

FRICION ENERGY LTD

Dust and Emission Management Plan

Application for a Bespoke Environmental Permit

at

St Margaret's Farm Composting and Biomass Boiler Facility,
St Margaret's Road, South Darenth, Dartford, DA4 9LB

Report Ref: CE-SM-1813-RP05 (DMP)-Final v.2



CRESTWOOD ENVIRONMENTAL LTD

ENVIRONMENT	LANDSCAPE	NOISE	LIGHTING
ECOLOGY	HERITAGE	WATER	TREES
MINERALS / WASTE	AIR QUALITY	LAND QUALITY	VISUALISATION

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1. INTRODUCTION

1.1 BACKGROUND AND CONTEXT

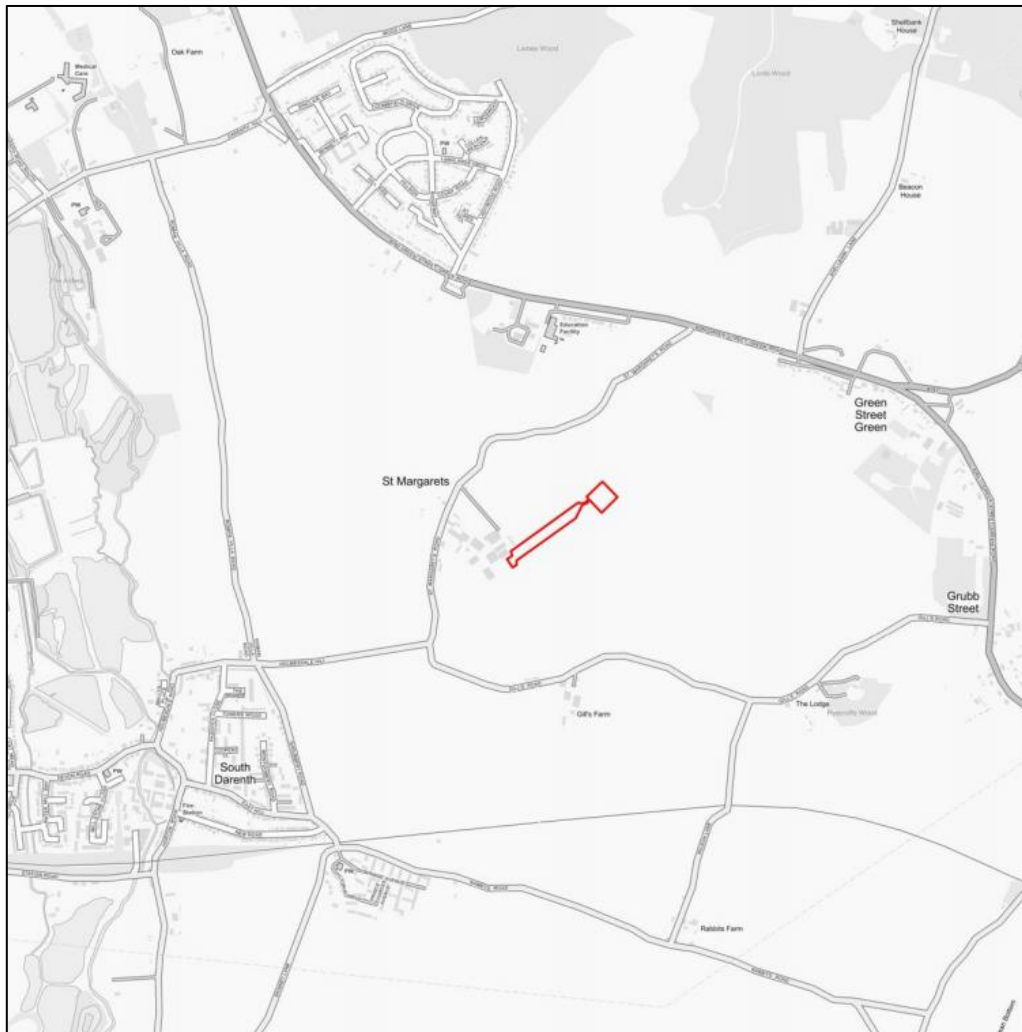
- 1.1.1 Crestwood Environmental Ltd has been commissioned by Friction Energy Ltd. (*the Operator*) to prepare a Dust and Emission Management Plan (DEMP) to support an application for a bespoke Environmental Permit at St Margaret's Farm, St Margaret's Road, South Darenth, Dartford, DA4 9LB (*the Site*).
- 1.1.2 The purpose of the application is to authorise a green waste composting facility and a biomass boiler plant on a parcel of land in the existing St Margaret's Farm Facility, which comprises of agricultural land, cold stores and a commercial business. The proposed facility will receive no more than 5,200 tonnes of virgin roundwood timber, green waste and forestry waste per annum.
- 1.1.3 The green waste will be processed via shredding and open windrow composting. Round wood sourced from local tree surgeons and ground maintenance contractors will be stockpiled and chipped in a separate section of the Site for combustion in two biomass boilers in order to generate an energy source to heat a store building and offices etc.
- 1.1.4 The requirement for a DEMP is due to the potential for emissions to arise during the operation of the facility and the associated impacts this may present to nearby sensitive receptors. Once likely sources of emissions are established, the potential for significant risk of impact at sensitive locations can be assessed and any abatement measures to control potential effects can be identified.
- 1.1.5 This DEMP has been prepared in accordance with H5 Dust and Particulate Emission Management Plan Template and Gov.uk Guidance `Control and monitor emissions for your environmental permit` (published 1st February 2016). It provides an assessment of the production of fugitive emissions relating to waste handling operations on the Site and aims to identify potential sources of dust emissions, the associated potential impacts along with detailed measures to be implemented at the Site to mitigate dust and particulate matter release.
- 1.1.6 In addition, this DEMP is an active document which requires periodic evaluation and updating as operations and/or circumstances change. The principal mechanisms of formulating and continually improving a DEMP are to review, report, identify sources, control and to monitor.

