



Proposed Residential Development on Land at Kingscroft Farm, Havant

Odour Assessment

Foreman Homes Group Ltd

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Basis of Report

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1.0 Introduction

SLR Consulting Limited (SLR) has been instructed by Foreman Homes Group Ltd ('the client') to undertake an odour assessment in support of a planning application¹ for a proposed residential development (the 'Proposed Development') on Land at Kingscroft Farm, Meyrick Road, Havant (the 'Site').

1.1 Site Context

The proposal includes for the construction of up to 120 dwellings, as well as associated infrastructure, on Land at Kingscroft Farm. The Proposed Development would be accessed from Meyrick Road.

The Site is located at the southwestern extent of Havant, at a similar distance from the Budds Farm Havant Wastewater Treatment Works (WwTW) as existing residential receptors within the site locale.

1.2 Scope

In reference to the consultation response received from Southern Water (SW)², they apply a *"precautionary buffer zone for any development located within 500 metres [sic] of the boundary of a WwTW"*. As the Proposed Development site is located within 500 meters of the Budds Farm Havant WwTW boundary, SW have requested that *"An Odour Assessment will need to be carried out by a specialist consultant employed by the developer [...]"*.

SW were contacted regarding the proposed scope of odour assessment at the Proposed Development³, however to-date no input has been received from SW regarding this. As such, this odour assessment has been undertaken to consider the significance of effects of potential odours at the Proposed Development site arising from the operation of the Budds Farm Havant WwTW.

¹ Havant Borough Council application reference: APP/22/00669.

² Southern Water correspondence reference: DSA000030023, dated January 2024.

³ Email correspondence from SLR to SW (SouthernWaterPlanning@southernwater.co.uk) dated: 18/11/2024.



2.0 Relevant Legislation, Policy & Guidance

2.1 Planning Policy

2.1.1 National Planning Policy

The 2024 update to the National Planning Policy Framework (NPPF)⁴ describes the policy context in relation to pollutants including odour:

“Para 187: Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] air [...] pollution [...]. Development should, wherever possible, help to improve local environmental conditions such as air [...] quality [...].”

“Para 198: Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”

“Para 201: The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

The accompanying Planning Practice Guidance (PPG)⁵, provides guiding principles on how planning can take account of the impact of new development on air quality, and includes the following in regard to odour:

“Odour and dust can also be a planning concern, for example, because of the effect on local amenity.

[...]

Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned.

[...]

Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented.”

The guidance within the NPPF and PPG specifically relating to odour has been considered as part of this assessment.

⁴ National Planning Policy Framework, Ministry of Housing, Communities & Local Government, December 2024.

⁵ The National Planning Policy Framework and relevant planning practice guidance, Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, 2019.



2.1.2 Local Planning Policy

Havant Borough Council (HBC) adopted the Havant Borough Core Strategy in March 2011, which guides the future development of the borough in the period up to 2026.

The Core Strategy sets out the strategic direction and broad distribution of development for the Borough and sets out policies for the planning area. The following policy relevant to the assessment of odours has been identified:

“Policy DM10: Pollution

Development that may cause pollution [...] through [...] smell [...] will only be permitted where all of the following relevant criteria can be met:

- 1. The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk.”*

As such, this policy has been considered within the assessment.

2.2 Odour Nuisance Regulation

2.2.1 Environmental Permitting Regulations

The operations such as those associated with the processing of sewage sludge at the Budds Farm Havant WwTW are regulated under the Environmental Permitting (England and Wales) Regulations 2016 (the ‘EP Regulations’). The EP Regulations include requirements on operating conditions, monitoring and Emission Limit Values (ELVs) that are incorporated into the site’s Environmental Permit (EP) and would be enforceable by the Environment Agency (EA).

The EA has produced the H4 Odour Management⁶ guidance with respect the control and assessment of potential odours from facilities regulated under EP Regulations (see Section 2.3.2 below).

2.2.2 Environmental Protection Act

The main requirements with respect to odour control from premises that are not permitted under the Environmental Permitting (England and Wales) Regulations (2016), and subsequent amendments, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

“any dust, steam, smell or other effluvia arising on industrial trade or business premises and being prejudicial to health or a nuisance.”

Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Local Authority (LA) is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an abatement notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no malodour beyond the boundary of the works. A defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to Best Practicable Means (BPM).

2.3 Assessment Guidance

There is neither European nor United Kingdom (UK) specific regulatory standards for the assessment of the impact of odours. However, it may be reasonably argued that complaints are likely to occur when

⁶ EA, H4 Odour Management: How to comply with your environmental permit, 2011.



odours become detectable and recognisable. The longer the odour detection persists for an individual, the greater the level of complaints may be expected, particularly if the odours are unpleasant.

In lieu of specific regulatory standards, the Institute of Air Quality Management (IAQM) and EA have produced specific guidance on the assessment of odours, as presented within the sections below.

2.3.1 IAQM Odour Guidance

The IAQM *Guidance on the Assessment of Odour for Planning*⁷ (the 'IAQM Odour Guidance') is specifically designed for assessing odour impacts for planning purposes rather than for environmental protection regulatory purposes (e.g., Environmental Permitting, statutory nuisance investigations, etc.).

The scope of the IAQM guidance specifically addresses *"planning application[s] [...] when a sensitive use is being proposed near to an existing odorous process (known as 'encroachment')"*.

The IAQM guidance summarises the typical requirements and approaches for undertaking an odour assessment for planning applications to determine the potential amenity impacts using both empirical and predictive techniques.

The potential for odorous compounds to cause nuisance is dependent upon the following key factors, commonly referred to the 'FIDOL' or 'FIDOR' factors:

- Frequency of Detection;
- Intensity of the odour perceived;
- Duration of exposure at receptor;
- Offensiveness of odours; and
- Location / Receptor sensitivity.

To facilitate the assessment of the significance of predicted odour exposure on amenity, the guidance defines receptor sensitivity and proposes 'odour effect descriptors' which combine the relative sensitivity of the receptors, the nature (or offensiveness) of the odour with quantitative predicted odour exposure levels.

The IAQM receptor sensitivity types are summarised in Table 2-1.

Table 2-1 IAQM Receptor Sensitivity

Receptor Sensitivity	Example Land-uses
High sensitivity receptors	Surrounding land where: • users can reasonably expect 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
Medium sensitivity receptors	Surrounding land where: • 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 • people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.

⁷ IAQM Guidance on the assessment of odour for planning, v1.2, 2018.



Receptor Sensitivity	Example Land-uses
	Examples may include places of work, commercial/retail premises and playing/recreation fields
Low sensitivity receptors	Surrounding land where: - the enjoyment of amenity would not reasonably be expected; or - 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. Examples may include industrial use, farms, footpaths and roads

The IAQM guidance states the following regarding the offensiveness potential of odours and specifically those relating to WwTW:

“For odours that are less unpleasant, the level of odour exposure required to elicit the same effect may be somewhat higher, requiring professional judgement to be applied. For example, odours from sewage treatment works plant operating normally, i.e., non-septic conditions, would not be expected to be at the ‘most offensive’ end of the spectrum [...] and can be considered on par with ‘moderately offensive’ odours [...]”

The IAQM Odour Guidance outlines methodologies by which to assess odours by conceptual model and through dispersion modelling, as outlined in further detail in Section 3.1 and 3.2. The guidance also states that “best practice is to use a multi-tool approach”, as adopted within this assessment.

For both assessment methods, the guidance presents a framework by which to consider the significance of the predicted odour effect in reference to the FIDOL/FIDOR factors. The matrix for determination of odour effects for the conceptual model is outlined in Table 2-2 below. Further details regarding the dispersion modelling approach are outlined in Appendix A.

Table 2-2 IAQM Magnitude of Odour Effect (Conceptual Model)

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

2.3.2 Environment Agency Odour Management Guidance

The EA’s H4 Odour Management Guidance⁸ outlines that facilities operating under an Environmental Permit (such as the Budds Farm Havant WwTW⁹) have an obligation not to cause odour pollution (i.e. nuisance or annoyance) at existing sensitive receptors (such as nearby residents).

The guidance outlines that consideration of whether potential odours from a facility are likely to cause odour pollution should be undertaken in reference to the FIDOL/FIDOR factors, as outlined in Section 2.3.1 above. This approach to assessment broadly aligns with that outlined within the IAQM Odour Guidance.

⁸ H4: Odour Management – How to comply with your Environmental Permit, EA, 2011.

⁹ Permit Number: EPR/AP3392HG.



3.0 Assessment Methodology

Assessment of odours has been undertaken in adoption of a multi-tool approach, as per the recommendations of the IAQM Odour Guidance.

3.1 Conceptual Model

A conceptual Source-Pathway-Receptor (SPR) model, as outlined within the IAQM Odour Guidance, has been utilised as the primary method of assessment by which to consider the significance of effects of potential odours from the Budds Farm Havant WwTW upon the Proposed Development.

The conceptual model considers the potential sources of odours, surrounding receptors and the pathway between source and receptor in order to assess the likely magnitude of risk.

Specifically the following aspects are reviewed:

- The type of activities at the Budds Farm Havant WwTW, including mitigation measures in place, in order to determine:
 - The potential magnitude of releases in general terms; and
 - The nature of that release;
- The location of receptors in the surrounding area with specific consideration of the type of receptor and therefore their potential sensitivity to odours; and
- The pathway between source and receptors incorporating buffer distance between receptors and any mitigating features, the frequency of wind conditions likely to result in the dispersion of emissions towards receptors.

