

Appendix A

Risk Assessment

Date of Working Plan Risk Assessment	February 2014
Risk Assessment Review Date*	February 2015
Approved by	Site Manager and Safety Officer
Date	February 2014
* Risk assessment should be reviewed where operations change, where the surrounding environment changes and in any case annually to keep the assessment relevant.	

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Harm	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
<i>What is at risk? What do I wish to protect?</i>	<i>What is the agent or process with potential to cause harm?</i>	<i>What are the harmful consequences if things go wrong?</i>	<i>How might the receptor come into contact with the source?</i>	<i>How likely is this contact?</i>	<i>How severe will the consequences be if this occurs?</i>	<i>What is the overall magnitude of the risk?</i>	<i>On what did I base my judgement?</i>	<i>How can I best manage the risk to reduce the magnitude?</i>	<i>What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).</i>
Local human population	Releases of particulate matter (dusts) and micro-organisms (bioaerosols).	Harm to human health - respiratory irritation and illness.	Air transport then inhalation.	Medium	Medium	Medium	Composting produces and is likely to release micro-organisms. There is potential for exposure if anyone living or working close to the site (excluding operator and employees. Limited number of humans but there are business nearby including other La Collette operations	Restriction on waste types and additionally mitigation at production source though use of targeted dust mitigation techniques.	Low

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Local human population	Release of dusts	Nuisance - dust on cars, clothing etc.	Air transport then deposition	Medium	Medium	Medium	Limited local sensitive human receptors due to the location of the facility. Other businesses and operations adjacent and near operations.	Restriction on waste types and additionally mitigation at production source though use of targeted dust mitigation techniques.	Low
Local human population, livestock and wildlife.	Litter	Nuisance, loss of amenity and harm to animal health	Air transport then deposition	Low	Medium	Medium	Limited human receptors, but wildlife receptors are present.	Control of waste types. Picking of contaminants before shredding. Restriction on the types of waste to those with limited potential to generate litter. Litter management (picking etc) within WP	Low
Local human population	Waste, litter and mud on local roads	Nuisance, loss of amenity, road traffic accidents.	Vehicles entering and leaving site.	Medium	Low	Low	Site has a private dedicated long and well surfaced access road.	Site has a dedicated wheel wash which can be used as required for vehicles leaving. The road is swept by La Collette reclamation site operators.	Low
Local human population	Odour	Nuisance, loss of amenity	Air transport then inhalation.	Medium	Medium	Medium	Composting produces	Control of acceptable waste types. Implementation of	Low

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							and is likely to release odour. There is potential for exposure for anyone living or working close to the site (excluding operator and employees). Local residents often sensitive to odour	an odour management plan as required by WML	
Local human population	Noise and vibration	Nuisance, loss of amenity, loss of sleep.	Noise through the air and vibration through the ground.	Medium	Medium	Medium	Local residents often sensitive to noise and vibration, however the site is at some distance from such receptors.	Control through operational measures.	Low
Local human population	Scavenging animals and scavenging birds	Harm to human health - from waste carried off site and faeces. Nuisance and loss of amenity.	Air transport and over land	Medium	Medium	Medium	Permitted wastes are unlikely to attract scavenging animals and birds. However if insect breed then birds by become pests as they are attracted to the insects	Limit on the types of wastes that are accepted. Implementation of correct composting technique	Low
Local human population	Pests (e.g. flies)	Harm to human health, nuisance, loss of amenity	Air transport and over land	Medium	Medium	Medium	Insect pests can multiply on permitted wastes, particularly in	As above	Low

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							summer months		
Local human population	All on-site hazards: wastes; machinery and vehicles.	Bodily injury	Direct physical contact	Low	Medium	Medium	Permitted waste types are non-hazardous so only a medium magnitude risk is estimated.	Activities shall be managed and operated in accordance with the WP which includes site security measures to prevent unauthorised access.	Low
Local human population and local environment.	Arson and / or vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	Respiratory irritation, illness and nuisance to local population. Injury to staff, firefighters or arsonists/vandals. Pollution of water or land.	Air transport of smoke. Spillages and contaminated firewater by direct run-off from site.	Low	Medium	Low	Permitted waste types do not include liquids and are non-hazardous so only a medium magnitude risk is estimated. The materials accepted are generally non-combustible in nature	WP contains measures to control fire and spillages. Control over the types of waste accepted.	Low
Local human population and local environment	Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land.	Respiratory irritation, illness and nuisance to local population. Injury to staff or firefighters. Pollution of water or land.	As above.	Medium	Medium	Low	Risk of accidental combustion of waste is moderate.	As above (excluding comments on access to waste). Licensed activities do not include the burning of waste	Low
Water environment	Spillage of liquids, leachate from waste, contaminated	Acute effects: oxygen depletion, fish kill and algal blooms	Direct run-off from site across ground surface, via surface water drains, ditches	Medium	Medium	Medium	Permitted waste types do not include liquids so only a medium	All liquids shall be provided with secondary containment.	Low

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	rainwater run-off from waste e.g. containing suspended solids.		etc.				magnitude risk is estimated.	Leachate collected in sealed system and lagoon. Compost is absorbent.	
Water environment	As above	Chronic effects: deterioration of water quality	As above. Indirect run-off via the soil layer	Low	Low	Low	Waste types are non-hazardous so harm is likely to be temporary and reversible.	As above	Low
Groundwater	As above	Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole.	Transport through soil/groundwater then extraction at borehole.	Medium	Medium	Medium	There is a potential for contaminated rainwater run-off or leachate from permitted waste types.	As above	Low
Protected sites - Ramsar	Any	Harm to protected site through toxic contamination, nutrient enrichment, smothering, disturbance, predation etc.	Any	Low	Medium	Low	Waste operations may cause harm to and deterioration of nature conservation sites. Predation unlikely as waste types will no attract scavengers etc.	Control over the types of waste permitted to be accepted is restricted. Incident procedures in place.	Low

Appendix B

Site Inspection Form

Checks to Undertake	Checked?	Description	Comments or Actions taken
Checked Site Engineering?	<input type="checkbox"/> (tick)	Check condition of site surfacing, drainage, walls etc (Visual)	
Checked Site Identification Board	<input type="checkbox"/> (tick)	Check condition of Site Identification Sign (Visual)	
Checked Site Security?	<input type="checkbox"/> (tick)	Check condition of site fence, gates, hedges	
Checked for Odour?	<input type="checkbox"/> (tick)	Check for odour at or beyond site boundary	Use odour management plan and template documents
Checked for Pests?	<input type="checkbox"/> (tick)	Check for evidence of pests	
Scavengers?	<input type="checkbox"/> (tick)	Check for evidence of scavengers	
Litter?	<input type="checkbox"/> (tick)	Complete daily litter check	
Dust/Noise?	<input type="checkbox"/> (tick)	Undertake check for dust or noise during operations (i.e. when tipping, sorting etc)	
Drainage/Lagoon Checked?	<input type="checkbox"/> (tick)	Check lagoon level and aeration system	
General Issues	Circle	Description	Comments of Actions taken
General Maintenance Undertaken?	Yes/No	Has any general site maintenance been undertaken? See Maintenance Schedule	
Breakdowns/Spillages?	Yes/No	Has any site machinery/plant broken down? Have spillages resulted? (Follow spillage plan)	
Emergencies/Incidents?	Yes/No	Have any Emergencies/incidents occurred? (complete incident plan)	
Problems with Waste Received?	Yes/No	Have there been problems with wastes, difficult, non-permitted?	
Any Complaints?	Yes/No	Nature of Complaint and action taken	
Any Other Issues?	Yes/No	Anything else of interest?	

Odour Control

Odour control

The waste types accepted by the organic waste facility are of the type that could give rise to potential odour nuisance. The WML requires that the facility has an odour management plan to control odours. This section is covered under 2.1 and 2.3 of the Composting SOP.

Odour diaries

Should frequent complaints regarding odour be received then complainants will be issued with an odour diary and encouraged to record details of detected odours. All reported odours will be formally investigated.

Dispersion enhancement

The organic waste facility is surrounded by a 2.5m earth bank. The earth bank has a misting system (see Appendix M). A separate 3m net wall has been constructed to prevent organic debris contaminating the lagoon and contributing to unwanted odours.

Odour monitoring

Monitoring will be undertaken using 'Sniff tests' by an appropriately trained person. The sniff tests are to be undertaken at several off site locations.

Sniff testing will be carried out on a monthly basis and in response to specific odour complaints.

A form to assist the sniff test is contained at the end of this Appendix. This appendix also contains notes on whom and how a sniff test should be undertaken and an odour monitoring record template.

Individual Odour Sensitivity Test Procedure

See Table C1 for Odour Monitoring References

At Least 3 sets of tests (as detailed in 'A Nasal Chemosensory Performance Test for Odor Inspectors' supplied by the St. Croix Sensory Inc to be carried out on each candidate.

Tests 1 and 2 can be carried out on one day with the third test being carried out with at least one day rest from the second test (BSEN13725, 2003).

To become a panel member the candidate should achieve an odour threshold average score of between 7 and 12 inclusively (Lay & McGinley, 2004).

Furthermore, active panel members should be re-tested, with a single test, every three months to confirm their olfactory function by using previous scores as the reference of function.

All results will be recorded on an Odour Sensitivity Data Sheet and this will be filed in The Odour Monitoring File for reference.

Odour Monitoring Requirements

Health and Safety

All monitoring panel members shall have passed the La Collette evacuation induction process.

The following Personal Protective Equipment (PPE) shall be worn when carrying out odour monitoring on the La Collette Reclamation Site:

Safety shoes or boots

High viz vest

Eye protection

Required Equipment:

A watch with a second hand or a digital type with seconds being easily visible

A pen

Clip board

Map of Odour Monitoring locations (see Table C2 - Odour monitoring locations)

Odour Monitoring Record Sheets

Nasal Ranger Field Olfactometer and all accessories required to carry out measurements

Mobile telephone

Before commencing monitoring during the hours of compost site operation, contact the Compost Site Chargehand (tel no 07797 861250), record any operations that are being carried out on the Odour Monitoring Record Sheet

Check in at the La Collette reception before going onto the La Collette Site for Monitoring Locations 1 and 2, and check out before leaving site.

Note: Location 3 can be accessed via the road next to the new Energy from Waste site.

Access to monitoring location number 4 is by driving along La Rue de Veule, La Collette.

Reclamation Site perimeter access road, caution, there is no turning area for a vehicle past the leachate collection lagoon located behind the North East ash mound

Odour Monitoring Procedure

Odour monitoring is to be carried out by an active panel member at least twice per week using the procedure set out in the Odour Monitoring protocol, at location numbers two to seven on the Odour Monitoring Map. If either assessor scores a 2 or higher for Intensity further detailed investigation will be carried out using a Nasal Ranger Olfactometer and following the manufactures guidance (St Croix Sensory Inc., 2004). The locations identified for odour monitoring are shown on the map, see table C2, (M. Ives, 2009).

All results are to be recorded on the Odour Monitoring Record Sheet. If odour is detected at any other site please make a note on the record sheet and inform the site chargehand/manager.

If a complaint has been received odour monitoring using the Nasal Ranger Field Olfactometer will be carried out first at the site of the complaint. Following this initial assessment, further readings will be taken and recoded at the locations identified in the Odour Monitoring Strategy (M. Ives, 2009)

Odour monitoring using the Nasal Ranger Field Olfactometer will be carried out following the procedure set out below:

- i Ensure the Nasal Ranger is fitted with Universal Odour filters P/N: NR8 – Type 1 These filters should be changed at the beginning of each week or sooner if break through occurs.
- ii Once at the desired odour monitor site and if an odour is detected, power up The Nasal Ranger Field Olfactometer by pushing the POWER Button ON and position the D/T Dial at the First BLANK Position located between 2-D/T and 60-D/T and inhale at a comfortable breathing rate through the Nasal Mask for 1-minute.
- iii Turn the D/T Dial **Clockwise** to the 60-D/T Position and inhale at the “Target Inhalation Rate” (16-20LPM) which is automatically determined by the **Green** indicator light on the Nasal Ranger LED display. If an odour is detected record the 60-D/T by putting an ‘X’ in the appropriate box on the Odour Monitoring Record Sheet.
- iv If no odour is detected turn the D/T Dial **Clockwise** to the next BLANK Position and inhale at a comfortable breathing rate through the Nasal Mask for 1-minute.
- v Turn the D/T Dial **Clockwise** to the 30-D/T Position and inhale at the “Target Inhalation Rate” (16-20LPM) which is automatically determined by the **Green** indicator light on the Nasal Ranger LED display. If an odour is detected record the 30-D/T by putting an ‘X’ in the appropriate box on the Odour Monitoring Record Sheet. Then proceed to the next test location.

