

**Biosolid Management Plan
For**

City of Depoe Bay

May 22, 2018

NPDES Permit No. 101383

File No. 24095

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WASTEWATER TREATMENT FACILITY

Liquids Processing

The City of Depoe Bay owns and operates a wastewater treatment facility and a sanitary sewage collection system. Flows received are primarily domestic and commercial sewage. Currently the plant serves the residents and businesses of the City of Depoe Bay and Gleneden Sanitary District. The facility was originally constructed in 1975. Septage is not accepted at this wastewater treatment facility. There are no industrial discharges to the City of Depoe Bay Facility, which require regulation under a local pretreatment permit. Treated effluent from the treatment plant is discharge to the Pacific Ocean (10=*PACI 176.70 D, LLID1239400456524).

The City completed an upgrade of the wastewater facility in June 2000. The upgrade consisted of refurbishing the existing secondary treatment unit and adding a duplicate treatment unit to provide larger treatment capacity than required to meet the twenty-year design period, including redundancy for each secondary process.

The Design Average Dry Weather Flow (DADWF) of the new duplicate facility is 0.85 Million Gallons per Day (MGD). The major treatment process used is conventional activated sludge. The facility consists of headworks with rag and grit removal, influent composite sampling, and an in-line magnetic flow meter from the main pump station. The secondary treatment unit consists of two activated sludge treatment units consisting of an annular aeration basin, a secondary clarifier and sludge storage. Effluent is disinfected by UV prior to discharge. The original facility has been rehabilitated to provide duplicate treatment and can be used in parallel providing comparable treatment to the new facility.

The influent flows through a grit removal rotating open drum screen then passes into one of two secondary treatment units. Influent enters the aeration basins where it is mixed with activated sludge. Return activated sludge is piped to the secondary clarifiers (280,000 total gallons). The aeration basin capacity is 560,000 gallons for both units. Effluent flows from the aeration basin through transfer pipes to the center of the secondary clarifier. In the secondary clarifier solids are allowed to settle out before the return activated sludge is returned to the aeration basin. The clarifier effluent is directed to a UV disinfection contact chamber and then discharged to the Pacific Ocean.

Waste activated sludge (WAS) is wasted in one of two aerobic digesters that have a total capacity of 585,000 gallons and provide 58.5 days of storage at 10,000 GPD WAS (1% solids). The facility has one sludge storage stabilization basin with 230,000 gallons of holding capacity which could add another 23 days detention at ambient temperatures. This facility may have the capacity to generate Class B biosolids (Process to Significantly Reduce Pathogens (PSRP)) by wasting activated sludge to the aerobic digester(s) in one or both secondary treatment unit(s) and providing further solids reduction through detention/treatment in the two sludge storage stabilization basins.

The current treatment system is working well although it is running well below the design loading capacity.

Solids Processing

Scum is pumped off the top of the clarifier and sludge is wasted from the bottom of the clarifier to one of two aerobic digesters (290,000 gal. each) with an additional waste activated sludge tank (262,000 gal.). The digester sludge retention time for this facility is 50 days at a concentration of 2,000 mg/L (about 2% solids in the digester and 1.5 % solids in the storage tank).

The de-watering press has an operating capacity of 146 gallons per hour solids of 1.7% total solids. The finished cake will be 16-18 % TS or more. The operation takes approximately 8-10 hours and should produce about 5 cubic yards, which can be stored in a lined, covered container. The two containers with lids are filled and then transported to a DEQ approved landfill. The on-site dumpster should provide two to three days storage.

There are several potential end routes for the solids from this facility and they are:

- 1) Dewatering the Class B biosolids through a screw press and then land application,
- 2) Direct land application of Class B biosolids with a truck and splash plate
- 3) Loading dewatered cake biosolids into a dumpster with lid, and hauling to a landfill.

Septage Processing

No septage received at this facility.

Pretreatment Program

Not applicable.

BIOSOLIDS TREATMENT PROCESSES

Under 40 CFR Part 503 and Oregon Administrative Rules Chapter 340, Division 50, pathogen reduction and vector attraction reduction for biosolids must be met prior to land application. Vector attraction reduction requirements can also be met at the time of land application if the biosolids are injected below the surface of the land or incorporated into the soil within 6 hours after application to the land. Biosolids are categorized as Class A or Class B depending on the method used to determine pathogen reduction. Biosolids may also be classified as exceptional quality (EQ) if the product meets: pollutant concentration limits in 40 CFR Part 503, one of the Class A pathogen reduction alternatives in 40 CFR §503.32(a), and one of the vector attraction reduction options in 40 CFR §503.33(b)(1) through (8). To meet regulatory requirements, pathogen reduction must be met before or at the same time that vector attraction reduction is achieved.

The City of Depoe Bay will certify in writing that Class B pathogen requirements and vector attraction reduction requirements are met each year biosolids are land applied. The City of Depoe Bay will also notify the Department in writing and obtain written approval prior to any process change that would use a pathogen reduction or vector attraction reduction method other than what is specified in this biosolids management plan.

Pathogen Reduction

Pathogen reduction requirements of 40 CFR Part 503 and OAR 340-050 are met through alternative(s) marked below. Depoe Bay will identify how and when the treatment process achieves these alternative(s) with include supporting data in their annual report.

Class B Pathogen Requirements

**Note: Must meet one of the following alternatives. Check applicable alternative.*

- X Alternative 1:** The geometric mean of the density of fecal coliform of seven representative samples shall be less than either 2 million Most Probable Number (MPN) or 2 million Colony Forming Units (CFU) per gram of total solids (dry weight basis).
- ☐ Alternative 2: Biosolids shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in the table below.
- ☐ Alternative 3: Biosolids shall be treated in a process that is equivalent to a PSRP, as determined by the permitting authority.

Processes to Significantly Reduce Pathogens (PSRP) Listed in Appendix B of 40 CFR Part 503

**Note: Check applicable PSRP*

X	Aerobic Digestion	Sewage sludge is agitated with air or oxygen to maintain aerobic conditions for a specific mean cell residence time (i.e., solids retention time) at a specific temperature. Values for the mean cell residence time and temperature shall be between 40 days at 20°C (68°F) and 60 days at 15°C (59°F).
☐	Air Drying	Sewage sludge is dried on sand beds or on paved or unpaved basins. The sewage sludge dries for a minimum of 3 months. During 2 of the 3 months, the ambient average daily temperature is above 0°C (23°F).
☐	Anaerobic Digestion	Sewage sludge is treated in the absence of air for a specific mean cell residence time (i.e., solids retention time) at a specific temperature. Values for the mean cell residence time and temperature shall be between 15 days at 35°C to 55°C (131°F) and 60 days at 20°C (68°F).
☐	Composting	Using either the within-vessel, static aerated pile, or windrow composting methods, the temperature of the sewage sludge is raised to 40°C (104°F) or higher and remains at 40°C (104°F) or higher for 5 days. For 4 hours during the 5-day period, the temperature in the compost pile exceeds 55°C (131°).
X	Lime Stabilization	Sufficient lime is added to the sewage sludge to raise the pH of the sewage sludge to 12 for ≥2 hours of contact.

