

Site Capacity Assessment

Issue 1.0

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Willerby IVC Facility





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1.0 INTRODUCTION

Biowise Ltd (Biowise) is seeking permission to increase the permitted capacity of the Willerby recycling facility to <90,000 tonnes per annum (tpa) to enable full capacity utilisation of the installed equipment. Biowise is currently operating in-vessel composting (IVC), open windrow composting (OWC) and aerated static pile (ASP) activities with the capacity to treat <75,000tpa but there is room for expansion as per the results of the capacity assessment below.

Process Type	Stage	Annual Receipt
In Vessel Composting	Sanitisation Food/Green Waste	90,000 tpa
Open Windrow Composting	OAW Maturation Food/Green Waste	90,000 tpa
	OAW Sanitisation Green Waste	
	OAW Stabilisation Green Waste	
Aerated Static Pile Composting	ASP Maturation Food/Green Waste	
	ASP Sanitisation Green Waste	
	ASP Stabilisation Green Waste	

The annual receipt limit for the external composting pad applies to the total material processed irrespective of treatment technique, i.e. any material processed in open systems (OAW or ASP) will be limited to 90,000tpa.

1.1 Demonstrating Operational Capacity

This document sets out the site operational capacity and infrastructure in order to demonstrate adequate capacity to process the proposed increase in annual tonnage of material to be treated at the facility. This will include an assessment of the IVC design capacity and the capacity of the external composting pad for the processing of all material in open systems, either in OAW or ASP.

2.0 IVC DESIGN & ASSESSMENT

The following section outlines the designed capacity of the in-vessel composting tunnel system against the proposed annual tonnage allowance for material reception and treatment.

2.1 Waste Reception

All incoming vehicles will enter via the existing waste facility site entrance and to the weighbridge. The site can receive waste Monday to Saturday. This provides 280 days of waste receipt (excluding Sundays, Bank Holidays and half days on a Saturday). However, given that the composting process is continual, material can be held in process 365 days per annum.

2.2 IVC Design Capacity

Comingled category 3 ABPR food and green wastes will be processed through an in-vessel tunnel composting system. The plant has been designed by GICOM and specified to treat the proposed annual throughput of material.

The IVC consists of eight composting tunnels, each 6m high, 5.2m wide and 35m long. Each tunnel can hold up to 315t of material which is processed for a typical period of 7-10 days during which time temperatures must reach 60°C for two consecutive days to meet the requirements of ABPR.

In process, the IVC can therefore hold at any time **2,500 tonnes** of waste materials.

It should be noted that this calculation assumes a straight line material throughput which in reality would not occur due to seasonality in feedstocks. However, this is considered against the overall capacity of the proposed design specification.

2.3 IVC Capacity Assessment

A calculation is provided below demonstrating the maximum capacity of material that could be treated per annum based upon the overall system design.

1. Holding Capacity: Tunnel capacity (315 tonnes) * number of tunnels (8) = **2,500t**
2. Process Period: Operational days (365) / Maximum process length (10 days) *
= **36 process periods per tunnel per annum**
3. Design Capacity: Holding Capacity * Process Period = **90,000 tonnes per annum**

The overall assessment therefore identifies that the IVC is designed to be able to treat a straight line throughput at maximum capacity throughout a given year of 90,000tpa.

3.0 ASP DESIGN & ASSESSMENT

The following section outlines the designed capacity of the aerated static pile system against the proposed annual tonnage allowance for material reception and treatment.

3.1 Waste Reception

All incoming vehicles will enter via the existing waste facility site entrance and to the weighbridge. The site can receive waste Monday to Saturday. This provides 280 days of waste receipt (excluding Sundays, Bank Holidays and half days on a Saturday). However, given that the composting process is continual, material can be held in process 365 days per annum.

3.2 ASP Design Capacity

Sanitised food and green wastes from the IVC or green only wastes will be processed through an aerated static pile composting system. The plant has been designed by GICOM and specified to treat the proposed annual throughput of material.

The ASP system consists of five ASP bays, each 4m high, 30m wide and 20m long. Each bay can hold up to 1,560t of material which is processed for a typical period of 4 weeks during which time process parameters must be met.

In process, the ASP system can therefore hold at any time **7,800 tonnes** of waste materials.

It should be noted that this calculation assumes a straight line material throughput which in reality would not occur due to seasonality in feedstocks. However, this is considered against the overall capacity of the proposed design specification.

3.3 ASP Capacity Assessment

A calculation is provided below demonstrating the maximum capacity of material that could be treated per annum based upon the overall system design.

1. Holding Capacity: Bay capacity (2,400m³) * waste density factor (0.65) * number of bays (5) = **7,800t**.
2. Process Period: Operational days (365) / maximum process length (28 days) * = **13 process periods per bay per annum**.
3. Design Capacity: Holding Capacity * Process Period = **101,400 tonnes per Annum**

The overall assessment therefore identifies that the ASP is designed to be able to treat a straight-line throughput at maximum capacity throughout a given year of **101,400tpa**. This figure does also not allow for mass reduction from the processing of waste through the IVC. Mass loss through the IVC of 30% would result in a net 63,000 tonnes of material requiring maturation, thereby demonstrating adequate ASP capacity (160%) for the total annual throughput.

