



# Oregon

Theodore Kulongoski, Governor

## Department of Environmental Quality

Western Region Roseburg Office

1102 Lincoln St. Suite 210

Eugene, OR 97401

(541) 687-7439

FAX (541) 686-7551

September 17, 2008

Allen Middaugh,  
Public Works Superintendent  
City of Siletz  
215 W. Buford Ave.  
P.O. Box 318  
Siletz, OR 97380

Re: City of Siletz  
Biosolids Management Plan Approval Letter  
NPDES Permit # 101680  
File # 81276

Dear Mr. Allen Middaugh:

The Department has reviewed the City's 2008 approved Biosolids Management Plan. We are pleased to advise you that the Biosolids Management Plan (BMP) for the City of Siletz (Attachment A) has been updated and approved along with the following contingencies:

1. The City of Siletz shall promptly advise DEQ on any significant changes it intends to make in its solids handling activities, which could substantially, influence solids quality or quantity before anticipated modifications are initiated;
2. The City of Siletz shall advise the Department before any industrial sources are connected to the City's sewage collection system which could have significant impact on biosolids quality or quantity;
3. The City of Siletz shall maintain detailed daily records adequate to characterize its solids stabilization activities. Records shall include data on total and volatile solids entering and exiting the aerobic digester and calculations indicating the net volatile solids reduction which has occurred during the aerobic digestion process;
4. The City of Siletz shall maintain detailed daily records that describe biosolids handling activities at its DEQ authorized land-spreading sites. Records shall indicate (on a field map) where, when, and the quantity (gallons and dry pounds) of biosolids was land applied to a particular site. Records must remain available DEQ for evaluation for at least five years after biosolids land application on any Department authorized site has been discontinued;

5. Monthly, the City of Siletz shall provide DEQ with a summary of solids processing and land application activities on Discharge Monitoring Reports (DMR's) required under the sewage treatment facility's NPDES permit;
6. Annually, by February 19, of the succeeding year, the City of Siletz shall provide the Department's Western Region and Water Quality Division with updated biosolids management inventory data for the preceding year. Data will be used to help prepare a yearly inventory of Oregon's biosolids management activities. Data to be submitted shall include, but not be limited to, annual solids production (gallons and dry pounds), biosolids chemical analysis report(s) for the period, the number of pounds per acre available nitrogen, phosphorus, potassium and trace metals applied to each site that received biosolids within the year and the cumulative amount of metal (lbs./ac) added to DEQ authorized biosolids land spreading sites; and
7. The City of Siletz is required to meet the EPA 40 CFR 503 regulations by using the most appropriate alternatives for pathogen and vector attraction reduction. Current biosolids analysis must be used to determine the appropriate alternatives from the EPA 40 CFR 503.32 pathogen and 503.33-vector attraction reduction.

If the City has any questions concerning this Biosolids Management Plan approval please or desire any follow-up with technical assistance, please contact me at (541) 687-7439.

Sincerely,



Paul Kennedy,  
Natural Resource Specialist 3

CC: Biosolid Program, Portland DEQ  
City of Siletz NPDES File

## **Biosolids Management Plan**

**The City of Siletz  
NPDES Permit No. 101680  
File No. 81276**

**Wastewater Treatment Plant  
Siletz City Hall: (541) 444-2521**

### **INTRODUCTION**

The City of Siletz (population approximately 1133 in 2000) owns and operates a municipal wastewater collection and treatment system under National Pollutant Discharge Elimination System (NPDES) permit number 101680. The facility was built in 1992.

The City has a need for a biosolids land application program. Wastewater processed by the treatment works is primarily of domestic origin, and no formal pretreatment program is required to be implemented under our NPDES permit. This biosolids management plan, as required by the NPDES permit, outlines the liquids and solids processes at the facility, how biosolids are managed to meet federal and state requirements, and how the biosolids land application program will operate. Currently, Siletz does not have a biosolids management plan, as their existing lagoon has never needed to be emptied. This plan is part of the Capital Improvement Plan (The Dyer Partnership, October 2005) and is being compiled at this time to address the need to empty the existing facultative sludge lagoon.

