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Consulting Engineers Limited

Humber Gate Waste Treatment Facility

Humber Resources Group Ltd

Environmental Risk Assessment – Specialist Waste Facility

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Alice Merry		Environmental Scientist	24/04/2026
Checked by:	James Sturman		Principal Consultant	24/04/2026

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Contents

1 Introduction

Humber Resources Group Ltd (HRG) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) for an Environmental Permit (EP) to operate a thermal waste treatment facility, to be known as the Humber Gate Waste Treatment Facility (the Facility). The Facility will have a throughput capacity of 29,500 tonnes per annum.

Within the Environmental Permit (EP) application, HRG is required to demonstrate that the necessary measures are in place to protect the environment and ensure that the Facility, throughout its life, will not pose an unacceptable risk to the environment.

The aim of this report is to:

a. identify potential risks that the activity may present to the environment;
b. screen out those that are insignificant and don't require detailed assessment;
c. identify potentially significant risks, where appropriate;
d. choose the right control measures, where appropriate; and
e. report the findings of the assessment.

This document has been developed to consider the requirements of Environment Agency Guidance Notes H1 Annexes A, C, H and F. It is acknowledged that these guidance documents have been withdrawn; however, it is understood that the requirements of the guidance are still applicable.

1.1 Risk Assessment Process

This assessment has been developed in accordance with the Environment Agency Guidance Note H1. This guidance promotes four key steps:

1. identify risks from the activity;
2. assess the risks and check that they are acceptable;
3. justify appropriate measures to control the risks; and
4. present the assessment.

1.2 Step 1 – Identify Risks

The following report will identify the activities that present different types of risk to the environment associated with the operation of the Installation, including:

a. odour;
b. noise;
c. fugitive emissions; and
d. accidents.

1.3 Step 2 – Assess the Risk

The report will include an assessment of risks associated with the operation of the Installation, and will identify the:

a. hazard;
b. receptor; and
c. pathway.

1.4 Step 3 – Justify Appropriate Measures

This report will demonstrate that the risks associated with the operation of the Installation have been considered and identify the control measures which will be in place to demonstrate that the risks are being appropriately managed.

1.5 Step 4 – Present the Assessment

The assessment will conclude by presenting the following:

a. possibility of exposure;
b. consequence; and
c. the overall risk.

The report will present the overall risk applying the Environment Agency's H1 criteria, defined as:

a. insignificant;
b. not significant; and
c. significant.

