Drainage Review

The drainage of all the poultry houses has been reviewed to ensure conformance with the Best Available Techniques described by the Environment Agency (2010); EPR 6.09 Sector Guidance Note; How to comply you're your environmental permit for intensive farming; Version 2 and those in the 2013 Best Available Techniques (BAT) Conclusions document.

Barn Farm is a new installation erected in 2016 and 2017 and owned and operated by Cobb Europe Ltd. Existing dilapidated chicken sheds and auxiliary buildings on the site were entirely demolished and cleared. Installation comprises 8 new poultry houses purpose built for great grandparent breeder chickens producing fertilised eggs for grandparent breeder chicken flocks elsewhere. Each house provides approximately 8,500 places each and a combined capacity for 51,000 places. A vehicle transfer building, feed bins, weighing rooms, administration and egg stores, service crew building, package sewage treatment plant and package standby generator and storing diesel and LPG are directly associated activities.

Questionnaire

Receptors – where does the drainage end up – the outfall or destination of liquids

On the site drainage plan a receptor may be identified as either an engineered structure for the storage and subsequent managed disposal or a point of unmanaged discharge to controlled waters:

- Engineered structures = lagoons, above ground tanks, below ground tanks, reception pits – usually only receive contaminated water or slurries.
- Surface waters – ponds, rivers and ditches – these only receive uncontaminated water.
- Groundwater – swales and soakaways – these may only receive uncontaminated or lightly contaminated water

Drainage Review

	Question	Guidance	Answer Yes/No/N/a	Comments
1	Are the receptors clearly identified on the plan?	Show the location and boundary of engineered structures. Ensure that the plans also show the location of surface waters and groundwater, swales and soakaways.	Yes	Swales under-drained into the off-site ditch via emission points W1-W5 Off-site ditch for treated domestic sewage effluent via emission point S1 Below ground 50,000 litre dirty water storage tank.
2	Are they accessible at all times?	Access paths should be kept clear of nettles/thistles, etc to allow inspection by both the operator and the Environment Agency at all times. Answer for each receptor identified if more than one.	Yes	Receptors will always be accessible for inspection.
3	Are all sources identified that discharge to your receptors?	Where are the discharge points into ponds and ditches? As this water must be clean sources must be identified. Have you identified the source of all of the pipes discharging to your engineered structures and other receptors?	Yes Yes	Emission point W1-W5 into the off-site ditch alongside the eastern boundary for uncontaminated run-off from roofs of poultry houses, other buildings, hardstanding and roadway via under-drained swales. Emission point S1 into off-site ditch on southern boundary for treated domestic sewage effluent. Marked on the drainage plan:- • Filter drains for uncontaminated roof water alongside poultry houses • Gutters, downpipes & drains for uncontaminated roof water from other buildings • Surface water drains for uncontaminated run-off from hardstanding and roadway • Overland flows for uncontaminated surface water between the houses • Separate dirty water drains from poultry houses • Treated domestic sewage effluent from treatment plant to S1.

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4a	Are inlet points known?	The inlet and outlet points to dirty water stores should be identified. The inlet points to swales and soakaways should be identified.	Yes Yes	Marked on the drainage plan:- • Dirty water drains outside the doors of the poultry houses • Underground pipes into the underground dirty water tanks • Manholes/inspection chamber (IC) on the dirty water tank for inspection and emptying by a professional contractor for off-site disposal. Marked inlets into the under-drained swales on the drainage plan from:- • Filter drains for uncontaminated roof water alongside poultry houses • Overland flows for uncontaminated surface water between the houses • Gutters, downpipes & drains for uncontaminated roof water from the other buildings • Surface water drains for uncontaminated run-off from hardstanding and roadway.
4b	Are outlet points known?	How is water level maintained in ponds? Is there an outflow, where is it and to what does it discharge and is it controlled? Where there is no outflow and the pond does not overflow, is the pond leaking to groundwater?	N/A N/A	There are no ponds, the under-drained swales continue to discharge any water into the off-site ditch via orifice flow restrictions at emission points W1-W5 until dry - their purpose is to attenuate flow not to retain any water.