1.2 THE SITE

- 1.2.1 Located in the grounds of St Margaret`s Farm, the Site lies c.1km directly north east of the village of South Darenth and c.1km south west of the village of Green Street Green in the Sevenoaks District of Kent. Agricultural land immediately encompasses the Site beyond which, in the wider landscape, the land-use is also dominated by rural pastures and agricultural land with clusters of villages and residential properties intervening.
- 1.2.2 St Margaret`s Road undulates adjacent to the north, north-west, west and south-west of the Site where it merges into Gill`s Road to the south of the Site. A railway line is further to the south orientated parallel to Gill`s Road running in a north to south direction. Diagram 1 below shows

the Site boundary in context with the wider extent of the area.

Diagram 1 Site Boundary (red outline).



1.2.3 Although there are four Air Quality Management Areas (AQMAs) in the local authority of Dartford ([AQMAs interactive map \(defra.gov.uk\)](https://www.defra.gov.uk)), the Site is not located within the boundary of a designated AQMA. At its closest extent, an AQMA boundary declared by Dartford Borough Council, Dartford AQMA No.4, is located c. 2.5km to the north-east. This is as a consequence of the many areas in the UK unlikely to meet the objectives outlined in the Government's Air Quality Strategy.

2 LEGISLATION AND POLICY

2.1 EUROPEAN DIRECTIVES

2.1.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new Air Quality Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm. The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

2.1.2 The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 UK LEGISLATION

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for seven pollutants, as well as Target Values for an additional five pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objectives	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
NO _x	30	Annual mean

3 BASELINE

3.1 BACKGROUND POLLUTANT CONCENTRATIONS

- 3.1.1 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.
- 3.1.2 Predictions of background pollutant concentrations on a 1 km by 1 km grid basis have been produced by DEFRA for the entire UK to assist LAs in their Review and Assessment of air quality. The proposed development site is centred in grid square NGR: 557490 (X (easting)) 170380 (Y (Northing)). Data for this location was downloaded from the DEFRA website (<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>) for the purpose of the assessment and is summarised in Table 2.

Table 2 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration ($\mu\text{g}/\text{m}^3$)		
	2017	2019	2021
NO ₂	15.08	13.95	12.86
PM ₁₀	16.37	15.98	15.63
NO _x	21.34	19.50	17.79

- 3.1.3 According to DEFRA's Background Air Pollution Mapping Data, background emission concentrations in the locality of the Site since 2017, have been, and are predicted to be, significantly below air quality standards. National air quality objectives and European Directive limits and target values stipulate that concentrations of PM₁₀ measured at 24-hour mean levels should not exceed 50 $\mu\text{g}/\text{m}^3$ for more than 35 times a year. NO₂ concentrations should not exceed 40 $\mu\text{g}/\text{m}^3$ when measured on an annual mean basis. Based on background concentrations, as tabulated above in Table 2, the air quality at the Site itself and in the vicinity is unlikely to exceed these parameters.

3.2 METEOROLOGICAL CONDITIONS

3.2.1 Statistics based on observations taken from the nearest weather station at Gravesend, (c. 6.5km north-east of the Site) between December 2012 and February 2021 indicate that although the prevailing winds are variable, they originate predominantly from the west-south-west with an average speed of 4.67 knots. The rose diagram in Diagram 4 is conducive of this showing the wind strength distribution and direction is also chiefly from the W-S-W. (see Diagram 3). Data obtained from https://www.windfinder.com/windstatistics/gravesend_chalk

Diagram 2 Average Prevailing Wind Direction and Speed

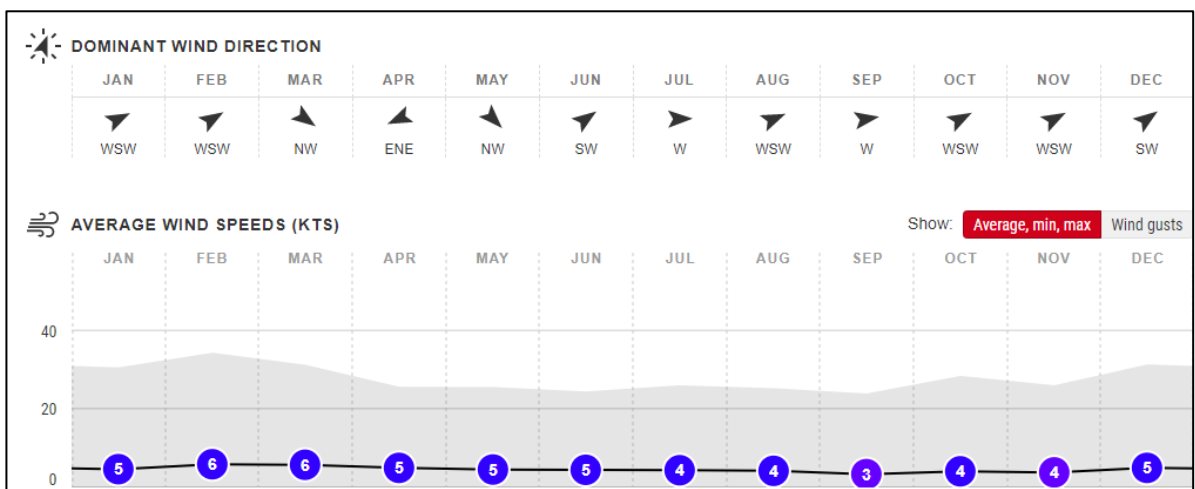
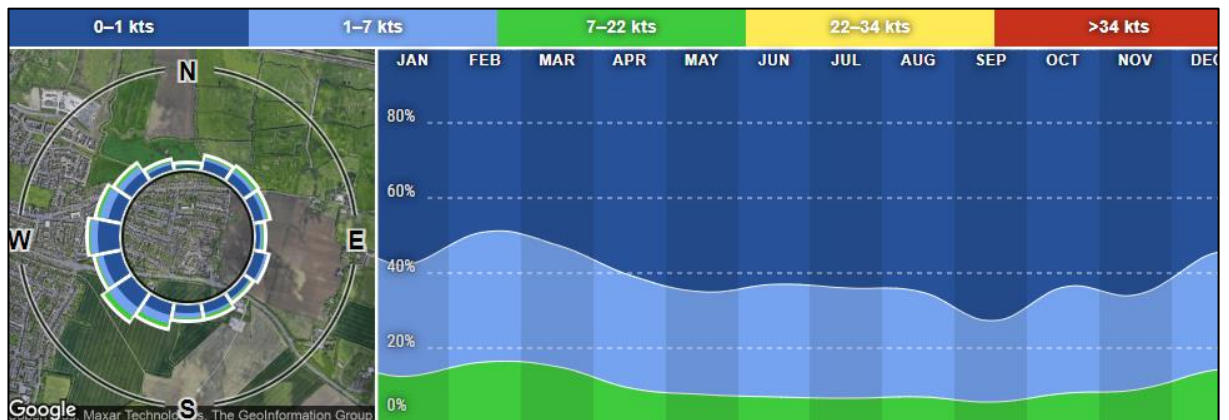


