EPR/XP3632QE/V003 Methwold Farm Pig Unit
Response to Environment Agency request for more information 03/05/2024

1. Gale breaker curtains

Conduct an option appraisal for different housing designs on Feltwell Fm to minimise odour emissions

a) Reviewed the BREF (2017) for guidance on housing and ventilation systems to minimise odour emissions. Taking into consideration BREF references to:-

i. *"The information submitted on techniques for the reduction of emissions from pig houses mainly focuses on NH_3 emissions to air whilst dust, odour and greenhouse gas emissions are also taken into consideration"* on p365.

ii. *"Ammonia and hydrogen sulphide should not be taken alone as an indication of the odour emission and/or of the odour nuisance. Ammonia, due to its high perception threshold, contributes to the odours emitted by the livestock buildings, but odours may persist even in the total absence of ammonia. A clear correlation between odour concentration and ammonia emissions does not exist. In general, measures to abate ammonia and dust emissions also contribute to a reduction in odorant emissions but the reduction ratio can be different"* on p205.

b) Studies on ammonia and odour emission factors for different animal housing systems are summarised in tables 3.81 on p206 and 4.102 on pp446-448:-

i. *Table 3.81 - Odour emission factors for different animal categories and housing systems in the Netherlands, Germany, and Denmark* on p206:-

Dutch and Danish studies reported no difference in emissions from finishers kept in pens with fully or partly slatted floors. The German study reported higher emissions from finishers in pens with fully slatted floors compared to partly slatted floors, and also significantly higher than in the other studies. Only the Danish study considered finishers in deep litter in one study – where emissions were significantly lower than from finishers kept on either partly or fully slatted floors.

ii. *Table 4.102 Emission levels of system-integrated housing techniques for fattening pigs* on pp446-448.

Includes data from 3 studies on odour emissions from deep litter floor systems with straw and 2 studies on littered floors with removal once a week. The straw bedded systems produced lower odour emissions compared to most of the studies on fully and partly slatted floors, whereas odour emissions were lower from partly slatted floors than a straw bedded system in one study.

Table 1 - Options appraisal of housing systems to minimise odour emissions from Feltwell Fm Pig Unit for pigs 35-110kg

Source of odour	Proposed options	Achieved environmental benefit	Cross media effects
Housing system	Option 1 (Reference option). Vacuum system for frequent slurry removal (in case of a fully slatted floor) in section 4.7.5.2 of the BREF. Widely used in the EU.	Not included in RSPCA Freedom Food certification standard to supply higher welfare friendly products to supermarkets so option is discounted.	–
	Option 2. Vacuum system for frequent slurry removal (in case of a partly slatted floor) in section 4.7.5.3 of the BREF. Widely used in the EU.	Partly slatted floors produce significantly lower odour emissions compared to fully slatted floors on p205. A reduction of 25% for NH3 emissions is reported due to frequent removal of slurry in comparison to a fully slatted floor with a deep pit on p453. In general, measures to abate ammonia and dust emissions also contribute to a reduction in odorant emissions on p205.	Due to the fact that pigs reared on a partly slatted floor, particularly finishing pigs, tend to excrete on the solid floor when a critical temperature is reached, the cleanliness of the area may thus deteriorate. Dirty floors have implications for pig hygiene and health, odour emissions, as well as for working conditions. This technique can generate odour peaks at time of emptying on p375.
	Option 3. Full litter system (in case of a solid concrete floor) is widely applied in UK, in section 4.7.5.13 of the BREF. Approx. 65% of growing pigs are kept in indoor straw-based systems according to RSPCA [1]. Houses for fattening pigs are mostly naturally ventilated with open fronts or with	Odour emissions are reduced compared to slurry-based housing systems if the system is managed according to best agricultural practises (e.g. supply of enough bedding material. Odour emissions from finishers kept in pens in deep litter - straw based system were lower compared to slurry-based systems in table 3.8.1 Odour emission factors for different animal categories and	Dust also plays an important role as a carrier of odorous compounds on p181. Dust levels are higher in litter-based systems than in slurry systems on p187. Increased dust emissions are reported. In general, in the case of poor management of the litter, ammonia, odour and nitrous oxide emissions are expected to be higher than from housing systems based on slurry on p469.

	curtains or vertical wooden planks not butted together (Yorkshire boarding).	housing systems in the Netherlands, Germany, and Denmark on p206. (one study). Studies on deep litter floor systems report lower odour emissions compared to most studies on fully and partly slatted floors in Table 4.102, Emission levels of system-integrated housing techniques for fattening pigs on p446. Higher animal welfare system, preferred producer system for Cranswick [2].	Production of solid manure (FYM) instead of slurry manure is considered an advantage from the agronomical point of view, as far as organic matter incorporated in the fields improves the physical characteristics of the soil, reducing run-off and leaching of nutrients to water bodies on p469. Deep bedding may be critical in creating thermoregulatory problems, including heat stress and decreased performance owing to the bedding fermenting and producing a large amount of heat, especially during summer periods on p71, and prejudice adaptations to climate change considered under options for ventilation.
	Option 4 (Preferred option) Straw flow system (in case of a solid concrete floor) in section 4.7.5.9 of the BREF. Approx. 65% of growing pigs are kept in indoor straw-based systems according to RSPCA [1].	Absorption of urine into the straw and the collection of manure in adjacent channel, which reduces the emitting surface, in combination with the frequent removal of manure from the dung channel, result in lower ammonia emissions on p462. Operator proposes to remove manure daily and replace straw in the lying areas. Odour emissions from finishers kept in pens in deep litter - straw based system were lower compared to slurry-based systems in table 3.8.1 Odour emission factors for different animal categories and housing systems in the Netherlands,	Dust also plays an important role as a carrier of odorous compounds on p181. Dust levels are higher in litter-based systems than in slurry systems on p187. Emissions including odour are expected to be higher than from housing systems based on slurry on p469.

