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Appendix 1 - AS Modelling & Data Ltd Ammonia Modelling Report

1 Introduction

1.1 Background

This environmental risk assessment (ERA) has been carried out in support of an Environmental Permit application for a free range hen, intensive farming unit to be operated by Saunders House Farm Ltd. The ERA systematically evaluates any potential environmental risks and associated impacts of the proposed site activities. The methodology and results documented below are to be read in conjunction with all the relevant application documentation.

1.2 Summary of Proposed Operations

Free range hens will be housed in three sheds providing accommodation for a total of 77,000 free range hens. Each shed is equipped with a ventilation system providing the required frequency of air changes via high-speed ridge fans. An aviary type system, with manure belt, facilitates weekly removal of litter. Additional facilities on site include an onsite incinerator facility for carcass disposal and a standby generator. A detailed description of the proposed operations has been provided within the application report referenced MWG-R01-F2 – Installation Information.

1.3 Report Approach & Guidance

The ERA undertaken follows current Environment Agency (EA) guidance for undertaking ERA's in support of permit applications [Risk assessments for your environmental permit - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit)

. This ERA follows the EA methodology by:

- Identifying and considering potential environmental risks for the site, and the sources of the potential environmental risks.
- Identifying the potential receptors (people, animals, property and anything else that could be affected by the hazard) at risk from the site.
- Identifying the possible pathways from the sources of the potential risks to the identified receptors.
- Assessing the potential risks relevant to the specific activity and evaluating whether they are acceptable and can be screened out.
- Detailing risk control measures if the potential environmental risks are considered too high.

In summary, the following risks and associated impacts were evaluated when undertaking the ERA:

- Amenity (litter / vermin / mud / fire).
- Odour.
- Noise.
- Fugitive Air Releases (dust / bioaerosols).
- Surface Water.
- Groundwater.
- Air.
- Waste Produced.
- Global Warming Potential (GWP) / Photochemical Ozone Creation Potential (POP).

1.4 Report Format

This ERA follows the format detailed below:

- Introduction.
- Initial Assessment.
- Sensitive Receptors.
- Environmental Risk Assessments.
- Environmental Impact Evaluations.
- Conclusions and Improvements.

2 Initial Assessment

2.1 Methodology

The initial assessment, considers the potential environmental risks and impacts for both normal operations and abnormal/accident situations. Tables 2.2.1 and 2.2.2 below detail the results of the initial assessments and have been used to determine which combinations of operations and potential impacts require a further detailed assessment.

Where it is assessed that there is minimal or no potential for an environmental impact to occur, a brief explanation has been provided for each impact criterion and activity. For those potential risks and impacts that cannot immediately be effectively controlled further evaluation is required.:

‘RA’ indicates - further evaluation for assessing environmental risk has been undertaken as detailed in Section 4 of this report, for normal operations, abnormal operations or accident situations.

‘IA’ indicates- where more detailed evaluation of emissions is required and has been undertaken as detailed in Section 5 of this report.

2.2 Initial Assessment

Table 2.2.1 Initial Assessment – Normal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
Amenity (litter / vermin / mud / fire)	Pest control in place as part of the site assurance scheme. No risk of mud and litter as all operational areas covered in concrete / hardstanding and kept clean. No foreseeable fire risk from transport operations.	Pest control in place as part of the site assurance scheme. Hen units and feed systems contained and kept clean to ensure compliance with animal welfare requirements, therefore, no potential amenity issues. No risk of mud and litter as all operational areas covered in concrete /	Pest control in place as part of assurance scheme site works to. Litter removed from sheds via belt system into trailers and from site on a weekly basis, therefore, no potential amenity issues. No risk of mud and litter as all operational areas covered in concrete /	No foreseeable amenity issues from the operation of a generator at site under normal operations.	Pest control in place as part of assurance scheme site works to. No other foreseeable amenity issues from the operation of an incinerator at site under normal operations.

