BIOMASS BOILER, SANDSCALE PARK PART B PERMIT APPLICATION SUPPORTING INFORMATION

JJC Hire Limited

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List of Appendices:

1 Introduction

1.1 Overview

1.1.1 This document contains supporting information which accompanies the Environmental Permit application being submitted by JJC Hire Limited for the proposed operation of a biomass boiler at Sandscale Park, Barrow-in-Furness. This application has been completed on behalf of JJC Hire Limited by Oaktree Environmental Ltd.

1.1.2 The application is for the operation of a biomass boiler installation. The boiler will be fuelled by Grade A waste wood, and have an operational capacity of up to approximately 285kg.hour^{-1} (dependent on moisture content and calorific value), generating up to 900KWh of renewable heat for use on the adjacent site. As the capacity of the biomass boiler exceeds 50kg.hour^{-1}, an Environmental Permit is required. The process will be regulated under Part 2, Chapter 5, Section 5.1 Part B(a)(v) of the Environmental Permitting (England and Wales) Regulations 2016, which is defined as follows:

"(a) The incineration in a small waste incineration plant with an aggregate capacity of 50 kilogrammes or more per hour of the following waste –

(v) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coatings"

1.1.3 Reference should be made to Appendix I for the proposed site infrastructure plan and proposed permit boundary plan.

1.2 Details of Site Operator

1.2.1 This permit is being applied for by JJC Hire Limited.

1.3 Documents Consulted

1.3.1 The following guidance documents have been consulted for the purpose of completing this supporting document:

- Process Guidance Note 1/12(13): Statutory Guidance for Combustion of Waste Wood, Department for Environment, Food and Rural Affairs (DEFRA), Revised July 2013.

2 Description of Process

2.1 Overview

2.1.1 Reference should be made to the drawings within Appendix I for site location and layout plans. The area which is the subject of this Environmental Permit application is outlined in red on drawing No. 3650/2272/02.

2.2 Site Operations

2.2.1 Reference should be made to Appendix I for a site infrastructure plan. The site will contain the following principal infrastructure within the permit boundary:

- 900KW_{th} output biomass boiler;
- Biomass fuel store and fuel loading system; and,
- Elevated flue for dilution and dispersion of residual emissions.

2.2.2 The wider site, outside the permit boundary, will include the biomass fuel processing/handling/storage operations. However, in accordance with the regulations, areas for the processing and handling of waste wood to be used in the boiler do not form part of the Part B permit (installation) being applied for, in accordance with the regulations which state the following:

"*When determining the extent of an installation carrying on an activity within Part B, any location of the following description is to be ignored: any location where the associated storage or handling of wastes and residues which are to be incinerated as part of that activity is carried on, other than a location where the associated storage or handling of animal remains intended for burning in an incinerator used wholly or mainly for the incineration of such remains or residues from the burning of such remains in such an incinerator is carried on.*"

. 2.2.3 The waste wood processing operations are subject to separate regulation under existing waste permits, and/or exemption(s) held by the site operator. In order to put the application into context, the wood processing operations have been discussed

within the application. It is understood that storage of processed wood, used in operations covered by a Part B permit should be treated as a Directly Associated Activity (DAA), regulated by Local Authorities. As such, the biomass fuel storage area has been included within the permit boundary.

2.3 Boiler Feedstock

2.3.1 The wood to be used in the boiler includes virgin biomass and Grade A waste wood, which is essentially clean, uncontaminated waste wood. Grade A waste wood was described in a previous WRAP report[1] as 'clean recycled wood', typically used as a fuel in non Waste Incineration Directive (WID) (now chapter IV of Industrial Emissions Directive [IED]) installations). Typical non-wood content prior to processing is described as nails and some fixings and minor amounts of paint and surface coatings.

2.3.2 The use of the term 'Grade A' waste wood has been a term widely used by the regulator in recent years, as included in previous Environment Agency (EA) position statements. The latest EA guide on waste wood regulation[2] states:

"Grade A waste wood must be visibly 'clean' non-hazardous waste wood from the arboriculture sector, packaging waste, scrap pallets, packing cases, cable drums and off-cuts from the manufacture of untreated wood products."

2.3.3 The EA waste wood guide also advises that both Grade A and B waste wood can be burnt under a Section 5.1 Part B permit, although if Grade B waste wood is included, there must be adequate quality controls in the supply chain to ensure no Grade C waste wood is included, However, this application only includes a proposal to burn Grade A waste wood.

2.3.4 With respect to Grade A waste wood, the EA waste wood guide states:

1 The Business Case for Wood Waste Collection Hubs, WRAP, 2012
2 Waste Wood: Quick Guide 43_17 – Issued 16/03/2017, Environment Agency.

"Single-use packaging and pallets manufactured within the UK are unlikely to have been subject to any form of non-visible treatment other than being kiln dried. However, pallets arising from outside of Europe may have been treated with methyl bromide for biosecurity purposes. In line with international convention, such pallets will be stamped with an M and is therefore treated wood."

2.3.5 As such, it is clear from the above that visibly clean pallets and wooden packaging can be considered to be Grade A waste wood (clean, uncontaminated), unless they are marked as described above and this also enables such waste to be clearly visually identified, regardless of whether the Grade A waste wood has been obtained from source segregated waste streams or mixed waste streams.

2.4 Grade A Waste Wood Sources

2.4.1 The Grade A waste wood will be sourced from a Biomass Suppliers List (BSL) registered supplier. However, robust procedures will be in place to ensure that no other waste wood other than clean and uncontaminated waste wood is used in the boiler, ensuring compliance with the Environmental Permit. Reference should be made to the Environmental Management System (EMS) in Appendix IV (document ref: 3650-2272-B) for detailed information on these procedures.

2.5 Wood Fuel Reception, Storage and Processing

2.5.1 As detailed previously, the processing of wood fuel to be used in the boiler is not regulated by the part B permit and these operations do not fall within the Part B permit boundary. The following details in this regard are provided for information purposes only and to put the application into context.

2.5.2 Grade A waste wood is to be received at the adjacent waste recycling site and transferred to the biomass fuel store, located as shown on the layout plan. The wood to be used in the boiler will be sourced from a BSL registered supplier. From the biomass fuel store, wood is continuously loaded to the boiler.

2.6 Boiler Operation

2.6.1 The boiler to be used is a Heizomat RHK-AK 1000 boiler, located as shown on the site layout plan. Drawings of the boiler configuration within the site are contained within Appendix III. Wood is loaded via continuous feed to the boiler from the biomass fuel store. The boiler is continuously loaded at a rate of up to approximately 285kg.hour^{-1}, generating up to 900KW of renewable heat for use on the adjacent site. Residual exhaust emissions from the boiler is released, following abatement, via an elevated flue. The flue height of 9.2m has been verified as suitable by a detailed emissions assessment using AERMOD, which has demonstrated the stack to be of a suitable height to prevent significant adverse impacts on local air quality. Reference should be made to Appendix II for a copy of the emissions assessment.

2.6.2 Waste ash arising from the boilers will be collected in an enclosed vessel and removed from site on a regular basis, taken to a suitable, permitted waste facility.

2.7 Plant and Machinery

2.7.1 In addition to the boiler and fuel loading system, the following plant and machinery may be used on site:

- Loading Shovel; and,
- Telehandler.

3 Potential Atmospheric Emissions and Control

3.1 Emission Sources

3.1.1 The main potential sources of air emissions have been identified as follows:

- Residual emissions from the flue serving the biomass boiler; and,
- Fugitive dust from the handling and storage of wood.

3.1.2 The biomass boiler flue location (A1) is shown on the permit boundary plan and also illustrated on the site infrastructure plan in Appendix I. The flue will be 9.2m in elevation.

3.2 Biomass Boiler Flue Emissions

3.2.1 Table 1 below contains an outline of the emission limits that will apply to the boiler, which are based upon the relevant sector guidance.[3]

Table 1 Boiler Emission Limits

Pollutant	Emission Limits ($mg.m^{-3}$) Expressed at Reference Conditions of 11% O_2, 273K, no correction for moisture
Carbon Monoxide (CO)	250
Total Particulate Matter	60
Nitrogen Oxides (NO_x)	400
Organic Compounds	20

3.2.2 The following abatement methods will be used to control emissions from the biomass boiler:

- Turbulators with cyclonic flow to control emissions of particulate matter; and,

[3] Process Guidance Note 1/12(13): Statutory Guidance for Combustion of Waste Wood, Department for Environment, Food and Rural Affairs (DEFRA), Revised: July 2013.

- Use of Lambda probe to ensure fuel/air mixture is optimised during operation to control combustion related pollutants.

3.2.3 In addition to the physical abatement methods used, servicing and preventative maintenance will be undertaken on the boiler at set intervals to maintain efficient boiler operation.

3.3 Fugitive Dust Emissions

3.3.1 There is potential for dust emission to arise as a result of the proposed activities, as follows:

- Fugitive dust emission from vehicles transferring Grade A wood to the fuel storage area; and,
- Fugitive dust from wood storage and loading area.

3.3.2 A series of dust mitigation measures will be implemented on site to ensure dust emissions are controlled as far as is practically possible. The measures include:

- Sheeting of vehicles delivering materials to the site (if necessary);
- sheeting of vehicles transporting potentially dusty loads off site;
- use of mobile bowser to damp down vehicle running surfaces, vehicle loads and areas on and around machinery which may give rise to dust, especially during dry and windy conditions;
- Cleaning of any spillages using wet cleaning methods;
- Drop heights minimised to prevent dust emissions; and,
- Enclosure of biomass fuel store, boiler and fuel loading system within a building, controlling fugitive emission.

3.3.3 A permanent water supply will be made available on site in all climatic conditions to ensure that the dust suppression systems can function effectively. Any external water pipes will be lagged to prevent frost damage during winter months.

4 Emissions Monitoring

4.1 Boiler Flue Emissions Monitoring

4.1.1 Excess air will be continuously monitored and controlled by means of a Lambda probe and control system.

4.1.2 Given that the boiler will be fuelled by a consistent type of feedstock (Grade A waste wood), will be continuously loaded with fuel, and have sensors in place to monitor and control excess air, it is argued that continuous monitoring of CO emissions is not required, in accordance with the relevant guidance. Emissions of CO would be monitored at least annually using approved methods.

4.1.3 Particulate matter and organic compounds will be monitored at least annually during services by a suitably qualified contractor, using approved methods.

4.1.4 NO_x emissions will be monitored upon commissioning of the boiler and after any subsequent substantial change to the installation using approved methods.

4.1.5 Oxygen will be continuously monitored using a Lambda probe.

4.1.6 Given the nature of the feedstock, which is essentially clean, uncontaminated waste wood, it is not considered that emissions monitoring will be required for any other pollutants outlined in the Process Guidance Note.

4.1.7 All monitoring will be undertaken in accordance with the methods detailed in DEFRA Process Guidance Note 1/12(13), or by alternative, equivalent method agreed with the Local Planning Authority.

4.1.8 Reference should be made to the EMS in Appendix IV for details of proposed emissions reporting procedures.

4.2 Visual Monitoring

Visual Monitoring - General

4.2.1 Site operatives will continuously monitor dust emissions whilst the site is in operation and will report back to the site supervisor for advice if required.

Visual Monitoring of Stack Exhaust

4.2.2 Emissions from the combustion process should be free from visible smoke. During start up and shut down of the boiler, emissions should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742:2009. All emissions from air should be free from droplets and persistent visible emissions. Stack emissions will be visibly monitored on an ongoing basis by site staff.

4.2.3 As detailed in the EMS in Appendix IV, a complaints procedure will be implemented during the day to day operation to ensure full investigation and remedial action for air emission related issues, such as dust.

4.2.4 Reference should be made to the EMS for a detailed outline of proposed visual monitoring and reporting procedures.

5 Potential Impacts on Environment

5.1 An assessment of potential environmental impacts (air) has been undertaken by undertaking an emissions modelling assessment using AERMOD. Reference should be made to Appendix II for a copy of the report. This has demonstrated that the stack height of 9.2m will be of suitable height to achieve adequate dilution and dispersion of residual emissions, resulting in no significant adverse impacts at surrounding ground level locations, including relevant human and ecological receptors.

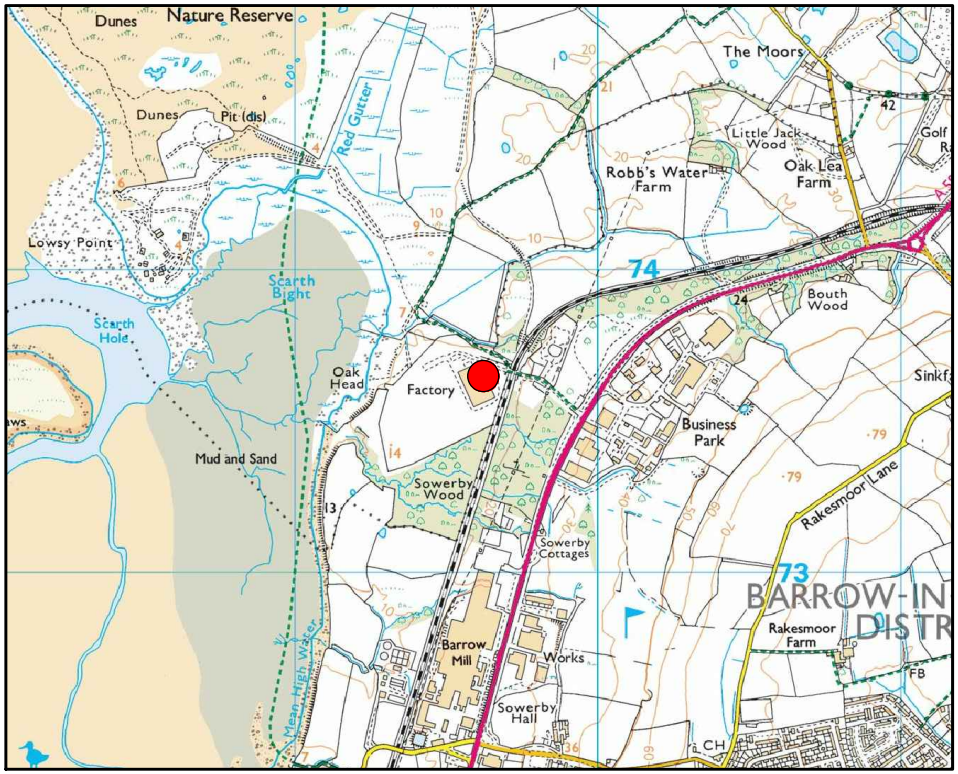
6 Environmental Management System

6.1 An EMS will be implemented during the day to day operation of the biomass boiler to ensure compliance with the Environmental Permit. Reference should be made to Appendix IV for a copy of the EMS which has been drafted for the operation. The EMS in Appendix IV outlines the following:

- General site management procedures;
- Training procedures;
- Emissions control procedures;
- Emissions monitoring procedures; and,
- Record keeping procedures.