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5	Are structures appropriately sized and constructed?	Engineered structures should be of sound design and maintained to ensure their integrity. They should be of sufficient size to meet both the operational requirements of the individual installation and to meet statutory long term storage requirements. These are the Control of Pollution (Silage, Slurry and Fuel Oil) Regulations at all installations (and the Nitrate Vulnerable Zones Regulations where appropriate). Structures should be managed to make sure the correct freeboard is maintained and that overfilling doesn't occur. Good construction, management, maintenance and appropriate sizing also apply to swales.	Yes Yes Yes	Professional drainage consultants provided a flood risk assessment & surface water drainage strategy for planning application in 2014, including mitigation measures with provisions for the heaviest rainfall falling in a 100 year return period plus 20% for global warming. Strategy detailed mitigation measures for filter drains, overland flows, run-off from the other buildings, under-drained swales with orifice flow restrictions to attenuate flow into the off-site ditch and dirty water storage tanks for the life of the installation. Installed the mitigation measures except - installed one below ground dirty water tank, rather than four proposed to reduce costs. Professional building contractor provided the sizing for the 50,000 litre package reinforced glass fibre dirty water tank and connections. Capacity of the below ground dirty water storage tank is adequate for all the dirty water from washing the houses after each production cycle and any rainfall that might occur during washing. Only two houses are cleaned out every 13 weeks. Checking regularly and emptied when necessary so it does not back-up or overflow.
6	Can receptors be managed to protect the environment?	Can all the receptors be protected? Can all discharges to them be contained, blocked, by-passed or isolated if necessary (this should be established in the accident management plan)?	Yes Yes	Diverter valves (X) installed inside inspection chambers to separate dirty water in the yard during stocking, destocking, removing litter and washing out. The dirty water tank has an inspection chambers for monitoring and emptying.

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		Can they be monitored in an emergency? How do you know when they are full or empty?	Yes	Regularly checking, repairing and maintaining drainage systems.
7	Is the quality of run-off consistent in all cases even though the quantities may fluctuate?	The quality of run-off can change? Clean water flows can become temporarily dirty (for example concrete driveways during shed cleanouts). If this can happen you will need a diversion system in place. If there's no diversion system installed then the run-off will need to be permanently treated as dirty water and directed to a suitable receptor. This may place a large storage burden on an engineered structure. There may also be subsequent disposal costs. This may be an area where operators can make cost effective improvements to their site drainage.	No Yes	Limited to uncontaminated run-off from poultry houses, other buildings, hardstanding and roadway. Dirty water grates outside the doors of the poultry houses receive dirty water during stocking, destocking, removing litter and washing out which is drained to the dirty water tank. At other times when it is raining the grates are likely to receive uncontaminated run-off from the overland flows between the houses and the roadway. Manual diverter valves marked on the plan (X) to divert uncontaminated run-off into the swales. Cleaners are trained in changing the diverters in the drains to prevent dirty water going into the swales or clean rainwater draining into the dirty water tank. Keeping yards and drainage channels clear and cleaning up spilt feed, dust & litter as soon as possible. Regularly checking, repairing and maintaining drainage systems. Package domestic sewage secondary treatment plant is managed in accordance with manufacturer's instructions and desludged by a professional contractor.

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Pathways – how does the drainage get there – the route that liquids take

On the site drainage plan the pathway should be identified by arrows showing the direction of flows, the location of drain inlets and access points (manhole covers and inspection chambers). The pathways are likely to be one of the following three categories:-

- Gutters, downpipes and drains – may be piped pathways fixed or temporary (rigid or flexible), above ground or buried, gravity fed or pumped
- Overland flow – may be planned and marshalled (yards and slopes)
- Channels, gullies and drain inlets – may be directing flow or intercepting it (to protect the buildings and structures).

	Question	Guidance	Answer Yes/No/N/a	Comments
8	Are all pathways shown on the plan?	The route should be shown in its entirety including direction of flow.	Yes	Marked routes that liquids take to the receptors and direction of flows on the drainage plan: • Filter drains for uncontaminated roof water alongside poultry houses • Gutters, drains for uncontaminated roof water from the other buildings • Surface water drains for uncontaminated yard water run-off • Overland flows for uncontaminated surface water between the houses • Separate dirty water drains from poultry houses Emission points W1-W5 for uncontaminated run-off into the off-site ditch and emission point S1 for treated domestic sewage effluent from the treatment plant are marked on the drainage plan.
9	Are all manholes and inspection covers shown on the plan?	Use the standard symbols to describe these. The key to symbols to use is in the introduction to this document.	Yes	Inspection chambers for the dirty water storage tank and are marked on the drainage plan. There are inspection chambers for maintenance of the uncontaminated water drains which are not marked, but clearly visible on site in the hard standing and roadway.