		Germany, and Denmark on p206. (one study), but no data for straw-flow system. Studies on deep litter floor systems report lower odour emissions compared to most studies on fully and partly slatted floors in Table 4.102, Emission levels of system-integrated housing techniques for fattening pigs on p446. Assume similar results could be achievable on straw flow system with frequent manure removal in absence of a study to provide actual data. Higher animal welfare system, preferred producer system for Cranswick [2].	
Ventilation system	Option 5 Exhaust ventilation: mechanical ventilation under negative pressure is widely applied in UK in section 2.3.2.2 of the BREF.	-	-
	Option 6 (Preferred option) Exhaust ventilation: Neutral ventilation mechanical ventilation under equal pressure is widely applied in UK in section 2.3.2.2 of the BREF. Optimise discharge conditions of exhaust air from pig houses to reduce odour emissions (BATc13):-		

	• Increase vertical outlet ventilation velocity with high velocity extraction fans on the ridge, efflux velocity 10m/s • increase outlet height by exhausting air above roof level and raise the stack height above the ridge 6.10m + 6.00m effective stack height = 12.10m. • Package, impermeable, plastic fabric, Galebreaker curtain walls close fitting on sides of houses above the concrete grain panels create continuous fresh air inlets close to the ceiling, similar to those on p92, but restricts capability to create negative pressure. Aperture of inlets can be increased in warm weather, or for back-up in emergency e.g., power outage.	As a rule, with forced ventilated housing the focus in terms of impact reduction is on achieving sufficient dilution of the waste air by the wind. In order to protect the local neighbourhood, it may be advisable to ensure the emission airstreams pass at a certain minimum height over and beyond local dwellings by raising the height source on p523. Reduce heat stress. Increasing air flow at pig level and keep dung passage under inlets cooler. Pigs choose to excrete in areas which are cold wet or draughty so keep lying areas clean and reduce odour. Modelling predicts odour impact result of Galebreakers being lowered during warm weather would not be significant.	Adapting to climate change when summer daily temperature may be around 7^{o}C higher compared to average summer temperatures now, with potential to reach extreme temperatures as high as over 40^{o}C with increasing frequency based on today's values according to intensive farming examples for adapting to climate change on the government website.
End-of-pipe techniques p489	Option 7 Wet scrubber, or trickling filter for removing pollutants from the exhaust air of a forced ventilation house in section 2.4 of the BREF. Two types of wet scrubbers are mainly used : 'acid scrubbers,' and bio-trickling filters and combinations e.g. an acid scrubber to remove ammonia and a bio-filter to remove odour. Manufacturers deliver either package, pre-fabricated modules, or custom-made	Potential to achieve a combined removal of ammonia, odour, and dust on p103. Dust also plays an important role as a carrier of odorous compounds.	Adaptation of the housing system may not always allow compliance with increasingly stringent emission regulations and targets. A driving force for the development and use of air cleaning systems on p103. Installation of air cleaning equipment significantly increases the flow resistance of forced ventilation systems. Higher capacity fans with a higher specific power requirement may be necessary on p286.

	installations on p104. Since maximum ventilation rates do not occur frequently scrubbers can be dimensioned for treating lower ventilation rates, so that the part of the exhaust air that exceeds the air cleaning system capacity is allowed to be vented untreated through a bypass. In this way the size and cost are significantly decreased (as cost is proportional to the volume of air to be treated), ammonia removal efficiency is kept high and emission loads are only slightly affected; on the other hand, odour nuisance mitigation will be completely compromised.		

[1] RSPCA welfare of pigs [Accessed online 19/06/2024] https://www.rspca.org.uk/documents/1494939/7712578/FAD-Pigs-Information-Sheet-2022.pdf
[2] Cranswick plc website [Accessed online 19/06/24] https://cranswick.plc.uk/responsibility/animal-welfare

2. Submit a revised ammonia modelling report that takes into account the following:-

a) Inclusion of the existing slurry lagoon to be retained and proposed slurry storage tank to be added at Feltwell Fm

Existing slurry storage lagoons A,B,C&D at Feltwell and Methwold Fm to be included in model for baseline scenario. Storage capacity in A.B&D required to operate all the slurry type housing at Feltwell Fm, and C for Methwold Fm. Slurry will contain a mixture of pig excreta, bedding, rainwater, and washings from the pig houses, so not classified as dirty water.