Diagram 3 Rose Diagram showing Wind Strength Distribution and Direction



3.3 SENSITIVE RECEPTORS

3.3.1 A review of potentially sensitive receptors within a 1km radius of the Site has been undertaken using the hierarchy of hospitals, schools, childcare facilities, elderly housing, convalescent facilities and residential properties, i.e. areas where inhabitants are more vulnerable to the adverse effects of exposure to dust and emissions. Food manufacturers, major infrastructure and

protected sites such as SSSIs, SPAs and SCAs are also considered, see Table 3 and Diagram 4.

- 3.3.2 In terms of predicted exposure risk, levels have been determined via a qualitative assessment, which evaluates the likelihood of exposure to emissions based on the receptors' proximity to the Site and the location of the sensitive receptors in regard to the prevailing wind direction as shown in Diagram 3 above.
- 3.3.3 A summary of the identified potentially sensitive receptors along with the overall exposure levels and principal receptor features has been tabulated in Table 3. For each receptor within the categories the determination of the overall risk classification has been based on the dominant risk level. Receptors are denoted by the numbered location points in Diagram 4 for reference.
- 3.3.4 Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning (May 2016) states that *"it is commonly accepted that the greatest impacts will be within 100 m of a source and this can include both large (>30 µm) and small dust particles. The greatest potential for high rates of dust deposition and elevated PM10 concentrations occurs within this distance. Intermediate-sized particles (10 to 30 µm) may travel up to 400 m, with occasional elevated levels of dust deposition and PM10 possible. Particles less than 10 µm have the potential to persist beyond 400 m but with minimal significance due to dispersion."*
- 3.3.5 Through a desk-top study, sensitive receptors were identified in the vicinity of the Site that require consideration. In accordance with IAQM Guidance outlined above in paragraph 3.3.5, locations within 500m of the facility boundary were focused on in order to provide a worst-case scenario as this is further than the 400 m that PM10 has the potential to remain in suspension. If particles did disperse beyond 400 m, the impacts would be negligible.
- 3.3.6 Within a 1km radii of the Site, there is one designated habitat site, i.e. Darenth Wood, a Site of Special Scientific Interest (SSSI), at c.910m to the north-east of the Site. No further protected sites such as Special Area of Conservation (SAC), Special Protection Area (SPA) or RAMSAR have been identified.

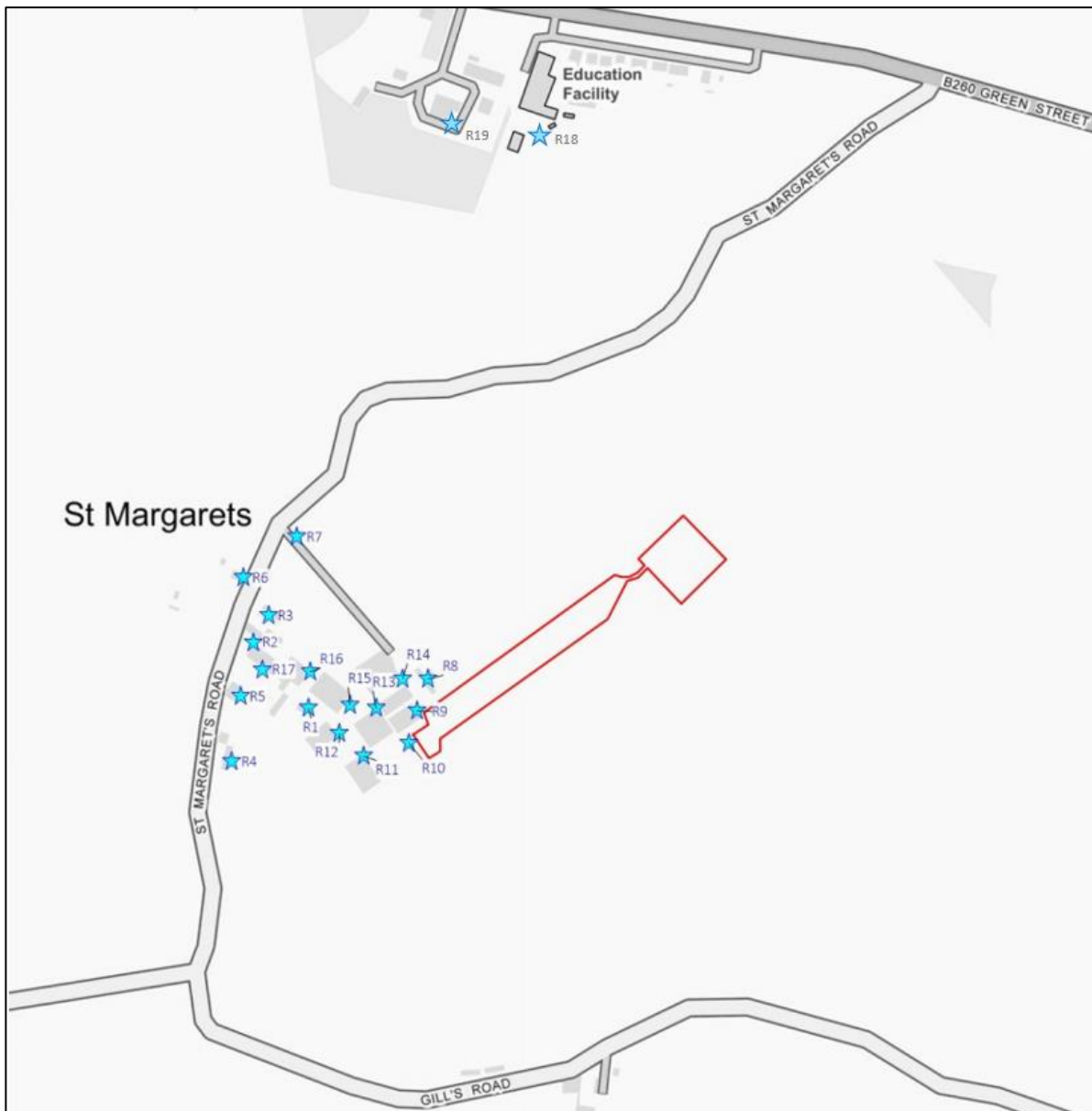
Table 3: Sensitive Receptor locations within 500m of the Facility's Boundary