Vector Attraction Reduction

Vector attraction reduction requirements of 40 CFR Part 503 are met through marked option(s) from the table below.

Vector Attraction Reduction Options

**Note: Must meet one of the following options.*

40 CFR Part 503 Requirement		What is Required?	Most Appropriate For:
X	Option 1 503.33(b)(1)	At least 38% reduction in volatile solids during sewage sludge treatment	Sewage sludge processed by: Anaerobic biological treatment Aerobic biological treatment
☐	Option 2 503.33(b)(2)	Less than 17% additional volatile solids loss during bench-scale anaerobic batch digestion of the sewage sludge for 40 additional days at 30°C to 37°C (86°F to 99°F)	Only for anaerobically digested sewage sludge that cannot meet the requirements of Option 1
X	Option 3 503.33(b)(3)	Less than 15% additional volatile solids reduction during bench-scale aerobic batch digestion for 30 additional days at 20°C (68°F)	Only for aerobically digested liquid sewage sludge with 2% or less solids that cannot meet the requirements of Option 1 – e.g., sewage sludge treated in extended aeration plants. Sludge's with 2% or greater solids must be diluted

☒	Option 4 503.33(b)(4)	SOUR at 20°C (68°F) is ≤ 1.5 mg oxygen/hr/g total sewage sludge solids	Liquid sewage sludge (2% or less solids) from aerobic processes run at temperatures between 10 to 30°C (should not be used for composted sewage sludge)
☐	Option 5 503.33(b)(5)	Aerobic treatment of the sewage sludge for at least 14 days at over 40°C (104°F) with an average temperature of over 45°C (113°F)	Composted sewage sludge (For sewage sludge from other aerobic processes, it will likely be easier to meet option 3 or 4)
☒	Option 6 503.33(b)(6)	Addition of sufficient alkali to raise the pH to at least 12 at 25°C (77°F) and maintain a pH ≥ 12 for 2 hours and a pH ≥ 11.5 for 22 more hours	Alkali-treated sewage sludge (alkaline materials include lime, fly ash, kiln dust, and wood ash)
☐	Option 7 503.33(b)(7)	Percent solids $\geq 75\%$ prior to mixing with other materials	Sewage sludge treated by an aerobic or anaerobic process (i.e., sewage sludge that do not contain unstabilized solids generated in primary wastewater treatment)
☐	Option 8 503.33(b)(8)	Percent solids $\geq 90\%$ prior to mixing with other materials	Sewage sludge that contain unstabilized solids generated in primary wastewater treatment (e.g., heat-dried sewage sludge)
☐	Option 9 503.33(b)(9)	Sewage sludge is injected into soil so that no significant amount of sewage sludge is present on the land surface 1 hour after injection, except Class A sewage sludge which must be injected within 8 hours after the pathogen reduction process	Sewage sludge applied to the land or placed on a surface disposal site. Domestic septage applied to agricultural land, a forest, or a reclamation site, or placed on a surface disposal site
☐	Option 10 503.33(b)(10)	Sewage sludge is incorporated into the soil within 6 hours after application to land or placement on a surface disposal site, except Class A sewage sludge which must be applied to or placed on the land surface within 8 hours after the pathogen reduction process	Sewage sludge applied to the land or placed on a surface disposal site. Domestic septage applied to agricultural land, forest, or a reclamation site, or placed on a surface disposal site

BIOSOLIDS STORAGE

Treatment Facility

There are two sludge storage-basins at this facility. Currently these basins are used to thicken and store sludge. In the past, one or both were used for alkaline stabilization.

Staging

The unloading and placement of biosolids in one area at a land application site may occur on a limited time basis. If staging of biosolids occurs, the requirements outlined in the site authorization letters for each site will be followed.

Field Storage

Field storage is authorized by the Department through a site authorization letter. Field storage has not been approved by the Department.

TRANSPORTATION

The City of Depoe Bay contracts out to transport biosolids from the wastewater treatment facility to authorized land application sites. Zewald contracting hauler operates the tanker trucks. The City of Depoe Bay is able to handle the volume of biosolids produced through these transportation practices.

REMEDIAL PROCEDURES

All spills into waters of the state or spills on the ground surface that are likely to enter waters of the state will be reported immediately to Oregon Emergency Response System (OERS) at 1-800-452-0311 and DEQ's regional biosolids specialist at (541) 687-7439. All spills of 25 gallons or more on the ground surface will be reported to DEQ's regional biosolids specialist within 24 hour(s) of the spill incident.

Spills during Transportation of Biosolids

In the event biosolids are spilled between the treatment facility and the land application site, the City of Depoe Bay sewage treatment works shall contain the spill, lime, absorb (via sand) and remove spilled sludge solids with a front end loader or shovels and dispose of the spillage at a DEQ authorized application or disposal site. All spills into waters of the state or spills on the ground surface that are like to enter waters of the state shall be reported to immediately to Oregon Emergency Response System (OERS) at 1-800-452-0311 and the regional biosolids coordinator at (541) 687-7439. All spills of 25 gallons or more on the ground surface shall be reported to the regional biosolids coordinator at (541) 440-3338.

The City of Depoe Bay is responsible for cleanup of any biosolids spills that occur while transporting to land application sites. If a spill occurs during the transport of biosolids between the wastewater treatment facility and the land application site, the City of Depoe Bay will:

- Contain the spill.
- Post the area and set up temporary fencing if there is a potential for public exposure.
- Remove spilled biosolids with a front-end loader or shovel.
- Cover the area with dry lime if and as needed.
- Apply absorbent (e.g., sand) if and as needed.
- Transport spilled product to a DEQ authorized biosolids land application or disposal site.

Solids Treatment Process Failure or Modification

If a mechanical problem occurs with the treatment plant and replacement parts are not in stock at the treatment facility, an emergency parts order will be placed. During this period, the City of Depoe Bay will continue to treat process solids as best as possible and divert waste activated sludge to another wastewater treatment facility or divert all sludge to a rented holding tank on site. DEQ may approve these actions on a conditional basis.