2 Ecological Sensitive Receptors

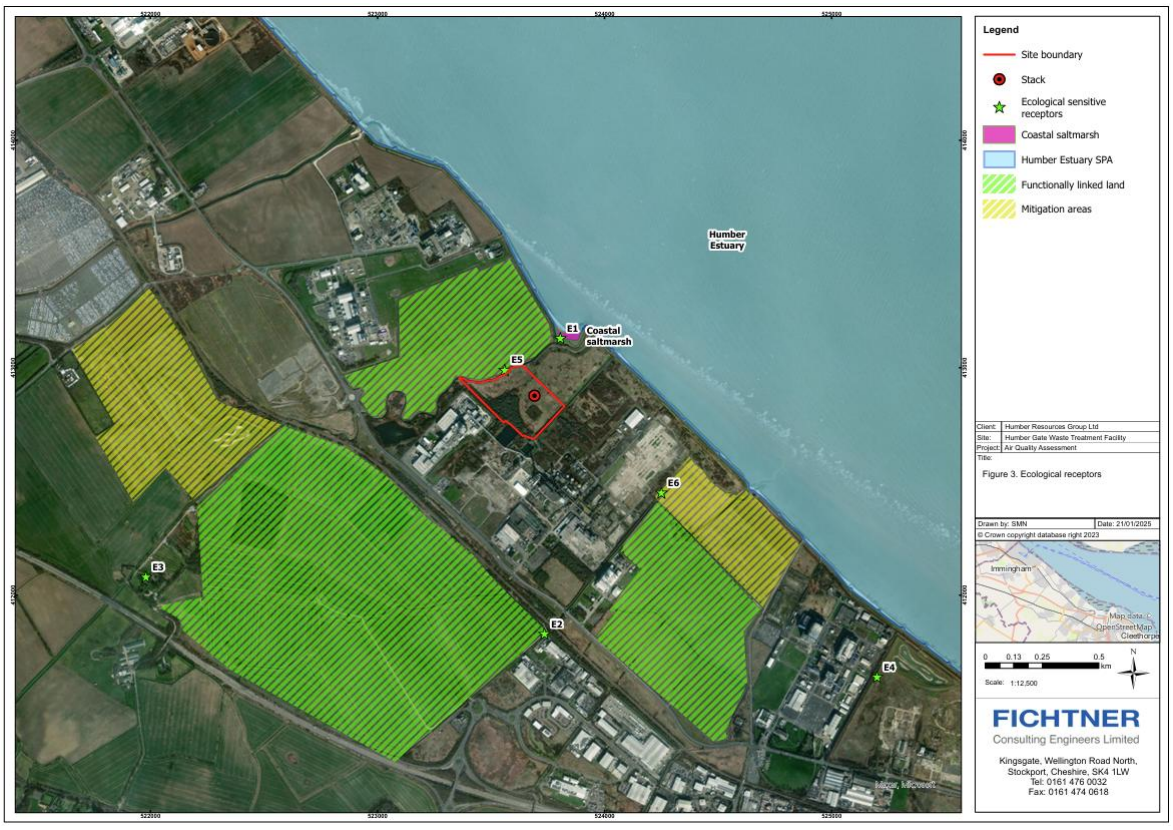
The EA has provided a Nature and Conservation Screening Report which identifies sites of ecological importance in accordance with the following screening distances:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs), or Ramsar sites within 10 km of the Site;
- Sites of Special Scientific Interest (SSSIs) within 2 km of the Site; and
- National Nature Reserves (NNR), Local Nature Reserves (LNRs), local wildlife sites (LWS) and ancient woodlands within 2 km of the Site. These are collectively referred to as local nature sites.

In addition, as requested in the Scoping Opinion issued by North East Lincolnshire Council, the impact at land functionally linked to SPAs (functionally linked land, FLL) within 2 km of the Facility has been assessed. FLL is land which supports bird species for which the SPAs are designated but is not included within the SPA designation.

The sensitive ecological receptors identified are listed in Figure 1 and Table 1.

Figure 1: Ecological Sensitive Receptors



Source: Refer to Appendix E, '4147-0320-0002SMN Dispersion Modelling Assessment_r1'

Table 1: Ecological Sensitive Receptors

ID	Site	Designation	Closest point to Facility		Distance from site boundary (km)
			X	Y	
E1	Humber Estuary	SAC/SPA/ Ramsar/SSSI	523805	413130	0.2

ID	Site	Designation	Closest point to Facility		Distance from site boundary (km)
			X	Y	
E2	Sweedale Croft Drain	LWS	523735	411830	0.8
E3	Healing Cress Beds	LWS	521980	412080	1.8
E4	Tioxide west fields	LWS	525200	411640	1.8
E5	Humber Estuary FLL	FLL	523560	412990	0
E6	Mitigation Areas	N/A	524250	412450	0.6

The Dispersion Modelling Assessment (Appendix E of the Application Pack) considers the impacts to ecological sensitive receptors from point source emissions to air, and a water quality modelling report (Appendix I of the Application Pack) considers the impacts from point source emissions to water.

Mitigation measures are proposed with the intention to prevent fugitive emissions and potentially harmful substances from escaping the site boundary and interacting with nearby ecological receptors. Refer to section 5 (Fugitive emissions) and section 6 (Accidents).

