

CITY OF KELOWNA

REGIONAL BIOSOLIDS COMPOSTING FACILITY OPERATION PLAN - ODOUR MANAGEMENT

NOVEMBER 30, 2017

FINAL





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CITY OF KELOWNA

FINAL

PROJECT NO.: 17M-01713-00
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November 30, 2017

Final

City of Kelowna
1435 Water Street
Kelowna, BC AV1Y 1K4

Attention: Mr. Gord Light

Dear Sir:

Subject: Regional Biosolids Composting Facility Operation Plan - Odour Management

WSP Canada Inc. (WSP), acting in the capacity of a Qualified Professional, is pleased to present an update to the *Regional Biosolids Composting Facility Operational Plan – Odour Management* (previously called the *Commonage Biosolids Facility Operation Plan - Odour Management*) for the City of Kelowna's Regional Biosolids Composting Facility located at 551 Commonage Road, Vernon, BC, V1H 1G3.

The odour management plan update was conducted in order to meet the requirements outlined in British Columbia Ministry of Environment's Permit Number: 108537 dated July 12, 2017.

As per the Permit, the odour management plan addresses the following items:

- Identify all odour generating areas including, but not limited to: receiving, mixing, primary composting, curing or secondary composting, screening, leachate collection system, aeration systems, biofilters, grinding and storage.
- Identify appropriate mitigating strategies employed for each area and provide a summary table in the plan.
- Identify all parameters and optimal ranges in the compost process needed to limit odour generation. Compost process parameters to be identified include, but are not limited to, feedstock type, bulking materials, bulk density, particle size, carbon to nitrogen ratios, moisture, temperature, oxygen, peak odour times (i.e. Day 3 or 7), pile turning schedules.
- Outline all best management practices and emission control technologies aimed at reducing odour generation being employed at the facility.
- Identify other best management practices and emission control technologies that could potentially be used on site to further reduce and control odour.
- Include an odour monitoring program. The program must describe how odours are monitored on-site and off-site.
- Include a complaint management process which includes a complaint form, any investigative actions to be taken and any mitigation actions to be taken.

WSP has updated the odour management plan with support from the City of Kelowna. In general, many of the elements of the original odour management plan were kept, and were updated based on current operational practices.

If you have any questions or comments regarding this odour management plan update, please contact the undersigned,

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Curtis Wan', written in a cursive style.

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CW/dg
Encl: Regional Biosolids Composting Facility Operation Plan – Odour Management
WSP ref.: 17M-01713-00

SIGNATURES

PREPARED BY



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1 INTRODUCTION – BACKGROUND

The City of Kelowna's Regional Biosolids Composting Facility (RBCF) at 551 Commonage Road, Vernon, V1H 1G3, operates under the British Columbia Ministry of Environment's Permit Number 108537, last dated July 12, 2017. As part of the July 12, 2017 Permit requirements, an update to the odour management plan is required to be submitted to the Director for approval by November 30, 2017. This updated odour management plan has been prepared to meet this objective. This following document is the odour management component of the Operations Plan for the RBCF.

1.1 GENERAL

This document is the odour management plan component of the Operations Plan for the RBCF. Other documents that make up the entirety of the Operations Plan are:

Biosolids Facility Operations Plan – this describes the entire facility and provides daily, weekly, monthly and annual tasks required to operate the facility.

Biosolids Composting Process Plan – this describes in detail the general composting process and the specific operational plans and characteristics of all stages of the composting equipment at the facility.

1.2 POTENTIAL ON-SITE ODOUR SOURCES

There are many potential on-site odour sources at the RBCF. The relative odour significance of these potential sources are due to their size, such as the final storage piles, while some are due to their intensity, such as the biofilter surface.

Following is a partial list of the odour sources, and their relative significance. See Figure 1-1 below for each referenced location.

Table 1-1 List of Potential On-Site Odour Sources

DESCRIPTION	FIGURE REFERENCE	RELATIVE SIGNIFICANCE	TYPE OF SIGNIFICANCE
Biosolid hauling		Low	Intensity
Fresh tipped biosolids area	A	Can be high	Intensity
Mixing building	B	Can be high	Size/Intensity
Wood waste storage areas	C	Low	Size
Primary composting zones		Can be high	Size
Building / breaking down primary composting piles		Low	Intensity
Paved working area	D	Low	Intensity
Secondary composting zones		Medium	Size
Building / breaking down secondary composting piles		Medium	Size
Aeration floor trenches	E	Can be high	Intensity
Aeration system sumps	F	Can be high	Intensity
Primary / secondary leachate collection holding tanks	G	Can be high	Intensity
Curing piles		Low	Size
Overs (slightly disturbed)		Low	Intensity
Sedimentation pond (upper)	H	Can be high	Intensity
Biofilter surface	I	Can be high	Intensity
Constructed drainage pond	J	Can be high	Intensity
Screening operations	K	Medium	Intensity
Final storage piles	L	Low	Size
Site housekeeping		Low	Size
Biofilter floor cleaning		Low	Intensity
Lower drainage pond		Medium	Intensity

