

## Note / Memo

HaskoningDHV UK Ltd.  
Water & Maritime

To: S R & R J Brown Limited  
From: Dominic Handscomb  
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**Subject: Land at Twine Valley Farm, Church Road, Shuttleworth - Odour Assessment**

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## 1 Introduction

This note provides a qualitative odour assessment for the proposed development of a slurry lagoon at the Land at Twine Valley Farm, Church Road, Shuttleworth (hereafter known as “the Site”).

The proposed slurry lagoon has already been constructed but is not yet operational. The lagoon is oval in shape, is 4 m deep and has 45 degree slopes to each side. It would have a stone base with a 2 mm thick black plastic liner to make the pond impermeable. It is proposed that when operational the lagoon will be covered with an impermeable UV-stabilised plastic floating cover, secured at the bank tops of the lagoon. The proposed cover will be as per recommendations from the Department for Environment, Food & Rural Affairs’ (Defra’s) guidance on the *Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions* (Defra, 2024) and *The Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control on the Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs* (European Union, 2017).

The proposed slurry lagoon is situated approximately 25 m east of Church Road. The nearest sensitive receptor to the proposed lagoon is a residential property on Edith Street, approximately 30 m west from the Site.

## 2 Guidance

### 2.1 Environment Agency H4 Odour Management Permitting Guidance

The Environment Agency published the H4 Odour Management guidance document providing technical support for processes operating under an Environmental Permit was published by the Environment Agency in 2011 (Environment Agency, 2011). It offers a detailed guide to the assessment, quantification, control and management of odours emitted from permitted processes. The guidance sets out benchmark criteria for a wide range of odours, as shown in **Table 1**.

**Table 1: H4 Benchmark odour criteria (Environment Agency, 2011)**

| Criterion, $C_{98}$ ouE /m <sup>3</sup> | Offensiveness        | Odour Emission Sources                                                                                                                                                                           |
|-----------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.5                                     | Most Offensive       | <ul style="list-style-type: none"> <li>Processes involving decaying animal or fish remains</li> <li>Processes involving septic effluent or sludge</li> <li>Biological landfill odours</li> </ul> |
| 3.0                                     | Moderately Offensive | <ul style="list-style-type: none"> <li>Intensive livestock rearing</li> <li>Fat frying (food processing)</li> <li>Sugar beet processing</li> <li>Well aerated green waste composting</li> </ul>  |
| 6.0                                     | Less Offensive       | <ul style="list-style-type: none"> <li>Brewery</li> <li>Confectionery</li> <li>Coffee roasting</li> <li>Bakery</li> </ul>                                                                        |

## 2.2 Institute of Air Quality Management Guidance

The Institute of Air Quality Management (IAQM) guidance on the assessment of odour for planning document was compiled and issued in 2014 by an expert panel of the Institute of Air Quality Management (IAQM) and was subsequently updated in 2018 (IAQM, 2018), on the basis of initial practical experience of its application and implementation. It provides a framework for the identification, assessment and categorisation of the scale and magnitude of the impact of odours emitted from industrial processes and other activities. It has become widely adopted and applied by odour professionals in the UK. The guidance uses the principle of FIDOL factors (Frequency, Intensity, Duration, Odour unpleasantness and Location) to determine the impact of odour at a location. The FIDOL factors are described in **Table 2**.

**Table 2: Description of FIDOL factors (IAQM, 2018)**

| Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Description                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | How often an individual is exposed to odour.                                                                                                                                                                                                                                                                                                                             |
| Intensity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The individual's perception of the strength of the odour.                                                                                                                                                                                                                                                                                                                |
| Duration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The overall duration that individuals are exposed to an odour over time.                                                                                                                                                                                                                                                                                                 |
| Odour unpleasantness                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score*. |
| Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors.                                                                                                  |
| <p>*Hedonic scores are values assigned to the unpleasantness of a smell in order to quantify an odour. This is assigned in laboratory conditions by a panel of trained assessors in line with the German VDI 3882 Part 2 method. Hedonic tone (the degree to which an odour is perceived as either pleasant or unpleasant) is scored on a nine-point scale ranging from very pleasant (a score of +4, such as a bakery smell) through neutral to highly unpleasant (a score of -4, such as rotting flesh).</p> |                                                                                                                                                                                                                                                                                                                                                                          |

### 3 Methodology

A qualitative risk-based assessment following the IAQM guidance (IAQM, 2018) has been carried out for the Site. A more sophisticated assessment is not practical given the poor characterisation of the potential odour source given the fact the lagoon is not currently in active use and therefore cannot be monitored.