For proposed new development scenario include lagoons A&B only at Feltwell Fm. Lagoon D is no longer available owing to leased to another user under an agreement and proposing to demolish C at Methwold Fm. Proposed new slurry tank, not to be included. Design changed to package fibreglass below ground slurry storage tank outside building for farm yard manure (FYM) not above ground tank, and continually pump into lagoon B and A if required. Proposed new livestock yard designed to slope and channel slurry into the tank.

Updated layout & drainage plans and updated supporting information in Q2b non-technical summary and Q8 technical standards.

b) Inclusion of the proposed manure storage at Feltwell Fm with no reduction applied to the total emission rate

Use EA emission factor for manure heaps = 1.49 kgNH_3/tonne, with no reduction for storing manure inside a building for proposed new development.as instructed by EA - *"The emission factor for manure heaps (1.49 kg NH3 / tonne fresh manure) does not differentiate between covered and uncovered stores and therefore this emission factor will need to be used in the revised detailed ammonia modelling for any manure stored within the installation boundary."*

c) Animal numbers and housing systems used for modelling existing permitted scenario are different to numbers and housing systems applied for under the existing permit

EA supplied animal places and housing systems applied for under the existing permit for the baseline scenario, but there was less than the number of places for production pigs >30kg under the permit shown in Table 1.

Table 1 – Livestock numbers & housing applied for under existing permit

Livestock type	Housing type	Number of animal places
Sows	Part-slatted floor (PSF) with reduced manure pit	524
Sows	FSF with vacuum system for frequent slurry removal	524
Farrowers	FSF/PSF with combination of water & manure channel	312
Weaners	Pen/flat deck with FSF/PSF with vacuum system for frequent slurry removal	6,900

Finishers	Fully slatted floor (FSF)	14,058 (note this includes 10 Boar places)

EA provided further qualification in an email dated 09/05/24 for the total places for production pigs >30kg and housing systems. As per Table S1.1… so, the total numbers are 20,948 production pig place. Airfield Fm 4,874 places for pigs. Feltwell Fm 16,074. Reviewed the livestock numbers, as-built housing, and ventilation systems onsite today with the operator for input into the existing permitted (baseline) scenario. Slightly more weaners would have been reared at Feltwell Fm compared to application, but difference is not significant. Number of places, housing and ventilation systems and ammonia emission factors for input into the baseline model are shown in Table 2:

Table 2 – Livestock numbers & housing types for input into existing (baseline) scenario

Farm	Livestock type	Housing type	Ventilation	Factor kgNH_3/ place/year [1]	Number of animal places
Airfield	Finishers Pigs >30kg	Solid floor – straw system	Natural/ capped ridge	2.00 [2]	4,874 [3]
Feltwell	Weaners Pigs 7-30kg	Pen/flat deck with FSF/PSF with vacuum system for frequent slurry removal [4]	Roof ventilation only. High velocity (vents greater than 3.5m high, fan efflux velocity greater than 2m/s	0.7 [5]	7,050 [6]
	Growers Pigs >30kg	Solid floor – straw system	Natural/ capped ridge	2.00 [2]	9,644
	Finishers Pigs >30kg	Fully slatted floor (FSF)	Roof ventilation only. High velocity (vents greater than 3.5m high, fan efflux velocity greater than 2m/s	3.60 [7]	5,148
	Finishers Pigs >30kg	Fully slatted floor (FSF)	Side ventilation with fans and roof inlets [8]	3.60 [7]	1,272
Methwold	Sows	Part-slatted floor (PSF) with reduced manure pit	Side ventilation with fans and roof inlets [9]	2.41	524
	Sows	FSF with vacuum system for frequent slurry removal		2.26	524
	Farrowers (includes piglets)	FSF/PSF with combination of water &		2.80	312

		manure channel			
	Boars	-		5.72	10 [3]

[1] EA Pre-application Request Form; Intensive Farming; Pigs.
[2] EA advise for existing permitted scenario, where production pigs >30kg are housed on solid floor -straw system use emission factor 2kg kgNH_3/place/year, based on AHDB Pork Trials 2017 for production Pigs on straw.
[3] Capacity for pigs >30kg at Airfield and Feltwell Fm in Schedule 1 of the permit (note this includes 10 places for boars shown at Methwold Fm.
[4] Housing for weaners described in the existing permit application in Table1, versus on solid floor-straw system and natural ventilation in the introductory note in the permit.
[5] Use legally binding BAT-AEL lower than EA factor for existing baseline scenario.
[6] Operator supplied number of places for weaners 7-30kg all the progeny of sows at Methwold Fm a directly associated activity in the permit to be included in the baseline.
[7] Use legally binding BAT-AEL lower than EA factor in existing baseline scenario.
[8] All slurry-based buildings are ventilated by fans in the roofs and vents in sides of the buildings, except for buildings [14&15] which have fans on the side and roof vents, described in the introductory note.
[9] Onsite observation confirmed ventilation provided by fans in side of buildings with roof inlets, same as introductory note.