SITE PLAN

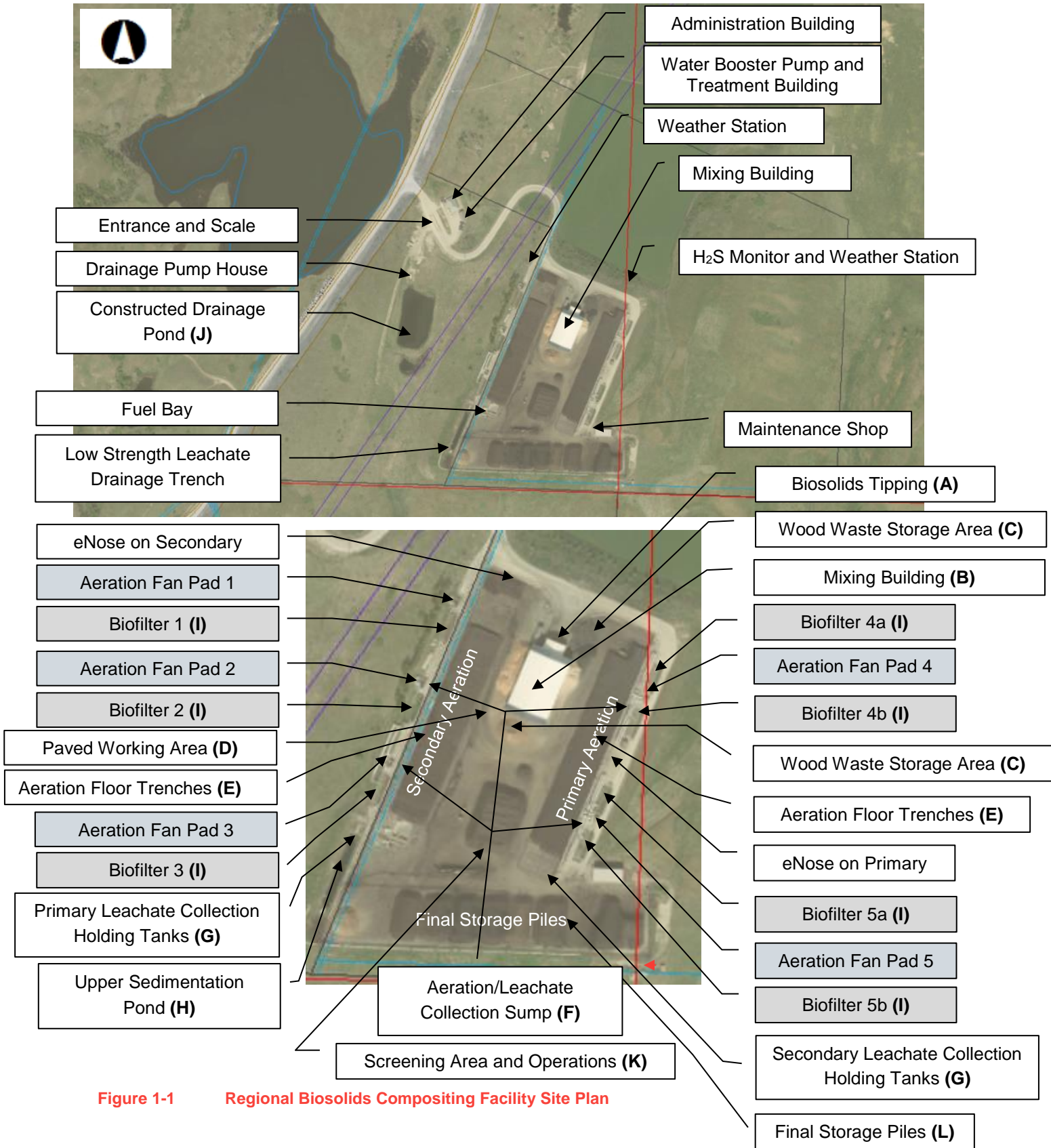


Figure 1-1 Regional Biosolids Composting Facility Site Plan

2 PREVENTATIVE MEASURES

This section describes the odour management preventative measures that occur at the facility.

2.1 BIOSOLIDS DELIVERY

Biosolids can release odours during transport. Trailers used to haul biosolids are covered. Trailers are equipped with a seal on the tail gate to prevent leakage. The City of Kelowna and the City of Vernon inject Bioxide, which is used for odour treatment, in the load during loading at the sewage treatment plant to mitigate odours from biosolids delivery. However, odour has been noted while passing or following the trucks. Procedures are in place to inspect trailers before they leave the treatment plants to make sure that biosolids are fully contained. Procedures and checks are in place to ensure that, prior to hauling, the trailer is checked to make sure that all biosolids are contained inside the trailer and that hatches are closed and the tailgate secured to prevent leakage. Truck operators are to clean their tailgates before leaving the facility.

2.2 SITE MANAGEMENT

Housekeeping activities:

– **Biosolids Tipping Area**

- Once per week, at random, check incoming loads of biosolids from Kelowna, Vernon, Lake Country and the Regional District of North Okanagan (RDNO). Check for:
 - Tailgate closed and secure – no leakage
 - Hatches closed upon arrival
 - Record on check list
 - Report any problems to your Supervisor

– **Mixing Building – Biosolids Tipping**

The facility is designed to contain odours within the coverall building. The doors are kept closed during non-working hours and in-operable doors are repaired promptly. Loads are generally received during working hours. Occasionally loads may be received after hours, but this is a rare occurrence, and these loads are covered with wood waste and mixed in as soon as possible.

- Daily Check:
 - At the end of the day make sure the doors are closed. Repair damaged or inoperable doors as soon as the work can be done.
 - (1) Record on check list
 - (2) Report any problems to your supervisor
- Weekly Check:
 - Observe tip, make sure biosolids are dropped into bay, not outside
 - Confirm that doors close and truck drivers know how to close them after tipping a load

– **Mixing Building – Mixing Area**

Mixing nitrogen rich biosolids with amendments high in carbon provides an ideal environment for bacterial action. Getting the right mix is the most important aspect of controlling odours. The mix is adjusted as required to create a C/N ratio and bulk density that is appropriate for composting.

Mixing is done inside an enclosed area with an Enviro-Processor batch mixer. The batch mixer is equipped with load cells that allow for accurate measurement of feedstock and water.

All loads of biosolids are mixed as soon as possible. Loads received during working hours are mixed before the end of the shift. Loads received during working hours that cannot be mixed are covered with wood waste until they can be

mixed. Loads received during non-working hours are contained inside the coverall building, and mixed as soon as possible.

