SGM WASTE MANAGEMENT FACILITY

SGM05 - DRAINAGE STRATEGY

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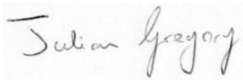
Prepared by	Julian Gregory	Signature 	Date 24/01/25
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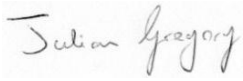
Authorised by	Julian Gregory	Signature 	Date 08/02/25

Document Control			
Rev	**Date**	**Purpose**	**Prepared by**
01	July 25	To address comments from NRW and updates to the site.	Tom Meads

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1. SITE DETAILS:

Name of the applicant	SGM Waste Management
Activity address	Sluice Farm Broad Street Common, Peterstone Wentloog, Cardiff, United Kingdom, CF3 2TN
National Grid Reference	ST 25327 79395

This Drainage Strategy has been prepared for SGM Waste Ltd waste management facility located at Sluice Farm, off Wentloog Avenue, Peterson Wentloog, Cardiff.

The site forms part of the family farm and is an agricultural diversification business.

SGM Waste Ltd proposes to operate a Domestic, Commercial and Industrial Waste Transfer Station, with Treatment and to process Inert Construction and Demolition Waste at the facility, under a Bespoke Environmental Permit.

1.1 At Risk Materials Stored at the SGM Waste Facility

The site is permitted to accept:

- Domestic, Commercial and Industrial wastes – predominantly segregated and mixed skip waste;
- Oils, coolants and other COSHH substances, used in the servicing and maintenance of plant and vehicles;
- Inert waste i.e. wastes which do not contain organic materials or liquids. Most of the raw materials for the process are construction and demolition wastes and excavated soils sourced through construction works.

Small volumes of waste produced during the operation of the facility will be stored on site for short durations pending collection by the waste management contractor. These include canteen waste, packaging waste, plant and vehicle servicing wastes. Maximum volumes of these materials to be stored at any time are 1 1100l Euro Bin for mixed wastes and 1 x 240l wheelie bin for dry recyclables. These do not form part of the permitted activities and will be removed by a third party Waste Management Company as part of the operation of the site.

2. SITE SENSITIVITY:

Information reviewed in the development of this document includes:

Environmental Land Quality Data Search – Groundsure - 2024

2.2 Geology:

Hydrogeology:

This section should be read in conjunction with the Groundsure Enviro Insight Geo and Environmental Report contained within SGM04 – Site Condition Report.

The superficial aquifer beneath the site has been designated as a Secondary Undifferentiated Aquifer, due to the variable characteristics of the rock type underlying the site.

The bedrock aquifer underlying the site has been designated as a Secondary B Aquifer, due to lower permeability layers. A small Principal Aquifer has been identified approximately 82m S of the site. This has been designated due to high intergranular and / or fractured permeability, which may provide a high level of water storage and may support water supply / river base flow. This lies in a circle beneath a section of the Tarwick Reen, although no interconnection is suggested.

The bedrock aquifer has been designated as a Secondary B Aquifer.

Within the Groundsure report, Groundwater Vulnerability has been assessed as Secondary superficial aquifer, high vulnerability (refer to Section 5.3 of the Groundsure report in Appendix 1). However Superficial Permeability has been assessed as Flow Type: Intergranular, Maximum Permeability: Moderate and Minimum Permeability: Very Low.

The site is not within a Source Protection Zone. The nearest licensed abstraction point to the site is 1955m north of the site. There are no potable water abstractions within 2000m of the site.

Two boreholes have been identified within 500m of the site, both of which are on the western side of Tarwick Reen.

Surface Water:

The Tarwick Reen flows along the sites western boundary in a north south direction, discharging into the Severn Estuary approximately 300m downstream, via a sluice system.

The Rhosog Fawr Reen flows along the sites southern boundary in an east west direction, discharging into the Tarwick Reen.

There is a small section of reen within the western section of the site, which discharges into the Tarwick Reen, via a high level pipe. During site visits, no flow has been noted within this and it is believed that this form part of the surface water drainage system for the farm. It is proposed to utilise this as an attenuation features for surface water flows, from the inert waste area, with this discharging via a full retention hydrocarbon separator.

Due to the sluice separating the reens from the Severn Estuary, they are not affected by normal tidal action.

River and Coastal Flooding:

The site has been assessed as being at low risk from river and coastal flooding, with no recorded historical flood events. Flood defences have been constructed along the edge of the Severn Estuary.

