

Standard Operating Procedure (SOP)

|                                       |                                                                         |                                   |                          |
|---------------------------------------|-------------------------------------------------------------------------|-----------------------------------|--------------------------|
| <b>Site:</b><br>Envar Cambridge       | <b>Procedure Title:</b><br>Envar SOP for the Biodrying of Sewage Sludge |                                   |                          |
| <b>Originated by:</b><br>James Cooper |                                                                         | <b>Signature:</b><br>James Cooper | <b>Date:</b><br>30/09/25 |

## Version Control

| Issue        | Date       | Revision Details / Summary of Changes                  | Author                               | Approved by |
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## 1. Identification of the biodrying process

### 1.1 Purpose, objective and scope of this SOP

Envar has implemented a sewage sludge biodrying process as part of a permit variation at its Cambridge site, the permit reference being (EPRGP3930DF/V006). The Biodrying process is limited to the Envar Cambridge site, the site is located at The Heath, Woodhurst, Cambridgeshire, PE28 3BS. This SOP comprises a manual for the biodrying of sewage sludge to produce a fuel via in-vessel composting treatment (biodrying), the scope of which includes the receipt of sewage sludge, processing, storage and out loading of the fuel material. The objective of this SOP is to produce the desired fuel output material safely, efficiently and in compliance with appropriate regulation and company procedures.

Biodrying refers to the biological drying process that uses heat generated by aerobic microbial activity in organic waste to evaporate moisture and reduce overall mass, retaining energy value in the stabilised output material. The process will utilise the site's Gicom in vessel composting tunnel system (G7-11) to effectively dry, stabilise and sanitise sewage sludge waste to produce a material that will be used as fuel at a suitably permitted facility. The process will involve blending the sewage sludge with a range of materials that can be identified in section 2 of this SOP. Blending materials facilitate effective aeration through the process and combined with sewage sludge contribute to the production of a suitable output fuel material. A fuel specification will be created with the customer for the output material. The Cambridge Biodrying Overview Layout can be found in Figure 1.

## 2 Input materials

The types of waste and material accepted into this process will be limited to those listed in Table 1.

*Table 1- EWC codes and descriptions of waste accepted as inputs to the biodrying process*

| EWC      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 02 01 03 | plant-tissue waste                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 02 01 06 | animal faeces, urine and manure (including spoiled straw) only                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 02 01 07 | wastes from forestry (biodegradable only)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 02 03 04 | materials unsuitable for consumption or processing (biodegradable only)                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 03 01 01 | waste bark and cork – virgin timber only                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 03 01 05 | sawdust, shavings, cuttings, wood and particle board other than those mentioned in 03 01 04 – virgin timber only                                                                                                                                                                                                                                                                                                                                                                                       |
| 03 03 01 | waste bark and wood                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15 01 03 | wooden packaging – Grade A timber only                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 17 02 01 | Wood – Grade A clean waste timber only                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 19 02 06 | Sludge from the dewatering of sludge with the use of flocculation and coagulation<br>Septic tank sludge from the dewatering of septic tank sludge with the use of flocculation and coagulation<br>Septic tank sludge stabilised using non-waste lime<br>Sludge stabilised using non-waste lime<br>Sludge mixed with non-waste straw, non-waste wood or other non-waste plant tissue material<br>Septic tank sludge mixed with non-waste straw, non-waste wood or other non-waste plant tissue material |

|          |                                                                                                                                                                                                                                                                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19 05 03 | Compost oversize from aerobic treatment (wood fraction only)                                                                                                                                                                                                                                                                                             |
| 19 06 06 | Digestate from anaerobic treatment of sludge with the addition of treated sewage effluent produced at the sludge producer's wastewater treatment plant<br>Digestate from anaerobic treatment of septic tank sludge                                                                                                                                       |
| 19 06 06 | Digestate from the treatment of non-source segregated municipal waste, to including digestate from anaerobic treatment of municipal waste from a process that accepts waste input types listed in this table, or anaerobic digestion or appropriate permit.<br>Digestate from segregated biodegradable waste that has been sourced from municipal waste. |
| 19 08 05 | sludges from treatment of urban wastewater (screened)                                                                                                                                                                                                                                                                                                    |
| 19 12 12 | Biodegradable waste (recovered wood from green waste)                                                                                                                                                                                                                                                                                                    |
| 20 02 01 | Biodegradable Waste                                                                                                                                                                                                                                                                                                                                      |

## 2.1 Waste Pre-acceptance

Where a contractual arrangement is made with a waste supplier, it shall include criteria for acceptance/rejection of loads delivered for biodrying, the waste acceptance for materials for biodrying shall follow the Envar MS 2.31 – Waste Acceptance, Inspection and Quarantine and Rejection Procedure.