The qualitative risk-based assessment presented in the IAQM guidance (IAQM, 2018) is underpinned by the basic concept of risk being dependent on the probability of the event occurring and the consequence of the event occurring. For odour assessments, the probability can be characterised by the likelihood of exposure (impact) and the consequence can be characterised as the effect on the receptor if that exposure (impact) was to occur. This is pulled together by the Source–Pathway–Receptor (S-P-R) concept.

The fundamental relationship behind the S-P-R concept is: **Effect  $\approx$  Dose x Response**

For an odour assessment, the dose can be considered to be equivalent to the odour exposure (impact). The impact will be determined by FIDO of the FIDOL factors presented in **Table 2**. The effect is the result of the changes upon human (in the case of odour) receptors, taking into account receptor sensitivity (i.e. the responsiveness to odour); the L (location) in FIDOL categorises the sensitivity.

The S-P-R approach considers the strength, how inherently odorous the compounds are and the unpleasantness of the odour source, how the odour will be diluted and dispersed in the open air and the effectiveness of any mitigation, and the sensitivity of affected receptors.

Before an adverse effect occurs, such as a loss of amenity, annoyance, nuisance, or the generation of complaints, there must be exposure to odour. The occurrence of odour exposure relies on the presence of all three components in the S-P-R chain:

- An emission source, which serves as a means for the odour to enter the atmosphere.
- A pathway through which the odour can travel through the air to locations off-site. It is important to note that anything enhancing the dilution and dispersion of an odorous plume during its journey from the source to the receptor will diminish the concentration, consequently reducing exposure. Additionally, increasing the length of the pathway (e.g. by releasing from a high stack) will, under equal conditions, amplify dilution and dispersion.
- The existence of receptors, referring to individuals who could potentially experience an adverse effect. It is important to acknowledge that people vary in their sensitivities to odour.

**Table 3** provides the factors to consider and examples for the odour source, the pathway effectiveness and receptor sensitivity.

**Table 3: IAQM Examples of Risk Factors for Odour Source, Pathway and Receptor Sensitivity. (IAQM, 2018)**

| Source Odour Potential                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Pathway Effectiveness                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Receptor Sensitivity                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Factors affecting the source odour potential include:</p> <ul style="list-style-type: none"> <li>the magnitude of the odour release (taking into account odour-control measures).</li> <li>how inherently odorous the compounds are.</li> <li>the unpleasantness of the odour.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Factors affecting the odour flux to the receptor are:</p> <ul style="list-style-type: none"> <li>distance from source to receptor.</li> <li>the frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind).</li> <li>the effectiveness of any mitigation/ control in reducing flux to the receptor.</li> <li>the effectiveness of dispersion/ dilution in reducing the odour flux to the receptor.</li> <li>the topography and terrain.</li> </ul>                               | <p>For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies taking into account the following general principles:</p>                                                                                                                                                                                                                      |
| <p><b>Large Source Odour Potential</b></p> <ul style="list-style-type: none"> <li>Magnitude – Larger Permitted processes of odorous nature or large Sewage Treatment Works (STWs); materials usage hundreds of thousands of tonnes/m<sup>3</sup> per year; area sources of thousands of m<sup>2</sup>.</li> <li>The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known.</li> <li>Unpleasantness – processes classed as “Most offensive” in <b>Table 1</b>; or (where known) compounds/ odours having unpleasant (-2) to very unpleasant (-4) hedonic score.</li> <li>Mitigation/ control – open air operation with no containment, reliance solely on good management techniques and best practice.</li> </ul> | <p><b>Highly Effective Pathway for Odour Flux to Receptor</b></p> <ul style="list-style-type: none"> <li>Distance – receptor is adjacent to the source/ site; distance well below any official set-back distances.</li> <li>Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind).</li> <li>Effectiveness of dispersion/ dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.</li> </ul> | <p><b>High sensitivity receptor</b><br/>Surrounding land where:</p> <ul style="list-style-type: none"> <li>users can reasonably expect enjoyment of a high level of amenity; and</li> <li>the people would reasonably be expected to be present there continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</li> </ul> <p>Examples may include residential dwellings, hospitals, schools/ education and tourist/ cultural locations.</p> |
| <p><b>Medium Source Odour Potential</b></p> <ul style="list-style-type: none"> <li>Magnitude – Smaller Permitted processes or small STWs; materials usage thousands of tonnes/m<sup>3</sup> per year; area sources of hundreds of m<sup>2</sup></li> <li>The compounds involved are moderately odorous.</li> <li>Unpleasantness – processes classed in <b>Table 1</b> as</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Moderately Effective Pathway for Odour Flux to Receptor</b></p> <ul style="list-style-type: none"> <li>Distance – receptor is local to the source. Where mitigation relies on dispersion/dilution – releases are elevated but compromised by building effects.</li> </ul>                                                                                                                                                                                                                                                                                         | <p><b>Medium sensitivity receptor</b><br/>Surrounding land where:</p> <ul style="list-style-type: none"> <li>users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or</li> <li>people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the</li> </ul>                                                                                     |