### **WASTEWATER TREATMENT FACILITY**

#### **Liquids Processing**

The City of Siletz operates a Sequencing Batch Reactor (SBR) activated sludge treatment plant (1264 James Frank Rd, Siletz OR 97380, Lincoln County) that centers around two Intermittent Cycle Extended Aeration System (ICEAS) units. These dual-operating units consist of a pre-reaction chamber, baffle wall, main chamber, decant mechanism, and aerobic digester.

Treated effluent is discharged year-round as allowed by the City's NPDES permit to the Siletz River at river mile 36.9. The designed average dry weather flow is 0.23 million gallons per day (MGD). Actual flows during the 1989 dry season averaged 0.0993 MGD and during the wet season averaged 0.276 MGD. The peak flow design capacity is 1.2 MGD. The SBR's are sized for a maximum daily flow of 0.62 MGD. The surge basin and surge overflow basins are used to store flow in excess of the design flow. The origin of the wastewater processed is approximately 95 percent domestic, approximately 5 percent commercial, and 0 percent industrial.

Raw sewage from the collection system enters the treatment facility at the headworks where there is mechanical bar screening. There is a pressure sensor flowmeter at the 6" Parshall Flume-Throat. The capacity of the headworks is 1.2 MGD.

The influent flow is then split between two dual-operating ICEAS Basins, entering each unit's pre-reaction zone, where it is mixed with RAS from the main chamber. The mixed liquor is aerated with coarse bubble diffusers until it passes under a baffle wall to the main chamber for clarification. Treated water flows into an equalization tank (volume of 42,000 gallons), passes through UV-disinfection facilities (0.62 MGD capacity) and is discharged into the Siletz River. The disinfection unit is equipped with a magnetic flowmeter and a flow control gate. Waste activated sludge from the main chamber is pumped each aerobic digester cell (32,000 gallons each). Hydraulic and solids retention time in the digester is 20 and 32 days, respectively. Supernatant from the digester is decanted back to the influent pump station for retreatment. Refer to Figure 1 for a general process schematic of the existing wastewater treatment facility.

Each of the two basins in the SBR has a treatment capacity of 0.31 MGD with a 0.072-pound BOD per day loading capacity. The total maximum volume of the two basins is 170,000 gallons. The SBR detention time at maximum month wet weather flow is 18 hours.

Conditioned sludge from the two 32,000 gallon aerobic digesters is wasted to the facultative sludge lagoon (FSL), which has a water surface area of 0.88 acres and a holding capacity of 2,100,000 gallons. The loading capacity of the FSL is 20 pounds of VSS per 1000 sq.ft. per day, and the solids detention time is 11 months.

If necessary, raw sewage exiting the headworks can be diverted to a surge basin, which can in turn overflow into a surge overflow basin. The surge basin can hold 510,000 gallons with a surface area of 0.33 acres. The surge overflow basin can hold 4,500,000 gallons with a surface area of 2.58 acres. The surge basin is equipped with a magnetic flow meter.

### **Solids Processing**

Currently all biosolids are pumped to the FSL. All biosolids are stored in a synthetic lined facultative sludge lagoon. The FSL has two inlet ports and a holding capacity of 2.1 MG. It has a maximum water depth of 8.5 feet. The waste activated sludge (WAS) is removed from the SBR and transferred for storage to the FSL. The FSL has been in operation for approximately thirteen years and there has never been any removal of biosolids to date. Current field measurements of the sludge indicate the depth to be approximately 24 inches.

Solids remain in the aerobic digester for a total of at least 32 days at an operating temperature of at least 15° C. No polymers are used in the thickening process. Solids are anaerobically processed in the FSL an additional period of five to seven years and will be removed on a regular cycle of every five to seven years after the initial removal. A 3-foot aerobic water cap is maintained on the lagoon surface to prevent the production of odors. In some cases it is necessary to agitate the surface of the FSL by use of a small surface mixer to prevent the formation of a scum blanket.