3. DRAINAGE STRATEGY RATIONAL

This Strategy has been prepared in line with Pollution Prevention Guidelines 3 (PPG3) Use and design of oil separators in surface water drainage systems (this has been withdrawn but much of the information is still relevant) and with the Oil Storage (Wales) regulation. This Strategy should be used in conjunction with Drawing Number 2154-SGM-002 – Drainage Layout.

This drainage strategy therefore proposes controls to safeguard the reens surrounding the site, the receiving Severn Estuary (SSSI/SAC/SPA/Ramsar Site) and the underlying aquifer.

Waste operations at the site are spilt into two distinct activities:

- The storage, sorting and processing of Domestic, Commercial and Industrial Waste, received as segregated and mixed skip waste.
- The storage and processing of Inert Construction and Demolition Waste – processing confined to screening into various size fractions and the removal of anthropogenic materials, using a trommel.

The key contaminants likely to be found within surface water runoff at the site are:

- Suspended solids from inert wastes, stone surfaces at the site and surrounding agricultural activities;
- Hydrocarbons from plant and vehicles;
- Unknown contaminants from domestic, commercial and industrial wastes, including: coatings and preservatives from wood, rainwater from skips and water draining from saturated wastes. Liquid wastes are not permitted at the site and will be rejected.

The overall drainage strategy for the site is therefore to confine all wastes which could contain unknown contaminants to an area which drains into a sealed drainage system and

then into a tank (Drainage Ref: SWDP02), where runoff can be stored and then tested for a range of common contaminants, prior to being uplifted by tanked and removed to a Permitted Facility to be treated.

All other areas of the site will drain to an attenuation pond to remove suspended solids and then a full retention hydrocarbon separator to remove hydrocarbons. The water will then discharge into Tarwick Reen and subsequently into the Severn Estuary (Drainage Ref: SWDP01).

3.2 Drainage Rational Inert Construction and Demolition Waste Area:

Key identified contaminants from this area will be suspended solids and hydrocarbons from vehicle movements.

Inert wastes are stored on a combination of impermeable and semi-permeable (graded crushed stone, above a geotextile separation layer) surface. These surfaces have been laid with a 1 in 200 crossfall towards site drainage.

Drainage takes the form of an open ditch along the southern edge of the inert waste storage area, which falls west to east into a manhole at the eastern end of the ditch. Coarse suspended solids will settle out along the ditch and will be removed by periodic cleaning out of the ditch using an excavator. The manhole at the eastern end of the ditch outfalls into an attenuation pond, which runs in an east west direction parallel to the end of the inert waste storage area. A ditch has been chosen for ease of maintenance, with volumes of suspended solids anticipated, which can be dredged out of the ditch. The outfall from the ditch into the manhole will be 200mm above the ditch invert, this will provide capacity for heavier suspended solids to settle out within the ditch and will prevent blockage of the manhole and pipework.

This will discharge into an attenuation pond, with a surface area of approximately 200m^2, as a linear pond to maximise efficiency. The inlet into the pond will be below water level to minimise turbulence and the outfall pipe will have a 90 degree bend so that the mouth of the pipe sits flush to the water surface, acting as a circular weir. This means, water will always be taken from the surface of the pond, which will always be the cleanest section of the water column (with the exception of hydrocarbons, floating on the surface of the pond)

A full retention hydrocarbon separator will be installed between the western end of the attenuation pond and the outfall into Tarwick Reen – SWDP01.

3.3 Drainage from Trafficked Areas of the Site:

Drainage from trafficked areas of the site, will fall into back drop gullies, constructed at low points on the site. These will discharge into the attenuation pond, via a series of 225mm pipes, with manholes at changes of direction and level.

Key contaminants of concern in runoff from trafficked areas will be suspended solids and small amounts of hydrocarbons from vehicles. There may also be some de-icing products (road salt) dragged from the surrounding highways during the winter.

The attenuation pond will remove suspended solids and the full retention hydrocarbon separator will remove hydrocarbons from the water prior to discharge – SWDP01. Plants will be encouraged to grow within the attenuation pond to assist with the aeration of the water and the removal of residual contamination.

3.4 Drainage Rational for Domestic, Commercial and Industrial Waste Area:

Domestic, Commercial and Industrial Wastes are tipped and sorted within a Materials Recovery Facility Building, which sits on an impermeable concrete slab. All runoff from the interior of the MRF is collected within a perimeter channel drain and channelled to a 30,000l underground tank via a sealed drainage system comprised of 125mm plastic pipes. This drainage is within the building and hence will not collect rainwater, but only water trapped within skips / bins from skips being left in the open during rain.

Water from the roof of the MRF are collected in gutters either side of the building and is channelled into 30,000l tanks on each eastern corner of the building – SWDP02. This water is used for dust suppression within the building.