Supporting Information Document Appendix I

Permit Boundary Plan and Site Layout Plan



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Drawing No:	Rev:
3650/2272/01	-

Title: SITE LOCATION MAP

Site: Sandscale Park, Barrow-in-Furness LA14 4QT

Client: JJC Hire Ltd

Date:	Job:
19 October 2018	3650

Drawn:	Checked:	Client:
RS	--	2272

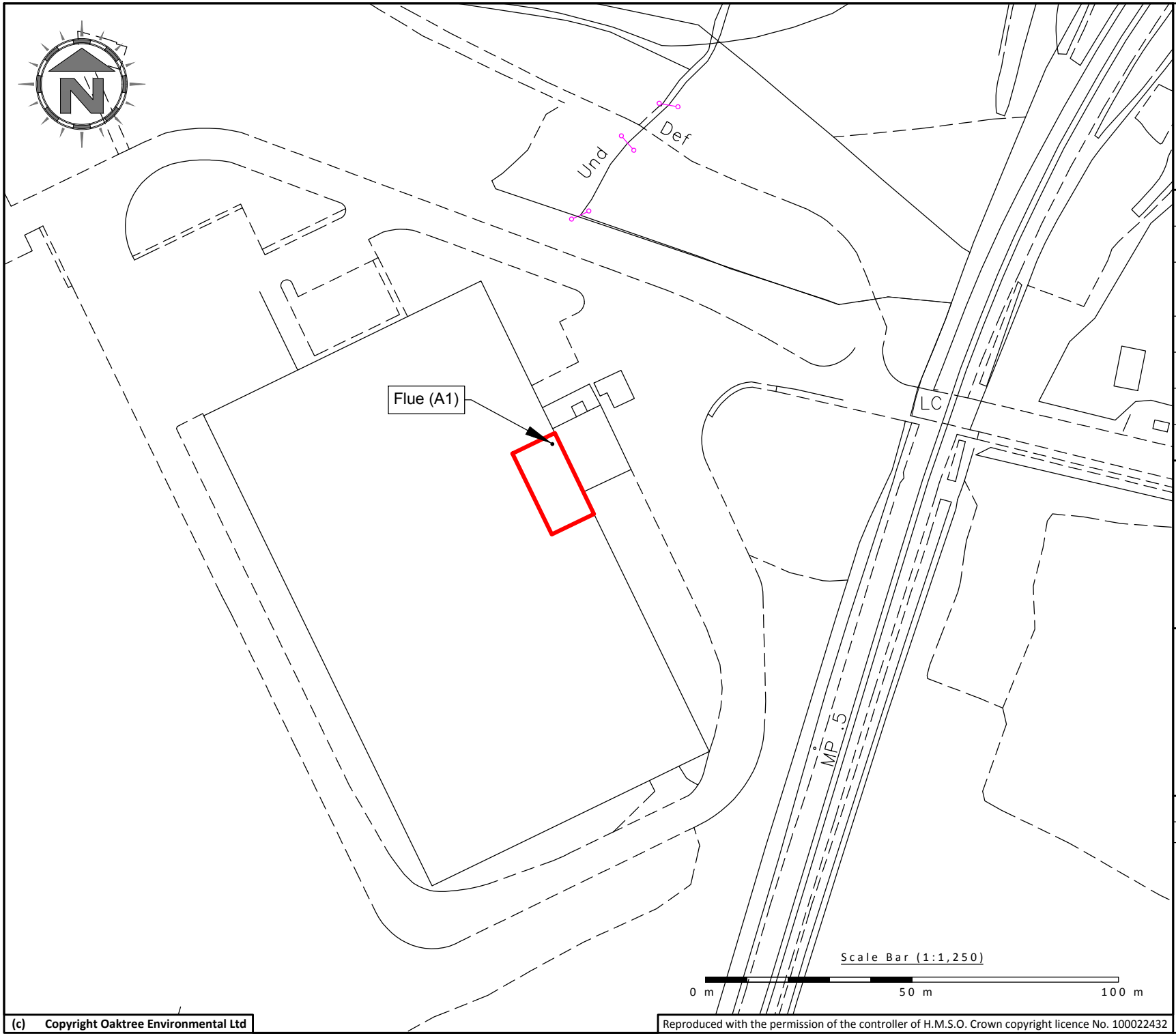
Scale:	Printed @:
1:25,000	A4

KEY:

Site location

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing



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Drawing No: 3650/2272/02		Rev: -
Title: PERMIT BOUNDARY PLAN		
Site: Sandscale Park, Barrow-in-Furness LA14 4QT		
Client: JJC Hire Ltd		
Date: 19 October 2018		Job: 3650
Drawn: RS	Checked: -	Client: 2272
Scale: 1:1,250		Printed @: A4

KEY:

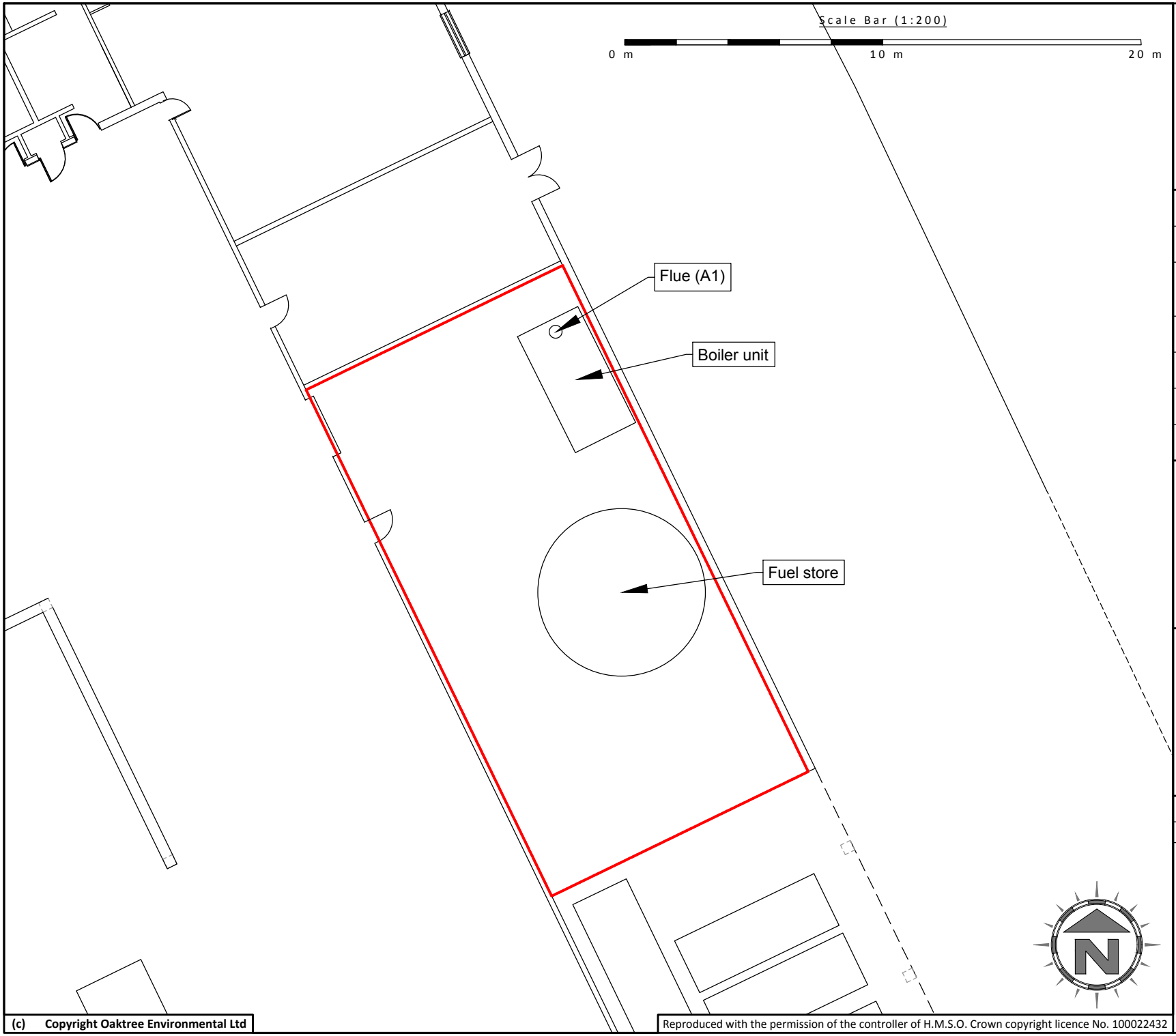
Permit boundary

Notes:

(1) Drawing for indication only.
(2) Do not scale from this drawing.

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing



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Drawing No: 3650/2272/03		Rev: -
Title: LAYOUT PLAN		
Site: Sandscale Park, Barrow-in-Furness LA14 4QT		
Client: JJC Hire Ltd		
Date: 19 October 2018		Job: 3650
Drawn: RS	Checked: -	Client: 2272
Scale: 1:200		Printed @: A4

KEY:

Permit boundary

Notes:

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Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing

Supporting Information Document

Appendix II

Emissions Modelling Assessment

BIOMASS BOILER, SANDSCALE PARK

JJC Hire Limited

VERSION:	1.1	DATE:	7 February 2019		
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List of Appendices:

1 Introduction

1.1 Background and Context of Assessment

1.1.1 An emissions modelling assessment has been undertaken in support of a Part B Permit Application being submitted for the operation of a biomass boiler at JJC Hire Limited, Sandscale Park, Barrow-In-Furness . The assessment has been undertaken to predict the potential air quality impacts at sensitive receptor locations as a result of residual emissions associated with the proposed process.

1.2 Site Location

1.2.1 The site is located approximately 4km to the North of Barrow-In-Furness. Reference should be made to Appendix I for a map of the proposed site location.

1.3 Proposed Activities and Environmental Context

1.3.1 The proposals are for the operation of a biomass boiler, having a thermal input capacity of 1100KW. The boiler will be fuelled by Grade A waste wood, which is essentially clean, uncontaminated waste wood. The boiler will be fuelled by up to approximately 285kg.hour^{-1} of wood. Given the operations proposed, the process will be regulated under Part 2, Chapter 5, Section 5.1 Part B(a)(v) of the Environmental Permitting (England and Wales) Regulations 2016 ("the regulations"), which is defined as follows:

"(a) The incineration in a small waste incineration plant with an aggregate capacity of 50 kilogrammes or more per hour of the following waste –

(v) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coatings"

1.3.2 The operation of the boiler will have the potential to create airborne emissions and subsequent impacts upon the surrounding environment. Potential air quality impacts have been quantified within this report through prediction of

resulting ground level pollutant concentrations which have been compared to the relevant Air Quality Limit Values (AQLVs), critical levels and loads

1.4 United Kingdom Legislative Perspective

1.4.1 The European Union (EU) established an Air Quality Assessment and Management Framework in 1996, Directive 96/62/EC. This identified twelve pollutants for which limit values would subsequently be set. These limits were outlined within four subsequent 'daughter' directives. Directives 99/30/EC, 2000/69/EC and 2004/107/EC defined ambient air limit values for nitrogen dioxide (NO_2) and particulate matter.

1.4.2 Within the United Kingdom (UK), AQLVs for ambient air were outlined within The Air Quality Standards Regulations 2007, which came into force on 15th February 2007. These regulations transposed AQLVs from the four EU daughter Directives into UK legislation, and outlined dates by which limit values were required to be achieved, in line with EU obligations. In the UK, the Air Quality Strategy is used to implement AQLVs and also for providing a framework for improving air quality.

1.4.3 EU Directive 2008/50/EC on 'ambient air quality and cleaner air for Europe' came into force on 21st May 2008. This directive aimed to simplify existing EU air quality legislation through consolidating previous directives into one single directive. The directive also introduced a new control framework for particulate matter less than 2.5µm in aerodynamic diameter ($PM_{2.5}$).[1] The provisions of this directive were required to be transposed into member states' legislation by 10th June 2010. Within the UK, this legislation was transposed within the Air Quality Standards Regulations 2010 on 11th June 2010, at which point the Air Quality Standards Regulations 2007 were revoked.

[1] Consultation on the Transposition of Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe, DEFRA, 2009.

1.4.4 Table 1.1 and **Error! Reference source not found.** contain the AQLVs which are relevant to this assessment.

Table 1.1 Air Quality Limit Values

Pollutant	Measured As	Purpose	Air Quality Limit Values/Air Quality Standards
NO_2	1-hour mean	Protection of human health	200μg.m^{-3} (not to be exceeded more than 18 times per calendar year)
	Annual mean	Protection of human health	40μg.m^{-3}
Particulate matter less than 10μm in aerodynamic diameter (PM_{10})	24-hour mean	Protection of human health	50μg.m^{-3} (not to be exceeded more than 35 times per calendar year)
	Annual mean	Protection of human health	40μg.m^{-3}
Particulate matter less than 2.5μm in aerodynamic diameter ($PM_{2.5}$)	Annual mean	Protection of human health	25μg.m^{-3}

1.5 Critical Levels for Protection of Vegetation and Ecosystems

1.5.1 Table 1.2 outlines critical levels for the protection of vegetation at nature conservation sites, obtained from permitting risk assessment guidance on the government website.

Table 1.2 Critical Levels for the Protection of Vegetation

Pollutant	Concentration (μg.m^{-3})	Measured As
NO_x	30	Annual mean
	75	Daily mean

1.6 Critical Loads for Protection of Vegetation and Ecosystems

1.6.1 Critical loads are assigned for nitrogen deposition at sensitive ecological sites, above which it is suggested harmful effects on vegetation may occur. The APIS

website[2] has been consulted to determine appropriate critical levels for ecological sites considered in this assessment.

Table 1.3 Site Specific Critical Loads for Nitrogen Deposition

Site	Worst Case Critical Load for Nitrogen Deposition (Kg $N.ha^{-1}.Year^{-1}$)
Duddon Estuary Ramsar/SSSI	8-10
Morecambe Bay SAC	8-10

[2] www.apis.ac.uk.

2 Baseline Air Quality

2.1 Air Quality Across Barrow-In-Furness

2.1.1 Barrow-in-Furness Borough Council (BFBC) are required to undertake a review and assessment of air quality within their area of jurisdiction under Section 82 part IV of the Environment Act (1995). Local Authorities (LAs) are obligated to prepare an Annual Status Report (ASR) each year. For areas where Air Quality Objectives (AQOs)/AQLVs are not expected to be achieved, the LA will undertake further assessment. Subsequently, if AQOs/AQLVs are not predicted to be met, the LA must declare an Air Quality Management Area (AQMA).

2.1.2 The 2018 Air Quality Annual Status Report for BFBC[3] confirmed that no exceedences of the annual mean AQLV for NO_2 have been reported in the most recent available year of data (2017). No routine monitoring of PM_{10} or $PM_{2.5}$ is undertaken across the borough.

2.1.3 No AQMAs are declared across the borough at present.

2.2 Air Quality Monitoring

2.2.1 Continuous Monitoring

2.2.1.1 The Automatic Urban and Rural Network (AURN) is a network of air pollution monitoring stations across the UK, managed by Bureau Veritas on behalf of DEFRA. The main purpose of the network is to enable the government to assess air quality at different locations to aid with the implementation of suitable policy measures for protection of human health.

2.2.1.2 The closest AURN monitoring station to the proposed site is Blackpool Marton, which is an urban background monitoring location situated approximately 35km to the South-South-East of the proposed site. With consideration to the proximity

[3] 2017 Air Quality Annual Status Report (ASR), NLC, 2017

to the proposed site, and the nature of this monitoring location, it is not considered that this site would provide a suitably representative source of background data for use in this assessment and therefore has not been considered further for this purpose.

2.2.1.3 BFBC do not maintain any continuous monitoring locations.

2.2.2 Nitrogen Dioxide Diffusion Tube Monitoring

2.2.2.1 BFBC maintain a series of NO_2 diffusion tubes across their area of jurisdiction. Four sites are maintained, including three roadside locations and one urban background location. Given the nature of the monitoring locations and the proximity to the site, it is not considered that they would provide a suitably representative source of background data for the site and receptors considered within this assessment and therefore have not been considered further for this purpose.

2.3 Background Pollutant Mapping

2.3.1 The DEFRA website contains background pollutant mapping data for NO_2, PM_{10} and $PM_{2.5}$ on a 1km by 1km grid square basis across the UK. This data is routinely used for assessing background pollutant concentrations where no suitably representative air pollution monitoring data exists. The archive is maintained by AEA on behalf of DEFRA. NO_2, PM_{10} and $PM_{2.5}$ data is available for each grid square for the years 2015 to 2030. Table 2.1 contains background pollutant concentrations for the grid square containing the site.

Table 2.1 Background Pollutant Mapping Data

Pollutant	2018 Annual Mean Pollutant Concentration ($\mu g.m^{-3}$) within Grid Square Containing Site (319500, 473500)
NO_x	8.24
NO_2	6.37
PM_{10}	9.85

Pollutant	2018 Annual Mean Pollutant Concentration ($\mu g.m^{-3}$) within Grid Square Containing Site (319500, 473500)
$PM_{2.5}$	6.6

2.4 Summary and Justification of Background Pollution data Used in Assessment

2.4.1 Table 2.2 below contains a summary of background pollution data used in this assessment. In lieu of any suitable available monitoring data, the DEFRA background mapping data has been used as a source of background data.

Table 2.2 Summary of Background Pollution Data Used in Assessment

Pollutant	Annual Mean Background Concentration	Short Term Background Concentration[(a)]	Source of Background Data
NO_x	8.24µg.m^{-3}	9.72µg.m^{-3}	DEFRA background mapping data
NO_2	6.37µg.m^{-3}	12.74µg.m^{-3} (1-hour mean)	DEFRA background mapping data
PM_{10}	9.85µg.m^{-3}	11.62µg.m^{-3} (24-hour mean)	DEFRA background mapping data
$PM_{2.5}$	6.6µg.m^{-3}	N/A	DEFRA background mapping data

N.B (a) 1-hour mean background concentrations assumed to be twice the annual mean concentration in accordance with government guidance, 24-hour mean background concentrations estimated by multiplying 1-hour mean background concentration by a factor of 0.59, in accordance with government guidance

2.5 Sensitive Receptors

2.5.1 Discrete Cartesian receptors have been identified for inclusion within the model. Sensitive receptors included in the model are outlined in the table below. These receptors are considered to provide representative points of closest exposure in various directions from the plant. Reference should be made to Appendix II for a graphical representation of receptor locations. The identified NGR for each receptor represents the nearest point(s) to the proposed site boundary in order to ensure a 'worst case' scenario. These were used as inputs to the model. Receptors R10 and R11 are ecological receptors which span over a large area. As such, discrete receptor points were place at minimum 5m intervals along the ecological receptor boundary closest to the site. This ensured the point of maximum input was captured to ensure a robust assessment. Reference should be made to Appendix II for a graphical representation of the receptor boundary included as a model input for R10 and R11.

Table 2.3 Sensitive Receptor Locations

Receptor Identifier	Receptor description	NGR (m)	
		X	Y
R1	Robb's Water Farm	320391	474326
R2	Oak Lea Farm	320792	474373
R3	Residential Property off Park Road	320857	473999
R4	Residential Property off Rakesmore Lane	321161	473576
R5	Rakesmore Farm	320806	472713
R6	Residential Property off Glenridding	320815	472558
R7	Residential Property off Rakesmore Lane	320501	472464
R8	Sowerby Hall	319863	472431
R9	Sowerby Lodge	319169	472342
R10	Duddon Estuary Ramsar/SSSI	Various	Various
R11	Morecambe Bay SAC	Various	Various

3 Modelling Methodology

3.1 Model Description

3.1.1 The potential air quality impacts associated with residual emissions arising from the biomass boiler have been quantified using AERMOD, which is a steady state, next generation, dispersion model. AERMOD was developed jointly by the American Meteorological Society (AMS) and the United States (US) Environmental Protection Agency (EPA) Regulatory Model Improvement Committee. AERMOD is a development from the Industrial Source Complex (ISC) 3 dispersion model and incorporates improved dispersion algorithms and pre-processors to integrate the impact of meteorology and topography within the modelling output, and is approved for use in the UK by the Environment Agency (EA). The version of AERMOD that has been used for this current assessment is Lakes Environmental ISC-AERMOD View Version 9.6.5. The model has been run using the most recent version of the AERMOD executable file, 18081. In order to improve modelling running times, Lakes Environmental have produced an equivalent source code to 18081, known as AERMOD parallel which enables the model to be run over multiple processors. The model was run using Lakes Environmental AERMOD MPI 18081.