The relative sensitivity of receptors to odours has been determined in reference to the IAQM Odour Guidance, as outlined in Table 2-1.

The effectiveness of the pathway between source and receptor ('pathway effectiveness') has been considered in reference to the methodology outlined in the IAQM Odour Guidance, as outlined in Table 3-1 below.

Table 3-1: Pathway Effectiveness (IAQM Guidance)

Pathway Effectiveness	Associated Characteristics
Highly Effective Pathway for Odour Flux to Receptor	<u>Distance:</u> Receptor is adjacent to the source/site. <u>Direction:</u> High frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). <u>Effectiveness of dispersion/dilution:</u> open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.
Moderately Effective Pathway for Odour Flux to Receptor	<u>Distance:</u> Receptor is local to the source. <u>Effectiveness of dispersion/dilution:</u> Where mitigation relies on dispersion/dilution – releases are elevated, but compromised by building effects.



Pathway Effectiveness	Associated Characteristics
Ineffective Pathway for Odour Flux to Receptor	<u>Distance:</u> Receptor is remote from the source. <u>Direction:</u> Low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). <u>Effectiveness of dispersion/dilution:</u> 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.

3.2 Dispersion Modelling

A dispersion modelling exercise has been undertaken to inform and supplement the SPR conceptual model which is considered to be the principal assessment technique. As such, a limited desktop dispersion modelling study has been undertaken to assess the dispersion of potential odours from the Budds Farm Havant WwTW towards both proposed and existing nearby sensitive receptors.

The AERMOD atmospheric dispersion modelling software has been utilised, in application of 5-years of recent meteorological data, in combination with building elevations and local topographical data.

Odour modelling assessments are undertaken using the concept of the European Odour Unit (ou_E), as defined in BS EN13725:2022¹⁰. Odour emission rates from the key odour sources identified at the Site have been defined in reference to literature sources and information within the public domain.

The offensiveness of odours has been considered in reference to guidance from both the IAQM Odour Guidance and EA's H4 which identify odours from WwTW operations as 'most' or 'moderately' offensive.

The magnitude of the predicted odour effect (i.e. impact significance) has been considered in reference to the IAQM Odour Guidance as well as consideration of the EA's H4 Guidance, with specific consideration given to the likely offensiveness of odours from the Site as well as the sensitivity of nearby receptors.

Further details are presented in Appendix A.

3.3 Odour Complaints Analysis

The local authority (HBC), the operator (SW) and the EA were contacted to ascertain any historic odour complaints within the last 5-years.

Analysis of odour complaints data can provide insight into trends within the historic complaints received, such as benchmarking the extent (distance from the source), dispersion trends (direction from the source) and prevalence (frequency of complaints) of potential odours from a facility.

¹⁰ BS EN13725:2022 stationary source emissions – determination of odour concentration by dynamic olfactometry and odour emission rate.



4.0 Baseline Environment

4.1 Site Setting

The Site is located at the southwestern extent of Havant on Land at Kingscroft Farm, at approximate National Grid Reference (NGR): x470600, y106200.

4.2 Existing Sources of Odour

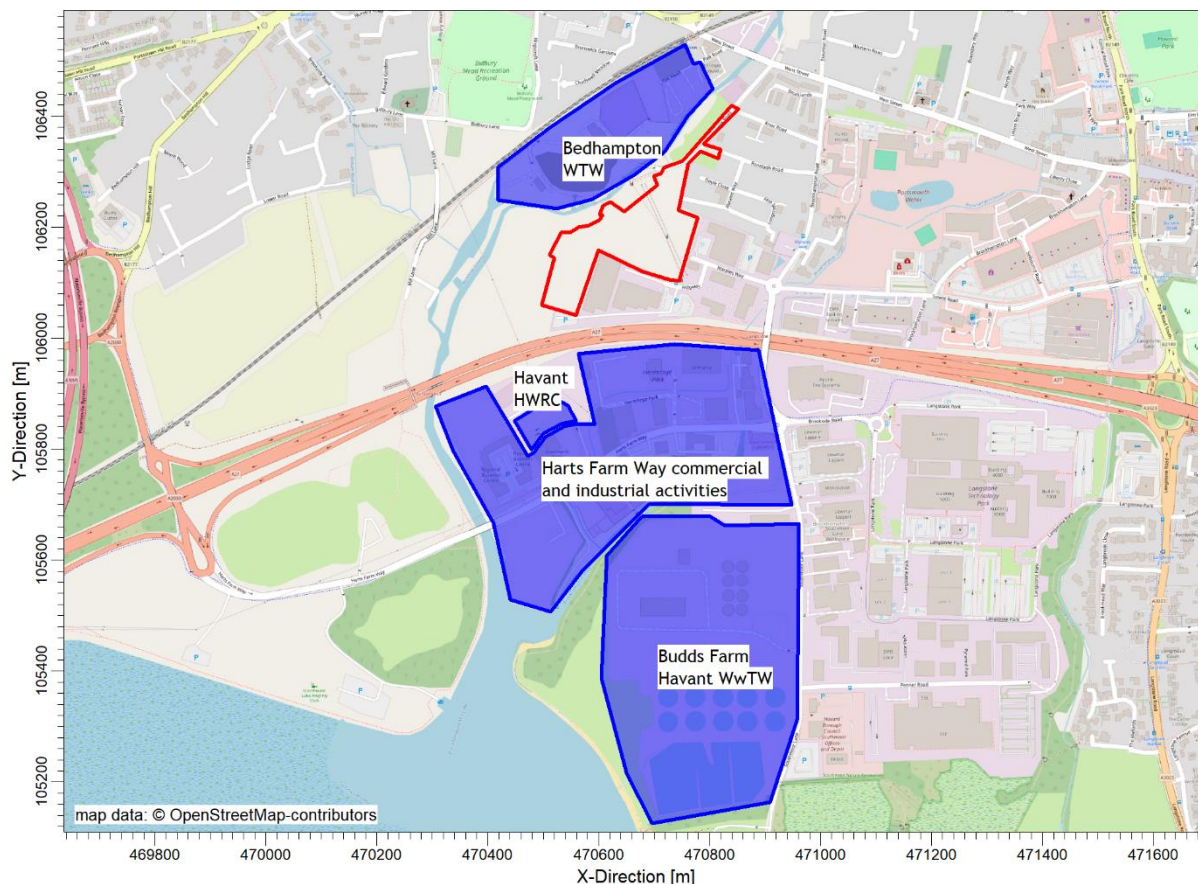
Whilst it is noted that the consultation response received from SW is limited to potential odours from the Budds Farm Havant WwTW, a review of any existing sources of potential odours in the Site locale has been undertaken.

In review of aerial imagery, the following potential sources of odours are identified within the Site locale:

- Portsmouth Water's Bedhampton Water Treatment Works (WTW);
- The Havant Household Waste Recycling Centre (HWRC);
- Commercial and industrial activities located off Harts Farm Way; and
- The Budds Farm Havant WwTW.

Figure 4-1 presents the location of the identified sources of potential odours (blue shaded areas) in relation to the Proposed Development (red outline).

Figure 4-1: Potential Sources of Odours Identified



Each identified source is discussed in turn in the following sections.



4.2.1 The Bedhampton WTW

The Bedhampton WTW extends along the northern boundary of the Proposed Development. It should be noted that **WTW** are associated with the distribution and filtration of clean water and should not be confused with **WwTW** which treat wastewater. In review of aerial imagery, the operations at the Bedhampton WTW appear to be limited to water distribution (pumping), electricity generation (solar panels) and storage of pipework. As such, the Bedhampton WTW is not identified as a source of potential odours, and therefore has not been considered further within this assessment.

4.2.2 The Havant HWRC

The Havant HWRC is located at a distance of approximately 140m south of the Proposed Development, on the opposite side of the A27. The operations at the HWRC would include the receipt, bulking and export of a wide range of waste types, some of which could be considered a potential source of odours (i.e. domestic residual waste and garden / 'green' waste). However, in consideration of the relatively small scale of the operations (and therefore the low volume of these waste types stored at the HWRC), the Havant HWRC is not considered a significant potential source of odours, and therefore has not been considered further within this assessment.

4.2.3 Commercial / Industrial Premises

There are a range of commercial and industrial premises along Harts Farm Way (on the opposite side of the A27 to the Proposed Development). In consideration of the likely operations undertaken at these premises (offices, vehicle depots, showrooms, aggregate processing and concrete batching) none of these premises are identified as a source of potential odours, and therefore have not been considered further within this assessment.

4.2.4 The Budds Farm Havant WwTW

The Budds Farm Havant WwTW is identified as the only source of potential odours identified within the Site locale which warrants assessment.

4.3 Proposed Development

In reference to the illustrative site plan¹¹, the Proposed Development would comprise the construction of up to 120 dwellings, as well as associated infrastructure (i.e. footpaths, car parking and roads).

In reference to the IAQM Odour Guidance, the relative sensitivity of residential land uses is 'high' and the relative sensitivity of footpaths, car parking and roads are 'low'.

This assessment has considered the entire Proposed Development area to be of a 'high' sensitivity to odours, representing a precautionary approach. A number of discrete receptors have been defined to represent the areas of the Proposed Development in closest proximity to the Budds Farm Havant WwTW, as presented in Table 4-1 below.

¹¹ 'Illustrative Site Plan', reference: 18.099.02R.

