



ODOUR ASSESSMENT RAW MATERIAL HANDLING & KITCHEN FACILITY

REC REFERENCE: AQ105933-2R2

REPORT PREPARED FOR: PRINCES LIMITED

DATE: SEPTEMBER 2018



National Consultancy, Locally Delivered

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Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Minor Amendments to text	-		
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EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by Princes Limited to undertake a Qualitative Odour Assessment in support of the proposed extension to an existing site located off Bridge Road/Hundred Lane, Long Sutton.

The proposals comprise extension of the existing site to provide a new Raw Materials Warehouse and Ingredient Processing Centre alongside associated parking and infrastructure. The proposed operation of the new facility will be the same as currently carried out in the existing store. The operation includes the following processes:

- ▶ Pulse mixing;
- ▶ Pasta inspection;
- ▶ Prune storage;
- ▶ Spice store including spice make up, de-boxing;
- ▶ Frozen mixing and bulk storage; and
- ▶ Tomato paste decanting.

Critically, it has been confirmed by the applicant that there are no additional food production activities to take place on the proposed site. Given the increase to Raw Materials to the site there could be potential for odour impacts to arise at sensitive locations in the vicinity of the site. A Qualitative Odour Assessment is therefore required in order to determine baseline conditions at the site and assess potential impacts as a result of the proposed development.

The assessment concluded that the potential for additional odour emissions is small and that the odour impacts on existing sensitive receptors would be **not significant**.

Based on the results of this assessment, it is considered odour issues should not be viewed as a constraint to planning.





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1. INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd was commissioned by Princes Limited to undertake a Qualitative Odour Assessment in support of the proposed extension to the existing site at Bridge Road, Long Sutton.

The proposals comprise the extension of the existing site to provide a new raw materials warehouse, new Ingredient Processing Centre and associated parking and infrastructure.

1.2 Site Location and Context

The site is located at Bridge Road, Long Sutton at approximate National Grid Reference (NGR): 544970, 322250. Reference should be made to Figure 1 within Appendix I for a location plan.

The proposals comprise extension of the existing site to provide a new Raw Materials Warehouse and Ingredient Processing Centre alongside associated parking and infrastructure. The proposed operation of the new facility will be the same as currently carried out in the existing store. The operation includes the following processes:

- ▶ Pulse mixing;
- ▶ Pasta inspection;
- ▶ Prune storage;
- ▶ Spice store including spice make up, de-boxing;
- ▶ Frozen mixing and bulk storage; and
- ▶ Tomato paste decanting.

Given the increase to Raw Materials to the site there could be potential for odour impacts to arise at sensitive locations in the vicinity of the site. A Qualitative Odour Assessment is therefore required in order to determine baseline conditions at the site and assess potential impacts as a result of the proposed development.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.





2. LEGISLATION AND POLICY

2.1 Odour Legislation and Guidance

The following legislation and guidance has been referred to in this assessment:

- ▶ H4: Odour Management, Environment Agency (EA), 2011;
- ▶ Odour Guidance for Local Authorities, Department for Environment, Food and Rural Affairs (DEFRA), 2010;
- ▶ Environmental Permitting (England and Wales) Regulations (2010);
- ▶ Guidance on the Assessment of Odour for Planning, Institute of Air Quality Management (IAQM), 2018;
- ▶ Defra Code of Practice on Odour Nuisance from Sewage Treatment Works, 2006.

2.2 Odour Definition

The DEFRA guidance¹ defines odour as:

"An odour is the organoleptic attribute perceptible by the olfactory organ on sniffing certain volatile substances. It is a property of odorous substances that make them perceptible to our sense of smell. The term odour refers to the stimuli from a chemical compound that is volatilised in air. Odour is our perception of that sensation and we interpret what the odour means. Odours may be perceived as pleasant or unpleasant. The main concern with odour is its ability to cause a response in individuals that is considered to be objectionable or offensive.

Odours have the potential to trigger strong reactions for good reason. Pleasant odours can provide enjoyment and prompt responses such as those associated with appetite. Equally, unpleasant odours can be useful indicators to protect us from harm such as the ingestion of rotten food. These protective mechanisms are learnt throughout our lives. Whilst there is often agreement about what constitutes pleasant and unpleasant odours, there is a wide variation between individuals as to what is deemed unacceptable and what affects our quality of life."