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				Otherwise we have used the symbols and colours suggested by the Environment Agency in How to comply.
10	Are they identified as - clean, dirty or lightly contaminated on the plan?	This refers to their identification and designation on the plan. Where a diverter is in place to deal with the flows of variable quality then the plan should show this and identify all of the categories that may use the pathway.	Yes	Marked the uncontaminated and dirty water drains on the drainage plan using symbols and colours suggested by the Environment Agency in How to comply. There are no lightly contaminated water drains.
11	Are they identified on site as clean or dirty by coloured paints?	Are all manholes, inspection chambers, drain inlets, etc identified by paint marks of the appropriate colour to signify their contents – red for dirty, blue for clean? Mark the direction of flow in the appropriate colour.	No	Not considered necessary.
12	Are all gutters downpipes and drains in good condition?	Are they entire (are there missing or broken gutters)? Do they connect to a satisfactory downpipe? Does it discharge to a drain and does the drain exclusively service the gutter (is the water clean and will it remain uncontaminated)? Are they adequately sized (downpipe frequency, diameter, etc?)	Yes Yes Yes	Gutters, downpipes & drains for uncontaminated roof water from the other buildings into uncontaminated water drains.

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		Are they fitted with filters?	Yes	Installed filter drains for uncontaminated roof water alongside the poultry houses,
		Are they maintained and do they work?	Yes	Regularly checking, repairing and maintaining drainage systems.
13	Are sleeping policeman diverters or interceptors identified on the plan?	Overland flow is a major feature of all farm installations. For each surface flow pathway the following points should be considered and documented:		
		• Is it concrete and is it impermeable (not cracked or pot holed)?	Yes	Concrete hardstanding and roadway is in good condition.
		• Are there any deviation devices – sleeping policeman, interceptors?	Yes	Diverter valves (X) marked on the drainage plan.
		• Is there any sectioning for clean and dirty water separation and is this permanent or temporary. If so does it change during the year at peak times such as mucking out or stock movement?	Yes	Dirty water drains are generally separate, only sharing short sections of clean water drains under the roadway during stocking, destocking and washing out for a short time every 13 weeks. Diverter valves are installed to prevent dirty water going into the swales or clean water filling the dirty water tank. Otherwise most sections for clean water are permanently separated from others including the drain from the package sewage treatment plant.
		• Is the flow ever impeded or contaminated by temporary storage of manures, straw, feedstuffs, etc. If so, is it diverted if it was previously clean?	No	Used litter is never stored on site, and there are very few materials temporarily stored, most arrive and are immediately installed after washing has finished (E.g. Bales of shavings/chopped straw for litter).

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14	Does the plan show the limits of both concreted and grassed areas?	Some clean water/rainfall may be disposed of on grassed areas or soakaways. Some run-off may initiate from grassed and non-concreted areas. Some areas may have surfaces made from tarmac, bitmac or compacted road planings. They should be shown on the plan as a source, pathway or receptor (or a combination).	No Yes No Yes	 Clean water run-off from overland flows from between the poultry houses into the clean water drains in the roadway marked on the drainage plan. All the hardstanding and roadways are concrete.
15	Are all drain inlets, channels and gullies identified on the plan?	Channels gullies and drain inlets: • Where are they? • Are they part of an integrated system with junctions and inspection chambers? • What is near them and are there high risk activities upslope of them? If so are safeguards in place (kerbs installed, emergency drain covers etc)?	 Yes Yes No	 Gullies and drain inlets for clean and dirty water are marked on the plan. Junctions, diverter valves (X) and inspection chambers (IC) are marked on the plan. Besides stocking, destocking, removing litter and washing out there are no other high risk activities upslope of them.

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		• Do they take clean or potentially clean water?	Yes	
16	Do they take clean or contaminated water and does the plan show this?	Are they identified by either red or blue colouring on the plan as appropriate? If there are flows of variable quality then use more than one colour as appropriate.	Yes	Generally marked on the plan using appropriate blue and red symbols for clean and dirty water suggested by the Environment Agency in How to comply, otherwise the overland flows in between the poultry houses are marked red having been marked as such in the original drawings, although we know each of them is uncontaminated water draining into clean water drains in the roadway.

