



## Application Site Condition Report

### Biomass UK No.4 Ltd Plymouth EfW Facility

Prepared by:  
Sol Environment Ltd

Date:  
September 2023

Project Issue Number:  
SOL\_21\_P024\_COG

VERSION CONTROL RECORD			
Contract/Proposal Number:		SOL_21_P024_COG	
Authors Name:		Emily Hingston	
Issue	Description of Status	Date	Reviewer Initials
1	First Issue to the Client	September 2023	SB

---

*This report has been prepared by Sol Environment Ltd (Sol) with all reasonable skill, care and diligence, and taking account of the Services and the Terms agreed between Sol and the Client. This report is confidential to the client, and Sol accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Sol beforehand. Any such party relies upon the report at their own risk.*

*Sol Environment Ltd disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the Services.*

---

## CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2.</b>	<b>SITE DETAILS</b>	<b>2</b>
<b>3.</b>	<b>CONDITION AT PERMIT ISSUE</b>	<b>3</b>
3.1	Environmental Setting	3
3.1.1	Geology, Hydrogeology and Surface Waters	4
3.1.2	Designated Sites	6
3.2	Pollution History	7
3.2.1	Environmental Database Records	7
3.2.2	Historical Land Uses	11
3.2.3	Site Reconnaissance	12
3.3	Evidence of Historic Contamination	13
3.3.1	Previous Site Investigations	13
3.4	Supporting Information	15
<b>4.</b>	<b>PERMITTED ACTIVITIES</b>	<b>16</b>
4.1	Proposed Activities Undertaken at the Installation	16
4.1.1	Description of Process	16
4.1.2	Substances Used at the Installation	17
4.1.3	Waste	18
4.1.4	Drainage Systems	18
4.1.5	Potential for Fugitive Releases to Soil, Groundwater and Surface Water	19

## 1. INTRODUCTION

This Application Site Condition Report has been prepared for Biomass UK No.4 Ltd (hereafter referred to as 'The Applicant' or 'Biomass UK') in support of a Bespoke Installations Permit Application under The Environmental Permitting (England and Wales) Regulations 2018 (as amended) for the operation of an Energy from Waste Facility located on land at Belliver Business Park, Plymouth.

This document represents the Application Site Condition Report (ASCR) submitted as part of the Application package to the Environment Agency (EA) and has relied on information supplied by the site and various third-party information sources (See Section 2).

The facility ('the Site') is located at Units 21-29, Belliver Business Park, 1 Belliver Way, Roborough, Devon, PL6 7BW, National Grid Reference: NZ 249900 062375.

The proposed development of the site comprises an energy from waste facility accepting up to 60,000 tonnes per annum of waste derived fuels (biomass and RDF) to undergo incineration utilising moving grate technology. The facility comprises a single-line incineration process, including a single thermal oil boiler serving a ORC turbine. The ORC turbine is designed to generate a gross electrical output of 4.64 MWe of electricity. The plant has a corresponding parasitic load of approximately 0.75MWe resulting in a net electrical export of approximately 3.9 MWe.

The Facility will have the capacity to export up to approximately 10 MWth of heat, subject to configuration and available offtake partners

The activities will meet the definition of an 'Installation' by virtue of Schedule 1:

- **Section 5.1 'Waste Incineration' Part A(1)(b)** *The incineration of non-hazardous waste in a waste incineration plant with a capacity of 3 tonnes per hour or more*

This document has been prepared in accordance with the EA's Guidance Document H5 Site Condition Reports Guidance and Templates (Version 2.0, dated 04/08/08). This report provides baseline information in relation to the site.

## 2. SITE DETAILS

**Table 2.1: Site Details**

<b>Name of the Applicant:</b>	Biomass UK No.4 Ltd
<b>Activity Address:</b>	Units 21-29, Belliver Business Park, 1 Belliver Way, Roborough, Plymouth, Devon, PL6 7BW
<b>Grid Reference:</b>	OS X (Eastings) 49900 OS Y (Northings) 62375
<b>Document References:</b>	EP Application Site Condition Report, Biomass UK No.4 Ltd  Document reference and date: SOL_21_P024_COG September 2023
<b>Annexes:</b>	Annex A: Figures Annex B: Groundsure Report Annex C: Site Photographs Annex D: Conceptual Model Annex E: Ground Investigation Report

## 3. CONDITION AT PERMIT ISSUE

### 3.1 Environmental Setting

The location of the subject Site is shown on Figure A1, Annex A, with the site being at approximate National Grid Reference 249900 062375. The proposed site layout is shown in Figure A2.

The site is located at Units 21-29, Belliver Business Park, 1 Belliver Way, Roborough, Plymouth, Devon, PL6 7BW.