Table 2.2.1 Initial Assessment – Normal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
		hardstanding and kept clean. No foreseeable fire risk under normal operation from the housing of livestock.	hardstanding and kept clean. No foreseeable fire risk under normal operation from litter storage / removal.		
Odour	RA	RA	RA	No foreseeable odour issues from the operation of a generator at site under normal operations.	No foreseeable odour issues from the operation of an incinerator at site under normal operations.
Noise	RA	RA	RA	Given low potential for noise from operation of the generator and the distance of sensitive receptors from generator >500 metres, no further assessment required.	Given low potential for noise from operation of the incinerator and the distance of sensitive receptors from generator >500 metres, no further assessment required.
Fugitive Air Releases (Dust / Bioaerosols)	No risk of dust / bioaerosol from reception / removal of hens as all operational areas covered in concrete / hardstanding and bird transfers are infrequent.	RA	RA	No plausible dust / bioaerosol issues from the operation of an generator at site under normal operations.	No plausible dust / bioaerosol issues from the operation of an incinerator at site under normal operations.
Surface Water	No risk to surface waters from the transfer of birds under normal operations as livestock handling systems are contained.	No risk to surface water from livestock housing / laying hens under normal operations as livestock buildings are contained.	No risk to surface water from litter / manure storage and removal under normal operations as livestock buildings are contained, manure and	No foreseeable risk to surface water from the operation of a generator at site under normal operations.	No foreseeable risk to surface water from the operation of a incinerator at site under normal operations.

Table 2.2.1 Initial Assessment – Normal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
			litter removed in suitable containment.		
Groundwater	No risk to ground waters from the transfer of birds under normal operations as livestock handling systems are contained.	No risk to ground water from livestock housing / laying hens under normal operations as livestock buildings are contained.	No risk to ground water from litter / manure storage and removal under normal operations as livestock buildings are contained, manure and litter removed in suitable containment.	No foreseeable risk to ground water from the operation of a generator at site under normal operations.	No foreseeable risk to ground water from the operation of an incinerator at site under normal operations.
Air	No point source emissions to air from bird transfers that site have direct control over.	IA	IA	IA	IA
Waste	No waste generated from bird transfers under normal operations.	IA	No waste generated under normal operations.	No waste generated under normal operations.	IA
GWP / POP	No point source / fugitive emissions to air from bird transfers that site have direct control over.	No point source / fugitive emissions to air from bird housing that site have direct control over.	No point source / fugitive emissions to air litter / manure storage / transfers that site have direct control over.	IA	IA

Table 2.2.2 Initial Assessment – Abnormal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
Amenity (litter / vermin / mud / fire)	Pest control in place as part of the site assurance scheme.	Pest control in place as part of the site assurance scheme.	Pest control in place as part of the site assurance scheme.	No foreseeable amenity issues from the operation	Pest control in place as part of the site assurance scheme.

Table 2.2.2 Initial Assessment – Abnormal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
	No risk of mud and litter as all operational areas covered in concrete / hardstanding and kept clean. No foreseeable fire risk from transport operations.	Hen units and feed systems contained and kept clean to ensure compliance with animal welfare requirements, therefore, no potential amenity issues. No risk of mud and litter as all operational areas covered in concrete / hardstanding and kept clean. Fire - RA	Litter removed from sheds via belt system into trailers and from site on a weekly basis, therefore, no potential amenity issues. No risk of mud and litter as all operational areas covered in concrete / hardstanding and kept clean. No fire risk under abnormal operation from litter storage / removal.	of a generator at site under normal operations. Fire - RA	No foreseeable amenity issues from the operation of an incinerator at site under normal operations. Fire - RA
Odour	RA	RA	RA	Given low potential for odour from operation of the generator and the distance of sensitive receptors from generator >500 metres, no further assessment required.	RA
Noise	RA	RA	RA	Given low potential for noise from operation of the generator and the distance of sensitive receptors from generator >500 metres, no further assessment required.	Given low potential for noise from operation of the incinerator and the distance of sensitive receptors from generator >500 metres, no further assessment required.
Fugitive Air Releases (dust / bioaerosols)	No risk of dust / bioaerosol from reception / removal of hens as all	RA	RA	No plausible dust / bioaerosol issues from the operation of the	RA

Table 2.2.2 Initial Assessment – Abnormal Operations					
Impact / Process – Operations	Transportation of Livestock	Livestock Housing / Laying Hens	Litter and Manure Storage / Removal	Generator	Incinerator
	operational areas covered in concrete / hardstanding and bird transfers are infrequent.			generator at site under normal operations.	
Surface Water	RA	RA	RA	RA	RA
Groundwater	RA	RA	RA	RA	RA
Air	No point source emissions to air from bird transfers that site have direct control over.	RA	IA	RA	RA
Waste	RA	RA	RA	RA	RA
GWP / POP	No point source / fugitive emissions to air from bird transfers that site have direct control over.	No point source / fugitive emissions to air from bird housing that site have direct control over.	No point source / fugitive emissions to air litter / manure storage / transfers that site have direct control over.	RA	RA

3 Sensitive Receptors

3.1 Site Location

The site is located at the following address: Saunders House Farm, Norbeck Bank, Rokeby, Barningham, County Durham, England, DL11 7EB, United Kingdom

The centre of the site is at National Grid Reference (NGR) NZ 08821 11661.