| Source Odour Potential                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Pathway Effectiveness                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Receptor Sensitivity                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>“Moderately offensive”; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score.</p> <ul style="list-style-type: none"> <li>Mitigation/ control – some mitigation measures in place, but significant residual odour remains.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>normal pattern of use of the land.</p> <p>Examples may include places of work, commercial/ retail premises and playing/ recreation fields.</p>                                                                                                                                                                                                                                                                                          |
| <p><b>Small Source Odour Potential</b></p> <ul style="list-style-type: none"> <li>Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m<sup>3</sup> per year; area sources of tens m<sup>2</sup>.</li> <li>The compounds involved are only mildly odorous, having relatively high ODTs where known.</li> <li>Unpleasantness – processes classed as “Less offensive” in <b>Table 1</b>; or (where known) compounds/ odours having neutral (0) to very pleasant (+4) hedonic score.</li> <li>Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>Ineffective Pathway for Odour Flux to Receptor</b></p> <ul style="list-style-type: none"> <li>Distance – receptor is remote from the source; distance exceeds any official set-back distances.</li> <li>Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind).</li> <li>Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents &gt;3 m above ridge height) and are not compromised by surrounding buildings.</li> </ul> | <p><b>Low sensitivity receptor</b><br/>Surrounding land where:</p> <ul style="list-style-type: none"> <li>the enjoyment of amenity would not reasonably be expected; or</li> <li>there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</li> </ul> <p>Examples may include industrial, farms, footpaths and roads</p> |
| <p>Notes: Minimum ‘setback’ distances may be defined for some odorous activities: for example, standard setback distances for livestock housing units are a popular tool for odour regulation in Australia and New Zealand, Europe and the United States. In the UK, there is no universally agreed-upon set of minimum setback distances for odorous activities. However as stated in The Town and Country Planning (General Permitted Development) (England) Order 2015 Schedule 2 Part 6 Class A, updated 2024, a development is not guaranteed consent if “the development is for the storage of slurry or sewage sludge where the building, structure or excavation is, or would be, within 400 metres of the curtilage of a protected building”.</p> <p>A protected building means “any permanent building which is normally occupied by people or would be so occupied, if it were in use for purposes for which it is designed; but does not include—</p> <p>(a) a building within the agricultural unit; or</p> <p>(b) a dwelling or other building on another agricultural unit which is used for or in connection with agriculture”</p> <p>Therefore, 400 m has been used as a recommended setback distance for the assessment.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                            |

The next step in the assessment combines the estimates of source odour potential and pathway effectiveness to predict the risk of odour exposure (impact) at the receptor location, as illustrated in the IAQM matrix in **Table 4**.

**Table 4: Risk Of Odour Exposure (Impact) at the Specific Receptor Location Matrix**

| Pathway Effectiveness        | Source Odour Potential |                 |             |
|------------------------------|------------------------|-----------------|-------------|
|                              | Small                  | Medium          | Large       |
| Highly effective pathway     | Low risk               | Medium risk     | High risk   |
| Moderately effective pathway | Negligible risk        | Low risk        | Medium risk |
| Ineffective pathway          | Negligible risk        | Negligible risk | Low risk    |

The last stage involves assessing the impact of the odour on the exposed receptor, considering its sensitivity, as depicted in the IAQM matrix provided in **Table 5**. The potential odour effects range from negligible and slight adverse to moderate adverse and substantial adverse.

**Table 5: Likely Magnitude of Odour Effect at the Specific Receptor Location Matrix**

| Receptor Odour Exposure (impact)  | Receptor Sensitivity  |                         |                            |
|-----------------------------------|-----------------------|-------------------------|----------------------------|
|                                   | Low                   | Medium                  | High                       |
| High risk of odour exposure       | Slight adverse effect | Moderate adverse effect | Substantial adverse effect |
| Medium risk of odour exposure     | Negligible effect     | Slight adverse effect   | Moderate adverse effect    |
| Low risk of odour exposure        | Negligible effect     | Negligible effect       | Slight adverse effect      |
| Negligible risk of odour exposure | Negligible effect     | Negligible effect       | Negligible effect          |

To assess the significance of the effect, the evaluation has incorporated the following recommendation from IAQM:

*“an assessment reaches a conclusion on the likely significance of the effects. Where the overall effect is greater than “slight adverse”, the effect is likely to be considered significant. This is a binary judgement: either it is “significant” or “not significant””.*

## 4 Baseline

To provide an assessment of the significance of any new development proposal (in terms of odour), it is necessary to identify and understand the baseline conditions in and around the study area. This provides a reference state against which any potential future changes in odour can be assessed.