The sludge will be dredged from the FSL and pumped into tank trucks, which will transport it to the land application site. Approximately 425,000 gallons of sludge is currently present in the FSL.

## Pretreatment Program

The City is not required at this time to implement an industrial wastewater pretreatment program as there are no significant industrial users discharging to the plant and no septage is received. Pollutant monitoring requirements as stated in the permit will ensure land application of biosolids occurs within federal and state limitations.

## 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 at the time of land application. Vector attraction reduction requirements can also be met at the time of land application if 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.

The City will certify in writing that Class B pathogen requirements and vector attraction reduction requirements are met. The City 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 Class B Biosolids, Alternate 2. Alternate 2 is met primarily through aerobic digestion, where the solids are continuously agitated with oxygen to maintain aerobic conditions for a combined duration of at least 32 days at 15°C. This facility's digester is smaller than required. Aerobic digestion in the FSL is then used to accomplish the additional combined pathogen and vector reduction.

#### *Class B Pathogen Requirements*

- ✓ **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*

- ✓ **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°).

**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 Option 1 from table below. Solids are processed primarily by aerobic biological treatment in the digesters and secondarily by anaerobic biological treatment in the FSL. The percent volatile solids reduction calculation, to use for aerobic digester that is decanted and that does not have appreciable grit accumulation is 15%.

To meet the biosolid vector attraction reduction requirements, the solids undergo aerobic biological treatment at 15°C for a duration less than the required 60 days. To meet the time requirement, anaerobic biological treatment is provided by the FSL for a period beyond the required 60 days to meet the 38% volatile solids reduction. The biosolids considered for land application have been in been undergoing anaerobic biological treatment for over ten years. This will become a regular five to seven year cycle when the city implements the biosolids management plan.

### Vector Attraction Reduction Options

*\*Note: Must meet one of the following options. Check applicable option(s).*

40 CFR Part 503 Requirement	What is Required?	Most Appropriate For:
<input checked="" type="checkbox"/> Option 1 503.33(b)(1)	At least 38% reduction in volatile solids during sewage sludge treatment	Sewage sludge processed by: <ul style="list-style-type: none"> <li>• Anaerobic biological treatment</li> <li>• Aerobic biological treatment</li> </ul>
<input type="checkbox"/> 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
<input type="checkbox"/> 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 sludges treated in extended aeration plants. Sludges with 2% or greater solids must be diluted
<input type="checkbox"/> Option 4 503.33(b)(4)	SOUR at 20°C (68°F) is $\leq 1.5$ mg oxygen/hr/g total sewage sludge solids	Liquid sewage sludges (2% or less solids) from aerobic processes run at temperatures between 10 to 30°C (should not be used for composted sewage sludges)
<input type="checkbox"/> 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 sludges from other aerobic processes, it will likely be easier to meet option 3 or 4)
<input type="checkbox"/> 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 $\geq 12$ for 2 hours and a pH $\geq 11.5$ for 22 more hours	Alkali-treated sewage sludge (alkaline materials include lime, fly ash, kiln dust, and wood ash)
<input type="checkbox"/> Option 7 503.33(b)(7)	Percent solids $\geq 75\%$ prior to mixing with other materials	Sewage sludges treated by an aerobic or anaerobic process (i.e., sewage sludges that do not contain unstabilized solids generated in primary wastewater treatment)
<input type="checkbox"/> Option 8 503.33(b)(8)	Percent solids $\geq 90\%$ prior to mixing with other materials	Sewage sludges that contain unstabilized solids generated in primary wastewater treatment (e.g., heat-dried sewage sludges)
<input type="checkbox"/> 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
<input type="checkbox"/> 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**

From the FSL liquid biosolids can be pumped into a truck for land application. The FSL is designed with a total water surface area of 0.88 acres and a holding capacity of 2.1 MG to accommodate for over ten years of storage until land application can commence. This is based on the past twelve years of operation history. Further pathogen reduction is achieved through anaerobic breakdown in the FSL prior to the biosolids being land applied.