3.2 Model Inputs

3.2.1 Emission Source Parameters

3.2.1.1 Reference should be made to Appendix I for a graphical representation of the proposed stack location in relation to the surrounding environment. Table 3.1 contains expected stack process parameters for the proposed biomass plant. Parameters for stack diameter, volumetric flow rate, temperature, oxygen content and pressure of exhaust gases were confirmed by the technology provider.

Table 3.1 Expected Emission Source Process Parameters

Process Parameter	Value
Exhaust Flue (A1) NGR (X,Y)	319625.7, 473651.8
Stack internal diameter (m)	0.5
Stack height (m)	9.2
Expected stack efflux velocity ($m.s^{-1}$)	5.093
Expected stack volumetric flowrate ($m^3.s^{-1}$)	1
Expected stack efflux temperature (K)	453
Expected oxygen content of exhaust gas (v/v, %)	11
Expected absolute stack pressure (KPa)	101.2

3.2.2 Pollutant Emissions

3.2.2.1 There will be a number of potential pollutant emissions as a result of operation of the proposed biomass boiler. The plant will need to comply with Emission Limit Values (ELVs) contained within Process Guidance Note 1/12(13)[4] for waste wood combustion, outlined in the table below.

Table 3.2 Boiler Emission Limits

Pollutant	Emission Limits ($mg.m^{-3}$) Expressed at Reference Conditions of 11% O_2, 273K, No Correction for Moisture
CO	250
Total Particulate Matter	60
NO_x	400
Organic Compounds	20

3.2.2.2 It also understood that the proposed boiler also has a Renewable Heat Incentive (RHI) certificate. In order to qualify for RHI, the boiler is required to meet maximum emissions levels of $30g.GJ^{-1}$ for particulate matter and $150g.GJ^{-1}$ for NO_x.

4 Process Guidance Note 1/12(13) – Statutory Guidance for Combustion of Waste Wood, DEFRA, July 2013.

3.2.2.3 The table below contains the worst case emission rates for the boiler, based on statutory emission limits and RHI limits.

Table 3.3 Pollutant Emission Rates

Pollutant	Maximum Pollutant Emission Rates ($g.s^{-1}$) Based on Statutory Emission Limits[a]	Maximum Pollutant Emission Rates ($g.s^{-1}$) Based on RHI Limits[b]
NO_x	0.241	0.165
Particulate matter	0.036	0.033

N.B (a) Emission rates calculated by converting ELV concentrations from reference conditions to stack operating conditions and multiplying by actual expected stack exhaust flow rate
(b) Based on an assumed worst case thermal capacity of 1100KW

3.2.2.4 The AQLVs related to particulate matter are for PM_{10} and $PM_{2.5}$. However, ELVs and monitoring data are expressed as total particulate matter. In order to determine resulting PM_{10} and $PM_{2.5}$ concentrations, modelled particulate matter concentrations have been factored by 0.8 to determine PM_{10} concentrations and 0.4 to determine $PM_{2.5}$ concentrations. This is in accordance with government guidance on pollution inventory reporting which advises that it can be assumed that 80% of total particulate matter comprises PM_{10} and 40% $PM_{2.5}$ from combustion processes using biomass.[5]

3.2.3 Building Downwash

3.2.3.1 The building which houses the biomass boiler was digitised within the model based on height information provided by the site operator. As the closest building to the boiler flue, this would be expected to have an influence on pollutant dispersion. Table 3.4 contains information on building height and dimensions used within the model. Reference should be made to Appendix I for details of the building location. The integrated Building Profile Input Programme (BPIP) module within AERMOD was used to assess the potential impact of building downwash upon predicted dispersion characteristics. Building

5 Pollution Inventory Reporting – Combustion Activities Guidance Note, Environmental Permitting (England and Wales) Regulations 2010 Regulation 60(1), Version 4, EA, January 2013.

downwash occurs when turbulence, induced by nearby structures, causes pollutants emitted from an elevated source to be displaced and dispersed rapidly towards the ground, resulting in elevated ground level concentrations. The building was used as an input in the BPIP processor.

Table 3.4 Building Dimensions

Structure	Max Height (m)	Length and Width (m)
Building Housing Biomass Boiler	7	74.7 x 126.6

3.2.4 Assessment Area

3.2.4.1 A uniform Cartesian receptor grid was used to define the modelling domain, centred on the stack location. This included a high resolution 4,500m by 4.500m uniform Cartesian receptor grid with a grid resolution of 20m in X and Y direction. This ensured that the point of maximum impact was captured. The discrete sensitive receptor locations identified within the previous chapter were also included as model inputs.

3.2.5 Meteorological Data

3.2.5.1 Meteorological data used in this assessment was from Barrow/Walney Island. Barrow/Walney Island meteorological station is located approximately 3km to the South-West of the proposed site. Given the proximity, topology and nature of the observing station location, it is considered that it provides suitable data for use in this assessment. Reference should be made to Appendix III for wind roses showing wind speed and direction frequency at Barrow/Walney Island between 2013 and 2017.

3.2.5.2 Five years of sequential meteorological data observed between 2013 and 2017 were used within the assessment. The AERMET processor within AERMOD was used to process the data to be site specific. US EPA guidance on processing met data for use within AERMOD states that land use up to 1km upwind from a site

should be considered when determining surface roughness characteristics, whilst for Bowen ratio and albedo, land use types within a 10km by 10km area centred over the site should be considered[6]. AERMOD guidance states that albedo and Bowen ratio should be calculated as the arithmetic and geometric mean respectively of land use types over the 10km by 10km grid, not weighted by direction or distance. The Land Use Creator and AERSURFACE tool within AERMET was used to calculate the appropriate land-use characteristics, which are contained in the following table.

Table 3.5 Parameters for Surface Roughness, Albedo and Bowen Ratio

Parameter	Directional Sector	Value
Surface Roughness	0-30°	0.087
	30-60°	0.087
	60-90°	0.087
	90-120°	0.078
	120-150°	0.034
	150-180°	0.058
	180-210°	0.078
	210-240°	0.024
	240-270°	0.007
	270-300°	0.003
	300-330°	0.011
	330-360°	0.069
Albedo	All	0.15
Bowen Ratio	All	0.33

3.2.6 Terrain Data

3.2.6.1 Topographical features can have a significant impact on pollutant dispersion. Assessment of the site and surrounding area indicates the gradient of the land across the site and surrounding modelling domain exceeds 10% in places.

6 AERMOD Implementation Guide, US EPA, August 2015.

Therefore, terrain data was included in accordance with the relevant guidance[7]. The terrain data used included OS Terrain 5 data, which is Digital Terrain Model (DTM) data at 1:10,000 scale, contoured at 5m vertical intervals, with a grid resolution of 5m spacing in X and Y direction. The data has a Root Mean Square Error (RMSE) value of 1.5m in urban areas and major communication routes with detailed modelling of significant features such as road, quarries and lakes. The AERMAP terrain processor was used to process the data to assign elevations and hill height scales to all sources, buildings and receptors.

3.2.7 NO_x to NO_2 Conversion

3.2.7.1 Nitric oxide (NO) and NO_2 are normally measured as oxides of NO_x, but when comparing against health based standards, NO_x is usually expressed as it's individual components. NO is oxidised to NO_2 in the presence of ozone. In order to provide a conservative estimate of resulting NO_2 concentrations, it has been assumed that 35% of modelled NO_x concentrations are present as NO_2 for short-term concentrations, whilst it has been assumed that 70% of modelled NO_x concentrations are present as NO_2 for long term average concentrations. This provides a worst case scenario, in accordance with EA guidance.

3.2.8 Model Scenarios

3.2.8.1 The scenarios modelled are contained within Table 3.6. It was assumed that the plant will be operational continuously for 24-hours per day, 365 days per year with no shut down periods which ensured a worst-case scenario. The pollutants modelled included particulate matter and NO_x which are considered to be the primary pollutants of concern.

Table 3.6 Model Scenarios

Pollutant	Modelled Scenarios

[7] LAQM.TG(16), DEFRA, 2016.

Pollutant	Modelled Scenarios
NO_x	Annual Mean, 24-hour maximum
NO_2	Annual mean, 99.8th percentile 1-hour mean
PM_{10}	Annual mean, 90.4th percentile 24-hour mean
$PM_{2.5}$	Annual mean

3.2.9 Model Uncertainty

3.2.9.1 It is widely accepted that there can be a significant degree of uncertainty in predictions made by any atmospheric dispersion model which needs to be taken into account when assessing modelled results.

3.2.9.2 The former National Society for Clean Air (NSCA)[8] published Stock U (uncertainty) values for determining the potential error within model predictions. These values have been derived from comparison between model runs and observed data during experiments undertaken in London. These are presented within Table 3.7.

Table 3.7 Model Standard Deviations

Air Quality Objective	Stock U Value[(a)]	Potential Model Error ($\mu g.m^{-3}$)
Nitrogen dioxide (annual mean)	0.1-0.2	+/-4
Nitrogen dioxide (99.8th percentile, 1-hour mean)	0.3-0.5	+/-60
Particles 24-hour mean (90th percentile)	0.3-0.5	+/-15
Particles (annual mean)	0.3	+/-12

N.B. (a) Based upon model runs in London

8 Air Quality Management Areas: A Review of Procedures and Practice for Local Authorities, NSCA,

3.2.9.3 As an example, the model standard deviation can be estimated for predicted annual mean NO_2 as follows:

$$0.1(\text{Stock U}) \times 40\,\mu g.m^{-3} (\text{Air Quality Objective}) = \pm 4\,\mu g.m^{-3}$$

3.3 Assessment of Potential Impacts

3.3.1 In order to assess potential impacts, reference has been made to the permitting air emissions risk assessment guidance on the government website.[9]

3.3.2 The government guidance indicates that potential impacts from a process can be considered insignificant if the following screening criteria are met:

- The long term process contribution (PC) is <1% of the long term environmental standard; and/or,
- The short term PC is <10% of the short term environmental standard.

3.3.3 The guidance also indicates that more detailed assessment of emissions (modelling) for a process may be required if the following criteria are met:

- The long term PC + background concentration is >70% of the long term environmental standard; and/or
- The short term process contribution is >20% (Short term environmental standard minus twice annual mean background concentration).

3.3.4 Therefore, if detailed dispersion modelling demonstrates that the above criteria will not be exceeded, it can logically be concluded that potential impacts will not be significant.

[9] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

4 Model Results

4.1 Modelled Impacts at Sensitive Human Receptors

4.1.1 The tables below present model results for annual mean and 1-hour mean NO_2 concentrations, annual mean and 24-hour mean PM_{10} concentrations and annual mean $PM_{2.5}$ concentrations at sensitive human receptors.

4.1.2 In accordance with previous guidance[10], annual mean AQLVs are considered relevant at receptors where cumulative occupancy exceeds 6 months of the year, eg residential properties. However, this should also include schools, hospitals and care homes. The annual mean AQLVs are not relevant at building facades of offices and other places of work where members of the public do not have regular access. 1-hour mean and 24-hour mean AQLVs are considered relevant at places where annual mean AQLVs apply, in addition to places where exposure would be expected to be more short term. For example, 24-hour mean AQLVs are relevant at places where exposure may last for 8 hours or more per day and 1-hour mean AQLVs relevant at places where exposure may be for 1 hour or more per day, for example offices and recreational areas.

Table 4.1 Modelled Ground Level Annual Mean NO_2 Concentrations at Sensitive Receptors – Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to Annual Mean NO_2 Concentrations ($\mu g.m^{-3}$)					Maximum PC to AQLV (Change in Concentration Relative to AQLV) (%)	Maximum PEC ($\mu g.m^{-3}$)	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
R1	0.11	0.11	0.12	0.13	0.16	0.40	6.53	16.33
R2	0.07	0.08	0.07	0.08	0.09	0.23	6.46	16.15
R3	0.09	0.1	0.09	0.09	0.12	0.30	6.49	16.23
R4	0.04	0.04	0.04	0.04	0.05	0.13	6.42	16.05
R5	0.04	0.04	0.05	0.04	0.04	0.13	6.42	16.05
R6	0.04	0.04	0.04	0.04	0.04	0.10	6.41	16.03
R7	0.03	0.03	0.03	0.04	0.04	0.10	6.41	16.03
R8	0.07	0.05	0.05	0.06	0.05	0.18	6.44	16.10
R9	0.05	0.04	0.06	0.05	0.03	0.15	6.43	16.08

[10] LAQM.TG(09), DEFRA, 2009.

Table 4.2 Modelled Ground Level 99.8th Percentile 1-Hour Mean NO_2 Concentrations at Sensitive Receptors Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to 99.8th Percentile 1-Hour Mean NO_2 Concentrations (µg.m^{-3})					Maximum PC to AQLV (%)	Maximum PEC (µg.m^{-3})	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
R1	2.69	2.63	2.75	3.41	3.52	1.76	16.26	8.13
R2	2.29	2.15	1.6	2.51	2.51	1.26	15.25	7.63
R3	2	2.41	2.24	2.53	4.4	2.20	17.14	8.57
R4	1.06	0.87	0.95	0.96	1.09	0.55	13.83	6.92
R5	1.25	1.16	1.13	1.26	1.08	0.63	14.00	7.00
R6	1.08	1.2	0.98	1.09	1.02	0.60	13.94	6.97
R7	1.14	1.22	1.2	1.25	1.19	0.63	13.99	7.00
R8	5.56	3.08	2.84	4.31	3.31	2.78	18.30	9.15
R9	2.88	2.68	2.91	2.82	2.78	1.46	15.65	7.83

Table 4.3 Maximum Modelled 99.8th Percentile 1-Hour Mean NO_2 Concentrations within Modelling Domain – Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled Process Contribution to 99.8th Percentile 1-Hour Mean NO_2 Concentrations (µg.m^{-3})					Maximum PC to AQLV (%)	Maximum PEC (µg.m^{-3})	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
Maximum Point of Impact	80.55	82.05	81.46	83.09	79.96	41.55	95.83	47.92

Table 4.4 Modelled Ground Level Annual Mean PM_{10} Concentrations at Sensitive Receptors Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to Annual Mean PM_{10} Concentrations (µg.m^{-3})					Maximum PC to AQLV (Change in Concentration Relative to AQLV) (%)	Maximum PEC (µg.m^{-3})	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
R1	0.019	0.018	0.021	0.023	0.027	0.068	9.877	24.69
R2	0.013	0.013	0.011	0.014	0.016	0.04	9.866	24.67
R3	0.015	0.017	0.016	0.016	0.02	0.05	9.870	24.68
R4	0.008	0.006	0.007	0.006	0.008	0.02	9.858	24.65
R5	0.008	0.008	0.008	0.008	0.008	0.02	9.858	24.65
R6	0.007	0.007	0.006	0.007	0.007	0.018	9.857	24.64
R7	0.006	0.006	0.005	0.006	0.007	0.018	9.857	24.64
R8	0.012	0.008	0.009	0.011	0.008	0.03	9.862	24.66
R9	0.009	0.007	0.01	0.009	0.006	0.025	9.860	24.65

Table 4.5 Modelled Ground Level 90.4th Percentile 24-Hour Mean PM_{10} Concentrations at Sensitive Receptors Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to 90.4th Percentile 24-Hour Mean PM_{10} Concentrations (µg.m^{-3})					Maximum PC to AQLV (%)	Maximum PEC (µg.m^{-3})	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
R1	0.063	0.059	0.06	0.076	0.081	0.16	11.70	23.4
R2	0.044	0.038	0.033	0.042	0.05	0.10	11.67	23.34
R3	0.043	0.058	0.048	0.045	0.058	0.12	11.68	23.36
R4	0.027	0.02	0.021	0.019	0.027	0.05	11.65	23.29
R5	0.028	0.026	0.026	0.027	0.026	0.06	11.65	23.3
R6	0.023	0.027	0.019	0.021	0.024	0.05	11.65	23.29
R7	0.023	0.019	0.02	0.022	0.023	0.05	11.64	23.29
R8	0.043	0.019	0.023	0.029	0.026	0.09	11.66	23.33
R9	0.033	0.03	0.029	0.03	0.01	0.07	11.65	23.31

Table 4.6 Maximum Modelled Ground Level 90.4th Percentile 24-Hour Mean PM_{10} Concentrations Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to 90.4th Percentile 24-Hour Mean PM_{10} Concentrations ($\mu g.m^{-3}$)					Maximum PC to AQLV (%)	Maximum PEC ($\mu g.m^{-3}$)	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
Maximum Point of Impact	6.758	6.524	7.187	6.902	7.047	14.37	18.81	37.61

Table 4.7 Modelled Ground Level Annual Mean $PM_{2.5}$ Concentrations at Sensitive Receptors Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to Annual Mean $PM_{2.5}$ Concentrations ($\mu g.m^{-3}$)					Maximum PC to AQTV (Change in Concentration Relative to AQLV) (%)	Maximum PEC ($\mu g.m^{-3}$)	Contribution of PEC to AQLV (%)
	2013	2014	2015	2016	2017			
R1	0.009	0.009	0.011	0.012	0.013	0.052	6.613	26.45
R2	0.006	0.007	0.006	0.007	0.008	0.032	6.608	26.43
R3	0.007	0.009	0.008	0.008	0.01	0.040	6.610	26.44
R4	0.004	0.003	0.003	0.003	0.004	0.016	6.604	26.42
R5	0.004	0.004	0.004	0.004	0.004	0.016	6.604	26.42
R6	0.003	0.003	0.003	0.003	0.003	0.012	6.603	26.41
R7	0.003	0.003	0.003	0.003	0.003	0.012	6.603	26.41
R8	0.006	0.004	0.005	0.005	0.004	0.024	6.606	26.42
R9	0.005	0.004	0.005	0.004	0.003	0.020	6.605	26.42

4.1.3 As is shown by the results, the modelled PC to annual mean PM_{10}, $PM_{2.5}$ and NO_2 concentrations is <1% of the relevant AQLV at all relevant sensitive receptors. Therefore, impacts are not predicted to be significant. The predicted PC to 24-hour mean PM_{10} concentrations is <10% of the AQLV at all discrete receptor locations surrounding the plant. As such, impacts on the short term AQLV for PM_{10} are not predicted to be significant at discrete receptor locations. Although the PC exceeds 10% of the 24-hour mean AQLV for PM_{10} at the maximum point of impact within the modelling domain, the screening criteria is only marginally exceeded (14.37% contribution to the AQLV) and the PEC is significantly less than the AQLV (37.61%). As such, the PEC is predicted to be significantly below the AQLV and therefore impacts are not predicted to be significant. The predicted PC to the AQLV for 1-hour mean NO_2 concentrations is <10% at all discrete receptor locations surrounding the plant. As such, impacts on the short term AQLV for NO_2 are not predicted to be significant at discrete receptor locations. Although the short term permitting risk assessment screening criteria is exceeded for 1-hour mean NO_2 concentrations at the maximum point of impact, impacts are not predicted to be significant, since the

PEC is significantly below the AQLV at the maximum point of impact (47.92% of the AQLV). These predictions are considered to be highly conservative and worst case, since the emission rates used in the model have been based on continual emissions at statutory emission limit levels which is unlikely to occur in reality.