For proposed new development scenario, number of places, housing and ventilation systems and emission factors are unchanged in Table 3:-

Table 3 – Livestock numbers & housing for input into proposed development scenario

Farm	Livestock type	Housing type	Ventilation	Factor kgNH_3/ place/year	Number of animal places
Feltwell	Pigs >30kg	Solid floor – straw system	Roof ventilation only. High velocity (vents greater than 5.5m high, fan efflux velocity greater than 7m/s	2.00 [1]	14,000
Methwold	Broilers	Solid floor, deep litter, and non-leaking drinkers		0.0247 [2]	870,000

[1] AHDB Pork (2017); Establishing Ammonia Emission Factors for Straw Based Buildings
[2] EA factor 0.034 reduced by 27.5% in accordance with an independent verification statement (2019) on reduction of ammonia emission per animal place per year with a tested heat exchanger.

d) Details for existing slurry lagoons used for modelling the existing permitted scenario are different to details applied for under the existing permit

EA supplied details of slurry lagoons applied for under the existing permit in Table 4:-

Table 4 - Slurry storage lagoons applied for under the existing permit

Storage type	Surface area of store (m^2)	Cover
Slurry – Lagoon	3,265	No cover
Slurry – Lagoon	6,598	No cover
Slurry – Lagoon	8,394	No cover
Slurry – Lagoon	6,559	No cover

Obtained further clarification from a contemporary site layout and drainage plan showing routes into 4no. existing earth banked slurry lagoons labelled A,B,C&D in Table 5:-

Table 5 – Slurry storge lagoons for input into existing permitted baseline scenario

Farm	Slurry ID [1]	NGR	Source area (m^2) [2]	Cover	Factor $kgNH_3/m^2$
Feltwell	Slurry – Lagoon A	TL 72559272	2,426	No cover	0.56
	Slurry – Lagoon B	TL 72699306	3,666	No cover	0.56
	Slurry – Lagoon D	TL 73469208	6,266	No cover	0.56
Methwold	Slurry – Lagoon C	TL 73619289	2,153	No cover	0.56

[1] Brown & Co, Methwold Fm, Feltwell Fm & Airfield Fm existing site layout plan & lagoons
[2] Groundsure (https://www.groundsure.com/)

Aggregate area has been nearly halved from 24,816m2 to 14,511m2 owing to the removal of some smaller lagoons and others have been reconfigured. See Table 6 Map regression for Airfield, Feltwell & Methwold Fm. Measured surface area on Groundsure website with 'snap-to-line' function for accuracy.

Use EA factor with floating cover = 0.56 $kgNH_3/m^2$ to model both existing (baseline) and proposed new development scenarios. The regulatory position statement for slurry stores on permitted pig and poultry farms with less than 1% dry matter provided operators using this position an extended deadline of 21 August 2022 to cover stores, so all stores should be covered.

For proposed new development scenario only include lagoons A&B for Feltwell Fm with floating covers. Lagoon D is no longer available owing to leased to another user under an agreement, and proposing to demolish lagoon C at Methwold Fm.

Ignore square-shaped feature centred on NGR TL 73759273 in between houses ME2 and ME3 at Methwold Fm which was not included in the existing permit application. Labelled as a water pond on drainage plan for house ME2, and no apparent connection so presumed not intended for storing any slurry, although a synthetic liner is installed.

e) Confirmed existing housing on Airfield, Feltwell and Methwold Fm built before introduction of Best Available Techniques (BAT) Reference Document (2017)

Table 6 – Map regression for Airfield, Feltwell & Methwold Fm

Map date	Observations from OS maps at the 1:10,000 scale
1983	10no. existing poultry houses, office/workshop, and small building across Airfield, Feltwell and Methwold Fm in place. Poultry houses repurposed from rearing poultry to pigs in early 1970s when site was being used exclusively for pigs according to a timeline on the Borough Council of Kings Lynn and West Norfolk planning portal.
2001	Additional 5no. new pig houses including ME3 buildings for rearing sows on Methwold Fm and 5no. new slurry storage lagoons – lagoon C on the north side plus 2 more in same place, and 2 south of Methwold Fm. 19no. new pig houses, office/workshop, and new slurry storage lagoons A&B in place on Feltwell Fm.
2010	Added a new slurry storage lagoon south of Methwold Fm and removed a small building on the farm.
2023	Slurry storage lagoon B north side of Feltwell Fm has been reduced in size. At Methwold Fm 2no. slurry storage lagoons on north side have been removed leaving lagoon C only, and 3no small lagoons to the south of Methwold Fm have been merged into a single larger lagoon D.

f) Emission factor for production pigs >30kg on solid floor straw system in existing baseline scenario

Use AHDB emission factor= 2kgNH_3/place/year to model both existing (baseline) scenario at Airfield and Feltwell Fm with solid floor straw system and for proposed new development as instructed. Otherwise use factors in Table 2.

g) Emission factor for pigs >30kg & unserved gilts housed on fully slatted floors (FSF) does not meet the current BAT-AEL