2.3 Odour Impacts

The magnitude of odour impact depends on a number of factors and the potential for complaints varies due to the subjective nature of odour perception. The FIDOR acronym is a useful reminder of the factors that will determine the degree of odour pollution:

- ▶ Frequency of detection - frequent odour incidents are more likely to result in complaints;
- ▶ Intensity as perceived - intense odour incidents are more likely to result in complaints;
- ▶ Duration of exposure - prolonged exposure is more likely to result in complaints;
- ▶ Offensiveness - more offensive odours have a higher risk of resulting in complaints; and
- ▶ Receptor sensitivity - sensitive areas are more likely to have a lower odour tolerance.

¹ Odour Guidance for Local Authorities, Department for Environment, Food and Rural Affairs, 2010.





It is important to note that even infrequent emissions may cause loss of amenity if odours are perceived to be particularly intense or offensive.

The FIDOR factors can be further considered to provide the following issues in regards to the potential for an odour emission to cause a nuisance:

- ▶ The rate of emission of the compound(s);
- ▶ The duration and frequency of emissions;
- ▶ The time of the day that this emission occurs;
- ▶ The prevailing meteorology;
- ▶ The sensitivity of receptors to the emission i.e. whether the odorous compound is more likely to cause nuisance, such as the sick or elderly, who may be more sensitive;
- ▶ The odour detection capacity of individuals to the various compound(s); and
- ▶ The individual perception of the odour (i.e. whether the odour is regarded as unpleasant). This is greatly subjective, and may vary significantly from individual to individual. For example, some individuals may consider some odours as pleasant, such as petrol, paint and creosote.

2.4 Odour Measurement

The concentration at which an odour is just detectable to a human nose is referred to as the detection threshold. This concept of a threshold concentration is the basis of olfactometry in which a quantitative sensory measurement is used to define the concentration of an odour. Standardised methods for measuring and reporting the detectability or concentration of an odour sample have been defined by European standard BS:EN 13725:2003. The concentration at which an odour is just detectable by a panel of selected human odour assessors is defined as the detection threshold and has an odour concentration of 1 European odour unit per cubic metre ($1\text{ou}_E/\text{m}^3$).

At the detection threshold, the concentration of an odour is so low that it is not recognisable as any specific odour at all, but the presence of some, very faint, odour can be sensed when the "sample" odour is compared to a clean, odour-free sample of air.

For a simple, single odorous compound (e.g. H_2S), the concentration of odour present in a sample of air can be expressed in terms of parts per million (ppm), parts per billion (ppb) or mg/m^3 . More usually, odours are complex mixtures of many different compounds and the concentration of the mixture can be expressed in ou_E/m^3 .

The concept of odour concentrations, as ou_E/m^3 , is based on a correlation between a physiological response when odour is detected by the nose and exposure to a particular sample at a specific concentration. The results of this assessment are expressed in terms of a single number. The odour sample assessed can be one of many individual odorous substances or a complex mixture of many substances, and so the odour unit or concentration will vary between test samples. A defined measurement standard for the odour unit is prescribed in the BS:EN standard on olfactometry using n-butanol. This gas is used to select and calibrate odour panel members.

An odour at a strength of $1\text{ou}_E/\text{m}^3$ is the concentration at which 50% of the population can detect the odour and 50% cannot within the controlled environment of an odour laboratory². As an odour

² Code of Practice on Odour Nuisance from Sewage Treatment Works, DEFRA, 2006.





becomes more concentrated, then it gradually becomes more apparent. Some guidance as to concentrations when this occurs can be derived from laboratory measurements of intensity. The following guideline values have been stated by DEFRA¹ to provide some context for discussion about exposure to odours:

- ▶ $1\text{ou}_\text{E}/\text{m}^3$ is the point of detection;
- ▶ $5\text{ou}_\text{E}/\text{m}^3$ is a faint odour; and
- ▶ $10\text{ou}_\text{E}/\text{m}^3$ is a distinct odour.

It is important to note that these values are based on laboratory measurements and in the general environment other factors affect our sense of odour perception, such as:

- ▶ The population is continuously exposed to a wide range of background odours at a range of different concentrations, and usually people are unaware of there being any background odours at all due to normal habituation. Individuals can also develop a tolerance to background and other specific odours. In an odour laboratory the determination of detection threshold is undertaken by comparison with non-odorous air, and in carefully controlled, odour-free, conditions. Normal background odours such as those from traffic, vegetation, grass mowings etc., can provide background odour concentrations from 5 to $60\text{ou}_\text{E}/\text{m}^3$ or more;
- ▶ The recognition threshold may be about $3\text{ou}_\text{E}/\text{m}^3$, although it might be less for offensive substances or higher if the receptor is less familiar with the odour or distracted by other stimuli; and
- ▶ An odour which fluctuates rapidly in concentration is often more noticeable than a steady odour at a low concentration.