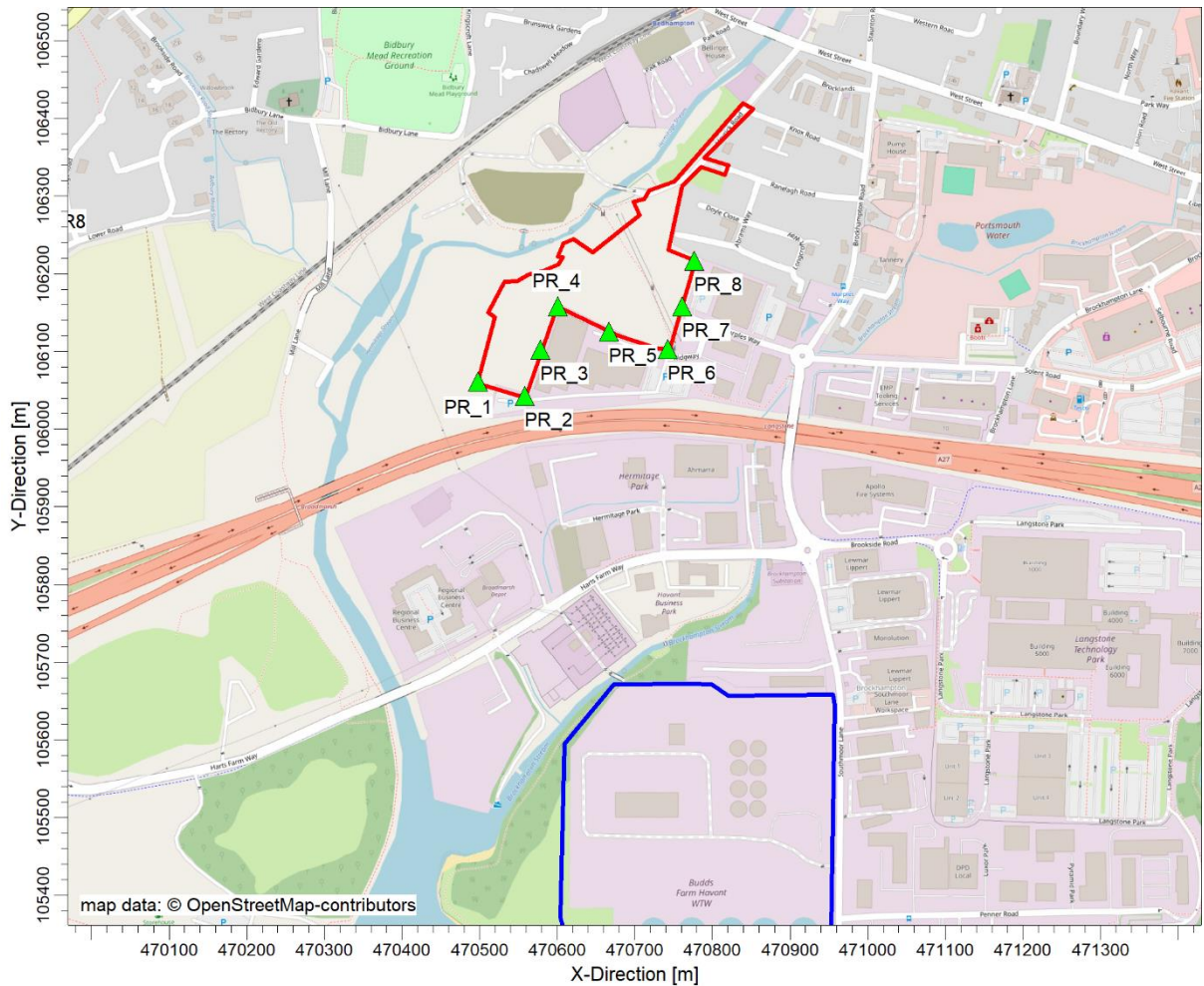


Table 4-1: Discrete Receptors at the Proposed Development

Receptor ID	Receptor Type	Sensitivity to Odours	Direction from the Budds Farm Havant WwTW	Distance from the Budds Farm Havant WwTW Boundary (m)
PR1	Residential	High	NNW	430
PR2	Residential	High	NNW	390
PR3	Residential	High	N	440
PR4	Residential	High	N	500
PR5	Residential	High	N	460
PR6	Residential	High	N	430
PR7	Residential	High	N	480
PR8	Residential	High	N	540

Reference should be made to Figure 4-2 for an illustration of the discrete receptors identified (green pins) relative to the Budds Farm Havant WwTW (blue outline) and the Proposed Development (red outline).

Figure 4-2: Discrete Receptors at the Proposed Development



4.4 Existing Receptors

There are a number of existing sensitive receptors in proximity to the Budds Farm Havant WwTW. A list of the closest existing sensitive receptors identified are presented in Table 4-2. The receptors identified do not represent an exhaustive list; the closest sensitive receptors in each direction surrounding the Budds Farm Havant WwTW have been identified. There may be more receptors at a greater distance, however exposure to odours would decrease as the distance from the source (i.e. the Budds Farm Havant WwTW) increases.

The sensitivity of receptors has been assigned in reference to the IAQM Odour Guidance (as presented in Table 2-1).

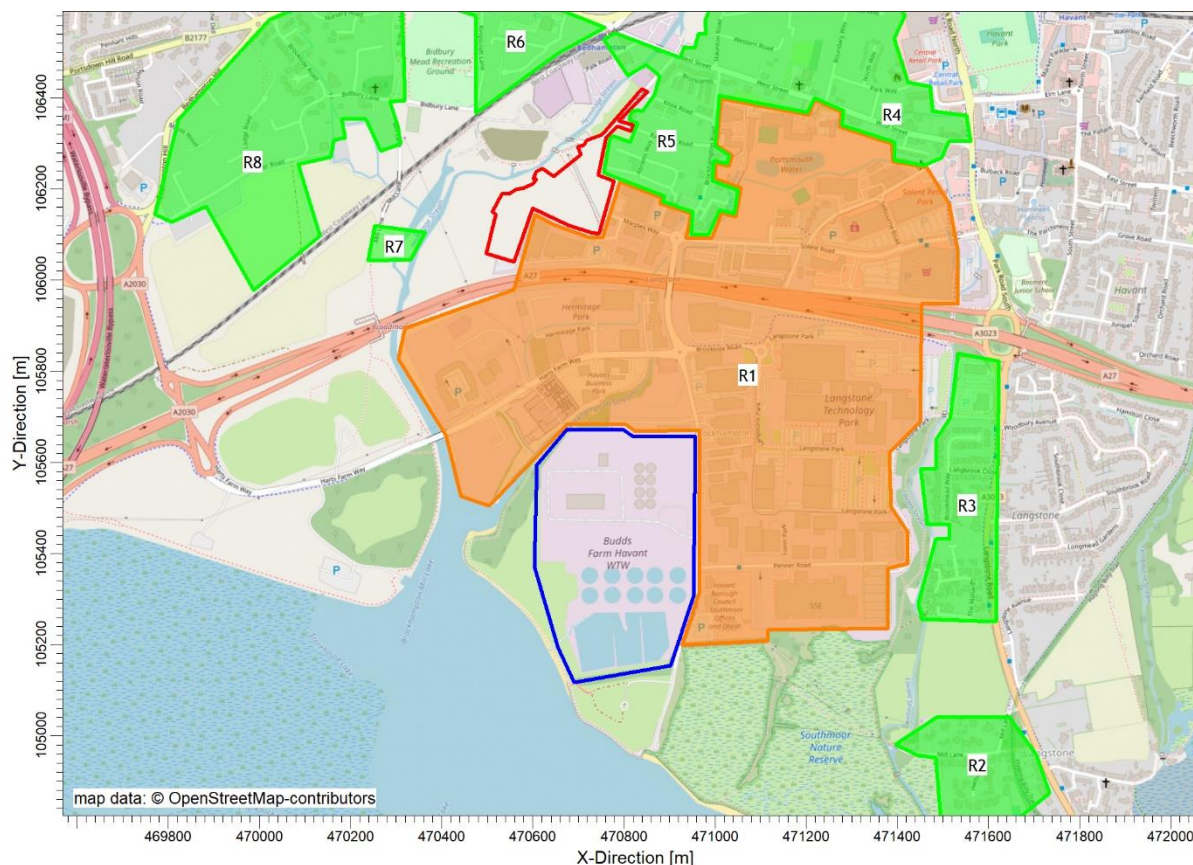
Table 4-2: Existing Sensitive Receptors Identified

Receptor	Receptor Type	Sensitivity to Odours	Direction from the Budds Farm Havant WwTW	Distance from the Budds Farm Havant WwTW Boundary (m)
R1	Commercial / industrial	Medium	NW through SE	At boundary
R2	Residential	High	SE	530
R3	Residential	High	ENE through ESE	500
R4	Residential	High	NNE through NE	750
R5	Residential	High	N through NNE	450
R6	Residential	High	NNW	730
R7	Residential	High	NW	500
R8	Residential	High	NW	690

Reference should be made to Figure 4-3 for an illustration of the identified existing high sensitivity receptors (green shaded areas) and medium sensitivity receptors (orange shaded area) relative to the Budds Farm Havant WwTW (blue outline) and the Proposed Development (red shaded area).