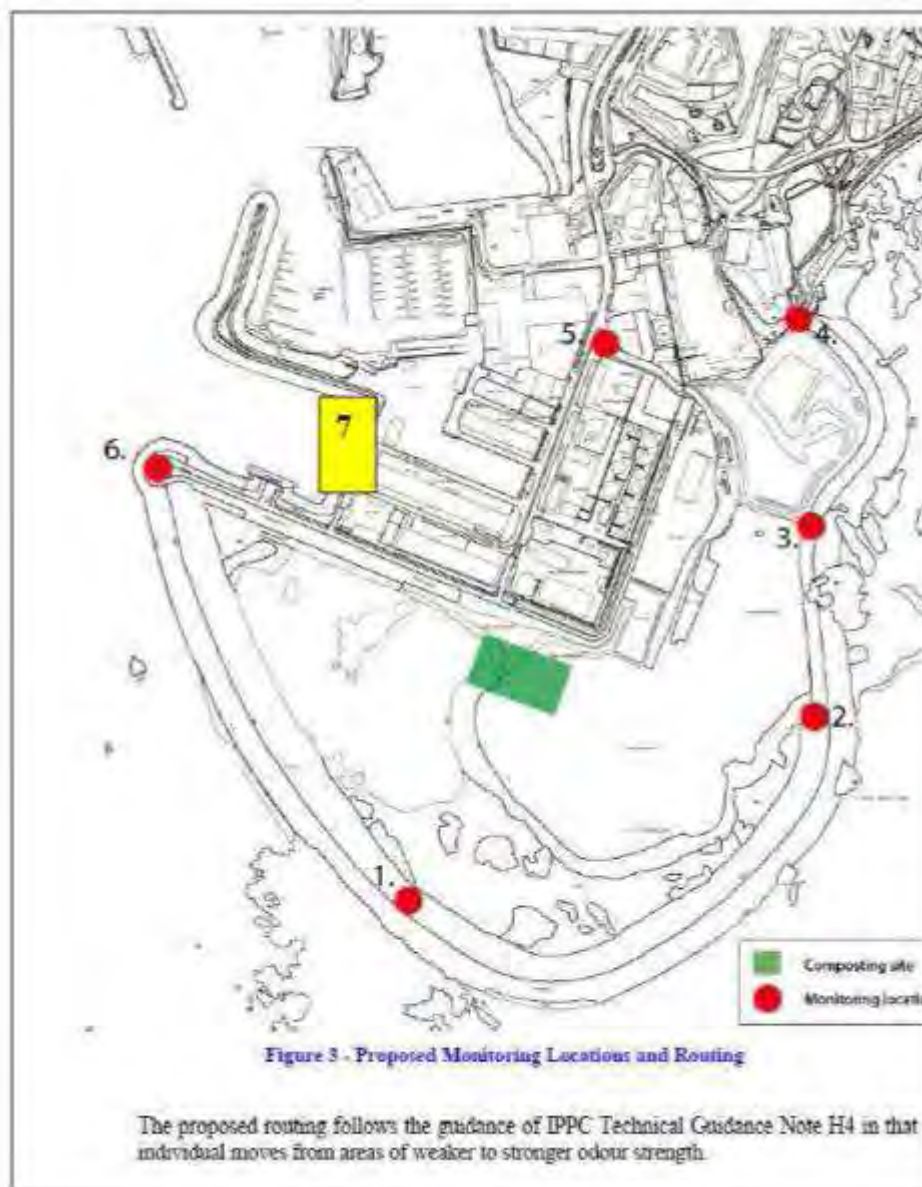
- vii Repeat steps 4 and 5 with BLANK Positions to “rest” the nose during comfortable breathing and “TEST” the ambient air with subsequent D/T positions (15, 7, 4, 2) during inhalation at the “Target Inhalation Rate of 16-20LPM through the Nasal Mask.
- viii If no odour is detected at the 2-D/T position record mark an ‘X’ in the <2 column on the Odour Monitoring Record Sheet. Then proceed to the next test location.
- ix One panel member will determine and record the dilution to threshold, along with all other relevant data on the Odour Monitoring Record Sheet. The second panel member will witness the test and counter sign the Odour Monitoring Record Sheet.
- x Once the round of odour monitoring tests is complete, the Odour Monitoring Record Sheet should be completed and filed in the Odour Monitoring File
- xi A text message is to be sent to the site chargehand/manager as soon as any odour is detected, stating the location, description of the odour and odour strength e.g. D/T level measured using the Nasal Ranger Olfactometer. The site chargehand/manager will then carry out an onsite investigation. If no odour is detected during the patrol, a text message should be sent to the site chargehand/manager stating no odour was detected during the patrol.

Table C1- Odour monitoring references

References

1. British Standard, BS EN 13725: 2003. *Air quality – determination of odour concentration by dynamic olfactometry*, 2003, British Standards Institution, London W4 4AL
2. Lay & McGinley: 2004. *A Nasal Chemosensory Performance Test for Odour Inspectors*: 2004, St. Croix Sensory Inc., Lake Elmo, USA
3. M. Ives: 2009. *Jersey TTSD La Collette organic waste Facility Odour Monitoring Strategy*, 2009, Fichtner Consulting Engineers, Stockport, Cheshire
4. St Croix Sensory Inc.: 2004. *The Nasal Ranger Field Olfactometer Operation Manual, version 6*, St Croix Sensory Inc., Minnesota, USA

Table C2 - Odour monitoring locations



Complaint Form

Odour Diary		Form version 110319	Sheet No
Name:	Address:		
Telephone Number:			

Date of odour:						
Time of odour:						
Location of odour, if not at above address (indoors, outside):						
Weather conditions (dry, rain, fog, snow etc):						
Temperature (very warm, warm, mild, cold or degrees if known):						
Wind strength (none, light, steady, strong, gusting):						
Wind direction (eg from NE):						
What does it smell like? How unpleasant is it? Do you consider this smell offensive?						
Intensity – How strong was it? (see below 1-5):						
How long did go on for? (time):						
Was it constant or intermittent in this period:						
What do believe the source/cause to be?						
Any actions taken or other comments:						

Intensity

- | | | |
|--------------------|------------------|--------------------------|
| 0 No odour | 3 Distinct odour | 5 Very strong odour |
| 1 Very faint odour | 4 Strong odour | 6 Extremely strong odour |
| 2 Faint odour | | |

Sniff Test

Odour report form					Date
Time of test					
Location of test e.g. street name etc					
Weather conditions (dry, rain, fog, snow etc):					
Temperature (very warm, warm, mild, cold, or degrees if known)					
Wind strength (none, light, steady, strong, gusting) Use Beaufort scale if known					
Wind direction (e.g. from NE)					
Intensity (see below)					
Duration (of test)					
Constant or intermittent in this period or persistence					
What does it smell like?					
Receptor sensitivity (see below)					
Is the source evident?					
Any other comments or observations					

Sketch a plan of where the tests were taken, the potential source(s).

<p>Intensity</p> <p>0 No odour 1 Very faint odour 2 Faint odour 3 Distinct odour 4 Strong odour 5 Very strong odour 6 Extremely strong odour Ref: German Standard VDI 3882, Part 14</p>	<p>Receptor sensitivity where odour detected</p> <p>Low (e.g footpath, road) Medium (e.g. industrial or commercial workplaces) High (e.g. housing, pub/hotel etc)</p>
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You may need to carry out an assessment either to work out whether you are complying with your Waste Management Licence, or as a part of an investigation into a complaint. You can use routine assessments to build up a picture of the impact the odour has on the surrounding environment over time. You can develop ‘worst case’ scenarios by doing assessments during adverse weather conditions or during particularly odorous cycles of an operation. Ideally, you should use the same methodology to follow up complaints.

Please note:

- Staff normally exposed to the odours may not be able to detect or reasonably judge the intensity of odours off-site. You might be better off using office staff or people who have not recently been working on the site to do this.
- Anyone who has a cold, sinusitis or a sore throat, is likely to underestimate the odours.
- To improve (or to check) data quality, you can get two people to do the test independently at the same time.
- Those doing the assessment should avoid strong food or drinks, including coffee, for at least half an hour beforehand. They should also avoid strongly scented toiletries and deodorisers in the vehicle used during the assessment.

Where you test will depend on:

- whether you are responding to a complaint;
- whether you are checking your state of compliance at sensitive receptors;
- whether you are trying to establish the source of an odour;
- wind direction.

The assessment may involve someone walking along a route that you have selected either because of these factors, or in response to the conditions they found when they got there. Another option is to choose fixed points so that you can evaluate the changing situation over several weeks or months. Or the test points may vary from test to test according to local conditions, which would help you identify worst case conditions.

You should also keep a note of any external activities (such as agricultural practices) that could be either be the source of the odour, contribute to the odour, or be a confounding factor. Remember that an odour will become diluted and may change character as this happens.

You should also take the factors given in Environment Agency Horizontal guidance H4 Section 5.2 Monitoring – Ambient Air into account.

Selection of Persons Suitable to Carry Out Direct Olfactometry

K.1 Code of behaviour for assessors and panel members:

- Panel members shall be at least 16 years of age and willing and able to follow instructions;

K.2 To qualify as a panel member, assessors shall observe the following code of behaviour:

- The panel member shall be motivated to carry out his/her job conscientiously.
- The panel member shall be available for a complete measurement session (series of measurements on a day, interrupted by short breaks only)
- The panel member shall be engaged for a sufficient period to build up and monitor a history of measurement.
- From 30 minutes before and during olfactometric measurement panel members shall not be allowed to smoke, eat, drink (except water) or use chewing gum or sweets.
- Panel members shall take great care not to cause any interference with their own perception or that of others in the odour rooms (testing office) by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics.
- Panel members suffering from a cold or any other ailment affecting their perception of smell (e.g. allergic fits, sinusitis) shall be excluded from participating in measurements.
- Panel members shall be present in the odour room (testing office) or a room with comparable conditions 15 minutes before the measurements start in order to get adapted to the actual odour environment of the measuring room.
- The odour room shall be free of odorous people, substances and any sources with regard to noise and light that could negatively affect the measurement in progress.
- During measurements panel members shall not communicate with each other about the results of their choices. When using 'forced choices' mode, informing them of the correctness of their choices after the measurement can enhance the motivation of the assessors during the measurements.
- The operator shall ensure that the code of conduct is fully known to each panel member.
- The enforcement of the code of conduct is a direct influence on the test results, and therefore of great importance. The operator shall ensure that the motivation of panel members is maintained throughout the measurements, and corrective action shall be taken when required (BS EN 13725, 2003).