If maintenance is needed on a treatment process component that will affect compliance with pathogen reduction or vector attraction reduction requirements, the City of Depoe Bay will notify DEQ and give updates on maintenance activity on a weekly basis.

MONITORING AND REPORTING

Monitoring and Sampling Program

The City of Depoe Bay's treatment works utilizes an activated sludge process. The treatment facility sends wastes activated sludge from the secondary clarifier to the aerobic digesters. The sludge under goes three to four months of digestion at ambient temperatures prior to volatile solids reduction calculations and alkaline

stabilization processes. at this time. The average volatile solids reduction criteria should be checked by the City of Depoe Bay wastewater treatment facility.

The City of Depoe Bay generated and land applied 78 dry US tons of Class B biosolids for 2017.

Sampling

The City of Depoe Bay has a biosolids sampling monitoring plan. All samples collected and analyzed are representative of the biosolids land applied that year. Quality control measures and procedures are implemented for microbiological tests. Sampling location(s) for pathogen and vector attraction reduction are taken close to or at the time of land application listed below which includes:

- The waste activated sludge sampling location (representative) is the inlet pipe to each digester,
- The sample port on the discharge line out of the digesters. Samples are collected in 1000 mL poly bottles. Samples are stored at 4 degrees C in ice chest or refrigerator. Samples are transported in an ice chest to maintain temperature during delivery to laboratory. Pathogen samples are delivered to lab within 6 hours of sample collection.
- Nutrients and metal samples are taken one day and are a composited of at least 7 discrete samples collected throughout the biosolids being tested for land application.

Monitoring

The City of Depoe Bay produces approximately 80 dry tons of biosolid each year. Under the 40 CFR Part 503, the City of Depoe Bay is required to sample biosolids once a year. Frequency of monitoring depends on the amount biosolid generated that is marketed to be sold or given away and or land application. Frequency depends the amount of bulk biosolid applied to the land, or the amount of sewage sludge received by a person who prepares the biosolid that is sold or given away in a bag or other container for application to the land (dry weight basis), or the amount of biosolid (excluding domestic septage) placed on a surface disposal site.

Biosolid Nutrient Analysis for 2017:

These biosolids contain about 1540 pound (lb.) total nitrogen (N) of which about 1143 lb. is in an available form of nitrogen form (NO₃-NO₂, and NH₃). Other nutrients include 756 lb., phosphorus (P), 145 lb., potassium (K), and has a pH of approximately 7.06.

IV Biosolid Beneficial Reuse Program

Transportation

Biosolids are off loaded into Contract hauler tank trucks near the treatment plant's headworks. The biosolid loading area is impounded in case of accidental spillage of biosolids during the truck loading process. This area has a drain that ties back into the headworks of the plant. During the summer months, the City of Depoe Bay's personnel will oversee all biosolids land application on DEQ authorized sites (about 120 acres total). The biosolid land application sites are capable of assimilating two times the City of Depoe Bay annual biosolids production.

Recordkeeping and Reporting Procedures

The City of Depoe Bay as the preparer and land applier of biosolids, maintain records to demonstrate that federal and state biosolids requirements are met. Records are kept on file and are available upon request by DEQ. Monitoring and sampling records will be retained for a period no less than 5 years), unless otherwise required by the NPDES permit or a site authorization letter. The minimum required records include the following information:

- Pollutant concentrations of each parameter stated in the permit,
- Pathogen requirements as stated in the permit for Class B,
- Description of vector attraction reduction requirements in 40 CFR §503.33(b) are met,
- Description of how the management practices in 40 CFR §503.14 and site restrictions in 40 CFR §503.32(b)(5) are met for each biosolids land application site, and
- Certification that the information submitted is accurate to determine compliance with pathogen and vector attraction reduction requirements, and site restriction/management requirements.

Annual Reporting

A biosolids annual report is required to be submitted to DEQ each year by February 19th or as required by the permit if bulk biosolids have been land applied, or biosolids derived products were sold or given away the previous year. The report will include information on biosolids handling activities and data (i.e., monitoring results, nutrient loading rates) from the previous calendar year. Some of the information required with the annual report includes:

- Daily site logs or records, including date, time, and quantity (gallon, pounds) of nitrogen/acre land applied.
- Map, including scale, showing the site and the land application location that coincides with the daily site application method (e.g., truck spreader bar, irrigation cannon).
- Signed copy of the certification statement (see next section on Certification Statement).

Certification Statement

The City of Depoe Bay's facility is capable of meeting their primary alternatives for achieving Class B biosolid pathogen and vector attraction reduction criteria. Signed Class B biosolid and vector attraction certification statements shall accompany all biosolids that are land applied. For Class B biosolids, annual biosolid analysis must be provided upon request. Certification statements must also show conformance with nutrient and land application loading rates where applicable.

"I certify, under penalty of law, that the pathogen requirements in 503.32(b)(2), the management practices in 503.14 and the vector attraction reduction requirements in [insert 503.33(b) (4)] have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and vector attraction reduction requirements have been met. I also certify that all biosolids were land applied at the approved agronomic loading rate noted in the respective Department site authorization letter. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

Signature_____Date_____

BIOSOLIDS CHARACTERISTICS

Sample analysis method: EPA 9045; EPA 160.3;EPA 160.4; SM 4500-NH3B; EPA 353.2; EPA 365.3; EPA 351.3; SW-846 7060; SW-846 6010; SW-846; SW-846 7481; SW-847 7471; SW-846 7740; SM 18th, 9221E.1; SM 18:9260D.1; ASTM D 4994-89; EPA 600/1-87/014; EPA 8240; EPA 1613; EPA 8270; EPA 1613B; EPA 1668(may include one or more of the referenced methods).

Biosolid Analysis 2017:

Biosolid Chemical Analysis (see Appendix A) :

Total solids 2.1%

Volatile solids 77%

pH 7.06

From the City of Depoe Bay's 2017 biosolids, analysis the following is a representative sampling of the biosolid metal concentration:

Pounds	(#)	Metal	#/acre-yr.	site life
lb.		Arsenic (As)	0.0071	6230
lb.		Cadmium (Cd)	0.001	28973
lb.		Chromium (Cr)	0.010	117991
lb.		Copper (Cu)	0.255	5871
lb.		Lead (PB)	0.019	15429
lb.		Mercury (Hg)	0.0001	21858
lb.		Molybdenum (Mo)	0.004	4593
lb.		Nickel (Ni)	0.011	39002
lb.		Selenium (Se)	0.0001	601754
lb.		Zinc (Zn)	0.2566	10909

The site life would be limited to 4593 years based on the molybdenum loading (2017) biosolids analysis. From the analysis, the City of Depoe Bay needs approximately 40 acres to land apply on to handle their annual biosolid production.

