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SITE CAPACITY ASSESSMENT

Environmental and sustainability solutions provided to
RESOURCE RECYCLING SOLUTIONS LTD

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REVISION LOG

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0.1	Initial draft	13/02/2024
0.2	Internal review	13/02/2024
0.3	Amendments following review	21/03/2024
1.0	First Issue	28/03/2024

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1.0 INTRODUCTION

Resource Recycling Solutions Ltd (RRS) is seeking permission to treat comingled food and green waste, or food waste only, via In-Vessel Composting (IVC) at facility in Out Rawcliffe, Lancashire. RRS currently operate a green waste composting facility, where the treatment is via Open Windrow Composting, with a permitted throughput of 75,000 tonnes per year.

In order to facilitate the treatment of comingled food and green waste or food wate only, RRS shall install a number of IVC tunnels in a new building located in the northwest corner of the existing site where the waste will be sanitised. Following sanitisation, the waste is removed from the tunnels and formed into windrows on the composting pad for maturation.

It is proposed that the throughput of waste at the site remains at 75,000 tonnes per year, which will be made up of any combination of green waste, food waste and comingled food and green waste.

Table 1 - Annual receipt per waste type and stage

Process Type	Stage	Annual Receipt
In-Vessel Composting	Sanitisation of: Food waste Food/green waste Green waste	Up to 75,000 tpa
Open Windrow Composting	Green waste sanitisation	Up to 75,000 tpa
	Green waste maturation	
	Food or food/green waste maturation	

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 windrows will be limited to 75,000 tonnes per annum.

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 waste types via the proposed methods 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 windrows.

2.0 IVC DESIGN AND ASSESSMENT

The following section outlines the designed capacity of the In-Vessel Composting (IVC) tunnel system against the proposed annual tonnage allowance for material reception and treatment.

2.1 Waste Reception

All incoming vehicles will enter the 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 Saturday). However, given that the composting process is continual, material can be held in process for 365 days per annum.

2.2 IVC Design Capacity

Green waste, comingled category 3 ABPR food and green waste or food waste only will be processed through an in-vessel tunnel composting system. The plant has been designed and specified to treat the proposed annual throughput of material.

The IVC building consists of 4No. tunnels, each 4m high (filled to 3.7m), 6m wide and 34m long. Each tunnel can hold up to 377 tonnes of material (using a bulk density of 0.5) which is processed for a typical period of 7 days during which time the critical limits in the tunnels are automatically monitored as part of a SCADA system.

In process, the IVC can therefore hold **1,508 tonnes** of waste material at any one time.

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 (377 tonnes) * Number of tunnels (4) = **1,508t**
2. Process period: Operational days (365) / Maximum process length (7 days) = **52 process periods** per tunnel per annum
3. Design Capacity: Holding capacity (1,508t) * Process period (52) = **78,416 tonnes per annum**.

The overall assessment therefore identifies that the IVC is designed to be able to treat a straight line throughout at maximum capacity throughout a given year of **78,416 tonnes**.

3.0 OWC DESIGN AND ASSESSMENT

The following section outlines the designed capacity of the open windrow composting (OWC) system against the proposed annual tonnage allowance for material reception and treatment.

3.1 Waste Reception

All incoming vehicles will enter the 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 Saturday). However, given that the composting process is continual, material can be held in process for 365 days per annum.

3.2 OWC Design Capacity

Following the sanitisation phase in the IVC facility, material will be transferred to the OWC for maturation. Alternatively, green waste only that is received on site is formed into windrows for sanitisation and maturation. The site has been sized to treat the proposed annual throughput of material. The open windrow composting area is an impermeable concrete processing pad with sealed drainage system. The OWC area has an approximate perimeter of 450m and an approximate area of 8,700m^2. Using a basal windrow width of 8m, it is calculated that 33 windrows can fit on the pad. The windrows are differing lengths to allow space for other associated activities.

For the purposes of the calculation, given that there are differing windrow lengths, each group of windrow lengths are calculated individually and then summed to provide overall site capacity. The treatment pad capacity therefore excludes areas dedicated for material reception, shredding and screening and therefore represents the real treatment pad space availability.

The sanitisation and maturation process of green waste or maturation process of IVC material occurs over a period of 8 weeks or 56 days. Given that the composting process will be operational 365 days per year, there can be a maximum of 6.5 batches processed through each windrow per year.

The capacity assessment assumes a straight-line throughput of material.

3.3 45m Long Windrows Capacity Assessment

A calculation is provided below demonstrating the total annual capacity of the 45m long windrows in tonnes of material per annum.

1. Windrow Volume: Width (8m) * Height (4m) * Length (45m) * Trapezoidal conversion (0.8) = **1,152m³**.
2. Number of windrows: **13**
3. Total Windrow Volume: No. of windrows (13) * Windrow volume (1,152m³) = **14,976m³**.
4. Daily Volume: Total windrow volume (14,976m³) / Composting period (56 days) = **267m³**.
5. Annual Capacity: Daily volume (267m³) * Waste density factor (0.5) * Operational days per annum (365) = **c. 48,728 tonnes**.