2.5 Hedonic Tone

The hedonic tone of an odour is a measure of its relative offensiveness or pleasantness. It can be determined under laboratory conditions and typically ranges from +4 for very pleasant odours (bakeries) to -4 for foul ones (rotting flesh). Neutral odours score 0. This score refers to the type of smell, irrespective of its strength (intensity) and can help to decide how offensive an odour may be.

2.6 National Planning Policy

The National Planning Policy Framework³ (NPPF) was published on 24th July 2018 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve

³ National Planning Policy Framework, Department for Communities and Local Government, 2018.





local environmental conditions such as air and water quality

The implications of the NPPF have been considered throughout this assessment.

2.7 Institute of Air Quality Management Guidance

The IAQM published the 'Guidance on the Assessment of Odour for Planning Version 1.1'⁴ document on 16th July 2018. This guidance specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity. The assessment methodology outlined in the guidance has been utilised in this report where relevant.

⁴ Guidance on the Assessment of Odour for Planning, IAQM, Version 1.1, 2018.





3. METHODOLOGY

The proposed development may result in odour emissions at sensitive receptors during normal operation. There are a number of tools available for the assessment of odour, ranging from site observations to quantitative measurement and computer modelling. In this case, based on an understanding of the key issues, the background to the project and the nature of the facility, a qualitative based assessment has been completed incorporating the assessment stages as described in Table 1.

Table 1 Assessment Stages

Stage	Description of Main Activities
Review of Meteorological Data	Wind data was obtained from ADM Ltd for Marham Airport meteorological station. This was reviewed in the context of the relative positioning of the application site and the identified potential sources of odour.
Qualitative Odour Assessment	A qualitative odour assessment was completed based on the IAQM ⁴ and DEFRA ¹ guidance

3.1 Assessment Methodology

In 2018 the IAQM published a guidance document⁴ which provides recommendations on how odour should be considered in the preparation and determination of planning applications and gives guidance on the application of various techniques for odour assessments.

The IAQM method for qualitative assessment essentially comprises four stages:

3.1.1 Stage 1 - Characterise the Source Odour Potential

The IAQM guidance refers to three categories of source odour potential: Large, Medium and Small. The judgement over the source odour potential is based on three key factors: the magnitude of the odour release (considering control measures), how inherently odorous the compounds or materials being assessed are and the unpleasantness (or offensiveness) of the odour.

Definitions are provided for each category as detailed in Table 2 (all repeated exactly as suggested by the guidance).





Table 2 Source Odour Potential

Source Odour Potential	Suggested Definition
Large	Magnitude - Larger Permitted processes of odorous nature or large Sewage Treatment Works (STWs); materials usage hundreds of thousands of tonnes/m³ per year; area sources of thousands of m². The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known. Unpleasantness - processes classed as "Most offensive" in H4; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score. Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice.
Medium	Magnitude - smaller Permitted processes or small STWs; materials usage thousands of tonnes/m³ per year; area sources of hundreds of m². The compounds involved are moderately odorous. Unpleasantness - processes classed in H4 as "Moderately offensive"; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score. Mitigation/control - some mitigation measures in place, but significant residual odour remains.
Small	Magnitude - falls below Part B threshold; materials usage hundreds of tonnes/m³ per year; area sources of tens m². The compounds involved are only mildly odorous, having relatively high ODTs where known. Unpleasantness - processes classed as "Less offensive" in H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score. Mitigation/control - effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.

3.1.2 Stage 2 - Assess Effectiveness of Transport Mechanism to a Receptor

This stage aims to assess the means by which odours released from the source may effect sensitive receptors; in this case, the existing nearby commercial and office buildings. This effectiveness of transport of odours (or the pathway) considers five main factors: distance from source to receptor, the frequency of winds blowing from the source towards the receptor, the effectiveness of any mitigation or controls, the effectiveness of dispersion and dilution (a tall stack for example), and topography and terrain in the local areas.

Suggested definitions of pathway effectiveness are provided by the guidance and summarised in Table 3.





Table 3 Pathway Effectiveness

Pathway Effectiveness	Suggested Definition
Highly Effective	Distance - receptor is adjacent to the source/site; distance well below any official set-back distances. Direction - high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). Effectiveness of dispersion/dilution - open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.
Moderately Effective	Distance - receptor is local to the source. Where mitigation relies on dispersion/dilution - releases are elevated, but compromised by building effects.
Ineffective	Distance - receptor is remote from the source; distance exceeds any official set-back distances. Direction - low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). Where mitigation relies on dispersion/ dilution - releases are from high level (e.g. stacks, or roof vents > 3m above ridge height) and are not compromised by surrounding buildings.