Facility and Reference Point	Distance and Direction from Site	Overall exposure level	Comments
St Margaret`s Cottage (R1)	125m W	Low-Medium	Located upwind of the prevailing wind and is relatively proximal to the source.
St Margaret`s Farm – Residential Properties (R2)	200m W	Low	Relatively distal from the Site with a low frequency of winds from source to receptor. The receptor is located upwind of the Site and intervening buildings serve as a barrier.
St Margaret`s Farm – Residential Property (R3)	200m W	Low	As above

Facility and Reference Point	Distance and Direction from Site	Overall exposure level	Comments
St Margaret's Road – Residential Property (R4)	210m W	Low	As above
St Margaret's Road – Residential Property (R5)	200m W	Low	As above
St Margaret's Road – Residential Property (R6)	240m NW	Low	As above
St Margaret's Road – Residential Property (R7)	230m NW	Low	As above
St Margaret's Farm – Warehouse (R8)	30m W	Medium	Although the receptor is upwind of the prevailing wind it is located in close proximity to the Site but building used intermittently by staff.
St Margaret's Farm – Grain Store (R9)	15m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Agricultural Building (R10)	10m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Agricultural Building (R11)	60m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Chilled Warehouse (R12)	80m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Warehouse (R13)	50m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Warehouse (R14)	65m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Warehouse (R15)	80m W	Medium	As above. Only short term occupancy by staff
St Margaret's Farm – Chilled Warehouse (R16)	130m W	Low-Medium	Although located upwind of the dominant prevailing wind it is considered relatively close to the Site. Pathways are also restricted by intervening infrastructures, trees and hedgerows. Only short term occupancy by staff
St Margaret's Farm – Brewery (R17)	175m W	Low-Medium	As above.
Greenlands Primary School (R18)	410m N	Low	There is a medium frequency of winds from source to receptor however the receptor is considered remote from the Site

Facility and Reference Point	Distance and Direction from Site	Overall exposure level	Comments
Greenlands at Darenth Children's Centre (R19)	400m W	Low	As above

Diagram 4. Sensitive Receptors within 500m of the Site



3.3.7 Other sources of aerial emissions have been assessed in this review and are considered in context within the local environs. Contributing factors include any industry or transportation type that may generate dust and particulate matter from operational processes.

3.3.8 Given that the immediate area surrounding the facility is rural, comprising arable agricultural land,

these may form further sources of dust emissions specifically during crop harvest periods. However, likely impacts associated with these releases are of short duration and considered not to be significant and would be expected for any rural location within the UK.

4 MANAGEMENT AND STORAGE OF WASTE

4.1 WASTE DELIVERIES

- 4.1.1 All vehicles delivering wastes to the Site stop at the weighbridge and are weighed. Weighbridge staff are suitably trained and follow documented procedures. The weighbridge operator examines waste descriptions at the weighbridge and the information is checked against the six figure European Waste Catalogue Code(s) and other details on the Waste Transfer Note or Season Ticket and against the waste types permitted by the Environmental Permit.
- 4.1.2 A banksman instructs the drivers to reverse into the appropriate tipping area within the Site for off-loading according to the type of waste being delivered to ensure materials (green waste or round wood) are stored and processed separately. This helps to ensure that materials are stored, handled and processed correctly.
- 4.1.3 A visual inspection of the contents of all waste loads, is made during deposit.
- 4.1.4 Any discrepancies found as a result of the checks detailed above results in the vehicle being detained whilst some, or all, of the following supplementary management decisions are taken:
- Redirection of delivery vehicle off Site, to a suitably authorised facility; and
 - If the waste has been discharged on the ground, removal of the waste to the secure quarantine area, prior to off-Site removal either to the waste producer or suitably authorised facility.
- 4.1.5 Waste will not be accepted if for any reason there is insufficient storage capacity available or if the Site is inadequately manned. This is to ensure that all waste is managed effectively to prevent pollution or loss of amenity.
- 4.1.6 Records of all incoming waste loads are kept on Site or in a secure off-Site location in accordance with Duty of Care and requirements of the Environmental Permit. Full details are included in the Environmental Management System (EMS) (Ref: CE-SM-1813-RP01).
- 4.1.7 As part of the Waste Acceptance Procedures for the Site, waste producers are required to provide details of any precautions that should be taken at the Site to control emissions. No inherently dusty wastes will be accepted at the Site.
- 4.1.8 Permitted wastes are shown in Table 5 below.