3 Table A1 – Odour Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Odorous emissions may occur during the delivery of waste, reception of waste and the storage and handling of waste prior to thermal treatment	Immediate area. The nearest residential receptors are located approximately 1.7 km south of the installation boundary.	Air- Winds generally blow from a south westerly direction.	Containers of small packaged odorous wastes will only be opened briefly to sample within reception areas and then directly incinerated. Waste handling and storage will be undertaken inside the enclosed HTI building under negative pressure. Air from within the building will be used as primary combustion air. Bulk storage vessels are nitrogen blanketed and sealed.	Minimal.	Odour annoyance will have more impact in the summer, when temperatures are higher and people are outdoors and more likely to be exposed to odour.	Not significant due to management systems in place.
Odorous emissions may occur during periods of shutdown	Immediate area. The nearest residential receptors are located	Air- Winds generally blow from a south westerly direction.	Potentially odorous wastes will be stored within their primary packages within	Minimal	Odour annoyance, which will have greater impact in the summer, when	Not significant due to management systems in place.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
	approximately 1.7 km south of the installation boundary.		designated storage areas and storage buildings. Regular olfactory checks will be undertaken around the installation boundary as part of daily walkround checks.		temperatures are higher and people are outdoors and more likely to be exposed to odour.	

4 Table A2 – Noise and Vibration Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Noise from waste treatment processes, including the waste shredding and pumping system and rotary kiln. Noise from ancillary plant items, including the heat recovery boiler, steam turbine, air cooled condenser, exhaust air fans, stack exhaust and compressed air cleaning systems. Noise radiation from the building envelope itself.	Immediate area. The nearest residential receptors (Primrose Cottage) are located approximately 1.86 km southwest of the Facility.	Sound propagation through air and the ground.	Noisy plant items, where practicable, will be installed inside buildings rather than outside and, where appropriate, they will be fitted with noise insulation. The installation will be designed to reduce noise and tonal components. Regular maintenance of plant items. Noise level checks will be carried out regularly in operational areas, with early warning of increasing noise levels resulting in reduction or mitigation.	Minimal.	Annoyance.	Not significant. Refer to Appendix C of the Application Pack for further information on the impact of noise from the operation of the Facility.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Noise from vehicle movements.	Immediate area. The nearest residential receptors (Primrose Cottage) are located approximately 1.86 km southwest of the Facility.	Sound propagation through air and the ground.	Waste deliveries will typically occur during day-time periods. Waste vehicle movements at night will be limited. Noise level checks will be carried out regularly in operational areas, with early warning of increasing noise levels resulting in reduction or mitigation.	Minimal.	Annoyance.	Not significant. Refer to Appendix C of the Application Pack for further information on noise impacts.