3.1.3 Stage 3 - Predict Risk of Odour Exposure

At this stage the source odour potential and pathway effectiveness are combined to predict the risk of odour exposure at the receptor being considered. The guidance recommends that this is done by a matrix approach, replicated in Table 4.

Table 4 Risk of Odour Exposure

Pathway Effectiveness	Source Odour Potential		
	Low	Medium	High
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

3.1.4 Stage 4 - Assess Impact at Receptor based on Predicted Level of Risk

Finally, the method involves using the prediction of risk to assess the likely impact on the receptor based on the level of risk, with the suggested assessment methods repeated below. Differing levels of receptor sensitivity are defined by the guidance but as this assessment is only concerned with the existing nearby commercial and office buildings, which corresponds to medium sensitivity, full definitions are not repeated here. The matrix utilised to predict the level of odour risk is summarised in Table 5.





Table 5 Odour Effect Levels

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible	Negligible Effect	Negligible Effect	Negligible Effect

3.2 Odour Risk Assessment

An Odour Risk Assessment was undertaken based on the assessment of the prevailing meteorological conditions at the site and nature of the relevant odour sources.





4. ASSESSMENT

The proposed extended operations may result in odour emissions in the vicinity of the site during normal operation. These are assessed in the following Sections.

4.1 Prevailing Meteorological Conditions

The potential for odour to impact at sensitive locations depends significantly on the meteorology, particularly wind direction, during emissions. In order to consider prevailing conditions at the site, a review of meteorological data was undertaken. In order to represent conditions at the proposed site, data was taken from Marham Meteorological Station over a 5-year period (1st January 2012 to 31st December 2016 inclusive). Marham Meteorological Station is located at NGR: 574100, 308840, which is approximately 32km south-east of the proposed facility. It is considered that conditions are likely to be reasonably similar over a distance of this magnitude and the information is a suitable source of data for an assessment of this nature.

The frequency of wind from the eight sectors which best describe the directions which may cause impacts from the existing facility and proposed extension are shown in Table 6. The direction which have the potential to impact at the closest sensitive receptors to the facility are shown in **bold text**.

Table 6 Wind Frequency Data

Orientation	Wind Direction (°)	Total Frequency of Wind (%)
North	337.5 - 22.5	10.71
North-east	22.5 - 67.5	8.74
East	67.5 - 112.5	8.20
South-east	112.5 - 157.5	10.37
South	157.5 - 202.5	20.97
South-west	202.5 - 247.5	19.44
West	247.5 - 292.5	13.05
North-west	292.5 - 337.5	7.73
	Sub-Total	99.21
	Calms	0.60
	Missing/Incomplete	0.19
	Total	100.00

All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of meteorological data within the UK. Reference should be made to Figure 2 within Appendix I for a graphical representation of the meteorological data.





As shown in Table 6, the prevailing wind direction at the proposed facility is from the south and south-west. Winds from the north-east and north-west are relatively infrequent, which is indicative of conditions throughout the UK.

Importantly, odour episodes generically tend to occur during stable atmospheric conditions with low wind speed, which gives poor dispersion and dilution; receptors close to the source in all directions can be affected under these conditions. The IAQM guidance states that when conditions are not calm, it will be the downwind receptors that are affected. Overall therefore, receptors that are downwind with respect to the prevailing wind direction tend to be at higher risk of odour impact.

As indicated in Figure 1 within Appendix I, the closest sensitive receptors are located to the North, North East and East of the proposed facility. Receptors to these directions are considered to be downwind from the facility for approximately **20.97%**, **19.45%**, and **13.05%** of the time annually. As such, there is a reasonable probability of emissions from the operations at the proposed site being carried towards the receptors locations downwind of the facility.

Analysis of the 5-years of meteorological data from Marham Meteorological Station indicated wind speeds of 3 m/s or lower occur on average for approximately **27.82%** of the year. Critically, north, north-easterly and easterly winds with a speed less than 3 m/s only occur for approximately 5.93%, 2.93% and 2.48% of the time respectively.

This indicates that light odour conducive winds are infrequent.

A review of the 20-years Climate Averages obtained from the Met Office⁵ from Holbeach Climate Station indicated that the average annual rainfall is 610mm. As such, the potential for entrainment of odours into the air is limited by both wind speed and rainfall.

The analysis of cumulative effects of the directional winds and particularly wind speeds indicated that existing receptor location closest to the facility, to the north, north-east and east could be affected by potential odour episodes for approximately a combined total of 11.34% of the year. Individual receptors would be affected by frequencies less than this.

