Title:	**BAT Assessment**
Report Reference:	**PWG-R03-F3**
Client:	**Linton Wold Farm**
Submitted To:	**Environment Agency**
Date:	**25-09-2024**
Main Contributor:	**Edward Bennett – AWSM Recycling Limited**

Report Issue History

Report Reference	*Details*
PWG-R03-D1	16-08-24 Draft for Internal Review
PWG-R03-F1	23-08-24 – Finalised for EA Issue
PWG-R03-F2	23-09-24 – Update with slurry store information.
PWG-R03-F3	25-09-24 – Updated with emission point details.

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Contents

1 Introduction

1.1 Background

The tables below provide the Best Available Technique (BAT) requirements for the operations covered by the Permit application at Linton Wold Farm along with details on how these are met by the proposed operation. The BAT requirements have been taken from relevant guidance documents as specified below:

- Table 1: EUCOMMISSION IMPLEMENTING DECISION (EU) 2017/302 of 15 February 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the intensive rearing of poultry or pigs.
- Tables 2 and 3: "EPR 6.09 Sector Guidance Note How to comply with your environmental permit for intensive farming".

2 BAT Assessment

2.1 Site Assessment v BAT

This Section of the report compares the proposed site operations against the BAT requirements as specified under Directive 2010/75/EU. The comparison has been undertaken and presented Table 1.1 below, by listing the relevant BAT requirements and detailing how the proposed site operations meets the criteria. In addition, it is worth noting that the facility only farms pigs and therefore parts of BAT document relating to other species / types of operation will not be relevant and have not been included within the Table below. Where other BAT clauses are deemed not applicable, "N/A" has been inserted in the 'Site BAT Assessment' column.

BAT Condition	Site BAT Assessment
1.1. Environmental management systems (EMS)	
BAT 1. In order to improve the overall environmental performance of farms, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features: 1. commitment of the management, including senior management; 2. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; 3. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; 4. implementation of procedures paying particular attention to: (a) structure and responsibility; (b) training, awareness and competence; (c) communication; (d) employee involvement; (e) documentation; (f) effective process control; (g) maintenance programmes; (h) emergency preparedness and response; (i) safeguarding compliance with environmental legislation.	The Environmental Management System implemented on site has been summarised within PWG-R04-F1. The farm is currently within an externally audited assurance scheme. While this primarily incorporates food safety and security controls above and beyond those outlined in current UK and EU legislation, it also covers environmental management aspects.

BAT Condition	Site BAT Assessment
5. checking performance and taking corrective action, paying particular attention to: (a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions from IED installations — ROM); (b) corrective and preventive action; (c) maintenance of records; (d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; 6. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management; 7. following the development of cleaner technologies; 8. Consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; 9. Application of sectoral benchmarking (e.g. EMAS Sectoral Reference Document) on a regular basis. Specifically for the intensive poultry or pig rearing sector, BAT is also to incorporate the following features in the EMS: 10. Implementation of a noise management plan (see BAT 9); 11. Implementation of an odour management plan (see BAT 12). Technical considerations relevant to applicability The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) is related to the nature, scale and complexity of the farm, and the range of environmental impacts it may have.	
Good Housekeeping	

BAT Condition	Site BAT Assessment
BAT 2. In order to prevent or reduce the environmental impact and improve overall performance, BAT is to use all the techniques given below. a Proper location of the plant/farm and spatial arrangements of the activities in order to: • reduce transport of animals and materials (including manure); • ensure adequate distances from sensitive receptors requiring protection; • take into account prevailing climatic conditions (e.g. wind and precipitation); • consider the potential future development capacity of the farm; • prevent the contamination of water. Items above may not be generally applicable to existing plants/farms.	Although restricted by existing site infrastructure, farm adaptations have been designed and located to ensure – • reduce transport of animals and materials (including slurry); • ensure adequate distances from sensitive receptors requiring protection; • take into account prevailing climatic conditions (e.g. wind and precipitation); • consider the potential future development capacity of the farm; • prevent the contamination of water.
b Educate and train staff, in particular for: • relevant regulations, livestock farming, animal health and welfare, manure management, worker safety; • manure transport and landspreading; • planning of activities; • emergency planning and management; • repair and maintenance of equipment. Items above generally applicable.	All staff are to be suitably trained in their job roles, covering the following items as relevant. • relevant regulations, livestock farming, animal health and welfare, manure management, worker safety; • slurry transport and landspreading; • planning of activities; • emergency planning and management; • repair and maintenance of equipment.
C Prepare an emergency plan for dealing with unexpected emissions and incidents such as pollution of water bodies. This can include: • a plan of the farm showing the drainage systems and water/effluent sources; • plans of action for responding to certain potential events (e.g. fires, leaking or collapsing of slurry stores, uncontrolled run-off from manure heaps, oil spillages); • available equipment for dealing with a pollution incident (e.g. equipment for plugging land drains, damming ditches, scum boards for oil spillages). Items above generally applicable.	An Environmental Accident Management Plan for dealing with unexpected emissions and incidents will be implemented as part of the EMS.

<table>
<tr><th>BAT Condition</th><th>Site BAT Assessment</th></tr>
<tr><td>d Regularly check, repair and maintain structures and equipment, such as:
• slurry stores for any sign of damage, degradation, leakage;
• slurry pumps, mixers, separators, irrigators;
• water and feed supply systems;
• ventilation system and temperature sensors;
• silos and transport equipment (e.g. valves, tubes);
• air cleaning systems (e.g. by regular inspections).

This can include cleanliness of the farm and pest management.

Items above generally applicable.</td><td>An Infrastructure Monitoring Program and Planned Preventive Maintenance Regime is implemented on site as part of the EMS, to ensure regular checks, repairs and maintenance of structures, plant and equipment is undertaken on environmentally critical items.</td></tr>
<tr><td>E Store dead animals in such a way as to prevent or reduce emissions.