Site plans outlining the site location and the receptors identified below can be found in the supporting report referenced – MWG-R06-F1.

3.2 Sensitive Receptors

Table 3. 1 below details sensitive receptors identified within a 2 kilometre radius (unless otherwise specified), of the proposed installation boundaries. For clarity only the closest receptor in each direction is listed.

Table 3.1 - Sensitive Receptors			
Receptor Classification	Compass Direction	Approx Distance from the Proposed Installation¹	Plan Reference²
Human Occupied Receptors (within 1 km)			
Residential	W	c. 0.26 km	R1
	N	c. 0.96 km	R2
	SSW	c. 0.72 km	R3
	Farm workers housed on the farm. This receptor is not marked on the receptor plan.		
Industrial / Commercial / Offices	None identified within 1 km.		
Habitat Receptors³			
Ramsar (England) (within 5km)	None identified within 5 km.		
Brignall Banks SSSI (England) (within 5km)	NW	c. 0.85 km	H1
Special Areas of Conservation (England) (within 5km)	None identified within 5 km.		
Special Protection Areas (England) (within 5km)			
Local Nature Reserve (England)	None identified within 2 km.		
National Nature Reserve (England)	None identified within 2 km.		
Ancient Woodland	NW	c. 0.85 km	H2
Water Resource Receptors (within 1 km)			
Land Drain	N	c. 0.29 km	W1

Table 3.1 - Sensitive Receptors			
Receptor Classification	Compass Direction	Approx Distance from the Proposed Installation ¹	Plan Reference²
Land Drain	W	c. 0.76 km	W2
Pond	E	c.0.08 km	W3
Land Drain	S	c.0.5 km	W4
Ground Water ³	The site is located on a Secondary Aquifer.		
	The site is not within a Source Protection Zone or a Drinking Water Safeguard Zone.		
Other Receptors			
Highways and Transportation ⁴	NW	c. 0.31 km	T1
Air Quality Management Areas ⁵	Site is not located within an Air Quality Management Area.		
Scheduled Monuments (within 1km)	None identified within 1 km.		
Table Notes:			
*: Closest receptor identified from the Hen Unit Sheds.			
1: Distance shown measured using Ordnance Survey data provided by Promap.			
2: Locations shown on Sensitive Receptor Plan, Report Ref MWG-R06-F1.			
3: Habitat / Groundwater Source Protection Zones areas identified using the MAGIC Website, January 2024.			
4: Closest local road network only.			
5: AQMA locations reviewed through DEFRA's website – January 2024.			

4 Environmental Risk Assessment

4.1 Methodology

The risk assessment has been undertaken for each potential environmental risk identified in the tables set out in section 2.2 above, for normal operations, abnormal operations and accident situations, where **RA** has been stated. The risk classification assigned has been evaluated by assessing the likelihood of an incident occurring and the severity of impact should it occur, using the following methodology.

Table 4.1 – Environmental Risk Scoring Matrix		
Score	Description	Definition
Probability of an event occurring		
1	Very Low	Extremely unlikely to occur (<1 per 10 years)
2	Low	Unlikely to occur (<1 per year)
3	Moderate	Could occur (1 per year)
4	High	Could occur frequently (>1 per year)
5	Very High	Could occur continuously
Severity of impact should the event occur		
1	Very Low	Negligible impact
2	Low	Minor impact (contained in localised area on site & recoverable)
3	Moderate	Medium impact (contained within site boundary & recoverable)
4	High	Major impact (spread off site &/or difficult to recover)
5	Very High	Major impact (spread off-site & long term/permanent damage)

The Probability (P) and Severity (S) scores assigned to each item are then multiplied together to provide a total risk assessment score (R):

$$\text{Risk} = \text{Probability} \times \text{Severity}$$

$$R = P \times S.$$

Scores are considered to be high or low risk using the following risk classification:

< 10 – Low Risk – Insignificant

≥10 – High Risk - Significant Risk

Where the residual risks are found to be significant a more detailed assessment will be undertaken, or improvements i.e. additional control measures implemented, to mitigate the risks will be recommended within the conclusions section of this report.

4.2 Pre-Requisite Policies and Procedures

The procedures and policies to be implemented at the site to minimise the potential for environmental risk that form part of the sites Environmental Management System are summarised within the report referenced MWG-R04-F1. These policy and procedures, along with the identified impact control measures, have been considered when calculating the residual risk.

4.3 Risk Assessment Key

The tables set out below detail the risk assessments undertaken based on the methodology outlined above, for all activities and associated impacts recorded as a 'RA' in Tables 2.2.1 and 2.2.2.