5 Table A3 – Fugitive Emissions Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Emission releases, including dust, from the main building when opening and closing doors.	Immediate area and Humber Estuary FLL and Humber Estuary SAC/SPA/Ramsar/ SSSI– air.	Air, surface runoff, direct contact.	The majority of waste and residue handling activities will be undertaken within an enclosed building. Waste arrives enclosed. The only storage of waste not within a building is the bulk liquid storage. Therefore, there will be minimal potential for dust arisings which could leave the site boundary due to the nature of the waste and its handling in enclosed containers and enclosed buildings.	Low.	Nuisance, dust on clothing and cars, suffocation of vegetation in surrounding habitats and dust deposits within the Humber Estuary.	Insignificant.
Spillage of waste during delivery and offloading.	Immediate area – air, land, water.	Air, surface runoff.	Waste will be delivered in enclosed vehicles. All waste unloading activities will be undertaken under an enclosed/covered area. All	Minimal.	Nuisance and dust, suffocation of vegetation in surrounding habitats and dust deposits	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			waste offloading and storage areas are impermeable concrete and bunded. Therefore, blocking the pathway of spillages to outside the site boundary and into ecological designations.		within the Humber Estuary.	
Dust from waste deliveries being blown off-site.	Immediate area and Humber Estuary FLL and Humber Estuary SAC/SPA/Ramsar/ SSSI – air, land.	Air, surface runoff.	Waste will be delivered in enclosed vehicles. All waste unloading activities will be undertaken under an enclosed/covered area on impermeable surfaces. The nature of the waste is such that there is minimal potential for dust arisings which could leave the site boundary.	Minimal.	Nuisance and dust.	Insignificant.
Bottom ash discharge from the Facility.	Immediate area – air.	Air, surface runoff, direct contact.	Dust from bottom ash will be contained within a fully enclosed system.	Low.	Nuisance.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			The ash will fall into the ash chamber underneath the rotary kiln and from there automatically discharged using dedicated screw conveyors to a skip equipped with a hood. All ash leaves the process dry. Once the ash container is full it will be sprayed with water and transferred to Building 29 for storage and analysis. After analysis is completed, it will then be sent to most appropriate disposal route based on chemical analysis. Therefore, blocking the pathway of dust arising from bottom ash spreading to outside the site boundary and impacting on ecological designations.			
Discharge of Air Pollution Control	Immediate area – air, land.	Air, surface runoff, direct contact.	APCr will be collected in sealed $1m^3$ 'Big Bags'. The Big Bags will	Low.	Nuisance, release of hazardous dust.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
residues (APCr) from the Facility.			be stored in Building 29 prior to transfer offsite in curtain-sided vehicles. Therefore, blocking the pathway of residues arising from APCr spreading to outside the site boundary and impacting on ecological designations.			
Reagent and chemical discharges when filling silos.	Immediate area – air.	Air, surface runoff, direct contact.	Reagents such as sodium bicarbonate will be delivered in sealed tankers and off-loaded via a standard pneumatic hose connection. Air displaced from the silo will be discharged through fabric filters on the top of the silo where reagents are of a solid/powdered form. Regular inspections and maintenance of abatement equipment. Unloading activities will only be undertaken by suitably trained personnel in areas of impermeable surface and	Low.	Nuisance.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			sealed drainage. Therefore, blocking the pathway of spillages to outside the site boundary and impacting on ecological designations.			
Sodium Bicarbonate leak during injection into APCr system.	Immediate area – air.	Air, surface runoff, direct contact.	Systems are enclosed, and regular inspections & maintenance will be carried out. Reagent will be injected via an enclosed dosing and auger system.	Low.	Nuisance.	Insignificant.
Spillage of APC reagents when capping or changing filter bags.	Immediate area – air, land.	Air, surface runoff, direct contact.	Enclosed system. Kept under suction by the ID fan. The fabric filter will have a number of cells. When capping or changing bags, the relevant cell will be shut down for a sufficient time to enable the dust to settle. Monitoring of bags will be part of routine checks and bag changeover will be managed by	Low.	Nuisance, release of hazardous dust.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			HRG Treatment employees when plant is operational.			
Spillage/leak of liquid chemicals when tanker off-loading.	Immediate area – air, land.	Air, direct contact.	Deliveries will be from sealed tankers and off-loaded via a hose by suitably trained personnel. Spillage will be prevented by good operating procedures, high tank level alarm/trips etc. Tanks will be located within suitably designed secondary containment with sealed drainage systems. All offloading areas are impermeable concrete. Therefore, blocking the pathway of spillages to outside the site boundary and impacting on ecological designations.	Low.	Liquid or vapour release.	Insignificant.
Spillage/leak when unloading from delivery vehicles chemical containers	Immediate area – air, land.	Air, direct contact.	Deliveries will be from road vehicles and off-loaded via FLT. Potential leaks/spills will be prevented by experienced	Low.	Hazardous liquid or vapour release.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
(IBC's, FIBC's, drums, etc).			mobile equipment operators undertaking unloading activities. Unloading activities will only be undertaken in areas of impermeable surface with sealed contained drainage. Chemical containers will be stored within suitably designed secondary containment with sealed drainage systems after waste reception is completed. Waste reception and offloading area will have impermeable surface and sealed drainage and bunding. This is under a canopy to prevent water ingress. Therefore, blocking the pathway of spillages to outside the site boundary and impacting on ecological designations.			
Release off-site of litter.	Immediate area and Humber Estuary FLL	Air, direct contact.	Waste will be delivered in enclosed vehicles and unloading	Low.	Nuisance, dust on cars and road, fauna	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
	and Humber Estuary SAC/SPA/Ramsar/ SSSI– air, land.		of all waste bins will be within an enclosed building. The nature of the waste will ensure that the risk of dust emissions is low.		ingesting litter, fauna entanglement in litter, spoiling of flora.	
Release of dusts from the transfer off-site of bottom ash.	Immediate area and Humber Estuary FLL and Humber Estuary SAC/SPA/Ramsar/ SSSI – air, land.	Air, direct contact.	Dust from bottom ash will be contained within a fully enclosed system. The ash will fall into the ash chamber underneath the rotary kiln and from there automatically discharged using dedicated screw conveyors to a skip equipped with a hood. All ash will then be removed to Building 29 for analysis. Once analysis is completed, ash will be transferred to appropriate end disposal. Therefore, blocking the pathway of dust arising from bottom ash spreading to outside the site	Low.	Nuisance, dust on cars and road.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			boundary and impacting on ecological designations.			
Re-suspension of dust from road surface, when site vehicles arrive/leave.	Immediate area and Humber Estuary FLL and Humber Estuary SAC/SPA/Ramsar/ SSSI – air, land, water.	Air, surface runoff.	Control speeds, maintain the condition of the road, and take due care and attention of trafficking conditions. Regular road cleaning.	Low.	Nuisance, dust on cars and road.	Insignificant.