4.1.4 Reference should be made to the pollutant contour profiles in Appendix IV. These demonstrate that pollutant concentrations peak in very close proximity to the plant, with concentrations rapidly decreasing with increasing distance from the site due to dilution and dispersion of residual emissions.

4.2 Modelled Impacts at Sensitive Ecological Receptors

4.2.1 Impacts on Critical Levels

4.2.1.1 The tables below present modelled annual mean and 24-hour mean NO_x concentrations at sensitive ecological receptors.

4.2.1.2 Although the PC to critical level marginally exceeds the screening criteria of 1% for annual mean NO_x concentrations, the PEC is less than 70% of the critical level. As such, potential impacts are concluded to be insignificant.

4.2.1.3 Although the PC to critical level marginally exceeds the screening criteria of 10% for 24-hour mean NO_x concentrations, the PEC is significantly less than the critical level (31.33%). Given that the PEC is significantly below the critical level, impacts are not predicted to be significant.

Table 4.8 Modelled Ground Level Annual Mean NO_x Concentrations at Sensitive Receptors – Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to Annual Mean NO_x Concentrations ($\mu g.m^{-3}$)					Maximum PC to Critical Level (%)	Maximum PEC ($\mu g.m^{-3}$)	Contribution of PEC to Critical Level (%)
	2013	2014	2015	2016	2017			
R10/R11	1.16	1.14	1.00	0.98	1.12	3.87	9.4	31.33

Table 4.9 Modelled Ground Level 24-Hour Mean NO_x Concentrations at Sensitive Receptors – Based on Emissions at Statutory Emission Limit Level

Receptor	Modelled PC to 24-Hour Mean NO_x Concentrations (Highest 24-Hour Mean Across Five Years of Data) ($\mu g.m^{-3}$)	Maximum PC to Critical Level (%)	Maximum PEC ($\mu g.m^{-3}$)	Contribution of PEC to Critical Level (%)
R10/R11	14.27	19.03	23.99	31.99

4.2.2 Nitrogen Deposition

4.2.2.1 The maximum PC to nitrogen deposition has been calculated from predicted annual mean NO_2 concentrations, in accordance with the relevant guidance. The corresponding PC to nitrogen deposition can be calculated as follows:

$$F = \frac{Vd \times C \times 10000}{1000000000} \times 0.30 \times 31536000$$

Where: F = deposition flux (Kg N $ha^{-1}Year^{-1}$)
V_d = nitrogen dry deposition velocity, assumed to be 0.0015m.s^{-1}
C = predicted annual mean NO_2 concentration ($\mu g.m^{-3}$)
10000 = conversion from m^2 to hectares (ha)
1000000000 = conversion from µg to Kg
0.30 = correcting NO_2 to N
31536000 = conversion from seconds to year

4.2.2.2 The tables below present the calculated nitrogen deposition at sensitive ecological receptors, Results have been presented based on emissions at the statutory emission limit level and the more realistic worst case scenario of emissions at the RHI level. As is indicated, whilst the process contribution to the worst case critical load marginally exceeds 1% based on emissions at the statutory emission limit level, the PC is modelled to be less than 1% of the worst case critical load based on emissions at the RHI level. Given that emissions based on the RHI limit are considered to provide a more realistic worst case assessment, it is concluded that impacts will not be significant in accordance with the relevant guidance.

Table 4.10 Calculated Nitrogen Deposition at Sensitive Ecological Receptors Based on Emissions at Statutory Emission Limit Level

Receptor	Maximum Modelled PC to Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)	Calculated PC to Annual Nitrogen Deposition ($Kg\ N.ha^{-1}.Year^{-1}$)	Worst Case Critical Load ($Kg\ N.ha^{-1}.Year^{-1}$)	PC to Critical Load (%) Based on Emissions at Statutory Emission Limit Level
R10/R11	0.812	0.12	8	1.5

Table 4.11 Calculated Nitrogen Deposition at Sensitive Ecological Receptors Based on Emissions at RHI Emission Limit Level

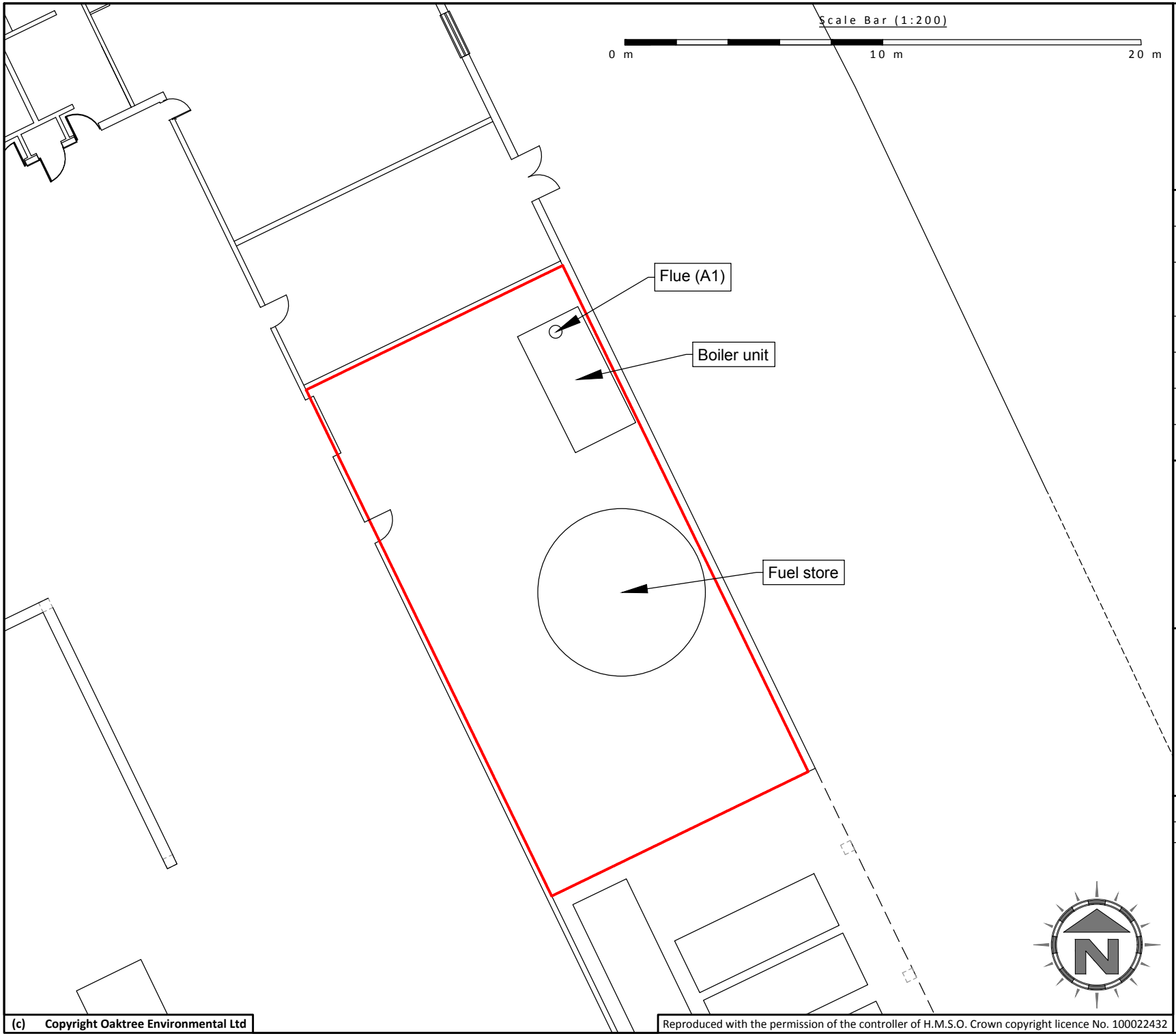
Receptor	Maximum Modelled PC to Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)	Calculated PC to Annual Nitrogen Deposition ($Kg\ N.ha^{-1}.Year^{-1}$)	Worst Case Critical Load ($Kg\ N.ha^{-1}.Year^{-1}$)	PC to Critical Load (%) Based on Emissions at Statutory Emission Limit Level
R10/R11	0.55	0.078	8	0.98

5 Conclusions

5.1 An assessment of potential air quality impacts has been undertaken for the proposed operation of a biomass boiler at JJC Hire Limited, in support of an Environmental Permit application. Modelling has been undertaken using AERMOD to quantify resulting pollutant concentrations at surrounding ground level locations and an assessment undertaken of potential impacts. The modelling results have demonstrated that the proposals will not generate any significant adverse impacts on local air quality. No exceedences of health based Air Quality Standards are predicted at relevant receptor locations. Impacts on critical levels and loads have not been predicted to be significant at ecological receptor locations.

Appendix I

Site Location and Layout Plans



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Drawing No: 3650/2272/03		Rev: -
Title: LAYOUT PLAN		
Site: Sandscale Park, Barrow-in-Furness LA14 4QT		
Client: JJC Hire Ltd		
Date: 19 October 2018		Job: 3650
Drawn: RS	Checked: -	Client: 2272
Scale: 1:200		Printed @: A4

KEY:

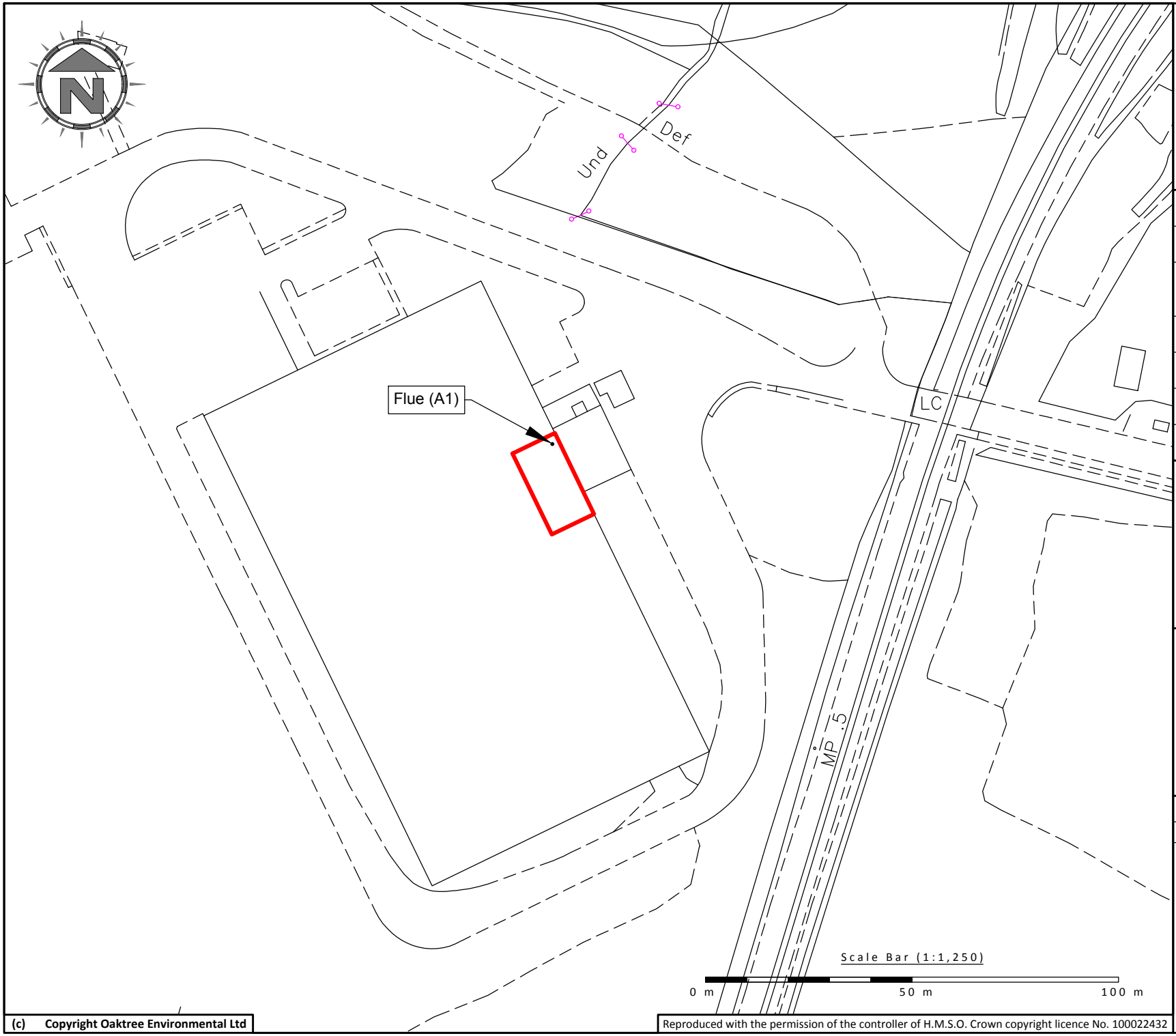
Permit boundary

Notes:

(1) Drawing for indication only.
(2) Do not scale from this drawing.

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing



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Drawing No: 3650/2272/02	Rev: -
Title: PERMIT BOUNDARY PLAN	
Site: Sandscale Park, Barrow-in-Furness LA14 4QT	
Client: JJC Hire Ltd	
Date: 19 October 2018	Job: 3650
Drawn: RS / Checked: -	Client: 2272
Scale: 1:1,250	Printed @: A4

KEY:

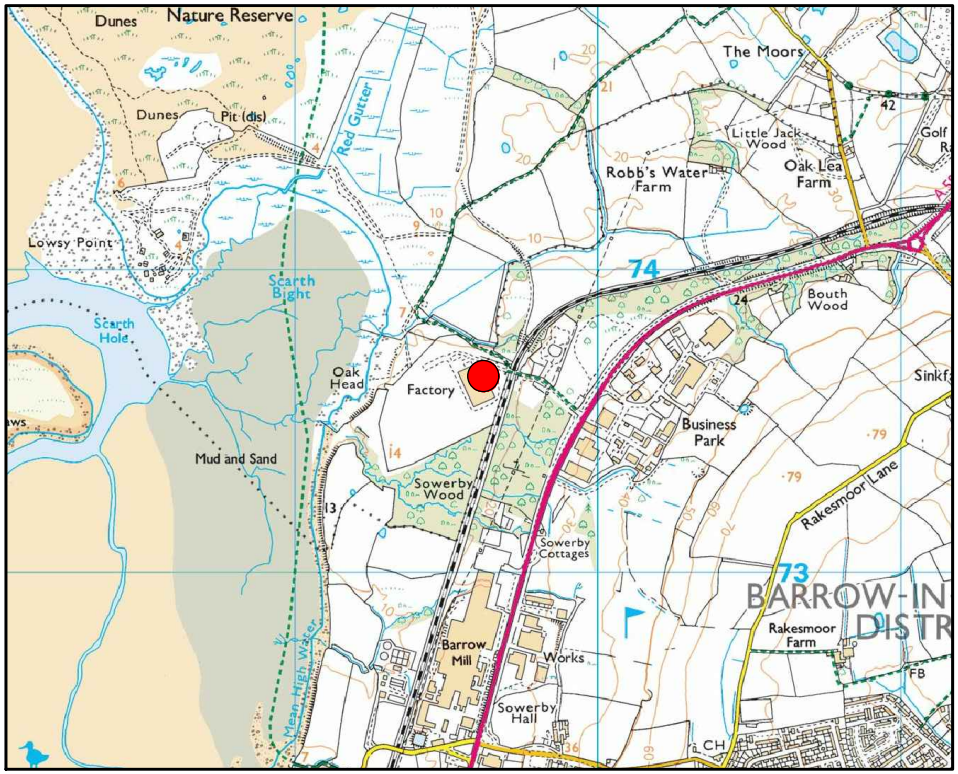
Permit boundary

Notes:

(1) Drawing for indication only.
(2) Do not scale from this drawing.