Odour Monitoring Record Sheet

The States of Jersey

ODOUR MONITORING RECORD SHEET

Transport Technical Services Department

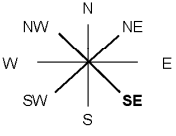
Complaint Received? YES / NO
 Plan attached showing location of complaint and extent of odour? YES / NO

- Intensity:**
 1 - No detectable odour
 2 - Faint Odour (barely detectable, need to stand still & inhale facing into wind)
 3 - Moderate Odour (odour easily detectable while walking & breathing normally)
 4 - Strong Odour
 5 - Very Strong Odour (probably causing nausea)
- Offensiveness**
 1 - No Detectable Odour
 2 - Potential Offensive
 3 - Moderately Offensive
 4 - Very Offensive

Date & time of complaint received		Number of complaints which may relate to the same source	
Location of complaint			
Grid reference (if not a property)		Time odour noticed & duration	

Time	Location	Intensity Score (1 - 5)	Offensiveness Score (1 - 4)	D/T							Descriptors Smells like...	Comments: (Including persistence, potential source)	
		Assessor 1	Assessor 1	60	30	15	7	4	2	<2			

ODOUR MONITORING RECORD SHEET

<p>Weather Conditions</p> <p><input type="checkbox"/> Sunny</p> <p><input type="checkbox"/> Partly Cloudy</p> <p><input type="checkbox"/> Mostly Cloudy</p> <p><input type="checkbox"/> Overcast</p> <p><input type="checkbox"/> Hazy</p>	<p>Precipitation</p> <p><input type="checkbox"/> None</p> <p><input type="checkbox"/> Fog</p> <p><input type="checkbox"/> Rain</p> <p><input type="checkbox"/> Sleet</p> <p><input type="checkbox"/> Snow</p>	<p>Wind Direction Blowing From</p> 	<p>Wind Speed</p> <p><input type="checkbox"/> Calm</p> <p><input type="checkbox"/> Light Breeze (1-5 mph)</p> <p><input type="checkbox"/> Moderate Wind (5-15mph)</p> <p><input type="checkbox"/> Strong Winds (>15 mph)</p>
<p>Temperature: ____ C Relative Humidity: ____ % Barometric Pressure: _____</p>			
<p>Operations being carried out on compost site: (Telephone site manager prior to monitoring)</p> <p><input type="checkbox"/> Shredding <input type="checkbox"/> Screening</p> <p><input type="checkbox"/> Turning <input type="checkbox"/> Other - list details</p>			
<p>Misting system operating Y/N <input type="checkbox"/> If 'Yes' which sides around site N, S, E, W _____</p>			
<p>Comments: _____</p>			
<p>Nasal Ranger Test carried out by: _____</p>			
<p>_____ Date</p>		<p>_____ Signature</p>	
<p>_____ Assessor 1: Name</p>		<p>_____ Signature</p>	

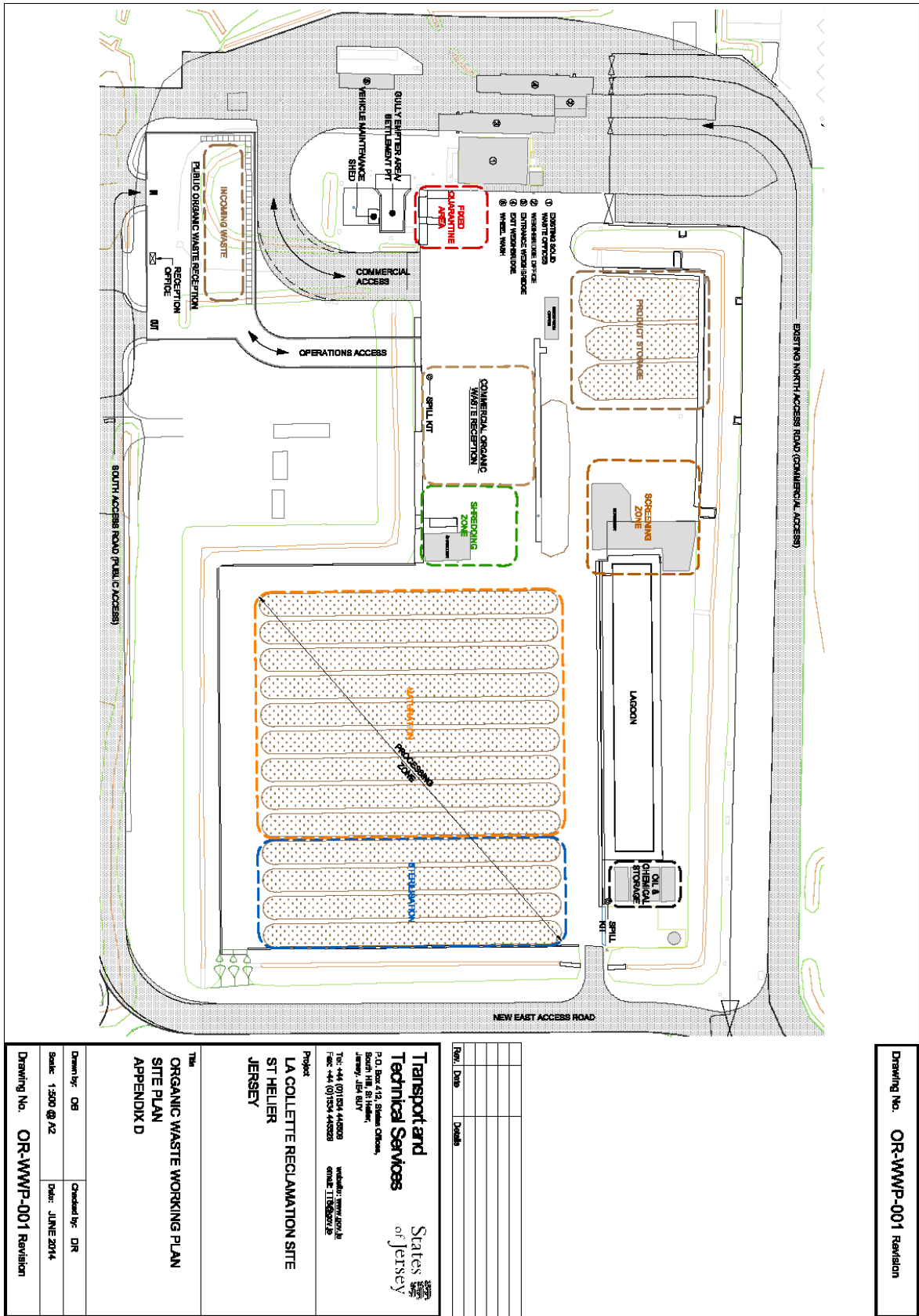
Descriptors:- Smells like...

- Compost**
- Fresh Compost
 - Fresh cut grass
 - Grass
 - Putrid
 - Rancid Compost
 - Sweet Compost

- Others:**
- Burnt Organic
 - Food
 - Garbage
 - Oil
 - Petrol / Diesel
 - Rotting Seaweed
 - Seaweed
 - Sewage
 - Slurry
 - Vomit

Add your own to form if not on list

La Collette Reclamation Site Plans



Drawing No. **OR-WWP-001** Revision

Rev.	Date	Details

Transport and Technical Services of **States of Jersey**
 P.O. Box 412, Salem Creek,
 South 108, St. Helier,
 Jersey, JE1 8JY
 Tel: +44 (0)1534 445800 website: www.jds.co.uk
 Fax: +44 (0)1534 445829 email: TTS@jds.co.uk

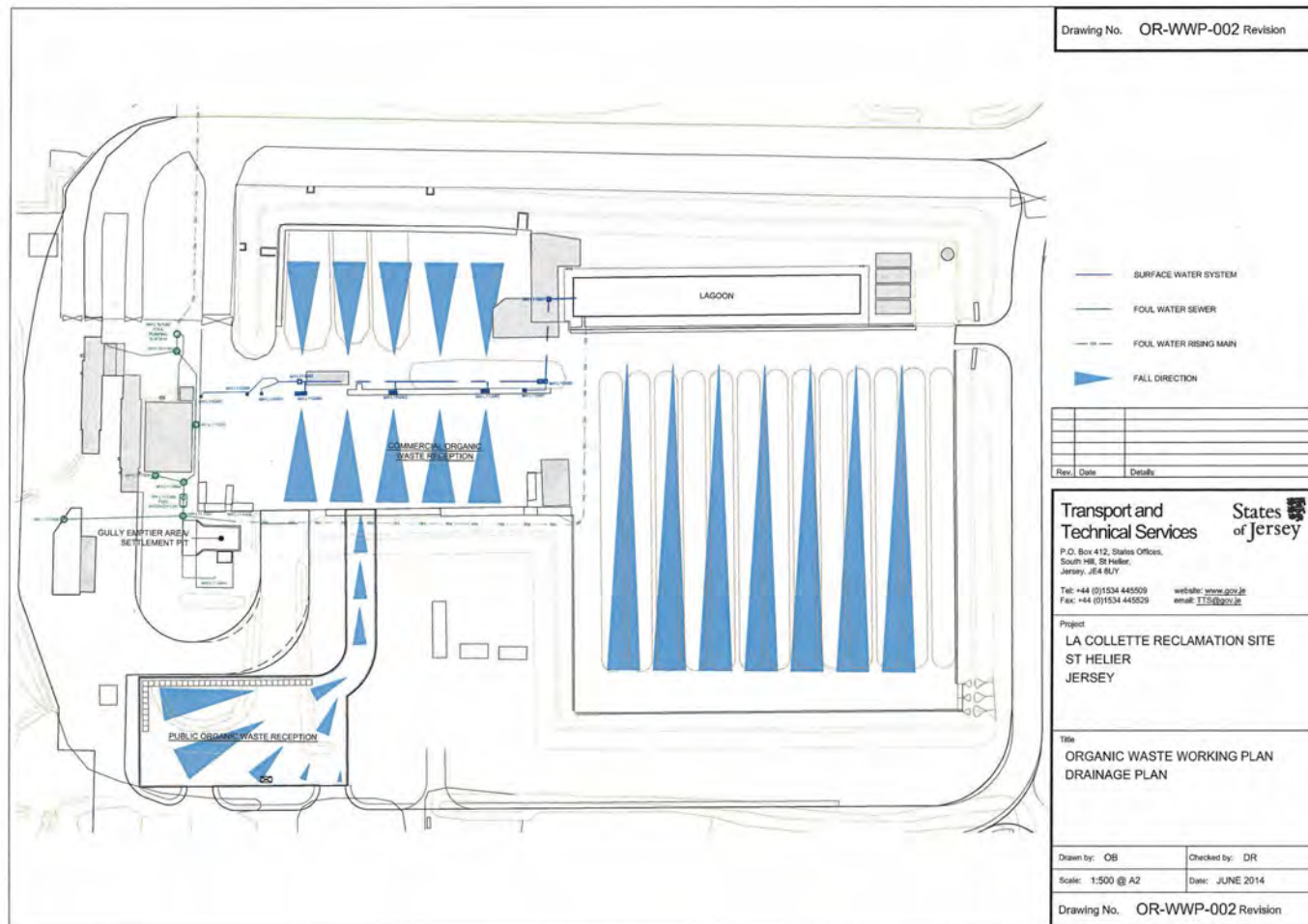
Project
LA COLLETTE RECLAMATION SITE
ST HELIER
JERSEY

THE
ORGANIC WASTE WORKING PLAN
SITE PLAN
APPENDIX D

Drawn by: DB	Checked by: DR
Scale: 1:500 @ A2	Date: JUNE 2014
Drawing No. OR-WWP-001 Revision	

Appendix E

Site Drainage



Standard Operating Procedures (SOPs) for composting systems operated by States of Jersey



La Collette Organic Waste Facility

**Prepared by 4R Environmental Consultants, using Renewable Energy Association
Template documents**

Date of Issue: 24th July 2014

Contents

Section number	Section title
1.	Identity and summary of composting process and its products
1.1	Company, site and process details
1.2	General description of facility, process and products
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Identity of composting process and its products

1.1 Company, site and process details

- a) States of Jersey, States Office, South Hill, St Helier Jersey JE4 8UY

01534 448595

- b) Composting Facility

Composting Site, La Collette, St Helier Jersey JE2 3NX
01534 445509

- c) Composting process that these SOPs refer to:

Open air windrow process for source segregated green waste and sludges from the treatment of urban waste water (biosolids) only.

1.2 General description of the composting process and its outputs

The site currently composts green waste via *sanitisation*, *stabilisation* and *maturity* phases using an open-air, turned windrow composting process. The quantities of waste composted are set out in the sites planning permission. All in-coming vehicles received at the site are logged and recorded at the site weigh bridge. Incoming wastes are stock piled, shredded and formed in to windrows as soon after shredding as possible. Windrows are maintained at a height of approximately 2.5-3m, a width of 4-5m and length of c. 50m, and are turned a minimum of 3 turns (Agriculture grade). Compost is screened through a 30mm screen aperture for Agriculture grade (minimum 4 weeks composting) and Soil Blending grade (minimum 6 weeks composting), while stabilised compost is screened through a 10mm aperture, creating a Soil Improver grade (minimum 12 weeks composting). Any oversize fractions are stored and then re-introduced as a bulking agent via mixing with in-coming fresh feedstocks *i.e.* green waste/biosolids.

In summary four compost grades are currently produced at La Collette, these are:

0 to 30 mm compost grade, defined as Agriculture Grade, produced after 4 weeks sanitisation and stabilisation.

0 to 30 mm compost grade, defined as Soil Blending Grade, produced after minimum of 6 weeks sanitisation and stabilisation, and

0 to 10 mm compost grade, defined as Soil Improver Grade, produced after a minimum of 12 weeks sanitisation, stabilisation and maturity.