Items above generally applicable.</td><td>Dead animals will be stored in covered containers prior to removal off site.</td></tr>
<tr><td colspan="2">Nutritional Management</td></tr>
<tr><td>BAT 3. In order to reduce total nitrogen excreted and consequently ammonia emissions while meeting the nutritional needs of the animals, BAT is to use a diet formulation and nutritional strategy which includes one or a combination of the techniques given below.

a. Reduce the crude protein content by using an N-balanced diet based on the energy needs and digestible amino acids- Generally applicable.
b. Multiphase feeding with a diet formulation adapted to the specific requirements of the production period - Generally applicable.
c. Addition of controlled amounts of essential amino acids to a low crude protein diet- Applicability may be restricted when low-protein feedstuffs are not economically available. Synthetic amino acids are not applicable to organic livestock production.
d. Use of authorised feed additives which reduce the total nitrogen excreted - Generally applicable.

<table>
<tr><th colspan="3">BAT-associated total nitrogen excreted</th></tr>
<tr><td>Parameter</td><td>Animal category</td><td>Parameter Animal category BAT-associated total nitrogen excreted (1) (2) (kg N excreted/animal place/year)</td></tr>
<tr><td></td><td>Weaners</td><td>1,5-4,0</td></tr>
</table>
</td><td>The diet formulation and nutritional strategy of the feed takes into consideration ammonia emissions associated with the operation, while maintaining animal welfare standards.</td></tr>
</table>

<table>
<tr><th>BAT Condition</th><th>Site BAT Assessment</th></tr>
<tr><td>
<table>
<tr><td rowspan="2">Total nitrogen excreted, expressed as N.</td><td>Fattening pigs</td><td>7,0-13,0</td></tr>
<tr><td>Sows (including piglets)</td><td>17,0-30,0</td></tr>
<tr><td colspan="3">(1) The lower end of the range can be achieved by using a combination of techniques.</td></tr>
</table>

The associated monitoring is in BAT 24. The BAT-associated total nitrogen excreted levels may not be applicable to organic livestock production and to the rearing of poultry species not indicated above.
</td><td></td></tr>
<tr><td>
BAT 4. In order to reduce the total phosphorus excreted, while meeting the nutritional needs of the animals, BAT is to use a diet formulation and a nutritional strategy which includes one or a combination of the techniques given below.

a. Multiphase feeding with a diet formulation adapted to the specific requirements of the production period.
b. Use of authorised feed additives which reduce the total phosphorus excreted (e.g. phytase).
c. Use of highly digestible inorganic phosphates for the partial replacement of conventional sources of phosphorus in the feed.
<table>
<tr><th>Parameter</th><th>Animal category</th><th>BAT-associated total phosphorus excreted (1) (2) (kg P2O5 excreted/animal place/year)</th></tr>
<tr><td rowspan="3">Total phosphorus excreted, expressed as P2O5.</td><td>Weaners</td><td>1,2-2,2</td></tr>
<tr><td>Fattening pigs</td><td>3,5-5,4</td></tr>
<tr><td>Sows (including piglets)</td><td>9,0-15,0</td></tr>
<tr><td colspan="3">(1) The lower end of the range can be achieved by using a combination of techniques.</td></tr>
</table>

The associated monitoring is in BAT 24. The BAT-associated total phosphorus excreted levels may not be applicable to organic livestock production and to the rearing of poultry species not indicated above.
</td><td>The diet formulation and nutritional strategy of the feed takes into consideration Phosphorus emissions associated with the operation, while maintaining animal welfare standards.</td></tr>
</table>

BAT Condition	Site BAT Assessment
Efficient use of water	
BAT 5. In order to use water efficiently, BAT is to use a combination of the techniques given below. a. Keep a record of water use. b. Detect and repair water leakages. c. Use high-pressure cleaners for cleaning animal housing and equipment. d. Select and use suitable equipment (e.g. nipple drinkers, round drinkers, water troughs) for the specific animal category while ensuring water availability (ad libitum). e. Verify and (if necessary) adjust on a regular basis the calibration of the drinking water equipment. f. Reuse uncontaminated rainwater as cleaning water.	The following water efficiency techniques are to be implemented on site – • Maintenance / inspection programmes will detect and instigate repairs of water leakages. • High-pressure cleaners will be used for cleaning animal housing and equipment. • Animal housing equipment is specific to the animal housed. • Drinking water equipment will be checked and calibrated to ensure efficient use of water. • Site will look to re-use uncontaminated rainwater where possible where this does not impact on bio-security.
Emissions from Wastewater	
BAT 6. In order to reduce the generation of wastewater, BAT is to use a combination of the techniques given below. a. Keep the fouled yard areas as small as possible. b. Minimise use of water. c. Segregate uncontaminated rainwater from wastewater streams that require treatment.	In order to reduce the generation of wastewater the site– - Will ensure water is used efficiently as set out above. - Has been designed to ensure new foul yard areas are as small as possible. - Segregate uncontaminated rainwater from wastewater streams that require treatment.
BAT 7. In order to reduce emissions to water from wastewater, BAT is to use one or a combination of the techniques given below. a. Drain wastewater to a dedicated container or to a slurry store. b. Treat wastewater. c. Landspreading of wastewater e.g. by using an irrigation system such as sprinkler, travelling irrigator, tanker, umbilical injector.	Any washwater generated will be collected on site, prior to transfer for spreading to land by Site Management / a suitably competent contractor.
Efficient Use of Energy	
Efficient use of energy BAT 8. In order to use energy efficiently in a farm, BAT is to use a combination of the techniques given below. a. High efficiency heating/cooling and ventilation systems. b. Optimisation of heating/cooling and ventilation systems and management, especially where air cleaning systems are used.	Site Management will ensure efficient use of energy by Permitted operations through adopting the following techniques – • High efficiency heating/cooling and ventilation systems. • Optimisation of heating/cooling and ventilation systems and management, especially where air cleaning systems are used.