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing



Scale Bar (1:25,000)

0 km 1 km 2 km

Oaktree Environmental Ltd
Waste, Planning and Environmental Consultants

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1 Road One
Winsford Ind. Est.
Winsford, Cheshire
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Drawing No:	Rev:
3650/2272/01	-

Title: SITE LOCATION MAP

Site: Sandscale Park, Barrow-in-Furness LA14 4QT

Client: JJC Hire Ltd

Date:	Job:
19 October 2018	3650

Drawn:	Checked:	Client:
RS	--	2272

Scale:	Printed @:
1:25,000	A4

KEY:

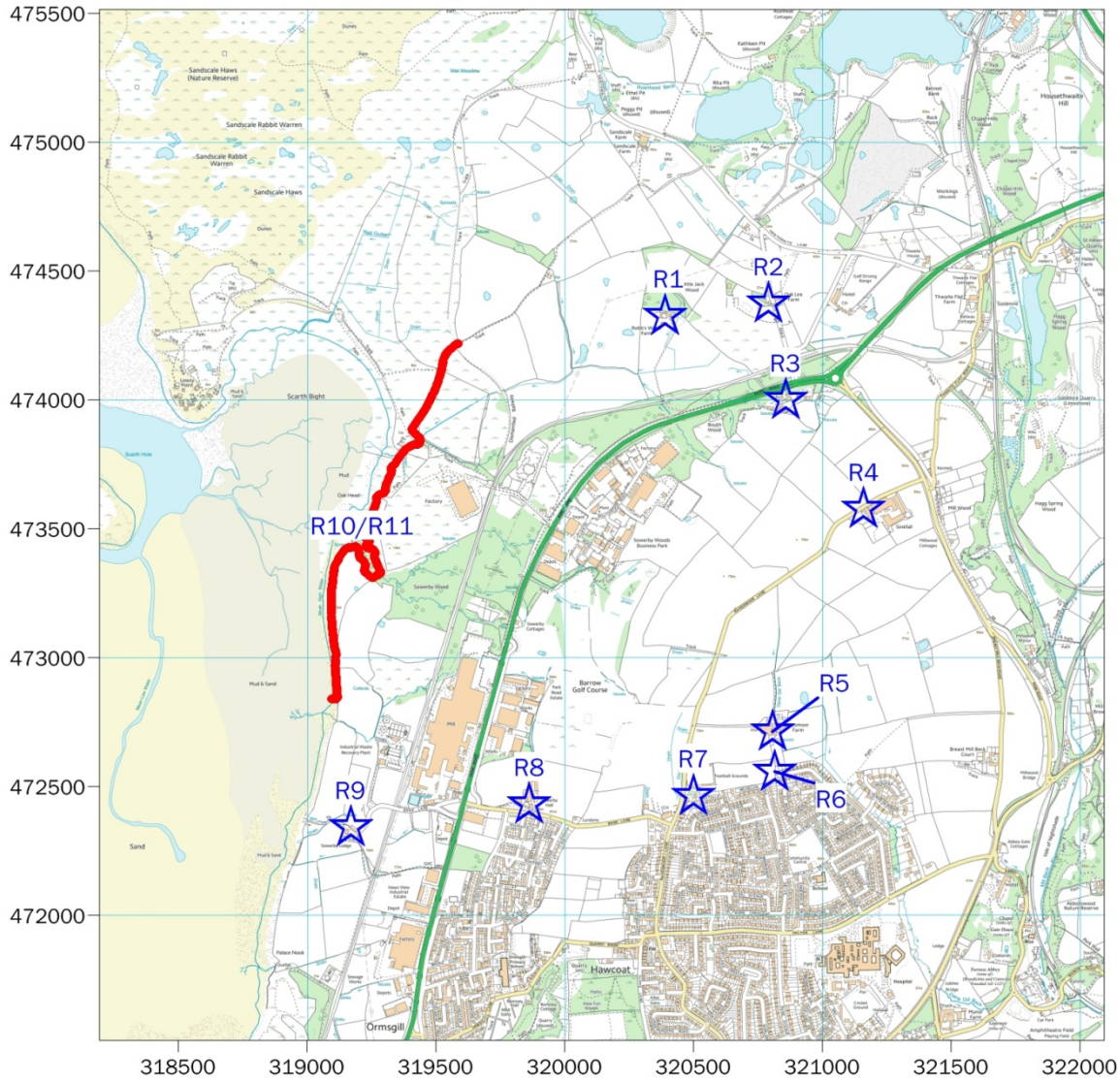
Site location

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing

Appendix II

Sensitive Receptor Locations



Sensitive Receptors

☆ Human Receptor Location

Ecological Receptor Location

R1 Receptor Identifier

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ

Appendix III

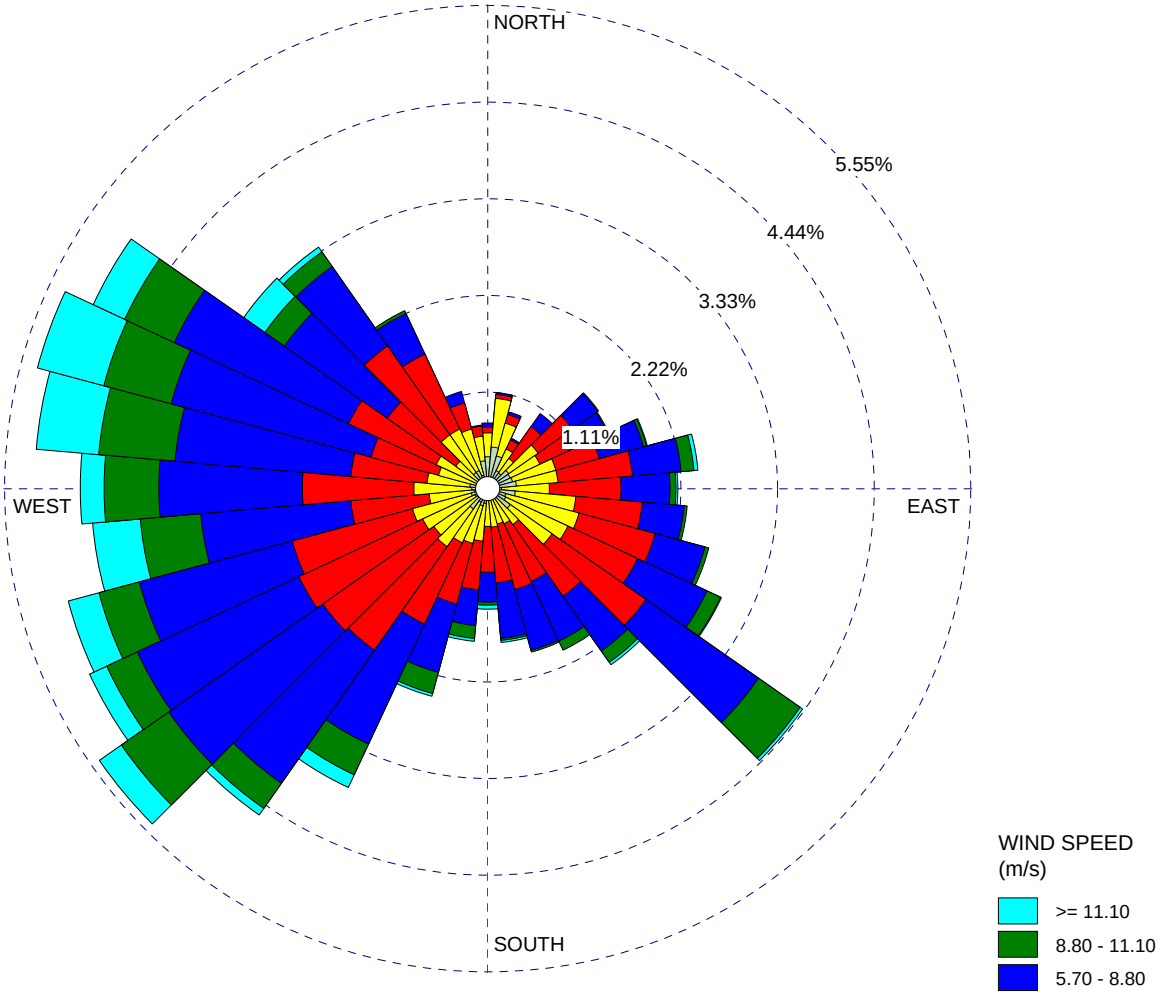
Wind Roses for Barrow/Walney Island

WIND ROSE PLOT:

Barrow/Walney Island - Wind Speed and Direction Frequency

DISPLAY:

Wind Speed
Direction (blowing from)



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		MODELER:	
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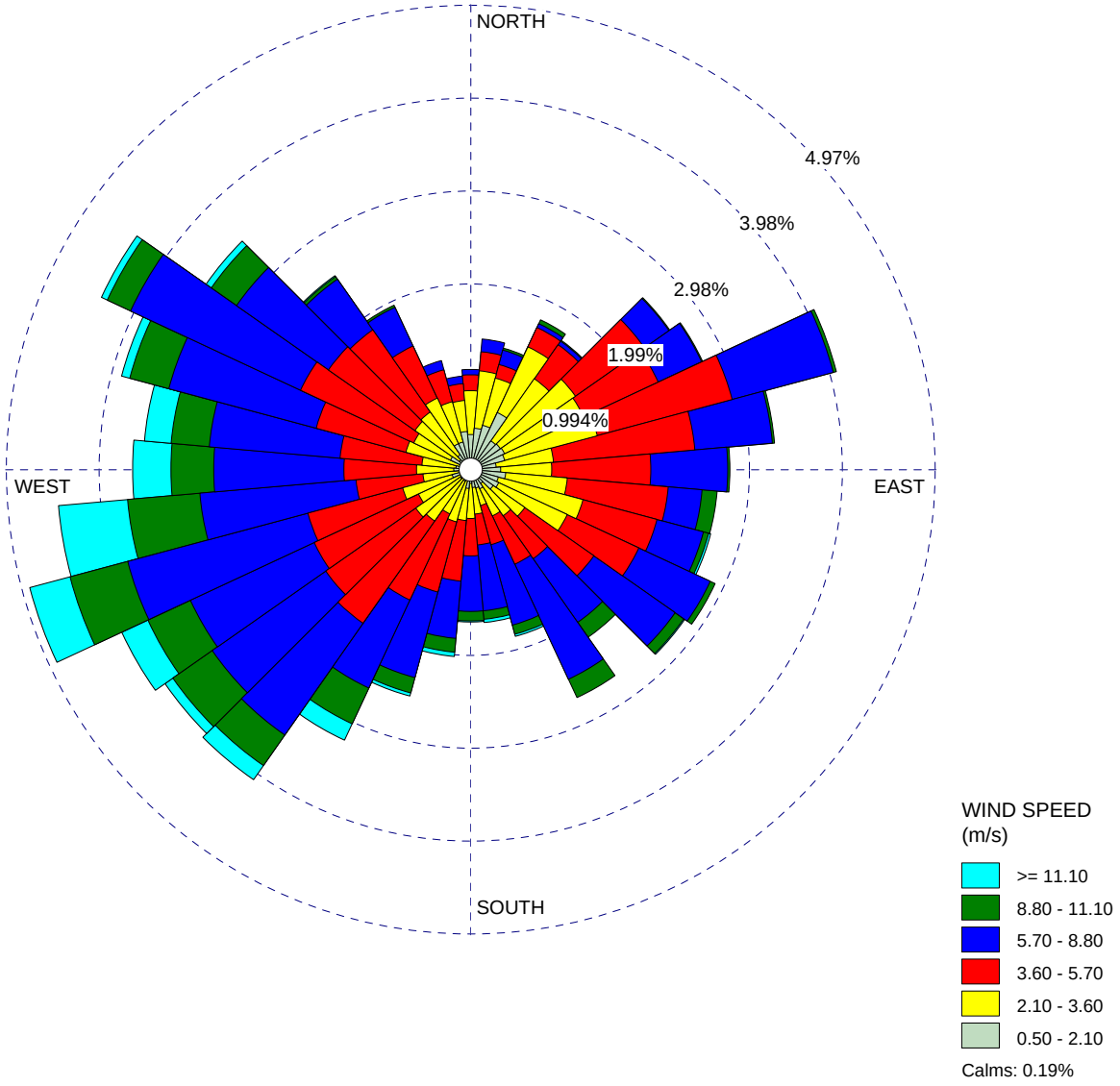
	AVG. WIND SPEED: **5.51 m/s**	DATE: **21/11/2018**	PROJECT NO.: **3650**

WIND ROSE PLOT:

Barrow/Walney Island - Wind Speed and Direction Frequency

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 01/01/2016 - 00:00** **End Date: 31/12/2016 - 23:00**	COMPANY NAME:	
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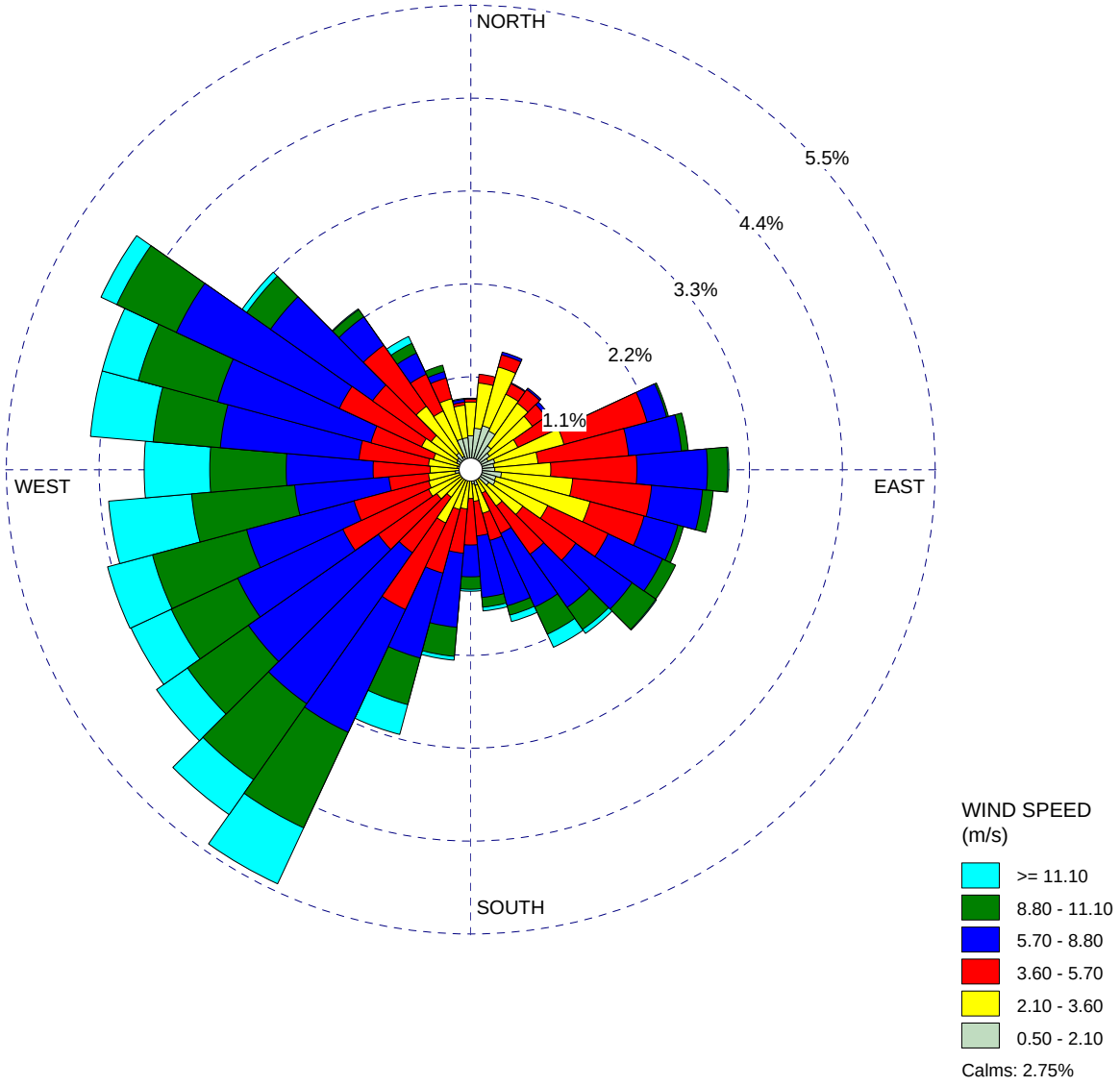
	AVG. WIND SPEED: **5.13 m/s**	DATE: **21/11/2018**	PROJECT NO.: **3650**

WIND ROSE PLOT:

Barrow/Walney Island - Wind Speed and Direction Frequency

DISPLAY:

Wind Speed
Direction (blowing from)