The application site is located to the north of the city of Plymouth within Belliver Business Park. The surrounding area is a mix of residential to the south and east (Roborough) and woodland to the north and west with farmland beyond. The Business Park houses a number of industrial neighbours including Toshiba Carrier (UK), Burts Potato Chips, Devon and Cornwall Food Action and BD Vacutainer Systems.

The site is immediately bound to the south by Belliver Way, to the east and west by industrial units and to the north by Haxter Close with steeply sloping topography down into the wooded valley of Tamerton Foliot Stream which is located approximately 110m distant.

The site is roughly rectangular in shape and covers an area of approximately 1 hectare. The site is presently occupied by an industrial half clad half brick unit which houses a defunct biomass plant and associated hardstanding yard areas. The nearest residential areas to the site are on Lady Fern Road in Roborough which lies approximately 100m southeast of the site.

Table 3.1 below provides information regarding the surrounding site.

Table 3.1: Site Setting	
Direction	Observations
North	Immediate Vicinity: Haxter Close, Pipex Yard Within 500m: Woodland, Tamerton Foliot Stream, Agricultural Fields Beyond 500m: Roborough Farm, Commercial Units, Agricultural Land, Woodland
North East	Immediate Vicinity: Industrial Unit. Within 500m: Haxter Close, Pipex, Agricultural Fields Beyond 500m: Devonport Leat, Nursing Home (Roborough House), Woodland, Sewage Treatment Works
East	Immediate Vicinity: Industrial Unit. Within 500m: Belliver Way, Residential Housing, A386. Beyond 500m: Agricultural Fields
South East	Immediate Vicinity: Belliver Way Within 500m: Industrial Unit, Residential Area, A386. Beyond 500m: Residential Areas of Roborough and Woolwell,
South	Immediate Vicinity: Belliver Way Within 500m: Industrial Unit, Wooded Valley, Stream

	Beyond 500m: Residential Areas of Belliver and Southway
South West	Immediate Vicinity: Belliver Way. Within 500m: Industrial Unit, Wooded Valley, Stream Beyond 500m: Residential Area of Southway, Oakwood Primary School, Widewell Primary Academy
West	Immediate Vicinity: Industrial Unit Within 500m: Industrial Units of Belliver Business Park, Steeply Wooded Valley, Stream Beyond 500m: Agricultural Fields and Farmland
North West	Immediate Vicinity: Haxter Close. Within 500m: Steeply Wooded Valley, Stream, Industrial Units Beyond 500m: Agricultural Fields and Farmland

### 3.1.1 Geology, Hydrogeology and Surface Waters

Desk-based research of the local geology, hydrogeology and surface waters has been carried out in order to establish the potential for migration of contamination onto or away from the Site, and to assess the surface water and groundwater sensitivity of the site area. Information was obtained from multiple sources, namely:

- Environment Agency Flood Risk Map;
- Information provided by Groundsure Reports (Annex B).
- Geological maps produced by the British Geological Survey (BGS) and the BGS Geology of Britain Viewer (<http://maps.bgs.ac.uk/geologyviewer>);
- MAGIC (<http://magic.defra.gov.uk>); and
- BGS Borehole Record Viewer (<http://www.bgs.ac.uk/data/boreholescans/home.html>).

#### Geology

According to BGS Geological Mapping there are no superficial deposits recorded at the site.

The BGS records the underlying bedrock of the site as Upper Devonian Slate. This is described in the BGS lexicon as '*Slate with subsidiary hornfelsed slate and trace mudstone.*' Approximately 500m to the southeast of the site is an intrusive dyke comprised of Felsite of Permian age. .

#### *Made Ground*

No made ground is recorded as present on site. (*To be confirmed*)

#### *Radon Potential*

According to data issued by the British Geological Survey and Public Health England, the site is not located in an area that has an elevated radon potential, meaning the maximum radon potential is <1%. This means no Radon Protection Measures are required.

#### *Shrink Swell*

The maximum shrink swell hazard rating identified on the application site is negligible.

#### *Landslides*

The maximum landslide hazard rating identified on the application site is very low.

#### *Soluble Rocks*

The maximum soluble rock hazard rating identified on the application site is Negligible.

#### *Compressible Ground*

The maximum compressible ground hazard rating identified on the application site is negligible.

#### *Collapsible Rocks*

The maximum collapsible rocks hazard rating identified on the application site is very low.

#### *Running Sands*

The maximum running sand hazard rating identified on the application site is Negligible.

### **Hydrogeology**

The Environment Agency classifies the bedrock at the site as a Secondary A aquifer. This suggests that the bedrock geology contains permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The site is not located within a Source Protection Zone (SPZ).

The groundwater vulnerability at the site is identified at the site high via well connected fractures.

There are no active groundwater abstraction licenses within 2 km of the site.

The site is considered to be situated in an area of low sensitivity with respect to groundwater resources as it is situated upon a secondary Aquifer and there are no active groundwater abstractions within 2km.