Pollutant Characteristics

The following table is a representative biosolids analysis for pollutant characteristics. This data and all previous data indicate that pollutant concentrations for all regulated pollutants have been met.

Parameter	Biosolids Analytical Result (mg/kg)	40 CFR §503.13(b)(3) Pollutant Concentration Limits (mg/kg)
Arsenic (As)	11	41
Cadmium (Cd)	2.25	39
Chromium (Cr)	17	-
Copper (Cu)	427	1500
Lead (Pb)	32.5	300
Mercury (Hg)	0.13	17
Molybdenum (Mo)	6.55	-
Nickel (Ni)	1818	420
Selenium (Se)	0.1	100
Zinc (Zn)	429	2800

Nutrient Characteristics and Other Parameters

The following table is a representative biosolids analysis for nutrient characteristics and other parameters.

Parameter/measurement unit	Biosolids Analytical Result
Total solids, percent	2.1
Volatile solids, percent	77
TKN, percent	5.4
NO ₃ -N, percent	2.62
NH ₄ -N, percent	1.9
Phosphorus (P), percent	2.02
Potassium (K), percent	0.39
pH, standard unit	7

BIOSOLIDS UTILIZATION PROGRAM

Currently all biosolids generated by Depoe Bay is beneficially used through land application. The following biosolids land application plan outlines agronomic application rate and site crops, where biosolids are land applied, site selection criteria for a new site, and site and crop management practices.

BIOSOLIDS LAND APPLICATION PLAN

Agronomic Application Rate and Site Crops

Class B biosolids are required to be land applied to a site at a rate that is equal to or less than the agronomic rate for the site. An agronomic rate is the whole biosolids application rate (dry weight basis) designed to provide the annual total amount of nitrogen needed by a crop and to minimize the amount of nitrogen passing below the root zone of the crop or vegetation to groundwater.

Biosolids application rates for the Depoe Bay sites were developed based on Oregon State University (OSU) Extension Service Fertilizer Guide for Western Oregon Pastures. The annual application rate for type of crop is 100 pounds plant available nitrogen (N) per acre, unless the application site demonstrates additional nitrogen is required to match crop uptake rates. The land application sites authorized for use can assimilate the total plant available nitrogen the biosolids provide on an annual basis. Specific site agronomic loading rates are stated in the Department issued site authorization letters.

Site Inventory of Existing and Potential Sites

The City of Depoe Bay currently land applies Class B biosolids to the DEQ authorized sites listed in the table below. Surface application of biosolids is performed using tanker and splash plate. Site maps with the general location and size of existing authorized sites are included as (see **Appendix B**) of this biosolids management plan. The City of Depoe Bay currently has the total number acres that are authorized for land application. This is an adequate land base for current and future operations, based on current biosolids generation rates.

Biosolids Land Application Site Inventory

The City of Depoe Bay's 2017 total biosolid nitrogen production was 1540 lbs. The perennial agronomic biosolid land application rate for pastures and grass is 100 lb. available N per acre-yr.

The City of Depoe Bay land applies on farmlands to beneficially reuse their biosolids as a soil amendment.

Biosolids Site management Information:

Site Name Site

Site Name	Site No.	Net Acres	Loading (lb./ac/yr.)	Usable Nitrogen per Site lb. N/ac
J. Mann	1	7.9	100 lb. N/ac	790
J. Mann	2	25	100 lb. N/ac	2500
J. Mann	3	10	100 lb. N/ac	1000
J. Mann	4	12	100 lb. N/ac	1200
J. Mann	5	35	100 lb. N/ac	3500
J. Mann	6	30	100 lb. N/ac	3000
Total	6	119.9		11990

Long-term biosolid application rates and site restrictions are contained in the biosolid site authorization letter. References to the OAR 34-50, The EPA 40 CFR Part 503, site setbacks, site agronomic loading rates, land application restrictions and site restrictions are also detailed out in the site authorization letter.

Land Application Plan and Site Selection Criteria for New Sites

If necessary, the City of Depoe Bay will locate additional sites for land applying biosolids. Prior to using any site for land application, the City of Depoe Bay is required to receive a written site authorization letter from DEQ. The following site conditions will be considered when determining the suitability of a site for land application:

- All sites will be located on agricultural/forest/reclamation land in Lincoln, Benton, Polk counties or more defined area.
- A site should be on a stable geologic formation not subject to flooding or excessive run-off from adjacent land.
- Minimum depth to permanent groundwater should be four feet and the minimum depth to temporary groundwater should be one foot at the time when application of liquid biosolids occurs.
- Topography should be suitable for normal agricultural operations. Liquid biosolids should not be land applied on bare soils when the slope exceeds 12 percent. Dewatered or dried biosolids may be land applied on well vegetated slopes up to 30 percent.
- Soil should have a minimum rooting depth of 24 inches.

Public Notification

The City of Depoe Bay is required to notify the public of the proposed land application activity. Each year prior to land application of biosolids, the City of Depoe Bay should verify those sites to be used for the year that the property owners who received prior notification have not changed. If a property owner has changed, notification of the land application activity should be made to the new property owner and documented.

Site Management Practices

Site access restrictions and setbacks will be followed as outlined in DEQ's site authorization letters. The City of Depoe Bay will ensure that access is restricted by appropriate means as necessary, such as fencing or posting of signs at the land application site. Biosolids land application will not occur in those areas designated as buffer strips and will be achieved through accurate measurement of the buffer area prior to commencing land application.

Crop Management Practices

As listed in the Biosolids Land Application Site Inventory table on page 11, biosolids are applied to pasture. Timing of application and the harvest cycle of the crop are also listed. Soil conditions must be favorable for

application such that runoff, leaching, or soil compaction does not occur. The timing of land application will take into consideration tilling and irrigation practices that may occur on an authorized site.

The overall management of nutrients at the land application sites takes into account the amount of biosolids land applied, the amount of commercial fertilizers used and the amount of residual nutrients in the soil. When additional sources of nitrogen (e.g., commercial fertilizer) are applied to a site, then the application of biosolids should be reduced to compensate for the additional nitrogen loading.

Prior to the initiation of biosolids application to a site, a representative soil sample is collected across the entire site, and analyzed by an independent commercial laboratory. Existing nitrogen levels in the soil profile are subtracted from the OSU Extension Service recommended nitrogen application rates for the crop and the biosolids application rate is adjusted. Soil testing should be conducted at land application site on a 3 year frequency. Soil sampling must be taken at soil depths of 0 to 12 inches and 12 to 24 inches. Each soil sample must be taken at seven locations or more and must be representative of the land application site soil type. Each soil sample depth must be a composited sample from the same seven locations for soil depth of 12 to 24 inches as well. The two composted samples (0-12 and 12-24") must be analyzed for the following: (carryover nitrogen TKN-N, NH₃, NO₃, and P, pH.