Table 4.3 below summaries the abbreviations and notes associated with the risk assessments.

Table 4.3 – Table Key	
Letter / Symbol	Abbreviation
P	Probability
S	Severity (Impact / Consequence)
R	Risk Level
N	Normal
A	Abnormal
E	Emergency (accident).
<p>General Notes –</p> <ol style="list-style-type: none"> 1. This is an Environmental Risk Assessment. No account of Health and Safety risk assessments (human receptors) have been considered in the tables below. 2. All contingency planning requirements are dealt with in the Environmental Accident Management Plan and associated procedures. 	

4.4 Risk Assessment Tables

Table 4.4.1: Transportation of Livestock						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Odour > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Odours from livestock and associated transport vehicles.	N / A / E	<ul style="list-style-type: none"> The Hens delivered and removed from site are clean in line with animal welfare requirements. Livestock transport vehicles kept clean, in line with animal welfare requirements. 	1	4	4
Noise > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Noise from livestock and associated transport vehicles.	N / A / E	<ul style="list-style-type: none"> Transport vehicles maintained under service contract. Site speed limit. Site access road well maintained. Hens handled by trained stockmen to ensure they are not startled. 	2	3	6
Surface Water > Ground / Groundwater Watercourses Closest watercourse is c.290 metres from the Hen Units.	Livestock vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils that escape off site into surface waters.	A / E	<ul style="list-style-type: none"> Site speed limit enforced. Vehicles maintained under surface contract. Livestock vehicles on site for only a brief period of time. 	1	4	4
	Fuel leaks from parked vehicles that escape off site into surface waters.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Livestock vehicles on site for only a brief period. 	2	4	8
Ground Water > Groundwater	Livestock vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils that	A / E	<ul style="list-style-type: none"> Site speed limit enforced. Vehicles maintained under surface contract. Vehicles on site for only a brief period. 	1	4	4

Table 4.4.1: Transportation of Livestock						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Underlying ground / groundwater. Site located on a secondary aquifer and not within a Source Protection of Drinking Water safeguard zone.	escape off site to ground / groundwater.					
	Fuel leaks from parked vehicles that escape off site into ground / groundwater.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Livestock vehicles on site for only a brief period. 	2	4	8
Waste > Production of Waste	Waste generated from the clean-up of spilt fuels / oils from transport vehicles.	A / E	<ul style="list-style-type: none"> Staff trained in spill containment and control procedures. Dedicated containers used for the clean-up and handling of waste to ensure waste generation is kept to a minimum. 	2	3	6

Table 4.4.2: Livestock Housing / Laying Hens						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Amenity > Air > Humans	Equipment electrical resulting in fire.	A / E	<ul style="list-style-type: none"> Key equipment maintained under service contract. 	1	5	5
Closest human occupied receptor is c.530 metres from the Hen Units.						
Odour > Air > Humans	Odours from hen units / ranging hens.	N / A / E	<ul style="list-style-type: none"> Livestock kept clean as per animal welfare requirements. 	1	4	4

Table 4.4.2: Livestock Housing / Laying Hens						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Closest human occupied receptor is c.530 metres from the Hen Units.						
Noise > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Noise from hen units / ranging hens.	N / A / E	<ul style="list-style-type: none"> With exception of the pop holes the Hen units are contained. Hens handled by trained stockmen to ensure they are not startled. Hens welfare at the unit monitored by a dedicated stockman. Operations on site undertaken in such a manner as to not startle livestock. 	3	2	9
	Noise from feed / fuel delivery vehicles.	N / A / E	<ul style="list-style-type: none"> Site speed limit enforced. Vehicles maintained under surface contract. 	2	3	6
Fugitive Releases – Dust / Bio Aerosols > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Dust / bioaerosols from the Hen units and associated feed systems.	N / A / E	<ul style="list-style-type: none"> Units ventilated and systems maintained under service contract. Feed stored in contained silo. Feed distribution systems contained. Feed delivered by suitably trained drivers to prevent overfilling of feed silos. Spillages of feed cleaned promptly. With exception of the pop holes the Hen units are contained. Housing and livestock kept clean to ensure animal welfare requirements are met. 	3	3	9

