

Odour Assessment

Plane Tree Farm- Proposed Slurry Lagoon

Background

This report assesses the potential impacts of odour from a proposed earth bank slurry lagoon at Plane Tree Farm, Chaigley. The lagoon will provide storage of cattle slurry from the 120 strong milking herd.

The proposed lagoon is located within a grassland parcel Grid Ref SD67300 41687.

Organic manures must be stored in accordance with the requirements of the Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oils) (England) Regulations 2010.

The proposed lagoon will have a maximum surface area of 60m x 25m. A 750mm freeboard will reduce the actual slurry surface area. The lagoon will be covered with a fixed floating cover.

The lagoon will be filled by a pumped overground flexible pipe arrangement. Manures will be spread by an umbilical spreading system.

Sensitivity

The location of the lagoon has been determined by ground source investigation carried out by the Environment Agency, the proximity to drainage ditches and soil permeability tests.

The Institute of Air Quality Management (IAQM) Sensitivity Class for odour for residential dwellings is High Sensitivity where:

- Users can reasonably expect to enjoyment of a high level of amenity; and
- People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
Examples may include residential dwellings, hospitals, schools/education and tourist cultural.

The table below shows the distances of properties close by.

Dwelling	Distance from proposed lagoon (m)
The Old Barn	156
Walker Fold	161
Walker Fold Barn	166
Walker Fold House	174
The Cottage	140
The Manse	161
The Old School Room	184
Bull Hill	323
Manor Barn	402
Plane Tree Cottage	423
High Trees	492
Plane Tree Farmhouse	454

Regulatory Guidelines

Currently there are no statutory numerical standards for assessing the acceptability of predicted odour impacts in the UK. UK guidance identifies a number of odour impact criteria depending on the nature of the odour (i.e it's pleasantness/unpleasantness) and the likelihood

of causing unacceptable impacts based on the 98th percentile of predicted hourly average concentrations.

In respect of agriculture environmental permitting is required for intensive pig and poultry units. There is currently no requirement for dairy farmers to cover slurry stores or lagoons. Whilst proposals under the 2019 Clean Air Act to impose the retrofit rule by 2027 were withdrawn by Defra, it is anticipated that this will become mandatory in the future as part of wider environmental legislation.

IAQM Guidance

The IAQM guidance can be used to classify the impact from a facility.

In relation to an intensive agricultural facility (i.e for a 'moderately offensive odour' from a pig and poultry unit at a high sensitivity receptor the effect would be classified as

- **Negligible** at below 1.5 ou_g/m³
- **Slight adverse** from 1.5 ou_g/m³ – 3.0 ou_g/m³ as a 98th percentile of hourly means; or
- **Moderate adverse** impact above 3.0 ou_g/m³ – 10.0ou_g/m³ as a 98th percentile of hourly means.

Moderate impact (or greater) would be regarded as 'significant' for the purposes of environmental assessment when considering planning balance.

Research has shown that cattle odours are less offensive than intensive pig and poultry with a weighting factor of 1.5 for poultry, 0.75 for pigs and 0.5 for cattle (Moshammer,H;Oetti,D,;Mandi,M,;Kropsch,M; Weitensfeider,L,; *Comparing Annoyance Potency Assessments for Odors from Different Livestock Animals, Atmosphere* 2029, 10 659.)

Emissions

Seasonal odour emission rates have been used for the lagoon which is consistent with published library data for cattle slurry (Valli, Laura & Moscatelli, Guiseppe & Labartino, Nicola (2008) *Odour emissions from livestock production facilities. Chem Eng. Trans.*, 25)

Odour Emission Factors

Table 1

Season	Mean ou _g /m ² /s	St Dev ou _g /m ² /s	CV
Summer average	3.6	1.7	0.5
Winter average	1.8	0.9	0.5
Annual Average	2.7	1.6	0.6

SCAll assumes that floating covers mitigate ammonia emissions by 55-65% , however this refers to a light expanded clay aggregate (i.e floating clay ball) type cover rather than a fixed sheeting system. The Agricultural and Horticultural Development Board (AHDB) estimate that floating covers reduce odour emissions between 61% and 90%.

On this basis the emissions from a covered slurry lagoon will fall into the 'Negligible' category and will have no significant effect on residential properties.

Management Factors

It is important to understand the function of the lagoon as a storage facility for the dairy unit. The lagoon is effectively a storage vessel for the organic slurry which includes faeces, urine, dirty yard water and milking parlour washings.

The association of unpleasant smells relating to slurry is largely attributed to when the slurry is spread to the land. The storage of slurry in a covered store or lagoon does not involve dispersion of particles which carry on the wind. Uncovered stores require stirring as liquid solid elements of the slurry separate. The agitation of the slurry for the proposed covered store will be via an aeration 'bubbling' system where air is pumped into the slurry to effectively mix solids and liquids whilst contained within the covered lagoon.

The proposed lagoon will be filled by a pumped overground pipe to the store and discharge below the fixed cover. This means there is no dispersion of odour during the winter months. Spreading rules mean that no organic manures can be spread during the months when plant uptake does not occur.

Emptying the lagoon will be carried out by contractors using an umbilical system which again will be pumped directly from under the fixed cover.

Conclusion

The proposed store is a lined unit which will ensure water quality within the catchment is protected. The installation of a fixed floating cover will ensure there are no unpleasant odours which will affect nearby residences. The impact of the lagoon on residences will be insignificant.