In the event of annual biosolids application to the same field for 3 consecutive years, annual sampling and testing of application site soils for nitrate and ammonia nitrogen will be conducted prior to biosolids application. Application rates must be adjusted to account for available nitrogen carried over from previous applications. If crop removal of nitrogen exceeds the calculated agronomic rate, additional nitrogen may be required to sustain crop production.

APPENDIX A Depoe Bay Biosolids Metals and Nutrient Analysis

Name	Depoe Bay		Biosolid Analysis	
File No.	24095		2017	
Phone No.				
	Lab analysis #	Coffey A102271-A	Date	A102271
	mg/kg dry-wt.		2/26/2001	
Arsenic	11			
Cadmium	2.25	Total Metric tons	1	Total US tons 1.11
Chromium	17	Total US tons	18.70	16.8257
Copper	427	Acres land applied	70	9
Lead	32.5	City used primary site, total acres		
Mercury	0.13			
Molybdenu m	6.55	Cake Biosolid	1	0.85 Replace the 1 with the appropriate decimal
Nickel	18	Liquid Biosolid	0.5	0.5 Dewater (10-50%) and Liquid
Selenium	0.1	% Total Solids	2.1	
Zinc	429	% Volatile Solids	77	Conversion
				US-> Metric tons multiply by 1.1
Total Organic	1.38	35000	Organic N = (%TKN-%NH4)	Metric -> US tons multiply by 0.9
TN	5.4	54000		
NH4	1.9	19000	Inorganic N = (%NH4 + %NO3)	
NO3	2.12	21200		color key
pH	7.06			requires entered value
Fecal Coliform		<2,000,000 /dry gr. Total Solids		calculated value
org./100ml	680			replace the 1 with # from selection
Phosphorus	2.02	20200		
Potassium	0.39	3900		
Anaerobic D.	1	0.2	Replace the 1 with the appropriate decimal	
Aerobic D.	0.3	0.3	Replace the 1 with the appropriate decimal	
Drying Bed Gal/yr.	1	0.15	Replace the 1 with the appropriate decimal	
	213490			

<i>Lb. TS/yr.</i>	37390.64	37390.64	Lb. Total Solids	18.70	dry US tons
<i>Dry TS ton/yr.</i>	18.70				

	Biosolid concentration	503.13 Table 3 Conc.	503.13 Table 3 metal	Yearly Lb. Metal per ton biosolids	Yearly Loading g lb./ac-yr.	Yearly Loading kg/ha
Metal	mg/kg	mg/kg	lb./ton biosolid			
<i>Arsenic</i>	11	41	0.082	0.41130	0.00588	0.007
<i>Cadmium</i>	2.25	39	0.078	0.08413	0.00120	0.001
<i>Chromium</i>	17	1200	2.400	0.63564	0.00908	0.010
<i>Copper</i>	427	1500	3.000	15.96580	0.22808	0.255
<i>Lead</i>	32.5	300	0.600	1.21520	0.01736	0.019
<i>Mercury</i>	0.13	17	0.034	0.00486	0.00007	0.000
<i>Molybdenum</i>	6.55	18	0.036	0.24491	0.00350	0.004
<i>Nickel</i>	18	420	0.840	0.67303	0.00961	0.011
<i>Selenium</i>	0.1	36	0.072	0.00374	0.00005	0.000
<i>Zinc</i>	429	2800	5.600	16.04058	0.22915	0.257

	mg/kg dry-wt.	lb. N / yr.	lb./ac-yr.	kg/ha
<i>Total Organic</i>	1.38	392.6017	5.6086	6.2816
<i>TKN</i>	5.4	605.7283	28.8442	32.3055
<i>NH4</i>	1.9	355.2111	5.0744	5.6834
<i>NO3</i>	2.12	792.6815	11.32402	12.68290

Lb. mineralized organic N/dry ton	5.6086	
Lb. inorganic N/dry ton	16.3985	
Total Lb. available N/dry ton	22.007	
Nitrogen loading rate N lb./acre	100.000	112 kg/ha

Number dry tons land applied per acre	4.544	10.179 metric ton/ha
Total Lb. Org-N produced per year	392.602	
Total Lb. NH4 produced per year	355.211	
Total Lb. NO3 produced per year	792.68154	
Total Lb. Available N per year	1540.494	
Total number of acres required per year	15.40	

Total lb. Phosphorus /yr	755.29
lb. Phosphorus/acre-yr	10.79
Total lb, Potassium-yr	145.82

Trace Metals

Sample calculation:

$(((5.0 \text{ mg As}/1000000 \text{ mgTS} \times 140000 \text{ lb. Total Solids})) = 0.07 \text{ lb. As/yr.}$

$(((5.0 \text{ mg As}/ 1000000 \text{ mg TS}) \times 140000 \text{ lb. TS}) / 52 \text{ ac} = 0.013 \text{ lb. As/ac-yr.}$

$(\text{EPA cumulative loading } 41 \text{ total lb. As/ac} / 0.013 \text{ lb. As/ac/yr.}) = 2719.3 \text{ yr. site life for As}$

$(0.013 \text{ lb. As/ac-yr.}) \times 1.12 \text{ conversion factor} = 0.015 \text{ kg/ha-yr.}$

$(2.6 \text{ tons biosolid is equivalent to a loading rate of } 100 \text{ lb. total available N/ac}) .$

	Analysis	Ceiling Limits			Biosoli d	
	Biosolid	40 CFR	40 CFR 503.13	Yearly	Loadin g	Biosolid
	concentratio n	Table 2 Conc.	Table 2 metal	lb. Metal per	lb./ac- yr.	Loading
Metal	mg/kg	mg/ha	lb./ac biosolid	ton biosolids		kg/ha-yr.
<i>Arsenic</i>	11	41	45.920	1.540	0.0220	0.025
<i>Cadmium</i>	2.25	39	43.680	0.315	0.0045	0.005
<i>Chromium</i>	17	1200	1344.000	2.380	0.0340	0.038
<i>Copper</i>	427	1500	1680.000	59.780	0.8540	0.956
<i>Lead</i>	32.5	300	336.000	4.550	0.0650	0.073
<i>Mercury</i>	0.13	17	19.040	0.018	0.0003	0.000
<i>Molybdenu m</i>	6.55	18	20.160	0.917	0.0131	0.015
<i>Nickel</i>	18	420	470.400	2.520	0.0360	0.040
<i>Selenium</i>	0.1	36	40.320	0.014	0.0002	0.000
<i>Zinc</i>	429	2800	3136.000	60.060	0.8580	0.961