Figure 4-3: Existing Sensitive Receptors Identified



4.5 Historic Odour Complaints

Environmental Information Requests (EIR) were placed with SW and the EA to ascertain whether any odour complaints have been received and attributed to the operation of the Budds Farm Havant WwTW within the last five years. A Freedom of Information (FoI) request was placed with HBC to the same effect.

A response was received from the EA¹², which confirmed that no odour complaints have been received within the last five years.

A response was received from SW¹³, which confirmed that a single odour complaint has been received within the last five years. This odour complaint was received on 19th December 2019, from a location to the northeast of the Budds Farm Havant WwTW¹⁴. No information was available as to whether this complaint was substantiated at the time it was received.

A response was received from HBC¹⁵, which confirmed that two odour complaints have been received within the last five years. These odour complaints were received on 23rd August 2019 from an address on Penner Road and on 21st August 2024 from an address on Grove Road. No information was available as to whether these complaints were substantiated at the time they were received. Penner Road extends to the east from the boundary of the Budds Farm Havant

¹² EA EIR reference: SOA00751.

¹³ SW EIR reference: 3024.

¹⁴ Postcode provided: PO9 1J*. Due to the non-specific nature of this location, a more accurate direction and distance from the WwTW cannot be determined.

¹⁵ HBC FoI reference: 24-492.



WwTW and is an area of commercial / industrial land uses. Grove Road is located approximately 1km to the northeast of the Budds Farm Havant WwTW and is a residential area.

In summary of the above:

- two odour complaints were received in relation to the operations at the Budds Farm Havant WwTW in 2019;
- no odour complaints were received between 2020 and 2023; and
- one odour complaint was received in relation to the operations at the Budds Farm Havant WwTW in 2024.

It should be noted that the sensitivity of the general population to odours varies. Receipt of a low number of odour complaints can indicate that odours are occasionally perceptible to members of the public with a more acuity/sensitive sense of smell, but that these odours are generally not perceptible to the general population (of a lower acuity/sensitivity).

In consideration of the large number of sensitive receptors surrounding the WwTW, the number of odour complaints resulting from these receptors over the past five years is considered to be very low.

4.6 Meteorological Conditions

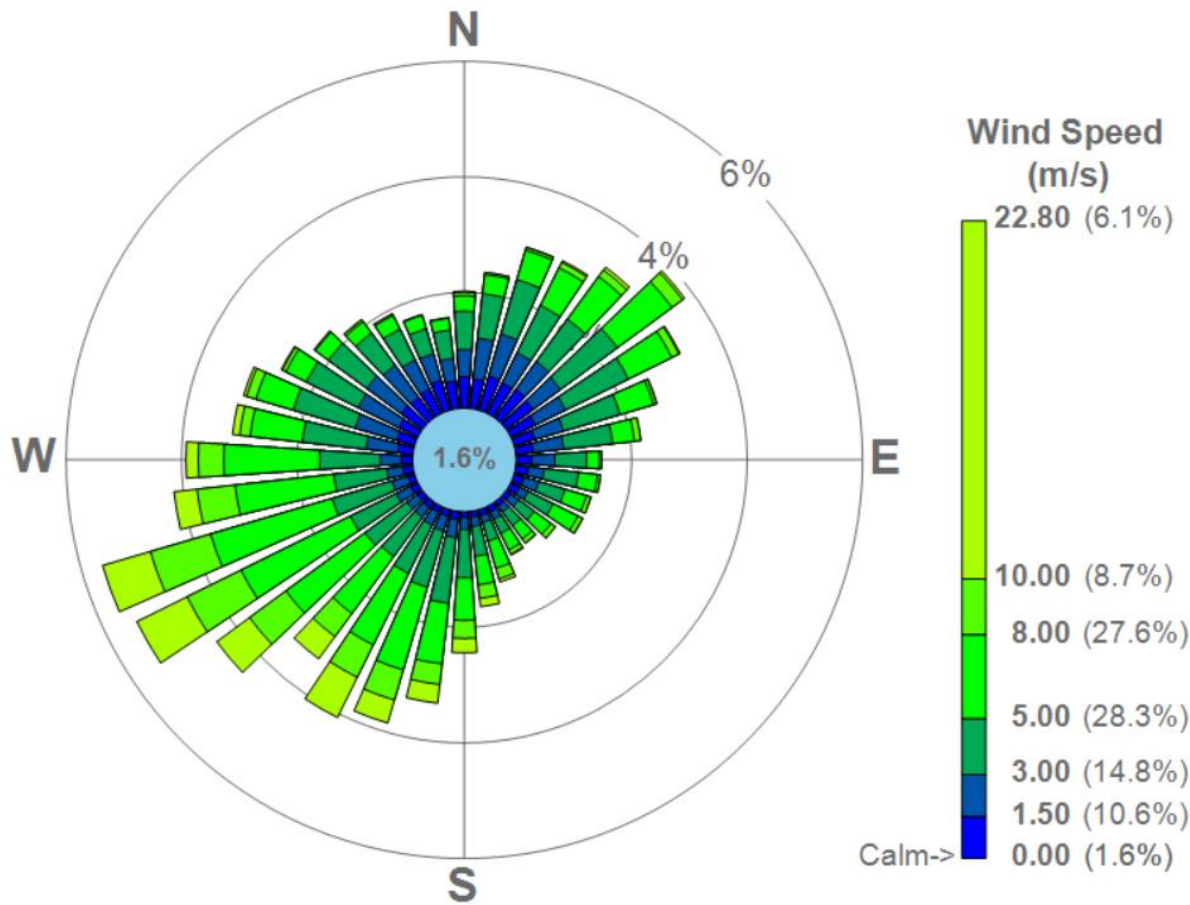
The most important climatic parameters governing the release and dispersal of potential odours from the Site are:

- Wind direction, which determines the broad direction of dispersal; and
- Wind speed, affects the level of dispersal achieved and the distance at which odours might be detectable.

A windrose from the Thorney Island meteorological observation station (located approximately 6km southeast of the Budds Farm Havant WwTW), providing the frequency of wind speed and direction, is presented in Figure 4-4 below. It is evident that winds from southwestern and northeastern sectors are most prevalent. Low wind speeds (less than 5 m/s) are relatively common (approximately 55% of total hours) and occur most frequently from the northwestern through to northeastern sectors.



Figure 4-4: Wind Rose (Thorney Island, 2018-2022 Average)



5.0 Odour Assessment

The likely significance of effects of potential odours from the Budds Farm Havant WwTW upon the Proposed Development has been considered in adoption of a multi-tool approach, as per the recommendations of the IAQM Odour Guidance.

5.1 Conceptual Model

The likely magnitude of odour effects at the Proposed Development has been considered through application of a conceptual SPR model, as defined within the IAQM Odour Guidance.

5.1.1 Source Odour Potential

The Budds Farm Havant WwTW is a source of potential odours resulting from the receipt, storage and treatment of wastewater at the site.

The Budds Farm Havant WwTW serves a population equivalent of 400,000 people within the Portsmouth area¹⁶ and receives wastewater via 52 pumping stations.

In reference to the examples outlined within the IAQM Odour Guidance, “*Larger Permitted processes of odorous nature or large STWs*” are associated with a ‘large’ source odour potential.

As such, the overall source odour potential of the Budds Farm Havant WwTW is large (i.e. the highest possible category).

5.1.2 Pathway Effectiveness

The pathway effectiveness to the proposed sensitive receptors was determined through a combination of the distance to the emission source, the frequency of winds with the potential to disperse odour towards those receptors and the effectiveness of dispersion/dilution of odours from the sources identified at the Site.

The determination of pathway effectiveness is presented in Table 5-1. The effectiveness of dispersion/dilution of odours from the sources identified at the Site is considered to be low, in line with open processes with low-level releases (i.e. non-enclosed and ground-level channels, chambers and tanks).

The Proposed Development is represented by eight discrete receptors (PR1-PR8), located at the areas of the Site in closest proximity to the WwTW.

Table 5-1: Determination of Pathway Effectiveness

ID	Distance from the Budds Farm Havant WwTW Boundary ^(A)		Wind Direction Linking Source to Receptor ^(B)	Frequency of Winds from Source to Receptor ^(C)			Pathway Effectiveness
	(m)	Notes		Low Winds ^(D)	Total	Notes	
PR1	430m	Remote from source	SSE	1.1%	2.2%	Infrequent	Ineffective
PR2	390m	Remote from source	SSE	1.1%	2.2%	Infrequent	Ineffective
PR3	440m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective

¹⁶ Notably including Waterlooville, Havant and Hayling Island.



ID	Distance from the Budds Farm Havant WwTW Boundary ^(A)		Wind Direction Linking Source to Receptor ^(B)	Frequency of Winds from Source to Receptor ^(C)			Pathway Effectiveness
	(m)	Notes		Low Winds ^(D)	Total	Notes	
PR4	500m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective
PR5	460m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective
PR6	430m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective
PR7	480m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective
PR8	540m	Remote from source	S	3.5%	7.4%	Infrequent	Ineffective

Table notes:

- (A) The distance from the Budds Farm Havant WwTW has been measured to the boundary, reflecting a precautionary approach (as the distance to nearest odour source at the WwTW would be greater than this).
- (B) Wind direction blowing from (i.e. the inverse of the direction from the Budds Farm Havant WwTW).
- (C) Determined in reference to meteorological data from the Thorney Island recording station, as presented in Section 4.6).
- (D) Defined as wind speeds below 5m/s.

