Crop Templates\Pasture, yr1 fall plant; clean till, fall mb plow, CMZ49	default	(none)	(none)	0.0018	2	61.58

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

OREGON PHOSPHORUS INDEX (EAST)

FIELD SUMMARY & EASTERN OREGON P INDEX

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

Grower:
Application Plan by:
Date:

H3 Feeders LLC
Bruce Wilson, H&R Engineering LLC
September 5, 2013

Field Acres	Half Circle 16.6	Big Circle 33.4	Hay/Pasture 17.7					
Soil	3A, Adkins	95B, Taunton	3A, Adkins					
Soil test date	2012	2012	2012					
Olsen P (ppm)	200	98	200					
Acetate K (ppm)	221	188	221					
pH	5.8	5.6	5.8					
SMP	6.3	6.1	6.1					
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	<1	<1	<1	<1	<1	<1	<1	<1
Sprinkler Irr erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff
Surface Irr erosion (tons/ac-yr)	<1	<1	<1	<1	<1	<1	<1	<1
Runoff Class	medium	medium	medium	none	none	none	none	none
Distance to stream (ft)	> 500 ft	> 500 ft	< 100 ft	> 500 ft	> 500 ft	> 500 ft	> 500 ft	> 500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	none	none	none	none	none
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	194	231	150	0	0	0	0	0
Organic P2O5 method	Surface App, no Incorp	Surface App, no Incorp	Surface App, no Incorp	None applied	None applied	None applied	None applied	None applied
Organic P2O5 timing	All months possible	All months possible	All months possible	None applied	None applied	None applied	None applied	None applied
SCORE								
P RUNOFF RISK RATING	67.2 Medium	45.9 Medium	65.3 Medium	0.0 Low	0.0 Low	0.0 Low	0.0 Low	0.0 Low

COMMENTS

SOIL AND RISK ASSESSMENT

Oregon Phosphorus Index Risk Interpretation

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

SOIL AND RISK ASSESSMENT

REFERENCES

PUBLICATIONS AND SOFTWARE

Crop Fertilizer Recommendations

Nutrient Requirements for Dairy Cattle 7th Ed, 2001 Natl. Research Council
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<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20643/fg71-e.pdf>

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<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20719/pnw513.pdf>

Manure Application Rates for Forage Production, OSU EM 8585-E, July 2007
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20536/em8585-e.pdf>

Monitoring Soil Nutrients Using a Management Unit Approach, PNW 570-E, October 2003, <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20762/pnw570-e.pdf>

Post-Harvest Soil Nitrate Testing for Manured Croppings Systems, EM 8832-E, May 2003, <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20221/em8832-e.pdf>

Silage Corn, Western Oregon, EM 8978-E, June 2009
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20610/em8978-e.pdf>

Soil Test Interpretation Guide, OSU EC 1478, August 1999
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/22023/ec1478.pdf>

Feed Management

Feed Management, A tool for balancing nutrients on dairies and other livestock operations, EM 8913-E, July 2006
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20501/em8913-e.pdf>

Manure Application Setback Features/Distances

CAFO General Permit #1
http://oregon.gov/ODA/NRD/docs/pdf/cafo_gnlpmt.pdf

Manure Nutrient Availability

Waste Utilization Jobsheet 633 OR-JS, Oregon USDA-NRCS, May 2003
<http://efotg.sc.egov.usda.gov/references/public/OR/633js042707.pdf>

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Phosphorus Assessment

Agronomy Technical Note No. 26: The Phosphorus Index, Oregon NRCS, June 2008
ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Agronomy/Agronomy26.pdf

Agricultural Phosphorus Management Using the Oregon/Washington Phosphorus Indexes, <http://eesc.orst.edu/agcomwebfile/edmat/em8848-e.pdf>

Practice Standards

Oregon NRCS Waste Recycling Standard (633), July 2013
http://efotg.sc.egov.usda.gov/references/public/OR/633std_OR-July11.pdf

Record Keeping

Oregon ODA CAFO Recordkeeping Calendar, January 2015
<http://www.oregon.gov/ODA/NRD/pages/cafoprodocs.aspx>

Online Decision making And Record Keeping, October 2015
<http://www.odark.org>

Water Quality/Quantity

Oregon NRCS Water Quality Technical Note No. 1: Water Quality Indicator Tools, October 2000
ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Water%20Quality/WaterQual01.pdf

Software

Revised Universal Soil Loss Equation, RUSLE2 version 1.26.6.4, October 2006
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Oregon Animal Waste Management Planning Tool, ORAWMv5.1, October 2015
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Online Decision making And Record Keeping, October 2015
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REFERENCES