	Biosolid					
	Analysis	Table 2 metal	lb. Metal per	Loading	Loadin g	Site Life
Metal	mg/kg	mg/ha	/ac biosolid	lb./ac-yr.	kg/ha- yr.	in years
<i>Arsenic</i>	11	41	45.920	0.006	0.0066	6230.2906

Cadmium	2.25	39	43.680	0.001	0.0013	28973.384
Chromium	17	1200	1344.000	0.009	0.0102	117991.16
Copper	427	1500	1680.000	0.228	0.2555	5871.9253
Lead	32.5	300	336.000	0.017	0.0194	15429.613
Mercury	0.13	17	19.040	0.000	0.0001	218586.18
Molybdenum	6.55	18	20.160	0.003	0.0039	4593.5489
Nickel	18	420	470.400	0.010	0.0108	39002.632
Selenium	0.1	36	40.320	0.000	0.0001	601754.9
Zinc	429	2800	3136.000	0.229	0.2566	10909.827

Depoe Bay Biosolid Land application Site
 Site List

Site Name	Site No.	Acres	Crop grown	Agronomic loading N#/ac	2017 lbs N/ac	
Jeff Mann	Site 1	7.9	pasture	100		
Jeff Mann	Site 2	13	pasture	100		
Jeff Mann	Site 3	10	pasture	100		
Jeff Mann	Site 4	12	pasture	100		
Jeff Mann	Site 5	35	pasture	100	27	945
Jeff Mann	Site 6	30	Pasture	100	43	1290
John Lupton	Site 1	7	pasture	100		0
Total	6	114.9			70	2235

Appendix B Depoe Bay Site Authorization Letter

Kate Brown, Governor

Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
OTRS 1-800-735-2900

Date

Gary Walls, Lead Operator
City of Depoe Bay
PO Box 8
Depoe Bay OR 97431

Re: Biosolids Site Authorization to Land Apply Biosolids: WR2018-01-BS
National Pollutant Discharge Elimination System permit number 101383
File number 24095
Site: Mann Ranch
2875 Moonshine Park Rd. Logsden OR 97357
Site location: Twp. 9 S, R. 10W. Sec. 19
Lincoln County
Parcels about 120 acres

Dear Gary Walls:

The Department is reauthorizing the Mann Ranch sites under as part of your updated Biosolids Management Plan. This letter is DEQ's approval of your request to land apply anaerobic Class B biosolids on the above referenced site. This Class B biosolids authorization is valid until one of the following occurs:

1. Site ownership changes.
2. The current site owner withdraws permission to apply biosolids.
3. Pursuant to OAR 340-045-0060, DEQ revokes the authorization for non-compliance, submittal of false information, violation of any applicable law, or a serious danger to public health, safety or the environment.

Please be aware that in accordance with OAR 340-050-0030(3), this site authorization letter is part of your biosolids management plan and requirements of this authorization are considered enforceable conditions under your National Pollutant Discharge Elimination System permit #101383.

This authorization to apply anaerobic Class B biosolids on the above referenced site is subject to criteria detailed in the OAR 340-050, NPDES permit #101383 and the following conditions.

Responsibilities

Depoe Bay must ensure the following:

1. All Class B biosolids are analyzed as required by the permit and meet all permit requirements prior to land application.
2. Proper handling and application of all biosolids at this location.
3. Class B biosolids are transported to the application site in such a manner as to prevent leaking or spilling the Class B biosolids onto the highways, streets, roads, waterways or other land surfaces not approved for biosolids application.
4. A copy of this site authorization letter and a signed Class B biosolids pathogen and vector attraction reduction certification statement must be in the possession of the person applying biosolids or in the application truck. Any person who applies biosolids must review this site authorization letter prior to applying biosolids.

Site Description

This site is currently in pasture grass and is comprised of Knappa silty loam 2% to 7% slope, Nehalem silt loam 0% to 3% slope, Quillamook silty loam 0% to 3% slope and Siletz silt loam 0% to 3% and Wolfer silt loam 0% to 3% slope soils. All these soils are well drained.

Approved Fields

DEQ approves Class B biosolids application on the portions of these sites that are outlined in colored hatching on the attached site approval maps and as referenced in the table below.

Table 1. Depoe Bay Mann sites.

Site number*	Township Range Section Tax Lot	Approx. Acres	Crop Type
Mann 1	Twp. 9S, R. 10W. Sec. 19 WM.,	8	pasture grass
Mann 2	Twp. 9S, R. 10W. Sec. 19 WM.,	25	pasture grass
Mann 3	Twp. 9S, R. 10W. Sec. 19 WM.,	10	pasture grass
Mann 4	Twp. 9S, R. 10W. Sec. 19 WM.,	12	pasture grass
Mann 5	Twp. 9S, R. 10W. Sec. 19 WM.,	35	pasture grass
Mann 6	Twp. 9S, R. 10W. Sec. 19 WM.,	30	pasture grass
Total acreage		120	

* see attachment 1. Site approval map.

Site Use Limitations and Requirements

Depoe Bay must ensure the following conditions are met:

1. DEQ approves these sites for summer Class B biosolids application from May 1 through October 31 during daylight hours (see Attachment 1 Approval Map). DEQ may approve earlier application upon request if:

- a. There has been no rain in the 2 days prior to the requested date;
 - b. Soils are not wet (see condition #3, p. 3); and
 - c. There is 48" of separation from the ground surface to the permanent water table (see #11, p. 4).
2. Depoe Bay must notify DEQ 48 hours prior to the first application of the season to allow DEQ the opportunity to inspect the site. DEQ may inspect the site before, during and/or after the application.
3. Class B biosolids application during wet soil conditions must be avoided, especially in low and concave areas. If rainfall exceeds $\frac{1}{4}$ inch in an hour or $\frac{1}{2}$ inch in a day, Class B biosolids application must stop until there are 24 continuous hours with no rain.
4. Application must not cause soil compaction or compression and/or increase the potential for surface runoff. Application must occur by pressure tank spray with spreader bar or splash plate. Application must be with standard agricultural equipment designed for land application of liquids with low compaction tires.
5. Application of Class B biosolids is not allowed on ground where the slope exceeds 30%. Liquid Class B biosolids application is not allowed on bare soils where the ground slope exceeds 12%.
6. For ground slopes from 12% to 30%, liquid Class B biosolids may be applied only if the following conditions are met:
 - a. Depoe Bay must notify DEQ 48 hours prior to such application to allow DEQ the opportunity to inspect the site before, during and/or after the application.
 - b. Application must only occur when there has been no rainfall for 3 days before application and no forecast for rain for 3 days after application. Use the National Weather Service forecast.
 - c. The daily application rate must not exceed the dry soil infiltration rate. The rate is exceeded if ponding or runoff occurs.
 - d. All land application must be on the contour. No land application is allowed up and down the slope.
 - e. Depoe Bay must visually inspect the application area after every truck load applied to ensure that no ponding and/or runoff occurs. Results of this inspection must be included in the daily log.
 - f. DEQ may require additional land application management practices in writing if ponding and/or runoff occur.