### **Surface Water**

The nearest surface water features are located to the northwest and southeast, both streams within steeply wooded valleys. The closest is Tamerton Foliot Stream, located approximately 112m northwest of the site, the other is located approximately 200m southeast running through Widewell Wood.

Both streams flow towards the southwest, meeting in confluence approximately 1km from the site and ultimately flow into the River Tamar located approximately 5.3km to the west.



Devonport Leat, a manmade watercourse for water transfer, is also located approximately 210m to the east of site.

There is one identified historical surface water abstraction recorded within 2 km of the site, 1745m west of the site and was from Great Trehills Farm Pond for the purposes of spray irrigation. There are no identified active or potable surface water abstractions within 2 km of the site.

The Environment Agency's flood risk map indicates that the site lies within Flood Zone 1, at low risk of flooding from rivers and the sea. The maximum flood risk (Zone 1) for this area is land assessed as having a chance of flooding of less than 1 in 1000 (<0.1%) chance of flooding each year. There have been no historical recorded flood events recorded within 250m. In addition, the site is in a negligible risk of groundwater flooding.

The site is considered to be in area of low to moderate sensitivity in regard to surface water due to proximity of Tamerton Foliot Stream downslope of the site.

### 3.1.2 Designated Sites

Environment Agency H1 and H5 guidance states that the potential impacts of the site should be assessed for the following habitat sites within 10km of the Installation:

- Special Areas of Conservations (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive;
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive; and
- Ramsar Sites designated under the Convention of Wetlands of International Importance.

It is also stated that within 2km of the Source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- Local Wildlife Sites (LWS), County Wildlife Sites (CWS) and potential wildlife sites (PWS);
- Sites of Importance for Nature Conservation (SINC); and
- Ancient Woodland.

Information from the Multi Agency Geographic Information for the Countryside (MAGIC) website (<http://magic.defra.gov.uk/>) has been used to obtain the above information.

There are no SSSI's or NNR's within 2km of the site, nor any Ramsar sites within 10km. The designated sites relevant to this study are presented in Table 3.2 below:

**Table 3.2: Location of Sensitive Habitat Receptors**

Distance and Direction	Name	Status
48m NW	Haxter Wood	Ancient & Semi-Natural Woodland
1137m W		Ancient Replanted Woodland
1168m W		Ancient & Semi-Natural Woodland
1227m S	Hatshill/holt Woods	Ancient Replanted Woodland
1303m NW	Ashleigh Blaxton Coppice	Ancient Replanted Woodland
1350m SW		Ancient Replanted Woodland
1373m SE	Hatshill/holt Woods	Ancient & Semi-Natural Woodland
1486m NW		Ancient Replanted Woodland
1511m NW	Ashleigh Blaxton Coppice	Ancient & Semi-Natural Woodland
1546m SE	Hatshill/holt Woods	Ancient & Semi-Natural Woodland
1572m W		Ancient & Semi-Natural Woodland
1638m SE	Hatshill/holt Woods	Ancient & Semi-Natural Woodland
1665m NE	Hele Wood	Ancient Replanted Woodland
1898m SE	Hatshill/holt Woods	Ancient & Semi-Natural Woodland
1906m NE	Hele Wood	Ancient Replanted Woodland
1.4km S	Southway Valley	LNR
2.4km W	Plymouth Sound and Estuaries	SAC
2.4km W	Tamar Estuaries Complex	SPA

Haxter Wood, 49m to the northwest is designated as Deciduous Woodland Priority Habitat.

The site is not located within an Air Quality Management Area.

The proposed operation will have little environmental emissions to land or controlled waters and emissions to atmosphere are well managed and controlled, therefore it is the conclusion of this assessment that there will be no direct or indirect effects on any of the statutory sites described above.

## 3.2 Pollution History

### 3.2.1 Environmental Database Records

The following information has been obtained from a search of a publicly available database of environmental information (Groundsure Insight Report, provided in Annex B).

The database contains records of information from public registers held by environmental regulatory authorities and can be used to assess the site's sensitivity, the potential for neighbouring activities to pose a risk to the site and to determine whether specific records of pollution relate to the subject site.

## Pollution Incidents

There are three recorded Pollution Incidents within 500m of the site. These are summarised in the table below.

Dist and Direction	Details	Pollutant	Impact
94m N	Date: 06/04/2003 Identification: 149691	Oils & Fuel - Mixed / Waste Oils & Tyres	Water: Category 3 (Minor Impact) Land: Category 3 (Minor Impact) Air: Category 4 (No Impact)
345m NE	Date: 03/09/2003 Identification: 187279	Chemicals/Products - Acids	Water: Category 4 (No Impact) Land: Category 4 (No Impact) Air: Category 4 (No Impact)
464m S	Date: 22/08/2016 Identification: 1464514	Sewage Materials – Crude Sewage	Water: Category 1 (Major Impact) Land: Category 3 (Minor Impact) Air: Category 4 (No Impact)

## Potentially Contaminative Industrial Sites

There are 36 potentially contaminative industrial sites within 250m of the application, those within 100m are detailed in Table 3.4.