- Procedure: mix biosolids and wood waste as soon as possible, using the proper recipe.
- **Paved Working Area**
 - Scrape and wash the asphalt surface as required to keep the surface clean. This is critical in the summer. Leachate can form and pond at the base of piles and in areas where it cannot drain to the drainage basin. It is a high source of odour. Leachate is removed by covering with compost, allowing the compost to soak up the leachate, and then the soaked up leachate is remixed into the finished compost.
- **Aeration Floor Trenches**
 - Routinely clean each aeration floor trench. This is a scheduled activity, twice a year.
- **Aeration / Leachate Collection System Sump**
 - Routinely pump out the sump with a vacuum truck. This is a scheduled activity, four times a year.
- **Leachate Collection Holding Tanks**
 - As the holding tanks fill with leachate pump them out with a vacuum truck. This is a scheduled activity, three times week.
- **Upper Sedimentation Pond**
 - As sediment builds up, remove it with an excavator. This is best done on a cool, windy day. The City is working on implementing a leachate treatment system to further minimize the risk of odour issues.
- **Biofilters**
 - Regular monitoring of the biofilter includes moisture, temperature, pH, Ammonia, Amines, and H₂S. This is a scheduled activity, occurring every 2 – 3 weeks. Moisture is monitored on a regular basis, with a target moisture content between 50 – 65%. Temperature is important in the winter and the amount of air may be adjusted to reduce the amount of cold air entering it. The strategy for odour management from the biofilter is to ensure that all operating parameters are continuously monitored and adjusted as needed.
 - Biofilter media is replaced annually, or sooner as necessary. During biofilter replacement the void space between under the biofilter, and the biofilter subfloor is also- flushed.
- **Biofiltration Cover**
 - All compost piles located in the primary and secondary compost zones are covered, at all times, with a layer of material that is at least 0.3 m thick. This material may be secondary teardown, oversized material (overs), a blend of secondary teardown and overs, or another appropriate covering layer of an appropriate type and thickness.
- **Drainage Pond Circulation**
 - A pump system is used to create circulation in the lower drainage pond. The City is working on implementing a leachate treatment system to further minimize the risk of odour issues.
- **Screening Area**
 - Screened overs are reused as a bulking agent in the process.
- **Final Storage Pile Area**
 - Piles are turned and water is added, as necessary, to ensure maturing of the final compost to comply with the Organic Matter Recycling Regulations (OMRR) composting material guidelines.

2.3 STANDARD COMPOSTING REQUIREMENTS AND PRACTICES

This section provides a broad summary of the composting process requirements. Refer to the Biosolids Composting Process Plan for more details. This table only serves as a guide, and operational experience in creating the best composting mix ultimately yields the best results.

The initial compost mix and pile heights are the key fundamentals for successfully composting and managing odour.

These operational practices will help mitigate instances of higher odour levels:

- Ensuring that hog fuel is used predominantly used for the wood amendment, supplemented by ground up dimensional lumber or yard debris
- Conduct twice a week checks for: bulk density, free air space, and moistures of the mix and feedstocks. The mix C:N ratio is calculated based on the feedstock C:N ratios periodically.
- Using mix ratios and pile heights consistent with the following capacity table (mix ratios are wood waste by weight divided by biosolids weight). Please note this table only shows idealized mix ratios, but ultimately mix ratios used are based on operator discretion.

Table 2-1 Idealized Mix Ratio Table

		Mix Ratio 4.0	
Process Phase	Pile Height (metres)	Retention (days)	Annual Incoming Biosolids Capacity (tonnes)
Primary	2.7	20 – 26 (target 24)	36,400 (2016 throughput: 28,746 tonnes)
Secondary	3.3	20 – 26 (target 24)	

The composting process includes both primary and secondary aerations stages. The aeration system, on both the primary and secondary zones, provides both positive and negative aeration systems. The positive aeration system pushes air through the composting piles. The negative aeration system pulls air through the composting piles. Part of the negative aeration system is a biofilter to treat the air that is pulled through the composting piles.

The anticipated average duration for aeration is 48 days (24 days of primary and 24 days of secondary). Compost that does not meet OMRR requirements after the anticipated duration of primary and secondary composting is re-blended into the feedstock for further processing.

2.4 ROUTINE / DAILY ACTIVITIES

The RBCF conducts routine / daily activities to ensure that compost operational procedures are not generating malodours which may impact the neighbouring community. These checks include the inspection and / or measurement of:

- The leachate drainage ponds and leachate holding tanks (Monthly, from April - October)
- Water usage (Weekly)
- Moisture content in the compost piles (Twice weekly)
- Moisture content in the biofilters, monitored (Twice weekly)
- Free air space, bulk density, and pH in the compost piles (Twice weekly)
- Nutrients, heavy metals in the finished piles (Monthly)
- Fecal coliform, and salmonella in the finished piles (As needed)
- H₂S, ammonia, and amines from the biofilters (Monthly)
- Biofilter temperatures using the ECS comptroller (Daily)
- PFRP, VAR, and temperature within the primary and secondary composting zones with the ECS comptroller software (Hourly)
- Odour units, H₂S concentrations, and weather data (Every 4 minutes for odour, every 30 minutes for H₂S)
- General house keeping

2.5 OTHER BEST MANAGEMENT PRACTICES AND EMISSION CONTROL TECHNOLOGIES FOR ODOUR CONTROL

The RBCF is constantly looking towards ways to progressively reduce and control odours occurring on-site. In the near future, the facility will be implementing:

- An upgrade of the leachate management system through the replacement of the current drainage pond and trench system with an approved leachate management system. This is expected to have a positive impact on potential off-site odour impacts due to the removal of the upper sedimentation pond and the constructed drainage pond, which can both potentially have very large odour impacts.

Should there be a need to further reduce and control odours on-site, the following best management practices and emission control technologies may potentially be used:

- Reduce volumes of material processed through the composting facility
- Full enclosure of the receiving (tipping) operations.
- Full or partial enclosure of the primary aeration composting operations. Negative aeration inside enclosure and biofiltration of odorous air.
- Full or partial enclosure of the secondary aeration composting operations. Negative aeration inside enclosure and biofiltration of odorous air.
- Enclosure of the biofilters, including installing a stack to allow for greater dispersion of odour from the facility

A comprehensive review of the effectiveness and costing for each of these best management practices or emission control technologies would be the first step before implementation.

3 ON-SITE ODOUR MONITORING AND AERATION PLAN

3.1 ON-SITE ODOUR MONITORING - CONTINUOUS

The major triggers for the Monitoring Plan will be based on the continuous measurements of odour, using electronic noses (eNoses) developed by Odotech for the monitoring of odour, and a hydrogen sulphide monitor. eNoses are located at the middle of the primary aeration area and the north end of the secondary aeration area. The hydrogen sulphide monitor is also at the north end of the site. Permanent weather stations are also provided at the northwest and northeast ends of the site.

The eNoses are part of OdoWatch® continuous odour measurement and monitoring system. The OdoWatch® system integrates meteorological data received from the weather tower and odour data from the eNoses, and then the system computes an atmospheric dispersion of odours. It displays the odour dispersion plume, colour-coded according to the odour concentration (odour units), superimposed on a site aerial map. This enables the operator a visualized glance of the site's odour impacts. The major benefit of the OdoWatch® is to provide quantitative odour measurements to provide a scientific discussion with the facility's neighbours and regulatory authorities, when discussing potential odour issues from the site.