10 to 40 mm compost grade, defined as Soil Mulch Grade, produced after a minimum of 12 weeks sanitisation, stabilisation and maturity.

This composting process is operated under a:

Waste Management Licence/Permit WML 003 as of 2007

The site shall operate an information management system that provides batch data records for types, quantities, source of waste received at the site, shredding and processing data (temperature, moisture and turning frequency records for each batch) and final end product screening and quality characterisation.

1.3 Security arrangements

Gates at the entrance prevent vehicular access to the site out of hours, and banks surround the operational area. All cabins and offices are locked at the end of each day.

Vehicle and plant keys are stored in the site office, and signed out when they are taken out and returned.

Run-off/liquor storage sumps are surrounded by fences and the gates are locked at all times except when access is required by staff.

Site visits are by appointment only and must be accompanied by a States of Jersey member of staff at all times.

1.4 Health and Safety Procedures

Staff must have been assessed by Occupational Health Specialists, and passed fit for work before undertaking duties which extend for a period of longer than 3 consecutive days.

Personnel Protective Equipment (PPE) appropriate to the activity undertaken must be worn including:

Particulate respirators, safety glasses, goggles or face shields, ear plugs or defenders, gloves, safety boots or shoes.

High visibility vests or jackets must be worn at all times while in operational areas of the site.

Staff working outside should change their clothes prior to leaving the site, unless returning to compost duties, showers and a laundry service for standard issue clothing are provided.

Staff must wash hands with anti-bacterial/fungal/viral soap prior to eating, smoking or drinking if they have been handling material or potentially contaminated surfaces.

Smoking is not permitted in operational areas or vehicles.

All accidents, and/or near misses must be reported, logged on a TTS form and passed to the Health and Safety Officer as soon as possible.

Minor cuts/scratches/abrasions should be seen by an on-site first aider, and if necessary further action will be taken.

The risk assessment for working with Green Waste Composting activities is attached to this document as Appendix 1

1.5 Site Visitor Arrangements

- Depending upon the nature/duration of the visit a site specific induction for visitors may be required. Under no circumstance will site visitors be allowed to go/or be left alone under any circumstance. If either of the above are required then the necessary arrangements will be made by the site charge hand.
- The Site Health and Safety Policy require that all visitors act in a safe way and not to put themselves or others at risk. The legal requirements listed below are extracted from the policy and the Health and Safety Management System and will help the site to work towards eliminating accidents on site.
- All visitors are required to enter their details in the Site Attendance Register.
- Helmets, Safety footwear and a High Visibility Vest/Coat must be worn at all times while on site. Additional PPE may be required at certain times or locations, the site representative will advise of any such requirements.
- The site representative will advise the visitor on the type and location of any site hazards.
- The site representative will inform the visitor of the Emergency and Fire alarm signals and the exit routes and assembly points.
- All accidents and near misses must be reported to the site representative, there is a duty on the part of the visitor to advise the site representative of any potentially dangerous incidents/situations or breaches of Safety Regulations they may observe.

1.6 Other Environmental considerations

The composting site is situated in close proximity to the South East Coast of Jersey, which has 3210.5 hectares designated under RAMSAR (site code number 7UK150), the International Convention on Wetlands of International Importance, an industrial estate and residential areas. Odour and bioaerosols are therefore issues that need to be considered.

Odour is an issue that has caused concern in the past, and every opportunity is taken to keep potential odorous emissions to a minimum, wind direction and general climatic conditions are taken in to account before material is disturbed. Odour monitoring is undertaken at seven points around La Collette on a daily basis and the results logged – see Appendix 2 Odour Monitoring Strategy.

Any complaints that may be received are logged, with the name of the complainant, time of the call and these are passed on to the duty charge hand at La Collette as a matter of urgency, for investigation, with a follow up made to the complainant to discuss the matter further, this is logged giving the time of the call and the outcome.

Bioaerosol monitoring is carried out on a regular basis by a suitably qualified organisation to provide an independent source of data on bioaerosols produced from background sources and site activities. These results are sent to TTS operational management and site manager for action to be taken, as appropriate.

2 Input materials

2.1 Types of input materials

The treatment process currently composts only green waste and biosolids, but the following source-segregated biodegradable waste / material types could be taken if agreed by TTS management in accordance with the site working plan:

Table 1. Types of input materials

Waste Code	Waste description	Source of waste	Name of waste supplier organisation
02 01 03	Plant tissue waste	The origin of source segregated green waste is limited to materials from domestic gardens, amenity sites plus municipal parks and gardens.	States of Jersey
02 01 06	Animal faeces, urine and manure		Jersey Airport
02 01 07	Wastes from forestry		Domestic homeowners,
03 01 01	Waste bark and cork	Biosolids are provided by TTS from the Bellazane sludge works.	Professional landscape architects and gardeners.
03 01 05	Sawdust, shavings, cuttings, wood and particle board only		
03 03 01	Waste bark and cork		
15 01 03	Wooden packaging		
15 01 05	Composite packaging		
15 01 09	Textile packaging		
17 02 01	Wood		
17 05 06	Dredging spoil		
19 05 03	Off-specification compost		

19 08 05	Sludges from treatment of urban waste water		
19 12 07	Wood not containing dangerous substances		
20 01 38	Wood not containing dangerous substances		
20 02 01	Biodegradable waste		
20 03 02	Biodegradable waste from markets		

N.B. The process is not licensed to accept catering wastes or any other wastes within the scope of the Animal By-Products Regulations

2.2 Rejection or acceptance and storage of input materials

Each load of biodegradable waste / material delivered for composting 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 (storage area) shall be recorded on a Weighbridge Ticket.

The weighbridge operator shall then notify the driver to proceed to the tipping area where a site operative shall ensure the waste carrier takes it to the input materials storage area. Here, the waste carrier will tip the waste so as not to merge / contaminate it with any input materials already being stored.

A site operative shall inspect each load deposited at the storage area. The load shall be rejected if by subjective assessment it contains visible litter/contrary material (e.g. glass, plastics, metal, building rubble, soil).

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 bags, non-compostable packaging and plastics, metals, concrete and consolidated mineral fragments (e.g. rocks, stones, and soil), etc.	No visible contrary material Score 1 = Acceptable = load delivered is clean	'Load accepted. Score and action logged in the <i>'Site Diary'</i>
	Visible Contrary Material Score 2 = POOR = physical contaminant content present unsuitable for composting evaluated by subjective assessment	Load rejected and should be removed from the site by deliverer of the waste. Score and action recorded on <i>'Input Load Inspection Record Sheet'</i> .

Weeds / plant invasive species	Japanese Knotweed absent from all input loads accepted for composting	Reject and send any loads that contain Japanese Knotweed for appropriate disposal. . See ORG Information sheet on “ <i>Composting noxious weeds</i> ” identifying and dealing with Japanese Knotweed. Actions recorded on ‘ <i>Input Load Inspection Record Sheet</i> ’
Plants containing toxins (rhododendron, yew, ragwort, hemlock)	Rhododendron, yew, ragwort, hemlock absent from all input loads accepted for composting>	Reject and send any loads that contain any of the named toxic plant species for appropriate disposal. See ORG Information sheet on “ <i>Composting noxious weeds</i> ” identifying and dealing with toxic plant species. Actions recorded on ‘ <i>Input Load Inspection Record Sheet</i> ’.

The acceptance criteria specified in table 2 shall be specified in the contractual arrangements or clearly communicated to each relevant input material supplier.

Before removal from the composting site, each load or part-load due rejection shall be kept separate from loads awaiting inspection or those accepted for composting.

Each accepted load shall be assessed to identify the processing requirements and any potential problems in the feedstock itself for example excess moisture or odour.

Any input materials stored for incorporation to future batches (e.g. woody material kept for mixing into loads delivered in Spring, which tend to contain high proportions of soft, sappy, putrescible plant tissues) shall carry a batch code marker. A batch record sheet shall be created and maintained for such stockpiled material so that it is traceable when mixed with recently delivered input materials that form new composting batches.

The maximum storage duration for input materials prior to shredding shall not exceed 48 hours unless agreed by Site Manager, normal operation is that material is shredded within 24 hours.

2.3 Traceability of input materials

A record system shall be maintained connecting sources of wastes 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 and the ‘*Site Diary*’.

Composting batches are created one at a time. Batch formation ‘start’ and ‘finish’ dates are recorded in the ‘*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 composting 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*'.

For each composting batch, the minimum composting process duration stated in these SOPs shall be calculated from the date the monitoring of that batch commences.

3 Preparation of input materials

3.1 Shredding

Green waste accepted for composting shall be stockpiled to form windrows of c.500m³ when shredded, typically over a period of a week depending on waste acceptance rates. Shredding shall be carried out typically every day depending on waste acceptance rates.

The material shall be shredded and formed into a windrow within 12 hours of shredding see section 4.1.

The residence time of unshredded material shall not exceed 48 hours (see section 2.2) .

3.2 Mixing

Waste accepted for composting may be mixed with screened oversize if it contains large volumes of high nitrogen material e.g. grass, to increase porosity and lower moisture levels.

3.3 Wetting prior to batch formation

Moisture evaluation of the windrow input material shall be carried out as per section 4.1.3, prior to any moisture addition.

The moisture content of samples of composting materials from each windrow shall be assessed by using the method described in Section 4.1.3.

3.4 Records connecting delivery notes with shredding dates, mixing and wetting

Each batch of compost shall be given a unique site reference number, which also serves as a unique windrow number. A post at the end of each windrow supporting a marked board indicates where each batch is and this stays with the batch during the composting process.

The results of the quality of input materials assessment, wetting 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*'.

4 Composting activities – managing, monitoring and evaluating sanitisation and stabilisation

4.1 Batch size and monitoring

The dimensions of each windrow shall be approximately 2.5 metres high, 4-5 metres wide and approximately 50 metres long.

Gaps of suitable width to enable turning / monitoring / litter picking shall be left between the windrows.

Each formed batch is identified by a marker that displays its batch code, in a way and location in the batch that is easily visible to operatives moving materials on site.

In the event that batches are combined during the composting process, the 'on-going' batch code(s) shall be recorded on each of the corresponding batch record sheets and the record for the later batch (*i.e.* youngest batch) shall be used as the ongoing record.

If any sanitised batch is combined with a batch that is only part way through the sanitisation phase, the sanitisation phase for those combined batches shall be restarted.

If any batch becomes separated from its batch code marker, the site manager shall be notified and efforts shall be made to re-identify and re-assign the batch with its correct batch code. If attempts to identify the batch fail, then it shall be recomposted with its own newly assigned batch code or dispatched as non-compliant material for disposal or use according to waste regulatory controls.

4.1.1 Temperature Monitoring system and equipment

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

- Compowatch temperature monitoring equipment,

The monitoring system (including equipment) shall be maintained in a functional state and maintained as per the maintenance schedule. .

Calibration checks on the temperature monitoring system / equipment are carried out once per year by the following independent calibration service provider:

Compost Systems GmbH, Maria Theresia Str. 9, A-4600 Wels, Austria.

Routine checks on the temperature monitoring system / equipment are carried out once per week and any temperature probe discrepancies immediately checked with alternative probe.

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

Temperature during the sanitisation phase is monitored as follows:

by inserting at least 1 temperature probe at the mid point of each windrow (*i.e.* halfway along the windrow), at a minimum of depth of 0.5 metres below the windrow surface. The temperature detected by the sensors, when inserted in the windrow, are automatically recorded via data download in the site office

All temperature monitoring results for the duration of the composting process of each windrow shall be recorded in the *Batch Monitoring Record System*, held on computer in the site office.

4.1.3 Moisture monitoring and records

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

- 'squeeze test' (grasping and clenching the sample in a gloved hand for approximately ten seconds, then opening and assessing moisture content using table 3 below), with scores verified regularly by comparison with quantitative results (% mass/mass) obtained using a drying in an oven and calculating the change of mass having weighed sample mass before and after 'drying and cooling of the sample' (see BS EN 13040)

Table 3. Moisture assessment index

Index number	Sample moisture behaviour	Interpretation
1	Water seeps out	Too wet
2	More than one droplet appears	Too wet
3	One droplet appears	OK
4	Compost particles remain packed together and no droplets appear	OK
5	Compost particles fall away from each other	Too dry

The source(s) of any water sprayed onto input materials or batches being formed shall be mains water or liquor from the lagoon. Liquor from surface water capture should not be sprayed on windrows that have completed its sanitisation phase because this could re-introduce pathogens.