Company / Feature	Distance and Direction	Activity	Category
Electricity Sub Station	On site	Electrical Features	Infrastructure and Facilities
Electricity Sub Station	Onsite	Electrical Features	Infrastructure and Facilities
Gas Governor	Onsite	Gas Features	Infrastructure and Facilities
Hadley Fencing Supplies Ltd	32m SW	Metals Manufacturers, Fabricators and Stockholders	Industrial Products
Luxus	32m SW	Candles	Consumer Products
Bam Precision Engineering	32m SW	Precision Engineers	Engineering Services
Greenfield Kitchens	32m SW	General Construction Supplies	Industrial Products
Westcountry Motorcycles	32m SW	Vehicle Repair, Testing and Servicing	Repair and Servicing

S C Conversions		33m SW	Vehicle Repair, Testing and Servicing	Repair and Servicing
Electricity Station	Sub	35m SE	Electrical Features	Infrastructure and Facilities
Luxus Fragrance	Home	48m SW	Candles	Consumer Products
Burts Potato Chips Ltd		63m NE	Catering and Non Specific Food Products	Foodstuffs
Electricity Station	Sub	65m SE	Electrical Features	Infrastructure and Facilities
Waterjet Profiles Plymouth Ltd		77m SW	Cutting, Drilling and Welding Services	Construction Services
Tank		92m E	Tanks (Generic)	Industrial Features
Water Pumping Station		92m E	Water Pumping Station	Industrial Features
Dartmoor BioPower – Advanced Conversion Technologies		97m NE	Energy Production	Industrial Features
Tank		97m SE	Tanks (Generic)	Industrial Features
B D Vacutainer Systems		100m SE	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products

### Landfills and Waste Sites

There are no active or historical landfill sites recorded within 500m of the site. There are two licensed waste sites located within 500m.

These are summarised in Table 3.5 below:

Table 3.5: Licensed waste sites within 500m of the site		
Company / Feature	Distance and Direction	Details
Plymouth Ford Spares	10m South	Vehicle Depollution Facility 5,000 tpa EPR/EN3003TX Waste Licence: 400951 Issued: 29/11/2013
Crumb Rubber Ltd	70m East	Material Recycling Treatment Facility 25,000 tpa EPR/EP3698LT

		Waste Licence: 101165 Issued: 15/02/2010 Surrendered: 15/02/2010
--	--	--

In addition there are 33 waste exemptions recorded within 500m of the site, the closest of which is located 70m southwest at the Training & Technology Centre for repair / refurbishment of WEEE.

### Discharge Consents

There are no active or historical Licensed Discharge Consents to controlled waters within 500m of the site. There is one record of discharge of a List 1 Dangerous Substance within 500m of the site. This is located 373m east at X-fab UK Ltd and is authorised for release of mercury and cadmium.

### Authorised or Permitted Processes

There are two recorded Part A installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 within 500m of the site. These are detailed in the table below.

Table 3.6: Active Authorised or Permitted Processes Part A		
Company / Feature	Distance and Direction	Details
Dartmoor Bio Power Limited / Mitie Infrastructure Limited	Onsite	Process: Biomass Power Station Permit Type: The incineration of non-hazardous waste in an incineration or co-incineration plant with a capacity exceeding 3 tonnes per hour Issued: 11/02/2014 Multiple transfers Status: Revoked
Plessey Semiconductors Limited – Plymouth Semiconductor Foundry	346m NE	Permit Number: EPR/BX1586IH Processes: Solvent Emissions Directive; Activities exceeding solvent threshold; Associated Processes; Disposal of >50t/d non-hazardous waste involving physico-chemical treatment; Fabrication of microelectric circuits into silicon wafers; inorganic chemicals – using halogens if released to air/water Status: Effective

There are 5 identified Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 within 500m of the site. The closest current Part B activity is undertaken 336m southwest of the site at Becton Dickinson (UK) Ltd for coating processes. This company also held a historical Radioactive Substances Consent which was originally issued in 1991, last updated in 2015 and is now revoked.

### 3.2.2 Historical Land Uses

Available historic maps for the site have been reviewed to determine if there is the potential for contamination to be present on Site associated with the Sites historical uses.