4.2 Odour Risk Assessment

4.2.1 Risk Assessment Outcomes

The predicted impact of the proposed facility on the existing sensitive receptors was assessed based on the methodology described in Section 3.

4.2.2 Source Odour Potential

Odours from Raw Material Warehouse and IPC are fugitive and diffuse in nature and generally occur during normal operation. Potential odour sources may arise from the preparation of food products which include pulses/bean, raw green vegetables, spices and fruits. Odour releases may occur during the cleaning, soaking, mixing or blanching processes.

⁵ <http://www.metoffice.gov.uk/public/weather/climate/gcw9qh9xv>





As stated within the SEPA Odour guidance 2010⁶, "Beany", "Spicy", "Fresh Green Vegetables" and "Fruity (other than citrus)" odours have hedonic scores of, +0.54, +1.99, +2.17 and +2.23 respectively. In accordance with the IAQM guidance⁴, odours that have a neutral (0) to unpleasant (+4) hedonic score are considered to have a Small Source Odour Potential.

Additionally, the client is proposing to include further mitigation measures into the design of the development in order to further reduce any potential odours. An Odour Management Plan (OMP) produced by Ricardo-AEA Ltd (Ref: ED11556101) indicates the following Best Practice Measures (BPM) which will influence the control and management of odour:

- ▶ Good raw materials management to minimise wastage and unnecessary water use or generation;
- ▶ Good manufacturing practice throughout the production areas to ensure:
 - Use of odorous materials is limited
 - Water use is minimised
 - Product wastage is minimised
 - Unnecessary emissions are avoided through good manufacturing practice and good housekeeping.
 - Unnecessary emissions are avoided keeping lids on vessels closed etc.

When considering the influence of the OMP and the nature of potential odour release during normal operation, the Source Odour Potential of the activities within the proposed Raw Material Warehouse and IPC is considered to be **Small** with reference to the IAQM guidance⁴.

4.2.3 Effectiveness of Pathway

The nearest Sensitive receptors are located to the North, North East and East of the facility, as indicated on Figure 1 within Appendix I. Receptors surrounding the site were assessed individually depending on the prevailing winds and their distance from the facility but also taking into consideration the emissions location.

Although receptors downwind of the facility are not considered to be directly adjacent to the odour source, it has been considered that the proposed facility will result in a **Highly Effective Pathway** to ensure that a robust assessment was carried out.

4.2.4 Receptor Sensitivity

There are residential receptors and places of work within the vicinity of the facility. The main concentration of receptors can be seen in Figure 1 within Appendix I. IAQM Guidance advises that such land uses are described to range from **Medium** to **High** sensitivity receptors. Receptor locations, distance from the facility and sensitivity can be seen below in Table 7.

⁶ Odour guidance 2010, Scottish Environment Protection Agency, 2010





Table 7 Sensitive Receptors

Receptors		NGR (m)		Distance from Facility (m)	Receptor Sensitivity
ID	Location	X	Y		
R1	Residential - 114 & 146 Bridge Road	545325	322287	66.5*	High
R2	Place of Work – Half Way House	545378	322221	139.9	Medium
R3	Residential 1 to 8 Bridge Road	544215	322334	47.5*	High
R4	Residential – Hospital Drove	545311	322340	108.1	High
R5	Residential – 99 Bridge Road	544823	322394	283.6	High
R6	Place of Work - L C Packaging	544633	322278	407.9	Medium
R7	Residential – 90 Bridge Road	544596	322343	470.4	High
T1	Transient Pedestrians (A17)	<10m	Low	<10m	Low
T2	Transient Motorists (A17)	<10m	Low	<10m	Low

* To nearest neighbour

Reference should be made to Figure 1 within Appendix I for a graphical representation of sensitive receptor locations.

4.2.5 Risk of Odour Exposure and Odour Effect

Table 8 shows the assessment at the nearest sensitive receptors of Odour Risk and Odour Effect based on IAQM Guidance⁴.

Table 8 Odour Risk and Odour Effect

ID	Source Odour Potential	Pathway Effectiveness	Odour Exposure Risk	Receptor Sensitivity	Likely Odour Effect
R1	Small	Highly Effective Pathway	Low	High	Slight Adverse Effect
R2	Small	Highly Effective Pathway	Low	Medium	Negligible Effect
R3	Small	Highly Effective Pathway	Low	High	Slight Adverse Effect
R4	Small	Highly Effective Pathway	Low	High	Slight Adverse Effect
R5	Small	Moderately Effective Pathway	Low	High	Slight Adverse Effect
R6	Small	Ineffective Pathway	Negligible	Medium	Negligible Effect
R7	Small	Ineffective Pathway	Negligible	High	Negligible Effect
T1	Small	Highly Effective Pathway	Low	Low	Negligible Effect
T2	Small	Highly Effective Pathway	Low	Low	Negligible Effect



With a **Small** source odour potential and **Highly Effective Pathway**, the risk of odour exposure at residential sensitive receptors downwind of the odour source is considered **Low**.