ORAWM WORKBOOK

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

2/25/2016

Version 5.1

CLIENT: **H3 Feeders LLC**ASSISTED BY: **Bruce D. Wilson, H&R Engineering LLC**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

ANNUAL NUTRIENT PRODUCTION													
Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Nutrient Production						Manure CF/D/AU	Annual		
				(lbs./day/1000 lb. Animal Unit)			(lbs./day)				Days Confined	Days Grazed	Days Off Farm
				N	P	K	N	P	K				
FINISHING CATTLE	▼ 7,000	825	5,775.0	0.36	0.04	0.11	2079.00	254.10	635.25	1.24	365	0	0
HEIFERS (12-24 Months)	▼ 1,000	500	500.0	0.27	0.05	0.12	133.00	22.75	60.00	0.90	347	18	0
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GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing												
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
FINISHING CATTLE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0
	7000	7000	7000	7000	7000	7000	7000	7000	7000	7000	7000	7000	0
HEIFERS (12-24 Months)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	300
	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	300
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Total AUM's Available>	0	0	0	0	0	0	0	0	0	0	0	0	0
Total AUM's Needed>>>	25	25	25	25	25	25	25	25	25	25	25	25	300
Total AUM's>>>>>>>>>>>>	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-300

2/25/2016

Version 5.1

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

[illegible][illegible]

CROP DATA		Nutrients Removed in Pounds per Acre							
Field Number	Acres	Crop	▼	Percent Dry Matter (DM)	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre		
							Nitrogen N	Phosphorous P2O5	Potassium K2O
Half Circle	16.6	Corn, Silage(AH)	▼	30%	Ton	30.00	225	82	217
Big Circle	33.4	Corn, Silage(AH)	▼	30%	Ton	30.00	225	82	217
Half Circle	16.6	Triticale, Haylage	▼	30%	Ton	13.00	191	61	54
Big Circle	33.4	Triticale, Haylage	▼	30%	Ton	13.00	191	61	54
Hay/Pasture	17.7	Grass Hay/Pasture	▼	85%	Ton	6.00	296	93	246
			▼						
			▼						
			▼						
			▼						
Off Farm			▼						
Total Acres-	67.7								

2/25/2016

Version 5.1

CLIENT: **H3 Feeders LLC**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

[illegible][illegible]

2/25/2016

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES															
Month	Runoff in Cubic Feet				Facility Water Use Cubic Feet	Manure		Bedding		Solids Separated		Solids in Liquids		Total Solids	Total Liquids
	Roof Area Square Feet	Paved Slab Area Square Feet	Unpaved Lot Area Square Feet	Silage Pit Surface Area, SF		Solids Cubic Feet	Liquids Cubic Feet	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
	0	0	443,779	29,216											
October	0	0	2,293	9,541	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	14,181
November	0	0	4,882	9,254	0	27,465	199,670	0	0	224,864	8,095,100	2,271	81,769	224,864	16,407
December	0	0	5,066	9,724	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	17,138
January	0	0	4,401	9,680	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	16,428
February	0	0	3,254	8,689	0	25,634	186,359	0	0	209,873	7,555,427	2,120	76,317	209,873	14,063
March	0	0	3,254	9,605	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	15,206
April	0	0	2,848	9,120	0	27,465	199,670	0	0	224,864	8,095,100	2,271	81,769	224,864	14,239
May	0	0	1,276	84	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	3,707
June	0	0	851	56	0	27,465	199,670	0	0	224,864	8,095,100	2,271	81,769	224,864	3,178
July	0	0	0	0	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	2,347
August	0	0	0	0	0	28,381	206,326	0	0	232,359	8,364,937	2,347	84,494	232,359	2,347
September	0	0	1,812	9,052	0	27,465	199,670	0	0	224,864	8,095,100	2,271	81,769	224,864	13,135
Annual	0	0	29,937	74,805	0	334,159	2,429,320	0	0	2,735,844	98,490,387	27,635	994,852	2,735,844	132,376
Annual Gallons	0	0	223,926	559,540	0	2,499,511	18,171,311	0	0	20,464,114		206,708		20,464,114	990,174

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING			Grazing Manure	Confined Manure
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	Gallons/Yr	Cubic Feet/Yr
FINISHING CATTLE	23.64	7.05	60.36	2,058.21	576.32	757.82	0.00	0.00	0.00	0	2,607.441
HEIFERS (12-24 Months)	1.51	0.63	5.70	131.67	51.60	71.58	133.00	52.12	72.30	61.430	156.038
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Total-										61,430	2,763,479