Table 3.7: Historical Map Review		
Year	Site	Surrounds
1865 1867	The site is undeveloped agricultural land, straddling a field boundary adjacent to Belliver Lane.	The site surrounds are generally agricultural fields. Haxtor Wood is present to the north of the site with Tamateron Foliot Stream located in its present day location. Belliver Lane is present directly to the south of the site. A trunk road runs north – south approximately 500m east of the site through the village of Jump (later named Roborough). Roborough Plantation and Roborough House are located approximately 750m to the north. The Plymouth and Dartmoor Tramway is located approximately 500m to the east.
1886	No change	Devonport Leat has been constructed diverting a stream towards the village of Roborough. A quarry is located approximately 150m north of site.
1906 1907	No change	Belliver Reservoir (Devonport Water Works Company) has been constructed approximately 600m to the east, with sluices onto Devonport Leat. The quarry to the north is no longer present.
1951 – 1954	No change	Roborough Sewage Works has been constructed approximately 200m southeast of the site. By 1954 the tramway is marked as ‘Old Tramway’.
1976 - 1981	No change	The residential area of Roborough has expanded significantly to the east and south of the site, linking with the residential area of Widewell, now within 200m south. Belliver Reservoir is now marked as ‘covered’. Roborough Sewage Works is no longer present.
1982 - Present day	An industrial unit has been constructed onsite.	Belliver Industrial Estate has been constructed bounding the site with a number of units marked as ‘factory’.

	Additional industrial units have been constructed within 500m to the northwest of the site. Residential areas to the south and east have continued expanding.
--	---

Aerial photography indicates that although the site was first developed in the early 1980's, from 1999 – 2006, there were no onsite buildings but hardstanding was present. From 2010 an industrial unit was present in the western half of the site, with an additional building in the southeast corner added in 2016.

Potentially contaminative historical land uses have been summarised in the table below. Please refer to *Annex B – Groundsure Report* for the historical maps.

**Table 3.8: Potentially Contaminative Land Uses**

Activity	Contaminants
<b>Onsite</b>	
Industrial Unit	Various contaminants depending on building use including hydrocarbons, heavy metals, organic and inorganics
<b>Offsite</b>	
Industrial Estate Factories and unspecified tanks	Various contaminants including heavy metals, organic and inorganics and ground gas
Roborough Sewage Works	Various contaminants including heavy metals, organic and inorganics
Infilled Quarry	Potential ground gas depending on backfill material

### 3.2.3 Site Reconnaissance

#### Visual/Olfactory Evidence of Existing Contamination

All areas of the site have been subject to a visual inspection at the time of this application by Sol Environment Ltd.

All aspects of the installation boundary have been inspected.

The site comprises a disused energy from waste facility, with a preexisting building and hardstanding across the site. Drainage is installed across the site. No contamination or spillages were observed during the site walkover.

There is a diesel tank, empty gas bottles, and empty skips on site in the external yard area.

At the time of the site walkover, there was no sign of any potentially contaminative uses.

### 3.3 Evidence of Historic Contamination

#### 3.3.1 Previous Site Investigations

To ensure no site contamination was present a Phase II Environment Site Assessment was undertaken, this is summarised below.

##### *Earth Environmental and Geotechnical Ltd, September 2023 (to be added later)*

EEGL undertook a targeted ground investigation in September 2023 in support of the permit application. The combined programme of works comprised:

- xx no. trial pits excavated by ...;
- xx no. boreholes drilled by ...;
- Soil sampling for in-field assessment and submission to ... laboratories for chemical and geotechnical testing;
- Installation of xx no. groundwater monitoring wells (including xx no. twin installations) with subsequent purge development;
- Groundwater sampling of all newly installed monitoring wells;
- Groundwater elevation survey of all newly installed monitoring wells.

The locations of the boreholes and trial pits were situated so as to provide wide site coverage.

The suite of chemical analysis was based upon potential contaminants of concern (CoCs) due to site history and soil samples were tested for xx. In addition, xx wells sampling groundwater were collected and analysed for a broad range of contaminants including xx.

Please refer to the report provided in Annex E of this report for detailed results of the fieldwork investigation. A brief summary of the baseline conditions at the site is provided below.

##### *Ground Conditions*

xx

##### *Groundwater*

xx

##### Metals

xx

##### Organics

xx

##### *Ground Gas*



During the ground gas monitoring round the following concentrations of gas was observed:

- xx

Gas flows were recorded with a maximum stable flow rate of xx l/hr observed. A preliminary gas risk assessment based on these results characterise the site as low risk for ground gas hazards.

#### *Soil Chemical Analysis Results*

In general, no widespread evidence of contamination was identified across the site, with all concentrations of contaminants identified as below the relevant screening values for commercial end use. A summary of the baseline soil conditions is provided in the table below.

Table 3.9: Summary Soil Analytical Results			
Contaminant	LQM/CIEH S4ULs or DEFRA C4SLs, Validation Criteria for Industrial / Commercial (Based on 6% SOM) (mg/kg)	Number of Exceedances	Details of Exceedances (mbgl)
<b>Metals</b>			
Arsenic			
Cadmium			
Chromium (III)			
Copper			
Lead			
Arsenic			
Naphthalene			
Phenanthrene			
Benzo(a)anthracene			
Chrysene			
Benzo(b)fluoranthene			
Benzo[a] pyrene			
Dibenz[ah] anthracene			
Dibenzofuran			

For further detail please refer to the report in Annex E.