5.1.3 Results

In reference to the methodology outlined in the IAQM Odour Guidance, the likely magnitude of odour effect has been determined by consideration of the source odour potential and the pathway effectiveness. The results are summarised in Table 5-2.

Table 5-2: Determination of Likely Odour Effect

ID	Budds Farm Havant WwTW Source Odour Potential	Pathway Effectiveness	Risk of Odour Exposure	Receptor Sensitivity	Likely Odour Effect
PR1	Large	Ineffective	Low risk	High	Slight Adverse
PR2	Large	Ineffective	Low risk	High	Slight Adverse
PR3	Large	Ineffective	Low risk	High	Slight Adverse
PR4	Large	Ineffective	Low risk	High	Slight Adverse
PR5	Large	Ineffective	Low risk	High	Slight Adverse
PR6	Large	Ineffective	Low risk	High	Slight Adverse
PR7	Large	Ineffective	Low risk	High	Slight Adverse
PR8	Large	Ineffective	Low risk	High	Slight Adverse



As such, the likely magnitude of odour effect at the Proposed Development is predicted to be 'slight adverse'.

5.2 Dispersion Modelling

In support of the conceptual SPR model, a limited dispersion modelling exercise has been undertaken to demonstrate the typical dispersion trends of potential odours from the Budds Farm Havant WwTW relative to the existing and proposed sensitive receptors identified (as outlined in Section 4.3 and 4.4).

The AERMOD dispersion model¹⁷ has been applied; this model is widely used and accepted by the EA for undertaking such assessments and its predictions have been validated against real-time monitoring data by the United States (US) Environmental Protection Agency (EPA). It is therefore considered a suitable model for this assessment.

Further details on the methodology and inputs for the dispersion modelling study are presented in Appendix A. The key model inputs and results of the dispersion modelling assessment are summarised within the sections below.

5.2.1 Identification of Odour Sources

The identification of key odour sources associated with the Budds Farm Havant WwTW has been undertaken in reference to aerial imagery and published literature regarding the operations at the WwTW.

A range of odour sources are identified, associated with the following key treatment phases:

- Preliminary treatment;
- Stormwater storage;
- Primary treatment;
- Secondary treatment; and
- Sludge treatment.

Further details are presented in Appendix A.

5.2.2 Quantification of Odour Emissions

The emission rates applied within the dispersion modelling have been defined in reference to UK Water Industry Research (UKWIR) Technical Reference Document 01/WW/13/3 'Odour Control in Wastewater Treatment', to provide an informed estimation of odour emissions from the Budds Farm Havant WwTW.

In consideration of the above, a precautionary approach has been adopted to seasonal variation; with peak 'summer' odour emissions applied year-round, and no seasonal reduction factor applied during Autumn and Winter (i.e. when average temperatures are lower and therefore odour emissions are likely to decrease compared to during the summer).

Full details of the odour sources identified, and the emission rates and emission parameters assigned, are presented in Table A-1 to A-3 in Appendix A.

5.2.3 Receptors

The dispersion modelling has considered a range of existing and proposed receptors, as presented in Section 4.2 and Section 4.3. In addition to these discrete receptors, a receptor grid has been utilised for the presentation of exposure isopleths. Further details are presented in Appendix A.

¹⁷ Software used: Lakes AERMOD View, (Executable Aermod_23132).



5.2.4 Impact Criterion

In consideration of the offensiveness of odours and receptor sensitivities, the significance of effects have been determined in reference to the approach presented within the IAQM Odour Guidance (as presented in Table A-1 in Appendix A). As such, the following odour criterion have been applied within this assessment to present the point at which the adverse effect of potential odours from the WwTW could be considered 'significant':

- $C_{98, 1\text{-hour}} 3.0 \text{ ou}_E/\text{m}^3$ odour criterion has been applied for 'high' sensitivity (i.e. residential) receptors; and
- $C_{98, 1\text{-hour}} 5.0 \text{ ou}_E/\text{m}^3$ odour criterion has been applied for all 'medium' sensitivity (i.e. commercial / industrial) receptors.

Further details are presented within Appendix A.

5.2.5 Results

The odour exposures predicted in consideration of the estimated odour emissions from the WwTW are presented in Table 5-3 below.

The odour exposures predicted as a result of odours from the Budds Farm Havant WwTW are below the associated impact criterion ($C_{98, 1\text{-hour}} 3.0 \text{ ou}_E/\text{m}^3$) **at the Proposed Development** (PR1 to PR8). Based upon the assessment inputs, the associated impact descriptor at the Proposed Development is 'negligible'.

The odour exposures predicted as a result of odours from the Budds Farm Havant WwTW exceed the associated impact criterion **at some existing receptor locations** (areas of R1 and R3). At worst, the associated impact descriptor is 'moderate' at the existing residential receptor locations, and 'substantial' at the existing commercial receptor locations.

The odour exposures predicted at the **existing sensitive receptor locations located at a similar distance from the WwTW as the Proposed Development** (R4 to R8) are below the associated impact criterion. The associated impact descriptor at these existing receptor locations is 'negligible'.



Table 5-3: Predicted Odour Concentrations at Sensitive Receptors

ID	Receptor Type	Associated Impact Criterion (C _{98, 1-hour} ouE/m ³)	Predicted Odour Concentration (C _{98, 1-hour} ouE/m ³)						Associated Impact Descriptor
			2018	2019	2020	2021	2022	Max	
PR1	Residential (proposed)	3.0	0.8	0.8	0.5	0.6	0.7	0.8	Negligible
PR2	Residential (proposed)	3.0	1.0	1.0	0.7	0.7	0.8	1.0	Negligible
PR3	Residential (proposed)	3.0	0.8	0.8	0.6	0.6	0.7	0.8	Negligible
PR4	Residential (proposed)	3.0	0.7	0.7	0.6	0.5	0.7	0.7	Negligible
PR5	Residential (proposed)	3.0	0.9	0.8	0.8	0.7	0.8	0.9	Negligible
PR6	Residential (proposed)	3.0	1.0	1.0	0.9	0.9	0.9	1.0	Negligible
PR7	Residential (proposed)	3.0	0.8	0.8	0.7	0.7	0.7	0.8	Negligible
PR8	Residential (proposed)	3.0	0.7	0.7	0.6	0.6	0.6	0.7	Negligible
R1	Commercial (existing)	5.0	20.1	23.4	21.2	22.3	21.4	23.4	Substantial
R2	Residential (existing)	3.0	2.9	3.6	3.2	3.4	3.5	3.6	Moderate
R3	Residential (existing)	3.0	3.5	4.9	4.4	4.1	4.0	4.9	Moderate
R4	Residential (existing)	3.0	0.4	0.6	0.6	0.6	0.5	0.6	Negligible
R5	Residential (existing)	3.0	0.9	0.9	0.8	1.0	0.8	1.0	Negligible
R6	Residential (existing)	3.0	0.4	0.4	0.3	0.3	0.3	0.4	Negligible
R7	Residential (existing)	3.0	0.6	0.5	0.3	0.4	0.5	0.6	Negligible
R8	Residential (existing)	3.0	0.5	0.4	0.2	0.2	0.3	0.5	Negligible

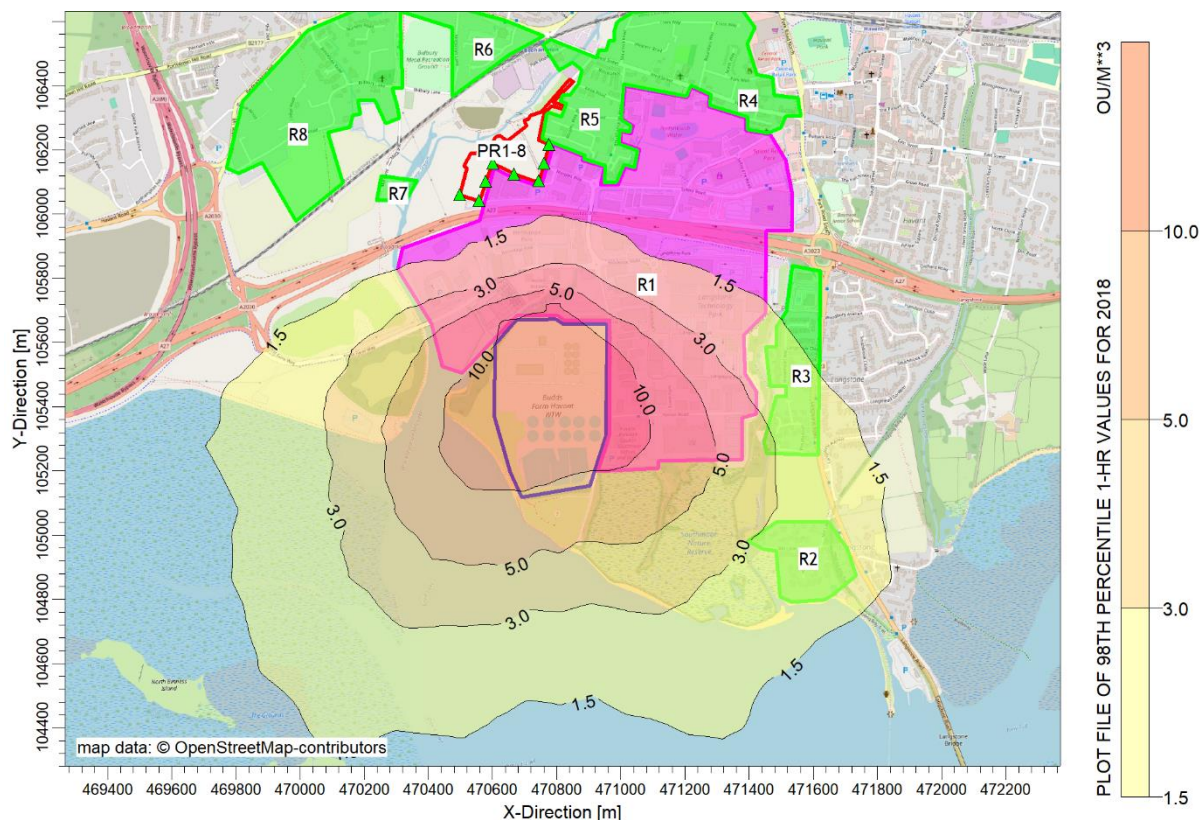
Figure 5-1 presents an isopleth plot of the 'worst-case' meteorological year investigated (defined in consideration of maximum predicted exposure at the Proposed Development). The remaining years investigated are presented in Appendix B.