These devices will continuously measure odour levels (in odour units) and hydrogen sulphide levels (in ppm). Every 4 minutes for odour levels and every 30 minutes for hydrogen sulphide the levels are recorded. The data can be used to automatically create graphs, tables or charts.

The eNoses undergo an annual maintenance and calibration, while the H₂S Sensors undergo maintenance and calibration twice a year. There is also a preventative maintenance contract with Odotech for the eNoses, who routinely check on the instrumentation remotely to ensure proper performance. It is recommended that within the next 5 – 7 years, or earlier if there is a significant change in feedstock material, a recalibration of the eNoses be conducted to relate odour units to a greater variety of sources and account for potential new feedstocks, and to update the dispersion modelling parameters as required.

3.2 ON-SITE ODOUR MONITORING – MONTHLY SAMPLES

The data from the continuous monitoring devices will be supplemented by odorous gas measurement at several locations on-site, conducted on a monthly basis.

The primary purpose of these measurements is to build up a database of information of typical odour levels throughout the site. Future grab sample odour measurements and odorous gas measurements can then be compared to these typical levels, and if there is a dramatic spike (or dip), action should be taken to determine the cause, and appropriate changes can be made.

The sample locations for the grab sample odour measurement and odorous gas measurements are shown on the plan on the following page and are:

- Fresh tipped biosolids area, within 5 minutes of being tipped (A)
- Mixing building, while mixing (B)
- Primary zone, positive air (C)
- Primary zone, negative air (D)
- Primary zone, air off (E)
- Biofilter intakes (F)
- Primary biofilter surface (G)
- Secondary biofilter surface (H)
- Secondary zone, one mid aged zone, turned to closed (I)
- Final storage piles (J)

SITE PLAN

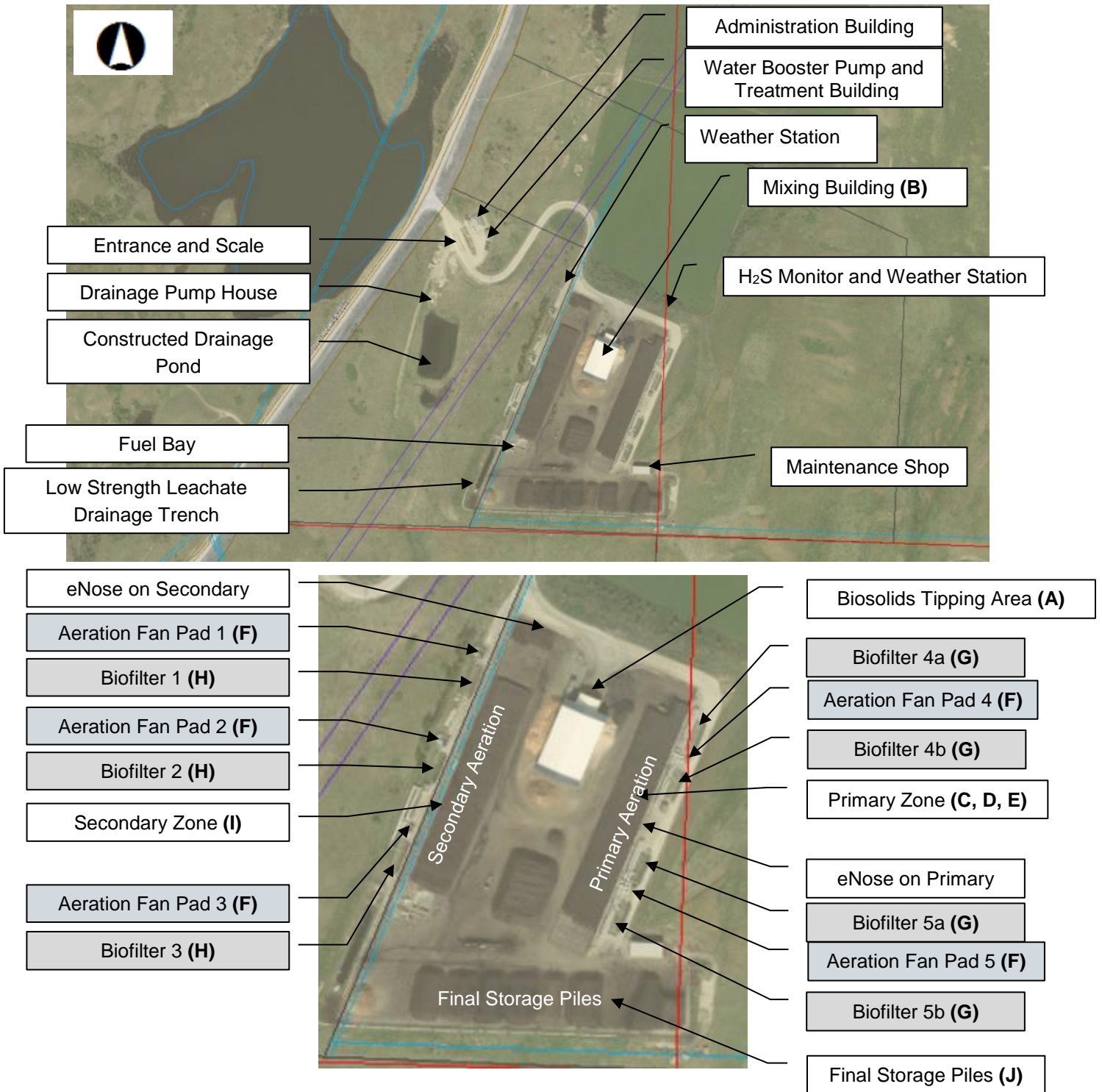


Figure 3-1 Regional Biosolids Composting Facility Site Plan with Odour Sampling Locations

The general sampling procedure is as follows:

- On the morning of the sampling day choose Pad 4 or 5 whichever has the most material loaded on it. Pick 3 mid-age zones and turn one off, one to negative and one to positive. Of the remaining zones turn 3 to negative, 2 off and 1 positive. Change as needed to accommodate empty zones. Leave the settings until the primary composting and biofilter samples have been taken.
- Reset all zones to automatic when sampling is complete.
- Gastec Sampling Equipment
 - NH₂ (amines), low range, 0.5 – 10 ppm, requires a 1-100 mL sample
 - NH₂ (amines), high range, 5 – 100 ppm, requires a 1-100 mL sample
 - NH₃ (ammonia), low range, 0 to 30 ppm, take a 1-50 mL or 1-100 mL sample
 - NH₃ (ammonia), high range, 2.5 to 200 ppm, take a 1-50 mL or 1-100 mL sample
 - Note date, time and ambient weather conditions. Update the spreadsheet later with wind speed and direction information from Odowatch.
 - Take “surface” temperature of sample area by holding the manual thermometer above the area at the same height as the sample will be taken. Avoid direct sunlight.
 - Sample by walking over the site holding the tubing as close as possible to the surface without pulling in any debris.
- Jerome H₂S Monitor
 - Plug the detector in the day before to ensure it is fully charged. Take 3 samples and record the average. Run a regeneration cycle on the analyzer at the beginning or end of each day.