#### *Groundwater Chemical Analysis Results*

Groundwater analysis on the sample taken from within the perched discontinuous groundwater in the base of the Made Ground identified low concentrations of xx. A summary of the baseline groundwater conditions is provided in the table below.

Table 3.10: Summary Ground Water Analytical Results		
Contaminant	LQM/CIEH S4ULs or DEFRA C4SLs, Validation Criteria for Industrial / Commercial (Based on 6% SOM) (µg/l)	Number of Exceedances
Aluminium		
Barium		
Chromium		
Copper		
Manganese		
Zinc		
Total Cyanide		
Ammoniacal Nitrogen		
Aromatic C5-C7		
Xylenes		
TPH		
Naphthalene		
Benzo(b)fluoranthene		
Benzo(a)pyrene		
Indeno(1,2,3-c,d) pyrene		
Benzo(g,h,i)perylene		
Phenol		
1,2-dichloroethane		

For further detail please refer to the report in Annex E.

### 3.4 Supporting Information

The supporting documentation consist of:

- Figures detailing the location, boundary and layouts of the Installation are shown in Annex A.
- Groundsure Reports are provided within Annex B
- Site Photographs are in Annex C.
- A Conceptual Model of the site is shown in Annex D.
- The Ground Investigation Report is provided in Annex E.

## 4. PERMITTED ACTIVITIES

### 4.1 Proposed Activities Undertaken at the Installation

#### 4.1.1 Description of Process

The Applicant proposes to employ a conventional technology, namely moving grate combustion, as a cost-effective means of recovering energy from waste feedstocks. Heat will be recovered via a boiler to raise steam and generate energy via a steam turbine. The site will have one line consisting of two gasifier units feeding into a single combustion tube, boiler, and turbine.

The principal components of the process comprise the following:

- *Waste Acceptance and Reception:* Refuse Derived Fuel (RDF) will be delivered to the Reception Hall. Waste is delivered and unloaded in the internal tipping area where a visual inspection will take place. The delivered RDF feedstocks will then be transferred to one of the internal storage bunkers. RDF is typically processed and used within 4 days of arrival onsite.
- *Fuel Feed System:* The fuel enters the feed system via a front loader onto the conveyor. The fuel is fed into the gasifiers via conveyors, disc screen, metal separator, and metering bins.
- *Gasifiers:* The site has two gasifiers on a single line. RDF will be fed into the gasifiers by a metering bin with variable feed control. Horizontal and vertical feed screws transfer fuel into the gasifier. Air is fed into the system via nozzles in the cone. Raw flue gas exits through an outlet at the top. Fuel feed and gasification air flow rates are regulated by firing tables and a radar level detector measure and maintains a constant pile height.
- *Residue Handling:* Bottom ash (IBA) from the rotating grate falls into one of two hoppers periodically and is then carried to the external ash recovery bins by a drag chain conveyor.
- *Oxidiser:* Syngas produced in the gasifiers are completely combusted in the vertical cylindrical refractory lined furnace. An oxidation air fan injects air into the oxidiser through inlet nozzles as required. Two staged combustion is combined with recirculated flue gas to ensure low excess air levels and temperatures are maintained so that NO<sub>x</sub> generation is minimised, and ash particulate does not melt.
- *Start-up Burner:* A natural gas fired start-up burner is mounted to the syngas transfer duct between the Gasifier and the Oxidiser. The start-up burner is only used during the start-up and shutdown of the gasification system.
- *Heat Recovery:* A Heat Recovery Steam Generator is connected to the Oxidiser flue gas outlet. Heat is recovered from the hot flue gases produced in the combustion chamber via a vertical tube boiler to produce steam.
- *Electricity Generation:* The superheated steam then passes to a single condensing steam turbine-generator, which will generate circa 4.3 MWe of renewable electricity for use

onsite and export to the National Grid. Exhaust steam is condensed via an air-cooled condenser prior to recirculation.

- *Flue-Gas Cleaning:* Flue gas cleaning and pollution control consists of Selective Non-Catalytic Reduction (SNCR) through urea injection into the flue gas duct. Downstream from the heat recovery system is a dry flue gas treatment (DFGT) system that removes particulate matter, acid gases, heavy metals, and dioxins. The DFGT system consists of a baghouse filter, a dry sorbent injection system, and a residue handling system.
- *Air Pollution Control:* The Induced Draft (ID) fan is located downstream of the baghouse to maintain negative pressure in the system. Flue gas is discharged to atmosphere at positive pressure via the flue gas stack. A portion of the flue gases are recirculated to the gasification and oxidation air fans.