In reference to the predicted odour concentrations presented within the isopleth plots, the results indicate that potential odours from the Budds Farm Havant WwTW are primarily dispersed to the



south, southwest and southeast (i.e. coastal). Predicted odour concentrations to the north and northwest (i.e. inland) of the Budds Farm Havant WwTW are lowest, indicating an ineffective pathway.

Figure 5-1: Modelled C₉₈ 1-hour Odour Concentrations - 2018 ('Worst-Case' Year)



5.3 Significance of Effects

The significance of effects of potential odours from the Budds Farm Havant WwTW upon the Proposed Development has been considered in application of a multi-tool approach (as recommended by the IAQM), in reference to the following:

- The findings of the conceptual model (as presented in Section 5.1);
- The findings of the dispersion modelling exercise (as presented in Section 5.2); and
- The history of odour complaints within the site locale (as presented in Section 4.5).

The conceptual model identifies an 'ineffective' pathway between potential odours from the Budds Farm Havant WwTW and the Proposed Development. This is supported by the dispersion modelling, which predicts that odour concentrations to the north and northwest of the Budds Farm Havant WwTW are lowest, therefore indicating an ineffective pathway between the Budds Farm Havant WwTW and the Proposed Development.

The conceptual model and odour modelling exercise predict the likely magnitude of odour effect at the Proposed Development to be either 'slight' or 'negligible' (respectively). In reference to the IAQM Odour Guidance, a 'slight' or 'negligible' likely magnitude of odour effect corresponds to an overall 'not significant' odour effect.

Furthermore, it should be noted that the dispersion modelling exercise predicts that odour concentrations at Proposed Development would be lower than that predicted at existing residential receptors in proximity to the Budds Farm Havant WwTW. In consideration that only a very low level of odour complaints (three) have been received regarding the operations at the Budds Farm Havant



WwTW over the last five years, this therefore indicates that odour complaints are unlikely to occur (as a result of odours from the Budds Farm Havant WwTW) at the Proposed Development.

As such, it is considered that odour does not represent a material constraint to the proposed residential development on Land at Kingscroft Farm.



6.0 Summary

SLR Consulting Limited has been instructed by Foreman Homes Group Ltd to undertake an odour assessment in support of a planning application for the proposed development of up to 120 residential dwellings (the 'Proposed Development') on Land at Kingscroft Farm, Meyrick Road, Havant (the 'Site').

The Site is located at the southwestern extent of Havant, at a similar distance from the Budds Farm Havant Wastewater Treatment Works (WwTW) as existing residential receptors within the site locale. Following receipt of a consultation response from Southern Water (SW), an odour assessment has been undertaken to consider the significance of effects of potential odours at the Proposed Development site arising from the operation of the Budds Farm Havant WwTW.

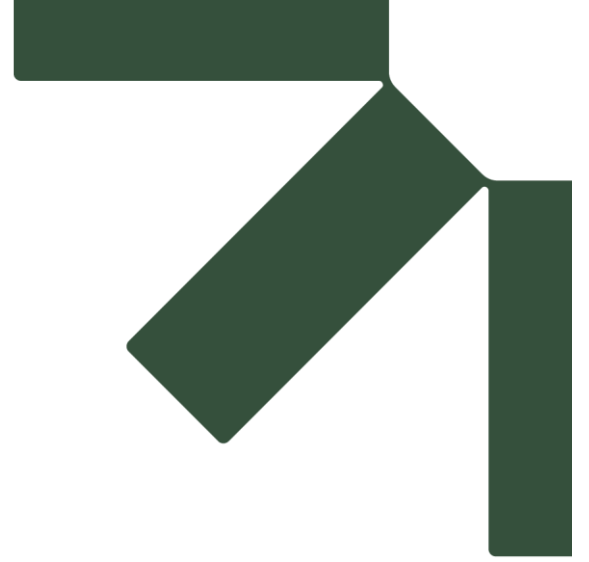
Assessment of odours has been undertaken in adoption of a multi-tool approach, as per the recommendations of the IAQM Odour Guidance. A conceptual Source-Pathway-Receptor (SPR) model has been utilised as the principal assessment technique. A dispersion modelling exercise has been undertaken to inform and supplement the SPR conceptual model.

The conceptual model and odour modelling exercise predict the likely magnitude of odour effect at the Proposed Development to be either 'slight' or 'negligible' (respectively). In reference to the IAQM Odour Guidance, a 'slight' or 'negligible' likely magnitude of odour effect corresponds to an overall 'not significant' odour effect.

Furthermore, it should be noted that the dispersion modelling exercise predicts that odour concentrations at Proposed Development would be lower than that predicted at existing residential receptors in proximity to the Budds Farm Havant WwTW. In consideration that only a very low level of odour complaints (three) have been received regarding the operations at the Budds Farm Havant WwTW over the last five years, this therefore indicates that odour complaints are unlikely to occur at the Proposed Development.

As such, it is considered that odour does not represent a material constraint to the proposed residential development on Land at Kingscroft Farm.





Appendix A Dispersion modelling: Model Inputs

A.1 Dispersion Model

For this assessment the AERMOD model¹⁸ has been applied; this model is widely used and accepted by the EA for undertaking such assessments and its predictions have been validated against real-time monitoring data by the United States (US) Environmental Protection Agency (EPA). It is therefore considered a suitable model for this assessment.

Model validation studies¹⁹ for AERMOD generally suggest that these dispersion models are for the vast majority of cases able to predict maximum short term high percentiles concentrations well within a factor of two and the latest evaluation study for AERMOD shows the composite (geometric mean) ratio of predicted to observed short-term averages from 'test sites' (where real-time monitoring data is available to validate model performance), to be between 0.96 and 1.2.

The 'urban' option for dispersion coefficients was selected in accordance with AERMOD guidance.

A.2 Identification of Odour Sources

Preliminary treatment operations are undertaken at the inlet works and comprises the receipt, screening and grit removal of incoming effluent. Some channels/chambers within the inlet works are covered, with air extracted to the abatement unit (as detailed below).

When incoming flows above that of the maximum treatment capacity of the Budds Farm Havant WwTW ('full flow to treatment') are received, the excess is diverted via channels to the stormwater storage tanks ('storm tanks'). Diverted effluent is screened (by the 'storm screens') prior to storage within the four storm tanks. It is noted that SW are considering the construction of an additional storm tank at the WwTW²⁰. Once incoming flows reduce back to a level below the full flow to treatment of the WwTW, the stored stormwater would be returned to the inlet works for processing. Following usage, a small volume of residual sediment ('storm sediment') is observed to be retained at the eastern end of the storm tanks. The storm screens and the northernmost storm tank are enclosed, with air extracted to the abatement unit (as detailed below).

Primary treatment of screened effluent is undertaken within eight Primary Settlement Tanks (PSTs).

Secondary treatment is undertaken within two Activated Sludge Plants (ASPs), each comprising an anoxic and aerobic treatment phase. Final treatment is undertaken by ten Final Settlement Tanks (FSTs), however these FSTs are not considered a significant source of odours.

The Budds Farm Havant WwTW is also operated as a Sludge Treatment Centre (STC), processing both indigenous (from the Budds Farm WwTW) and imported (tankered from other WwTWs) sludge via Anaerobic Digestion (AD). Following treatment, processed sludge is then dewatered to produce a solid 'sludge cake' which is stored within the enclosed STC main building prior to off-site export. The odorous assets associated with the STC operations

¹⁸ Software used: Lakes AERMOD View, (Executable Aermod_23132).

¹⁹ AERMOD: Latest Features and Evaluation Results, EPA-454/R-03-003, June 2003 (United States Environmental Protection Agency).

²⁰ [Environmental Impact Assessment \(EIA\) Screening Opinion regarding the proposal of construction of a new Storm Tank at Budds Farm Water Treatment Works](#), HBC planning application reference: GEN/23/00619.