6 Table A4 – Accidents Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Spill during unloading of chemicals.	Immediate area – air, land, water.	Direct contact.	Training in unloading practices including accident/spill procedures. Under manual control, continual observation. Bulk liquids pumped by fixed pumps rather than using vacuum tanker pumps. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary and impacting on ecological receptors: • impermeable surfaces outdoors; • contained and sealed drainage for chemical handling areas with local	Unlikely.	Low.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			collection sumps for cleaning of any spillages; and • spill kits easily available for spills.			
Overfilling of vessels.	Local environment air, land, water.	Surface runoff, wind.	Training in unloading practices including accident/spill procedures. Under manual control, continual observation. High level alarms. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary and impacting on ecological receptors: • impervious surfaces outdoors; • secondary containment for storage vessels;	Unlikely.	Low.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			• contained and sealed drainage; and • actuated valves on high high level on tanks to control the flow of liquids.			
Leak of water from treatment plant, and leak of boiler water treatment chemicals.	Immediate area – water.	Surface runoff	Routine inspection and maintenance. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary and impacting on ecological receptors: • secondary containment for storage vessels; • impervious surface indoors; and • separate drains for process water and local bunding.	Unlikely.	Pollution of surface water.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Flue gas leak.	Local environment – air.	Air.	Design standards. Inspection and maintenance programme. Controls and alarms for pressure. Most of the systems are retained at negative pressure.	Very unlikely.	Pollution of atmosphere, health impacts.	Not significant.
Control failure leading to combustion control upset.	Local environment – air.	Air - Winds generally blow from a south westerly direction.	Fuel inspection. Design of control system. Monitoring of combustion conditions. Maintenance of combustion air systems.	Unlikely.	Pollution of atmosphere (short term), human health impacts.	Not significant.
Failure of emission abatement equipment.	Local environment – air.	Air - Winds generally blow from a south westerly direction.	Regular maintenance, inspections. Redundancy of critical equipment or spares in stock. Multistage dry gas cleaning and wet scrubbing provides contingency to allow waste emissions to be safely controlled until repairs are completed.	Unlikely.	Pollution of atmosphere, human health impacts.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Failure of emission monitoring systems.	Immediate area – air.	Air - Winds generally blow from a south westerly direction.	Regular maintenance, inspections. Service contract from supplier. Back-up CEMS system will be available.	Unlikely.	Lack of data, public concern.	Not significant.
Failure of containment (e.g. bund).	Immediate area – water, land.	Surface runoff, wind, leaching.	Regular inspections of bunds by site engineering team. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary and impacting on ecological receptors: • sealed drainage; • impermeable surface; and • where identified specialist membranes / linings are used for additional protection measures.	Unlikely.	Pollution of surface water.	Not significant.
Making the wrong connections to drains.	Local environment – water.	Direct contact, leaching.	Detailed site drainage plan, available to all staff. Isolation valves where appropriate to	Low.	Pollution of surface water.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			prevent release of contaminated water off-site. No water can be discharged offsite without treatment other than rainwater that is fed directly into lagoon. This system prevents harmful discharges to water that could impact ecological receptors, such as the Humber Estuary.			
Preventing incompatible substances from coming into contact.	Immediate area.	Surface runoff, wind, direct contact.	Due care and attention. MSDS easily available for chemicals on site. Pre-acceptance and acceptance samples taken and analysed thoroughly through well-equipped laboratory by trained chemists. Compatibility testing for any mixing, adiabatic and reaction calorimetry	Low.	Pollution of surface water, human health impacts.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			completed for any tank transfers or liquid bulking.			