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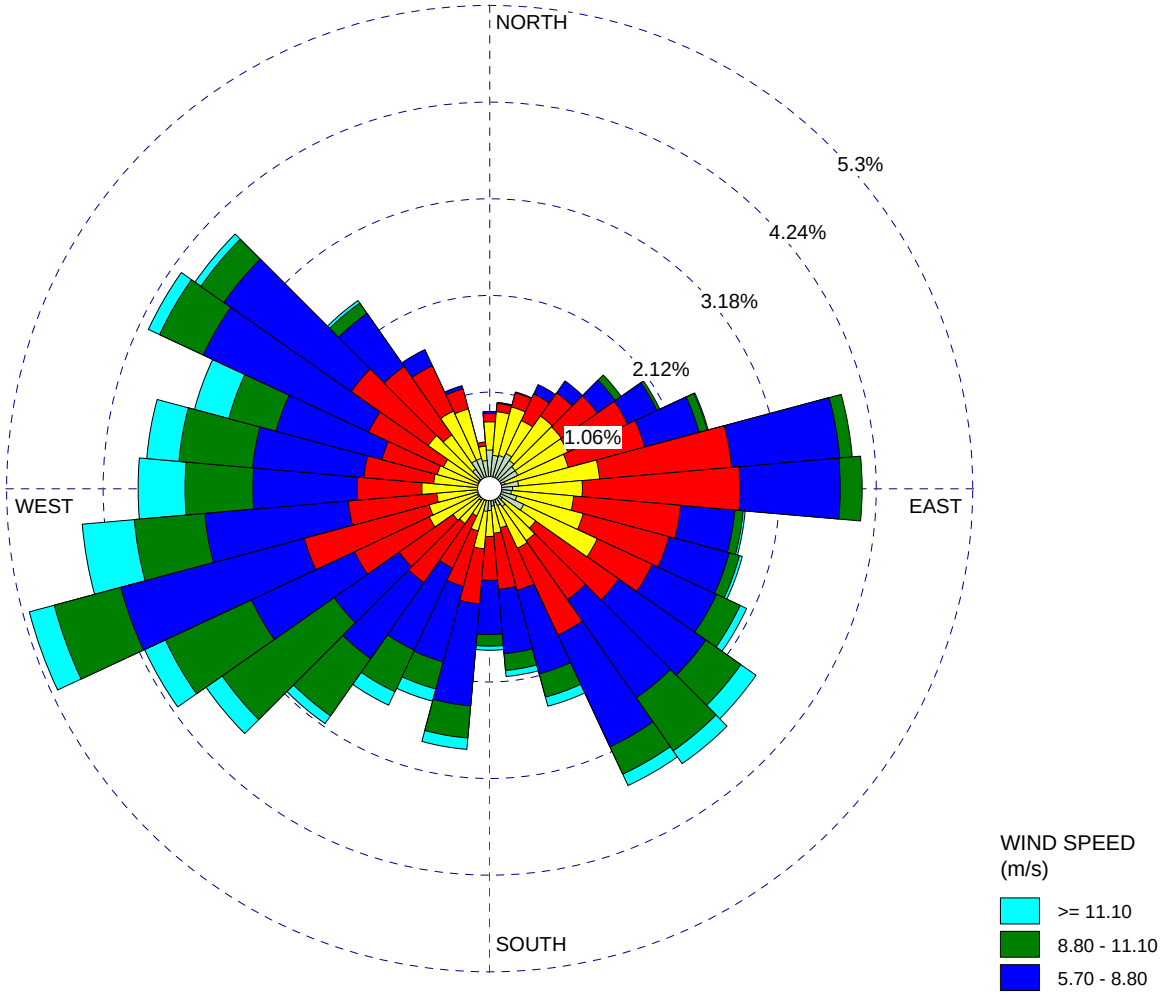
WIND ROSE PLOT:

Barrow/Walney Island - Wind Speed and Direction Frequency

DISPLAY:

Wind Speed
Direction (blowing from)



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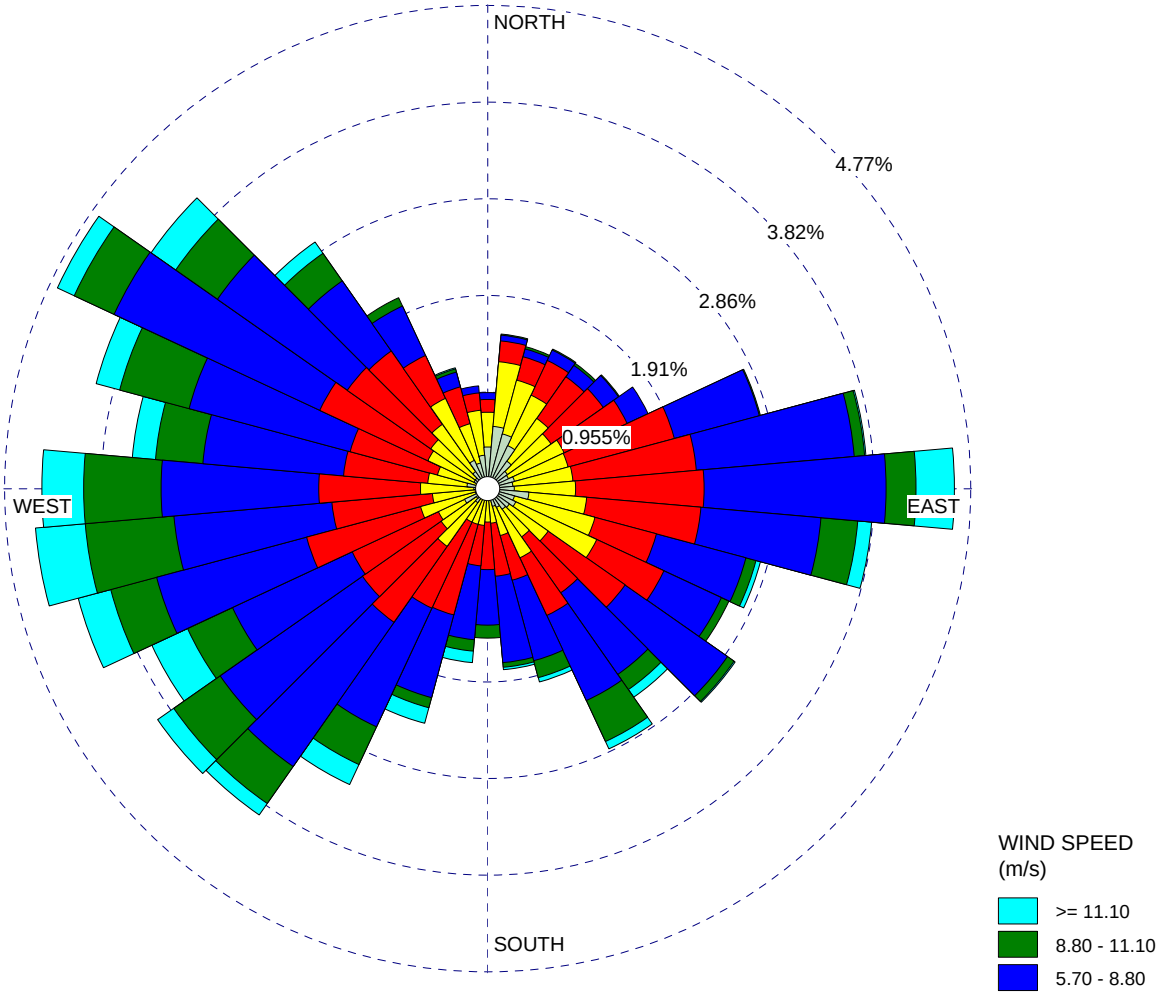
WIND ROSE PLOT:

Barrow/Walney Island - Wind Speed and Direction Frequency

DISPLAY:

Wind Speed
Direction (blowing from)



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Appendix IV

Pollutant Contour Profiles

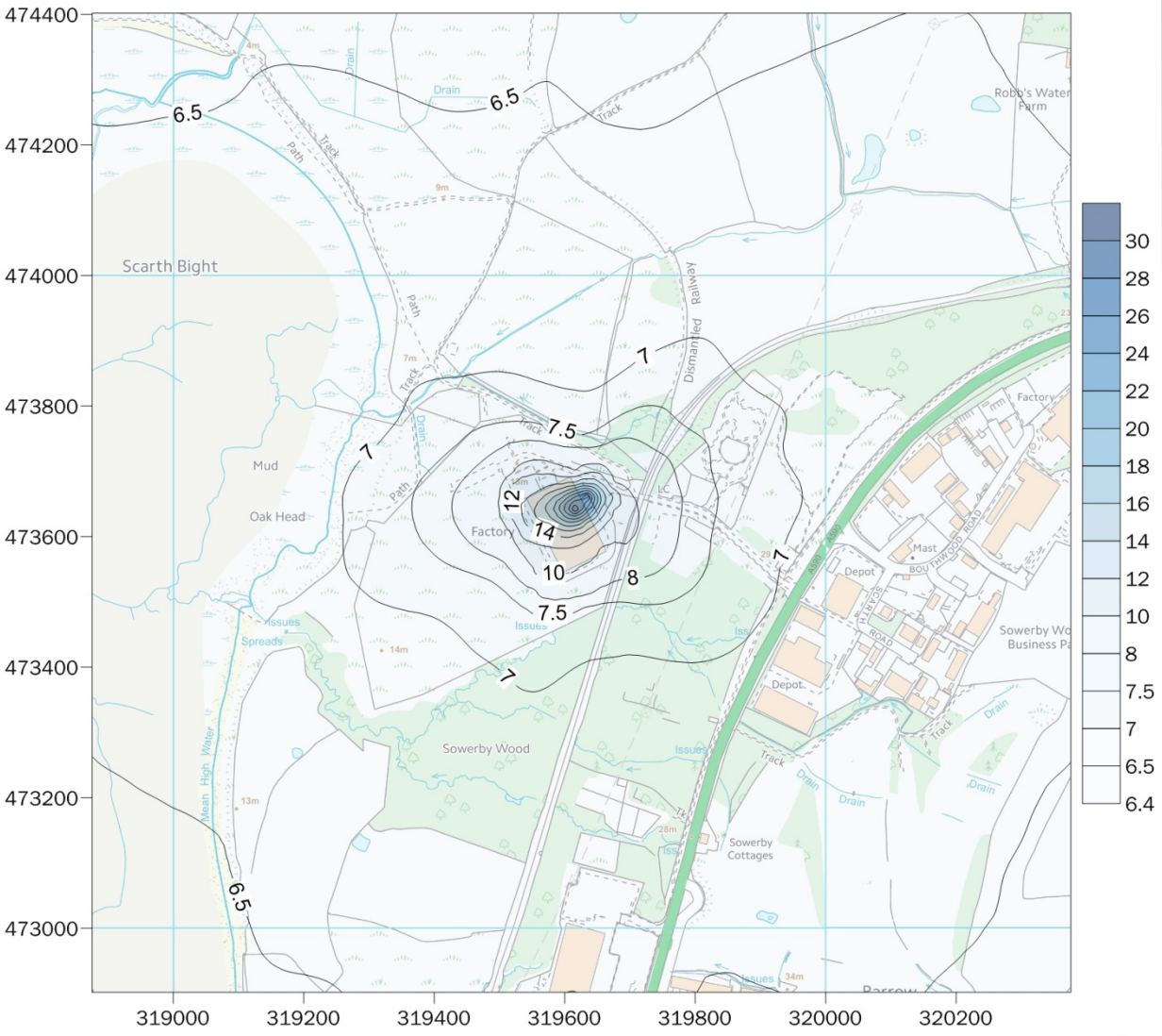


Figure IV Figure 1 - Modelled annual mean ground level nitrogen dioxide concentrations ($\mu g.m^{-3}$) based upon 2013 meteorological data

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ

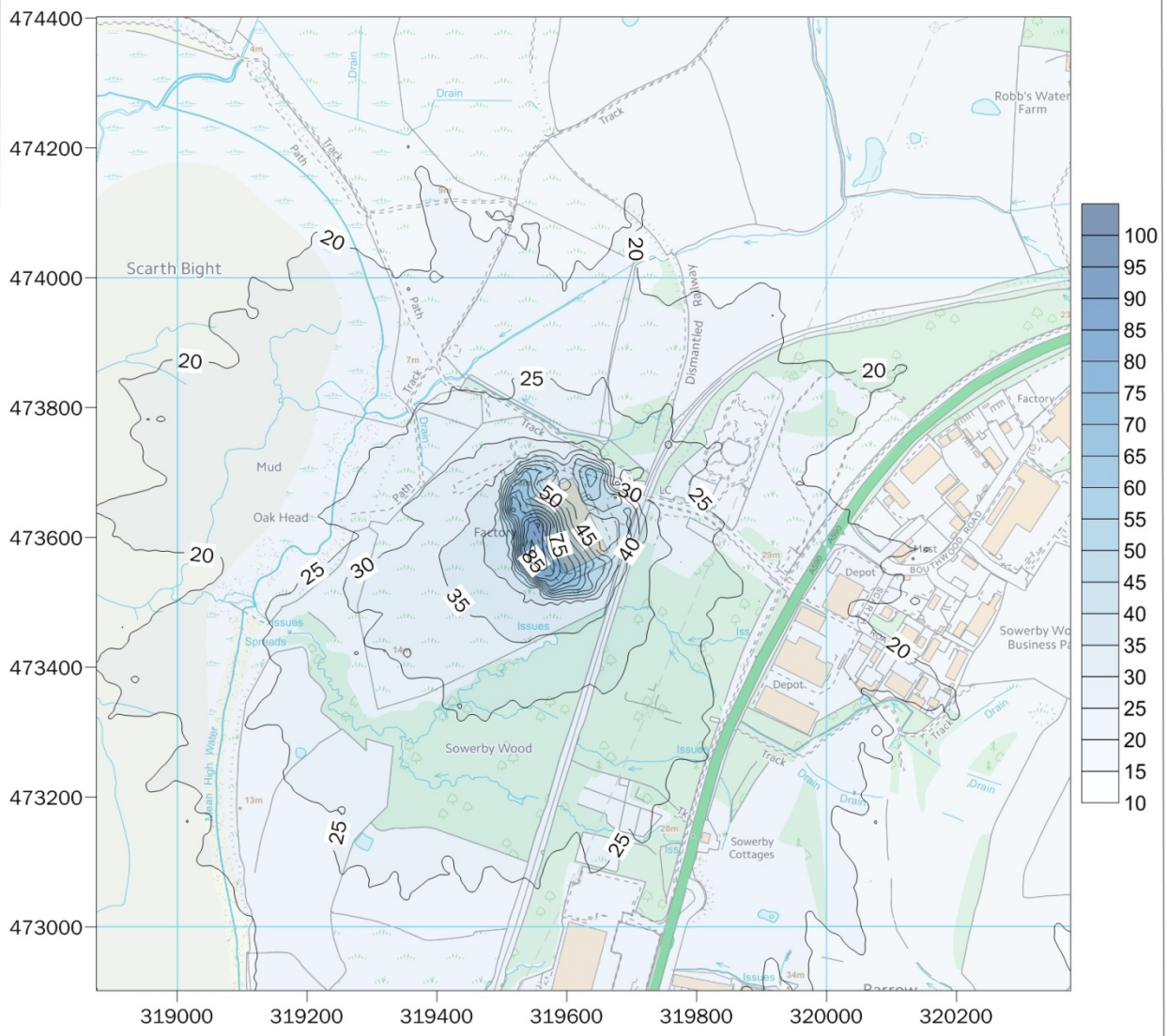


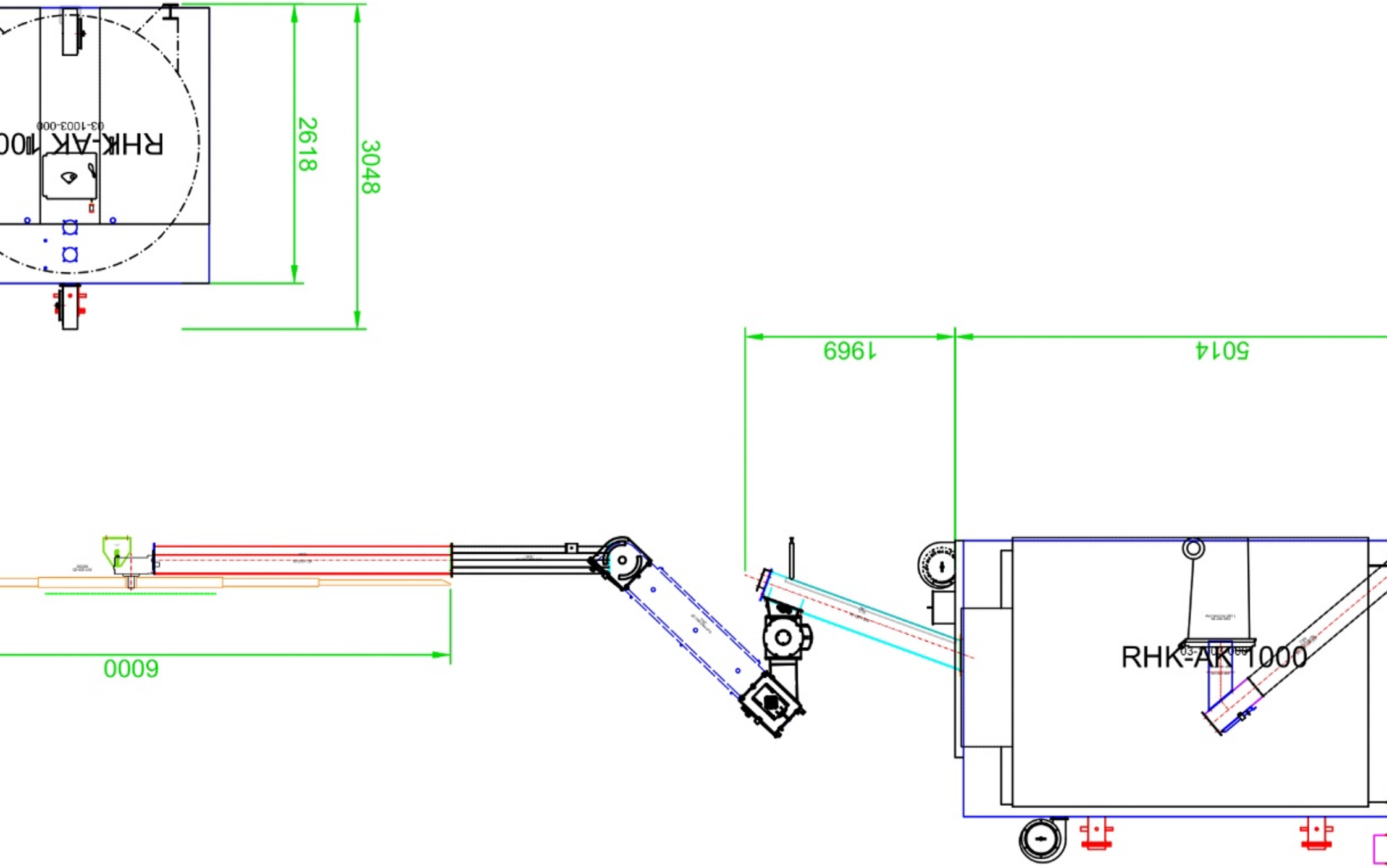
Figure IV Figure 2 - Modelled 99.8th percentile 1-hour mean ground level nitrogen dioxide concentrations (μg.m^{-3}) based upon 2016 meteorological data

