Drainage Management Plan

Birch Airfield Composting

Report produced for **Birch Airfield Composting Services Limited**

Provided by Walker Resource Management Ltd (WRM)

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1.2	09/04/2024	Amendments following client review
2.0	17/04/2024	Second Issue

CONTENTS

1.0 INTRODUCTION

1.1 Site Address

Birch Airfield Composting Services Limited
Birch Airfield,
Birch,
Blind Lane,
Colchester, Essex
CO5 9XE

Site Grid Reference: Easting 591122, Northing 219697

1.2 Site Description

The Birch Airfield Composting Limited (hereon referred to as BACS) site is located on an old RAF airfield and in a predominantly rural area of an agricultural nature and is situated approximately 3km north of Tiptree and 10km southwest of Colchester. The nearest residential property is approximately 570m north north-east of the Birch Airfield site.

The site is an open windrow composting the treatment of green biodegradable wastes to produce PAS 100 certified compost (0-10mm, and 0-20mm) and the blending of screened inert soil waste with 0-10mm compost to produce a topsoil certified to BS 3882. The site comprises of three areas:

- The reception area where waste is tipped and inspected.
- The operational area where the waste shredded, windrows formed and aerated, and where inert waste soil is blended with compost.
- The storage area where the composted material is stored, awaiting final use off-site.

This site is also equipped with a port-a-cabin site office providing a mess room, toilet and wash facilities and hot and cold water.

1.3 Site Setting

The facility is situated within a Total Catchment Source Protection Zone (Zone III) (Figure 1). The Environment Agency defines a Total Catchment – SPZ3 as the following:

"This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point."

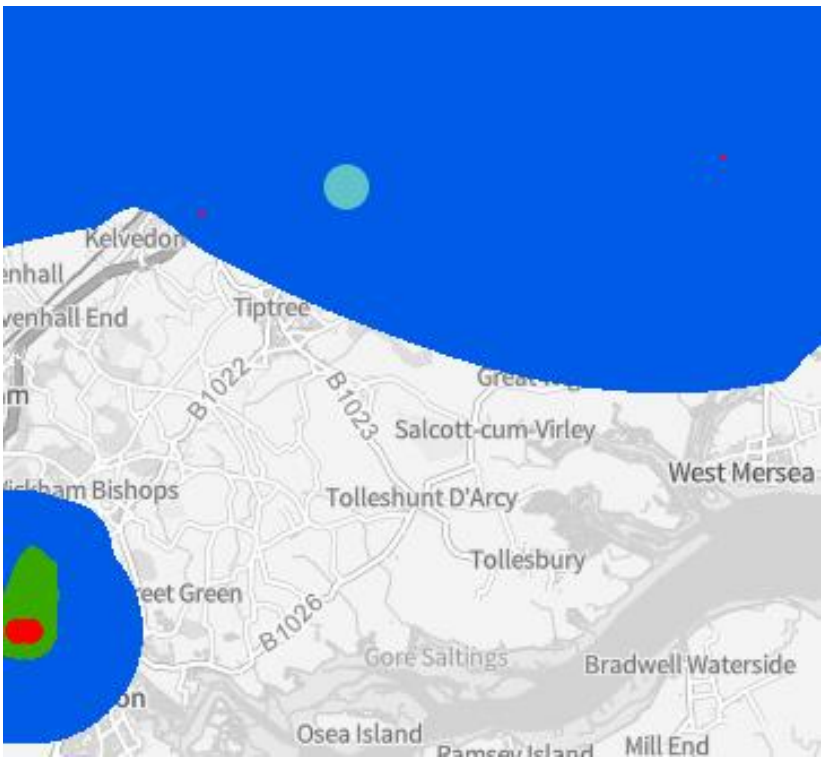

Figure 1 - Source Protection Zone Designation

The site is not located within a flood zone designation, the nearest flood zone is approximately 1km northwest of the site (Figure 2).