The following shall be recorded on the '*Batch Formation and Monitoring Record Sheet*':

- evaluations of moisture content and date carried out;
- date and approximate amount of any water added; and
- source of any water added if different to the above.

4.1.4 Dust Monitoring and records

Both green waste and biosolids are not normally friable and are moist to the touch. Subsequently neither poses any risk of dust emissions as a parent material, however compost may dry out, particularly during maturation and therefore dust monitoring is carried out on site.

Dust detection

Like odour the prevailing wind conditions strongly influences the potential for dust to be detected outside the site boundary and therefore the odour mitigation strategy for potential odour emissions are also applicable and relevant to potential dust emissions arising from the composting operations. The detectability of dust emissions at the boundary of the La Collette site (*i.e.* between the operating site and the local receptors) will be checked before treatment operations commence. The detectability of dust emissions at this boundary will be detected according to the wind direction at that present time (*i.e.* the northern boundary of the site will be checked if there is a southerly wind blowing). If dust is detectable at the site boundary, then operations will only commence if the prevailing wind is blowing away from potential receptors.

Mitigation strategy (remedial actions)

If a dust complaint is received then TTS will undertake the following remedial measures to control dust emissions so that operations can commence again;

1. Immediately stop operation of mobile plant
2. Determine wind direction to identify potential receptors of dust emissions which may have become detectable during operation and record findings
3. Determine the detectability of the dust at the location of complaint (if applicable) and record findings
4. Re-check the detectability of the dust at the boundary (location according to wind direction) and record findings
5. Check dust at the site boundary and at the location of the complaint (if applicable) frequently after operation of mobile plant was stopped
6. After 60 minutes;
 - a. If dust is no longer detectable at the site boundary or at the location of complaint (if applicable) then TES will commence operations and check dust detectability at both locations regularly throughout operation.
 - b. If dust remains to be detectable at the site boundary/location of complaint then operations will be ceased and any material will be stockpiled and allowed to settle. Mixed and feedstock materials will not generate dust emissions if they are not agitated and are allowed to settle. A mister will be temporarily used until the dust is mitigated, and compost moisture contents will be adjusted as per the moisture management strategy. Dust detection will be checked hourly and the findings will be recorded. Deliveries of feedstock materials will be allowed onto site.
 - c. If dust is detectable for more than three days at the site boundary or at the location of complaint then TES will cancel any future incoming loads of feedstock until the issues of dust can be rectified

4.1.5 Weather monitoring and records

The following weather conditions shall be monitored and recorded daily:

- temperature;
- description of weather conditions, including any precipitation (drizzle, rain, sleet, hail, snow); and
- wind direction and speed.

4.1.6 Miscellaneous Monitoring activities and records

As part of good practice inspections should be undertaken, by a member of site staff, of all compost windrows at the start and end of each working day, and within 1 hour of any compost turning/disturbance activities. The following observations should be recorded, in the site diary, and corrective actions undertaken:

- Excess and/or abnormal odours on site and at the site boundaries
- Presence/evidence of vermin in or around windrows and working areas
- Presence of physical contraries/litter in windrows and around working areas
- Evidence of noxious/harmful weeds within windrows.
- Evidence of dust being emitted from the windrows
- Visual check of windrow moisture contents, along with physical checks as described in sections 4.1.3 and 4.2.2
- Presence of at least 1 temperature probe per windrow.

4.1.7 Monitoring records and corrective actions

During the actively managed composting phase monitoring and process management records for each batch shall be evaluated, corrective actions carried out if necessary and records of corrective actions made. These actions are stated in this section.

Temperature monitoring records for each windrow in the sanitisation phase shall be checked daily during periods of actively managed composting before or after the sanitisation phase.

Corrective actions shall be carried out, in addition to routine turning, if temperatures monitored move outside of the target range specified in Table 4a when the batch is progressing through the sanitisation phase, and Table 4b when the batch is progressing through the stabilisation phase.

Windrows shall be turned using a Backhus 1755 windrow compost turner, and the date each windrow is turned shall be recorded on the batch information for those windrows.

Corrective action to raise the batch temperature may include:

- additional or more frequent batch turning/mixing;
- increased batch size;
- water addition if composting conditions have become too dry;
- addition of relatively dry input materials if composting conditions have become too moist; and/or
- alteration of the shape of the batch (cross section profile) to modify moisture addition to / loss from the composting material.

Following weekly assessment of windrow moisture monitoring records, any action taken – routine or corrective – to bring windrow moisture content within the target range shall be recorded on the batch information for those windrows. If precipitation is insufficient to bring moisture conditions within the target range within 7 days of the deficiency being identified, sufficient water from mains will be sprayed onto each moisture deficient windrow.

Any corrective action taken to bring temperatures or moisture conditions within the critical limits shall be recorded on the '*Batch Formation and Monitoring Record Sheet*'.

4.2 Leachate Collection and Management

The reception area, composting pad and maturation area are situated on an impermeable concrete base. The design of the site is such that any surface water on the site drains towards a leachate lagoon with a capacity designed to hold leachate produced. Liquor from the lagoon is used to adjust the moisture content of unsanitised compost/feedstocks or is disposed via foul drain (maximum of 0.5 litres/second) or tanker collection and disposal at Bellazane Sludge Treatment works

While in the lagoon, any stored liquor is managed through circulation and agitation to provide aeration and assist in reducing the risks of odour generation occurring through lagoon sedimentation. Additionally, the lagoons are de-silted every quarter to remove any entrapped sediment from the system.

4.3 Sanitisation and stabilisation

For each batch, the **sanitisation phase** shall occur during weeks 1 to 3.

Sanitisation shall be marked as complete by inserting the completion date on the '*Batch Appraisal Record Sheet*', only when the minimum time has been completed and batch temperatures, moisture and turning have been kept within the critical limits for the sanitisation phase (see table 4a and b below).

For each batch, the **stabilisation phase** shall occur during weeks 4 – 8 before maturation and/or storage begins.

Stabilisation shall be marked as complete by inserting the completion date on the '*Batch Appraisal Record Sheet*' when this minimum time has been completed and batch temperatures, moisture and turning have been kept within the critical limits for the stabilisation phase (see tables 4a and b below).

4.2.1 Process validation

The process validation phase shall be carried out when first evaluating conformity with any additional compost quality criteria subscribed to in the quality policy e.g. PAS100. Process validation shall also

be carried out when decided necessary as a result of regular or change-triggered management reviews (refer to the quality policy for information).

The minimum of three batches assessed for process validation shall be:

- composted for the minimum times (as per section 4.2. above and in addition to any minimum maturation applicable to the compost grade stated in section 5),
- appraised against the critical limits specified in table 4, and
- graded and sampled promptly when such composting has been completed.

Each sample of compost grade under assessment shall be representative of the batch from which it is taken and be sent for testing at an Approved Laboratory within 1 week after the batch has completed its minimum composting period.

Monitoring locations and frequencies of monitoring composting conditions within each batch shall be carried out as stated in table 5a when the batch is undergoing sanitisation and then as stated in table 5b when the batch is undergoing stabilisation

The responsible person shall ensure the critical control points and critical limits of the composting process (see tables 4a and 4b in section 4.2.2 and details below on screening and maturation for different grades) have been verified to consistently result in compost of the quality subscribed to in the quality policy. This, together with verification that compost test results meet the quality criteria subscribed to in the quality policy, shall constitute process validation. The duration and outcome of process validation shall be recorded (see the *'Process Validation Record Sheet'*).

4.2.2 After validation

After process validation, the critical control points and critical limits of composting during the actively managed composting phase (sanitisation and stabilisation phases) shall remain as those validated specified in tables 4a and b.

The site manager shall ensure that the critical control points and critical limits of the composting process continue to be effective for process management. If for any reason they are suspected or known to have become ineffective, a phase of Hazard Analysis and Critical Control Points evaluation and process validation shall be returned to (refer to the Quality Policy for details on compost quality that must be achieved).

During and after validation each batch shall be sanitised and stabilised by the end of the actively managed composting phase, with composting process conditions and management complying with the critical limits stated in tables 4a and b.

Table 4a. Validated critical limits of sanitisation phase critical control points

Parameter	Sanitisation phase critical limits
Temperature	Temperatures within the core zone of the composting batch are maintained at 55 - 70 °C
Moisture content	Moisture within the composting batch is maintained at result 3 or 4 from subjective assessment as per the moisture assessment index in section 4.1.3.
Minimum number of turns	3 turns at 65 ⁰ C

Table 4b. Validated critical limits of stabilisation phase critical control points – Agriculture Grade

Parameter	Stabilisation phase critical limits
Temperature	Temperatures within the core zone of the composting batch are maintained < 70 °C
Moisture content	Moisture within the composting batch is maintained at result 3 or 4 from subjective assessment as per the moisture assessment index in section 4.1.3.

Minimum duration	2 weeks, post sanitization step, when temperatures and moisture are within the above ranges (except during and up to 24 hours after each turn
Minimum number of turns	2 turns during the minimum duration

Table 4c. Validated critical limits of stabilisation phase critical control points – Soil Blending

Parameter	Stabilisation phase critical limits
Temperature	Temperatures within the core zone of the composting batch are maintained < 70 °C
Moisture content	Moisture within the composting batch is maintained at result 3 or 4 from subjective assessment as per the moisture assessment index in section 4.1.3.
Minimum duration	4 weeks, post sanitization step, when temperatures and moisture are within the above ranges (except during and up to 24 hours after each turn
Minimum number of turns	2 turns during the minimum duration

N.B. this is dependent on windrow and outlet assessment.

Table 4d. Validated critical limits of stabilisation phase critical control points – Soil Improver/Mulch

Parameter	Stabilisation phase critical limits
Temperature	Temperatures within the core zone of the composting batch are maintained < 70 °C
Moisture content	Moisture within the composting batch is maintained at result 3 or 4 from subjective assessment as per the moisture assessment index in section 4.1.3.
Minimum duration	12 weeks prior to screening, when temperatures and moisture are within the above ranges (except during and up to 24 hours after each turn
Minimum number of turns	6 turns during the minimum duration

Table 5a. Monitoring point locations and monitoring frequency for the sanitisation phase

Parameter & batch zone	Monitoring point locations	Monitoring frequency
Temperature Surface zone	At 1 point locations at a maximum of 0.5 metres below windrow surface	Continuous
Temperature Core zone	At 1 point at a minimum depth of 1.0 metres below windrow surface	Continuous
Moisture content	At 4 points at a minimum depth of 0.5 metres below windrow surface	Visual monitoring at least once per working day and physical test at least once per working week.

Table 5b. Monitoring point locations and monitoring frequency for the stabilisation phase

Parameter & batch zone	Monitoring point locations	Monitoring frequency
------------------------	----------------------------	----------------------

Temperature Surface zone	At 1 point locations at a maximum of 0.5 metres below windrow surface	Continuous
Temperature Core zone	At 1 point at a minimum depth of 1.0 metres below windrow surface	Continuous
Moisture content	At 4 points at a minimum depth of 0.5 metres below windrow surface	Visual monitoring at least once per working day and physical test at least once per working week.

5. Maturation

Following the actively managed composting phase (sanitisation and stabilisation phases), any windrow to be used for *Soil Improver* Grade shall undergo a maturation phase of at least four weeks on the Slab area of the composting site

If any batches are combined at the start of or during the maturation phase, the corresponding batch codes shall be recorded on the batch information for the windrows that have been combined.

6. Readiness for product preparation

Each windrow shall be deemed ready for product preparation (see section 8) when evaluated as having completed the actively managed composting phase (see section 4.2), i.e.:

- complied with sanitisation criteria (see section 4.2); and
- complied with stabilisation criteria (see section 4.2).

If maturation is applicable to the grade/product type and carried out before product preparation (e.g. screening), the relevant batches or part-batches shall first complete their maturation phase and comply with any critical limits set (see section 5).

7. Dealing with non-conforming batches

7.1 Batches that do not conform to composting process criteria

Any windrow that does not completely undergo all applicable critical control points and/or fails to comply with any of the critical limits set in these Standard Operating Procedures shall:

- undergo corrective action then be evaluated for conformance to the relevant critical control point and critical limit criteria;
- undergo re-composting then be evaluated for conformance to the relevant critical control point and critical limit criteria;
- be dispatched from the site for use, processing elsewhere or disposal, with notification of non-conformance to the recipient as well as the nature of the non-conformity.