Oaktree Environmental Ltd
Lime House
2 Road Two
Winsford
Cheshire
CW7 3QZ

Supporting Information Document

Appendix III

Boiler Configuration Drawing


2618
3048
1969
5014
0009
RHK-AK1000

Supporting Information Document

Appendix IV

Environmental Management System

EMS - BIOMASS BOILER, SANDSCALE PARK

JJC Hire Limited

VERSION:	1.1	DATE:	7 February 2019		
DOC. REF:	3650-2272-B	AUTHOR:	DY	CHECKED:	
CLIENT NO:	2272	JOB NO:	3650		

Oaktree Environmental Ltd

Waste, Planning & Environmental Consultants

Oaktree Environmental Ltd, Lime House, 2 Road Two, Winsford, Cheshire, CW7 3QZ
Tel: 01606 558833 | Fax: 01606 861183 | E-Mail: sales@oaktree-environmental.co.uk | Web: www.oaktree-environmental.co.uk
REGISTERED IN THE UK | COMPANY NO. 4850754

Document History:

Version	*Issue date*	*Author*	*Checked*	*Description*
1.0	22/11/2018	DY		Draft for client approval
1.1	07/02/2019	DY		Approved by applicant

CONTENTS

List of Appendices:

1 General Considerations

1.1 Site Operator/Permit Holder

1.1.1 JJC Hire Limited are applying for a Part B Environmental Permit to operate a biomass boiler to provide renewable heat for their site at Sandscale Park, Barrow-in-Furness. In addition to virgin timber, the boiler will be fuelled by Grade A waste wood, eg waste wood that is predominantly clean and uncontaminated.

1.1.2 The contact details for JJC Hire Limited are as follows:

JJC Hire Limited
Sandscale Park
Barrow-in-Furness
Cumbria
LA14 4QT

Contact: John Cooper
Position: Site Manager
Contact Number: 01229 827046

1.1.3 Oaktree Environmental Ltd have been engaged to act as consultants for JJC Hire Limited to assist in the preparation of this Management System and to submit an application for an Environmental Permit to operate a biomass boiler fuelled by Grade A waste wood.

1.1.4 Contact details for Oaktree Environmental Ltd are as follows:

Oaktree Environmental Ltd
Lime House
Road Two
Winsford Industrial Estate
Winsford
CW7 3QZ

Contact: David Young
Position: Senior Consultant
Tel: 01606 558833
Fax: 01606 861182
E-mail: david@oaktree-environmental.co.uk

1.2 Site Location

1.2.1 The biomass boiler is to be located at Sandscale Park, Barrow-in-Furness. Reference should be made to Drawing No. 3650/2272/02 in Appendix I for details of the site location.

1.3 Permit Area

1.3.1 The area which is the subject of this Environmental Permit is outlined in red on Drawing No. 3650/2272/02. The Environmental Permit is required for the operation of a biomass boiler fuelled by Grade A waste wood, eg wood that is predominantly clean and uncontaminated. The wider site outside the Part B permit boundary will include the biomass fuel handling/processing operations. This EMS provides a documented system for site management to minimise risk of air pollution to assist with compliance with the permit.

1.3.2 Reference should be made to the infrastructure plans in Appendix I for the layout of the operations.

1.4 Hours of Operation

1.4.1 The operating hours of the site for delivery of wood fuel to the biomass fuel store will be as follows, in accordance with the wider waste recycling site:

Monday to Friday	07:00 – 19:00
Saturday	07:00 – 19:00
Sundays and Bank Holidays	Closed

1.4.2 The boiler will be operated on a continuous basis, 24 hours per day, 7 days per week, except during periods of maintenance. Wood is fed continuously to the boiler from the biomass fuel storage area via walking floor loading system. The wood storage area will provide sufficient capacity for wood storage to ensure the boiler can run continuously outside of the above hours.

1.4.3 The only other activities on site which will be permitted outside of the above hours are maintenance works, general office use and work not connected with the permit.

1.4.4 During times where the site is closed or not in operation, the site will be secured to prevent unauthorised vehicular and/or pedestrian access.

1.5 Staffing

1.5.1 The applicant has confirmed that training has been provided to nominated members of staff on weekly upkeep of the biomass boiler. This will be supplemented by a quarterly full service by Ember Energy Ltd, an approved Heiozomat installer and service agent. A weekly check sheet and quarterly service sheet will be maintained by the applicant. In addition to regular staff, external contractors will be used for boiler maintenance and monitoring who will be periodically hired in.

2 Operations

2.1 Biomass Boiler Make, Model and Configuration

2.1.1 The boiler to be used includes a Heizomat RHK-AK 1000 boiler. Drawings of the boiler configuration are contained within Appendix I. The location of the biomass boiler and flue is illustrated on Drawing No. 3650/2272/02 and the configuration drawing in Appendix I. The boiler includes an elevated flue to release residual emissions, following abatement. The flue location is shown on drawing nos. 3650/2272/02 and 3650/2272/03, denoted as 'A1'.

2.2 Boiler Fuel Types and Quantities

2.2.1 In addition to virgin wood/biomass, the boiler will be fuelled by Grade A waste wood. No use of Grades B, C and D waste wood will be permitted.

2.2.2 The boiler will be fuelled continuously at a rate of up to 285kg.hour^{-1} (dependent on moisture content and calorific value), generating up to 900KWh of renewable heat for use on the adjacent site. This document outlines the procedures that will be implemented by the site operator to ensure that the permit can be complied with, eg. assurance that in additional to virgin wood/biomass, only Grade A waste wood will be used to fuel the boiler.

2.3 Plant and Machinery

2.3.1 The following plant and machinery (or similar replacement plant if not available) will be used for unloading/loading and handling of wood:

- Telehandler; and,
- Loading shovel.

2.4 Procedures for Wood Inspection and Handling

2.4.1 The procedures and regulations for the receipt and processing of waste wood at the adjacent site are outside the scope of this permit and are a matter for EA permitting/exemptions and regulation. However, this section contains

documented procedures for the visual identification of Grade A waste wood to ensure that in addition to virgin wood/biomass, only Grade A waste wood is used in the boiler, eg wood that is predominantly clean and uncontaminated.

2.4.2 The permit strictly prohibits the use of any other grades of waste wood in the boiler apart from Grade A (clean, uncontaminated).

2.4.3 It is likely that the Grade A waste wood that is used will be comprised predominantly of clean wooden packaging and pallets. As acknowledged by the EA, single use packaging and pallets manufactured in the UK are unlikely to have been subject to any form of non-visible treatment other than being kiln dried. Pallets arising from outside of Europe may have been treated with methyl bromide for biosecurity purposes. Any such pallets will be marked with an 'M' and will be rejected as treated wood. Given the above, clean, uncontaminated wooden packaging can be easily identified.

2.4.4 As it is intended to predominantly obtain wood from a BSL registered supplier, the wood used in the boiler will be strictly controlled.

2.4.5 The table below outlines the waste codes that will be acceptable for receipt and use in the biomass boilers. Upon receipt of the Grade A waste wood on-site, the Waste Transfer Note will be checked to verify the assigned waste code and to check that it meets the allowable codes. The wood will also be checked for other restrictions detailed in the table below. In the case of pallets and wooden packaging, these streams must be visibly clean and checks will be undertaken upon arrival on-site. As detailed previously, any clean pallets can be easily visually verified as being of Grade A waste wood status.

Table 1 List of Acceptable European Waste Codes

European Waste Code	Description	Other Restriction
02 01 03	Plant-tissue waste from agriculture, horticultural and forestry	
02 01 07	Waste from forestry	
03 01 01	Waste bark and cork from wood processing and the production of panels and furniture, pulp, paper and cardboard	Visibly clean, no treatments applied
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04 from wood processing and the production of panels and furniture, pulp, paper and cardboard	Visibly clean, no treatments applied
03 03 01	Waste bark and wood from pulp, paper and cardboard production and processing	Visibly clean, no treatments applied
15 01 03	Wooden packaging	Visibly clean, such as visibly clean wood pallets. Any pallets stamped with 'M' will be prohibited for use
19 12 07	Wood other than that mentioned in 19 12 06	Visibly clean wood, including visibly clean wooden packaging such as pallets. Any pallets stamped with 'M' will be prohibited for use

3 Control of Air Emissions, Monitoring and Reporting

3.1 Site Diary/Logbook and Record Keeping

3.1.1 A site diary/logbook will be maintained which contains details of all site inspections, monitoring and improvements made. All plant malfunctions and spillages will also be recorded within the log book along with the remedial action taken. All inspections will be completed by a person who is familiar with the requirements of the management system and permit for the site. A minimum of two years records will be kept on site and will be made available for inspection upon request by the LPA. Example record keeping forms are included in Appendix II of this EMS.

3.2 Control of Boiler Exhaust Emissions

3.2.1 The boiler is fitted with heat exchanger turbulators which create a cyclonic flow through each tube, removing the majority of particulate matter. Carbon monoxide (CO) and nitrogen oxides (NO_x) emissions are minimised via control of combustion conditions, including excess air.

3.3 Spillages

3.3.1 Good housekeeping will be maintained on site at all times to minimise risk of fugitive dust release. All site surfaces will be inspected daily when the site is in operation. Debris will be swept as required and placed in a skip for disposal to a suitably permitted site.

3.3.2 All spillages of waste and windblown litter will be cleared by the end of the working day in which they occur.

3.4 Control of Mud and Debris

3.4.1 Vehicles will be visually inspected before exit from site to check that loads are safe and that no mud or debris is carried out on the wheels or body of the vehicle. Visual inspections of the site roads will be carried out daily, however, staff will

report any problems with mud or debris on the site roads immediately to the Site Manager.

3.4.2 The deposit of material on the access road or public highway will be treated as an emergency and will be cleared immediately by the operator using either a brush and shovel or vacuum tanker/road sweeper if necessary.

3.5 Control of Dust

3.5.1 A series of dust mitigation measures will be implemented to ensure dust emissions are controlled as far as is practically possible. The measures include:

- Sheeting of vehicles delivering materials to the site (if necessary);
- Sheeting of vehicles transporting potentially dusty loads off site;
- Use of mobile bowser to damp down materials stockpiles, vehicle running surfaces, vehicle loads and areas on and around machinery which may give rise to dust, especially during dry and windy conditions;
- Cleaning of any spillages using wet cleaning methods;
- Drop heights minimised to prevent dust emissions; and,
- Enclosure of biomass fuel store, boiler and fuel loading system within a building, controlling fugitive emission.

3.5.2 A permanent water supply will be made available on site in all climatic conditions to ensure that the dust suppression systems can function effectively. Any external water pipes will be lagged to prevent frost damage during winter months.

3.5.3 All plant and machinery will be operated in accordance with manufacturer specification. Any spillages will be cleaned using wet cleaning methods.

3.6 Boiler Emissions Monitoring

3.6.1 The biomass boiler will be fitted with the following equipment to continuously monitor emissions:

- Lambda sensor to monitor exhaust oxygen content to enable control of excess air and air/fuel ratios;

3.6.2 Given that the boiler will be fuelled by a consistent type of feedstock (virgin biomass and Grade A waste wood), will be continuously loaded with fuel and have sensors in place to monitor and control excess air, monitoring of CO emissions is not required, in accordance with the relevant guidance. Emissions of CO will be monitored at least annually by a suitably qualified contractor, using approved methods.

3.6.3 Particulate matter and organic compounds will be monitored at least annually by a suitably qualified contractor, using approved methods.

3.6.4 NO_x emissions will be monitored upon commissioning of the boiler and after any subsequent substantial change to the installation.

3.6.5 Oxygen will be continuously monitored using a Lambda probe.

3.6.6 All monitoring will be undertaken in accordance with the methods detailed in DEFRA Process Guidance Note 1/12(13), or by alternative equivalent method agreed with the LPA.

3.6.7 The emission limits which apply to the boiler are outlined in Table 3. Emissions monitoring is required to demonstrate compliance with these emission limits.

Table 2 Boiler Emission Limits

Pollutant	Emission Limits ($mg.m^{-3}$) Expressed at Reference Conditions of 11% O_2, 273K, no correction for moisture
CO	250
Total Particulate Matter	60
NO_x	400
Organic Compounds	20

3.6.8 All monitoring results and subsequent actions will be recorded in the site log book and kept available for the regulator to examine for a minimum period of two years.

3.6.9 In the event of adverse results (non-compliance) for both continuous and non-continuous emissions monitoring, investigation will be immediately undertaken by the site operator, who will:

- Identify the cause and take corrective action;
- Clearly record as much detail as possible regarding the cause and extent of the problem, and the remedial action taken; and,
- Re-test to demonstrate compliance as soon as possible and inform the regulator of the steps taken and the re-test results.

3.7 Visual Monitoring - General

3.7.1 Site operatives will continuously visually monitor dust emissions whilst the site is in operation and will report back to the Depot Supervisor/Manager for advice if required.

3.7.2 In the event of complaints regarding visual emissions or dust beyond the site boundary, which in the opinion of the regulator may be attributable to the installation, the site operator will investigate to ascertain which part of the permitted operation is the cause, if applicable. Whilst issues are on-going, a visual check will be made at least once per day/shift by the site operator, with a record made of time, location and result of checks along with prevailing weather conditions at the time, including wind speed and strength. Once the source of emission is identified, corrective action will be taken without delay.

3.8 Visual Monitoring of Stack Exhaust

3.8.1 Emissions from the combustion process should be free from visible smoke. During start up and shut down of the boiler, emissions should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742:2009. All emissions from air should be free from droplets and persistent visible emissions. Stack emissions will be visually monitored on an ongoing basis by site staff.

3.9 Complaints Procedure

3.9.1 A complaints procedure will be maintained during operation of the site to ensure that any complaints made in relation to air emissions (eg dust) are investigated, documented and action taken as necessary. Reference should be made to Appendix IV for a copy of the complaints procedure.

4 Site Management and Training

4.1 General

4.1.1 A log book will be kept on site which will contain records of all monitoring results, visual assessments, inspections and maintenance undertaken. All plant malfunctions and spillages will also be recorded within the log book along with the remedial action taken. A minimum of two years records will be kept on site and will be made available for inspection upon request by the LPA. Any records maintained off-site will be made available within one week of request by the regulator.

4.2 Management Structure

4.2.1 The site will be managed by regular staff who have received appropriate training and the boiler will undergo regular servicing as detailed previously.

4.3 Health and Safety

4.3.1 Personal Protective Equipment (PPE) will be issued to all plant operators to ensure their safety. Such items may include safety goggles, gloves, hi-visibility vests/jackets, ear defenders/plugs, hard hats and safety boots.

4.4 Staff Training - General

4.4.1 All staff will be made aware of their responsibilities under the permit and receive training on the following:

- Steps necessary to minimise emissions during start-up and shut-down; and,
- Actions to be taken should abnormal conditions, accidents or spillages occur.

4.4.2 The operator will maintain a statement of training requirements for each operational post and maintain records of training received by each member of staff.

4.5 Training Needs Assessment

4.5.1 All new and existing site staff are subject to a specific training regime based on their responsibilities at the site to ensure all operations are carried out without harm to the environment or amenity of the surrounding area. Training with regard to the individual responsibilities of the site staff will help to prevent incidents occurring which may have an adverse impact on the environment and/or the employees and their co-workers.

4.6 Site Rules and Infrastructure Training

4.6.1 This information will be provided to all employees, visitors and contractors with a full understanding of the site's conditions of use, which will be communicated and documented at induction for all staff with specific induction for visitors and contractors.

4.6.2 Competency should be demonstrated within this field to ensure the employee is fully aware of the site's surroundings and operations to ensure their safety and compliance with specific operating conditions at the site.