Whenever criteria specified in table 2 and/or in a contractual arrangement are not met, this should be clearly communicated to the waste supplier and records of the communication shall be kept. Improved instructions, reminders of the operator's acceptance/rejection criteria, contractual arrangements (if applicable), control measures, and further clarification of any of the above shall be sent to the relevant waste supplier(s) when deemed appropriate by the operator. These shall be recorded via Envar's electronic compliance system as part of the QMS process. All acceptance shall be within the contamination limit as per the site permit biowaste acceptance.

The staff on site should be made aware and trained in the acceptance/rejection criteria, any contractual arrangements and control measures.

The site shall cease accepting loads if contamination has occurred repeatedly, yet the supplier has not attempted corrective action or the action taken has been ineffective.

## 2.2 Waste Acceptance

Each load of waste delivered for biodrying shall enter the site via the weighbridge. Details of the waste carrier, waste type, waste code, client/source, quantity (tonnes) of waste, delivery date and delivery location on site (Waste Reception Building) shall be recorded on a Waste Transfer Note/Weighbridge Ticket electronic system (Waste Metrix). All vehicles transporting sludge to the site should arrive enclosed or covered to minimise emissions during transport. Envar will not accept liquid sludge waste, if a load arrives on site via a tanker, the load will be rejected as per the relevant procedures. Only pre-arranged loads shall be accepted

The weighbridge operator shall then notify the driver to proceed to the Waste Reception Building where a site operative shall ensure the waste carrier is directed to the separated dedicated sludge reception area (Bay 1 and 2), this area is marked in The Cambridge Biodrying Overview Layout (Figure 1). Here, the waste carrier will tip the waste. The Waste Reception Building benefits from fast action roller shutter doors which will be closed whilst the vehicle discharges the load.

The process steps necessary to ensure loads are tipped to minimise odour are as follows. All relevant employees should be trained on this procedure as part of their induction training and records kept for inspection should this be required.

1. The load shall be directed from the weighbridge to either wait in the bull ring area for the appropriate time to unload or be directed to a bay to meet the reception operative (appropriately trained in hygiene measures).
2. The driver shall be instructed to wait and not to remove the sheet/cover/containment from the vehicle until told to do so by our operators. The driver will be given a Zone Safe tag and if required a Site Radio to ensure contact.
3. The driver shall be called in by an operator and shall open the door
4. The extraction system will be in continuous operation, in the event of complete failure deliveries shall be paused.
5. The driver shall fully enter the building, and the hygiene operative shall close the doors behind them
6. The sheeting or will be removed before the vehicle can discharge its load.
7. The reverse of this process is followed when the driver leaves.

This process will be made into a training toolbox talk or module on induction for appropriate staff, and this shall be made available for review should it be requested.

To ensure there is no tracking of waste out of the building after dispatching the load, hygiene procedures shall be followed. These shall include the steps outlined below. This closely mirrors the SOP for the Reception Area Hygiene Protocol and standard IVC hygiene procedures which are currently implemented on site. To ensure appropriate hygiene measures are followed for this waste stream, extra training and records shall be made as to

which members of staff are trained and when this took place as part of employee inductions and ongoing training.