BAT Condition	Site BAT Assessment
c. Insulation of the walls, floors and/or ceilings of animal housing. d. Use of energy-efficient lighting. e. Use of heat exchangers. One of the following systems may be used: 1. air-air; 2. air-water; 3. air-ground. f. Use of heat pumps for heat recovery. g. Heat recovery with heated and cooled littered floor (combideck system). (n/a for pig farms) h. Apply natural ventilation.	• Insulation of the walls, floors and/or ceilings of animal housing as appropriate. • Use of energy-efficient lighting.
Noise Emissions	
Noise emissions - BAT 9. In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up and implement a noise management plan, as part of the environmental management system (see BAT 1), that includes the following elements: i. a protocol containing appropriate actions and timelines; ii. a protocol for conducting noise monitoring; iii. a protocol for response to identified noise events; iv. a noise reduction programme designed to e.g. identify the source(s), to monitor noise emissions, to characterise the contributions of the sources and to implement elimination and/or reduction measures; v. a review of historical noise incidents and remedies and the dissemination of noise incident knowledge. Applicability - BAT 9 is only applicable to cases where a noise nuisance at sensitive receptors is expected and/or has been substantiated.	Given the distance to the nearest sensitive receptor from site, a Noise Management Plan is not required. Nonetheless, a Noise Management Plan would be developed and implemented should noise nuisance be identified and substantiated at sensitive receptors.
BAT 10. In order to prevent, or where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques given below. a. Ensure adequate distances between the plant/farm and the sensitive receptors - At the planning stage of the plant/farm, adequate distances between the plant/farm and the sensitive receptors are ensured by applying minimum standard distances. b. Equipment location. Noise levels can be reduced by: i. increasing the distance between the emitter and the receiver (by locating equipment as far away as practicable from sensitive receptors);	The farm is located away from receptors sensitive to noise. Nonetheless, Site Management look to reduce the potential for noise by – • Minimising the length of feed delivery pipes; • Locating feed bins and feed silos so as to minimise the movement of vehicles on the farm. • The closure of doors and major openings of buildings, especially during feeding time.

BAT Condition	Site BAT Assessment
ii. minimising the length of feed delivery pipes; iii. Locating feed bins and feed silos so as to minimise the movement of vehicles on the farm. c. Operational measures - These include measures, such as: i. closure of doors and major openings of the building, especially during feeding time, if possible; ii. equipment operation by experienced staff; iii. avoidance of noisy activities at night and during weekends, if possible; iv. provisions for noise control during maintenance activities; v. operate conveyers and augers full of feed, if possible; vi. keep outdoor scraped areas to a minimum in order to reduce noise from scraper tractors. d. Low-noise equipment - This includes equipment, such as: i. high efficiency fans, when natural ventilation is not possible or sufficient; ii. pumps and compressors; iii. feeding system which reduces the prefeeding stimulus (e.g. holding hoppers, passive ad libitum feeders, compact feeders). e. Noise-control equipment – i. noise reducers; ii. vibration isolation; iii. enclosure of noisy equipment (e.g. mills, pneumatic conveyers); iv. soundproofing of buildings. f. Noise abatement - Noise propagation can be reduced by inserting obstacles between emitters and receivers.	• Equipment operated by suitably trained and experienced staff; • Avoid the undertaking of noisy activities at night and during weekends; • Provisions for noise control during maintenance activities where required by H&S Regulations. • Operate conveyers and augers full of feed, if possible; • Keep outdoor scraped areas to a minimum in order to reduce noise from scraper tractors. • Use Low-noise equipment including high efficiency fans, when natural ventilation is not possible or sufficient. • Implement a planned preventive maintenance system to ensure all equipment is functioning as it should.
Dust emissions	
BAT 11. In order to reduce dust emissions from each animal house, BAT is to use one or a combination of the techniques given below. A Reduce dust generation inside livestock buildings. For this purpose, a combination of the following techniques may be used: 1. Use coarser litter material (e.g. long straw or wood shavings rather than chopped straw);	Site Management apply the following techniques, in order to reduce dust emissions from each animal house. • Apply ad libitum feeding; • Use enclosed dry feed systems and dry feed;

BAT Condition	Site BAT Assessment
2. Apply fresh litter using a low-dust littering technique (e.g. by hand); 3. Apply ad libitum feeding; 4. Use moist feed, pelleted feed or add oily raw materials or binders in dry feed systems; 5. Equip dry feed stores which are filled pneumatically with dust separators; 6. Design and operate the ventilation system with low air speed within the house.	• Design and operate the ventilation system with low air speed within the houses.
B Reduce dust concentration inside housing by applying one of the following techniques: 1. Water fogging; 2. Oil spraying; 3. Ionisation.	Full slated floor housing unit and not inherently dusty so not required.
C. Treatment of exhaust air by an air cleaning system, such as: 1. Water trap; 2. Dry filter; 3. Water scrubber; 4. Wet acid scrubber; 5. Bioscrubber (or biotrickling filter); 6. Two-stage or three-stage air cleaning system; 7. Biofilter.	Water trap only applicable to plants with a tunnel ventilation systems. Dry filter N / A due to the high implementation cost. Scrubbers N / A due to the high implementation cost. Biofilter N / A due to the high implementation cost.
Odour Emissions	
BAT 12. In order to prevent, or where that is not practicable, to reduce odour emissions from a farm, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes the following elements: i. a protocol containing appropriate actions and timelines; ii. a protocol for conducting odour monitoring; iii. a protocol for response to identified odour nuisance; iv. an odour prevention and elimination programme designed to e.g. identify the source(s), to monitor odour emissions (see BAT 26), to characterise the contributions of the sources and to implement elimination and/ or reduction measures; v. a review of historical odour incidents and remedies and the dissemination of odour incident knowledge. The associated monitoring is in BAT 26. BAT 12 is only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.	Given the distance to the nearest sensitive receptor from site, a Odour Management Plan is not required. Nonetheless, an Odour Management Plan would be developed and implemented should odour nuisance be identified and substantiated at sensitive receptors.