#### 4.1.2 Substances Used at the Installation

A summary of the substances present onsite which may present a pollution risk can be seen in the table below.

All re-fuelling of site vehicles and mobile plant takes place upon impermeable concrete hardstanding.

Table 4.1: Raw Materials Summary			
Material	Indicative consumption per annum	Location and nature of storage	Fate
Feedstock	Typically, 50,000 tonnes per annum. Delivered on a 'just in time' basis.	Internally within reception hall (1,000 t capacity) and bunkers (4 x 180 t capacity each)	Thermally converted to ash. Ash is transferred off site for disposal/recovery elsewhere.
Boiler treatment chemicals	<ul style="list-style-type: none"> <li>• Salt: 7.5 kg/day at full load for softening.</li> <li>• Oxygen Scavenger (Nalco Eliminox Hydrazide– 119 kg/yr at full load).</li> <li>• Phosphate Inhibitor (Nalco 72215 Phosphate – 3.667 kg/yr at full load).</li> <li>• Amine – return line treatment (Nalco 72310 Amine – 461.5 kg/yr).</li> </ul>	Stored internally within sealed containers	Discharged under consent as Trade Effluent.
Lubricating oil	10,000 litres	Stored internally within	Consumed within machinery.

**Table 4.1: Raw Materials Summary**

for turbine		sealed containers	Waste oil transferred off site for disposal.
Lubricating oil for gas reciprocating	10,000 litres	Stored internally within sealed containers	Consumed within machinery. Waste oil transferred off site for disposal.
Diesel	53,328 litres	Stored externally in a storage tank within a bund	Consumed within machinery. No waste product.
Urea	21.4 tonnes	Diluted and stored internally within a storage tank within a bund	Used in selective catalytic reduction. No waste product.
Lime	144 tonnes	Stored internally within sealed containers	Used in plant abatement. Waste product (APCR) transferred off site for disposal.
Activated Carbon	12 tonnes	Stored internally within sealed containers	Used in plant abatement. Waste product (APCR) transferred off site for disposal.
20209 Scale Inhibitor	200 litres	Stored internally within sealed containers	Used in water treatment for heat exchangers and cooling system. Discharged under consent as Trade Effluent.
CEMs Gases	<ul style="list-style-type: none"> <li>• M-99-T2-35226 (O<sub>2</sub> / C<sub>3</sub>H<sub>8</sub> / N<sub>2</sub>) X50</li> <li>• SO<sub>2</sub> / CO / NO / N<sub>2</sub></li> <li>• NH<sub>3</sub> / N<sub>2</sub></li> </ul>	Stored internally within sealed containers	Used to calibrate plant CEMs. No waste product.

#### 4.1.3 Waste

All RDF waste accepted onto site is subject to waste acceptance and rejection procedures and stored appropriately.

#### 4.1.4 Drainage Systems

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged via an oil-water separator to the surface water sewer (W1).

The roof area is used for rainwater recovery and rainwater is reclaimed as part of a sustainable drainage system (SUDS). Most of the roof runoff will be harvested as a sustainable source of plant water and will be used within the process primarily for process and for the washing of the air-cooled condenser.

External activities onsite are limited to incoming deliveries and waste collections, car parking, and sealed ash skip storage.

All other activities including unloading and processing take place internally within the onsite buildings. The buildings provide both secondary and tertiary containment. Any spillages, leaks or incidents arising within the buildings will be effectively contained and captured within the building footprint.

Any effluent arising from the process plant including waste reception washdown waters, cooling system blowdown, and boiler feedwater preparation plant reject will be collected in an effluent collection tank and treated at the onsite Water Treatment Plant (WTP) prior to discharge to sewer (S1).

All domestic effluent and other trade effluents arising from the site operations discharge directly to the sewer.

Above ground drainage been designed in accordance with BS EN 12056.

### **Hardstanding**

The sites operational areas will be underlain by impermeable concrete hardstanding.

### **Tanks and Bunds**

All storage tanks will be installed with secondary containment and be designed to comply with the following EA guidance requirements;

- Pollution prevention for businesses;
- Oil storage regulations for businesses;
- Storing oil at your home or business;

All storage tanks associated with the process are detailed within Table 3.4 in Section 3.5 'Raw Materials.'

#### **4.1.5 Potential for Fugitive Releases to Soil, Groundwater and Surface Water**

The materials and substances used at the site are not considered to have significant potential to cause ground or groundwater contamination under general storage or operating procedures.

The following measures have been incorporated into the design of the activity to protect groundwater and soil from installation substances;

- The site takes place on impermeable hardstanding;
- All waste processing at the site takes place internally;
- Emergency spill kits are available in the event of a spillage;
- There are no emissions to controlled water arising from the process; and
- Vehicles are covered when deliveries take place.