The procedure for ensuring the hygiene of vehicles and personnel both delivering and removing materials from the biodrying process:

1. Vehicles entering the site are unlikely to be soiled with materials which would cause an issue on the way into the building. However, the area into which the vehicle shall be reversing will need to be clean and clear of waste and debris to make later cleaning before leaving easier.
2. The reversing and tipping area (see Figure 1) shall be kept clear of debris and “scraped up”. This means the shovel bucket shall be used to remove loose debris from the surface.
3. Tipping shall be supervised by a member of Envar staff and when completed the driver and hygiene operative shall make sure all the waste has come out of the trailer.
4. Once confirmed the trailer shall be resecured and checked for any loose remaining debris or waste on the tipping areas of the trailer or chassis.
5. When out loading materials, the same procedure shall be followed but in reverse. The operator shall be checking for material which when loaded was inadvertently tipped over the chassis or body.
6. All debris shall be removed before leaving the building. And the load if removing a load shall be covered/sheeted.
7. The wheels shall be disinfected with a DEFRA approved virucidal disinfectant when any vehicle leaves the biodrying reception or dispatch areas. This shall be applied after a low-pressure hose is used to remove any loose large particle debris first. Disinfectant shall be applied using a knapsack sprayer on leaving the building through the roller shutter on both sides of the vehicle.

Personal hygiene shall follow the same process:

1. Personnel shall only leave the building after bio-controls have been followed.
2. Personnel shall wear overalls or workwear in the building which shall be washed on site.
3. Operators shall always wear boots and gloves
4. Boots shall be cleaned to remove loose debris from their surfaces. Before leaving biodrying areas, operators shall use the foot dips provided which have a virucidal DEFRA approved disinfectant solution in them

General hygiene measures include:

1. Daily and weekly inspections to identify areas of concern which may include, for example, corners where waste has accumulated and needs to be cleaned to prevent pests.
2. Identified areas shall be cleaned down daily or weekly depending on urgency informed by inspection – areas likely to cause pests or odour shall be given higher priority.
3. The weekly inspection shall identify any areas such as ledges or rafters which have a buildup of waste on them. These areas shall have debris removed weekly and a record made of the cleaning carried out.
4. Drains shall be cleaned weekly or more frequently if inspection shows this is required.
5. Tunnel spigots are cleaned after every processed batch by a tunnel brush mounted on the machine.
6. Annual jetting of the spigot air pipes shall be completed to remove debris. Should more frequent cleaning be required this shall be picked up by monitoring tunnel floor pressure trends and the appropriate actions taken.

A site operative shall spread and inspect each load deposited at the reception area. The outcome of the inspection is recorded as a score in the Waste Metrix. If a load is rejected, a Rejected Loads Record Sheet will be completed. A copy of the relevant part(s) input load inspection/rejection record sheet will be provided to each waste supplier if requested.

Criteria for acceptance / rejection of input loads delivered are specified in Table 2 below, with corrective actions that shall be carried out if the load exceeds the specified criteria.

Table 2 - Acceptance criteria for acceptance/rejection of input loads

| Hazardous content                                                                                                                                                                                          | Acceptance criteria (critical limit) and load inspection score                                                                                                                                                        | Control activity and associated record                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical contaminants (e.g., plastic or 'rag' material), non-compostable packaging and plastics, metals, concrete and consolidated mineral fragments (e.g., rocks and stones), etc.                        | <b>Score 0% = Good (1)</b> = load delivered is very clean                                                                                                                                                             | Load accepted.                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                            | <b>Score 0.5% = Low (2)</b> = load delivered has negligible physical contaminant content                                                                                                                              | Load accepted. Score and action logged in the waste Metrix.                                                                                                                                                                                                      |
|                                                                                                                                                                                                            | <b>Score 3-5% = Medium (3-4)</b> = total physical contaminant content is quite high, but still below 1 % plastics & 5% paper, card and packaging items unsuitable for bio drying evaluated by subjective assessment   | Load accepted. Plastic shall be removed as far as practically possible and placed into a 'rejects' container stored on site. The container's contents shall regularly be removed for disposal. Contaminant level shall be logged as a score in the waste Metrix. |
|                                                                                                                                                                                                            | <b>Score &gt;5% Plastic &amp; non-biodegradable &gt; 1% = HIGH (5)</b> = Physical contaminant content exceeds critical limits as stipulated in company waste acceptance criteria. Evaluated by subjective assessment. | Load rejected. Score and action recorded in the waste Metrix. Inform supplier and file under ' <i>Communications with waste suppliers</i> ' in QMS.                                                                                                              |
| <b>Wood &amp; wood-derived wastes impregnated with preservatives, painted, or with any non-biodegradable layers. Any demolition wood or "processed" wood. IE non-virgin (cut, shaped or chipped is OK)</b> | No tolerance                                                                                                                                                                                                          | Load accepted. Contaminants shall be removed as far as practically possible and placed into a 'rejects' container stored on site. The container's contents shall regularly be removed for disposal. Score logged in the waste Metrix.                            |