3.3 ODOUR LEVEL THRESHOLDS

Desirable, higher, and maximum levels of measured odour and hydrogen sulphide were established in the November, 2010 version of the odour management plan. These threshold levels were reviewed as part of the current revision of the odour management plan (November, 2017) and it was deemed that these levels were still appropriate based on a review of the historical odour concentrations and H₂S readings, number of historical exceedances of these thresholds, and the number and nature of odour complaints against the RBCF. The only adjustment made was to change the 2 hour rolling averaging period to a 1 hour rolling averaging period for the odour level thresholds. A 2 hour rolling averaging period is still kept for the H₂S threshold levels.

Threshold levels are established as trigger points for action, as detailed in Section 3.4. These levels are as follows:

- Exceedance of the desirable levels: 50 OU/m³ at the property boundary for a rolling 1 hour time period, or 0.001 ppm H₂S for a rolling 2 hour time period, will lead to investigation of the cause and possible action
- Exceedance of a higher threshold: 75 OU/m³ at the property boundary for a rolling 1 hour time period, or 0.003 ppm H₂S for a rolling 2 hour time period, results in another set of actions
- Exceedance of the maximum level: 100 OU/m³ at the property boundary for a rolling 1 hour time period, or 0.005 ppm H₂S for a rolling 2 hour time period, results in another set of actions

The threshold levels should be reviewed routinely. Figure 3-2 below shows the property boundary alert point locations.

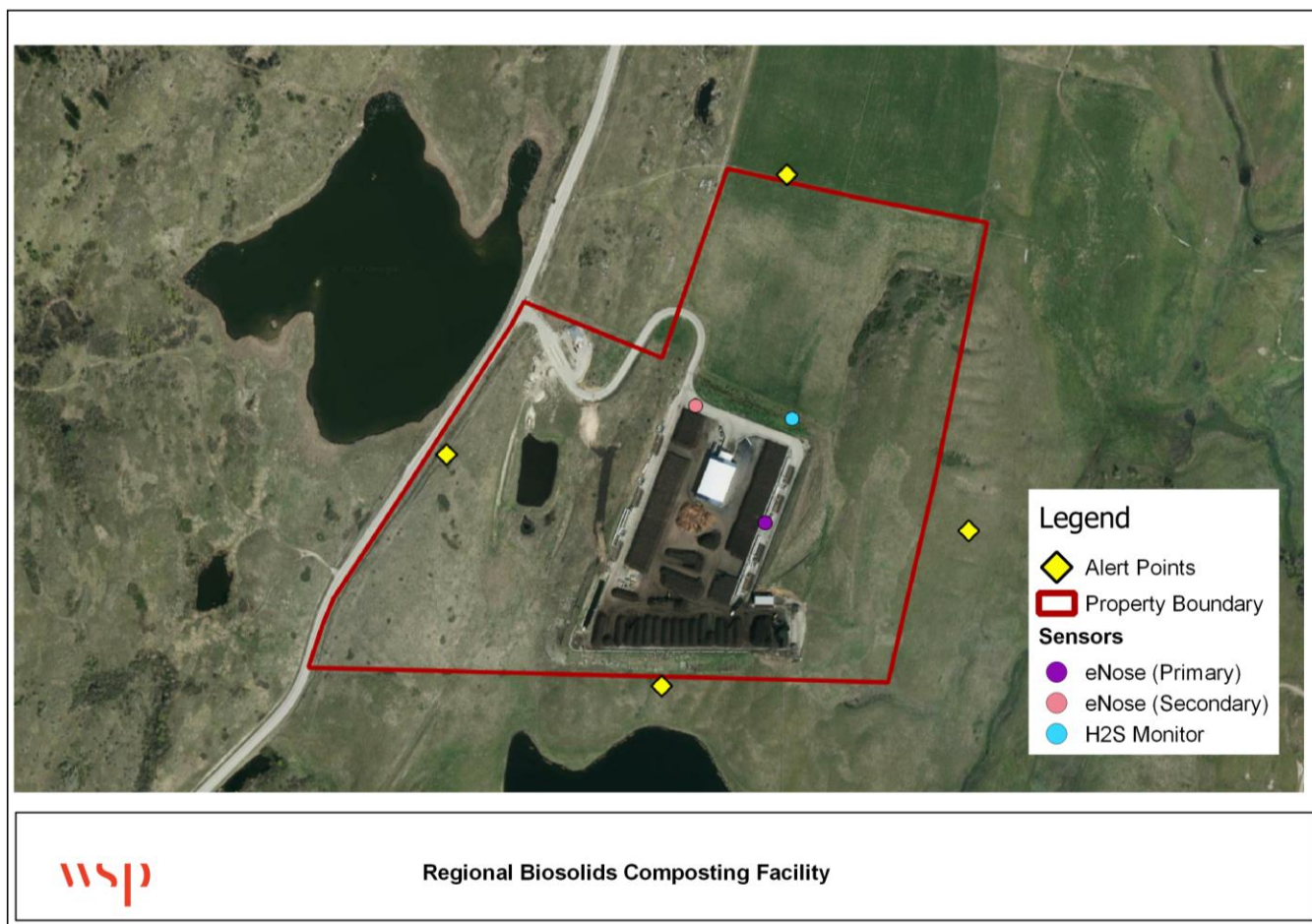


Figure 3-2 Property Boundary Alert Points

3.4 THRESHOLD ACTIONS

Different actions will be triggered depending on the odour level threshold that is exceeded. The threshold actions will be staged as follows:

- Stage 1 exceedance, triggered by exceeding the desirable levels of 0.001 ppm H₂S for a rolling 2 hour time period and/or projected odour intensity of 50 OU/m³ at the property boundary for a rolling 1 hour time period, will result in a **thorough site review**
- Stage 2 exceedance, triggered by exceeding the threshold of 0.003 ppm H₂S for a rolling 2 hour time period and/or projected odour intensity of 75 OU/m³ at the property boundary for a rolling 1 hour time period, will result in a thorough **composting process review and process adjustment**
- Stage 3 exceedance, triggered by exceeding the threshold of 0.005 ppm H₂S for a rolling 2 hour time period and/or projected odour intensity of 100 OU/m³ at the property boundary for a rolling 1 hour time period, will result in an **odour prevention activity**

3.4.1 STAGE 1 EXCEEDANCE ACTIVITIES

The purpose of the **thorough site review** is to make sure that all of the conditions necessary for proper odour management are in place. As well, if a site activity such as: biosolids delivery/dumping; hog fuel dumping; or setting pond cleaning has created the exceedance, this will be identified and documented.

The thorough site review will include the following:

- Check the H₂S and odour monitor calibration;
- Are the primary and aeration system controls set properly?
- Are the aeration zone sprinkler system controls set properly?
- Are the biosolids delivery protocols being followed?
- Are the aeration pile heights correct?
- Are the site management/housekeeping activities (i.e. preventative measures) being conducted properly?
- Check mix ratio, bulk density, free air space, moisture content.
- Check Comptroller for pile temperatures, positive and negative cycling.

Check lists and forms will be filled out to provide a record of the thorough site review and action (if any) that was required. See Appendix 1 for a Stage 1 Exceedance Form.

3.4.2 STAGE 2 EXCEEDANCE ACTIVITIES

The purpose of the **composting process review and process adjustment** is to determine if the compost mix or aeration process is within the suggested parameters. The hand held H₂S monitor and draeger tube odour gas measurement devices will likely be used to help pin point the significant odour source.

The compost process review will include:

- Comparison of hand held device measurements to historical data (in either table or graph format)
- Are the mix parameters (wood amendment quality; C:N Ratio; moisture content; mix ratio) within required parameters?
- Are the primary and secondary aeration time periods being achieved?
- Should there be adjustments to:
 - The aeration system control set points?
 - The sprinkler system watering durations?

Forms will be filled out to provide a record of the composting process review and action (if any) that was required. Refer to Appendix 1 for a Stage 2A Exceedance Form.

The **composting process adjustment** stage will be used if the actions conducted in either Stage 1 or composting process review (Stage 2A) are not successful in reducing the measured H₂S or odour levels.

The Stage 2B actions will consist of physical changes such as:

- Replacing the biofilter media
- Changing the pile heights
- Changing the cover thickness
- Changing the mix parameters

Forms will be filled out to provide a record of the composting process adjustments that were made. Refer to Appendix 1 for a Stage 2B Exceedance Form.

3.4.3 STAGE 3 EXCEEDANCE ACTIVITIES

The odour prevention activity stage will be used if the combination of Stage 1, Stage 2A, and Stage 2B actions are not successful in reducing the measured H₂S or odour levels.

The Stage 3 actions are:

- Using full time negative aeration in as many primary and secondary aeration zones necessary to reduce the odour levels to acceptable levels
- Diverting biosolids elsewhere

Refer to Appendix 1 for a Stage 3 Exceedance Form.

4 OFF-SITE ODOUR MONITORING

4.1 NEIGHBOURHOOD REPORTS

When a neighbourhood odour report (or complaint) is made these procedures will be used:

- A comparison / evaluation of the on-site Odowatch system will be made. This will include:
 - Time of day
 - Temperature, wind direction and speed and solar radiation data
 - Predicted odour levels at each property boundary at the time of the report
- An evaluation of whether or not an unusual on-site activity that creates higher than usual odour potential was taking place.
- An evaluation of whether or not a Stage 1, Stage 2 or Stage 3 exceedance was taking place.
- For information, the projected odour intensity at a nearby neighbourhood alert point will be recorded. The following Figure 4-1 shows the neighbourhood alert point locations. Please note this project only allows for the impact of the biosolids facility and does not allow for any other odour source.