7. Class B biosolids must be applied evenly at approved agronomic rate and in a manner to prevent ponding or runoff.
8. The site setbacks and 12% slope break must be flagged prior to Class B biosolids application. Flags should be spaced every 300 feet if practicable.
9. Class B biosolids applications are not allowed within the following setbacks:

Table 2 Agricultural setbacks for Class B liquid and cake Class B biosolids.

Setback to:	Liquid	Cake
Neighboring house*	50 feet	50 feet
Neighbor's property line	50 feet or 200 feet if drinking well location is unknown	50 feet or 200 feet if drinking well location is unknown
Seasonal drainage ditch, channel, pond, waterway	50 feet	50 feet
Water wells, drinking water sources	200 feet	200 feet
County road, public access	50 feet	25 feet
Farmer's road, no public access	10 feet	10 feet

*Setback may increase if DEQ receives odor complaints.

10. Liquid Class B biosolids application is not allowed when there is a constant wind speed greater than 20 miles per hour. Depoe Bay may use a wind chart or website to estimate wind speed if a site measurement is not economically feasible. The following are acceptable examples of the Beaufort wind scale and potential websites:
 - a. Beaufort wind scale
http://www.weather.gov/media/iwx/webpages/skywarn/Beaufort_Wind_Chart.pdf or
<http://www.stormfax.com/beaufort.htm>
 - b. Accuweather <http://www.accuweather.com/en/us/roseburg-or/97470/weather-forecast/335275>
 - c. WindyTV <https://www.windy.com/43.217/-123.342?2017-06-11-09,42.759,-123.344,8,m:eRcacJA> (forecast in knots; 1 knot ~ 1.151 mph)
11. A minimum of 48" vertical separation must be maintained from the ground surface to the permanent water table. For sites requiring piezometer installation and use (see Table 1 and attachment 1 Approval Area Map), the water table depth must be measured daily and written record must be kept. The piezometer must meet the following requirements:
 - a. A 2" diameter PVC pipe at least 60" deep from the ground surface.
 - b. The pipe must have a cap and a visible flag showing the piezometer location.

- c. The pipe must have ¼" perforation spaced an inch apart on opposite sides of the pipe at the lower 2 foot section of the piezometer; this section must covered with a fine mesh screen (window screening will do).
 - d. Care must be taken not to smear the soil surface borehole as this can affect water readings. If smearing occurs, you must rough up the smooth borehole surface with a rake or similar tool.
12. The Class B biosolids application rate must not exceed the recommendations in the applicable Oregon State University fertilizer guides and must not exceed the following plant available nitrogen rates:

Table 3 Agricultural setbacks for Class B liquid and cake Class B biosolids.

Crop	Plant Available Nitrogen (PAN) lbs./acre/year
Pasture grass*	100 lbs./acre/year

*OSU fertilizerguide FG63 for Pastures Western Oregon (Jan. 2000).

13. Changes in the Class B biosolids characteristics or crops management may necessitate appropriate adjustments in the Class B biosolids application rate to maintain proper plant available nitrogen for desired crop growth.
14. If other sources of nitrogen are used, such as recycled water or commercial fertilizer, the Class B biosolids application rate must be reduced so the total nitrogen applied does not exceed the base agronomic loading rate specified in condition 8 above.
15. Public access to land with a high potential for public exposure must be restricted for one year after application of Class B biosolids.
- a. Signs must be posted at the start of the application and throughout the application season as follows: "No Trespassing – Class B Biosolids Land Application". Signs should be at least 8.5" x 11" in size and spaced a minimum of 500 feet apart. Signs may be removed 2 days after the last application of the season.
 - b. Controlled access (site must have a minimum three strand wire fence around perimeter) to the Class B biosolids site must be maintained for a period of 12 months following biosolids application.
16. Grazing of domestic animals is prohibited for 30 days following the last day of Class B biosolids application. Grazing of lactating animals (for example, dairy cattle) is prohibited for 90 days following the last day of Class B biosolids application.
17. Should nuisance issues such as malodors or flies become a problem, Class B biosolids application practices must be reviewed and immediate countermeasures taken, which may include plowing the solids into the soil within 6 hours of land application.

Spill Reporting and Cleanup Requirements

Depoe Bay must comply with the following:

1. Immediately clean up any spillage of Class B biosolids and notify the DEQ Eugene office at 541-687-7439 of any such occurrence. Outside of DEQ business hours or when spills reach or have the potential to reach waters of the state, notify the Oregon Emergency Response System (OERS) at 1-800- 452-0311.
2. Spillage that cannot be completely cleaned up must be covered with hydrated lime (calcium hydroxide) or lime (calcium oxide). A 50-lb. bag of lime must be available during transportation of Class B biosolids.
3. A copy of the current year's Class B biosolids analysis must be carried in the land application truck with all Class B biosolids that are to be land applied.

Monitoring and Reporting Requirements

Depoe Bay must conduct the following monitoring and reporting:

4. Soil nutrients and carry over nitrogen sampling is required on all active Class B biosolids land application sites as specified in Table 3 below. DEQ may require more frequent soil sampling based on land application practices and approved agronomic loading for crops grown on the site.
5. Written daily land application records must be kept on a field grid map or other easily readable system. Depoe Bay is responsible for tracking the land application of Class B biosolids on daily basis (number gallons and the equivalent number of dry pounds nitrogen land applied per acre).
6. The results of the monitoring must be submitted to DEQ with the biosolids annual report by no later than February 19 of each year.