### **Field Storage**

Field storage is not authorized by the Department at this time.

## **TRANSPORTATION**

The City contracts out to transport biosolids from the wastewater treatment facility to authorized land application sites. The tank vehicles are operated by contract employees. The contract hauler shall be required to review and comply with the City's Site Authorization, Spill Containment, and Biosolid Management Plans. The contract haulers shall be required to carry copies of these plans while hauling biosolids to the land application site. The contract haulers shall be required to know all the site restrictions and setbacks prior to land application. The contract hauler shall be advised of who should be called in case of a spill. The contract hauler will operate under the city's permit. The City of Siletz is able to handle the volume of biosolids produced through these transportation practices. Liquid biosolids are loaded from FSL at treatment facility into the tank vehicle for land application. Biosolids are removed from the FSL with a dredge, to the FSL pump station, then pumped into a contractor's tank vehicle. The biosolids loading area are impounded in case of accidental spillage of biosolids during the vehicle loading process. These areas drain back into the FSL.

## **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 the Department's regional biosolids specialist at (541) 686-7838. All spills of 25 gallons or more on the ground surface will be reported to the Department's regional biosolids specialist within 24 hour(s) of the spill incident or as soon as possible.

### **Spill During Transportation of Biosolids**

The City 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 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 needed when spillage cannot be completely cleaned up. A 50-lb bag of liming material shall remain available during transportation of biosolids.

- Apply absorbent (e.g., kitty litter) if needed to absorb spilled biosolids. Biosolids removed from the spill area will be taken to a permitted disposal site. A 50-lb bag of absorbent material shall remain available during transportation of biosolids.
- Transport spilled product to a Department authorized biosolids land application or disposal site.
- Notify the Regional DEQ of spills (25 gallons or more on land) as soon as possible, but not later than the end of the next working day.

### **Solids Treatment Process Failure or Modification**

If a mechanical problem occurs with tank vehicle/land applicator and replacement parts are not in stock at the treatment facility, an emergency parts order will be placed. During this period, the sludge may be returned to the FSL for storage. If maintenance is needed on a treatment process component that will affect compliance with pathogen reduction or vector attraction reduction requirements, the City will notify the Department and get approval prior to the maintenance activity.

## **MONITORING AND REPORTING**

### **Monitoring and Sampling Program**

The City will develop and implement a biosolids monitoring and sampling plan. Samples collected and analyzed will be representative of the biosolids to be land applied. Quality control measures and procedures will be implemented for microbiological tests to verify precision and accuracy. Sampling location(s) stated will demonstrate how vector attraction reduction option(s) 1 is met. The plan includes:

- The sampling location (must be representative),
- How samples will be collected, preserved and transported,
- The analytical method for each analysis.

All monitoring and reporting will be conducted in accordance with the City's NPDES permit. The monitoring frequency will be based on the amount of biosolids generated that is land applied. Based on 40 CFR §503.16, Table 1 and the amount of biosolids generated and used during 2007, the City is required to sample biosolids annually.

See Appendix B, B3

### **Record Keeping and Reporting Procedures**

The City as the preparer and land applier of biosolids is required to maintain records to demonstrate that federal and state biosolids requirements are met. Records will be kept on file by the City and will be available upon request by the Department. 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, See Appendix B, B3
- Pathogen requirements as stated in the permit for Class B,
- Description of how one of the vector attraction reduction requirements in 40 CFR §503.33(b)(1) through (8) 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 (*note: this is for Class B bulk biosolids*), 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**

Any year biosolids is generated and/or land applied a Biosolid Annual Report is required to be submitted to the Department each year by February 19th following 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).
- VAR data (table of data that will be collected to support 38% VSR)
- Signed copy of the certification statement (see next section on Certification Statement).