BAT Condition	Site BAT Assessment
BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions and/or odour impact from a farm, BAT is to use a combination of the techniques given below. A. Ensure adequate distances between the farm/plant and the sensitive receptors.	Farm is located away from receptors sensitive to odour. Current farm has no history of odour complaints.
B - Use a housing system which implements one or a combination of the following principles: - keeping the animals and the surfaces dry and clean (e.g. avoid feed spillages, avoid dung in lying areas of partly slatted floors); - reducing the emitting surface of manure (e.g. use metal or plastic slats, channels with a reduced exposed manure surface); - removing manure frequently to an external (covered) manure store; - reducing the temperature of the manure (e.g. by slurry cooling) and of the indoor environment; - decreasing the air flow and velocity over the manure surface; - keeping the litter dry and under aerobic conditions in litter-based systems.	Site implement the following controls: • Site and surfaces kept dry and clean. • Frequent slurry removal. • Slurry store covered.
C - Optimise the discharge conditions of exhaust air from the animal house by using one or a combination of the following techniques: - increasing the outlet height (e.g. exhaust air above roof level, stacks, divert air exhaust through the ridge instead of through the low part of the walls); - increasing the vertical outlet ventilation velocity; - effective placement of external barriers to create turbulence in the outgoing air flow (e.g. vegetation); - adding deflector covers in exhaust apertures located in low parts of walls in order to divert exhaust air towards the ground; - dispersing the exhaust air at the housing side which faces away from the sensitive receptor; - aligning the ridge axis of a naturally ventilated building transversally to the prevailing wind direction.	Exhaust air from animal housing discharged above roof level.
D Use an air cleaning system, such as: 1. Bioscrubber (or biotrickling filter); 2. Biofilter; 3. Two-stage or three-stage air cleaning system.	Techniques not applicable due to the high implementation costs.
E - Use one or a combination of the following techniques for storage of manure: 1. Cover slurry or solid manure during storage; 2. Locate the store taking into account the general wind direction and/or adopt measures to reduce wind speed around and above the store (e.g. trees, natural barriers);	Slurry store fitted with a flexible cover. Stirring of the slurry will only be undertaken as required.

BAT Condition	Site BAT Assessment
3. Minimise stirring of slurry.	
F - Process manure with one of the following techniques in order to minimise odour emissions during (or prior to) landspreading: 1. Aerobic digestion (aeration) of slurry; 2. Compost solid manure; 3. Anaerobic digestion.	No solid manure produced on farm.
G - Use one or a combination of the following techniques for manure landspreading: 1. Band spreader, shallow injector or deep injector for slurry landspreading; 2. Incorporate manure as soon as possible.	No solid manure produced on farm.
Emissions from solid manure storage	
BAT 14. In order to reduce ammonia emissions to air from the storage of solid manure, BAT is to use one or a combination of the techniques given below. A. Reduce the ratio between the emitting surface area and the volume of the solid manure heap. B. Cover solid manure heaps. C. Store dried solid manure in a barn.	N / A – No solid manure produced on farm.
BAT 15. In order to prevent, or where that is not practicable, to reduce emissions to soil and water from the storage of solid manure, BAT is to use a combination of the techniques given below in the following order of priority. A - Store dried solid manure in a barn. B - Use a concrete silo for storage of solid manure. C - Store solid manure on solid impermeable floor equipped with a drainage system and a collection tank for the run-off. D - Select a storage facility with a sufficient capacity to hold the solid manure during periods in which landspreading is not possible. E- Store solid manure in field heaps placed away from surface and/or underground watercourses which liquid run-off might enter.	N / A – No solid manure produced on farm.
Emissions from slurry storage	

BAT Condition	Site BAT Assessment
Emissions from slurry storage - BAT 16. In order to reduce ammonia emissions to air from a slurry store, BAT is to use a combination of the techniques given below. A. Appropriate design and management of the slurry store by using a combination of the following techniques: - Reduce the ratio between the emitting surface area and the volume of the slurry store; - Reduce wind velocity and air exchange on the slurry surface by operating the store at a lower level of fill; - Minimise stirring of slurry.	Slurry store installed on site is fitted with a flexible floating cover, only stirred when required and by maintaining the required freeboard ensures wind velocity and air exchange on the slurry surface is minimised.
B. Cover the slurry store. For this purpose, one of the following techniques may be used: 1. Rigid cover; 2. Flexible covers; 3. Floating covers such as: — plastic pellets; — light bulk materials; — floating flexible covers; — geometrical plastic tiles; — air-inflated cover; — natural crust; — straw.	Slurry store fitted with a flexible floating cover.
C Slurry Acidification	N / A - Slurry not acidified on farm.
BAT 17. In order to reduce ammonia emissions to air from an earth-banked slurry store (lagoon), BAT is to use a combination of the techniques given below. A. Minimise stirring of the slurry.	N / A - Slurry stored in an above ground tank and not an earth banked lagoon.
B. Cover the earth-banked slurry store (lagoon) with a flexible and/or floating cover such as: • flexible plastic sheets; • light bulk materials; • natural crust; • straw.	N / A - Slurry stored in an above ground tank and not an earth banked lagoon.
BAT 18. In order to prevent emissions to soil and water from slurry collection, piping, and from a store and/or an earth-banked storage (lagoon), BAT is to use a combination of the techniques given below. A Use stores that are able to withstand mechanical, chemical and thermal influences.	Store installed is SSAFO Compliant and can withstand viable mechanical, chemical and thermal influences.