The acceptance criteria specified in table 2 or a company waste acceptance-criteria, detailing similar criteria, shall be specified in the contractual arrangements or clearly communicated to each relevant waste supplier.

Before removal from the biodrying site, each load or part-load due rejection shall be kept separate from loads awaiting inspection or those accepted for biodrying.  
Each accepted load shall be assessed to identify the processing requirements and any potential problems and discussed with the Operations Manager as to how it is to be best treated.

The maximum storage duration for bio drying destined waste input materials prior to shredding shall not exceed the conditions stipulated by the FPP.

### **2.3 Traceability of input materials**

A record system shall be maintained connecting sources of waste with delivery dates and weights. This is achieved via the use of a weighbridge system, the duty of care information collected for every load that arrives. Bio drying batches are created one at a time. Batch formation 'start' and 'finish' dates are recorded in the '*Bio drying Batch Formation and Monitoring Record Sheet*'. All waste loads that arrive at the weighbridge between these two dates therefore have gone into that batch and thus can be traced back to source.

Each batch shall be given a unique number /code when being formed, clearly identifiable by a post with a marked board, or similar. This stays with the batch during the bio drying process.  
When batch formation is completed batch monitoring begins and its monitoring start date is recorded on the corresponding '*Batch Formation and Monitoring Record Sheet*'.

## **3 Preparation of input materials**

### **3.1 Shredding**

The blending materials such as straw and green waste are required to be shredded to achieve an appropriate particle size for the process. Feedstock material for blending is shredded to a particle size of  $\leq$  40cm which reflects the site ABPR sanitisation requirements, prior to filling into the tunnels.

### **3.2 Mixing**

Feedstock shredding and mixing takes place in the Waste Reception Building in the separate processing area (Bay 1 and 2). Once the feedstock is appropriately mixed it is loaded onto a conveyor which links to the biodrying tunnels (G7-11), the material is conveyed inside the link building and dispatched ready for loading into the tunnels.

### **3.3 Records connecting delivery notes with shredding dates, mixing and wetting.**

The results of the quality of input materials assessment and mixing activities, and the unique number of any other batches mixed with a batch when being formed (including oversize) shall be recorded on the '*Batch Formation and Monitoring Record Sheet*'.

### **3.4 Biodrying process additives**

Not used. There are no process additives, chemicals or other materials added other than those waste codes which are included in Table 2.

### 3.5 Chemicals

Approved biocides are used for fly control when necessary. Only structures within the waste reception area are treated. None is applied to the feedstock.

Currently used; Twenty 1 WP for wall treatment. Bag flytraps externally.

### 3.6 Operations

#### 1. Daily pre-start checks.

- a. Ensure that all PPE & Zonesafe Tag are worn in the reception & link area.
- b. Conduct a pre-start check on the loading shovel & shredder, ensuring the equipment have sufficient fuel to conduct the work & record the information on the weekly operator's defect report sheet. If there are any critical or safety faults, report them to your line manager.
- c. The combe teeth on the shredder must be set to have a maximum of 40 cm / 400mm gap to comply with the Animal By-Products Regulations (ABPR).