Approximately the same quantity of biosolids will be land applied in the calendar year 2009.

**Certification Statement**

The City is capable of meeting Class B pathogen reduction and vector attraction reduction requirements. As required under 40 CFR §503.17, the City must retain a certification statement indicating whether compliance with pathogen reduction, vector attraction reduction, and certain site restrictions have been met. The certification statement must be retained for a period of five years, and must be submitted with the annual report that is due February 19th or as required by the permit. The City will retain the following certification statement and it will be signed by a principal executive officer or ranking elected official or their duly authorized representative (e.g., individual or position having responsibility for the overall operation of the system, such as the position of *plant manager*, supervisor, superintendent or equivalent responsibility).

“I certify, under penalty of law, that the information that will be used to determine compliance with the Class B pathogen requirements in 40 CFR §503.32(b)(3), the vector attraction reduction requirement in 40 CFR §503.33(b) option (1), and the site restrictions in 40 CFR §503.32(b)(5) for each site on which Class B sewage sludge was applied, was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.”

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

The City is also required as the land applier to certify that the management practices in 40 CFR §503.14 are being met. This certification includes that biosolids are being land applied at approved agronomic loading rates as specified in department issued site authorization letters. “I certify, under penalty of law that the management practices in 40 CFR §503.14 have been met for each site on which bulk biosolids is applied. 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 management practices have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.”

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

## BIOSOLIDS CHARACTERISTICS

### 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)	Sample Date	40 CFR §503.13(b)(3) Pollutant Concentration Limits (mg/kg)
Arsenic (As)	ND @ 5.0	4/30/08	41
Cadmium (Cd)	2.9	4/30/08	39
Chromium (Cr)	38.3	4/30/08	-
Copper (Cu)	52.3	4/30/08	1500
Lead (Pb)	36.7	4/30/08	300
Mercury (Hg)	4.1	4/30/08	17
Molybdenum (Mo)	7.7	4/30/08	-
Nickel (Ni)	28.6	4/30/08	420
Selenium (Se)	ND @ 5.0	4/30/08	100
Zinc (Zn)	800	4/30/08	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	Sample Date
Total solids, percent	2.34	4/30/08
Volatile solids, percent	67.3	4/30/08
TKN, percent	6.07	4/30/08
NO <sub>3</sub> -N, percent	ND @ 0.01	4/30/08
NH <sub>4</sub> -N, percent	1.14	4/30/08
Phosphorus (P), percent	2.60	4/30/08
Potassium (K), percent	0.24	4/30/08
pH, standard unit	7.0	4/30/08

## BIOSOLIDS UTILIZATION PROGRAM

100% of biosolids generated by the City 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 City sites were developed based on Oregon State University (OSU) Extension Service Fertilizer Guide: FG 63. The annual application rate for hay/pasture is 100 pounds 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 currently land applies Class B biosolids to the Department authorized sites listed in Appendix D. Surface application of biosolids is performed using tank vehicle. Site maps with the general location and size of existing authorized sites are included as Appendix D of this biosolids management plan. The City currently has 125 acres that are authorized for land application. This is an adequate land base for current and future operations, based on current biosolids generation rates.

### **Site Selection Criteria for a New Site**

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

- All sites will be located on approved rural land in Western Oregon.
- 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 shall not be land applied on bare soils when the slope exceeds 12 percent.
- Soil should have a minimum rooting depth of 24 inches.

### **Public Notification**

The City is required to notify the public of the proposed land application activity. Each year prior to land application of biosolids, the City should verify for 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. The City shall notify adjacent neighbors of the City's intent to land apply Class B Biosolid prior to the proposed land application.

#### **Site Management Practices**

Site access restrictions and setbacks will be followed as outlined in the Department's site authorization letters. The City 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 D3, biosolids are applied to hay/pasture land. 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. 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 will be conducted at 1516 NW James Frank Rd., Siletz, Oregon on approximately 50 acres per year basis. 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.