Ambient levels of odour are typically very low and are not routinely monitored in the UK. Based upon a desktop survey there are few potentially significant sources of odour in the immediate vicinity of the Site. The closest potential sources of odour to the Site are the cattle sheds located at Twine Valley Farm approximately 50 m southeast of the Site. The Fletcher Bank Quarry located 260 m to the south and residential properties to the east are not expected to give rise to significant odours.

## 5 Odour Emissions Assessment

The initial step in the assessment involves estimating the potential for odour generation from site activities, referred to as 'Source Odour Potential'. This estimation of Source Odour Potential is assessed in **Table 6**

**Table 6: Assessment of Source Odour Potential**

| Factor Affecting Source Odour Potential                    | Discussion                                                                                                                                                                             | Source Odour Potential |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| The scale (magnitude) of the release from the odour source | Based on drawings provided, the slurry lagoon is estimated to have an area of 686 m <sup>2</sup> and have a volume of approximately 1,400 m <sup>3</sup>                               | Medium                 |
| The inherent odour intensity of the emission.              | The exact contents of the slurry lagoon are unknown at this time and as the lagoon is not yet in place an assessment of the odour intensity (e.g. sniff testing) cannot be undertaken. | N/A                    |
| The relative pleasantness/unpleasantness of the odour.     | The contents of the slurry lagoon would be classified as the most offensive odour category in the H4 odour criteria in <b>Table 1</b> .                                                | Large                  |

The overall Source Odour Potential of the Site is therefore assessed as **Large**.

Taking into account the example risk factors in **Table 3**, the effectiveness of the source pathway and sensitivity of nearby receptors has been assessed in **Table 7**. The proposed plastic floating cover will reduce ammonia and odour emissions from the lagoon. With impermeable floating covers in place, ammonia emission reductions of approximately 95 % or more have previously been reported (European Union, 2017). With this type of odour reduction in place the odour pathway effectiveness from the lagoon is considered to be ineffective at all receptors.

**Table 7: Assessment of Source Pathway and Receptor Sensitivity**

| Receptor Details and Location | Discussion                                                                                                                                                                                                                                                                                                                           | Pathway Effectiveness | Receptor Sensitivity |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|
| Edith Street, Shuttleworth    | Receptor is approximately 25 m west from the Site.<br>Receptor is located upwind of the prevailing wind direction and approximately 5 m downhill from the Site (OS Maps, 2025).<br>The lagoon is a closed, covered process. Although the release is low-level, it is considered to be an ineffective odour pathway due to the cover. | Ineffective pathway   | High                 |
| Church Road, Shuttleworth     | Receptor is approximately 65 m west from the Site.<br>Receptor is located upwind of the prevailing wind direction and is approximately 2 m downhill from the Site.                                                                                                                                                                   | Ineffective pathway   | High                 |
| Bye Road, Shuttleworth        | Receptor is approximately 85 m southwest from the Site.<br>Receptor is located upwind of the prevailing wind direction and is approximately 10 m downhill from the Site. Building effects from the Twine Valley Cattle sheds 50 m south of the Site are likely.                                                                      | Ineffective pathway   | High                 |
| Whalley Rd, Ramsbottom        | Receptor is approximately 230 m northwest from the Site. Receptor is not located downwind of the prevailing                                                                                                                                                                                                                          | Ineffective pathway   | High                 |

| Receptor Details and Location                              | Discussion                                                                                                                                                                                                                                                                              | Pathway Effectiveness | Receptor Sensitivity |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|
|                                                            | wind direction and is approximately 6 m uphill from the Site.                                                                                                                                                                                                                           |                       |                      |
| Bury Old Road, Ramsbottom                                  | Receptor is approximately 395 m east from the Site.<br>Receptor is not located upwind of the prevailing wind direction and is approximately 17 m uphill from the Site.<br>Building effects from the Twine Valley agricultural machinery store located 60 m east of the Site are likely. | Ineffective pathway   | High                 |
| The Stables Luxury B&B, Bury Old Road Ramsbottom           | Receptor is approximately 425 m east from the Site.<br>Receptor is not located upwind of the prevailing wind direction and is approximately 25 m uphill from the Site.<br>Building effects from the Twine Valley agricultural machinery store located 60 m east of the Site are likely. | Ineffective pathway   | High                 |
| Holts Farm and Equestrian Centre, Bury Old Road Ramsbottom | Receptor is approximately 550 m northeast from the Site.<br>Receptor is located downwind of the prevailing wind direction and is approximately 48 m uphill from the Site.                                                                                                               | Ineffective pathway   | High                 |

The risk of odour exposure (impact) at each receptor location was determined using the matrix in **Table 4** and is presented in **Table 8**.