Table 4.4.2: Livestock Housing / Laying Hens						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
			<ul style="list-style-type: none"> Stocking density in line with animal welfare requirements. 			
Surface Water > Ground / Groundwater Watercourses Closest watercourse is c.290 metres from the Hen Units.	Failure of housing and dirty water systems leading to significant loss of materials, including litter, feed and wash waters. Materials enter ground / surface water.	A / E	<ul style="list-style-type: none"> Floor of the hen units is impermeable and resistant to spoiled litter. Wash water collection sumps and associated drains are impermeable, corrosion resistant and form part of the Infrastructure Monitoring Programme implemented on site. Only dry feeds are used on site. 	1	4	4
	Feed delivery vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils, feed that escape off site to ground / groundwater.	A / E	<ul style="list-style-type: none"> Site speed limit enforced. Vehicles maintained under surface contract. Vehicles on site for only a brief period. Only dry feed used on site. 	1	4	4
	Fuel leaks from parked vehicles that escape off site into ground / groundwater.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Livestock vehicles on site for only a brief period. 	2	4	8
	Fire, resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Key equipment maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. 	1	5	5

Table 4.4.2: Livestock Housing / Laying Hens						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
			<ul style="list-style-type: none"> Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 			
Ground Water > Groundwater Underlying ground / groundwater. Site located on a secondary aquifer and not within a Source Protection of Drinking Water safeguard zone.	Failure of housing and dirty water systems leading to significant loss of materials, including litter, feed and wash waters. Materials enter ground / surface water.	A / E	<ul style="list-style-type: none"> Floor of the hen units is impermeable and resistant to spoiled litter. Wash water collection sumps and associated drains are impermeable, corrosion resistant and form part of the Infrastructure Monitoring Programme implemented on site. Only dry feeds are used on site. 	1	4	4
	Feed delivery vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils that escape off site to ground / groundwater.	A / E	<ul style="list-style-type: none"> Site speed limit enforced. Vehicles maintained under surface contract. Vehicles on site for only a brief period. Only dry feed used on site. 	1	4	4
	Fuel leaks from parked vehicles that escape off site into ground / groundwater.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Livestock vehicles on site for only a brief period. 	2	4	8
	Fire, resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Key equipment maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. 	1	5	5

Table 4.4.2: Livestock Housing / Laying Hens						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
			<ul style="list-style-type: none"> Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 			
Point Source Air Releases > Atmosphere > Habitats Brignall Banks SSSI and Ancient Woodland c.850 metres from site.	Failure / malfunction of site ventilation systems resulting in poor dispersion of hen unit air, impacting on atmosphere / identified habitats.	A / E	<ul style="list-style-type: none"> Ventilation systems maintained under service contract. Performance of ventilation systems monitored daily by operatives. 	1	5	5
Waste > Production of Waste	Waste generated from the clean-up of spilt fuels / oils / feed from feed delivery vehicles.	A / E	<ul style="list-style-type: none"> Staff trained in spill containment and control procedures. Dedicated containers used for the clean-up and handling of waste to ensure waste generation is kept to a minimum. 	2	3	6

Table 4.4.3: Litter and Manure Storage / Removal						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Odour > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Odours from hen litter / manure.	N / A / E	<ul style="list-style-type: none"> Litter removed from sheds and directly off site on a weekly basis. Collected litter removed in sheeted trailer. 	2	2	4

Table 4.4.3: Litter and Manure Storage / Removal						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
<p>Noise > Air > Humans</p> <p>Closest human occupied receptor is c.530 metres from the Hen Units.</p>	Noise from vehicles collecting litter / manures.	N / A / E	<ul style="list-style-type: none"> • Transport vehicles maintained under service contract. • Site speed limit. • Site access road well maintained. 	2	3	6
<p>Fugitive Releases – Dust / Bio Aerosols > Air > Humans</p> <p>Closest human occupied receptor is c.530 metres from the Hen Units.</p>	Dust / bioaerosols from litter / manure systems / transport vehicles.	N / A / E	<ul style="list-style-type: none"> • Litter removed from sheds and directly off site on a weekly basis. • Collected litter removed in sheeted trailer. 	3	2	6
<p>Surface Water > Ground / Groundwater > Watercourses</p> <p>Closest watercourse is c.290 metres from the Hen Units.</p>	Failure of litter / manure belt and / or collection trailer leading to significant loss of materials. Materials enter ground / surface water.	A / E	<ul style="list-style-type: none"> • Floor of the hen units is impermeable and resistant to spoiled litter. • Litter collected in a dedicated trailer prior to transfer off site. 	2	3	6
	Litter / manure collection vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils, litter that escape off site to ground / groundwater.	A / E	<ul style="list-style-type: none"> • Site speed limit enforced. • Collection trailers sheeted. • Vehicles maintained under surface contract. • Vehicles on site for only a brief period. 	1	4	4