The sensitivity of each sensitive receptor locations is considered to range from **High to Low**. Therefore, in line with the IAQM impact assessment criteria, a **High** sensitivity receptor and a **Low** risk of odour exposure results in a **Slight Adverse Effect**. Table 8 indicates that four sensitive receptor locations are likely to experience **Slight Adverse Effects** as a result of the Raw Material Warehouse and IPC; with the remaining five sensitive receptor locations likely to experience **Negligible Effects**.

As such, the overall significance of odour effects as a result of the proposed development is considered to be **not significant** and therefore it should not be a deciding factor in planning determination and it would not trigger the requirement for additional mitigation.

4.3 Discussion

The receptors located closest to the odour source are of Residential Use (R1 and R3) to the North and East of the proposed facility. These receptors are considered in the highest category as users would expect a high level of amenity at these locations. Receptors downwind of the proposed facility are considered to have **Highly Effective Pathways**. The majority of downwind receptor locations are of residential use, (R1, R3 and R4) and as such, they are considered to be **High Sensitivity Receptors**. Receptor location R2, located downwind to the east of the facility is a commercial premises and therefore represents a **Medium Sensitivity Receptor** as users would not expect a high level of amenity at this location.

A review of the meteorological data from Marham Meteorological Station, the closest station to the proposed facility, indicates that southerly, south-westerly, and easterly winds occur **53.47%** of the year.

However, a detailed review of wind speed data indicates that odour conducive winds, or those under 3m/s, will only occur approximately **11.34%** of the year. As a result, the **High Sensitivity receptors** downwind of the facility, to the north, north-east and east will only be affected by potential odour episodes for 5.93%, 2.93% and 2.48% of the year respectively.

The proposed development was determined to have a **Small** source odour potential. This is supported by the information provided by the applicant which indicates that the characteristics associated with the operational processes does not include and intensive or unpleasant odour emissions as detailed in Section 4.2.2.

Based on the IAQM odour risk assessment for the proposed development indicated that the odour impacts at all sensitive receptors were **Low** or **Negligible** risk. Subsequently, this resulted in the odour effects at all sensitive receptors to range from **Slight Adverse** to **Negligible**. It should be noted that the receptors experiencing **Slight Adverse** effects are likely an overestimation due to the inclusion of the proposed BPM detailed in the OMP

It should also be noted that odour emissions from the existing operations on the site have been assessed previously as **not significant**. These odours include cooking processes and are likely to be more noticeable than any odours from the proposed development due to their different characteristics. It is therefore considered unlikely that the potential odours from the proposed





development would be noticeable.

Given the above and the robust nature of the assessment and odour controls, it is considered that the odour impacts from the proposed development would be **not significant** and that a high level of confidence can be placed in this conclusion.





5. CONCLUSION

REC Ltd was commissioned by Princes Limited to undertake a Qualitative Odour Assessment in support of the proposed extension to the existing site at Bridge Road, Long Sutton.

The proposals comprise extension of the existing site to provide a new Raw Materials Warehouse and Ingredient Processing Centre alongside associated parking and infrastructure. As confirmed by the applicant the proposed operation of the new facility will remain unchanged from the existing operations.

Receptors in the assessment extents comprised of residential dwellings, offices and commercial premises as well as transient routes. As such, the receptor sensitivity ranged from **Low** to **High**. The source odour potential of the facility was determined to be **Small**, due to characteristics of the potential odours with hedonic tones ranging from 0 to +4.

Based on the IAQM odour risk assessment for the proposed development indicated that the odour impacts at all sensitive receptors ranged from **Low** to **Negligible** risk. Subsequently, this resulted in the **Slight Adverse Effects** at four sensitive locations, and **Negligible Effects** at the remaining five locations. Impacts of this magnitude are considered to be **not significant** and therefore it should not be a deciding factor in planning determination and it would not trigger the requirement for additional mitigation beyond the BPMs already implemented during operation.

It should also be noted that odour emissions from the existing operations on the site have been assessed previously as not significant. These odours include cooking processes and are likely to be more noticeable than any odours from the proposed development due to their different characteristics. It is therefore considered unlikely that the potential odours from the proposed development would be noticeable.