The corrective actions taken and the destiny of each non-conforming batch shall be recorded in the relevant record according to the type of non-conformity and the process step the non-conformity relates to.

7.2 Sampled and tested batches that fail to comply with the Quality Policy

Any sampled and tested batch that does not conform to the Quality Policy's Table 1 quality criteria applicable to the compost grade shall:

- undergo corrective action then be sampled and tested in terms of the parameter(s) relevant for evaluating efficacy of the corrective action;
- undergo re-composting with or without addition of further input material as appropriate, then be sampled and tested in terms of the parameter(s) relevant for evaluating the efficacy of the corrective action; or
- be dispatched for use, processing elsewhere or disposal, and the recipient and regulator notified of the nature of its non-conformity.

The actions taken and the destiny of each such batch shall be recorded in the relevant QMS document(s).

8. Product preparation, storage and batch identification

8.1 Screening

Screening of the compost shall be carried out with the star screen and result in the following compost particle size grade(s):

- 0-40 mm Agriculture Grade – *i.e.* undergone sanitisation and limited stabilisation
- 0-30 mm Soil Mix Grade – *i.e.* undergone sanitisation and some stabilisation
- 0-10mm Soil Improver Grade – *i.e.* undergone sanitisation, stabilisation and maturation.
- 10-40mm Mulch – *i.e.* undergone sanitisation, stabilisation and maturation

The date(s) on which each batch is screened and its batch code shall be recorded on the '*Batch Screening, Maturation and Sampling Record Sheet*'.

Oversize material coming off the screen shall only be re-composted if visual assessment confirms that physical contaminants will not adversely affect the composting process or prevent effective control of compost quality (as stated in the quality policy). Addition of oversize material to a batch of composting material shall only be carried out when it is being formed (see SOPs section 3.4), and this shall be recorded on the '*Batch Screening, Maturation and Sampling Record Sheet*' for the new batch.

If the oversize material is too heavily contaminated for re-composting, it shall be disposed of at the Energy from Waste Facility. Its destiny shall be recorded in the site diary.

The screened compost shall be inspected by a site operative, in particular for physical contaminants. Any batch or part-batch suspected to fail any of the quality criteria subscribed to in the Quality Policy shall be evaluated by the site manager/supervisor. If it is decided that the batch or part-batch does not comply with the requirements, it shall be subject to one of the options listed in section 7. Actions taken and batch code(s) shall be recorded, as specified in section 7.

8.2 Blending

No blending processes are currently undertaken.

8.3 Bagging

Bagging of 0-10mm soil improver in 40 litre bags is undertaken by TTS.

Soil Improver Grade Compost is manually scooped and tipped into a 40 litre pre-marked hopper. The compost is then allowed to drop through the hopper into pre-printed 40 litre plastic bag which are then sealed using a heat sealer. Each bag is date marked on the day of bagging. The 40 litre bags of compost are then stacked on pallets with 40 bags of compost per pallet.

Each 40 bag pallet is finally secured with pallet wrap with a sheet of white plastic covering to reduce sun deterioration while in storage. A sheet of A4 with the date clearly written is included under the pallet wrap to ensure easy identification of batches once pallets are stored back at La Collette.

A record is kept, by the charge hand at La Collette, of batches of compost that leaves La Collette and the pallets that return to the site.

Each 40 litre bag of compost contains the following details:

- Storage instruction
- Warnings about product miss use, handling and safety advise
- Details of material types from which compost is made and instructions on restrictions of use
- Relevant accreditations e.g. Genuine Jersey, Soil Association
- Contact details for compost producer
- Date of bagging

N.B. Research undertaken by WRAP¹ has shown green waste compost must be fully stabilised before bagging so as not to experience deterioration in product quality, through microbial activity, during storage. As a consequence it is recommended that storage of bagged compost should not exceed 6 months.

8.4 Product storage and batch identification

Products are stored at La Collette until it is moved. The date that each product is moved to its storage location shall be recorded on the batch information for that window.

Each product batch shall be identifiable in its storage location by a marker that displays its unique product batch code.

Each product batch shall contain compost from no greater than 4 composting batches and will be stored for a maximum of 12 months before dispatch to the customer.

The product batches shall be stored such that access can be gained to each one and that the position of each is known.

9. Compost sampling and testing, minimum quality, and sampled batch evaluation

9.1 Compost sampling and testing

Compost shall be sampled and tested:

- when the batch has completed the composting process (including any maturation applicable to the grade/product type);
- after any product preparation (e.g. screening); and
- before any blending of the compost with other wastes, materials, composts, products or additives.

Samples shall be taken as per the British Standards Institution's BS EN 12579 and should be taken within 1 week after the minimum, total composting duration (sanitisation, stabilisation and, if applicable maturation) has been completed by the batch. Product preparation such as screening should be carried out within the 1 week after the batch due for sampling has completed its minimum, total composting duration.

The minimum frequencies for sampling compost in a product batch and testing is stated in Tables 6a and 6b (dependent on compost Grade) during post –process validation.

¹ WRAP 2005c. STORAGE TRIALS OF RETAIL GROWING MEDIA PRODUCTS CONTAINING COMPOSTED GREEN MATERIALS. November 2005. ISBN: 1-84405-226-5.

Any individual who carries out compost batch sampling shall first be appropriately trained. For each representative batch sample obtained, a 'Compost Sampling and Analysis Request Record Sheet', or equivalent record, shall be completed. A copy of each completed record sheet shall be filed as per the quality policy and the original completed record shall be sent to the laboratory with the sample.

Table 6a. Routine compost sampling and testing frequency during the post-process validation phase - Agriculture and Soil Blending Grade (0-30mm)

Parameter	Number of representative samples per quantity of compost produced
Pathogens	1 per 2,000m ³ or 1 per 6 months, whichever is sooner
Potentially Toxic Elements	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Physical contaminants	1 per 5,000m ³ or 1 per 6 months, whichever is sooner

Table 6b. Minimum compost sampling and testing frequency during the post-process validation phase - Soil Improver (0-10mm) and Soil Mulch (10-40mm) Grades

Parameter	Number of representative samples per quantity of compost produced
Pathogens	1 per 2,000m ³ or 1 per 6 months, whichever is sooner
Potentially Toxic Elements	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Physical contaminants	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Phytotoxins	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Weed Propagules	1 per 5,000m ³ or 1 per 6 months, whichever is sooner

For each representative sample obtained, a 'Compost Analysis Request' form shall be filled out and information shall include the product batch code(s) from which the sample was derived. A copy of the completed 'Compost Analysis Request' form shall be kept on site and further copies sent to the laboratory.

One final sample representative of the batch sampled shall be archived and another sent to the laboratory, preferably on day of sampling. The archive sample should be stored on site in a cool dark place, and in sufficient quantity should subsequent analysis be required.

9.2 Minimum compost quality and sampled batch evaluation

Results for each of the tested compost batch samples shall be evaluated against the quality criteria see Table 8a and 8b below.

Table 8a Minimum Compost Quality Parameters - Agriculture and Soil Blending Grade (0-30mm)

Parameter	Upper Limit
Human Pathogens <i>Salmonella spp</i> <i>Escherichia coli</i>	Absent in 25g < 1000 CFU g ⁻¹
Potentially Toxic Elements Cadmium Chromium Copper Lead Mercury Nickel Zinc	1.5 mg kg ⁻¹ dry matter 100 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 1.0 mg kg ⁻¹ dry matter 50 mg kg ⁻¹ dry matter 400 mg kg ⁻¹ dry matter
Physical contaminants Total glass, metal and plastic > 2mm Stones and other consolidated	0.25% m/m of total air dried sample (of which < 0.12% m/m of total air dried sample is plastic)

Appendix F

mineral contaminants > 4mm	8% m/m of air-dried sample
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Table 8a Minimum Compost Quality Parameters - Soil Improver (0-10mm) and Mulch (10-30mm) Grades

Parameter	Upper Limit
Human Pathogens <i>Salmonella spp</i> <i>Escherichia coli</i>	Absent in 25g < 1000 CFU g ⁻¹
Potentially Toxic Elements Cadmium Chromium Copper Lead Mercury Nickel Zinc	1.5 mg kg ⁻¹ dry matter 100 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 1.0 mg kg ⁻¹ dry matter 50 mg kg ⁻¹ dry matter 400 mg kg ⁻¹ dry matter
Microbial Respiration	16 mg CO ₂ /g organic matter/day
Physical contaminants Total glass, metal and plastic > 2mm Stones and other consolidated mineral contaminants > 4mm	0.25% m/m of total air dried sample (of which < 0.12% m/m of total air dried sample is plastic) 8% m/m of air-dried sample
Phytotoxins Plant tolerance	20% below control
Weed Contaminants Weed propagules	0 viable propagules per Litre

Compost Analysis results, for each batch, will be assessed by a suitably qualified person (e.g. FACTS qualified advisor) to determine suitability and appropriate land application rates for the materials.

Any sampled and tested compost batch (es) or part-batch (es) that have failed to comply with any of the quality criteria listed in Table 8a or 8b, shall be subject to one of the following options (as appropriate to whether the batch has been quarantined – see the ‘Quarantine policy for sampled and tested compost batches’ in section 10.2.2 of this SOP):

- undergo corrective action then be sampled and tested in terms of the parameter(s) relevant for evaluating efficacy of the QMS change or the corrective action;
- undergo recomposting with or without addition of further input material as appropriate, then be sampled and tested in terms of the parameter(s) relevant for evaluating efficacy of the corrective action; or
- be dispatched for use, processing elsewhere or disposal, and the recipient and regulator notified of the nature of its non-conformity. Such notification shall be recorded on batch record sheet.

After validation, if a tested compost sample fails to meet the quality criteria, the following actions shall be carried out and recorded on the ‘*Failed Batch Investigation Record Sheet*’, without undue delay:

- investigation of why the failure happened;
- decision whether the QMS needs to be changed and if ‘yes’, the nature of the change;
- the nature of the corrective action undertaken if the QMS is not changed;
- sampling and testing of extra batch(es) produced according to the changed QMS or corrective action taken;
- checking the efficacy of the change to the QMS or corrective action taken by evaluating the laboratory test results of the extra batch(es);
- determining the outcome of the investigation; and
- recording the investigation period (in addition to the above).

9.3 Compost Tests for determining appropriate use

Parameter	Suggested Test
Dry Matter	BS EN 13040
Organic Matter	BS EN 13039
Electrical Conductivity	BS EN 13038
pH	BS EN 13037
Total Nitrogen	BS EN 13654-1 or BS EN 13654-2
Total nutrients phosphorus, potassium, calcium, magnesium, sulphur, boron, iron, manganese and sodium	BS EN 13650
Water soluble nutrients Ammonium-N, nitrate-N, phosphorus, potassium, calcium, magnesium, sulphur, boron, chloride, copper, iron, manganese, zinc and sodium	BS EN 13652
Neutralising Value	^a

^a Amended Fertiliser (Sampling and Analysis) Regulations 1996 Schedule 2, Part II Section 6 Determination of the neutralising value of liming materials, omitting need for 1mm sieving.

Compost Analysis results, for each batch, will be assessed by a suitably qualified person (e.g. FACTS qualified advisor) to determine suitability and appropriate land application rates for the materials.

10. Product labelling, distribution and records

10.1 Product labelling

Compost products produced at La Collette are labelled as products made entirely from natural products composted to produce a peat-like material. Compost produced at La Collette, of an entirely green waste origin, is approved by the Soil Association, and all compost products are labelled as "Genuine Jersey"²

No labelling or documentation for exact batch quality are given to end users of La Collette compost *i.e.* a batch quality specification is not provided, although typical quality parameters and assurance that compost batches have achieved a minimum compost standard can be provided,

A product batch or part-batch shall only be distributed with claim of compliance with a quality criteria e.g. PAS 100:

- if the compost grade is independently certified to pass a quality criteria e.g. PAS 100;
- if the compost is from one or more batches or a part-batches that have been produced according to all applicable critical control points and their critical limits set in these Standard Operating Procedures; and
- all other requirements in the Scheme Rules have been complied with.