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.1

2/25/2016

CLIENT: **H3 Feeders LLC**
 ASSISTED BY: **Bruce D. Wilson, H&R Engineering LLC**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Total Pounds of Nutrients from ALL SOURCES		
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
October	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
November	752	229	1,973	65,499	18,760	24,775	200	78	108	66,451	19,068	26,856
December	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
January	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
February	702	214	1,842	61,132	17,510	23,123	186	73	101	62,021	17,797	25,066
March	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
April	752	229	1,973	65,499	18,760	24,775	200	78	108	66,451	19,068	26,856
May	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
June	752	229	1,973	65,499	18,760	24,775	200	78	108	66,451	19,068	26,856
July	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
August	777	237	2,039	67,682	19,386	25,600	206	81	112	68,666	19,703	27,752
September	752	229	1,973	65,499	18,760	24,775	200	78	108	66,451	19,068	26,856
Annual	9,153	2,792	24,009	796,903	228,249	301,424	2,427	951	1,319	808,483	231,992	326,753

MONTHLY IMPORTS INTO STORAGE FACILITIES

Month	Liquids		Solids	
	Cubic Feet	Gallons	Cubic Feet	Tons
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Totals-	0	0	0	0

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

2/25/2016

CLIENT: H3 Feeders LLC

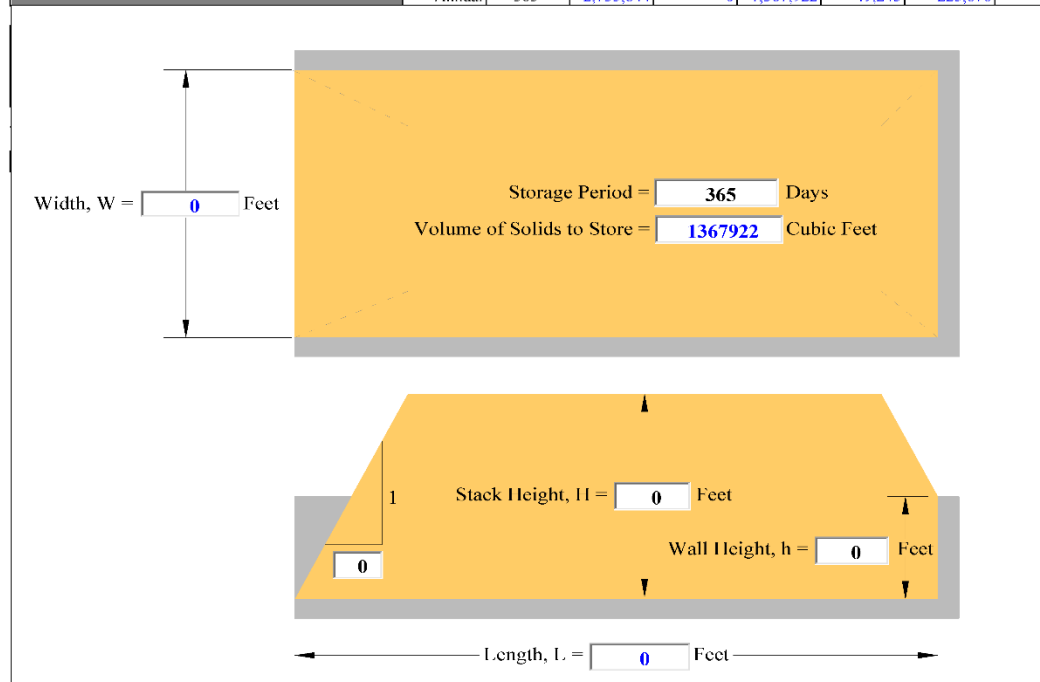
ASSISTED BY: Bruce D. Wilson, H&R Engineering LLC