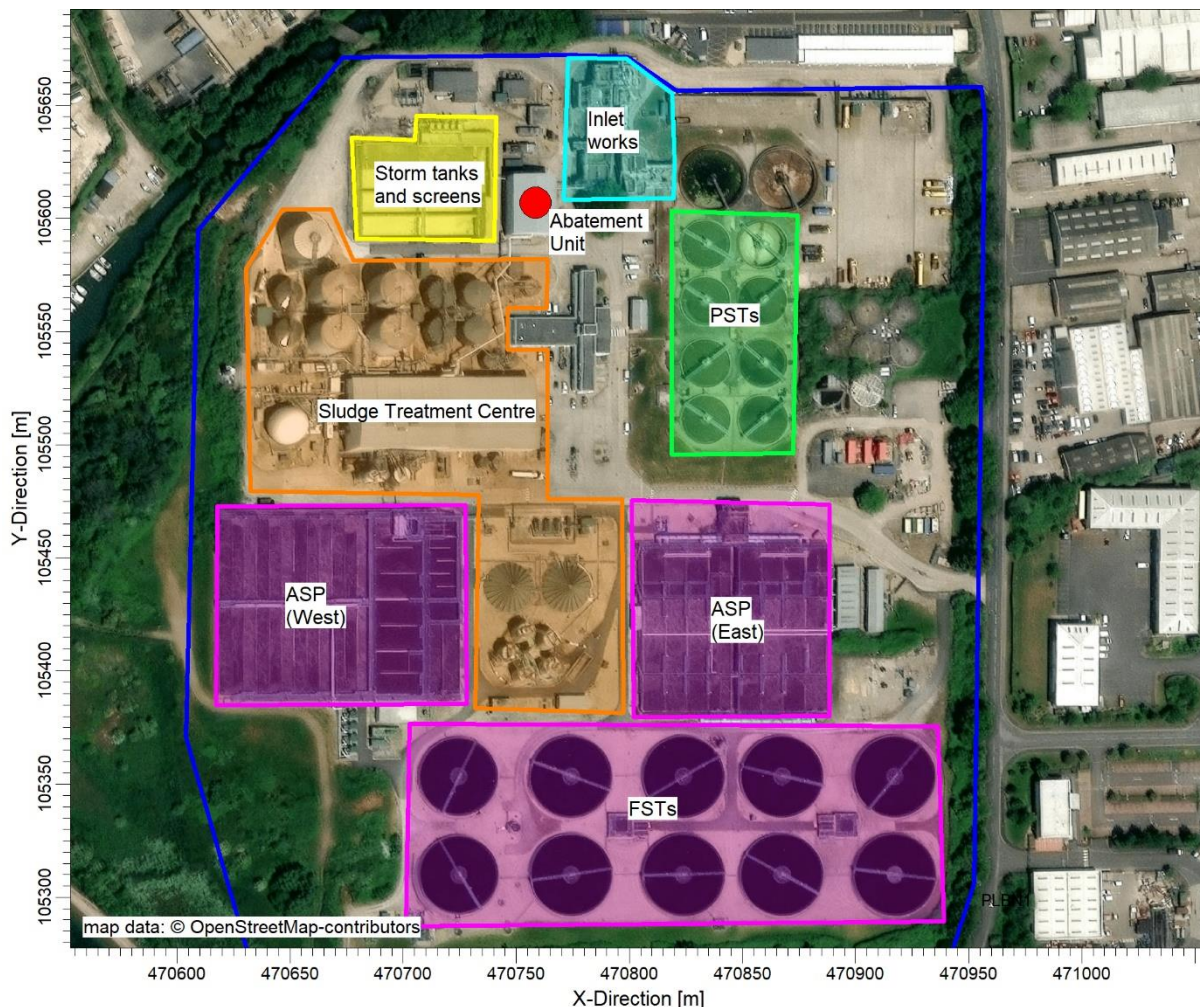


are either sealed and captured by the gas capture system (such as the digesters) or enclosed with air extracted to the abatement unit (as detailed below).

The abatement unit is located to the east of the storm tanks and extracts and treats odorous air extracted from enclosed STC assets, covered sections of the inlet works, the storm screens and the northernmost storm tank. The abatement unit discharges treated air via an elevated release stack.

The location of these the odour sources identified are outlined in Figure A-1 below.

Figure A-1: Identified Odour Sources - Budds Farm Havant WwTW



A.3 Derivation of Odour Emissions

The odour unit is a Standard Unit in the same way as gram or milligram, therefore the notation used in odour assessment follows the conventions of any mass emission unit as follows:

- Concentration: $\text{ou}_\text{E}/\text{m}^3$;
- Emission: $\text{ou}_\text{E}/\text{s}$; and
- Specific emission (emission per unit area): $\text{ou}_\text{E}/\text{m}^2/\text{s}$.



The odour emission rates and emission parameters applied within the dispersion modelling are outlined in Table A-1 to A-3 below.

Area odour emission rates have been defined in reference to UK Water Industry Research (UKWIR) Technical Reference Document 01/WW/13/3 'Odour Control in Wastewater Treatment'.

Table A-1: Odour Emission Rates – Area Sources

Treatment Phase	Odour Source	Total Surface Area (m ²)	Area Odour Emission Rate (ou _E /m ² /s)	Odour Emission Rate (ou _E / s)
Preliminary	Reception chambers	60	53	3,180
	Screens and channels	36	53	1,908
	Screening skips	20	40	800
	Detritors	85	25	2,125
	Grit skips	15	40	600
Stormwater	Storm screening skips	10	40	400
	Storm tanks: stormwater ^(A)	1,560	8.3	12,948
	Proposed new storm tank: stormwater ^(A)	520	8.3	2,158
	Storm tanks: areas of retained sediment ^(B)	150	7.9	1,185
Primary	PSTs	2,880	7.5	21,600
Secondary	ASPs: aerobic zones	11,100	2.0	22,200
	ASPs: anoxic zones	3,400	5.0	17,000
Table notes: (A) The modelling has applied a time factor for odour emission from stormwater; assuming that all tanks would be filled with stormwater for one day per week. (B) The modelling has applied a time factor for odour emission from retained sediment within the storm tanks; assuming that sediment would be present when the tanks are not filled with stormwater (i.e. for the remaining six days per week).				

The odour concentration for treated air released from the abatement unit has been defined in reference to the upper range specified within the Best Available Techniques Reference



(BAT) reference document for the Waste Treatment sector²¹. The release height and stack diameter were defined in reference to high resolution LIDAR data.

Table A-2: Emission Parameters – Point Sources

Emission Parameter	Abatement Unit
Release height (m)	14.0
Stack diameter	1.0
Release temperature	Ambient ^(A)
Efflux velocity (m/s)	15.0
Airflow rate (m ³ /s)	11.8 ^(B)
Odour concentration (ou _E /m ³)	1,000 ^(C)
Odour emission rate (ou _E /s)	11,800
Table notes: (A) The ‘ambient’ option within Aermod has been selected. This equates the emission temperature with the ambient temperature within the meteorological data file. (B) The airflow rate from the abatement unit has been calculated in consideration of the observed stack diameter and the assumed design efflux velocity. (C) The odour concentration of air released from the abatement unit has been defined in reference to Section 6.3.1.2 of the BAT reference document for the Waste Treatment sector.	

In consideration of the emission rates and release parameters defined above, the contribution to total odour emissions from each treatment phase of the Budds Farm Havant WwTW are summarised below.

Table A-3: Odour Emissions Summary

Treatment Phase	Associated Odour Source(s)	Odour Emission Rate (ou _E / s)	Contribution to Total Odour Emissions
Preliminary	Reception chambers	8,613	9.1%
	Screens and channels		
	Screening skips		
	Detritors		
Stormwater	Grit skips	16,691	17.7%
	Storm screening skips		

²¹ Best Available Techniques (BAT) Reference Document for Waste Treatment, Directive 2010/75/EU (Integrated Pollution Prevention and Control), European Commission, 2018 (see Section 6.3.1.2).



Treatment Phase	Associated Odour Source(s)	Odour Emission Rate (ou _E / s)	Contribution to Total Odour Emissions
	Storm tanks: stormwater		
	Proposed new storm tank: stormwater		
	Storm tanks: areas of retained sediment		
Primary	Primary Settlement Tanks (PSTs)	21,600	22.9%
Secondary	Activated Sludge Plant (ASP): aerobic zones	35,800	37.9%
	ASPs: anoxic zones		
Sludge (STC)	Abatement Unit	11,800	12.5%
Total		94,504	100%

A.4 Model Domain and Receptors

The modelling has been undertaken using a receptor grid across a map of the study area. Pollutant exposure isopleths are generated by interpolation between receptor points and superimposed onto the map.

A nested receptor grid of 2km by 2km (and flagpole height of 1.5m) centred upon the Budds Farm Havant WwTW was applied as follows:

- 500m x 500m at 50m grid resolution;
- 1000m x 1000m at 100m grid resolution; and
- 2000m x 2000m at 200m grid resolution.

In addition, the location of specific existing and proposed sensitive receptors have been presented as discrete receptors, as described in Section 2 and 4.3.

A.5 Topography

The presence of elevated terrain can affect the dispersion of pollutants and the resulting ground level concentration in a number of ways. Elevated terrain reduces the distance between the plume centre line and the ground level, thereby increasing ground level concentrations. Elevated terrain can also increase turbulence and, hence, plume mixing with the effect of increasing concentrations near to a source and reducing concentrations further away.