Unwanted reactions.	Immediate area.	Surface runoff, wind, direct contact.	Due care and attention. Mixing and blending procedures. Desktop assessment and sign off prior to any processing. Compatibility testing.	Unlikely.	Low.	Not significant.
Loss of power.	None.	N/A	Back-up generation for combustion control systems. Controlled shutdown of the water treatment plant.	Low.	None.	Not significant.
Loss of compressed air.	None.	N/A	Multiple compressors, backup power supplies.	Low.	None.	Not significant.
Loss of boiler water.	None.	N/A	Failsafe shutdown.	Low.	None.	Not significant.
Steam leak to plant building/atmosphere.	Noise, visual impact.	Air	Statutory design, fabrication and inspection standards for steam systems. Controls and alarms for pressure. Routine operator checks.	Low.	Nuisance from noise and visual impact.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Residues handling failure.	Immediate area – air, land, water.	Direct contact.	Training in residue handling practices. Contained transfer systems. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary and impacting ecological receptors: • impermeable surfaces in residue handling areas; and • designated sealed drainage systems in areas where residues are stored.	Unlikely.	Pollution of surface waters.	Not significant.
Fires in FGT bag filter.	Local environment.	Air - Winds generally blow from a south westerly direction.	Temperature measurement in filter, fire-fighting systems and detection systems.	Low.	Dust, pollution of air.	Not significant.
Fire in furnace / waste feed system.	Immediate area – air.	Air.	Furnace charging procedures / training. Fire detection and fire-fighting systems. The backward flow of combustion gases and the	Low.	Pollution of air.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			premature ignition of waste will be prevented by keeping the furnace under negative pressure. The solid waste elevator and hopper system is isolated from the furnace through a pair of slide valves, where one is always closed. Feed systems are in high nitrogen and oxygen deficient atmosphere for process safety controls.			
Over pressurisation of the boiler.	Immediate area – air.	Direct contact.	The boiler will be fitted with a pressure release valve which will open to prevent over pressurisation / explosion of the boiler. Boiler inspected and cleaned annually and NDT tested where directed in accordance with pressure testing regulation.	Low.	Pollution of air.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Fires in all waste reception storage and handling areas.	Immediate area – air.	Direct contact.	Fire detection systems, water sprinklers and fire hoses. Fire marshals.	Low.	Visual impact, pollution of air.	Not significant.
Fire from ignition of lube oil leak.	Immediate area – air.	Wind, direct contact.	Use of fire-proof lube oil. Fire detection and protection systems.	Low.	Visual.	Not significant.
Contaminated fire water.	Immediate area – water, land.	Surface runoff, leaching.	Site drainage for external areas will be fitted with an isolation system, linked to the fire detection systems to contain any firefighting water from external areas. Contaminated fire water only stored locally within impermeable areas or can be pumped to “dirty” side (Area 1) of lagoon if required. No contaminated fire water can be discharged from site. This system prevents harmful discharges to water that could impact ecological	Low.	Pollution of surface water.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			receptors, namely the Humber Estuary.			
Failure to contain firewater.	Land.	Land, water, groundwater.	Maintenance of the shut-off valve/isolation system within the drainage system. In the event of a spillage, the following control measures are in place to control the pathway of spillages to outside the site boundary which could impact ecological receptors: • Inspection and maintenance of roadways and areas of Impermeable surfaces across plot I, where facility processes take place; and • all local bunded areas for waste storage segregated in accordance with HSG 51 and fitted with fire	Unlikely.	Release of chemicals to water.	Not significant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing The Risk	Assessing The Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			detection and suppression systems to minimise spread of fire and volume of fire water produced.			
Vandalism.	Immediate area.	Land, air, water.	Security fences, controlled entrance to the site, CCTV.	Low.	Release of substances to any environment.	Not significant.