**WEEKLY OPERATORS DEFECT REPORT SHEET**

|                                                                                                                           |                                                                                                                                                   |             |            |             |            |            |                 |                |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|-------------|------------|------------|-----------------|----------------|
| <b>MACHINE</b><br>Loader/360/Menart/Tractor                                                                               | <b>Start Hours</b>                                                                                                                                |             |            |             |            |            | <b>DATE W/C</b> |                |
| <b>Plant ID No:</b><br><b>Operators Name:</b>                                                                             | DAILY VEHICLE CHECK - Items to be checked by driver at the start of every shift and handed in at the end of weekly shift by 10:30hrs EVERY Monday |             |            |             |            |            |                 |                |
|                                                                                                                           | <b>MON</b>                                                                                                                                        | <b>TUES</b> | <b>WED</b> | <b>THUR</b> | <b>FRI</b> | <b>SAT</b> | <b>SUN</b>      | <b>DEFECTS</b> |
| <b>Warning beacon – check function</b>                                                                                    |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Headlamps check function<br/>Change bulbs if required</b>                                                              |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Work lights – check function<br/>Change bulbs if required</b>                                                          |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Reversing/brake lights</b>                                                                                             |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Reversing siren/reversing camera – check function</b>                                                                  |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Horn – check function</b>                                                                                              |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Mirrors/windscreen – check function / damage</b>                                                                       |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Seat belt – check function</b>                                                                                         |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Brakes – check leaks</b>                                                                                               |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Engine fluid, oil and water – check levels</b>                                                                         |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Transmission/hydraulic – check levels</b>                                                                              |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Wheels / tyres/Tracks – condition / security / tread</b>                                                               |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Machine cleaned down</b>                                                                                               |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Machine greased and blow out filters</b>                                                                               |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Engine compartment cleaned</b>                                                                                         |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Radiator Cleaning-Engine/Transmission/Intercooler/Air Con</b>                                                          |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Battery compartment cleaned</b>                                                                                        |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>PTO guards secure</b>                                                                                                  |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Pins –pivots, rams, lift arms, bucket pins</b>                                                                         |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Fire Extinguisher</b>                                                                                                  |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>DIESEL USAGE</b>                                                                                                       |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>End of weekly shift hours</b>                                                                                          | -----                                                                                                                                             | -----       | -----      | -----       | -----      | -----      | -----           | Hours          |
| <b>Machine stand down time of 30 minutes for cleaning of windows, mirrors, radiators, blow out filters and fire watch</b> |                                                                                                                                                   |             |            |             |            |            |                 |                |
| <b>Operator initials (I confirm information provided is correct)</b>                                                      |                                                                                                                                                   |             |            |             |            |            |                 | Signed         |

Items in bold are essential safety checks, please complete this form in a tidy and recognisable manner, please file in correct tray on a weekly basis, report defects immediately on White board with your plant ID No.

Envar Cambs - Operators Defect Report Sheet -V1

Figure 1- the Envar Weekly Operators Defect Report Sheet

d. Check there is sufficient space within the Link buildings to store the processed waste.



e. If the link building is full then check the daily tunnel information sheet for available space to move the processed waste into an empty tunnel or radio a supervisor.



Daily tunnel information sheet

| Tunnel | Max Tunnel capacity | Date Filled | Heat Up Time  | Empty date and time |                  | Status  | Order | Remarks |
|--------|---------------------|-------------|---------------|---------------------|------------------|---------|-------|---------|
| G3     | 200 tons            |             |               |                     |                  | Empty   |       |         |
| G4     | 200 tons            | 31/05/20    | 2 Days 14 Hrs | Sunday              | 07/06/2020 04:00 | Heating | 5     |         |
| G5     | 200 tons            | 02/06/20    |               |                     |                  | Heating |       |         |
| G6     | 200 tons            | 01/06/20    | 1 Days 16 Hrs | Sunday              | 07/06/2020 06:20 | Heating | 6     |         |
| G7     | 400 tons            | 29/05/20    | 3 Days 10 Hrs | Saturday            | 06/06/2020 11:00 | Heating | 4     |         |
| G8     | 400 tons            | 03/06/20    |               |                     |                  | Heating |       |         |
| G9     | 400 tons            | 29/05/20    | 2 Days 20 Hrs | Friday              | 05/06/2020 08:00 | Heating | 3     |         |
| G10    | 400 tons            | 28/05/20    | 2 Days 4 Hrs  | Wednesday           | 03/06/2020 23:40 | Heating | 1     |         |
| G11    | 400 tons            | 28/05/20    | 3 Days 3 Hrs  | Thursday            | 04/06/2020 11:30 | Heating | 2     |         |

## 2. Waste Processing Schedule

- a. All waste in the reception is then processed using the **first in - first out (FIFO) system**. Waste at the back always gets processed first and then the loading shovel pushes the new waste forward towards the back. The reception has 2 x double-ended reception bays for the biodrying operation, marked as bay 1 and 2 which ensures the waste at the back always gets processed first and then the loading shovel pushes the new waste forward towards the back.