Table 4.4.3: Litter and Manure Storage / Removal						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
	Fuel leaks from parked vehicles that escape off site into ground / groundwater.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Vehicles on site for only a brief period. 	2	4	8
Ground Water > Groundwater Underlying ground / groundwater. Site located on a secondary aquifer and not within a Source Protection of Drinking Water safeguard zone.	Failure of litter / manure belt and / or collection trailer leading to significant loss of materials. Materials enter ground / surface water.	A / E	<ul style="list-style-type: none"> Floor of the hen units is impermeable and resistant to spoiled litter. Litter collected in a dedicated trailer prior to transfer off site. 	2	3	6
	Litter / manure collection vehicle fuel containment failure, or collision leading to significant spillage of materials, including vehicle fuels and oils, litter that escape off site to ground / groundwater.	A / E	<ul style="list-style-type: none"> Site speed limit enforced. Collection trailers sheeted. Vehicles maintained under surface contract. Vehicles on site for only a brief period. 	1	4	4
	Fuel leaks from parked vehicles that escape off site into ground / groundwater.	A / E	<ul style="list-style-type: none"> Vehicles maintained under surface contract. Vehicles on site for only a brief period. 	2	4	8
Waste > Production of Waste	Waste generated from the clean-up of spilt fuels / oils / litter from feed delivery vehicles.	A / E	<ul style="list-style-type: none"> Staff trained in spill containment and control procedures. Dedicated containers used for the clean-up and handling of waste to ensure waste generation is kept to a minimum. 	2	3	6

Table 4.4.4: Generator						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Amenity > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Malfunction of the generator resulting in fire.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. Generator tested weekly on full load. 	1	5	5
Surface Water > Ground / Groundwater Watercourses Closest watercourse is c.290 metres from the Hen Units.	Fuel spill during delivery, from vehicle collision, during filling or overfilling of fuel tank, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Spills cleaned up immediately. Site speed limit. Generator included as part of the site's infrastructure monitoring programme. 	2	3	6
	Generator poorly maintained leading to tank / pipe work failure, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. 	1	4	4
	Fire, resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 	1	5	5
Ground Water > Groundwater	Fuel spill during delivery, from vehicle collision, during filling or overfilling of fuel tank, resulting in	A / E	<ul style="list-style-type: none"> Spills cleaned up immediately. Site speed limit. 	2	3	6

Table 4.4.4: Generator						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Underlying ground / groundwater. Site located on a secondary aquifer and not within a Source Protection of Drinking Water safeguard zone.	the escaped materials entering ground / surface water.		<ul style="list-style-type: none"> Generator included as part of the site's infrastructure monitoring programme. 			
	Generator poorly maintained leading to tank / pipe work failure, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. 	1	4	4
	Fire resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 	1	5	5
Point Source Air Releases > Atmosphere > Habitats / GWP Brignall Banks SSSI and Ancient Woodland c.850 metres from site.	Failure / malfunction of generator, resulting in release to atmosphere of gases following incomplete combustion of fuel.	A / E	<ul style="list-style-type: none"> Generator maintained under service contract. 	1	5	5
Waste > Production of Waste	Waste generated from the clean-up of spilt fuels / oils / litter from fuel delivery vehicles.	A / E	<ul style="list-style-type: none"> Staff trained in spill containment and control procedures. Dedicated containers used for the clean-up and handling of waste to ensure waste generation is kept to a minimum. 	2	3	6

Table 4.4.5: Incinerator						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Amenity > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Malfunction of the incinerator resulting in fire.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. 	1	5	5
Odour > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Odour from fallen stock left in the incinerator, left to degrade.	A / E	<ul style="list-style-type: none"> Fallen stock incinerated within 24 hours of being placed within the incinerator. 	2	3	6
Fugitive Releases – Dust / Bio Aerosols > Air > Humans Closest human occupied receptor is c.530 metres from the Hen Units.	Spillage of ash from the operation of the incinerator.	A / E	<ul style="list-style-type: none"> Only small volumes of ash generated. 	4	2	8
Surface Water > Ground / Groundwater Watercourses Closest watercourse is c.290 metres from the Hen Units.	Fuel spill during delivery, from vehicle collision, during filling or overfilling of fuel tank, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Spills cleaned up immediately. Site speed limit. Incinerator included as part of the site's infrastructure monitoring programme. 	2	3	6
	Incinerator poorly maintained leading to tank / pipe work failure, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. 	1	4	4