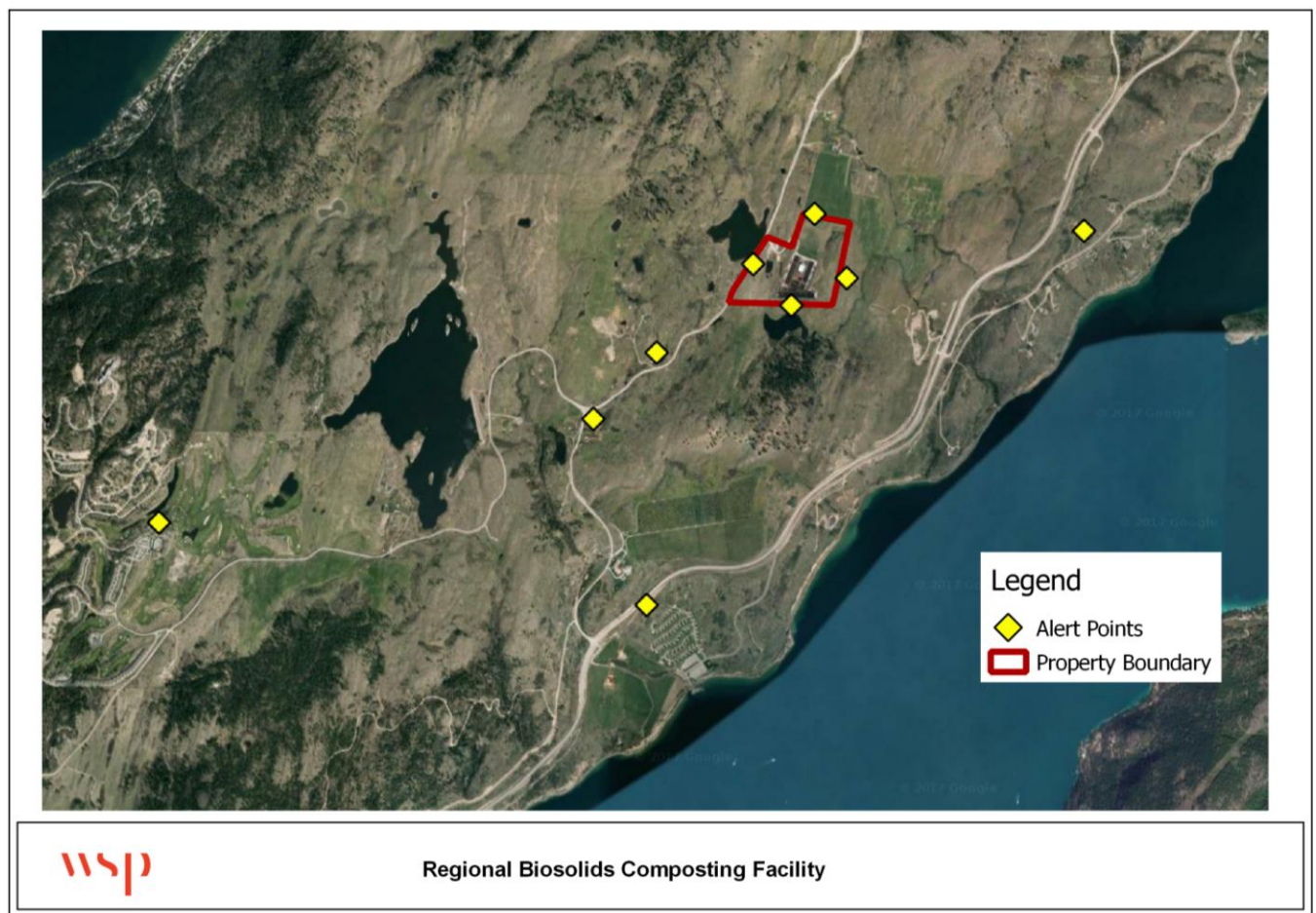


Figure 4-1 Neighbourhood Alert Points

- A response will be prepared for the creator of the neighbourhood (or complaint) report.
 - All responses and neighbourhood (or complaint) reports are available upon request.
-

4.2 SURROUNDING AREA (BACKGROUND) ODOUR MEASUREMENT

In June, 2009, a sampling location at Kekuli Bay Estates (High Ridge Gate) was established. The purpose of this was to define the level of odour experienced in this area when the compost odour was present.

On September 30, 2009 background odour samples were taken at a number of locations around the site. The purpose of these samples is to establish the background odour levels surrounding the facility. The locations are as follows and are shown in Figure 4-2 below.

- Commonage Road
 - Driveway to 637 Commonage Road (#1)
 - Driveway to 585 Commonage Road (French residence) (#2)
 - Entrance to Composting Facility (#3)
 - Driveway to 520 Commonage Road (#4)
 - Intersection of Bailey and Commonage Road (#5)
- Kalamalka Lakeview Drive / High Ridge Road
 - Kalamalka Lake Lookout (A)
 - Gravel Pull Out on East Side of Road (1.0 km north of Kekuli Bay Estates sign) (B)
 - 315 Kalamalka Lakeview Drive driveway (High Ridge Gate) (C)
 - Driveway at 429 High Ridge Road (D)
 - Entrance to Kekuli Bay Provincial Park (E)

These background measurements indicated that odour is present at a variety of intensities around the site. As well, the tests indicated that the composting site is not the only odour source in the area. Further analysis is available for the background odour samples.