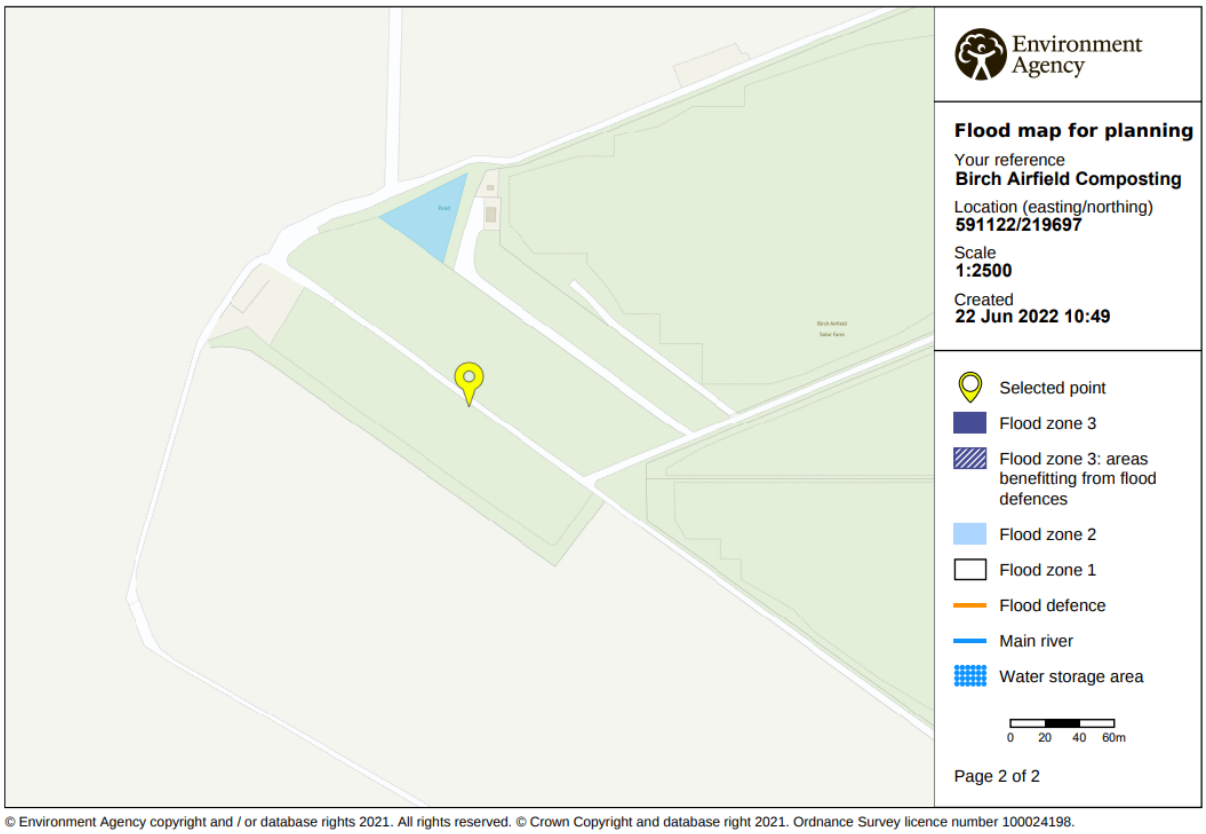

Figure 2 - Flood Zone Map

2.0 SOURCES OF LIQUID REQUIRING MANAGEMENT

The management of water at the BACS facility incorporates several sources of water that actively fall within the control of this management plan. Sources of water that require management control include:

- **Clean water**: surface water/rainwater runoff from buildings and on the non-operational areas of the site within the site boundary as a result of direct precipitation.
- **Leachate**: surface water runoff from all areas of impermeable concrete within the site boundary as a result of water used for vehicle washdown and water addition to compost.
- **Foul Water**: from the onsite welfare facilities.

3.0 DRAINAGE SYSTEM

3.1 Overview

A plan showing the drainage system for managing waters is provided as BACS – Site Drainage Plan. The table below clarifies the basic overview of how waters are managed on site at the different process areas.

Table 1 - Overview of Drainage Management Systems

Process Area	Surface/Rainwater	Leachate	Foul Water
Composting Pad	**Source:** Precipitation that lands on surfaces within the site area. **Management:** Site is equipped with a dedicated drainage system to control surface water and rainwater that accumulates on site. The original composting pad is equipped with an engineered fall to the middle of the pad. There are four silt traps/gullies running along the track in the middle of the site. It is then piped to the on-site lagoon. For the site extension, falls are constructed into the concrete pad directing leachate to five silt traps attached to underground pipework that runs north-westerly along the base of the windrows and then northerly into the new lagoon. **Storage:** 1,696m^3 original lagoon. 2,296m^3 new lagoon.	**Source:** All process waters generated from the OWC process. **Management:** Site is equipped with a dedicated drainage system to control leachate generated on site. Any leachate generated on site is captured within the drainage system and stored within the lagoon. **Storage:** 1,696m^3 original lagoon. 2,296m^3 new lagoon.	N/A
Weighbridge office roof/ vehicle store roof/maintenance shed roof.	**Source** Precipitation that lands on building roofs. **Management:**	**Source:** N/A	**Source:** Welfare facilities. **Management:**

Process Area	Surface/Rainwater	Leachate	Foul Water
	Direct precipitation that lands on the roofs runs directly onto the concrete and subsequently directed into the drainage system. Any excess water on the concrete gets swept using a teleporter and is then piped to the lagoon. **Storage:** 1,696m^3 lagoon.		Drains to a septic tank via a dedicated foul water drain.