Drainage Review

Sources and pollutants – where does the drainage come from and what is it

On the site drainage plan a source will be shown as a physical structure. This may include:

- Buildings, tanks, hoppers, raceways, yards, reception pits, clamps, incinerators, wheel washes etc.

Depending on what the structure is, it will generate a range of liquids and possible contaminants.

	Question	Guidance	Answer Yes/No/N/a	Comments
17	Are all sources included on the plan and are they clearly identified?	Are all the buildings included on the plan?	Yes	
18	Is the roof water from the structure uncontaminated?	The collection of rainwater from the roofs is the most obvious source of potentially uncontaminated liquid (clean water). This, and run-off from clean yard surfaces is the only material that can be directed straight to a watercourse. However, where there are roof vents, roof water is assumed to be contaminated and should be intercepted.	Yes	Clean roof water run-off from the poultry houses is uncontaminated. High velocity ridge outlets are installed so high speed exhaust is not deflected down the roof line, so dust is unlikely to settle or contaminate roof water.

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19	Is the rainfall collected from yard areas uncontaminated?	Provided that they are kept clean, run-off from yards can be classed as uncontaminated. Yard cleanliness may be periodic. During shed emptying or livestock removal they may be dirty and some form of drainage diversion will be necessary.	Yes	Clean roof water run-off from the other buildings, hardstanding and roadway is uncontaminated. Dirty water drains are generally separate, only sharing short sections of clean water drains under the roadway during stocking, destocking and washing out for a short time every 13 weeks. Diverter valves are installed to prevent dirty water going into the swales or clean water filling the dirty water tank.
20	Are all contaminated liquids directed to a managed receptor?	Other materials that may be generated from buildings may include: • Slurry (from manure stores, seepage from buildings and passageways, scraping routes, etc) • Fuels and oils, pesticides, disinfectants • Feedstuffs – spillages and dust from milled products	Yes Yes Yes	Bird droppings, used litter and washings every 13 weeks during stocking, destocking, removing litter and washing out. Washings are diverted into dirty water tank for transferring off-site. Installed package standby generator and secure fuel tank. Use suitable, approved disinfectants for sanitising the houses supplied by professional cleaning contractors and diverted into the dirty water tank during washing out, otherwise only small quantities of boot dips and lorry wheel disinfectants stored on site. Installed package dust collectors on each silo and regularly checking and maintaining feed supply system. Any spillages will be cleared up quickly.

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		• Pressure washing areas can also be sources of contaminated water.	Yes	A pressure vehicle wash is enclosed in the transfer building for vehicles coming on site including those for bird and feed deliveries, bird collections and removing litter. Disinfectant is added to the wash water and drains to the dirty water tank. The poultry houses will be cleaned with pressure washers and management of the washings is described elsewhere in this review.
21	Are any lightly contaminated sources directed to swales and soakaways?	Dust from buildings with side-wall ventilation systems and rainfall from roof-vented sheds may create contaminated water. This may be disposed of via a swale or a soakaway taking account of groundwater vulnerability. Soakaways may not be appropriate if the site is on a major aquifer.	No	There are no lightly contaminated sources.

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22	Has the release of all contaminants been minimised where possible?	The risk from contaminants may occur continuously from rainfall, scraping down, seepage, ventilation fans etc. Other contaminants may be only occasionally released from delivery of fuels, pesticides, feedstuffs, shed clearance and cleaning at the end of rearing cycles. Rarer risks arise from accident and emergency situations. Most sources and risks can be minimised by bunding stores, kerbing muck pads, installing sleeping policeman in muck passage doorways etc.	Yes	Comments already included in question 20 above.

Drainage Review

Checklist – are the following included on your drainage plan

Points to be shown on plan	Tick if included on plan
The location of all receptors	✓
All buildings, structures and other sources of drainage	✓
Points where clean water discharges to ditches, rivers and watercourses	✓
Outfall points into dirty water lagoons and their emptying points	✓
Boundaries of grassed areas, swales and soakaways	✓
Pathways using blue where the flows are clean water	✓
Pathways using purple where flows are lightly contaminated water	N/A
Pathways using red where the flows are dirty water	✓
Access points into the pathways and coloured accordingly	✓
Inspection points and manholes and coloured accordingly	✓
Diverters, interceptors and sleeping policemen	✓

Drainage Review

Drainage action plan

	Issue	Action	Proposed timescale for completion	Estimated Cost £	Timescale agreed with Environment Agency

Improvements are included in Appendix 5: Technical Standards