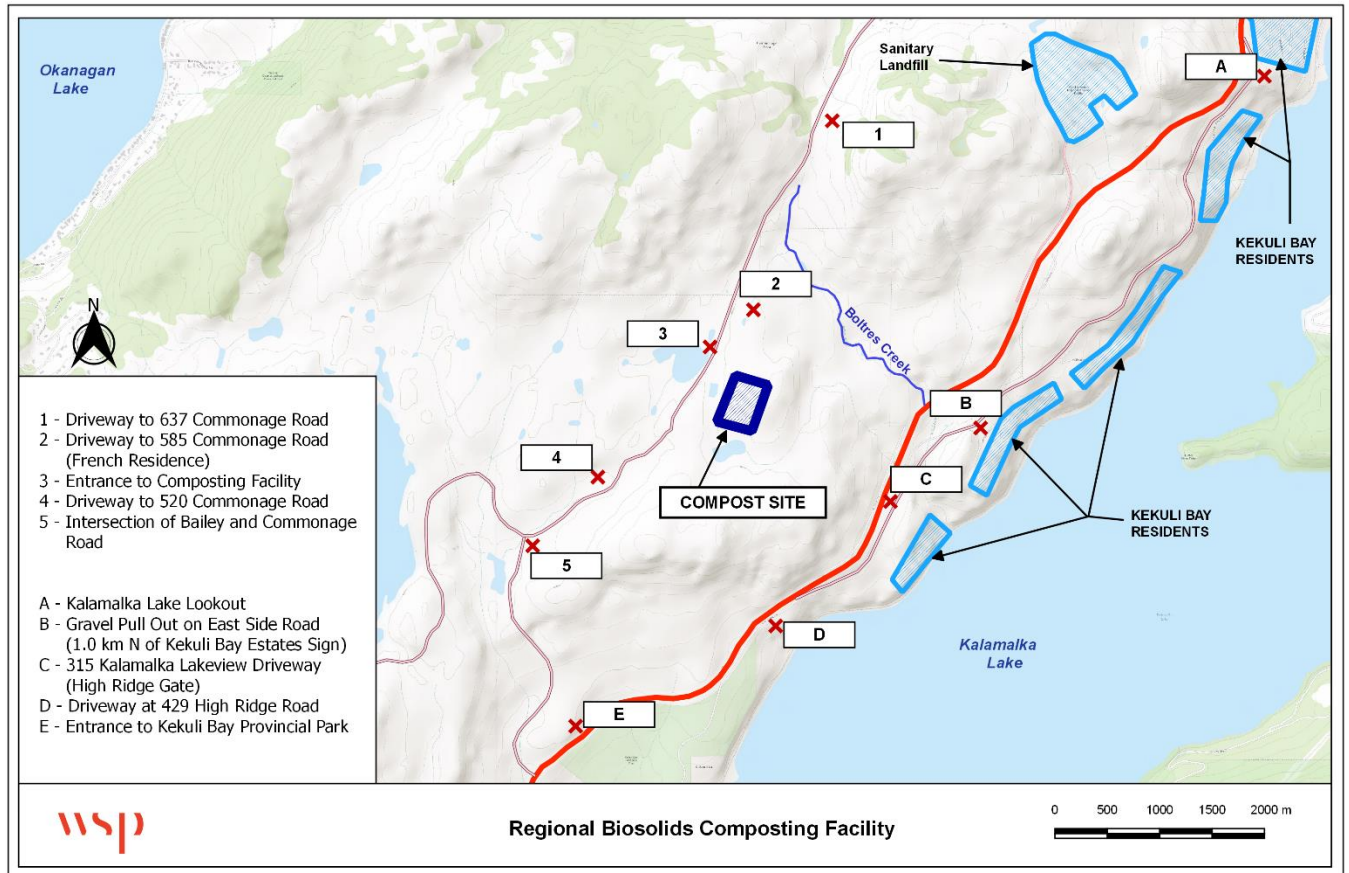


Figure 4-2 Background Odour Sample Locations

5 POTENTIAL REPORTS

5.1 POTENTIAL REPORTS AND COMMUNICATIONS

- Instantaneous Odowatch and H₂S gas measurement graphs and charts are available to the facility operators.
 - Suggested reports are:
 - Stage # 1 exceedance (analysis and action)
 - Stage # 2A exceedance (analysis and action)
 - Stage # 2B exceedance (analysis and action)
 - Stage # 3 exceedance (analysis and action)
 - Annual capacity and threshold level analysis
-

5.2 BIOSOLIDS COMMITTEE

- Receive a summary of all reports at each meeting
-

5.3 MINISTRY OF ENVIRONMENT


- Receive all Stage #1, #2, and #3 reports within 3 days of the exceedance
 - Receive all annual reports, as well as the studies listed in Permit 108537.
-

5.4 SURROUNDING AREA RESIDENTS

- Receive the response when they provide a neighbourhood report

APPENDIX

A-1 THRESHOLD EXCEEDENCE FORMS



**Commonage Biosolids Facility
 Stage 1 Exceedance Form**

Date: _____

If the rolling 1 hour average reading from the odour monitor exceeds 50 OU/m³ and/or the rolling 2 hour average readings from the Arizona Instruments H₂S monitor exceeds 1 ppb record the following:

H ₂ S/Odour monitor properly calibrated?
Current mix ratios
Recent mix ratios
Feedstock (wood amendment type)
Primary aeration pile heights
Secondary aeration pile heights

Aeration settings *note pressure differential inches H ₂ O for each node	Secondary Node 1
	Secondary Node 2
	Secondary Node 3
	Primary Node 4
	Primary Node 5

Sprinkler system settings	Secondary Side
	Primary Side

Biofilter media age and condition *note the last time the media was changed and any associated odours	Biofilter 1
	Biofilter 2
	Biofilter 3
	Biofilter 4A
	Biofilter 4B
	Biofilter 5A
	Biofilter 5B

Biosolids delivery protocols being followed? _____

Are housekeeping/site management activities current? _____

Within 3 business days of the occurrence, fax this form to:

Ministry of Environment
 Environmental Protection Division
 102 Industrial Place
 Penticton, BC V2A 7C8
FAX: (250) 490-2231

 Recorded By

 Approved By

Civic Operations
 Regional Compost Facility
 551 Commonage Road
 Vernon, BC V1H 1G3
 TEL 250 541-0501
 FAX 250 862-3330
 kelowna.ca



Commonage Biosolids Facility Stage 2A Exceedance Form

Date: _____

If the rolling 1 hour average reading from the odour monitor exceeds 75 OU/m³ and/or the rolling 2 hour average readings from the Arizona Instruments H₂S monitor exceeds 3 ppb record the following conditions:

Hand held H ₂ S monitor results and comparison to past (ie. can the significant odour source be identified).	
Are the mix parameters (wood amendment quality, C/N rates, moisture content, mix ratio) within required parameters?	
Are the primary aeration time periods (ie. 24 days) being achieved?	
Are the secondary aeration time periods (ie. 24 days) being achieved?	
Should the aeration system control points be adjusted?	
What are the new set points?	
Should the sprinkler system durations be adjusted?	
What are the new durations?	

Within 3 business days of the occurrence, fax this form to:

Ministry of Environment
 Environmental Protection Division
 102 Industrial Place
 Penticton, BC V2A 7C8
FAX: (250) 490-2231

Recorded By

Approved By

Civic Operations
 Regional Compost Facility
 551 Commonage Road
 Vernon, BC V1H 1G3
 TEL 250 541-0501
 FAX 250 862-3330
 kelowna.ca



Commonage Biosolids Facility Stage 2B Exceedance Form

Date: _____

If the rolling 1 hour average reading from the odour monitor exceeds 75 OU/m³ and/or the rolling 2 hour average readings from the Arizona Instruments H₂S monitor exceeds 3 ppb record the following:

Biofilter Media Replacement	
Primary Aeration Pile Height	
Secondary Aeration Pile Height	
Mix Parameter Changes:	
<ul style="list-style-type: none"> • Amendment Type 	
<ul style="list-style-type: none"> • C/N Ratio 	
<ul style="list-style-type: none"> • Mix Ratio 	
<ul style="list-style-type: none"> • Moisture Content 	

Within 3 business days of the occurrence, fax this form to:

Ministry of Environment
 Environmental Protection Division
 102 Industrial Place
 Penticton, BC V2A 7C8
FAX: (250) 490-2231

Recorded By

Approved By

Civic Operations
Regional Compost Facility
551 Commonage Road
Vernon, BC V1H 1G3
TEL 250 541-0501
FAX 250 862-3330

kelowna.ca



Commonage Biosolids Facility Stage 3 Exceedance Form

Date: _____

If the rolling 1 hour average reading from the odour monitor exceeds 100 OU/m³ and/or the rolling 2 hour average reading from the Arizona Instruments H₂S monitor exceeds 5 ppb record the following:

What odour prevention activity will be used?

Use of Full Negative-Aeration	
Biosolids Diversion	

Within 3 business days of the occurrence, fax this form to:

Ministry of Environment
Environmental Protection Division
102 Industrial Place
Penticton, BC V2A 7C8
FAX: (250) 490-2231

Recorded By

Approved By