Table 4.4.5: Incinerator						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
	Fire resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 	1	5	5
Ground Water > Groundwater Underlying ground / groundwater. Site located on a secondary aquifer and not within a Source Protection of Drinking Water safeguard zone.	Fuel spill during delivery, from vehicle collision, during filling or overfilling of fuel tank, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Spills cleaned up immediately. Site speed limit. Incinerator included as part of the site's infrastructure monitoring programme. 	2	3	6
	Incinerator poorly maintained leading to tank / pipe work failure, resulting in the escaped materials entering ground / surface water.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. 	1	4	4
	Fire resulting in firewater escaping from site.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. Safe handling of combustible materials in line with assurance scheme requirements. Spill kits on site that can be used to block surface water drains to contain and prevent the release of firewater from site. 	1	5	5

Table 4.4.5: Incinerator						
Potential Risks ¹			Control Measures	Assessment		
Environmental Risk > Pathway > Receptors	Initiating Event	Condition N/A/E	Risk Management Controls ²	Residual Risk		
				P	S	R
Point Source Air Releases > Atmosphere > Habitats / GWP Brignall Banks SSSI and Ancient Woodland c.850 metres from site.	Failure / malfunction of incinerator, resulting in release to atmosphere of gases following incomplete combustion of fuel.	A / E	<ul style="list-style-type: none"> Incinerator maintained under service contract. 	1	5	5
Waste > Production of Waste	Waste generated from the clean-up of spilt fuels / oils / ash from fuel delivery vehicles.	A / E	<ul style="list-style-type: none"> Staff trained in spill containment and control procedures. Dedicated containers used for the clean-up and handling of waste to ensure waste generation is kept to a minimum. 	2	3	6

5 Detailed Impact Assessments

5.1 Introduction

The screening assessment detailed above sets out those activities and associated emissions that require a detailed Impact Assessment of their potential impacts under normal operations. Detailed Impacts for the following emissions:

- Air – Ammonia releases from livestock operations and combustion emissions from the site generator and incinerator.
- Waste – Waste produced from livestock operations.
- Global Warming Potential (GWP) and Photochemical Ozone Creation Potential (POCP) from site's proposed operations.

5.2 Releases to Air

5.2.1 Ammonia

The pre-application response provided by the Environment Agency within the document referenced 'Pre-application number: EPR/WP3024SG/P001' set out that *'detailed ammonia modelling is required for ammonia impacts on Brignall Banks SSSI.'*

The Environment Agency state that *'For SSSI a permit may be issued where the ammonia screening tool or detailed modelling demonstrates that either:*

- *the process contribution is <20% Critical Level and Critical Load; or*
- *the process contribution plus contributions from other relevant intensive farms is <50% Critical Level or Critical Load;*
- *the process contribution plus contributions from other relevant intensive farms plus background is below the relevant Critical Level or Critical Load.'*

Detailed ammonia modelling was undertaken by AS Modelling & Data Ltd. A copy of the modelling report has been provided within Appendix 1. The detailed modelling found that:

- *'The Process contributions from the proposed poultry houses would be below the Environment Agency's lower threshold percentage of both the Critical Level of 1.0 µg/m³ and the Critical Load of 10.0 kg/ha at Bignall Banks SSSI.'*

Therefore, the ammonia impact at the identified receptors are permissible.

5.2.2 Combustion Sources

There are two combustions sources on site –

- A Generator with a thermal input rating of less than 0.5 MWth.
- A fallen stock Incinerator that is compliant with current Animal By-Product Regulations.

Given the fact that-

- the size of the Generator can only result in negligible emissions.
- the incinerator conforms to EU Animal By-Products Regulation (ABPR) (EC) No 142/2011 which ensures it meets the necessary environmental standards.

Both sources are considered to be insignificant and no further detailed assessment is required.

5.3 Waste

5.3.1 Assessment of Wastes

Table 5.1 below identifies the waste streams produced on-site and assesses their potential for environmental impact. The potential for environmental impact of the recovery routes selected for the wastes identified have been assessed, including scoring them following Environment Agency guidance as set out on .gov.uk - <https://www.gov.uk/guidance/select-a-waste-recovery-or-disposal-method-for-your-environmental-permit>. Although classed as Animal By-Products / non-wastes, litter, fallen stock and wash waters have been included within the assessment below for completeness.