# Biosolids Management Plan

The City of Siletz  
NPDES Permit No. 101680  
File No. 81276

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Vector Attraction Reduction Supporting Data

Monitoring and Sampling Program

1. Sampling locations
  - a. See attached Sampling Plan for locations.
  - b. To meet Class B - Alternative 1, Testing: A minimum of 7 samples of the biosolids shall be collected at the time the biosolids are used. The geometric mean of the density of fecal coliform of the samples shall be determined and must be less than 2,000,000 Most Probable Number per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis). An aliquot of each sample shall be dried and the solids content determined in accordance with procedure 2540 G of the 18<sup>th</sup> edition of Standard Methods for the Examination of Water and Wastewater (SM)
  - c. To meet Class B - Alternative 2, Process to Significantly Reduce Pathogens. The biosolids must be treated in one of the processes to significantly reduce pathogens described in (a) through (e) of this subsection.
    1. Anaerobic digestion. The biosolids must be treated in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature must be between 15 days at 35 to 55°C (95 to 131°F) and 60 days at 20°C (68°F).

(1) **Alternative 1: Volatile Solids Reduction.** The mass of volatile solids in the biosolids must be reduced by a minimum of 38 percent.

The criteria used to meet the Class B requirements are:

38% Volatile Reduction:

$$\begin{aligned} \text{\% VSS Reduction} &= \frac{\text{\%VSS into digester} - \text{\%VSS(FSL)}}{\text{\%VSS into digester} - (\text{\%VSS into digester} - \text{\%VSS(FSL)})} \\ \text{\% VSS Reduction} &= \frac{.89 - .673}{.89 - (.89(.673))} = .7456 = 75\% \end{aligned}$$

(a) **Bench-scale test for anaerobically-digested solids.** When the 38 percent volatile solids reduction requirement in this subsection cannot be met for anaerobically digested biosolids, vector attraction reduction can be demonstrated by digesting a portion of the previously digested biosolids anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37°C (86 and 98.6°F). After the 40-day period, the vector attraction reduction requirement is met if the volatile solids in the biosolids at the beginning of that period are reduced by less than 17 percent.

(i) Food crops, feed crops, and fiber crops must not be harvested for a minimum of 30 days after the last application of biosolids.

(v) Livestock must not be allowed to graze on the land for a minimum of 30 days after the last application of biosolids.

**(5) Application rates.**

(a) Biosolids that is applied to the land must be applied at a rate not exceeding the rate determined by equation (3).

(b) At its discretion, the department may require the use of a different approach for calculating application rates based on the mixture ratios and site specific criteria, but at no time may the rate exceed that calculated by equation (3).

**Equation (3)**

$$AAR = \frac{N}{365}$$

Where:

*AAR = Annual application rate in gallons per acre per 365-day period.*

*N = Amount of nitrogen in pounds per acre per 365-day period needed by the crop or vegetation grown on the land (subtract any nitrogen supplied by other sources—for example, commercial fertilizers or manures).*

**(6) Spreader drive length.** To determine the distance (in feet) over which a load of liquid septage should be spread to meet the application rate, use equation (4).

**Equation (4)**

$$\text{Drive length (in feet)} = \frac{\text{gallons in spreader}}{\text{spread width (in feet)} \times 43,560} \div AAR$$

Where:

*AAR = Annual application rate in gallons per acre per 365-day period.*

2. How samples are collected, preserved, and transported

Take samples from the facultative sludge lagoon by holding the bottle near its base in the hand and plunging it, neck downward, below the surface. Turn bottle until neck points slightly upward and mouth is directed toward the current. If there is no current, as in the case of a reservoir, create a current artificially by pushing bottle forward horizontally in a direction away from the hand. When sampling from a boat, obtain samples from upstream side of boat. If it is not possible to collect samples from these situations in this way, attach a weight to base of bottle and lower it into the water. In any case, take care to avoid contact with bank or stream bed; otherwise, water fouling may occur.