7 Detailed Assessment

This assessment has been expanded by a more comprehensive Air Quality Assessment (see Appendix E of the Application Pack), full Noise Assessment (see Appendix C of the Application Pack), and a water quality modelling report (Appendix I of the Application Pack).

7.1 Emissions to Air

The assessment using the Environment Agency's H1 tool is presented in Appendix A of this report. Where appropriate, the H1 assessment draws in information contained in the Air Quality Assessment (presented in Appendix E of the Application Pack).

The detailed Air Quality Assessment presented in Appendix E concludes:

> *'The assessment has shown that emissions from the Facility would not result in any significant air quality effects. As such, there should be no air quality constraint in granting an EP to operate the Facility'*

7.2 Habitats Assessment

Habitats present within the appropriate screening distances from the stack were assessed in the Air Quality Assessment – refer to Appendix E of the Application Pack. At all local, European and UK statutory designated sites, the impact of the proposed development can be screened out as insignificant. Furthermore, where the impact of Local Wildlife Sites cannot be screened out as insignificant, taking into consideration the background concentrations of pollutants the impact can be described as not significant.

Sections 3 to 6 consider the environmental impacts of the facility operations to the ecological sensitive receptors, especially the closest receptor – Humber Estuary. Mitigation measures are designed with the intention to prevent emissions from escaping the site boundary and interacting with nearby ecological receptors. Sections 5 and 6 explain how the Facility is designed with the intention to prevent fugitive emissions and accidents (such as spillages) from escaping the site boundary and interacting with nearby ecological receptors, namely:

- waste unloading, handling and storage undertaken inside enclosed buildings;
- waste will be delivered in enclosed vehicles;
- the nature of the waste is not expected to give rise to dust;
- all waste offloading and storage areas are impermeable concrete, bunded, and with sealed drainage systems; and
- local collection sumps within chemical handling areas for cleaning of any spillages.

7.3 Emissions to water

Surface water run-off from non-buildings / roofs and impermeable concrete on plot I will be collected in the surface water drainage system or local collection tanks for roof-water run-off. Uncontaminated rainwater directly from roofs and canopies will be transferred from local tanks to the ''clean'' side (Area 2) of the lagoon. Surface water run-off from hardstanding will be directed from interceptors to the ''dirty'' side (Area 1) of the lagoon prior to treatment. Potentially contaminated surface water and uncontaminated rainwater is to be kept separate from process effluents from the thermal treatment process. Surface water will be treated through onsite WWT plant in Building 2 prior to re-use.

Under normal operating conditions all water harvested from roadways, as well as roof water, will be used as scrubber make up water.

In the event of flooding or high rainfall, uncontaminated roof water may be discharged to Humber estuary via pipeline.