The overall assessment therefore identifies that this sized windrow is designed to be able to treat a straight-line throughput at maximum capacity throughout a given year of c.**48,728tpa**. This figure does also not allow for mass reduction from the processing of waste through the OWC or for seasonal variation.

3.4 27m Long Windrows Capacity Assessment

A calculation is provided below demonstrating the total annual capacity of the 27m long windrows in tonnes of material per annum.

1. Windrow Volume: Width (8m) * Height (4m) * Length (27m) * Trapezoidal conversion (0.8) = **691m³**.
2. Number of windrows: **15**
3. Total Windrow Volume: No. of windrows (15) * Windrow volume (691m³) = **10,365m³**.
4. Daily Volume: Total windrow volume (10,365m³) / Composting period (56 days) = **185m³**.
5. Annual Capacity: Daily volume (185m³) * Waste density factor (0.5) * Operational days per annum (365) = **c. 33,779 tonnes**.

The overall assessment therefore identifies that this sized windrow is designed to be able to treat a straight-line throughput at maximum capacity throughout a given year of c.**33,779tpa**. This figure does also not allow for mass reduction from the processing of waste through the OWC or for seasonal variation.

3.5 24m Long Windrows Capacity Assessment

A calculation is provided below demonstrating the total annual capacity of the 24m long windrows in tonnes of material per annum.

1. Windrow Volume: Width (8m) * Height (4m) * Length (24m) * Trapezoidal conversion (0.8) = **614m³**.
2. Number of windrows: **5**
3. Total Windrow Volume: No. of windrows (5) * Windrow volume (614m³) = **3,070m³**.
4. Daily Volume: Total windrow volume (3,070m³) / Composting period (56 days) = **55m³**.
5. Annual Capacity: Daily volume (55m³) * Waste density factor (0.5) * Operational days per annum (365) = **c. 10,037 tonnes**.

The overall assessment therefore identifies that this sized windrow is designed to be able to treat a straight-line throughput at maximum capacity throughout a given year of c.**10,037tpa**. This figure does also not allow for mass reduction from the processing of waste through the OWC or for seasonal variation.

3.6 Total Open Windrow Treatment Capacity

The combined open windrows have a straight-line treatment capacity of approximately **92,544 tonnes per annum**. 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 54,891 tonnes of material requiring maturation, thereby demonstrating adequate OWC capacity (169%) for the total annual throughput. See Appendix 1 for the proposed site layout for operation at full capacity.

4.0 STORAGE AT ANY ONE TIME

The total amount of waste to be held on site at any one time is outlined below. This includes waste materials during the active composting phase only, including sanitisation and maturation. The processing throughput (tonnes per day) has been calculated for the shortest possible sequence of treatment techniques, i.e. 7 days for IVC sanitisation and 56 days for open windrow sanitisation/maturation.

Table 2 - Biological Treatment Calculation

Process Type	Process Stage Tonnage	Process Length (days)	Treatment Capacity (t/day)
IVC Sanitisation	1,600t	7	229
OWC Sanitisation/Maturation – 45m long	7,488t	56	134
OWC Sanitisation/Maturation – 27m long	5,183t	56	93
OWC Sanitisation/Maturation – 24m long	1,535	56	27

Table 2 demonstrates that the facility has a capacity to treat more than 75 tonnes per day which is the threshold for treatment under the Industrial Emissions Directive above which a treatment facility is classified as an Installation.

4.1 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 Table 3.

Table 3 - Ancillary Storage Overview.

Storage Area	Storage Capacity (tonnes)	Maximum Duration (Days)
OWC Reception	250	7
OWC Pre-treatment	250	7 (as part of the maximum of 7 days)
IVC Reception	300	3
IVC Pre-treatment	300	1 (as part of the maximum of 3 days)
Screening	300	5
Product	2,500	365

Storage Area	Storage Capacity (tonnes)	Maximum Duration (Days)
Oversize	250	182
Aggregates	1,000	365
Waste Wood	1,000	365
Soils	1,000	365
Total	7,150	N/A

4.2 Operational Management

The IVC process is new to the site and has been accounted for in the site's Environmental Management System, specifically in the Waste Acceptance Procedure and Waste Treatment Procedure. The Standard Operating Procedures (SOPs) have also been updated to account for the IVC process. 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. The critical limits are detailed as per the SOPs and pile dimensions and spacing are consistent with current practices. As demonstrated above, there is sufficient spare capacity within the system to enable the treatment of the throughput without amending current and industry best practice operational techniques.

4.3 Vehicle Movements

There will be no increase in vehicle movements on site as a result of the addition of the IVC treatment facility. The annual tonnage treated shall remain at 75,000 tonnes, only there is now the option to process comingled food and green waste or just food waste as part of this figure.