*g. Sampling apparatus:* Special apparatus that permits mechanical removal of bottle stopper below water surface is required to collect samples from depths of a lake or reservoir. A Sludge Judge is to be used.

4. Size of Sample

The volume of sample should be sufficient to carry out all tests required, preferably not less than 100 mL.

5. Identifying Data

Accompany samples by complete and accurate identifying and descriptive data. Do not accept for examination inadequately identified samples.

**Preservation and Storage**

1. Holding Time and Temperature

*a. General:* Start microbiological analysis of water samples as soon as possible after collection to avoid unpredictable changes in the microbial population. For most accurate results, ice samples during transport to the laboratory, if they cannot be processed within 1 h after collection. If the results may be used in legal action, employ special means (rapid transport, express mail, courier service, etc.) to deliver the samples to the laboratory within the specified time limits and maintain chain of custody. Follow the guidelines and requirements given below for specific water types.

## Site Authorization Documentation for the Land Application of Biosolids

### 1. Site Information

#### a. Maps and Aerial Photograph Attachments

1. Vicinity map indicating the location of the proposed land application site.
2. Aerial photograph indicating the location of the proposed land application site, gross acreage.
3. Aerial photograph indicating the location of the proposed land application site, including delineation of buffer strips, net acreage.
4. Detailed map showing property boundaries, buffers, roadways, nearest residences, domestic water sources, and surface waters.

#### b. This site is located on NW James Frank Road just outside the city limits of the City of Siletz. The street address is: 1516 James Frank Rd., Siletz, Oregon. The property is listed under two Property ID and Parcel ID numbers:

- |    |         |                      |   |
|----|---------|----------------------|---|
| 1. | R131153 | 10-10-08-00-00200-00 | 5 acres with a feeder barn and roof cover |
| 2. | R405185 | 10-10-08-00-00200-00 | 59.47 acres with no reported structures   |

Both parcels are located in Section 8 of Township 10N, Range 10W in Lincoln County, Oregon. *Additional acreage is available.*

#### c. The site owner is Doina High Family Trust, Doina High, Trustee P.O. Box 552 Siletz, Oregon 97380

#### d. Buffer strips for the biosolids land application site application will provided as follows:

1. 200 feet from domestic water sources or wells
2. 200 feet from nearest residences
3. 50 feet from ditches and waterways
4. 200 feet from James Frank Road

#### e. Site Management Agreement Attachment

### 2. Soil Information

#### a. Attachments:

1. USDA NRCS soil survey map
2. Soil survey map description

### 3. Agricultural and Crop Management Information

- a. Site is used for pasture or for hay crop.
- b. Crop assimilative capacity (N) is 100 pounds per acre.
- c. Biosolids will be applied during the month of August or September.

- d. If site is currently being used for pasture at the time of application, livestock shall not be allowed to graze on the land for 30 days after the application of biosolids. If site is currently being used for hay crop, the site shall not be harvested for 30 days after application of biosolids.
- e. This site is not to any tilling.
- f. This site is not subject to any irrigation or fertilizer application.

4. Biosolids and Land Application Information

- a. Biosolids characteristics form the most recent biosolids analyses. See page 10 of Biosolids Management Plan.
- b. Forecast of biosolids application rate is approximately 1,050 gallons per acre once a year. Nutrient and metal loadings based on biosolids analyses and total acreage land applied for the year. See page 10 of Biosolids Management Plan.
- c. Calculations used for forecasting annual biosolids application rate:
  - 1. Funding available: \$10,000 for 2008
  - 2. Estimated cost per gallon to apply: \$0.015, therefore:  
\$10,000 @ 0.015¢ per gallon = 666,667 gallons to be applied in 2008
  - 3. Acreage available to land apply biosolids on:  
64.47 acres - buffer zones = 50 acres
- d. Land application site is within one-quarter mile from facultative sludge lagoon, the source of the biosolids, so no storage is necessary.