When operated in the manner described above the proposed operations will not introduce any sub surface or potentially polluting activities to the site.

Due to the protection measures mentioned above, the risk to soil and groundwater from the development is considered to be LOW as summarised in the Conceptual Site Model below.

Table 4.2: Conceptual Site Model

Contaminant Source	Contaminants of Concern	Receptor	Exposure Present?	Pathway	Likelihood of Risk
Historical soil contamination within Made Ground generally associated with industrial activities onsite	Various – as yet investigated. Considered to be low levels if present.	Construction Workers	Yes – Potential pathway during construction of the site, full PPE will be worn by workers during the construction phase to limit contact.		Low – Use of control measures during construction work should minimise potential exposure. Future works will include appropriate PPE.
		Future Site Users	Yes – Though majority of site is covered by impermeable hardstanding, areas of soft landscaping are present.		Low – Hardstanding will cover the operational areas of the site.
		Groundwater	Yes – Leaching of contaminants by infiltrating rainfall is possible in areas of soft landscaping.		Low – Hardstanding covers the majority of the site preventing downward migration. Levels of contaminants likely to be low and not a risk to groundwater body.
		Surface Water	Yes – Areas of soft landscaping are present in the wider site area allowing dissolution of contaminants into surface water run-off.		Low – Hardstanding covers the operational areas of the site and contamination potential is low. All surface water run-off will be managed onsite.
Potential Backfilled materials from Old Offsite Quarry	Ground Gas	Future Site Users & Buildings	Yes – potential pathway through fractures within bedrock geology		Low – levels are likely to be low if at all present due to distance from site. Recommended that monitoring is undertaken to establish if present and ground gas measures incorporated into building if required.
Substances either stored on site, used or generated during processing	Polluting substances created in processing, specifically NOX and CO2 emitted from the stacks	Soil	Yes – Deposition of pollutants on soil is possible		Low – The flue gases created from the processing are reduced in contaminants from flue gas abatement measures, therefore greatly reducing this risk.
		Surface Water	Yes – The process discharge has the potential to hold contaminants.		Very Low – Only uncontaminated surface water run-off from external areas is discharged via separator to surface

				waters. All effluent is treated at the onsite effluent treatment plant and discharged to sewer.
		Ground Water	Yes – The process discharge has the potential to hold contaminants, as well as hazardous substances which are used.	Negligible – The hard standing that covers the operational areas ensure no contamination will be present for ground water at the site.
		Human Receptors	Yes – The stack emissions have the potential to impact nearby sensitive receptors.	Low – The abatement technology used in the stack will reduce contaminants in the flue gases.
		Ecological Receptors	Yes – The stack emissions have the potential to impact nearby sensitive receptors.	
	Polluting substances used or stored for the operation, including diesel, RDF, abatement chemicals	Soil	No – All materials on site will be stored and processed on hardstanding, removing the potential for contamination of this receptor.	Low – All potentially polluting substances used at the facility are controlled by following strict risk assessment and guidance surrounding the storage, use and removal, thus reducing the risk. The operational areas of the site being covered in hard standing for all operational areas also greatly reduces the risk of contamination to the sensitive receptors.
		Human Receptors	Yes – There is a pathway present for this pollution to occur, with the operation utilising potentially polluting substances.	Low – The management and guidance surrounding storage and use of contaminants helps to reduce this risk to low.
		Surface Water	Yes – There is a pathway present for this pollution to occur, with surface water runoff from the site having the potential to contain polluting substances.	Low – Internal management systems surrounding storage of waste, including no outdoor storage of waste will reduce this risk.
		Ground Water	No – All materials on site will be stored and processed on hardstanding, removing the potential for	Negligible.



			contamination of this receptor.	
		Ecological Receptors	Yes – There is a pathway present for this pollution to occur, with the operation utilising potentially polluting substances.	Low – Although there is a risk internal management systems surrounding storage of waste, including no outdoor storage of waste will reduce this risk.

In addition, the site operates in accordance with the environmental management system. The management system includes visual inspections of:

- All storage areas, processing areas and hard standing will be physically inspected to detect any signs of deterioration, leaks or spillage. Any corrective action required is reported to and implemented by the Site Manager; and
- Equipment in all process areas as part of the company’s planned/predictive maintenance programme.

Based on this assessment, the potential for the varied site to impact on soil and groundwater underlying the installation is considered to be low.

Non-permitted activities undertaken at the Installation	Not applicable
Plan showing activity layout	Refer to Figure A2, Annex A
Environmental Risk Assessment	See attached Main Application Document SOL_21_P024_COG.



---

## ANNEX A: FIGURES



---

# ANNEX B: ENVIRONMENTAL RECORDS

## ANNEX C: SITE PHOTOGRAPHS

## ANNEX D: CONCEPTUAL MODEL



---

# ANNEX E: GROUND INVESTIGATION REPORT