Under normal operating conditions, wastewater will be generated from the following processes on site (excluding rainfall):

- reject water from the water treatment plant;
- process effluent (e.g. boiler blowdown);
- blowdown from the wet scrubber – this is treated in WWT plant within Building 12;
- low volumes of effluent generated through washing and maintenance procedures.

Waste waters from surplus boiler water and water treatment plant effluent will be recycled where possible and reused to make wet scrubber input water. Treated wet scrubber water after physiochemical treatment will either be recycled if possible through evaporator process or tested prior to transfer to a designated tank within Building 2 prior to final discharge to the Humber Estuary. The discharge will comply with the BAT-AELS for 'direct emissions to water' stated in the Waste Incineration BREF.

Therefore, the water streams that could be discharged to the Humber Estuary are:

- treated wet scrubber effluent after physiochemical treatment and confirmation from laboratory testing that it is within the EP emission limits; and
- uncontaminated roof water.

A H1 assessment was conducted (refer to Appendix A), which determined that water quality impacts could not be careened out, and water quality modelling was required. A water quality modelling report is provided in Appendix I of the Application Pack.

At this stage it not possible to provide a detailed composition of the effluent as it has not been generated. Therefore, for the purposes of the assessment, the assessment has utilised the emission limits within the EP (Ref: EPR/FP3935KL) for the Fawley HTI. For the purposes of the assessment, only those constituents which have an EQS have been considered. In addition, it is understood that some of the pollutants which have emission limits within the Fawley HTI EP have been banned in the UK for 15 years and more. Therefore, the following parameters have been excluded:

- Aldrin;
- Dichlorvos;
- Dieldrin;
- Fenitrothion; and
- Trifluralin.

The assessment confirms that the impact of emissions to water will generally achieve compliance within less than 5m of the outfall throughout the tidal cycle. In addition to compliance with the BAT-AELs, it is proposed that an Improvement Condition is included in the EP which requires HRG to undertake analysis of the treated effluent generated to confirm that it is in accordance with the emission parameters utilised within the water quality assessment.

7.4 Emissions to sewer

There are no readily accessible public sewers within the vicinity of the site. Therefore, a package treatment plant will be installed on-site to treat domestic effluents from the office building (Plot C). The treated effluent from this will either be tested for potential reuse onsite or suitability for

discharge to the Humber Estuary via the fixed pipeline. A separate EP application will be submitted for the operation of the package treatment plant.

7.5 Noise

The impact of noise from the Installation is considered in the noise assessment contained in Appendix C of the Application Pack. The assessment indicates a negligible and therefore not significant impact according to BS 4142 for the residential and ecological receptors.

7.6 Visual Impact

The visual impact of the Installation has not been considered in the EP application, since this is primarily a matter for the planning authorities.

7.7 Odour

The mitigation measures for odour are presented in Section 2.5.6 of the Supporting Information.

If these measures are not effective and there are complaints of odour which can be attributed to the Facility, HRG will develop and implement an odour management in consultation with the Environment Agency.

7.8 Global Warming

The assessment of the contribution of the Installation to Global Warming is complex. On the one hand, the Facility releases carbon dioxide to the atmosphere by the incineration of specialist waste, as well as an auxiliary fuel. On the other hand, the Installation generates electricity, which displaces other electricity generation, which would release carbon dioxide from the combustion of fossil fuels. In addition, the primary aim of the Facility is to safely dispose of specialist waste, regardless of any climate change impacts.

7.9 Disposal of Waste

Methods for residue recovery and disposal are considered in Section 2.12 of the Supporting Information.

8 Conclusions

As presented in this report, the Facility is considered to contain appropriate control measures and management systems to ensure that the Facility does not have any significant impacts upon the local environment.

Appendices

A H1 Assessment

ENGINEERING CONSULTING

FICHTNER

Consulting Engineers Limited

Kingsgate (Floor 3), Wellington Road North,
Stockport, Cheshire, SK4 1LW,
United Kingdom

t: +44 (0)161 476 0032
f: +44 (0)161 474 0618

www.fichtner.co.uk