Use BAT-AEL=3.60kgNH_3/place/year for pigs >30kg including any unserved gilts on FSF at Feltwell to model existing (baseline) scenario:-.

i. Current BAT-associated emission level (BAT-AEL) for pigs >30kg is lower than EA factor=4.14kgNH_3/place/year. BAT-AELs are legally binding therefore an applicant must meet these levels in accordance with the guidance in (2021) UK Interpretation Guidance and Permitting Advice on the Best Available Techniques (BAT) Conclusions for Intensive rearing of poultry or pigs (IRPP). Operator can demonstrate meeting the objective of BAT30 to reduce ammonia emission to air by using one of the techniques given in the BREF, to achieve the BAT-AEL. Comply using frequent slurry and manure removal to external storage.

ii. Otherwise not installed FSF with vacuum system for frequent removal for rearing pigs >30kg at Feltwell Fm regardless the emission factor =

2kgNH_3/place/year is lower. Operator has purchased installation for proposed new development. Currently only uses houses with repurposed solid concrete floors and rearing less than half of the 16,064 pigs >30kg permitted at Feltwell, and no unserved gilts. Comply with BAT 30 using - straw flow system (in case of a solid concrete floor). Justified for RSPCA welfare standards for pigs certification, required to supply lots of supermarkets.

h) Emission factor for pigs <30kg housed on fully slatted floor (FSF) does not meet the current BAT-AEL

Use BAT-AEL=0.7kgNH_3/place/year for pigs <30kg on FSF at Feltwell to model existing (baseline) scenario:-

i. Current BAT-associated emission level (BAT-AEL) for pigs <30kg is lower than EA factor (0.29+1.59)/2=0.94 kgNH_3/place/year. BAT-AELs are legally binding therefore an applicant must meet these levels in accordance with the guidance in (2021) UK Interpretation Guidance and Permitting Advice on the Best Available Techniques (BAT) Conclusions for Intensive rearing of poultry or pigs (IRPP). Operator can demonstrate meeting the objective of BAT30 to reduce ammonia emission to air by using one of the techniques given in the BREF and achieve the BAT-AEL. Comply using frequent slurry and manure removal to external storage.

ii. For proposed new development scenario there will be no pigs <30kg, will all be delivered to Feltwell from other breeding farms at approx. 35kg.

i) Confirm if 'young gilts 30kg' are served or unserved for existing permitted scenario

Remove the 30 & 125kg 'young gilts' from inputs into the existing (baseline) scenario.

Presume unserved gilts included in the 16,094 pigs >30kg permitted at Feltwell Fm. Some female pigs would have been selected from small pigs >30kg for rearing in separate pens for gilts, to replace sows at Methwold Fm, not production pigs for slaughter. Rearing techniques the same e.g., same housing and feedstuffs. Presume served gilts included in the 1,360 sows at Methwold Fm.

In addition to the above revisions to ammonia modelling assessment provided the following in the revised report:-

j) Provided in the report:-

- Comparison of the process contributions (PC) from the current permitted operating scenario (existing baseline scenario) against the process contributions of the proposed operating scenario (proposed new development scenario). These are summarised in Tables 23 and 29 respectively in the report.
- What these are as a percentage of the relevant critical level and critical loads for each receptor point. These are summarised in Tables 24 and 30 in the report.

- Predicted percentage changes between the current permitted scenario and proposed operating scenario. These are summarised in Table 35 in the report.

k) Report includes the critical level for ammonia and critical loads for nitrogen deposition and acid deposition used for each nature conservation site assessed in the ammonia modelling. These are summarised in Tables 16,17&18 respectively.

Used critical levels and loads as EA instructed in the ammonia pre-application report provided on 28th July 2022 with exception of those nature conservation sites listed below where revised critical levels and critical loads have been obtained from APIS or in consultation with Natural England:-

Table 7 – Revised critical levels and critical loads at nature conservation sites

Site name	Designation/ status	Ammonia critical level (µg/m3)	Nutrient nitrogen critical load (kgN/ha/yr)	Acid critical load (keq/ha/yr)
Breckland Farmland	SSSI	-	10	4.856
Breckland	SPA	3	3	0.536

l) Report includes grid co-ordinate points for the receptor points modelled. These are summarised in Table 15 in the report.

m) Confirmed efflux velocity of high velocity roof fans on the broiler houses at Methwold Fm will be 12m/s in email from professional designers in Table 11 in the report.

n) Confirmed efflux velocity of high velocity roof fans on the pig houses at Feltwell Fm will be 10m/s from the Wayland Farms; Feltwell Ventilation Systems statement in Table 11 in the report.

o) Submitted Redmore Environmental; Ammonia Assessment Land at Airfield Farm, Feltwell Farm and Methwold Farm; Reference: 3894-3r1; date 27th June 2024 and EA Ammonia Model files.zip.