BAT Condition	Site BAT Assessment
B Select a storage facility with a sufficient capacity to hold the slurry during periods in which landspreading is not possible.	Store adequately sized to hold the slurry during periods in which land spreading is not possible.
C Construct leak-proof facilities and equipment for collection and transfer of slurry (e.g. pits, channels, drains, pump stations).	All infrastructure associated with collection and transfer of slurry is leak proof.
D Store slurry in earth-banked stores (lagoons) with an impermeable base and walls e.g. with clay or plastic lining (or double-lined).	N / A – Slurry stored in an above ground storage tank.
E Install a leakage detection system, e.g. consisting of a geomembrane, a drainage layer and a drainage pipe system.	Slurry stored in an above ground storage tank.
F Check structural integrity of stores at least once every year.	Store forms part of the site infrastructure monitoring programme to ensure the integrity of the store is inspected at least once per year.
On Farm Processing of Manure	
On farm processing of manure BAT 19. If on-farm processing of manure is used, in order to reduce emissions of nitrogen, phosphorus, odour and microbial pathogens to air and water and facilitate manure storage and/or landspreading, BAT is to process the manure by applying one or a combination of the techniques given below. A Mechanical separation of slurry. This includes e.g.: Screw press separator; — Decanter-centrifuge separator; — Coagulation-Flocculation; — Separation by sieves; — Filter pressing.	N / A – No on farm manure processing.
B Anaerobic digestion of manure in a biogas installation.	
C Use of an external tunnel for manure drying.	
D Aerobic digestion (aeration) of slurry.	
E Nitrification-denitrification of slurry.	
F Composting of solid manure.	
Manure Landspreading BAT 20.	
In order to prevent or, where that is not practicable, to reduce emissions of nitrogen, phosphorus and microbial pathogens to soil and water from manure landspreading, BAT is to use all the techniques given below. A Assess the manure receiving land to identify risks of run-off, taking into account: — soil type, conditions and slope of the field;	Slurry spread to land by Site Management or a suitably competent contractor under their EMS. Their EMS ensures all techniques listed are followed.

BAT Condition	Site BAT Assessment
— climatic conditions; — field drainage and irrigation; — crop rotations; — water resources and water protected zones.	
B. Keep sufficient distance between manure spreading fields (leaving an untreated strip of land) and: 1. areas where there is a risk of run-off to water such as watercourses, springs, boreholes, etc.; 2. neighbouring properties (including hedges).	
C Avoid manure spreading when the risk of run-off can be significant. In particular, manure is not applied when: 1. the field is flooded, frozen or snow-covered; 2. soil conditions (e.g. water saturation or compaction) in combination with the slope of the field and/ or field drainage are such that the risk of run-off or drainage is high; 3. run-off can be anticipated according to expected rainfall events.	
D Adapt the manure landspreading rate taking into account the nitrogen and phosphorus content of the manure and taking into account the characteristics of the soil (e.g. nutrient content), the seasonal crop requirements and weather or field conditions that could cause run-off.	
E Synchronize manure landspreading with the nutrient demand of crops.	
F Check the spreading fields at regular intervals to identify any sign of run-off and properly respond when necessary.	
G Ensure adequate access to the manure store and that loading of manure can be done effectively without spillage.	
H Check that machinery for manure landspreading is in good working order and set at the proper application rate.	
BAT 21. In order to reduce ammonia emissions to air from slurry landspreading, BAT is to use one or a combination of the techniques given below. A Slurry dilution, followed by techniques such as low-pressure water irrigation system.	Slurry will be spread inline with BAT, typically using a dribble bar / band spreader.
B Band spreader, by applying one of the following techniques: 1. Trailing hose; 2. Trailing shoe.	

<table>
<tr><th>BAT Condition</th><th>Site BAT Assessment</th></tr>
<tr><td>C Shallow injector (open slot). Not applicable on stony, shallow or compacted soil where it is difficult to achieve a uniform penetration.</td><td rowspan="3"></td></tr>
<tr><td>D Deep injector (closed slot). Not applicable on stony, shallow or compacted soil where it is difficult to achieve a uniform penetration and an effective slit closure.</td></tr>
<tr><td>E Slurry acidification.</td></tr>
<tr><td>BAT 22. In order to reduce ammonia emissions to air from manure landspreading, BAT is to incorporate the manure into the soil as soon as possible.

Description - Incorporation of manure spread on the soil surface is done by either ploughing or using other cultivation equipment, such as tines or disc harrows, depending on the soil type and conditions. Manure is completely mixed with soil or buried.

Solid manure spreading is carried out by a suitable spreader (e.g. rota-spreader, rear discharge spreader, dualpurpose spreader). Slurry landspreading is carried out according to BAT 21.

Applicability - Not applicable to grassland and conservation tillage, unless changing to arable land or when reseeding. Not applicable to cultivated land with crops that can be damaged by the incorporation of manure. Incorporation of slurry is not applicable after landspreading using shallow or deep injectors.

<table>
<tr><td colspan="2">Table 1.3 - BAT-associated time delay between manure landspreading and incorporation into the soil</td></tr>
<tr><td>Parameter</td><td>BAT-associated time delay between manure landspreading and incorporation into the soil (hours)</td></tr>
<tr><td>Time</td><td>0 (1)-4 (2)</td></tr>
<tr><td colspan="2">(1) The lower end of the range corresponds to immediate incorporation.
(2) The upper end of the range can be up to 12 hours when conditions are not favourable for a faster incorporation, e.g. when human and machinery resources are not economically available.</td></tr>
</table>
</td><td>Slurry will be incorporated as soon as possible when applied to the seedbed.</td></tr>
<tr><td colspan="2">Emissions from the whole production process</td></tr>
<tr><td>BAT 23. In order to reduce ammonia emissions from the whole production process for the rearing of pigs (including sows) or poultry, BAT is to estimate or calculate the reduction of ammonia emissions from the whole production process using the BAT implemented on the farm.</td><td>Estimated by using EA factors.</td></tr>
<tr><td colspan="2">Monitoring of emissions and process parameters</td></tr>
</table>