Table 5 Waste Streams Accepted at the Site

Waste Code	Description
02	WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING
02 01	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing
02 01 03	plant-tissue waste
02 01 07	wastes from forestry

5 OVERVIEW OF WASTE PROCESSING AND DUST CONTROLS

5.1 OPEN WINDROW COMPOSTING

- 5.1.1 Green waste deliveries will be deposited in the tipping area for storage and visual inspection. Any roundwood/timber within the green waste deliveries will be separated and transferred to a separate, dedicated storage area prior to separate chipping and combustion in the biomass boiler plant (see section 5.2 below).
- 5.1.2 Green waste will be stockpiled until up to 500 tonnes is available for shredding, where upon it will be shred using a contract hire unit, which will be transported to the Site.
- 5.1.3 Shred feedstock material will be transferred from the tipping and shredding area to a concrete composting pad situated on the eastern section of the Site, where it will be deposited and formed into windrows. Each windrow will be circa 4m wide and 3m in height.
- 5.1.4 Once a windrow is formed it takes 6 to 20-weeks for the composting process to complete. During this period the windrows will be mechanically turned using a windrow turner or similar in order to aerate the material and maintain optimum pore space for aerobic decomposition.
- 5.1.5 The specific frequency and duration of turning activities will depend on the age, temperature and moisture content of material. However, it is anticipated that turning operations will be undertaken weekly over the period of 1-working day. This is consistent with practices undertaken at other commercial composting facilities.
- 5.1.6 The windrows will be monitored to evaluate moisture content, temperature and oxygen levels. This will help to ensure that optimum conditions are maintained and that unmanaged decomposition of the material does not occur.

5.2 SCREENING AND STORAGE OF COMPOST

- 5.2.1 Material that has completed the windrow composting phase will be transferred to a separate section of the pad where it will be processed using a trommel screen. This will separate the material into fine grades and oversize fractions. As with chipping operations, this activity will only

be undertaken once sufficient quantities are available for processing. It is proposed to utilise a contract hire unit for the operation, which will be transported to the Site.

- 5.2.2 The fine grades will be transferred to a storage area and formed into piles prior to use within the farm estate as a soil improver. Oversize material will be transferred back to the tipping and shredding area, where it will be stored before it is re-shred and incorporated back into the windrow composting process.

5.3 LOADING AND DISPATCH OF COMPOST

- 5.3.1 Finished compost will be transferred off-site via tractor in sheeted trailers to be spread to land in the farming estate. The material will be removed from the storage piles and loaded directly into the relevant dispatch vehicles. This operation will mainly occur during the months of July to October. However, a limited number of loading activities will also take place during other months throughout the year.

5.4 BIOMASS BOILER PLANT

- 5.4.1 Biomass fuel processing operations will be undertaken within a dedicated area on the western section of the Site. Wood waste will be delivered in LCVs and deposited in a reception area. The material will then be stored until sufficient quantities are available for chipping using the contract hire unit.
- 5.4.2 Woodchip will be transferred to a covered storage, where it will be dried to remove moisture before being fed to the biomass boiler plant. Heat from the boilers will be used on Site to dry grain grown at the farm and provide heating to the offices and an absorption chiller, which will deliver heat to the two cold stores.
- 5.4.3 The biomass boiler plant will comprise 2 No Froling Landamat 1Mw units, each with 980KWth output. Each boiler is fitted with a separate 7m high vent stack. The biomass boiler plant will be housed in a new steel frame barn type building. An Air Quality Assessment has been prepared for biomass boiler plant to support the permit application.

5.5 MATERIAL EXPORTED OFF-SITE

- 5.5.1 Any rejected loads, or materials recovered from waste deliveries (plastic bags or other hand picked reject material or litter which is collected into a covered skip) will be dispatched from the Site in suitably enclosed or sheeted vehicle to authorised facilities in accordance with the Duty of Care and Waste Transfer Note procedure..
- 5.5.2 Material rejected from the Site is issued with a record stating why, when and from which contract the waste was provided. This record is held on Site for the Environment Agency to inspect. In addition, the 'Record of Non-Conformance' (Appendix 2 of the EMS), is completed with the record held on Site.

6 DUST AND EMISSIONS MANAGEMENT

6.1 RESPONSIBILITY FOR IMPLEMENTATION OF THE DEMP

- 6.1.1 The Site Manager and Technically Competent Manager (TCM) will oversee the implementation of the DEMP and ensure that the methods detailed within this DEMP provide effective dust mitigation.
- 6.1.2 Where the responsible individual is unavailable to supervise in the implementation of dust suppression measures, a suitably experienced Site operative will be allocated responsibility.
- 6.1.3 If dust and particulate emissions continue to be observed following the use of the dust suppression measures outlined in the DEMP, the document will be reviewed and additional measures such as fixed suppression systems considered.
- 6.1.4 The DEMP will be subject to an annual review and update as a minimum, so as to reflect any changes in operational practices and receptor sensitivity.
- 6.1.5 Amendments of the DEMP to reflect any potential improvements will be made during the review process.
- 6.1.6 The TCM who will administer the implementation of the DEMP has been assessed in the implementation of Site control measures as part of the Certificate of Technical Competence and therefore is deemed proficient to execute and review this DEMP.
- 6.1.7 During the induction process, all staff members will be trained in the dust suppression measures outlined in this DEMP. Refresher training will be provided in the scenario where additional dust suppression measures have been introduced to ensure staff remain competent.
- 6.1.8 The DEMP will be reviewed at least annually or following any adjustments in operations which have the potential to increase the level of exposure to surrounding sensitive receptors.

6.2 SOURCES AND CONTROL OF FUGITIVE DUST/PARTICULATE EMISSIONS

- 6.2.1 The handling and processing of wood and green waste has the potential to generate dust emissions. At most composting facilities, several aspects of the operation can generate dust, particularly during waste receipt, loading, conveying, processing, screening, roadways and hauling. At certain stages during composting, even good process management practices can inherently lead to dust generation.
- 6.2.2 In general, the wood arrives in relatively large pieces from tree surgeons and from ground maintenance activities. This unprocessed wood for chipping is considered to be not significant dust source. Although the wood in this form does not constitute a significant dust source, there does exist the potential for small quantities of dust contamination in deliveries and release during unloading.