4.7 Vehicle /Plant Preventative Maintenance Training

4.7.1 This training is provided specifically for the vehicle and plant operators in order to ensure that all plant and machinery is checked regularly to prevent any occurrences which may lead to any adverse impacts on the environment or human health.

4.7.2 Training will be based on the preventative maintenance schedule supplied by the plant/equipment manufacturer.

4.7.3 The same training will be provided to senior management enabling a dual-level maintenance programme.

4.8 Plant Operation Training

4.8.1 Any employees who are required to operate loading or processing plant for the movement or processing of wood or other fuels/wastes will be required to undertake the necessary qualifications for the operation of the specific item of plant in question. This will be required prior to operating the plant and will be obtained through necessary external certification programmes.

4.8.2 Regardless of general plant operation certification, all operatives will be fully inducted in the operation of the specific make and/or model of plant used on site.

4.9 Permit /Management System Training

4.9.1 All employees will be inducted into the operating conditions as prescribed in the Environmental Permit for the site. Whilst much of the above training will provide specific guidance on many aspects of these documents, all employees will be made aware of the location of the Environmental Permit in the site office. All managerial positions will be made fully aware of the site operating conditions.

4.10 Training for Contractors

4.10.1 General site training will be provided to any contractors who are working on the site on a temporary basis.

4.10.2 Additional training will be provided to contractors in their area of expertise. If they are dealing with specific items of plant/machinery, site operating conditions and a general understanding of the Environmental Permit conditions will be provided to prevent any adverse impacts on the environment.

5 Maintenance

5.1 The site operator will maintain a written maintenance programme for all pollution control equipment and keep records of any maintenance that has been undertaken within the logbook.

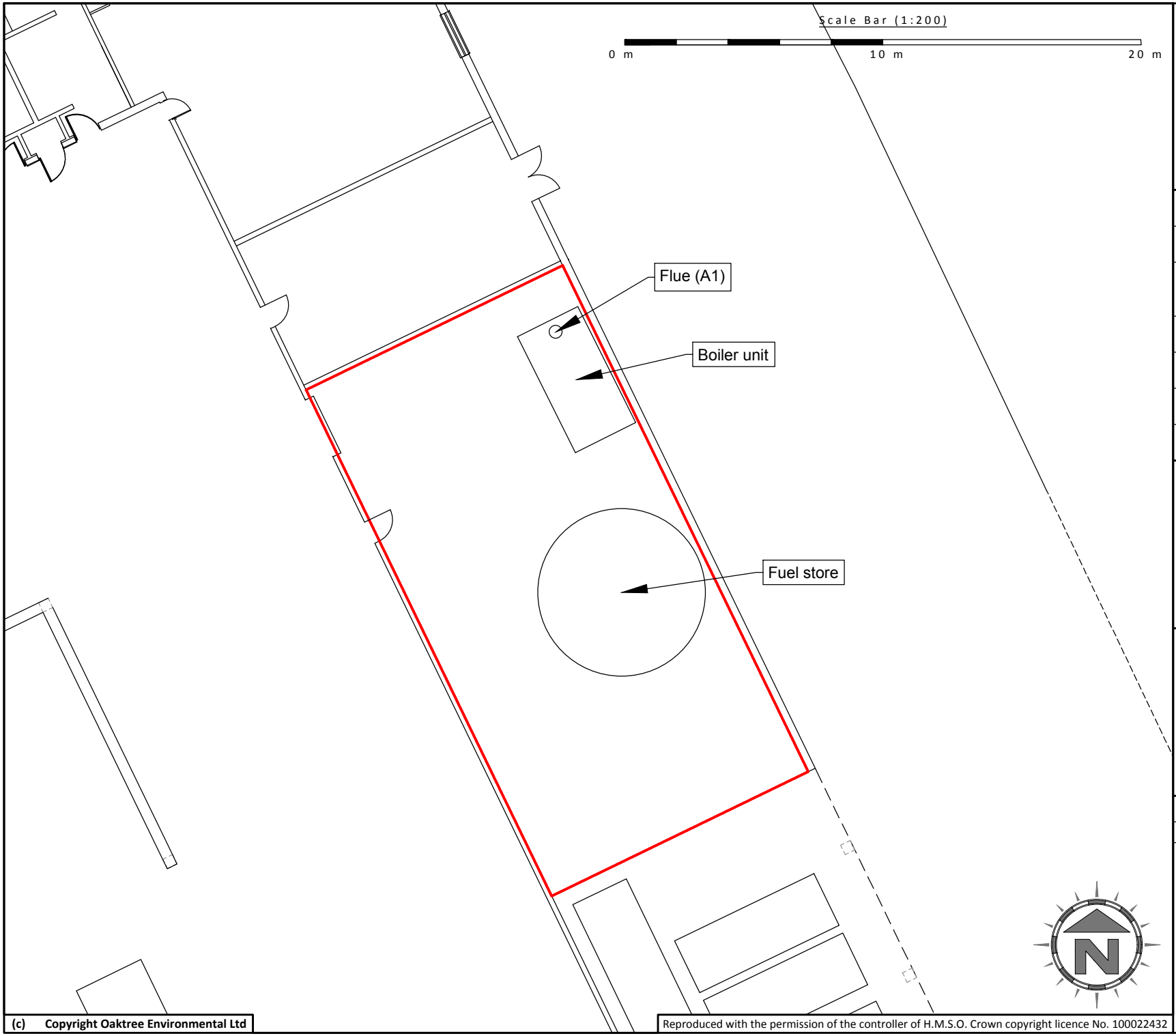
5.2 Essential spares for plant maintenance will be kept on site at all times.

5.3 All checks on plant and equipment will be recorded within the log book.

5.4 Good housekeeping will be maintained at all times on site. Any spillages will be cleaned on a regular basis.

Appendix I

Permit Boundary Plan and Site layout Plan



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e: sales@oaktree-environmental.co.uk

Drawing No: 3650/2272/03		Rev: -
Title: LAYOUT PLAN		
Site: Sandscale Park, Barrow-in-Furness LA14 4QT		
Client: JJC Hire Ltd		
Date: 19 October 2018		Job: 3650
Drawn: RS	Checked: -	Client: 2272
Scale: 1:200		Printed @: A4

KEY:

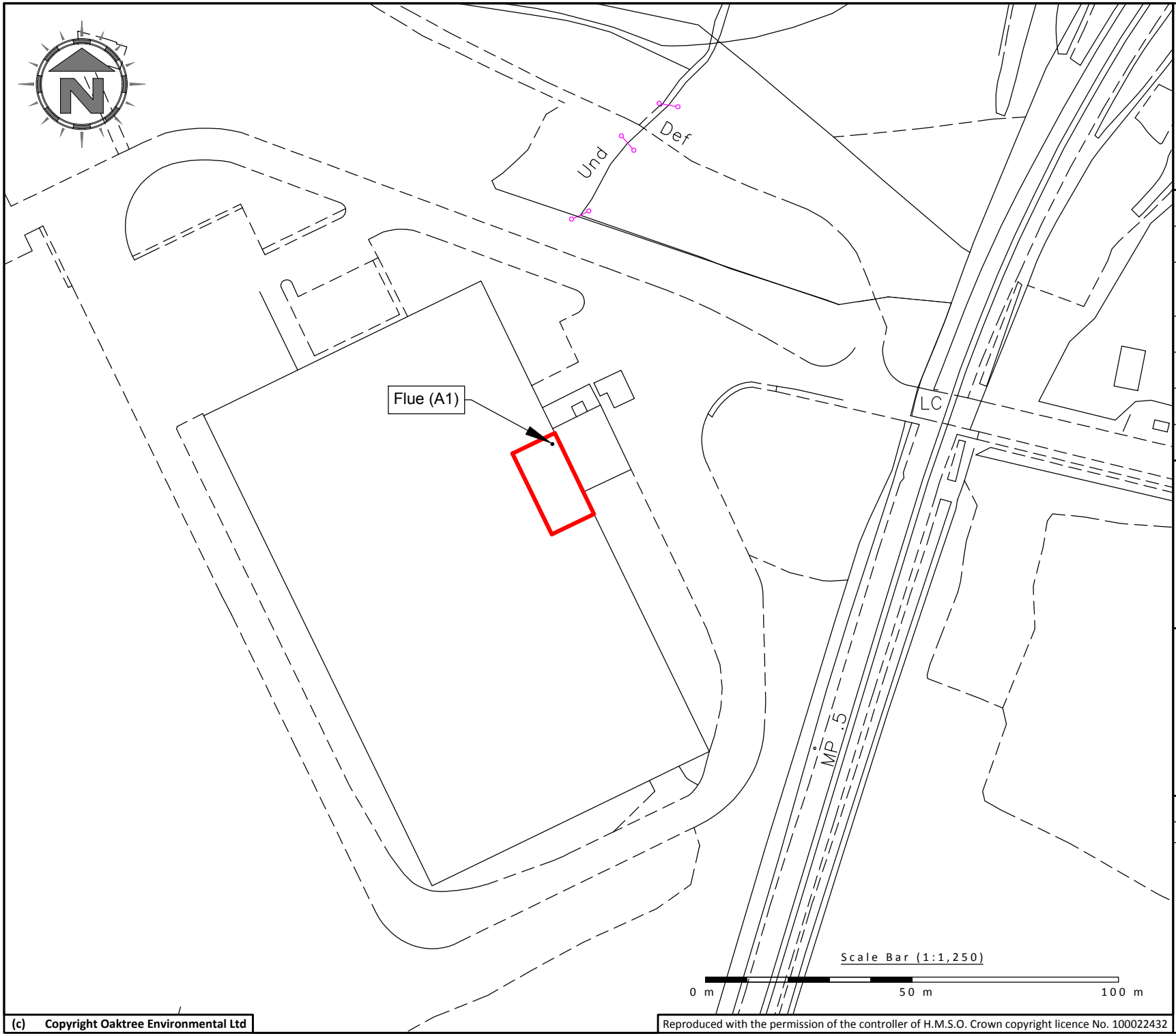
Permit boundary

Notes:

(1) Drawing for indication only.
(2) Do not scale from this drawing.

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing



Oaktree Environmental Ltd
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Drawing No: 3650/2272/02		Rev: -
Title: PERMIT BOUNDARY PLAN		
Site: Sandscale Park, Barrow-in-Furness LA14 4QT		
Client: JJC Hire Ltd		
Date: 19 October 2018		Job: 3650
Drawn: RS	Checked: -	Client: 2272
Scale: 1:1,250		Printed @: A4

KEY:

Permit boundary

Notes:

(1) Drawing for indication only.
(2) Do not scale from this drawing.

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	19/10/18	RS	Initial drawing

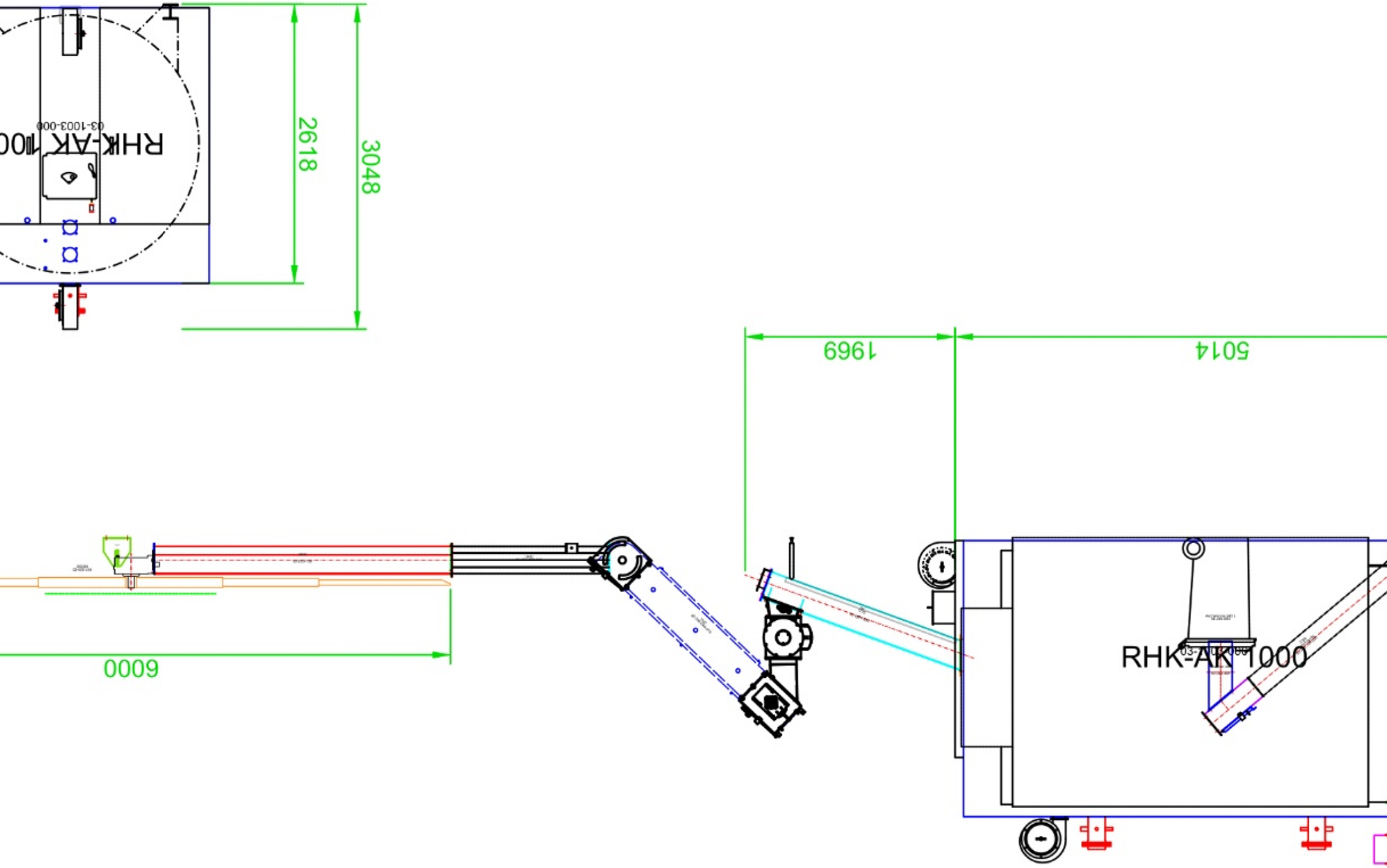
Appendix II

Record Keeping Forms

STAFF TRAINING/REVIEW FORM										
EMPLOYEE NAME					DATE					
POSITION					REVIEW DUE					
TRAINING CARRIED OUT BY										
POSITION										
TRAINING REQUIRED	GENERAL OPERATIVES		HGV DRIVERS		PLANT OPERATOR		DEPOT MANAGER/SUPERVISOR		OTHER	
CARRIED OUT?	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE		
SITE RULES AND INFRASTRUCTURE										
EMERGENCY PROCEDURES										
FIRE SAFETY/ FIRE FIGHTING										
RECOGNITION OF WASTE TYPES										
STORAGE AREAS/LIMITS										
RECORD KEEPING										
VEHICLE CHECKS (Preventative Maintenance)										
PLANT CHECKS (Preventative Maintenance)										
DUTY OF CARE WASTE TRANSFER NOTES										
PLANT OPERATION - LOADING PLANT										
PLANT OPERATION - BOILER										
MANAGEMENT SYSTEM & PERMIT										
OTHER 1 (PLEASE SPECIFY)										
OTHER 2 (PLEASE SPECIFY)										

Appendix III

Boiler Configuration Drawing


2618
3048
1969
5014
0009
RHK-AK1000

Appendix IV

Complaints Procedure

JJC HIRE LIMITED - COMPLAINTS REPORT FORM

Date Recorded:	Reference Number:
Name and address of caller	
Telephone number of caller	
Time and Date of call	
Nature of complaint (noise, odour, dust, other) (date, time, duration)	
Weather at the time of complaint (rain, snow, fog, etc.)	
Wind (strength, direction)	
Any other complaints relating to this report	
Any other relevant information	
Potential reasons for complaint	
The operations being carried out on site at the time of the complaint	
Follow Up	
Actions taken	
Date of call back to complainant	
Summary of call back conversation	
Recommendations	
Change in procedures	
Changes to Written Management System (EMS)	
Date changes implemented	
Form completed by	
Signed	
Date completed	

COMPLAINT RECORDING PROCEDURE:

1) Any complaints received will be recorded on the above form. This form will normally be completed, signed and dated by the Site Manager; if they are not available the Office Manager will complete the form.

2) The name, address and telephone number of the caller will be requested.

3) Each complaint will be given a reference number.

4) The caller will be asked to give details of:

    a. the nature of the complaint;
    b. the time;
    c. how long it lasted;
    d. how often it occurs;
    e. Is this the first time the problem has been noticed; and
    f. what prompted them to complain

5) The person completing the form will then, if possible, make a note of:

    a. the weather conditions at the time of the problem (rain, snow, fog etc.)
    b. strength and direction of the wind; and
    c. the activity or activities taken place on the site at the time the noise was detected, particularly anything unusual.

6) The reason for the complaint will be investigated and a note of the findings added to the report.

7) The caller will then be contacted with an explanation of the source of the complaint if identified and the action taken to prevent a recurrence of the problem in future.

8) If the caller is unhappy about the outcome or unwilling to identify themselves the caller will be invited to contact the Local Authority.

9) Following any complaint the relevant management plan(s) will be reviewed to ensure appropriate actions are in place to counter any problems.

Appendix V

Environmental Permit (to be added later)