N.B.: Before validation, no graded compost batch (es) or part-batch shall be distributed with claim of compliance with a standard.

10.2 Product dispatch

10.2.1 General

Prior to dispatch, each load shall be checked to ensure information supplied to the recipient and kept on record by the compost is correct.

² The Genuine Jersey Products Association is committed to raising awareness of local goods and supporting all those involved in their production. This is achieved in part by educating local people and visitors about the benefits of buying local and informing them about the range and diversity of seasonal produce on offer.

Compost from this composting process is supplied for use in the following markets:

- Agriculture Grade *i.e.* 0 -30 mm grade, agriculture and soil grown horticulture market
- Soil Mixing Grade *i.e.* 0 - 30 mm grade, landscaping and soil blending
- Soil Improver Grade *i.e.* 0.10mm grade, domestic gardens and horticulture.
- Soil Mulch Grade *i.e.* 10-40mm grade, domestic gardens and horticulture

10.2.2 Quarantine policy for sampled and tested compost batches

No compost batch sampled for testing shall be dispatched before its test results have been evaluated. If it has failed, appropriate action as stated in section 7.2 of the SOPs shall be taken.

10.2.3 Vehicle cleanliness

The cleanliness of the parts of mobile plant that will be in contact with the compost, or product that contains it, shall be inspected by a site operative. Before product is loaded up, the transportation vehicle shall also be inspected for cleanliness, especially the surfaces that will be in contact with the product.

If unsuitable for contact with loose or packaged product, the mobile plant and/or transportation vehicle shall be cleaned or not used. If a vehicle is judged to be unclean, a record shall be made of vehicle identification details, the date and actions/outcome in the site diary.

Plasterboard Gypsum

Standard Operating Procedures (SOPs) for composting systems operated by States of Jersey



La Collette Green Waste Facility

Prepared by 4R Environmental Consultants

Date of Issue: 20th June 2014

1. Background

This document serves as an Appendix to the La Collette Green Waste Facility SOP for composting systems operated by the Sates of Jersey. This document should be read in conjunction with the main SOP which covers site operating procedures in more detail. This SOP is intended to cover any additional requirements with respect to including plasterboard gypsum within the operation.

2. Identity of composting process and its products

1.1 General description of the composting process and its outputs

The La Collette site currently composts organic waste via *sanitisation*, *stabilisation* and *maturation* phases using an open-air, turned windrow composting process. The quantities of waste composted are set out in the sites planning permission. All in-coming vehicles received at the site are logged and recorded at the site weigh bridge. Waste are stock piled, shredded and formed in to windrows as soon after shredding as possible. Windrows are maintained at a height of approximately 3-4m, a width of 5-6m and length of c. 50m, and are turned a minimum of 3 turns (Agriculture grade). Compost is screened through a 30mm screen aperture for Agriculture grade (minimum 4 weeks composting) and Soil Blending grade (minimum 6 weeks composting), while stabilised compost is screened through a 10mm aperture, creating a Soil Improver grade (minimum 12 weeks composting). Any oversize fractions are stored and then re-introduced as a bulking agent via mixing with in-coming fresh green waste.

In summary three compost grades are currently produced at La Collette, these are:

0 to 30 mm compost grade, defined as Agriculture Grade, produced after 4 weeks sanitisation and stabilisation.

0 to 30 mm compost grade, defined as Soil Blending Grade, produced after minimum of 6 weeks sanitisation and stabilisation, and

0 to 10 mm compost grade, defined as Soil Improver Grade, produced after a minimum of 12 weeks sanitisation, stabilisation and maturation.

Additional grades of gypsum enhanced compost, are produced through adding clean scrap plasterboard at a ratio of 5:1 (green waste: plasterboard *i.e.* c. 425m³ Green Waste:75m³ Plasterboard scrap¹) at the start of the composting process (plasterboard added at the shredding phase). One size and two maturation grades of compost are produced *i.e.* 0-30mm Agriculture Grade and 0-30mm Soil Blending Grade, with the designations "Gypsum Enhanced".

The site operates an information management system that provides batch data records for types, quantities, source of waste received at the site, shredding and processing data (temperature, moisture and turning frequency records for each batch) and final end product screening and quality characterisation.

2 Input materials

2.1 Types of input materials

The composting process where Gypsum enhanced compost is produced includes the following additional material types to those listed in the main composting SOP:

¹ 75m³ of scrap plasterboard = c. 26-30 tonnes. No more than 30 tonnes of plasterboard is added to any single windrow. In order to avoid over application of plasterboard, a cumulative total of plasterboard delivered to site, since last shredding/mixing, is kept by TTS and the composting site informed when c. 23 tonnes of plasterboard have been delivered, this will enable planning for next plasterboard included windrow to be made by the composting site team.

Table 1. Types of input materials

Waste Code	Waste description	Source of waste	Name of waste supplier organisation
17 08 02	gypsum-based construction materials other than those mentioned in 17 08 01*	Domestic and Construction	States of Jersey, domestic homeowners, waste management contractors, construction contractors
19 12 12	gypsum based construction materials other than those mentioned in 19 12 11*		

2.2 Rejection or acceptance and storage of input materials

Each load of plasterboard waste delivered for the composting process 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 (storage area) shall be recorded on a Weighbridge Ticket.

The weighbridge operator shall then notify the driver to proceed to the tipping area where a site operative shall ensure the waste carrier takes it to the gypsum input materials storage area. Here, the waste carrier will tip the waste so as not to merge / contaminate it with any input materials already being stored.

A site operative shall spread and inspect each load deposited at the storage area. The load shall be rejected if by subjective assessment it contains visible litter/contrary material (e.g. glass, silver foil backing, foam backing, plastics, metal, building rubble, soil etc.) i.e. only paper backed or plasterboard stripped of its backing shall be accepted.

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. silver foil, foam, plastic bags, non-compostable packaging and plastics, metals, concrete and consolidated mineral fragments (e.g. rocks and stones), etc	No Visible Contrary Material Score 1 = VERY GOOD = load delivered is very clean	'Load accepted. Score and action logged on the <i>'Input Load Inspection Record Sheet</i>
	Visible Contrary Material Score 2 = POOR = physical contaminant content present unsuitable for composting evaluated by subjective assessment	Load rejected and should be removed from the site by deliverer of the waste. Score and action recorded on <i>'Input Load Inspection Record Sheet'</i> .

The acceptance criteria specified in table 2 shall be specified in the contractual arrangements or clearly communicated to each relevant input material supplier.

Before removal from La Collette, each load or part-load due for rejection shall be kept separate from loads awaiting inspection or those accepted for composting.

Each accepted load shall be assessed to identify the processing requirements and any potential problems in the feedstock itself for example excess moisture or dust.

Any input materials stored for incorporation to future batches shall carry a batch code marker. A batch record sheet shall be created and maintained for such stockpiled material so that it is traceable when mixed with recently delivered input materials that form new composting batches.

The maximum storage duration for gypsum input materials prior to shredding shall not exceed 28 days.

2.3 Traceability of input materials

A record system shall be maintained connecting sources of wastes 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 and the '*Input Load Inspection Record Sheet*'.

Composting batches are created one at a time. Batch formation 'start' and 'finish' dates are recorded in the '*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 composting 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*'.

For each composting batch, the minimum composting process duration stated in these SOPs shall be calculated from the date the monitoring of that batch commences.

3 Preparation of input materials

3.1 Shredding

Plasterboard accepted and stored for composting shall be stockpiled to form quantities of $c.75m^3$ when shredded, typically over a period of two weeks depending on waste acceptance rates. Shredding of plasterboard shall be carried out typically once per fortnight depending on waste acceptance rates.

All plasterboard shall be shredded and formed into a windrow within 1 month of delivery to La Collette, see section 4.1 *i.e.* the residence time of un-shredded material shall not exceed 28 days.

Records connecting delivery notes with shredding dates, mixing and wetting

Each batch of compost shall be given a unique site reference number, which also serves as a unique windrow number. A post at the end of each windrow supporting a marked board indicates where each batch is and this stays with the batch during the composting process.

The results of the quality of input materials assessment, wetting 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*'.

4 Composting activities – managing, monitoring and evaluating sanitisation and stabilisation

4.2.1 Process validation

As per the main La Collette Organic Waste Facility SOP *i.e.*:

The minimum of three batches assessed for process validation shall be:

- composted for the minimum times (as per section 1.1. above and in addition to any minimum maturation applicable to the compost grade stated),
- appraised against the critical limits specified in table 6a, and
- graded and sampled promptly when such composting has been completed.

5 Product preparation, storage and batch identification

5.1 Screening

Screening of the compost shall be carried out with a star screen and result in the following compost particle size grade(s):

- 0-30 mm Gypsum Enhanced Agriculture Grade – *i.e.* undergone sanitisation and limited stabilisation
- 0-30 mm Gypsum Enhanced Soil Blending Grade – *i.e.* undergone sanitisation and some stabilisation

The date(s) on which each batch is screened and its batch code shall be recorded on the '*Batch Screening, Maturation and Sampling Record Sheet*'.

Oversize material coming off the screen shall be re-composted in a subsequent batch of compost if visual assessment confirms that physical contaminants will not adversely affect the composting process or prevent effective control of compost quality (as stated in the quality policy). Addition of oversize material to a batch of composting material shall only be carried out when it is being formed (see SOPs section 3.4), and this shall be recorded on the '*Batch Screening, Maturation and Sampling Record Sheet*' for the new batch.

The screened compost shall be inspected by a site operative, in particular for physical contaminants. Any batch or part-batch suspected to fail any of the quality criteria subscribed to in the Quality Policy shall be evaluated by the site manager/supervisor. If it is decided that the batch or part-batch does not comply with the requirements, it shall be subject to one of the options listed in section 7 of the main composting SOP. Actions taken and batch code(s) shall be recorded.

6 Compost sampling and testing, minimum quality, and sampled batch evaluation

6.1 Compost sampling and testing

Compost shall be sampled and tested:

- when the batch has completed the composting process (including any maturation applicable to the grade/product type);
- after any product preparation (e.g. screening); and
- before any blending of the compost with other wastes, materials, composts, products or additives.

Samples shall be taken as per the British Standards Institution's BS EN 12579 and should be taken within 1 week after the minimum, total composting duration (sanitisation, stabilisation and, if applicable maturation) has been completed by the batch. Product preparation such as screening should be carried out within the 1 week after the batch due for sampling has completed its minimum, total composting duration.

The minimum frequencies for sampling compost in a product batch and testing is stated in Table 6 (dependent on compost Grade) during process validation and as stated in Table 7 (dependent on compost Grade) during post –process validation.

Any individual who carries out compost batch sampling shall first be appropriately trained. For each representative batch sample obtained, a '*Compost Sampling and Analysis Request Record Sheet*',

or equivalent record, shall be completed. A copy of each completed record sheet shall be filed as per the quality policy and the original completed record shall be sent to the laboratory with the sample.

Table 6. Minimum compost sampling and testing frequency during process validation phase – Gypsum Enhanced Agriculture and Gypsum Enhanced Soil Blending Grade (0-30mm)

Parameter	Number of representative samples per quantity of compost produced
Pathogens	1 per 500m ³ or 1/batch, whichever is sooner
Potentially Toxic Elements	1 per 500m ³ or 1/batch, whichever is sooner
Physical contaminants	1 per 500m ³ or 1/batch, whichever is sooner

Table 7. Minimum compost sampling and testing frequency during the post-process validation phase – Gypsum Enhanced Agriculture and Gypsum Enhanced Soil Blending Grade (0-30mm)

Parameter	Number of representative samples per quantity of compost produced
Pathogens	1 per 2,000m ³ or 1 per 6 months, whichever is sooner
Potentially Toxic Elements	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Physical contaminants	1 per 5,000m ³ or 1 per 6 months, whichever is sooner

For each representative sample obtained, a 'Compost Analysis Request' form shall be filled out and information shall include the product batch code(s) from which the sample was derived. A copy of the completed 'Compost Analysis Request' form shall be kept on site and further copies sent to the laboratory.

One final sample representative of the batch sampled shall be archived and another sent to the laboratory, preferably on day of sampling. The archive sample should be stored on site in a cool dark place, and in sufficient quantity should subsequent analysis be required.

6.2 Minimum compost quality and sampled batch evaluation

Results for each of the tested compost batch samples shall be evaluated against the quality criteria, see Table 8.