4.0 OWC DESIGN & ASSESSMENT

The following section outlines the designed capacity of the open windrow composting pad against both the currently permitted annual throughput of green wastes and the proposed annual tonnage allowance for the maturation of compost materials exiting the IVC facility.

4.1 Waste Reception

All incoming vehicles will enter via the existing waste facility site entrance and to the weighbridge. The site can receive waste Monday to Saturday. This provides 280 days of waste receipt (excluding Sundays, Bank Holidays and half days on a Saturday). However, given that the composting process is continual, material can be held within the compost tunnels or on the external composting pad 365 days per annum.

4.2 OWC Design Capacity

The open windrow composting pad is a simple design consisting of an impermeable concrete processing pad with sealed drainage. The composting pad extends to 4,600m² and holds materials being composted entirely on the external pad (green wastes only) and materials being matured (post IVC comingled food and green wastes).

Open windrows may be utilised in parallel with aerated static piles to treat an annual throughput limit of 90,000t. As previously demonstrated in Section 3.3, there is adequate capacity within the ASP system to treat the total annual throughput. The OWC process will be maintained for use primarily as a backup to the ASP system during short periods of mechanical breakdown.

Although this is likely to consist of a mixture of green wastes and comingled, in order to assess capacity, the worst case scenario of 100% pad utilisation from green wastes at the longer residence time has been implemented for the calculations below.

4.3 OWC Capacity Assessment

A calculation is provided below demonstrating the required area of composting pad required in order to treat the annual throughput of materials.

1. Pad Area: Total area available for OWC processing = **4,600m²**.
2. Pad Length: Windrow length (40m) + perimeter space (4) = **44m**.
3. Pad Width: Pad area (4,600) / Pad Length (44) = **104m**.
4. Windrow Volume: Width (8m) * height (4m) * length (40m) * trapezoidal conversion (0.67) = **858m³**.
5. No. Windrows: [Pad width (104) – aisle space (9) – perimeter space (4)] / windrow width (8m) = **11**.

6. Pad Volume: No. windrows (11) * windrow volume (858m³) = **9,438m³**.
7. Daily Volume: Pad volume (9,438m³) / Composting period (56 days) = **168m³**.
8. Annual Capacity: Daily volume (168m³) * waste density factor (0.65) * operational days per annum (365) = **39,858 tonnes**.

Not including any shrinkage factor, the site currently has an open windrow composting pad with a capacity to treat **39,858 tonnes per annum**. This demonstrates that the OWC has significant capacity for backup treatment space should there be any capacity issues or downtime within the ASP bays.

4.4 Product Storage

Finished compost is stored within the OWC pad for up to 12 months following completion of the active composting phase. PAS100/QP compliant material does not require storage within the permitted boundary ensuring that there is adequate storage space available on the site. Markets are well established for compost products (PAS100), therefore material is constantly leaving the facility reducing the storage requirements within the 12 month upper limit.

5.0 STORAGE AT ANY ONE TIME

The total amount of waste to be held on site at any one time is outlined below. This includes wastes materials during the active composting phase only, including sanitisation and stabilisation/maturation. The processing throughput (tonnes per day) has been calculated for the shortest possible sequence of treatment techniques, i.e. 14 days at sanitisation and 28 days at stabilisation/maturation.

Process	Process Stage Tonnage	Process Length (days)
IVC Sanitisation	2,500t	14
OAW Sanitation	4,400t	14
OAW Maturation		42
ASP Sanitation	7,800t	14
ASP Maturation		28
Aggregated Total	= 14,700t	= 350 tonnes per day

5.1 Ancillary Storage

In addition to the materials that are actively being treated on site at any one time, there are ancillary storage areas on the site for materials awaiting processing or preparation for dispatch to end markets. These are identified in the table below.

Storage	Storage	Maximum Duration (Days)
IVC Reception	3,000t	2
OAW/ASP Reception and shredding	2,000t	5
Screening	1,500t	5
Product Storage	10,000t	365
Oversize Storage	400t	182
Total	= 16,900t	N/A

5.2 Operational Management

Waste is not expected to be retained on site any longer than under current operations as the Standard Operating Procedures (SOP) will remain the same, with the same processing time for both sanitisation and stabilisation. The operational management of the site and critical controls that are embedded into the Odour Management Plan are based on industry best

practice through the PAS100/QP production process. These management practices will remain and the increased throughput should not put any additional stress on the daily operations.

The critical limits will remain as per the SOP and windrow dimensions and spacing consistent with current practices. As demonstrated above, there is sufficient spare capacity on the processing pad to enable the treatment of the increased throughput without amending current and industry best practice operational techniques.

5.3 Vehicle Movements

There will be increased vehicle movements on site across the year as the result of the reception and processing of the increased material throughput. Biowise currently has no issue in dealing with the current level of movements.

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