BAT Condition	Site BAT Assessment
BAT 24. BAT is to monitor the total nitrogen and total phosphorus excreted in manure using one of the following techniques with at least the frequency given below. A Calculation by using a mass balance of nitrogen and phosphorus based on the feed intake, crude protein content of the diet, total phosphorus and animal performance. B Estimation by using manure analysis for total nitrogen and total phosphorus content.	Site to estimate by using slurry analysis for total nitrogen and total phosphorus content.
BAT 25. BAT is to monitor ammonia emissions to air using one of the following techniques with at least the frequency given below. A Estimation by using a mass balance based on the excretion and the total (or total ammoniacal) nitrogen present at each manure management stage - Once every year for each animal category. B Calculation by measuring the ammonia concentration and the ventilation rate using ISO, national or international standard methods or other methods ensuring data of an equivalent scientific quality - Every time there are significant changes to at least one of the following parameters: (a) the type of livestock reared at the farm; (b) the housing system. C Estimation by using emission factors - Once every year for each animal category.	Site to estimate by using emission factors - Once every year for each animal category.
BAT 26. BAT is to periodically monitor odour emissions to air. Description Odour emissions can be monitored by using: — EN standards (e.g. by using dynamic olfactometry according to EN 13725 in order to determine odour concentration). — When applying alternative methods for which no EN standards are available (e.g. measurement/estimation of odour exposure, estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality can be used.	N / A - only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.

BAT Condition	Site BAT Assessment
Applicability - BAT 26 is only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.	
BAT 27. BAT is to monitor dust emissions from each animal house using one of the following techniques with at least the frequency given below. A Calculation by measuring the dust concentration and the ventilation rate using EN standard methods or other methods (ISO, national or international) ensuring data of an equivalent scientific quality – Once a year. B Estimation by using emission factors - Once every year.	Estimation to be made by using emission factors once per year.
BAT 28. BAT is to monitor ammonia, dust and/or odour emissions from each animal house equipped with an air cleaning system by using all of the following techniques with at least the frequency given below. A - Verification of the air cleaning system performance by measuring ammonia, odour and/or dust under practical farm conditions and according to a prescribed measurement protocol and using EN standard methods or other methods (ISO, national or international) ensuring data of an equivalent scientific quality. - Once B - Control of the effective function of the air cleaning system (e.g. by continuously recording operational parameters or using alarm systems).	N / A – houses not equipped with an air cleaning system.
BAT 29. BAT is to monitor the following process parameters at least once every year. A - Water consumption - Recording using e.g. suitable meters or invoices. The main water-consuming processes in animal houses (cleaning, feeding, etc.) can be monitored separately. Monitoring the main water-consuming processes separately may not be applicable to existing farms, depending on the configuration of the water supply network. B - Electric energy consumption. Recording using e.g. suitable meters or invoices. Electricity consumption of animal houses is monitored separately from other plants in the farm. The main energy-consuming processes in animal houses (heating, ventilation, lighting, etc.) can be monitored separately. Monitoring the main energy-consuming processes separately may not be applicable to existing farms, depending on the configuration of the energy supply network.	The process parameters listed will be recorded using forms set out in the EMS / product assurance scheme.

BAT Condition	Site BAT Assessment
C - Fuel consumption. Recording using e.g. suitable meters or invoices. D - Number of incoming and outgoing animals, including births and deaths when relevant. Recording using e.g. existing registers. E- Feed consumption. Recording using e.g. invoices or existing registers. F- Manure generation. Recording using e.g. existing registers	
BAT CONCLUSIONS FOR THE INTENSIVE REARING OF PIGS	
BAT 30. In order to reduce ammonia emissions to air from each pig house, BAT is to use one or a combination of the techniques given below. a) One following principles: (i) reduce the ammonia emitting surface; (ii) increase the frequency of slurry (manure) removal to external storage; (iii) separate urine from faeces; (iv) keep litter clean and dry.	Pigs are housed on a fully slatted floor system with frequent slurry removal. This is based on a minimum 10 week slurry removal frequency and < 800 mm operational pit depth.
A vacuum system for frequent slurry removal (in case of a fully or partly slatted floor).	Pigs are housed on a fully slatted floor system with frequent slurry removal. This is based on a minimum 10 week slurry removal frequency and < 800 mm operational pit depth.
b Slurry cooling.	N / A slurry cooling systems not in place.
c Use of an air cleaning system, such as: 1. Wet acid scrubber; 2. Two-stage or three-stage air cleaning system; 3. Bioscrubber (or biotrickling filter).	N / A air cleaning system not in place.
d Slurry acidification.	N / A – no slurry acidification on farm.
e Use of floating balls in the manure channel	N / A – floating balls not used in manure channels.

2.2 Site Assessment v Intensive Farming Technical Standards

Tables 2 and 3 in this Section of the report compare the proposed site operations against the Technical Standards within the Intensive Farm How to Comply Guidance note. Table 4 provides technical description of emissions points.

Table 2 – Site Assessment v How to Comply	
Section 6.9A (1) (a) (ii) Pig production - How to comply EPR 6.09 Version 2	**Site Assessment v EA Guidance**
Pig feed storage and preparation	• Selection and use of feed is in accordance with SGN EPR 6.09 'How to comply with your environmental permit for intensive farming'. • Feed is stored in purpose built, covered, feed silos. Pellets are blown directly from the lorry into the relevant storage silos in a sealed system. Feed is piped in sealed system to the sheds minimising creation of dust. • Feed storage vessels are protected from collision damage by locating them on raised concrete plinths. • No liquid feed storage. • Areas around buildings are kept free from build-up of slurry and spilt feed. • Protein and phosphorus levels in the rations are matched to the animals' needs by providing at least two different feed formulations. A nutritionist is employed to regularly review and reformulate diets in order to optimise production and minimise excretion of nutrients.
Dirty water and manure storage	• Slurry is frequently removed from the slats to and above ground storage tank within the installation boundary. • Slurry is applied directly to land as appropriate to time of year and crop/soil demands, weather conditions. • The bases and all parts of the slurry storage and transfer infrastructure is impermeable. • The farm is located within a SPZ3 and a Nitrate Vulnerable Zone (NVZ).
Manure management	Application is in accordance with the Defra Code of Good Agricultural Practice and with a manure management plan for the receiving land which is itself in accordance with the NVZ regulations. A copy of this plan is retained, as well as stock counts and the tonnage/litres applied (including dates). The following protocols will be followed at all times: • Once started, the clearing and spreading process will be completed in as little time as possible; • The system is sealed and no spillage is anticipated, however, in the event of any spillage, spillage will be cleaned immediately.