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

VOLUME OF MONTHLY SOLIDS STACKED IN FACILITY

Solids Storage Facility Parameters	Value	Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Solids to Store Tons	Normal Runoff CF
Storage Period, Days=	365	October	31	232,359	0	116,180	4,182	17,285
Stacking Width, W in Feet=	0	November	30	224,864	0	112,432	4,048	36,799
Stacking Height, H in Feet=	0.00	December	31	232,359	0	116,180	4,182	38,193
Wall Height, h in Feet=	0.00	January	31	232,359	0	116,180	4,182	33,175
Stack Side Slope (X:1)=	0.00	February	28	209,873	0	104,936	3,778	24,533
Existing Storage, Cubic Feet=	1,693,770	March	31	232,359	0	116,180	4,182	24,533
Surface Area of Existing Storage, SF=	3,345,408	April	30	224,864	0	112,432	4,048	21,466
25 Year-24 Hour Storm Runoff, CF=	259,269	May	31	232,359	0	116,180	4,182	9,618
Volume Needed, Cubic Feet=	1,367,922	June	30	224,864	0	112,432	4,048	6,412
Design Volume, Cubic Feet=	0	July	31	232,359	0	116,180	4,182	0
Is Facility Covered?	NO	August	31	232,359	0	116,180	4,182	0
Volume Reduction Factor=	0.50	September	30	224,864	0	112,432	4,048	13,660
		Annual	365	2,735,844	0	1,367,922	49,245	225,676



H3FeedersORAWMv5.1

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

2/25/2016

CLIENT: H3 Feeders LLC

ASSISTED BY: Bruce D. Wilson, H&R Engineering LLC

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

MONTHLY INFLOWS INTO TANK

Tank Parameters	Value	Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage CF	Normal Runoff CF	Washwater CF	Solids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	30	October	31	-554	-18,818	29,119	0	2,347	12,094	90,467
Tank Width, Feet=	44	November	30	67	2,265	50,935	0	2,271	55,538	415,454
Tank Length, Feet=	70	December	31	169	5,750	52,984	0	2,347	61,250	458,185
Existing Storage, Cubic Feet=	354,850	January	31	116	3,920	47,256	0	2,347	53,639	401,250
Surface Area of Existing Storage, SF=	104,544	February	28	-54	-1,830	36,476	0	2,120	36,713	274,629
25 Year-24 Hour Storm Runoff, CF=	295,926	March	31	-382	-12,981	37,392	0	2,347	26,376	197,306
Volume Needed, Cubic Feet=	373,320	April	30	-770	-26,136	33,434	0	2,271	8,799	65,823
Design Volume, Cubic Feet=	18,470	May	31	-1,245	-42,253	10,978	0	2,347	-30,173	-225,710
Is Tank Covered? NO		June	30	-1,607	-54,537	7,319	0	2,271	-46,554	-348,247
Tank Dimensions? Rectangular		July	31	-1,951	-66,211	0	0	2,347	-65,815	-492,329
		August	31	-1,614	-54,798	0	0	2,347	-54,066	-404,441
		September	30	-993	-33,715	24,524	0	2,271	-7,913	-59,194
		Annual	365	-8,819	-299,344	330,417	0	27,635	49,888	373,191

1.0 Feet

Depth = Feet

Minimum Freeboard = 1.0 Feet

25Yr-24Hr Storm Precipitation =	1.8	Inches
25Yr-24Hr Storm Runoff =	295926	Cubic Feet
<input type="text" value="30"/> Day Precip - Evap =	0.66	Inches
Runoff from Normal Precipitation =	52983	Cubic Feet
Washwater =	0	Cubic Feet
Manure =	2347	Cubic Feet

Width = Feet

H3FeedersORAWMv5.1

REFERENCES

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2/25/2016

CLIENT: **H3 Feeders LLC**
 ASSISTED BY: **Bruce D. Wilson, H&R Engineering LLC**

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
	Type of Storage Facility	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Tank Manure Analysis	1,439	439	3,776	70%	85%	85%	1,008	373	3,209
Solids	Solids Storage Facility (Unroofed)	796,903	228,249	301,424	50%	75%	65%	398,452	171,187	195,926
Grazing	NONE	2,427	951	1,319	100%	100%	100%	2,427	951	1,319

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Sprinkling	1,008	373	3,209	75%	100%	100%	756	373	3,209
Solids	Broadcast (Incorporated 7 or more days after application)	398,452	171,187	195,926	70%	100%	100%	278,916	171,187	195,926
Grazing	Grazing	2,427	951	1,319	85%	100%	100%	2,063	951	1,319

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
	Soil Drainage Class	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Well Drained	756	373	3,209	94%	100%	100%	710	373	3,209
Solids	Well Drained	278,916	171,187	195,926	94%	100%	100%	262,181	171,187	195,926
Grazing	Well Drained	2,063	951	1,319	94%	100%	100%	1,939	951	1,319
TOTAL-								264,831	172,511	200,455

