

ATTACHMENT 4.7 BAT

1.1 Describe how best available techniques (BAT) that will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity concerned

1.1.1 Best available techniques for landfill activities

Donegal County Council will employ BAT to limit, abate or reduce an emission from the activity concerned where applicable. As previously stated the site is closed and has been restored with an engineered cap, leachate extraction system and landfill gas extraction system. Specified Engineering Works were submitted for agreement to EPA for all works taken to date. For those processes and emissions as per current waste licence are as follows:

1.1.1.1 Process Gas Emissions

In accordance with BAT Guidance Notes for the Waste Sector: Landfill Activities BAT for emissions to air is to:

- *Pre-treat waste to remove/reduce biodegradables.*
- *Selection of appropriate cell sizes.*
- *Maintenance of negative air pressure in the landfill gas extraction wells.*
- *Use of horizontal and vertical gas extraction wells.*
- *Use of appropriate materials for temporary cover, interim and final capping.*
- *Regular monitoring of landfill extraction well field, balancing of wells and elimination of non-design condensate traps.*
- *Use of horizontal landfill gas collection pipework at the top of the side wall riser (beneath cap).*
- *Provide landfill gas management systems,*
- *Control the combustion conditions of enclosed flares, in terms of the carbon monoxide concentration, temperature and retention time by ensuring that combustion occurs at 1,000°C with a product retention time of 0.3 seconds within the combustion zone.*

A landfill gas management system was progressively installed at Ballynacarrick as part of the restoration phases at the facility. A 500m³/hr enclosed landfill gas flare (AFS HT500) and SCADA System was installed in 2005. This is located in a compound adjacent to the site office. The gas management system consists of the following

- Vertical landfill gas extraction wells have been installed. The gas wells were drilled to 75% of the waste depth. The well head contains a gas sampling point and leachate dipping point.
- Self dewatering well heads have been installed where fall is back towards the gas extraction well.
- Horizontal landfill gas extraction wells has been installed in waste in Phase I and II only. This is connected to the 250mm landfill gas main.
- A 250mm landfill gas main has been installed from the flare compound on to the landfill site. Landfill gas wells are connected to the gas main using manifolds. Pipes are laid to a fall in the direction of landfill gas flow, where possible.

Landfill gas continues to be collected and flared. Field balancing is undertaken at the facility as required. Biannually monitoring at the flare stack (A2-1) as per current licence (C.1.2 Monitoring of Emissions to Air Schedule) is no longer required following low emissions in previous monitoring rounds as agreed with the

EPA inspector (OEE). Landfill gas production within the landfill waste body has depleted since waste filling ceased in 2012.

1.1.1.2 Discharges To Water

1.1.1.2.1 Discharges to Surface Water

In accordance with BAT Guidance Notes for the Waste Sector: Landfill Activities BAT for discharges to surface water is :

- *Only roof-water and water from undisturbed unpaved areas (not in landfill footprint and not used for the handling or storage of waste) are appropriate for direct discharge to surface waters.*
- *No untreated trade effluent shall be discharged direct to surface water.*
- *Other surface water discharges must as a minimum be passed through an interceptor (I.S. EN 858-2:2003 Part 2), or in the case of construction areas where solids can build up in storm water runoff, they may be discharged through settlement lagoons or reed bed systems.*
- *The provision of infrastructure to allow for isolation and monitoring of surface water discharges.*
- *The management and control techniques listed in Section 4.4.4.*

Surface water from the east of the site passes via a 500mm HDPE and concrete pipeline along the southern and western boundary at a discharge point to an existing stream at the North West of the site. Surface water pipework to the Northern Boundary consists of a 225mm corrugated twinwalled HDPE pipe, also discharging at the North West of the site. This collects surface water from the north of the site and also delivers surface water collected from the cap into the surface water management system.

Surface water collected from the capped areas via a 225mm corrugated twinwalled HDPE pipe along the southern boundary discharges into the 500mm HDPE and concrete pipeline.

The concrete roads and carpark at the site have a sufficient drainage layout to ensure that water is shed to drainage gulleys which flows through an oil interceptor prior to discharge to an area to the east of the site.

1.1.1.2.2 Discharges to Sewer

In accordance with BAT Guidance Notes for the Waste Sector: Landfill Activities BAT for discharges to sewer is :

- *Final effluent quality must meet standards set by the receiving Water Services Authority, to adequately treat the wastewaters it receives, or the Agency. The Agency may apply more stringent ELVs than those suggested by the Water Services Authority if it so considers. The Urban Wastewater Treatment Regulations specify discharge quality parameters to prevent significant discharges of harmful substances.*

There are no discharge points to sewer in the current waste licence.

1.1.1.2.1 Leachate Effluent

Discharge from leachate treatment plants may enter either surface watercourses or sewers or be recirculated in lined cells at the landfill. BAT is to control leachate effluent using the management and control techniques as outlined below.