Table 2 – Site Assessment v How to Comply	
Section 6.9A (1) (a) (ii) Pig production - How to comply EPR 6.09 Version 2	**Site Assessment v EA Guidance**
Fuel oil & chemical storage, low capacity non-SRM	• The only fuel oil stored on site is that in the backup generators self-contained bunded fuel tank. • Only small volumes of veterinary medicines are stored securely at the installation with capability for retaining any spillage. • There is no incinerator
Housing	• As detailed in the above BAT assessment, housing design and management is in accordance with SGN EPR6.09 'How to comply with your environmental permit for intensive farming' • The buildings and associated drainage have all been built to BAT standards, with a strong focus on resource saving and efficiency. • All pigs at all stages of production are kept on fully slated floors and the sheds are insulated and provided with adequate ventilation to ensure minimal heat loss and condensation. • All buildings and structures on site are maintained in good repair. In accordance with the management system. There is a programme of inspection and planned preventative maintenance for the housing, drainage and all equipment. Floors and walls are kept clean and an Incident and Corrective Action system implemented to ensure are defects are resolved. • Drinkers have been designed to prevent leakage to minimise the amount of dirty water going to storage. Water nipple drinkers are used and water consumption is monitored.
Low capacity non-SRM	N/A
Drainage	• A site drainage plan has been provided with the site drawings as part of the Permit application. • The clean water drainage systems are not contaminated. Dirty water / slurry is not allowed to enter clean water drainage routes. Only clean roof water leaves the site via soakaways. • Slurry captured within the animal housing is directed to the above ground slurry storage tank. • Disinfectant footbaths are designed not to overflow. Any used disinfectant is added to the slurry storage system.
Livestock numbers and movements	A system is in place to record the number of animals on the farm and animal movements on and off the farm, in line with farm assurance standards.

Table 2 – Site Assessment v How to Comply	
Section 6.9A (1) (a) (ii) Pig production - How to comply EPR 6.09 Version 2	**Site Assessment v EA Guidance**
Deadstock disposal	• Fallen stock is recovered in accordance with the current Animal By- Products Regulations. • It is collected by a licensed contractor as required. • Contractors entering site are required to follow our bio-security policy to minimize the risk for spread of disease.
Veterinary medicines and pest control	No bulk storage of pesticides and veterinary medicines on farm. Pest control is to be managed under service contract.
Pollution Prevention Measures	• Site will implement an infrastructure monitoring program to ensure controls in place to prevent pollution, are routinely inspected to ensure there is minimal potential for site operations to impact on the environment. • All staff are trained in pollution risk identification, minimisation and emergency procedures for general site activity and activity relating to their work duties. • There is an accident management plan in place with an Incident and Corrective Action procedure to review incidents and ensure corrective actions are suitably discharged.
Hazardous waste	• Veterinary waste is removed by the vet for safe recovery / disposal. • Other hazardous waste, such as fluorescent light bulbs, waste oils would be removed by a suitably licensed contractor and Consignment Notes held on site to demonstrate Duty of Care requirements have been complied with.
Fugitive Emissions – Ground / Groundwater	• The Environmental Management System implemented on site will include a thorough infrastructure monitoring programme designed to ensure there is no loss of integrity to the systems designed to prevent fugitive emissions to land and controlled waters.
Fugitive Emissions – Amenity / Flies	• There have been no incidents of fly nuisance at the farm. Appropriate actions will be put into place to prevent and control flies should a nuisance arise.
Fugitive Emissions – Dust	• Pigs are provided with dedicated housing units. • Diet is pellet fed, and blown directly into dedicated silos. • Feed is piped from the feed bins to the adlib feeders in the sheds, minimising dust emissions. • Site not located within 100metres of a relevant receptor, therefore, Dust and Bio-Aerosol Management Plan not required.

Table 2 – Site Assessment v How to Comply	
Section 6.9A (1) (a) (ii) Pig production - How to comply EPR 6.09 Version 2	**Site Assessment v EA Guidance**
Fugitive Emissions – Odour	• Pigs are provided with dedicated housing units. • Slurry store covered. • Fallen stock is disposed of in accordance with the current Animal By-Products Regulations. Carcasses are stored in a locked and sealed bin before collection by a licensed contractor. • Site not located within 400metres of a relevant receptor, therefore, Odour Management Plan not required.
Fugitive Emissions – Noise / Vibration	• Pigs are provided with dedicated housing units. • Drivers are requested not to excessively rev engines and to turn vehicle engines off when vehicles are standing. • Standby generator housed within acoustic housing. • Site not located within 400metres of a relevant receptor, there, Noise Management Plan not required.

Table 3 – Contingency Details		
Abnormal Scenario	**Remedial Action**	**Time Limit**
Damage to building	Damage would be repaired ASAP and, depending on nature of damage, area made safe and covered/contained in the meantime to prevent increased odour emissions and/or destocked in the immediate area if necessary.	Depends on severity of damage and whether environment or animals are at risk.
Dirty water store (where applicable) damage or overflow	Slurry storage designed and constructed inline with SSAFO and freeboard maintained to minimise potential for overflow. Any damage would be repaired ASAP. Contingency contractors held on file to export material for recovery off site where required.	Immediately.
Pipework damage	Immediately stop use of the pipe. Replace/repair pipe. Immediately install additional containment measures in the meantime if needed (e.g. using straw/sand or bucket brush).	Immediately stop potential for leak.
Livestock illness	Fieldsman and veterinary advice and treatment plan would be referred to and additional measures taken where necessary; i.e. more frequent removal of slurry from sheds. Where pigs need removing from their peers, hospital pens are included within the unit. These are managed exactly the same as the other pens, with slurry removed frequently, preventing elevated odour levels.	Immediate referral to veterinary/fieldsman advice for prompt treatment and herd management plans. Assess the risk for increased odour production, and adjust cleaning schedules accordingly.

