Title:	**BAT Assessment**
Report Reference:	**MWG-R03-F2**
Client:	**Saunders House Farm LTD**
Submitted To:	**Environment Agency**
Date:	**18-04-2024**
Main Contributor:	**Edward Bennett – AWSM Recycling Limited**

Report Issue History

Report Reference	*Details*
MWG-R03-D1	Draft for Internal Review
MWG-R03-D2	Draft for Client Review
MWG-R03-F1	30-01-24 – Finalised for EA Issue
MWG-R03-F2	18-04-24 – Updated file references.

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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 Saunders House 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 1.1: 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.

In relation to the guidance document, "EPR 6.09 Sector Guidance Note How to comply with your environmental permit for intensive farming", the requirements outlined in this document have been considered throughout all of the supporting documents submitted with this application.

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 laying hens 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 MWG-R04-F2. The farm is currently within the externally audited British Lion scheme. While this primarily incorporates food safety 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. 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 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.
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; • manure 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>A 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 incineration / 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 – • Water consumption is recorded. • 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 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.	Site Management will ensure efficient use of energy by Permitted operations through adopting the following techniques – • High efficiency heating/cooling and ventilation systems.

BAT Condition	Site BAT Assessment
b. Optimisation of heating/cooling and ventilation systems and management, especially where air cleaning systems are used. 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.	• Optimisation of heating/cooling and ventilation systems and management, especially where air cleaning systems are used. • 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.	A Noise Management Plan is implemented as part of the Environmental Management System.
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:	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.

BAT Condition	Site BAT Assessment
i. increasing the distance between the emitter and the receiver (by locating equipment as far away as practicable from sensitive receptors); 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.	• The closure of doors and major openings of buildings, especially during feeding time. • 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.	Site Management apply the following techniques, in order to reduce dust emissions from each animal house. • Apply fresh litter using low-dust littering techniques.

BAT Condition	Site BAT Assessment
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); 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.	• Apply ad libitum feeding; • Use enclosed dry feed systems and dry feed; • 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.	Techniques N/ A to Hen Unit.
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.	An Odour Management Plan is to be implemented as part of the Environmental Management System on site.

BAT Condition	Site BAT Assessment
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.	
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. • Manure removed from site on a weekly basis.
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 where possible.
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.

BAT Condition	Site BAT Assessment
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); 3. Minimise stirring of slurry.	Solid manure removed offsite once per week when removed from housing. No land spreading undertaken as part of Permitted operations.
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.	Solid manure removed offsite once per week when removed from housing. No land spreading undertaken as part of Permitted operations.
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.	Solid manure removed offsite once per week when removed from housing. No land spreading undertaken as part of Permitted operations.
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 – Manure not stored on site.
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 – Manure not stored on site.
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.	N / A – Only poultry wash waters generated during clean down and no slurry produced on farm.
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.	N / A – Only poultry wash waters generated during clean down and no slurry produced on farm. Wash water stored within impermeable reception tank prior to collection for recovery to land off site.
C Slurry Acidification	N / A – Only poultry wash waters generated during clean down and no slurry produced 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 – Only poultry wash waters generated during clean down and no slurry produced on farm.
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 – Only poultry wash waters generated during clean down and no slurry produced on farm.
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.	N / A – No slurry produced on farm.

BAT Condition	Site BAT Assessment
A Use stores that are able to withstand mechanical, chemical and thermal influences.	
B Select a storage facility with a sufficient capacity to hold the slurry during periods in which landspreading is not possible.	N / A – No slurry produced on farm. Wash water storage tanks are suitably size to store water generated during wash out, which only occurs every c.15 months under normal operations.
C Construct leak-proof facilities and equipment for collection and transfer of slurry (e.g. pits, channels, drains, pump stations).	N / A – No slurry produced on farm. Wash water storage tanks are 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 – No slurry produced on farm. Wash water storage tanks have impermeable base and walls.
E Install a leakage detection system, e.g. consisting of a geomembrane, a drainage layer and a drainage pipe system.	N / A – No slurry produced on farm. Wash water tanks are only used at clean down and are not permanent stores, therefore leak detection system not considered appropriate.
F Check structural integrity of stores at least once every year.	N / A – No slurry produced on farm. Wash water storage tanks will form part of the site infrastructure and inspection monitoring programme.
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.	

BAT Condition	Site BAT Assessment
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; — climatic conditions; — field drainage and irrigation; — crop rotations; — water resources and water protected zones.	Manure and wash waters spread to land by a suitably competent contractor under their EMS. Their EMS ensures all techniques listed are followed.
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.	N / A – No slurry produced on farm.

<table>
<tr><th>BAT Condition</th><th>Site BAT Assessment</th></tr>
<tr><td></td><td rowspan="4"></td></tr>
<tr><td>B Band spreader, by applying one of the following techniques:
1. Trailing hose;
2. Trailing shoe.</td></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></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>Manure and wash waters spread to land by a suitably competent contractor under their EMS. Their EMS ensures all techniques listed are followed.</td></tr>
</table>

BAT Condition	Site BAT Assessment
Emissions from the whole production process	
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.	Estimated by using EA factors.
Monitoring of emissions and process parameters	
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 manure 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).	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
— 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. 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.	The process parameters listed will be recorded using forms set out in the EMS / product assurance scheme.

BAT Condition	Site BAT Assessment
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. 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 POULTRY	
BAT 31.In order to reduce ammonia emissions to air from each house for laying hens, broiler breeders or pullets, BAT is to use one or a combination of the techniques given below. i. Manure removal by belts (in case of enriched or unenriched cage systems) with at least: a. — one removal per week with air drying; or two removals per week without air drying.	N / A – Not a caged system.
ii. In case of non-cage systems: 0. Forced ventilation system and infrequent manure removal (in case of deep litter with a manure pit) only if used in combination with an additional mitigation measure, e.g.: — achieving a high dry matter content of the manure; an air cleaning system. 1. Manure belt or scraper (in case of deep litter with a manure pit). 2. Forced air drying of manure via tubes (in case of deep litter with a manure pit) 3. Forced air drying of manure using perforated floor (in case of deep litter with a manure pit). 4. Manure belts (in case of aviary). 5. Forced drying of litter using indoor air (in case of solid floor with deep litter).	Use of manure belts on farm.
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.