In line with Best Available Technique for point-source releases to surface water or sewer, the following general principles will be adopted and applied at the facility to control emissions to water:

- Water use will be minimised, and wastewater reused or recycled where possible;
- Contamination risk of process or surface water will be minimised;
- Where any potentially harmful materials are used, measures will be taken to prevent them entering water or wastewater systems;
- Where appropriate the facility will consider filtration/osmosis or other techniques to allow site water to be cleaned for return to the process; and
- Where prevention is not possible, the emissions benchmarks will be achieved.

3.2 External Site Area

The original site is covered in 160mm thick concrete. The entire site foundation is a comprised of 300mm of crushed, mainly concrete, hardcore. A layer of terram sheeting runs beneath the concrete hardcore. The extended site area also utilises the site materials and layers for its construction, to ensure replication of the original area. The geology beneath the concrete hardstanding is Heavy Clay Subsoil. All waste storage, including storage of quarantined waste, and composting related activities take place on this concrete hardstanding.

The original OWC area is predominantly surrounded with soil bunds approximately 4m wide at the base and 1m high with a 2m wide top. The aspect adjacent to the lagoon features a piped ditch covered with stones. The OWC extension area features a perimeter bund that runs south-westerly along the southern edge of the windrows and then north-easterly along the eastern edge of the concrete area. This bund is 3m wide at the base, 0.5m wide at the top and 1m high. A further perimeter bund is located on the edge of the field adjacent to OWC extension area to the southwest of the site. This bund runs northwesterly and then northerly to the west of the new lagoon. It is 5m wide at the base, 1m at the top and 2m high.

The original surface of the composting base is equipped with an engineered fall to the middle of the composting pad. There are four silt traps/gullies running along the track in the middle of the site (as marked on BACS – Site Drainage Plan 002). Each silt trap/gully is attached to a drain. For the site extension, falls are constructed into the concrete pad directing leachate to five silt traps attached to underground pipework that runs northwesterly along the base of the windrows and then northerly into the new lagoon.

At the northern exit of the site there is a shallow sleeping policeman (100mm long x 500mm wide) along the curtilage to make sure any liquids are contained within the working area. The slopes on the approaching runways mean that little if any road water will enter the site from outside the composting area. Most of it will run off to either side of the runways.

3.3 Rainwater/Surface Waters

Any rainwater/surface water than accumulates on the external composting pad is directed to the drainage system described above. Any collected rainwater/surface waters are directed to the leachate lagoon for recirculation onto the compost piles during the first 7 days of the sanitisation phase. The lagoon water levels are inspected on a daily basis and shall be reduced when the collected liquids reach >75% of capacity.

3.4 Exisiting Leachate lagoon

The lagoon is a triangular shape with equal sides 45m x 45m x 45m at ground level with a freeboard of 0.75m with sloping side of 1 in 2. The lagoon has the following dimensions:

- Area at ground level= 877m^2
- Area at top water level- 756m^2
- Water storage depth= 3m
- Freeboard to ground level= 0.75m
- Base area= 375m^2
- Storage capacity to top water level= 1,696m^3

The lagoon is surrounded by soil bunds with the following dimensions: 1m x 4m x 2m (height x base width x top width).

3.4.1 New Leachate Lagoon

The new lagoon is rectangular in shape (20m l x 28m w) with a 0.75m freeboard. The lagoon has the following dimensions:

- Area = 560m^2
- Water Stroage Depth = 4.1m
- Storage capacity to top water level = 2,296m^3

The lagoon has a bund along the western edge with the following dimensions: 2m x 5m x 1m (height x base width x top width).

3.5 Roof Drainage

Direct precipitation that lands on the roofs runs directly onto the concrete and is subsequently directed to the drainage system (as described above). Any excess water on the concrete gets swept using a teleporter and is then piped to the lagoon. Any collected rainwater/surface waters are directed to the leachate lagoon for recirculation onto the compost piles during the first 7 days of the sanitisation phase.

3.6 Staff Welfare Facilities

There are staff welfare facilities located within the site office consisting of a mess room, toilet and wash facilities. All foul water generated onsite drains to a septic tank via a dedicated foul water drain. No foul water comes into contact with the surface water drainage system. The septic tank is emptied and cleaned out at regular intervals by the company's nominated sewage contractor.