Table 3 – Contingency Details		
Abnormal Scenario	**Remedial Action**	**Time Limit**
	A decision-making protocol is also in place regarding acceptable treatment windows and when to make the decision to euthanise as per the herd health plan. This reduces the risk to animals which aren't recovering in an acceptable timeframe for high welfare, or aren't likely to be ultimately fit for transport, being kept on in hospital pens indefinitely. In the case of a notifiable disease outbreak, the site is designed for accommodating pigs to their full adult size so the feed, water and space requirements are correct for an extended housing period if required. Advice from the EA and APHA would be sought as required.	Mitigation measures will continue until the situation is under control and it is assessed as safe to revert to normal practice. This will be recorded in the animal management records and/or incident records as applicable.
Fire	Control the fire as quickly as possible. If the fire is not immediately possible to extinguish and is spreading, contact fire brigade immediately and remove at-risk animals if safely possible. Unless there is sufficient, and safe, accommodation available on site at the correct stocking densities - arrange for removal of these animals from the site within 8 hours maximum. All firewater will be contained within the slats. Contact Environment Agency for advice on disposal. Follow fire brigade advice regarding creation of fire breaks/protection and removal of flammable materials. Once the fire is under control and it is safe to do so, remove all burnt material within 24 hours and thoroughly clean and decontaminate the area.	Ring fire brigade immediately. Refer to Accident Management Plan – Fire section Ring haulier (see Emergency Contacts) to arrange for movement of stock, if necessary, within 8 hours maximum. Mitigation measures will continue until the damage is repaired/situation remedied and it is assessed as safe to revert to normal practice. This will be recorded in the inspection and maintenance records and/or incident records.
Diet problems	In the case of a diet issue (e.g. where feed quality was below standard or feed type was incorrect), there is capacity to remove and replace feed in the bins. N.B. Diets are only sourced from UFAS accredited mills.	Contact Site Owner and fed supplier immediately (and vet if applicable). Mitigation measures will continue until the situation is remedied. This will be recorded in the inspection and maintenance records and/or incident records.

Table 3 – Contingency Details		
Abnormal Scenario	**Remedial Action**	**Time Limit**
Failure of containment of food	In the case that a feed pipe leaks within the pig buildings, the system should be stopped and leaked feed cleared up promptly. No potential for contamination of clean water system given this is segregated from feed supply. In the case that the feed bin leaks or the blow pipe fails and feed is spilled on to an outdoor area this will be cleaned immediately. For uncontaminated feed fit for animal consumption, it can be transported by teleporter bucket to the feeders in pens or blown into another silo by the feed company vehicle (dependent on biosecurity risk). For any spillage that is unfit for animal consumption the spillage will be cleared up in to containers and removed from site for disposal via an appointed waste contractor within 72 hours of the incident.	Stop the potential for leaks immediately. Protect clean water inlet immediately by shutting it off or containing the spillage area through use of eg. straw/sandbags. Protect from rainfall and pests if it is not possible to remove the spilled feed, or feed from a damaged bin, within a few hours. The affected area/feed bin should be free of feed within 24 hours. Mitigation measures will continue until the damage is repaired/situation remedied and it is assessed as safe to revert to normal practice. This will be recorded in the inspection and maintenance records and/or incident records.
Carcass disposal route failure	In the case of increased mortality or/and culling of large numbers, the fallen collector must be able to collect all deadstock immediately or within short timescale. Where immediate collection is not possible, all carcases must be stored in sealed, locked containers capable of retaining all effluents and of reducing risk of odours. In the case of normal contracted deadstock collector being unable to collect the carcases within the required timeframe, there are contingency collectors which can be called on.	Immediate communication with fallen stock company. Mitigation measures will continue until the situation is concluded/remedied and it is assessed as safe to revert to normal practice. This will be recorded in the animal management records and/or incident records as appropriate.
Temporary storage and disposal of any wastes arising from incidents	Used absorbents, and other waste materials arising from containing pollutants should be stored on an impermeable surface protected from drainage routes.	Where applicable, the waste contractor (see emergency contacts) should be contacted within 24 hours of an incident and arrangements made for safe disposal. Mitigation measures will continue until the situation is remedied. This will be recorded in the incident records.
Notes – To ensure remedial action has been completed successfully, the operators are responsible for inspecting the situation or equipment/infrastructure and assessing whether it is made safe and can operate in compliance with the permit and other regulatory requirements. Inspection and monitoring schedules may be revised to monitor the specific situation more frequently/closely thereafter, as appropriate.		

Table 4 - Emission Point Details

Table 4 – Emissions Points		
Emission Point Reference	**Emission Point Description and Location**	**Source**
Air		
A1	Pig Housing Vents	Fully slatted flooring system with frequent vacuum slurry removal. High velocity roof fans, with an efflux of 13m/s are installed in the roof which is in excess of 5.5 metres in height. The sheds operate on a 15-week cycle (105 days) during which the average occupancy is 78 days, equating to 74.3% occupancy rate.
A2	Standby Generator	Releases of combustion gases from the standby generator. Usage is 1 hour per week testing and total testing and standby usage hours < 500 per annum.
Note - No carcass incinerator on site.		
Ground		
Soakaways	Roof rainwater from Unit 1 and Unit 2.	Contained clean roof water discharged to ground via hardcore soakaway.
Surface Water / Sewer		
None - There are no surface water, trade effluent or domestic discharges from site.		