3. <u>Heat exchangers on Methwold (Breckland) Fm Poultry Unit</u>

a) During the production cycle when broilers are about two to three weeks old integral washing/cleaning system set to run on an automatic once or twice daily, according to the VERA Verification Statement (2019). At Methwold Fm the dirty water, including any condensate, will be conveyed in solid underground pipes into dirty water tanks shown on the drainage plans BRECK-DRAIN-N dated 31-08-23 and BRECK-DRAIN-S dated 07/11/23.

b) Multiplied EA emission factor for broilers 0.034 by 0.725 = 0.0247 kgNH_3/place/year. According to VERA Verification Statement (2019) for Agro Clima unit (ACU) Clima+ 200, type 2.5 "*28% reduction of ammonia emission per animal place per year can be achieved in broiler houses with the tested technology combination*." Actually achieved

27.5% according to test results in the Statement. Submitted the statement with the additional request for the application.

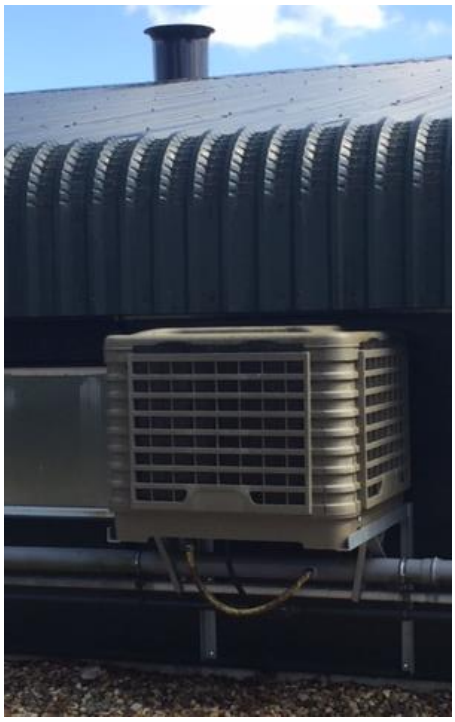
c) Poultry houses designed with litter-based system with air recirculated (equally spread) by indoor fans and heaters, plus a heat exchanger in accordance with technique 4.6.4.2.3 in the Best Available Techniques (BAT) Reference Document, and same as the tested technology combination in the Statement.

4. <u>Evaporative cooling units on Methwold (Breckland) Fm poultry unit</u>

Confirmed what happens to any condensate produced from evaporative cooling units:-

a) No condensate expected from evaporative cooling units inside or outside houses.
b) Use mains water supply controlled by automatic valves and water level sensors. Pump water over the cooling pads and recirculated via the pumps so no wastewater in use.
c) Maintenance in accordance with manufacturer's instructions. Drain uncontaminated mains water out of storage tank, pump, and evaporative cooling units for maintenance every 6 months, and to prevent freezing in cold weather. No cleaning chemicals or disinfectant to be used for any cleaning, will enter into water circulation system, and evaporate into air stream.
d) Uncontaminated mains water drains into French drains filled with stones and onsite infiltration basins act as soakaways. Submitted updated supporting information having added evaporative cooling units as sources into the table of point source emissions in Q7 Emissions to air, water, and land.

Storage tank, pump, drain-pipe for emptying & evaporative cooling units at Lopham Poultry Unit, North Lopham in April 2024



5. Emergency backup generators

a) Not proposing a permanent emergency backup generator for Feltwell Fm. Submitted updated noise management plan having removed the erroneous reference.

b) Propose 2no. new 600KVA diesel-fired backup generators at Methwold (Breckland) Fm only to guarantee sufficient air renewal for chicken welfare:-

i. Net rated thermal inputs 0.516MWth each.
ii. Will not be tested more than 1 hour per week to ensure they are working properly, and use the electricity generated from the tests onsite.
iii. For emergency backup only and will not be operated more than 500 hours averaged over 3 years, including the hours for testing.

6. Slurry storage at Feltwell Fm pig unit

Confirmed the following for proposed new slurry storage tank at Feltwell Fm:-

a) Design changed to package fibreglass below ground slurry storage tank outside building for farm yard manure (FYM) not above ground tank, and continually pump into lagoon B and A if required. Proposed new livestock yard designed to slope and channel slurry into the tank. Sizing to be confirmed but not significant for storage capacity, owing to using lagoons.

Updated layout & drainage plans and supporting information in Q2b non-technical summary and Q8 technical standards.

b) No cover required.

c) Confirmed the capacity and surface area of existing slurry lagoons at Feltwell Fm in Table 6:-

Table 6 – Capacity of existing slurry lagoons at Feltwell Fm using Slurry Wizard [1]

Slurry ID [2]	NGR	Total volume (m^3)	Freeboard 750mm (m^3)	Working volume (m^3)	Surface area (m^2) [3]
Lagoon A	TL 72559272	8,708	1,836	6,873	2,426
Lagoon B	TL 72699306	11,914	2,904	8,992	3,666
Lagoon D	TL 73469208	23.073	4,572	18,501	6,266

[1] AHDB (https://ahdb.org.uk/knowledge-library/slurry-wizard-user-guide)
[2] Brown & Co, Methwold Fm, Feltwell Fm & Airfield Fm existing site layout plan & lagoons
[3} Groundsure (https://www.groundsure.com/)

d) Propose to cover lagoon B with floating geometrical tiles to reduce ammonia emissions to air, in accordance with Best Available Techniques (BAT) Reference Document (2017). EA emission factor 0.56 compared to 1.40 $kgNH_3/m^2$ with no cover. A fixed floating plastic membrane would reduce ammonia emissions to 0.28 $kgNH_3/m^2$ but unclear if embankments are suitable for fixings, and more costly.

e) Cover to be installed on lagoon B before bringing any new pig housing into use, and on lagoon A if required to provide sufficient storage capacity.