- b. The first in - first out (FIFO) bay process system operates by alternating the bays in which it is taken from, ensuring that no waste sits inside the building for any longer than 48 hours, which is a requirement of the Animal By-Products Regulations (ABPR).



- c. When processing the waste continue to **inspect and check waste for any hazardous waste, strong odour & contamination**.
  - i. **Hazardous waste** – If any Hazardous Items are seen in the waste, e.g. Car batteries, fire extinguishers, oil-filters, then these items must be removed & stored for disposal.
  - ii. **Strong Odour** – if the odour is a really strong, a supervisor or manager will request the waste is moved from the reception to the front of the bay to be processed first.
  - i. **Contamination** –If any large pieces of Metal, plastics, rubber, stones, fabrics, tetra-packs and any other inorganics are seen in the waste then these items must be removed, weighed & stored for disposal. A manager will immediately contact the customer to resolve the issue.

## 3. Processing the Waste.

- a. Start the shredder & ensure it is running correctly.



- b. With a loading shovel, take a full bucket of waste material from the bay using the first in - first out (FIFO) system.



- c. The loader then fills the shredder hopper with the unprocessed waste product. This process will continue until all the waste has been processed.



- d. The shredder will process the waste material down to a maximum 40cm / 400mm to comply with the Animal By-Products Regulations (ABPR) & will stockpile the waste material for collection.



- e. If the waste is dense, then a management decision will be made to add oversize material to the waste to ensure that the material achieves effective sanitisation within the IVC process.
- f. The shredded material is conveyed from the reception into the link or bay ready for processing which includes blending into the tunnels biosolids and the shredded wood and bulky degradable material to ensure sufficient air flow can be achieved through the composting/bio drying mass



- g. The Processed waste is loaded into the tunnels. This will continue until all the processed waste material has been stockpiled or loaded into tunnels.



#### 4. Receiving & Processing Biowaste waste additional procedures.

- a. If the waste pile within the reception area requires to be pushed up to create space then the hygiene operative will call up the loaders on the 2 way radio **Ensure that the hygiene operator moves out of the reception bay when this activity takes place.**



- b. All Dirty Loading equipment must be cleaned before it leaves the reception/link area.
- c. All site personnel/visitors leaving the reception area will use the disinfectant footbaths provided to clean their feet.



- d. All Dirty loading buckets/attachments/shredders must remain in the reception area unless cleaned.
- e. All waste in the reception is then processed using the **first in - first out system (FIFO)** which ensures the waste at the back always gets processed first and then the loading shovel pushes the new waste forward towards the back. This ensures that no waste will sit inside the building for any longer than 48 hours as pre the site permit requirements.

## 4 Bio drying activities – managing, monitoring and evaluating sanitisation and stabilisation.

### 4.1 Sanitisation tunnel dimensions

The company operates sanitisation tunnels designed by GiCom B.V. and are of the following specifications:

*Table 2 - size of tunnels*

| Number of tunnels | Dimensions (m) L x W x H |
|-------------------|--------------------------|
| Up to 5           | 42 x 6.5 x 5             |

#### Batch size and monitoring

The approximate typical batch size is: 500 m<sup>3</sup>, with minimum expected size: 500m<sup>3</sup>, and maximum expected size: 600 m<sup>3</sup>.

Each formed batch is identified by a batch code, in a way and location that is easily identifiable by operatives moving materials on site.