Table 8 Minimum Compost Quality Parameters - Agriculture and Soil Blending Grade (0-30mm)

Parameter	Upper Limit
Human Pathogens <i>Salmonella spp</i> <i>Escherichia coli</i>	Absent in 25g < 1000 CFU g ⁻¹
Potentially Toxic Elements Cadmium Chromium Copper Lead Mercury Nickel Zinc	1.5 mg kg ⁻¹ dry matter 100 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 200 mg kg ⁻¹ dry matter 1.0 mg kg ⁻¹ dry matter 50 mg kg ⁻¹ dry matter 400 mg kg ⁻¹ dry matter
Physical contaminants Total glass, metal and plastic > 2mm Stones and other consolidated mineral contaminants > 2mm	0.25% m/m of total air dried sample (of which < 0.12% m/m of total air dried sample is plastic) 8% m/m of air-dried sample

Any sampled and tested compost batch(es) or part-batch(es) that have failed to comply with any of the quality criteria listed in Table 8, shall be subject to one of the following options (as appropriate to whether the batch has been quarantined – see the ‘Quarantine policy for sampled and tested compost batches’ in section 10.2.2 of the main composting SOP):

7. Product labelling, distribution and records

7.1 Product labelling

All product batches or part-batch shall be distributed with clear documentation that the batch contains an element of waste plasterboard at an input ratio of 5:1 (green waste: plasterboard

7.2.1 Product dispatch

Prior to dispatch, each load shall be checked to ensure information supplied to the recipient and kept on record by the compost site is correct.

Compost from this composting process is supplied for use in the following markets:

- Gypsum Enhanced Agriculture Grade *i.e.* 0 -30 mm grade, agriculture and soil grown horticulture market
- Gypsum Enhanced Soil Blending Grade *i.e.* 0 - 30 mm grade, landscaping and soil blending

Standard Operating Procedures (SOPs) for processing **Seaweed** by States of Jersey



La Collette Organic Waste Facility

Prepared by 4R Environmental Consultants

Date of Issue: 7th July 2014

Identity of process and its products

1.1 Company, site and process details

- a) States of Jersey, States Office, South Hill, St Helier Jersey JE4 8UY
01534 448595
- b) Process Facility
Organic Waste Treatment, La Collette, St Helier Jersey JE2 3NX
01534 445509
- c) Process that these SOPs refer to:
Open air windrow processing of high water mark seaweed only.

1.2 General description of the process and its outputs

The site processes sea weed via using an open-air, turned windrow process. Incoming loads of seaweed are stock piled and added to the current sea weed windrow as soon after delivery as possible. Windrows are maintained at a height of approximately 2.5-3.0m, a width of 4-5m and maximum length of c. 50m, and are turned a minimum of 3 turns and as often as required to minimise odour. The resulting product is screened through a 40mm screen aperture (after a minimum of 4 weeks processing) creating a product for agriculture or a 30mm screen aperture creating a product for soil blending. Any oversize fractions (mainly stone and physical contaminants are removed from site for disposal/recovery)

In summary the material produced are:

- 0 to 40 mm Agriculture Grade, produced after 4 weeks processing.
- 0 to 30 mm Soil Blending Grade, produced after 4 weeks processing

2 Input materials

2.1 Types of input materials

The treatment process only uses high water seaweed, with entrained sand.

Table 1. Types of input materials

Waste Code	Waste description	Source of waste	Name of waste supplier organisation
20 02 01	Seaweed	Jersey beaches high water line	States of Jersey

2.2 Rejection or acceptance and storage of input materials

A site operative shall inspect each load deposited at the storage area. The load shall be rejected if by subjective assessment it contains significant visible litter/contrary material (e.g. glass, plastics, metals).

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 bags, non-compostable packaging and plastics, metals, and consolidated mineral fragments (e.g. rocks, stones), etc.	Limited visible contrary material Score 1 = Acceptable = load delivered is clean	'Load accepted. Score and action logged in the <i>'Site Diary'</i>
	Significant visible Contrary Material Score 2 = POOR = physical contaminant content present unsuitable for processing evaluated by subjective assessment	Load rejected and should be removed from the site by deliverer of the waste. Score and action recorded on <i>'Input Load Inspection Record Sheet'</i> .

The acceptance criteria specified in table 2 shall be clearly communicated to relevant TTS staff involved in collection and delivery of material to La Collette.

The maximum storage duration for input materials prior to mixing shall not exceed 48 hours unless agreed by Site Manager, normal operation is that material is mixed within 24 hours.

3 Preparation of input materials

3.1 Windrow formation

Seaweed accepted for processing shall be stockpiled to form windrows of a maximum c.500m³ when mixed, build time will be dependent on waste acceptance rates. Addition of new material to the windrow shall be carried out typically every day depending on waste acceptance rates.

The material shall be mixed and formed into a windrow within 24 hours of delivery see section 2.2.

The residence time of unmixed material shall not exceed 48 hours (see section 2.2) .

3.2 Mixing

Seaweed accepted for processing may be mixed with screened oversize (maximum 1:1 ratio) if the site manager determines the seaweed material contains significant volumes of sand and needs increased porosity to reduce the risks of anaerobic conditions and resulting generation of odour.

4. Processing activities – managing, monitoring and evaluating stabilisation

4.1 Batch size and monitoring

The maximum dimensions of each windrow shall be approximately 2.5 metres high, 4-5 metres wide and approximately 50 metres long.

Gaps of suitable width to enable turning / monitoring / litter picking shall be left between the windrows.

Each formed batch is identified by a marker that displays its batch code, in a way and location in the batch that is easily visible to operatives moving materials on site.

In the event that batches are combined during the process, the 'on-going' batch code(s) shall be recorded on each of the corresponding batch record sheets and the record for the later batch (*i.e.* youngest batch) shall be used as the ongoing record.

4.1.1 Temperature monitoring and records

Temperature during seaweed processing is monitored as follows:

by inserting at least 1 temperature probe at the mid point of each windrow (*i.e.* halfway along the windrow), at a minimum of depth of 0.5 metres below the windrow surface. The temperature detected by the sensors, when inserted in the windrow, are automatically recorded via data download in the site office

All temperature monitoring results for the duration of processing each windrow shall be recorded in the *Batch Monitoring Record System*, held on computer in the site office. However there are no specific time and temperature requirements associated with the process.

4.1.2 Miscellaneous Monitoring activities and records

As part of good practice inspections should be undertaken, by a member of site staff, of all La Collette windrows at the start and end of each working day, and within 1 hour of any turning/disturbance activities. The following observations should be recorded, in the site diary, and corrective actions undertaken:

- Excess and/or abnormal odours on site and at the site boundaries
- Presence/evidence of vermin in or around windrows and working areas
- Presence of physical contraries/litter in windrows and around working areas
- Evidence of noxious/harmful weeds within windrows.
- Evidence of dust being emitted from the windrows
- Visual check of windrow moisture contents, along with physical checks
- Presence of at least 1 temperature probe per windrow.

5. Readiness for product preparation

Each windrow shall be deemed ready for product preparation when it is evaluated as having completed the actively managed phase, *i.e.*:

- Under gone minimum of 3 turns within 4 week period.

6. Product preparation, storage and batch identification

6.1 Screening

Screening of the product shall be carried out with the star screen and result in the following particle size grade(s):

- 0-40 mm Agriculture Grade
- 0-30 mm Soil Mix Grade

The date(s) on which each batch is screened and its batch code shall be recorded on the '*Batch Screening and Sampling Record Sheet*'.

Oversize material coming off the screen shall only be re-processed if visual assessment confirms that physical contaminants will not adversely affect the process or prevent effective control of product quality (as stated in the quality policy). Addition of oversize material to a batch of material shall only be carried out when it is being formed and this shall be recorded.

If the oversize material is too heavily contaminated for re-processing, it shall be disposed of e.g. the Energy from Waste Facility. Its destiny shall be recorded in the site diary.

6.2 Blending

No blending processes are currently undertaken.

6.3 Bagging

No bagging processes are currently undertaken.

7. Sampling and testing, minimum quality, and sampled batch evaluation

7.1 Sampling and testing

Product shall be sampled and tested:

- when the batch has completed the processing;
- after any product preparation (e.g. screening); and
- before any blending of the material with other wastes, materials, composts, products or additives.

Samples shall be taken as per the British Standards Institution's BS EN 12579 and should be taken within 1 week after the minimum, total process duration has been completed by the batch. Product preparation such as screening should be carried out within the 1 week after the batch due for sampling has completed its minimum, total processing duration.

The minimum frequencies for sampling a product batch and testing is stated in Table 6.

Any individual who carries out batch sampling shall first be appropriately trained. For each representative batch sample obtained, a '*Sampling and Analysis Request Record Sheet*', or equivalent record, shall be completed. A copy of each completed record sheet shall be filed as per the quality policy and the original completed record shall be sent to the laboratory with the sample.

Table 6. Routine sampling and testing frequency - Agriculture and Soil Blending Grade

Parameter	Number of representative samples per quantity of material produced
Potentially Toxic Elements	1 per 5,000m ³ or 1 per 6 months, whichever is sooner
Physical contaminants	1 per 5,000m ³ or 1 per 6 months, whichever is sooner

For each representative sample obtained, an 'Analysis Request' form shall be filled out and information shall include the product batch code(s) from which the sample was derived. A copy of the completed 'Analysis Request' form shall be kept on site and further copies sent to the laboratory.

One final sample representative of the batch sampled shall be archived and another sent to the laboratory, preferably on day of sampling. The archive sample should be stored on site in a cool dark place, and in sufficient quantity should subsequent analysis be required.

7.2 Minimum quality and sampled batch evaluation

Results for each of the tested batch samples shall be evaluated against the quality criteria see below.

Table 8 Minimum Quality Parameters - Agriculture and Soil Blending Grade

Parameter	Upper Limit
Potentially Toxic Elements	
Cadmium	1.5 mg kg ⁻¹ dry matter
Chromium	100 mg kg ⁻¹ dry matter
Copper	200 mg kg ⁻¹ dry matter
Lead	200 mg kg ⁻¹ dry matter
Mercury	1.0 mg kg ⁻¹ dry matter
Nickel	50 mg kg ⁻¹ dry matter
Zinc	400 mg kg ⁻¹ dry matter
Physical contaminants	
Total glass, metal and plastic > 2mm	0.25% m/m of total air dried sample (of which < 0.12% m/m of total air dried sample is plastic)

Analysis results, for each batch, will be assessed by a suitably qualified person (e.g. FACTS qualified advisor) to determine suitability and appropriate land application rates for the materials.

Any sampled and tested batch (es) or part-batch (es) that have failed to comply with any of the quality criteria listed in Table 8, shall be subject to one of the following options

- undergo corrective action then be sampled and tested in terms of the parameter(s) relevant for evaluating efficacy;
- undergo re-processing with or without addition of further input material as appropriate, then be sampled and tested in terms of the parameter(s) relevant for evaluating efficacy of the corrective action; or
- be dispatched for use, processing elsewhere or disposal, and the recipient and regulator notified of the nature of its non-conformity. Such notification shall be recorded on batch record sheet.

7.3 Tests for determining appropriate use

Parameter	Suggested Test
Dry Matter	BS EN 13040
Organic Matter	BS EN 13039
Electrical Conductivity	BS EN 13038
pH	BS EN 13037
Total Nitrogen	BS EN 13654-1 or BS EN 13654-2
Total nutrients phosphorus, potassium, calcium, magnesium, sulphur, boron, iron, manganese and sodium	BS EN 13650

Analysis results, for each batch, will be assessed by a suitably qualified person (e.g. FACTS qualified advisor) to determine suitability and appropriate land application rates for the materials.

8. Product labelling, distribution and records

8.1 Product labelling

No labelling or documentation for exact batch quality are given to end users of La Collette seaweed *i.e.* a batch quality specification is not provided, although typical quality parameters and assurance that batches have achieved a minimum quality standard can be provided,

8.2 Product dispatch

8.2.1 General

Appendix H

Prior to dispatch, each load shall be checked to ensure information supplied to the recipient and kept on record by TTS is correct.

Material from this seaweed processing is supplied for use in the following markets:

- Agriculture Grade *i.e.* 0-40 mm grade, agriculture and soil grown horticulture market
- Soil Mixing Grade *i.e.* 0-30 mm grade, landscaping and soil blending