4.0 SECONDARY CONTAINMENT SYSTEMS

The secondary containment systems for the site are described below.

4.1 Soil Bunds

The original composting area is within impermeable bunded clay walls and has storage areas to either side of the central access road on Birch Airfield. The site is surrounded with soil bunds approximately 4m wide at the base and 1m high with a 2m wide top. The OWC extension area features a perimeter bund that runs southwesterly along the southern edge of the windrows and then northeasterly along the eastern edge of the concrete area. This bund is 3m wide at the base, 0.5m wide at the top and 1m high. A further perimeter bund is located on the edge of the field adjacent to OWC extension area to the southwest of the site. This bund runs northwesterly and then northerly to the west of the new lagoon. It is 5m wide at the base, 1m at the top and 2m high.

The bunds are formed from excavated clay subsoil from the site and consolidated by tracking in with a tracklayer tractor. The bank slopes are 1 in 1.5 which will hold firm on this soil type. The site slopes broadly from southwest to northeast by between 0.6m and 1.0m, giving general natural site falls of about 1 in 200. The soil bunds are covered in a 100mm layer of topsoil and grassed down. The bunds are built on the subsoil and not on the edge of the prepared composting surface. As such they are keyed into the subsoil forming a liquid seal. These bunds will not be used as retaining walls for the compost but more as a demarcation of the site edges and also to usefully utilise the soil excavated to form the lagoon.

At the northern exit there is a shallow 100mm x 500mm wide sleeping policeman along the whole side to make sure any liquids are contained within the working area. The slopes on the access road mean that little if any road water will enter the site from outside the composting area. The majority of this water will run off to either side of the access road. The whole area is surrounded by a belt of trees indigenous to the area to improve the appearance.

4.2 Diesel Tank

The site is equipped with a diesel tank with a capacity of 3,000 litres. The tank is bunded to 110% of its capacity and is sited on impermeable concrete. The tank on site will:

- Be impermeable and resistant to the stored materials;
- Be designed to catch leaks from tanks or fittings;
- Be subject to programmed engineering inspection (normally visual but extending to water testing every 6-12 months or where integrity is in doubt); and,
- Be inspected on a daily basis.

Any defects observed will be reported immediately, and remedial works undertaken as soon as reasonably practicable following identification. In the event of a spillage, Mobile Spillage Kits are located in the maintenance shed and operatives are trained to follow the operator's Spillage Procedure. The diesel is used for refuelling plant and machinery on site.

Access to the BACS site is strictly controlled and the entrance to the site is kept locked outside of operational hours.

5.0 SYSTEM MANAGEMENT

The following section outlines the site requirements for managing surface waters and keeping management procedures up to date and in line with current site activities.

5.1 Monitoring

The processing area is inspected on a regular basis to ensure no cracking, pooling or prevention of free-flowing runoff to the drainage system. The results of the inspections are recorded in the Site Diary together with any remedial actions that are considered proportionate to the nature of any faults found.

The lagoon water levels shall be inspected on a daily basis. Water levels and shall be reduced when the collected liquids reach >75% of capacity. Removed leachate shall either be spread onto designated agricultural land under an Environment Agency approved deployment or disposed of using a suitably qualified liquid waste disposal contractor if required. The water level inspections shall be recorded on the 'Daily Inspection sheet'.

5.2 Routine Maintenance

All drainage systems are regularly inspected and maintained by the site manager and recorded in the site diary, at least on a weekly basis. The site manager initiates regular inspection and cleaning of building gutters, gullies, drains and storage tanks at regular intervals. The results of the inspections will be recorded together with any remedial actions that are taken. The frequency of inspection will be increased at times of higher risk under the direction of the site manager.

Routine maintenance of the drainage system within the site includes the following:

- Clearance of growing or fallen vegetation,
- Repairing any damage caused by operational activities,
- Removal of any excess accumulations of sediment,
- Temporary repairs are carried out as appropriate, with permanent repair works commencing within 28 days of the defect being recognised, unless it is causing an immediate problem.
- Cleaning of building gutters, gullies, drains and storage tanks.

All maintenance activities are recorded within the Site Diary.

5.3 Management Review

This Drainage Management Plan is kept up to date and in line with the Management System for the overall operational activities carried out on site. The plan is reviewed at least annually, or as required by changes in operational procedures or incidents that require review.

5.4 Emergencies

The emergency response to drainage system failures is provided within BAC - Accident Management Plan.

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