Table 5.1 – Waste Assessment						
EWC / Origin / Nature	Annual Volume	Description / Hierarchy	EA Hazard Rating	EA Impact Score	Hazard Rating x Impact Score	Assessment
02 01 06 – Litter from sheds. Non-Hazardous.	Anticipated to be 4,500 t per production cycle.	R10 - Land treatment resulting in benefit to agriculture or ecological improvement.	4	4	16	Material is an ABP and recovery to land represents the best available environmental option for the material. Therefore, considered as insignificant in terms of environmental impact.
02 01 06 – Wash waters Non-Hazardous.	Unknown	R10 - Land treatment resulting in benefit to agriculture or ecological improvement.	4	4	16	Material is an ABP and recovery to land represents the best available environmental option for the material. Therefore, considered as insignificant in terms of environmental impact.
02 01 02 - Hen Carcass / Fallen stock. Non-Hazardous.	Variable.	D10 - Incineration without energy recovery.	4	20	80	Materials is an ABP and incinerated in line with ABP and biosecurity requirements. In addition, the volume of waste produced is anticipated to be below Permit Reporting thresholds. Therefore, considered as insignificant in terms of environmental impact.
19 01 12 –Ash from on-site. Non-Hazardous.	< 5 t /yr	R10 - Land treatment resulting in benefit to agriculture or ecological improvement/	4	4	16	Recovery to land represents the best available environmental option for the material. Therefore, considered as insignificant in terms of environmental impact.
02 01 99 / Veterinary Waste from welfare activities.	Unknown and variable.	Returned to supplier.	2	N / A	2	Veterinary medicines will be supplied on an as required basis, therefore any wastage will be

Table 5.1 – Waste Assessment						
EWC / Origin / Nature	Annual Volume	Description / Hierarchy	EA Hazard Rating	EA Impact Score	Hazard Rating x Impact Score	Assessment
Non-Hazardous.						minimal and considered as insignificant in terms of environmental impact.
15.01.02 - Plastic packaging from raw materials. Non-Hazardous.	< 5 t /yr	R3 – Recycling	4	3	12	Recycling represents the best available environmental option for the material. In addition, the volume of waste produced is anticipated to be below Permit Reporting thresholds. Therefore, considered as insignificant in terms of environmental impact.

5.3.2 Conclusion

The majority of materials detailed above are sent for recovery to land for agricultural benefit, which is considered the best available environmental option for the stream. It is anticipated that all other streams produced will be at levels below Permit reporting thresholds. On this basis, all waste streams produced, and their associated disposal / recovery routes are considered to be insignificant in terms of environmental impact.

A review of wastes will be undertaken as required in the timescales specified in the Environmental Permit to provide a complete assessment of waste recovery.

5.4 Global Warming Potential (GWP) and Photochemical Ozone Creation Potential (POCP)

5.4.1 Introduction

Both the direct emissions from the facility and the indirect emissions from the use of energy have global warming potential (GWP) and these need to be calculated along with the Photochemical Ozone Creation Potential (POCP) of the site. These have been calculated following the Environment Agency guidance note on .gov.uk - <https://www.gov.uk/guidance/assess-the-impact-of-air-emissions-on-global-warming#identify-greenhouse-gas-emissions>.

5.4.2 Assessment

The table below outlines the GWP and POCP of the site based on the estimated energy consumption under normal operations. Energy consumption sources and levels are as follows -

- Electricity - 308 MWh.

Table 5.1 – Global Warming Potential Assessment								
Energy Source	Quantity of Fuel Used	Delivered Energy (MWh)	Primary Energy (MWh)	GWP CO ₂ (tonnes)	N ₂ O (GWP t CO ₂ equivalent)	VOC (GWP as t CO ₂ equivalent)	Total GWP (t / yr CO ₂ Equivalent)	Total POCP (kg / yr)
Electricity		308	739	123			123	
Reference Factors								
Electricity	Electricity converted to primary energy factor of 2.4;							
	Electricity converted to CO ₂ apply EA's H1 factor 0.166 t / MWh Primary							

6 Conclusion

The Environmental Risk Assessment identified a number of processes and activities on site that have the potential to create an environmental impact on identified environmentally sensitive receptors, under normal, abnormal and emergency (accident) scenarios.

The results of the Environmental Risk Assessment has been summarised in Table 6.1 below.

Table 6.1 Environmental Risk Assessment Summary	
Impact	Significance / Further Assessment
Amenity (litter / vermin / mud / fire).	Insignificant impact - no further assessment required.
Odour.	Insignificant impact - no further assessment required.
Noise.	Insignificant impact -no further assessment required.
Fugitive Air Releases (dust / bioaerosols).	Insignificant impact - no further assessment required.
Surface Water.	Insignificant impact - no further assessment required.
Groundwater.	Insignificant impact - no further assessment required.
Air.	Combustion Equipment - Insignificant impact - no further assessment required. Ammonia – Impacts shown to be Permittable.
Waste Produced.	Insignificant impact - no further assessment required.
Global Warming Potential (GWP) / Photochemical Ozone Creation Potential (POP).	Values calculated. No further assessment required.

Appendix 1 - AS Modelling & Data Ltd Ammonia Modelling Report