Once sorted, individual waste streams are placed into skips, which are either removed from site as soon as they are full, or are stored for no more than 48hrs before being removed from site. These skips are stored on an impermeable concrete surfaced area to the west of the MRF and are covered with tarpaulins to prevent the ingress of rainwater.

Runoff from rainwater falling onto this slab is directed to a gully within the yard and is then channelled to the attenuation pond to remove any suspended solids which may be present and this is then discharged into Tarwick Reen via the hydrocarbon separator, as described above

Liquid wastes are not permitted on site and any waste consignments which include liquid wastes will be rejected. Full skips are stored on a concrete slab, which drains into the site drainage system (see below). Full skips are covered with tarpaulins to prevent the ingress of rainwater.

3.5 Drainage from Building Roofs:

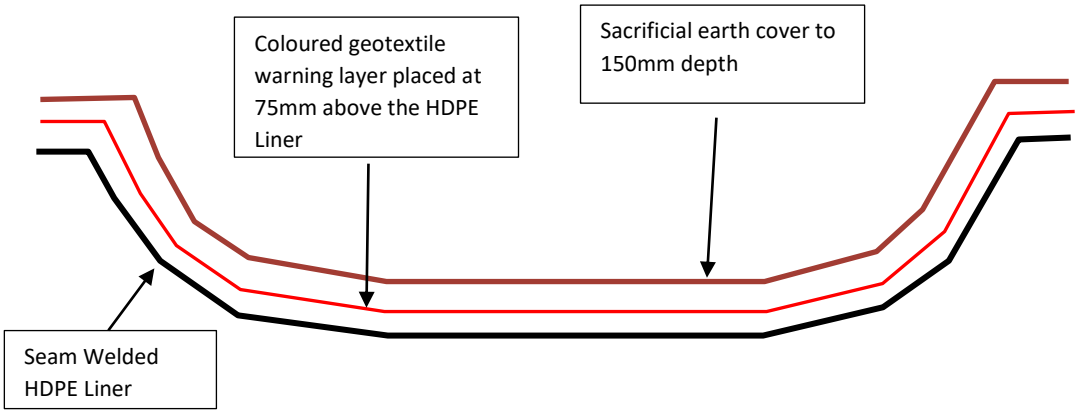
The roof of the Materials Recovery Facility (MRF) building will drain into gutters either side of the building and be channelled into 30,000l tanks on each eastern corner of the building. This water is used for dust suppression within the building.

The roofs of the offices, workshop and machinery store buildings are covered and runoff from these roofs will be captured in guttering and released either into areas of surrounding

vegetation, or onto actively drained areas of the site, from where they will discharge via the attenuation pond.

4. ATTENUATION POND DESIGN

The pond has been designed as a linear 4.5m x 45m pond, with a depth of approximately 1.2m in the centre. The pond has been lined using an impermeable HDPE Liner, which has been covered with a 150mm deep sacrificial soil layer. 75mm into this sacrificial layer will be located a red geotextile indicator layer. This will act as a warning to machinery operators during de-silting operations, that they are close to the liner and will prevent puncture of the liner.



Cross Section through attenuation pond illustrating HDPE Liner, Coloured geotextile indicator layer and sacrificial earth cover (not to scale)

The SGM Waste facility accepts a broad range of inert materials. This will result in a wide range of particle sizes being mobilised by works at the site. We have therefore assumed that particles to be settled will be a combination of sand, silts with some clay particles. The pond has been designed to remove all but the smaller <0.05 microns, particles during peak flow conditions. These will be colloidal and will remain in suspension for a significant period of time.

Using the H R Wallingford Greenfield Runoff Estimator, the 1 in 100yr runoff rate for the site is 3.93l/s (14.11m^3/hr), this will give a residence time of 1.42hrs during a 1 in 100yr rainfall event. During this time, suspended particulates within the water column will need to settle approximately 100mm to prevent being dragged over the outfall weir. Due to the variable nature of the soils likely to be encountered at the site, we have not undertaken a long tube

settlement test, but from data for similar sites we believe that particles up to 0.01mm will adequately settle out during peak flow events.

5. INTERCEPTOR DESIGN:

Bypass Hydrocarbon Interceptor installed at the discharge point from all ponds. The area draining into the attenuation pond, includes the site access and all access roads around site, is approximately 7,000m^2 (including building roofs, some of which will be drained to tanks / soak aways) and hence a Class 1 Interceptor (PB1) measuring 2195mm x 1590mm x 1180mm will be required for this area. This will have 225mm pipe connections;

APPENDIX 1 – DRAINAGE PLAN