- 6.2.3 There is the potential for dust release during the wood chipping process to produce wood chip for the biomass boilers. Wood chip is described as having approximately 50% moisture content with a large particle size which is considered to result in a low dust potential (Defra Process Guidance Note PG6/O2 (12) *‘Statutory Guidance for the working of timber and manufacture of wood-based products’*. September 2012). Dried woodchip used in the biomass boiler plant, which is considered to represent a greater risk of dust impact due to the lower moisture content, is kept internally in covered storage to minimise external dispersion.
- 6.2.4 Green waste generally has a moisture content of approx. 50% (*Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes*. DEFRA 2011) and therefore the potential for generating dust is considered to be low, although there does exist a potential for dust generation when the material is dry, particularly during the turning of windrows.
- 6.2.5 Detailed below are examples of potential sources of fugitive dust and particulate emissions associated with all the operations and activities at the Site:
- loading and unloading of waste wood and green waste;
 - wood processing on the western section of the Site;
 - drying of wood chip in the building to the west of the Site;
 - green waste operations including composting;
 - Vehicles entering and/or leaving the Site with mud on wheels, and tracking dust on to or off the Site;
 - Debris falling off vehicles which arrive uncovered;
 - Vehicles and plant moving around the Site kicking up dust;
 - Road vehicles tipping waste;
 - Site surfaces (i.e. the ground, plant and equipment);
 - Loading any inadvertently accepted non-permitted wastes back on to vehicles for removal off-Site to authorised facilities;
 - Particulate emissions from the exhaust of vehicles/plant/machinery on Site.
- 6.2.6 Table 6 below details the measures to be applied to the Site for each of the sources outlined above to break the source-pathway-receptor routes.
- 6.2.7 Preventative and remedial measures to integrate on Site to alleviate potential fugitive dust and particulate emissions are tabulated in Table 7 below. These are grouped in terms of low to high cost and can be used individually or in conjunction.

Table 6 Source-Pathway-Receptor Route

Source	Pathway	Receptor	Type of impact	Where relationship can be interrupted
Mud	Tracking dust on wheels and vehicles. Mud dropping off wheels/vehicles when dry	Neighbouring residential properties and properties and buildings associated with St Margaret`s Farm	Visual build-up and soiling of dust and particulates, also consequent resuspension into the air column	<ul style="list-style-type: none"> The external yard comprises engineered concrete surface. Vehicles will not be required to drive over any unpaved areas. Inspection of vehicles and, where required, removal of any mud from the wheels etc prior to exiting the Site. In the unlikely event that mud or dust is identified as an ongoing issue a road sweeper can be provided by a nearby supplier.
Debris	Falling off vehicles	As above	Visual build-up and soiling of dust and particulates, also consequent resuspension into the air column	<ul style="list-style-type: none"> Waste loads will be delivered to the Site in contained vehicles or sheeted vehicles. Efficient and prompt unloading of vehicles into the designated areas. All areas subject to regular housekeeping. Where debris is identified as an ongoing issue a road sweeper can be provided from a local road sweeper hire company.
Vehicles and plant moving	Atmospheric dispersion	Surrounding sensitive receptors	Airbourne particulates	<ul style="list-style-type: none"> The external yard comprises engineered concrete surface. Vehicles will not be required to drive over any unpaved areas. Therefore, dust generation which may impact surrounding sensitive receptors will be minimal. All areas, vehicles and plant machinery are subjected to regular housekeeping and removal of loose particles.
Tipping and storage of wastes	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> Waste material is not inherently dusty and will remain static during storage. Site bounded by fencing and vegetation, which aids as a barrier. Minimise source strength by means of low drop heights. Dampening down of material during dry periods or where load is identified during the inspection process as `dusty`. All plant is inspected prior to and after use for dust and debris build-up. Plant is regularly cleaned down after use to prevent the accumulation of dust and loose material. All plant used on Site is maintained and serviced in accordance with manufacturers` guidelines and service agreements.

Exhaust emissions	Atmospheric dispersion	Surrounding sensitive receptors	Airborne particulates	<ul style="list-style-type: none"> Regulatory controls and best-practice measures to minimise source strength. Plant will be switched off when not in use. Delivery and collection vehicles will be required to switch engines off while unloading and loading where possible.
Green waste and oversize during wood chipping	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> Operations will only be undertaken once sufficient quantities are available for contract hire of a shredding/chipping unit. Where practicable the drop height of material will be minimised in order to reduce release potential. Full training will be provided to the bucket loader operative to avoid material spillage during transfer. If required, a water bowser or hose will be used to damp down material as it is discharged from the chipper and the ground of the processing area. This will help to minimise the potential for dust release.
Static windrows during composting	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> During static composting periods there will be limited disturbance of the windrows. This will help to reduce the potential for dust I emissions and associated exposure at the receptors. Temperature, oxygen and moisture levels will be monitored throughout the maturation phase in order to ensure optimum conditions are maintained. If required, leachate will be added to the windrows in order to optimise the moisture content. Increasing moisture content of the material is likely reduce the potential for surface wind stripping of dust and loose particles.
Windrows during mechanical turning	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> It is anticipated that turning operations will be undertaken on a weekly basis over a period of approximately 9-hours. All reasonable measures will be undertaken at the site to reduce the drop height of material during turning.

				<ul style="list-style-type: none"> • Training in the use of turning equipment will be provided to all relevant staff. • All turning equipment will be well maintained and serviced as per manufacturer's specifications.
Exposed biomass feedstocks	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> • The site will only accept clean wood waste and green waste. Any contaminated material will be transferred to the quarantine area. • Moisture content of the feedstock aids to minimise particle release. • Material will only be disturbed during chipping and transfer to the biomass feed hopper in order to reduce the potential for dust emissions. • Any spilled material will be cleared by a site operative.
Biomass boiler plant	Atmospheric dispersion	Surrounding sensitive receptors	Visual soiling and dispersion of airborne particulates	<ul style="list-style-type: none"> • Woodchip feedstock will be dried in a building, which will minimise dust emissions. • Each biomass boiler incorporates a multicyclone designed to remove particulate emissions. • Each biomass boiler is required to meet a dust emission limit no greater than 20mg/m³ in exhaust gases discharged to atmosphere, via a 7m high stack. • An Air Quality Assessment and supporting air dispersion modelling has demonstrated that dust emissions from the biomass boiler plant will have no significant impact on human health or designated habitat sites. • Ash from the combustion process is collected by an automatic raking system and transferred to a dedicated sealed and enclosed container for storage prior to off-Site removal to authorised landfill for disposal.