Table 4. Monitoring Requirements

Parameter	Frequency (Unless otherwise required by DEQ in writing)	Sample Type	Reporting Requirement (Unless otherwise required by DEQ in writing)
Distance from ground surface to groundwater (inches)	Before each application	Written record from piezometer	Keep log in application truck Submit copy of log to DEQ in annual report

Parameter	Frequency (Unless otherwise required by DEQ in writing)	Sample Type	Reporting Requirement (Unless otherwise required by DEQ in writing)
1. Application date and time 2. Each application location on the site 3. Name of applicator 4. Quantity applied (gallons and dry lbs. total nitrogen based on most recent Class B biosolids analysis) 5. Visual observation for ponding and/or runoff after application	For each application on a daily basis	Written record and written record of visual observation	Keep log in application truck Submit copy of log to DEQ in annual report
Total gallons applied on site	Monthly summary	Written report	Submit to DEQ in annual report

Parameter	Frequency (Unless otherwise required by DEQ in writing)	Sample Type	Reporting Requirement (Unless otherwise required by DEQ in writing)
Carryover nutrients in the 0" – 12" soil profile: 1. Ammonia (NH ₃ , mg/kg or mg/L) 2. Nitrate + Nitrite (NO ₃ +NO ₂ , mg/kg or mg/L) 3. Total Kjeldahl Nitrogen (TKN, mg/kg) 4. Phosphorus (mg/kg) 5. pH (S.U.) 6. Potassium (mg/kg)	Once year prior to biosolids application (Unless otherwise requested by DEQ)	Composite soil sample that is representative of the site. At a minimum, the sample must be composite of a minimum of 7 distinct locations for each soil type.	Submit to DEQ in annual report
Carryover nutrients in the 12" – 24" soil profile: 1. Ammonia (NH ₃ , mg/kg or mg/L) 2. Nitrate + Nitrite (NO ₃ +NO ₂ , mg/kg or mg/L) 3. Total Kjeldahl Nitrogen (TKN, mg/kg) 4. Phosphorus (mg/kg) 5. pH (S.U.) 6. Potassium (mg/kg)	Once prior to biosolids land application (Unless otherwise requested by DEQ)	Composite soil sample that is representative of the site. At a minimum, the sample must be composite of a minimum of 7 distinct locations for each soil type.	Submit to DEQ in annual report

City of Depoe Bay File #24095
Mann Ranch Site Authorization
Date
p. 9 of 11

If you have any questions regarding this authorization, please call me at 541-687-7439.

Sincerely,

Paul Kennedy, CPSS-REHS
Natural Resource Specialist 4

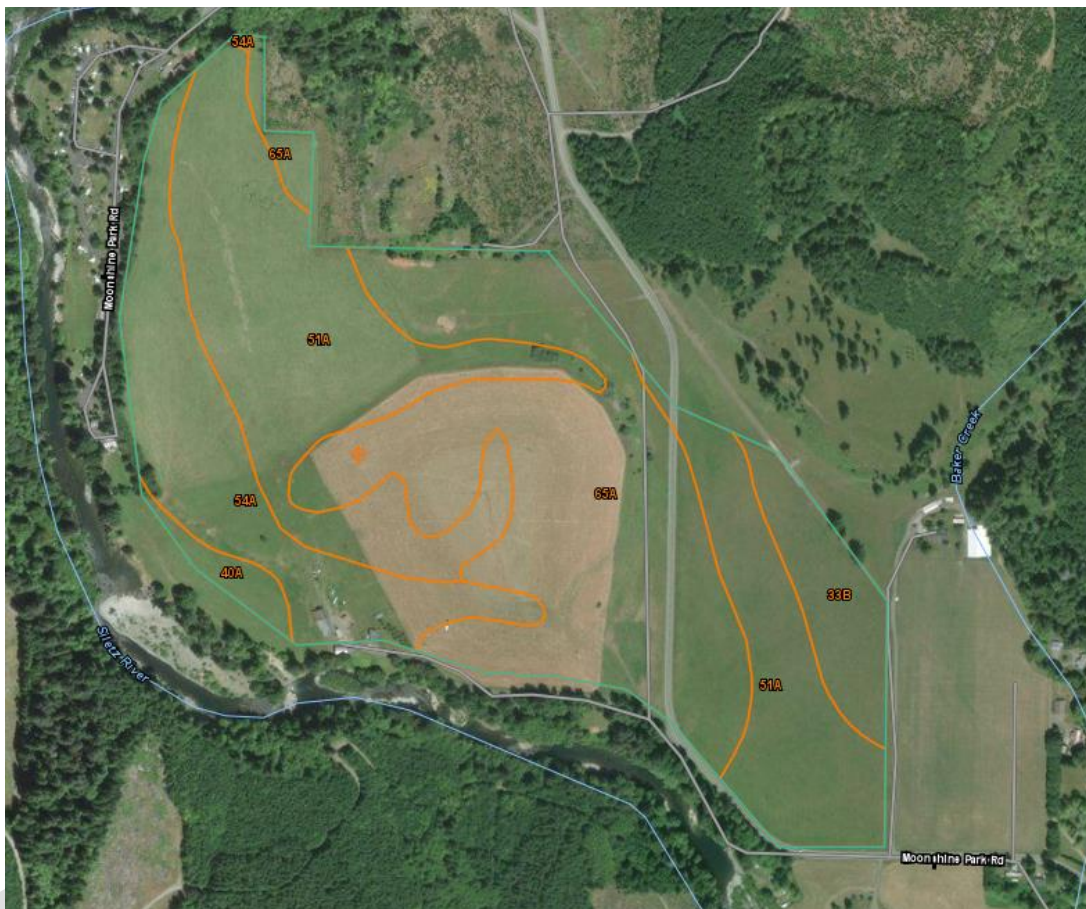
Attachment: OSU fertilizerguide FG63 Pastures Western Oregon
Mann site approval map.

ec: Pat Heins, Biosolids Program Coordinator, DEQ HQ (w/encl)
Amy Chapman REHS, achapman@co.lincoln.or.us, Lincoln County Human Services
Department, 36 SW Nye St. Newport OR 97365 (w/enc)

cc: File Copy (w/enc)
Mr. Mann, 2875 Moonshine Park Rd., Logsden, OR 97357 (w/enc)

Mann Ranch Logsden OR, Lincoln County Area, Oregon (OR638)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
33B	Knappa silt loam, 2 to 7 percent slopes	8.4	6.1%
40A	Nehalem silt loam, 0 to 3 percent slopes	2.3	1.7%
51A	Quillamook silt loam, 0 to 3 percent slopes	52.0	38.0%
54A	Siletz silt loam, 0 to 3 percent slopes	22.1	16.1%
65A	Wolfer silt loam, 0 to 3 percent slopes	52.2	38.1%
Totals for Area of Interest		136.9	100.0%



Attachment 1
Site Approval Map

Approval Map, approx. 130 acres, 3 to 12% slope.