#### 4.1.1 Monitoring system and equipment

The biodrying monitoring system, including the monitoring equipment, is as follows:

All monitoring systems for the tunnels are supplied by GiCom b.v, designer of the tunnels and supplier of the monitoring systems. These systems are controlled by SCADA remotely

The monitoring system (including equipment) shall be maintained in a functional state by the Technical Manager. Calibration checks on the temperature monitoring system / equipment are carried out once per 12 months by the following independent calibration service provider:

Cambridge Calibration – a division of Industrial Technical Services Ltd. Tel: 01954 230 586.

Routine checks on the temperature monitoring system / equipment are carried out by the Technical Manager once per 12 months, following the procedures below:

When the calibration service provider or the composter's designated person finds that any part of the temperature monitoring system has caused inaccurate temperature data, immediate corrective action shall be taken and recorded on the '*Temperature Monitoring System Calibration Record Sheet*'. After taking corrective action, the affected part of the system shall be re-checked, evaluated and recorded straight afterwards.

Data obtained during each calibration check on the temperature monitoring system shall be recorded on the '*Temperature Monitoring System Calibration Record Sheet*', or such records shall be obtained from the independent calibration service provider together with his/her written method statement of how the calibration checks were carried out. Record details shall also be kept of any repairs or adjustments undertaken and the outcome, or replacement of an item / component / part of the system shall also be recorded on the '*Temperature Monitoring System Calibration Record Sheet*'.

#### 4.1.2 Temperature monitoring and records

Drying of the materials is the key requirement of this process. However, following the sanitisation and stabilisation phases as the site is set up to do will allow for effective buildup of microbial biomass for heat generation throughout the process.

The high temperatures achieved in the IVC process are designed to volatilise the more potentially odorous compounds for treatment. Therefore, this system and the currently used temperature set up shall be used. As per the ABP standard.

**Records shall be maintained as per the current system for the achievement of these temperatures and the time in which they were achieved and held for.**

#### 4.1.3 Moisture monitoring and records

The moisture content of samples of biodrying materials from each batch shall be assessed by:

In-house laboratory testing.

## 4.2 Monitoring

Monitoring locations and frequencies of monitoring biodrying conditions within each batch shall be carried out as stated in 5b

The person responsible shall ensure the critical control points and critical limits of the biodrying process are maintained (see tables 4a and 4b in section 4.2.2) This, together with verification that biodrying test results meet the quality criteria input requirements of the permitted sites the materials shall be sent to

*Table 3. Validated critical limits of sanitisation phase critical control points.*

| <b>Parameter</b> | <b>Sanitisation phase critical limits</b>                    |
|------------------|--------------------------------------------------------------|
| Temperature      | Tunnels G3-G11 $\geq 60$ °C and $\geq 45$ °C                 |
| Moisture content | N/A                                                          |
| Minimum duration | Tunnels G3-G11 24 hours and 72 hours once (EC No. 1069/2009) |

*Table 4. Monitoring point locations and monitoring frequency for the sanitisation phase*

| <b>Parameter</b> | <b>Monitoring point locations</b>                                                     | <b>Monitoring frequency</b>                                       |
|------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Temperature      | Within vessel.                                                                        | Continuous, as per ABPR requirements                              |
| Moisture content | 'Not applicable' if Thermophilic Aerobic Digestion is used for the sanitisation phase | Thermophilic Aerobic Digestion is used for the sanitisation phase |

### **5. Readiness for product preparation**

Each shall be deemed ready for product preparation (see section 8) when evaluated as having completed the actively managed biodrying phase (see section 4.2), i.e. complied with the criteria set out in this SOP and in line with the customer’s permit. Temperature shall be monitored on the exit of the tunnels through the use of the onsite laboratory (not accredited).

### **6. Biofuel preparation, storage and batch identification**

The date(s) on which each batch is loaded out, and its batch treatment code shall be recorded on the weighbridge electronic software system.

### **7. Biofuel storage**

The material is removed from the IVC tunnels and stored in the dedicated dispatch hall, within the same fully enclosed building from which air is treated through the abatement system. The vehicle loading process would be treated in the same way as unloading feedstock material; vehicle in the building, doors closed and abatement running.

Biofuel material is stored in stockpiles on site. To prevent the stockpiles becoming anaerobic they shall be formed and stored in maximum pile sizes of 500m.

**Figure 1 – Cambridge Biodrying Overview Layout**