**Table 8: Risk of Odour Exposure at the Specific Receptor Location**

| Receptor Details and Location                              | Pathway Effectiveness | Source Odour Potential | Risk of Odour Exposure |
|------------------------------------------------------------|-----------------------|------------------------|------------------------|
| Edith Street, Shuttleworth                                 | Ineffective pathway   | Large                  | Low risk               |
| Church Road, Shuttleworth                                  | Ineffective pathway   | Large                  | Low risk               |
| Bye Road, Shuttleworth                                     | Ineffective pathway   | Large                  | Low risk               |
| Whalley Rd, Ramsbottom                                     | Ineffective pathway   | Large                  | Low risk               |
| Bury Old Road, Ramsbottom                                  | Ineffective pathway   | Large                  | Low risk               |
| The Stables Luxury B&B, Bury Old Road Ramsbottom           | Ineffective pathway   | Large                  | Low risk               |
| Holts Farm and Equestrian Centre, Bury Old Road Ramsbottom | Ineffective pathway   | Large                  | Low risk               |

The magnitude of odour effect at the specific receptor location was determined using the matrix in **Table 5** and is presented in **Table 9**.

**Table 9: Magnitude of Odour Effect at the Specific Receptor location**

| Receptor Details and Location                              | Risk of Odour Exposure | Receptor Sensitivity | Magnitude of Odour Effect at Receptor Location |
|------------------------------------------------------------|------------------------|----------------------|------------------------------------------------|
| Edith Street, Shuttleworth                                 | Low risk               | High                 | Slight adverse effect                          |
| Church Road, Shuttleworth                                  | Low risk               | High                 | Slight adverse effect                          |
| Bye Road, Shuttleworth                                     | Low risk               | High                 | Slight adverse effect                          |
| Whalley Rd, Ramsbottom                                     | Low risk               | High                 | Slight adverse effect                          |
| Bury Old Road, Ramsbottom                                  | Low risk               | High                 | Slight adverse effect                          |
| The Stables Luxury B&B, Bury Old Road Ramsbottom           | Low risk               | High                 | Slight adverse effect                          |
| Holts Farm and Equestrian Centre, Bury Old Road Ramsbottom | Low risk               | High                 | Slight adverse effect                          |

Given the “low risk” of odour exposure and the “high” receptor sensitivity, the likely magnitude of odour effect at all receptors assessed is categorised as **Slight Adverse**, therefore according to the IAQM (2018) guidance, the effects at these receptors are considered to be **not significant**.

## 6 Summary and recommendations

A Summary of the likely odour effects at existing sensitive receptors is presented in **Table 10**

**Table 10: Summary of the Likely Odour Effects at Existing Sensitive Receptors**

| Receptor Details and Location                              | Source Odour Potential | Pathway Effectiveness | Risk of Odour Exposure | Receptor Sensitivity | Magnitude of Odour Effect at Receptor Location |
|------------------------------------------------------------|------------------------|-----------------------|------------------------|----------------------|------------------------------------------------|
| Edith Street, Shuttleworth                                 | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| Church Road, Shuttleworth                                  | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| Bye Road, Shuttleworth                                     | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| Whalley Rd, Ramsbottom                                     | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| Bury Old Road, Ramsbottom                                  | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| The Stables Luxury B&B, Bury Old Road Ramsbottom           | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |
| Holts Farm and Equestrian Centre, Bury Old Road Ramsbottom | Large                  | Ineffective pathway   | Low risk               | High                 | Slight adverse effect                          |

With the proposed mitigation of an impermeable UV-stabilised plastic floating cover implemented, the potential for effects at all nearby receptors is predicted to be not significant. It is recommended that the cover will be as per recommendations from Defra's guidance on the Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions (Defra, 2024) and The Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control on the Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs (European Union, 2017).

## 7 References

Department for Environment Food and Rural Affairs, “Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions” 2024. [Online] Available <https://www.gov.uk/government/publications/code-of-good-agricultural-practice-for-reducing-ammonia-emissions/code-of-good-agricultural-practice-cogap-for-reducing-ammonia-emissions>

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