Table 7 Measures used on site to control Dust/Particulates (PM₁₀)

Abatement Measure	Description / Effect	Overall consideration and implementation
Preventative Measures		
Low Cost Options		
Site layout in relation to receptors	External yard areas covered with an impermeable concrete surface.	The off-loading, storage and loading of wastes within designated areas will help to minimise any fugitive emissions of dust and particulates.
Site speed limit, 'no idling' policy and minimisation of vehicle movements on site	Reducing vehicle movements and idling should reduce emissions from vehicles. Enforcement of a speed limit may reduce re-suspension of particulates by vehicle wheels.	As stated above, site speed limit of 10mph will be enforced. Vehicle engines will be switched off when not in use, to minimise any idling.
Minimising drop heights for waste.	Minimising the height at which waste is handled should reduce the airborne generation of debris, dust and particulates	As stated above, vehicle drop heights will be minimised.
Minimisation of waste storage heights and volumes on site	Minimising the height at which waste is handled should reduce the distance over which debris, dust and particulates could be blown and dispersed by winds. Reducing storage volumes should reduce the surface area over which particulates can be mobilised.	Waste material will not be stockpiled over long periods of time prior to transfer to use at St Margaret's Farm or transfer to waste facilities.
Preventative Measures		
Medium Cost options		
Use of fully enclosed or sheeted vehicles to deliver wastes	Prevents the escape of debris, dust and particulates from vehicles as they travel.	Waste loads will be either fully enclosed or delivered in sheeted vehicles to avoid dispersion of emissions.

Abatement Measure	Description / Effect	Overall consideration and implementation
Hosing of vehicles on exit	May remove some dirt, dust and particulates from the lower parts of vehicles although unlikely to be necessary as all areas of the Site incorporate concrete pavement.	As a preventative measure to reduce the deposition of dust and loose material off site.
Ceasing operation during high winds and/or prevailing wind direction	During periods of elevated wind speeds the deposit of chipped wastes for supply as feedstock to the biomass boiler plant within the building should still ensure that dust emissions are suitably controlled and minimised.	During periods of elevated wind speeds the deposit of wastes within the building or enclosed bays should still ensure that dust emissions are suitably controlled and minimised. It is unlikely that operations will need to cease due to high winds. However, this will be gauged by the Site Manager or Technically Competent Person and should wind speeds become so great that they are a risk to Site personnel, local residents, neighbouring businesses and the environment then measures will be implemented to cease waste deliveries and close the Site.
Remedial Measures		
Low Cost Options		
On-site sweeping	Sweeping could be effective in managing larger debris, dust and particulates but may also cause the mobilisation of smaller particles. Road sweeping vehicles damp down dust and particulates whilst brushing and collecting dust and particulates from the road surface, particularly at the kerbside. This may generate dust and particulate movement that may become a Health and Safety issue if the filters and spray bars on the sweepers are not maintained.	As stated above, sweeping will form part of the general housekeeping of the Site to minimise the build-up of loose material and thus the generation of potential dust.
Remedial Measures		

Abatement Measure	Description / Effect	Overall consideration and implementation
Medium Cost Options		
Water suppression with hoses on site	Damping down of site areas using hoses can reduce dust and particulate re-suspension and may assist in the cleaning of the Site if combined with sweeping.	Will be predominantly implemented during dry and dusty conditions and for dampening down vehicles.
Water suppression with bowser	Using bowsers is a quick method of damping down large areas of the Site with large water jets or dribble bars.	This will be implemented for the dampening down of larger areas, should this be deemed necessary by the Site Manager or Technically Competent Person.

6.3 VISUAL DUST MONITORING

- 6.3.1 Dust monitoring at the Site boundary will be carried out as part of the routine daily Site inspections with any relevant observations recorded and retained on-Site.
- 6.3.2 All plant will be inspected on a daily basis and cleaned after use, as appropriate, in order to prevent the accumulation of dust and loose materials.
- 6.3.3 Informal dust monitoring, comprising of operational staff remaining vigilant for observable dust and particulate will be carried out during the operational process. Where significant dust emissions are identified, operations will cease, and the Site boundary will be examined to ensure emissions are not dissipating towards sensitive receptors. Dampening down of the source of any fugitive emissions will be undertaken before operational processes resume.
- 6.3.4 Due to the levels of abatement measures to be integrated on the Site as detailed above, the likelihood of emissions impacting on the identified sensitive receptors is considered **low**. Therefore, no other form of dust monitoring is proposed for the Site.
- 6.3.5 In the unlikely event that dust emissions are identified as an issue, the operator will review the mitigation measures and monitoring techniques detailed in this DEMP in order to reduce exposure levels and inhibit emissions dispersing from the Site. In this scenario, quantitative techniques will be considered as a monitoring process.

7 REPORTING AND COMPLAINTS

- 7.1.1 Friction Energy Ltd operate and maintain an Environmental Management System (EMS). Any complaints received concerning dust and particulate emissions at the Site will be dealt with in accordance with the company's EMS complaints procedure.
- 7.1.2 Any complaints received at the Site, e.g. about noise or dust, will be reported to the Site Manager or Technically Competent Person who is responsible for the Site management, e.g. in the absence of the Site Manager due to illness or annual leave etc.
- 7.1.3 The following actions will be taken on receipt of an external complaint:
- The responsible person receiving the complaint at the Site will immediately record the key details, initiating the investigation process. Details will be entered on the Complaint Report Form (see below). The form sets out the key information that should be recorded at this time in order to facilitate further suitable investigation.
 - The Site Manager or Technically Competent Person will be informed of the complaint as soon as possible, including the location, time and date of the complaint being lodged.