In accordance with BAT Guidance Notes for the Waste Sector: Landfill Activities BAT for management of leachate is as follows;

Management Techniques

- *The active fill area should be kept as small as practicable, with maximum of 25 metres x 25 metres (width x length) and slope of 1:3, unless where specifically agreed by the Agency.*

- *The use of good compaction, and daily and intermediate cover to reduce the level of water infiltration and hence the quantity/quality of leachate produced.*
- *The applicant should put in place procedures to ensure that the capping system is not damaged by the placement of the soil restoration layers or the construction of environmental control systems, e.g., landfill gas or leachate pipework and associated manholes.*
- *Leachate Recirculation. This engineering practice reduces the volume of effluent for treatment and assists in accelerating the degradation/stabilisation of the waste in the landfill however leachate recirculation may only be considered in engineered, lined cells where suitable leachate collection systems, leachate level monitoring is in place and the lined cell is capped to the satisfaction of the Agency.*
- *The applicant should develop procedures to ensure that the capping system is not damaged by long-term settlement. A comprehensive monitoring and repair programme should be initiated to ensure the integrity of the capping layers.*
- *Adherence to the waste acceptance procedures and inspection of waste procedures.*

Control Techniques

The following control techniques are used at landfills for the minimisation of leachate emissions:

- *Using soil, recovered or recycled materials or artificial cover materials to reduce infiltration of rainfall into the deposited waste, whilst operating restricted active area.*
- *Provide extraction system to enable removal of leachate for treatment and/or disposal.*
- *Monitoring of the depth and composition of leachate accumulating within the fill.*
- *Capping and restoring any completed area of the landfill as soon as possible.*
- *Leachate that has been removed from the landfill must be managed and shall undergo an appropriate level of treatment before it can be discharged to the environment.*
- *Adequate leachate storage facilities (appropriately sized).*
- *Covering of leachate storage facilities.*
- *Any on-site leachate treatment facility should be constructed and operated to appropriate design standards. Any aeration in leachate lagoon should be subsurface aeration.*
- *Diversion and collection of uncontaminated storm water for discharge or appropriate use from lined areas awaiting waste placement.*

An engineered cell was constructed 2002, with an extension to the west of the site being developed in 2004/05. The extension consisted of two engineered cells (Phase 1 and Phase 2). The site has been progressively restored on a phased basis in accordance with the Waste Licence (Ref: W0024-04) since 2004 with the final restoration being completed in 2013.

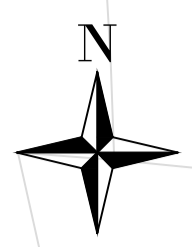
Current leachate management infrastructure is shown on Drawing IBR1279/LR105 and includes:

- Landfill capping across the site to minimise leachate generation;
- Culverting of all surface waters across the site entering the site to a down gradient off-site location into an unnamed stream;
- Abstraction of leachate from a number of locations onsite, including abstraction boreholes, toe drains and sump chambers for management in an onsite treatment facility;
- Diversion of contaminated groundwater from the groundwater drainage blanket underlying Phases 1 and 2 cells to the onsite treatment facility;
- A leachate treatment facility consisting of 2 Nr glass lined steel tanks, one of which contains activated sludge and is aerated overnight in order to provide preliminary treatment prior to disposal offsite to a
- Waste Water Treatment Works (WwTW) in Letterkenny by tankers.

REPORT

Two glass lined steel tanks store leachate in a service area to the south of the site entrance. These tanks were installed in 2002 and 2005 in order to manage and treat leachate prior to removal from the site to a wastewater treatment works. Tank 1 has a diameter of 7m and was installed in 2002 by Irish Industrial Tanks and currently acts as a balance tank and provides additional storage capacity for leachate during wet weather. A second, larger storage and treatment tank (Tank 2) with a diameter of 20.5m was installed in 2005 by TAL Ltd on a piled platform to support the tank. An aerator is located within the centre of this tank to provide pre treatment of leachate from the site in conjunction with activated sludge, prior to disposal offsite at a WwTW in Letterkenny. An Integrated Constructed Wetland (ICW) as agreed with Office of Environmental Enforcement of the EPA will be installed at the landfill facility for tertiary treatment and discharge to adjacent waterbodies.

Appendix A Drawing



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NOTES

1. Verifying Dimensions.
The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipient's own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipient's drawing production, or setting out on site.
4. Datum.
5. Key:

- Proposed Licence Boundary
- - - Phase 1 Boundary
- - - Phase 2 Boundary
- - - Cell 4 Boundary
- Surface Water
- - - Leachate Pipe Drain
- - - Leachate Cut Off Drain
- - - Leachate Toe Drain
- 90mm Ø Leachate Pumping Main
- 160mm Ø Leachate Pumping Main
- Existing Pipe
- Groundwater Diversion Pipe
- + Formation Level
- IL = 89.00 Invert Level
- Pumps
- PL Pump Level
- SL Sump Level
- ◇ Pump connected to Main



rev	amendments	check	date

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Client
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Project
Ballynacarrick LFS Licence Review

Title
Service Plan Leachate Management

Project Number IBR1279	Sheet Size A1	Drawing Scale 1:1500
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Drawing Number
IBR1279/LR105

Drawn By MC	Status Prelim	Revision -
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Checked By AmcG	Approved By JD	Date 18/10/22
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