Based on the results of this assessment and robust assumptions and controls within, it is considered odour issues should not be viewed as a constraint to planning.





6. ABBREVIATIONS

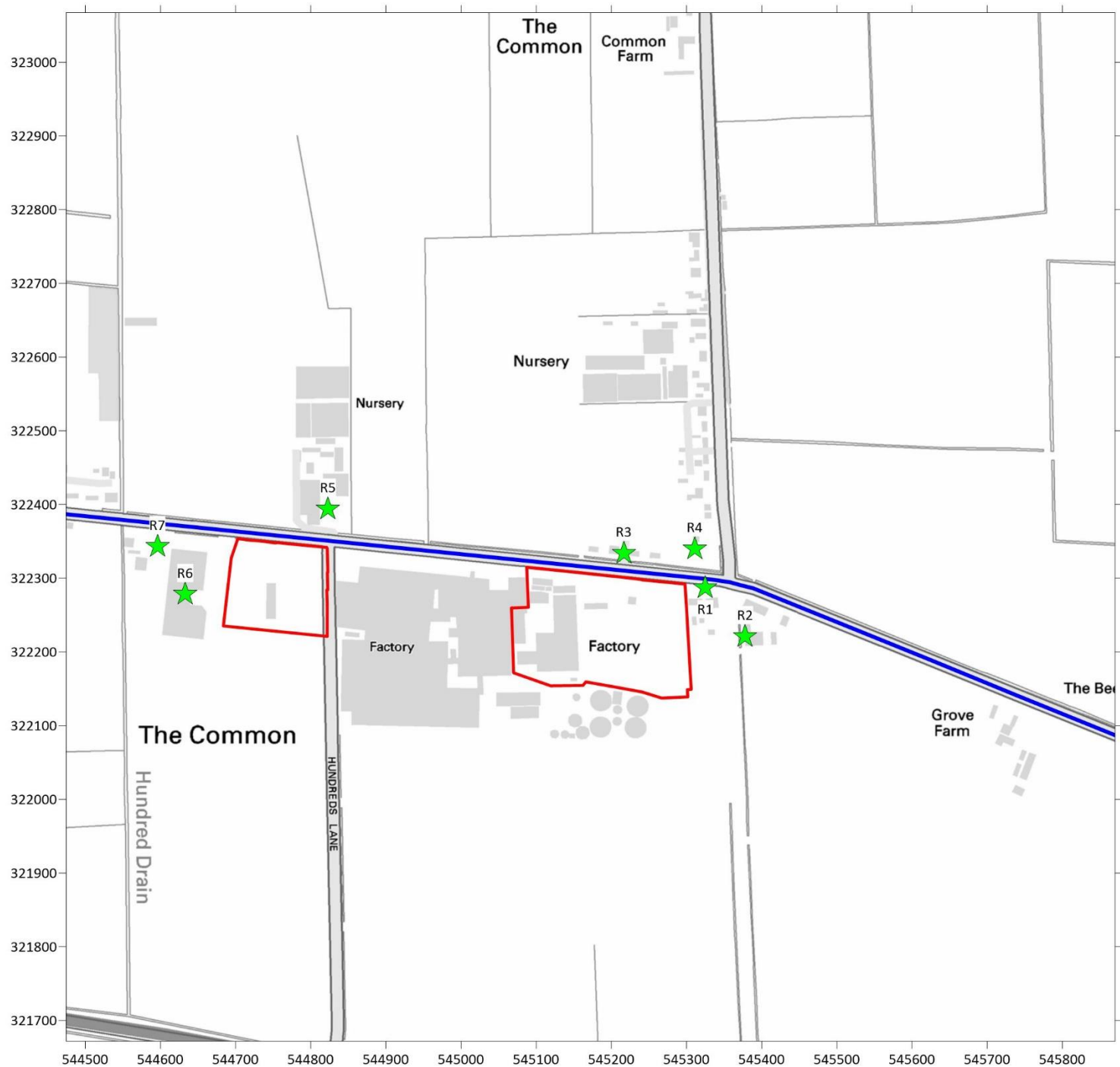
ADM	Atmospheric Dispersion Modelling
BPM	Best Practice Measures
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
H ₂ S	Hydrogen Sulphide
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
OMP	Odour Management Plan
PPM	Parts per Million
PPB	Parts per Billion
REC	Resource and Environmental Consultants
SHDC	South Holland District Council