Confirmed the following for the proposed new slurry storage lagoons at Feltwell Fm:-

f) Existing slurry storage lagoons A&B will provide statutory 6 months storage capacity for 14,000 production pigs in proposed new housing during the closed period for land spreading organic manure in a nitrate vulnerable zone. Used Slurry Wizard on the Agriculture and Horticulture Development Board website to calculate capacity required. Operator provided for lagoon B - depth 6.28-6.54m and slope 25 degrees. Estimated 6 metres for lagoon A&D, based on typical maximum depth for a medium sized excavator, and also 25 degrees.

g) Operator confirmed only uses lagoon B for rearing 7,500 production pig places on solid floor-straw system since purchased the farm in 2019, and always been adequate capacity. Expects to only use B for proposed new housing for 14,000 pig places and will retain A as a back-up. Slurry Wizard calculates worse-case storage capacity required for pigs reared on fully or part slatted floors, with rainfall and washing, not on straw producing FYM and less slurry.

h) Confirmed lagoon D is no longer available owing to leased to another user under an agreement and proposing to demolish lagoon C at Methwold Fm for development.

i) Lagoon C to be emptied and exported offsite for land spreading ahead of starting any proposed new development and demolition. Not been used for years and unclear if it contains residual slurry from pig breeding operations at Methwold Fm or accumulated rainfall or a mixture. Will be properly evaluated for disposal options. In event this occurs during the closed period for land spreading can transfer any slurry to lagoons A or B.

7. <u>Used litter at Methwold (Breckland) Fm Poultry Unit</u>

Operator confirms no plans to export litter from Methwold Fm, or FYM or slurry from Feltwell Fm, to the nearby Methwold anaerobic digestion plant. Any reference to such in the ammonia modelling report and the Environmental Statement for planning is an error. The report and statement will be subject to further revision and addendum, respectively.

8. <u>Airfield Fm</u>

Confirmed by the operator:-

a) Airfield Fm is not currently being used but will be, at least temporarily, for rearing 4,874 permitted production pigs >30kg until demolition and construction phases at Feltwell Fm are complete and all the new pig houses are brought into use.

b) Besides rearing pigs during demolition and construction phases, there will be no activities relating to pig or poultry operations at Feltwell at Methwold (Breckland) Fm, respectively. Partial surrender of the permit is an option, and has been discussed, but

nothing planned. Likely will be reviewed after proposed new development is completed and brought into use.

9. Site boundary plan

Submitted an OS map marked with extended installation boundary for Feltwell Fm pig unit (comprising Airfield Fm & Feltwell Fm) and Methwold (Breckland) Fm poultry unit. Includes enclosure of the soakaway and infiltration basin at Feltwell Fm requested.

10. Methwold (Breckland) Fm poultry unit layout & drainage plan

a) Please delete plans on the EA system, and submitted correct drawings:-

- Layout plan No. Breck-LAY1-12 dated 07/11/23, and
- Drainage plans No. BRECK-DRAIN-N and BRECK-DRAIN-S dated 07/11/23.

b) Addressed points on the correct drawings, or added for avoidance of any confusion:-

i. Drainage routes of storm water (blue) and dirty water (red)
ii. Location of isolation/diverter valves for north and south ends
iii. Location of underground dirty water tanks, chemical stores, and wheel washes for north and south ends.
iv. Point source emissions to land W1-W7 listed in the supporting information.

Submitted supporting information for Q7 Emissions to air, water, and land also updated for emissions to land from French drains filled with stones acting as soakaways under eaves of poultry houses, missed off in error.

11. Feltwell Fm Pig Unit drainage plan

a) Submitted revised proposed site layout plan including drainage plan No. 20-L45-IP002B dated June 2023 having extended installation boundary to enclose soakaway (SW1) and the infiltration basin (SW9) as instructed.

Submitted updated site condition report for Feltwell Fm for the 5.88 + 0.06ha additional greenfield agricultural land enclosed for the soakaway and basin (Total installation area 12.55ha), and Q2b Summary of the proposed changed in the supporting information.

b) Operator confirmed no existing wheel washes, or proposed at Feltwell Fm.

c) No isolation/diverter valves required. Proposed new livestock yard designed to slope and channel slurry into new package fibreglass below ground slurry storage tank and continually pump into lagoon B and A if required. Slurry will contain a mixture of pig excreta, straw bedding, rainwater, and washings.

12. Feltwell Fm Pig Unit layout plan

Submitted revised proposed site layout plan including drainage plan No. 20-L45-IP002B dated June 2023 showing location of carcass storage and chemical store. Not proposing any emergency back-up generator and associated fuel tank.