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.1

2/25/2016

CLIENT: **H3 Feeders LLC**
ASSISTED BY: **Bruce D. Wilson, H&R Engineering LLC**

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON											
NITROGEN, N											
Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
Half Circle	16.6	Corn, Silage(AH)	50%	355	2	1%	1,311	6	0%	0	0
Big Circle	33.4	Corn, Silage(AH)	0%	0	0	3%	6,555	29	0%	0	0
Half Circle	16.6	Triticale, Haylage	50%	355	2	0%	0	0	0%	0	0
Big Circle	33.4	Triticale, Haylage	0%	0	0	2%	5,244	27	0%	0	0
Hay/Pasture	17.7	Grass Hay/Pasture	0%	0	0	1%	2,622	9	100%	1,939	7
Off Farm			0%	0		94%	246,450		0%	0	
TOTALS-	67.7		100%	710	3	100%	262,181	71	100%	1,939	7

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre
Half Circle	16.6	Corn, Silage(AH)	100	63	156	225	82	217	-125	-20	-61
Big Circle	33.4	Corn, Silage(AH)	196	128	147	225	82	217	-29	46	-70
Half Circle	16.6	Triticale, Haylage	21	11	97	191	61	54	-170	-50	43
Big Circle	33.4	Triticale, Haylage	157	103	117	191	61	54	-34	42	64
Hay/Pasture	17.7	Grass Hay/Pasture	258	150	185	296	93	246	-38	57	-61
Off Farm											

REFERENCES

REFERENCES

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. 01-2009 (permit) was issued by the Oregon Department of Agriculture (ODA) and Department of Environmental Quality (DEQ) and became effective on **June 29, 2009**. The permit expired on **May 31, 2014**, and was administratively extended on April 23, 2014. 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. 1-2009 on **October 21, 2014**, based on information provided by you as follows:

Master Address No. AG-P1000116CAFG		EPA Registration No. ORG010690
	Operator	Legal owner, if different
Name	Perry Martin Mehrten and Glenda Homer	Homer Cattle Company: Mehtren, Glenda, Will and Lee Homer
Business Name	H3 Feeders	
Mailing Address	76122 Colonel Jordan Rd. Hermiston, OR 97838	PO Box 485 Fossil, OR 97830
Facility Address	76122 Colonel Jordan Rd. Hermiston, OR 97838	
Office Phone	541/667/8991	
Mehrten & Glenda Phone	541/763/4907	
Mehrten & Glenda Fax	541/763/2205	
E-mail Address	Perry: h3feeders@gmail.com	Glenda.homer@natural-beef.com
Maximum Number of Animals	The maximum number of animals that may be held at this Feedlot CAFO is 8,000 based on a herd composition of 8,000 beef feeders and heifers . 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>	

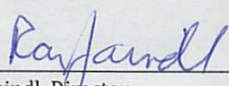
Umatilla County

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.
For Questions/ Additional Information	If you have questions, call your regional livestock water quality specialist for Area V at (541) 617-0055 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
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.

Prohibited Discharges See permit section S2, p. 9 & 10 for full text.	The following types of discharges are prohibited: <ul style="list-style-type: none"> Contaminated runoff from confinement or waste accumulation areas; Overflow or discharges from waste storage facilities; Discharges due to improper land application activities from 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.
When Discharge is Allowed Permit sections S2.B, p. 9; S2.C, pp. 9 & 10.	Production Area: Discharges of process waste water to surface waters of the state are generally prohibited except: <ul style="list-style-type: none"> When rainfall events cause an overflow of process waste water from a facility designed, constructed, operated, and maintained to contain all process-generated waste waters plus the runoff and direct precipitation from a 25-year, 24-hour rainfall event provided these discharges do not cause or contribute to a violation of state water quality standards; or In the event of an upset or bypass condition. <i>These conditions are further defined in the permit.</i> 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.

REFERENCES

	Land Application Area: Storm water runoff from the land application area is not considered a prohibited discharge and is allowed if the land is being managed in compliance with the AWMP approved by ODA.
Animal Waste Management Plan (AWMP) Requirement Permit section S3, pp. 12-15.	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, p. 10.	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 are suitable.
Monitoring, Recordkeeping & Reporting Permit section S4, pp. 16-19.	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, pp. 9 & 10; S3.C, p. 12 & 13.	You must apply manure, litter and process wastes to lands at agronomic rates in accordance with proper agricultural practices and as specified in a waste management plan that has been approved by ODA. 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 waste water application to frozen soil must be included in an AWMP. Land application of wastes or waste water 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, p. 18.	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, p. 18.	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, p. 10.	S2.E. 2 of the permit states that you "must site, design, construct, operate, and maintain all waste storage facilities consistent with the 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." 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, pp. 7 & 8.	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 Pesticides

REFERENCES

(Insert WPCF or NPDES Permit Here)