APPENDIX I FIGURES





Legend

-  Site Boundary
-  Sensitive Receptor Locations
-  Transient Routes

Title

Figure 1
Site Boundary and Surrounding Context

Project

Raw Material Handling & Kitchen Facility

Project Number

AQ105933

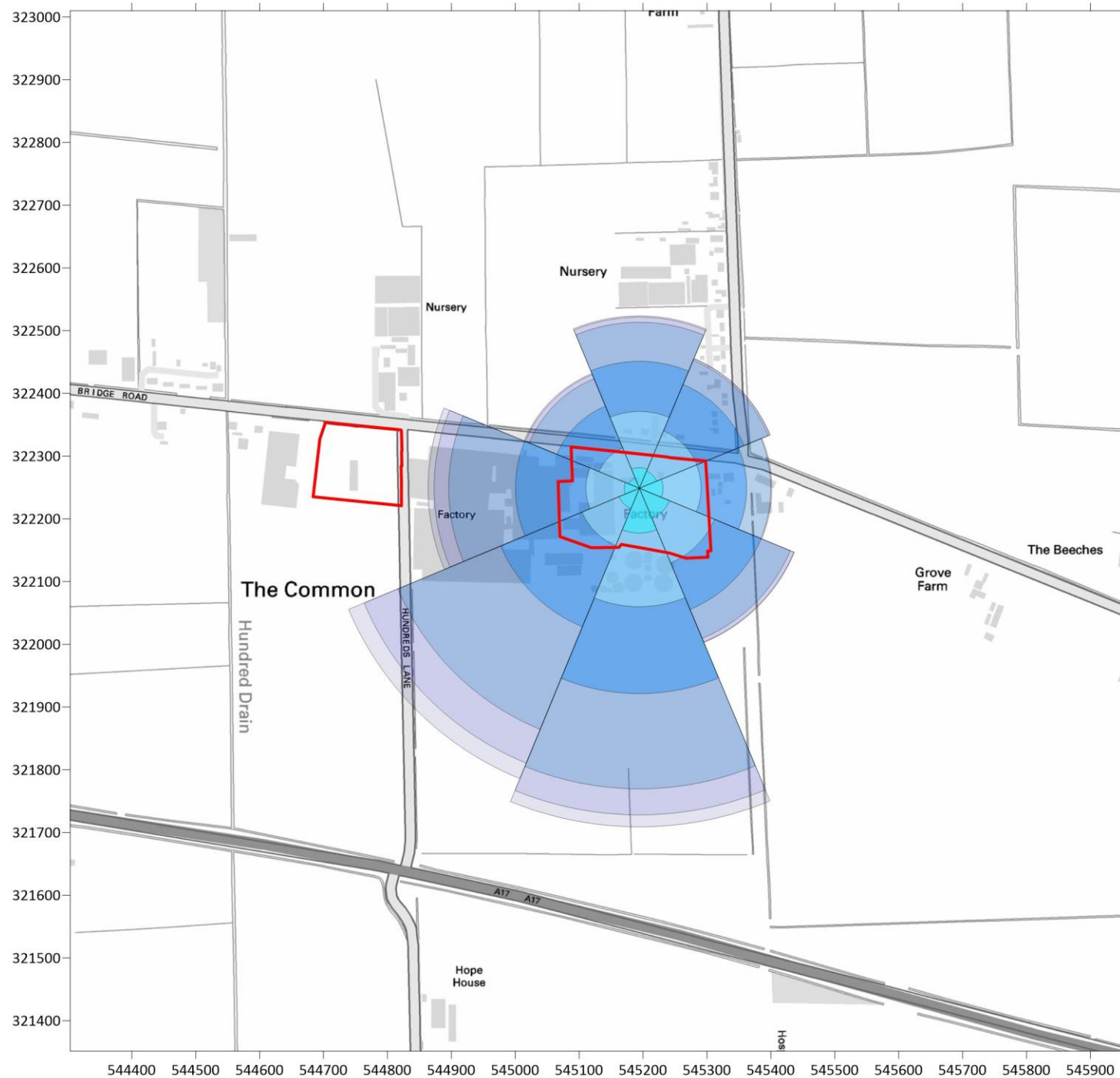
Client

Princes Limited

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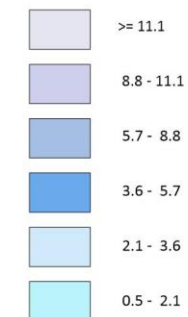


Legend



Site Boundary

Wind Speed (m/s)



Calms: 0.76%

Title

Figure 2
2012 - 2016 Wind Rose
Marham Metreological Station

Project

Raw Material Handling & Kitchen Facility

Project Number

AQ105933

Client

Princes Limited

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