13. Environmental impact assessment

Submitted Bidwell's Environmental Statement addendum updated February 2023 in Parts 1-4 plus a non-technical summary accessed from the Borough Council of Kings Lynn & West Norfolk planning portal.

Note, a fully updated ES is expected soon, as per request of BCKL&WN to be submitted.

14. Site drainage - Methwold (Breckland) Fm Poultry Unit

a) Dirty wash water from wheel washes will be conveyed into catch pits with grates then via solid underground pipes direct into package below ground dirty water tanks, not via diverter valves. Same for the wheel washes on both north and south gateways.

b) Confirmed none of the infiltration basins will have overflows owing to no available watercourses. Professional flood risk and drainage consultant designed a sustainable urban drainage strategy to utilise the porous underlying geology with separate infiltration basins for uncontaminated roof and road water. Basins located within the Cut-off Channel surface water body catchment, a tributary of Great Ouse main river.

15. Chemical store on Feltwell Fm Pig Unit

Confirmed pesticides and veterinary medicines will be kept in stores that are resistant to fire, dry, frost-free, and secure against unauthorised access and capable of retaining any spillage. Updated change in the supporting information in Q8 Operating techniques missed off in error.

16. Odour and noise management plans

a) Confirmed all the residential dwellings at Feltwell Fm are sensitive receptors for both Feltwell Fm Pig Unit and Methwold (Breckland) Fm Poultry Unit. Not owned by the operators and will not be occupied by workers at Airfield, Feltwell or Methwold (Breckland) Fm.

Most of the dwelling houses nearest to Feltwell Fm Pig Unit are owned by a related company - Cranswick Country Foods plc (Company No.01803402). Rents the bungalows to employees working at the company's slaughterhouse and food processing plant at Watton. Both Wayland Farms Ltd and Crown Chicken Ltd are subsidiary undertakings of Cranswick Country Foods plc. Residents in the 2no. dwelling house at Feltwell Fm farthest from the Pig Unit have no relationship with the operators or with Cranswick.

b) Updated NMP and OMP for Feltwell Fm Pig Unit. Added agricultural premises (a poultry farm) and a residential dwelling in the same place, and planning permission for another within 400m of Airfield Fm. Corrected post codes for the dwelling houses at Feltwell Fm and Breckland Fm in the DMPs, NMPs, and OMPs for both Feltwell Fm Pig Unit and Methwold (Breckland) Fm Poultry Unit.

17. Operating experience at Methwold (Breckland) Fm Poultry Unit

Workers at Methwold (Breckland) poultry farm will be full-time employees qualified with NVQ level 2, and managers and area managers with NVQ level 3, and all members of the Poultry Passport scheme.

Workers will receive environmental awareness training supplied by external and internal trainers. Include awareness of permit conditions and the role of the EA and broader legal requirements on preventing pollution. Awareness of the sensitive receptors outside of the installation boundary at nearby dwellings, industrial and agricultural premises and controls and contingency actions in the dust, noise, and odour management plans to avoid causing annoyance and deal with complaints.

Created a suite of written safe systems of work in EMS for use with internal training and sign-off, on avoiding harm to humans, fauna, and flora, for example in the accident management plan - on diverter valve responsibility, chemical spillage management training for any workers likely to handle chemicals and fuel, etc.

List of submitted documents

1. Redmore Environmental; Ammonia Assessment Land at Airfield Farm, Feltwell Farm and Methwold Farm; Reference: 3894-3r1; date 27th June 2024 and EA Ammonia Model files.zip.
2. VERA Verification Statement (2019) for Agro Clima unit (ACU) Clima+ 200, type 2.5
3. Supporting information to vary an intensive farming permit for proposed development at Methwold (Breckland) Farm Poultry Unit with updated Q7 Emissions to air, water and land
4. Noise management plan for Feltwell Fm Pig Unit (comprising Airfield Fm & Feltwell Fm).
5. OS map marked with extended installation boundary for Feltwell Fm pig unit (comprising Airfield Fm & Feltwell Fm) and Methwold (Breckland) Fm poultry unit.
6. Layout plan No. Breck-LAY1-12 dated 07/11/23, and drainage plans No. BRECK-DRAIN-N and BRECK-DRAIN-S dated 07/11/23 for Methwold (Breckland) Farm poultry Unit.
7. Proposed site layout plan including drainage No. 20-L45-IP002B dated June 2023 for Feltwell Fm Pig Unit
8. Site condition report for Feltwell Farm Pig Unit.
9. Bidwell's Environmental Statement:
   22_00866_FM-PART_1_MAIN_REPORT-5538319
   22_00866_FM-PART_2_MAIN_REPORT-5538278
   22_00866_FM-PART_3_MAIN_REPORT-5538280
   22_00866_FM-PART_4_MAIN_REPORT-5538281
   22_00866_FM-UPDATED_ES_ADDENDUM_VOL_1_-_MAIN_REPORT-5311845
   22_00866_FM-UPDATED_ES_ADDENDUM_VOL_3_-_NTS-5311848