COMPLAINT RECORD FORM

Who made the complaint?	
Name:	
Address:	
Phone No:	
Date and time they made the complaint	
What caused it?	
Was anyone else aware of this? If so who?	
What was the source of the problem, what went wrong? If source is unknown contact a suitably qualified person to investigate.	
What have you done to make sure it won't happen again?	
Was there any significant pollution – for example oil entering a surface water drain?	
If there was then you must notify the Environment Agency (open 24hours/day) Have you done so?	Yes/No/not applicable Time: Date:

You must also notify the Environment Agency via email or letter.	EA Incident number:
Please print name and sign:	

7.1.4 In recognising that some dust complaints can be transient and short-lived, timely notification of complaints directly from the complainant or the Environment Agency is imperative to allow for appropriate investigation. If the complaint occurs more than 12 hours before notification is provided to the Operator, it may not be possible to substantiate the complaint or pinpoint the cause. The Operator will, however, contact the complainant where possible, review any operations at the time which had the potential to cause the complaint and complete and record a comprehensive complaint investigation. For complaints received within 12 hours of the incident the following actions will be undertaken:

- The Site Manager or Technically Competent Person will visit the complaint location as soon as possible, with the aim of undertaking monitoring within 2 hours if this is possible within the working day. The Site Manager or Technically Competent Person will subjectively determine the presence or absence of the cause of the complaint, e.g. visible dust presence. Opportunities to meet the complainant to discuss the matter directly will be pursued, wherever possible.
- If the cause of complaint, e.g. visible dust, is present, the key 'FIDOR' criteria will be assessed at the complaint location, as follows:
 - Frequency – is the cause of the complaint, e.g. dust, intermittent or persistent; is there a history of complaints at this location?
 - Intensity – is the cause of complaint faint, moderate, strong, or very strong?
 - Duration – how long is the cause of complaint present at this location?
 - Offensiveness – provide a description of the cause of complaint; is it high, moderate, or low offensiveness?
 - Receptor sensitivity - is the cause of complaint present at a remote or highly sensitive location; is it localised or widespread?

7.1.5 The Site Manager or Technically Competent Person will subsequently undertake the following further assessment process:

- Review of the operations at the Site prior to and at the time of the complaint;
- Review of the environmental control systems prior to and at the time of the complaint;
- Review of the meteorological conditions (wind speed, wind direction, rainfall, atmospheric pressure) prior to and at the time of the complaint – to establish

whether a pathway can be established between the Site and the complainant;

- Review of the previous complaint history at the location identified.

7.1.6 Where a significant complaint is substantiated by the Site Manager or Technically Competent Person, the Operator will contact the Environment Agency to discuss the incident as soon as possible following receipt of the complaint details, allowing sufficient time for the above investigation to be completed, and within a maximum target response period of 24 hours from complaint receipt. If the necessary contact details are available and direct feedback has been requested the Operator will also contact the complainant directly to discuss the issue, the findings of the subsequent investigation, and any actions arising.

7.1.7 Once actions have been completed the Site Manager or Technically Competent Person will visit the complaint location to ensure that the cause of complaint has subsided.

8 SUMMARY

8.1.1 This Dust and Emissions Management Plan (DEMP) supports an application for a bespoke Environmental Permit for St Margaret's Farm Composting and Biomass Boiler Facility, St Margaret's Road, South Darenth, Dartford, DA4 9LB.

8.1.2 This DEMP has been produced in accordance with H5 Dust and Particulate Emissions Management Plan template and Gov.uk guidance 'Control and monitor emissions for your environmental permit' (published 1st February 2016 and last updated 17th February 2020).

8.1.3 The DEMP will be reviewed and updated following any material change in operations or at least annually

8.1.4 The DEMP has identified the potential sources of dust and particulate emissions on Site, the potential impacts and exposure levels along with measures to be implemented at the Site to mitigate against such discharges.

8.1.5 Sensitive receptors and residential properties were identified within a 500m radius of the Site as determined by their vulnerability to the adverse effects of potential exposure to elevated levels of airborne dust and particulate matter.

8.1.6 Other contributing sources of emissions were considered in terms of dust and particulates arising from operational processes within a 500m radius of the Site.

8.1.7 Wastes delivered comprise green wastes and wood waste originating from the local area. Records of all incoming loads are stored on Site or in a secure off-Site location in accordance with the Duty of Care requirements and the Environmental Permit.

8.1.8 Preventative and remedial measures to be implemented on the Site include the off-loading of wastes with minimal drop heights and the use of a 10mph speed limit on Site to help to reduce any fugitive emissions of dust and particulates.

8.1.9 The external yard area and Site entrance will be dampened down using hoses and/or a water bowser during dry and dusty conditions, should this be deemed necessary by the

Site Manager or Technically Competent Person. Vehicles and plant will also be hosed on exit from the Site if required in order to minimise the dispersion of emissions to sensitive receptors off Site.

- 8.1.10 On Site sweeping will take place when conditions require and the concreted surface will assist in keeping them free of debris. All areas and plant will be subjected to general housekeeping to prevent the accumulation of dust and loose material.
- 8.1.11 Wastes that are stockpiled i.e. the windrows, the wood waste and wood chip, will not exceed 4m in height to minimise the potential of emissions becoming airborne.
- 8.1.12 The wastes accepted at the Site are inherently moist with relatively large particle size, thereby the potential for dust generation is significantly reduced. As an extra precaution, protective filter masks will be provided to employees and offered to any Site visitors.
- 8.1.13 The Site Manager and Technically Competent Person will be responsible for the implementation of the DEMP and the application of appropriate, recommended dust suppression measures.
- 8.1.14 Any complaints received concerning dust and particulate emissions at the Site will be dealt with in accordance with the company's EMS complaints procedure.
- 8.1.15 The investigation will be instigated by the Site Manager or the Technical Competent Person following the completion of the Complaints Report Form.
- 8.1.16 Implementation of the identified dust management measures should ensure that there are no adverse impacts on sensitive receptors from the consented operations.
- 8.1.17 Due to the levels of abatement measures to be integrated on the Site as detailed above, the likelihood of emissions impacting on the identified sensitive receptors is considered **low**. Therefore, no other form of dust monitoring is proposed for the site.