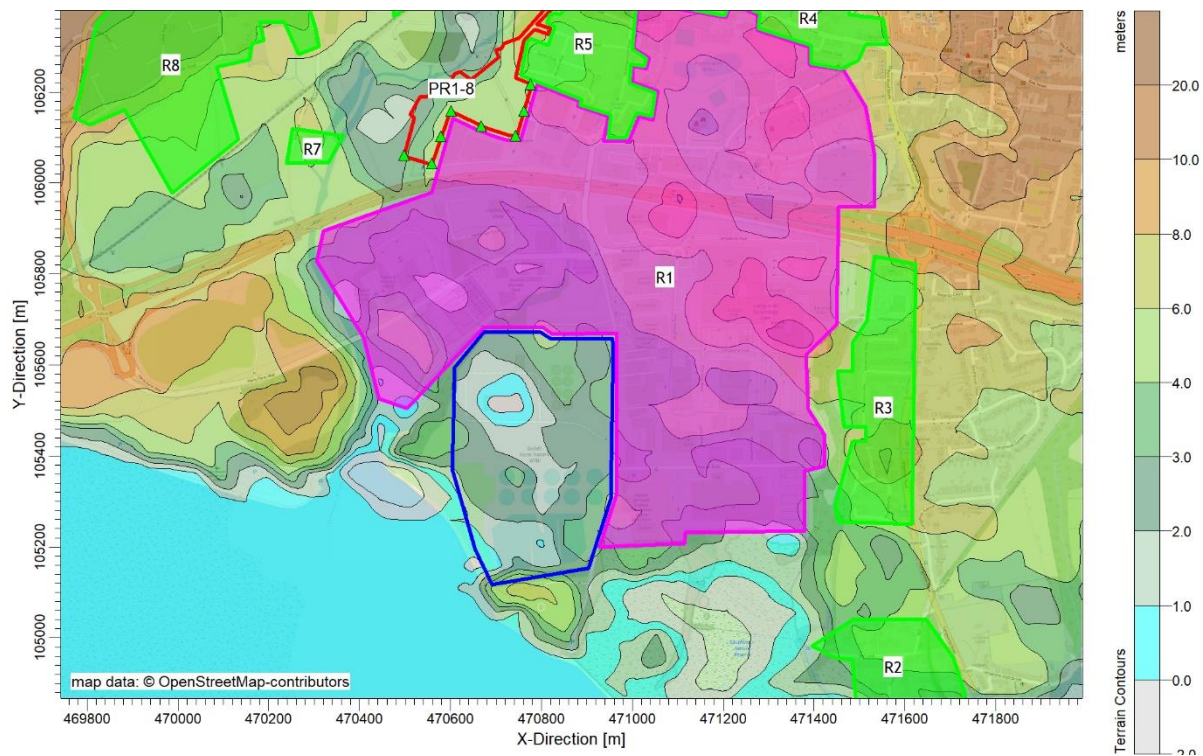
AERMOD utilises digital elevation data to determine the impact of topography on dispersion from a source. Topography was incorporated within the modelling using 30m resolution Shuttle Radar Topography Mission (SRTM) terrain data files. Data was processed by the AERMAP function within AERMOD to calculate terrain heights.

The Budds Farm Havant WwTW is located at approximately 2m above ordnance datum (AOD) in a relatively flat urban area. The Proposed Development is at a similar elevation, of



approximately 3m AOD. Topography has been incorporated into the model and is illustrated in Figure A-2 below.

Figure A-2: Topography



A.6 Building Downwash

Building downwash occurs when turbulence, induced by nearby structures, causes pollutants emitted from an elevated source to be displaced and dispersed rapidly towards the ground, resulting in elevated ground level concentrations. Building downwash has been considered for buildings that have a maximum height equivalent to at least 40% of the emission height and which are within a distance defined as five times the lesser of the height or maximum projected width of the building.

The integrated Building Profile Input Programme (BPIP) module within AERMOD was used to assess the potential impact of building downwash upon predicted dispersion characteristics. It should be noted that this applied to point sources only (i.e. the abatement unit).

A.7 Meteorological Data Preparation

The nearest meteorological recording station to the Site is the 'Thorney Island' meteorological recording station, located approximately 6km southeast of the Budds Farm Havant WwTW at a similar elevation to the works (between 0 and 10m). A windrose from Thorney Island meteorological recording station, showing the frequency of wind speed and direction, used in the assessment is presented in Section 4.6. The windrose shows winds from the west and south-west are most prevalent.

The meteorological data (5 years hourly sequential data for 2018-2022 inclusive) was obtained in .met format from the data supplier. The data was converted to the required



surface and profile formats for use in AERMOD, in accordance with the latest guidance²², using AerMet View meteorological pre-processor. Details specific to the meteorological recording station location were used to define surface roughness, albedo and bowen ratio in the conversion using the AerSurface tool within AerMet.

A.8 Relative Offensiveness of Odours

Odours from the preliminary and primary treatment phases, as well as from sewage sludge, are typically associated with 'most' offensive odour potential. Odours from the secondary treatment phase are typically associated with 'moderately' or 'less' offensive odours. Where odours are captured and treated by an appropriate abatement system, the relative offensiveness of odours released from the system are typically reduced. As such, the offensiveness of odours from the abatement system are considered 'moderately offensive'.

In reference to the contribution to total odour emissions of the different treatment phases and assets (as presented in In consideration **of the emission rates and release parameters defined above, the contribution to total odour emissions from each treatment phase of the Budds Farm Havant WwTW are summarised below.**

Table A-3), the overall offensiveness of odours from the Budds Farm Havant WwTW is considered 'moderately' offensive.

A.9 Odour Criterion

As per air quality standards for individual pollutants, exposure to odour is given in terms of a percentile of averages over the course of a year. The exposure criteria most accepted in the UK at present is given in terms of (concentration) European Odour Units as a 98th percentile (C_{98}) of hourly averages. This allows 2% of the year when the impact may be above the limit criterion (175 hours). The notation for impact is therefore: $C_{98, 1 \text{ hour}} \times \text{ou}_E/\text{m}^3$.

IAQM Odour Guidance

The matrix for determination of the Odour Effect Descriptors associated with 'moderately offensive' odour types, as presented within the IAQM Odour Guidance is transposed below.

Table A-4 Odour Effect Descriptors – IAQM Approach (Moderately Offensive)

Predicted Odour Exposure $C_{98, 1\text{-hour}} \text{ ou}_E/\text{m}^3$	Receptor Sensitivity		
	Low	Medium	High
≥ 10	Moderate	Substantial	Substantial
5-<10	Slight	Moderate	Moderate
3-<5	Negligible	Slight	Moderate
1.5-<3	Negligible	Negligible	Slight
0.5-<1.5	Negligible	Negligible	Negligible
<0.5	Negligible	Negligible	Negligible

²² AERMOD Implementation guide. AERMOD implementation workgroup, USEPA. Last revised June 2022.



In reference to the above:

- 'Moderately offensive' odours predicted at concentrations below $C_{98, 1\text{-hour}} 3.0 \text{ ou}_E/\text{m}^3$ at 'high' sensitivity receptors would represent a 'slight' or 'negligible' odour effect; and
- 'Moderately offensive' odours predicted at concentrations below $C_{98, 1\text{-hour}} 5.0 \text{ ou}_E/\text{m}^3$ at 'medium' sensitivity receptors would represent a 'slight' or 'negligible' odour effect.

Where the odour effect at sensitivity receptors is predicted to be 'slight' or 'negligible', the likely significance of effect is considered 'not significant'.

Chartered Institute for Water and Environmental Management

The Chartered Institute for Water and Environmental Management (CIWEM) released a Policy Position Statement regarding odour in February 2011. In consideration of an appropriate assessment criterion to determine potential odour impacts, CIWEM stated that:

"Given the differing odour impact criteria available, the selection of the most appropriate criterion should be determined by the objective of the assessment (whether this be against a standard of avoidance of nuisance or 'significant pollution') and the nature of the odour under assessment.

It is, therefore, the view of CIWEM that these and other odour impact criteria should be regarded as indicative guidelines and cannot be applied as over-arching statutory numerical standards. CIWEM considers that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:

- $C_{98, 1\text{-hour}} > 10 \text{ ou}_E/\text{m}^3$ – complaints are highly likely and odour exposure at these levels represents an actionable nuisance;
- $C_{98, 1\text{-hour}} > 5 \text{ ou}_E/\text{m}^3$, – complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance
- $C_{98, 1\text{-hour}} < 3 \text{ ou}_E/\text{m}^3$, – complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature."

EA H4 Odour Guidance

The EA's H4 odour guidance outlines 'benchmark levels' for the assessment of odours. For 'moderately offensive' odours, the guidance outlines that a predicted odour concentration above $C_{98, 1\text{-hour}} 3.0 \text{ ou}_E/\text{m}^3$ "indicates the likelihood of unacceptable odour pollution".

Odour Criterion Applied

In consideration of the offensiveness of odours (as presented in Section A.9) and receptor sensitivities (as presented in Sections 4.2 and 4.3), and in reference to the guidance presented above, the following odour criterion have been applied within this assessment to present the point at which the adverse effect of potential odours from the Budds Farm Havant WwTW could be considered 'significant':

- $C_{98, 1\text{-hour}} 3.0 \text{ ou}_E/\text{m}^3$ odour criterion has been applied for 'high' sensitivity (i.e. residential) receptors; and



- $C_{98, 1\text{-hour}} 5.0 \text{ ouE/m}^3$ odour criterion has been applied for all 'medium' sensitivity (i.e. commercial / industrial) receptors.



Appendix B Dispersion Modelling: Isopleth Maps



Figure B-1: Modelled C₉₈ 1-hour Odour Concentrations – 2019

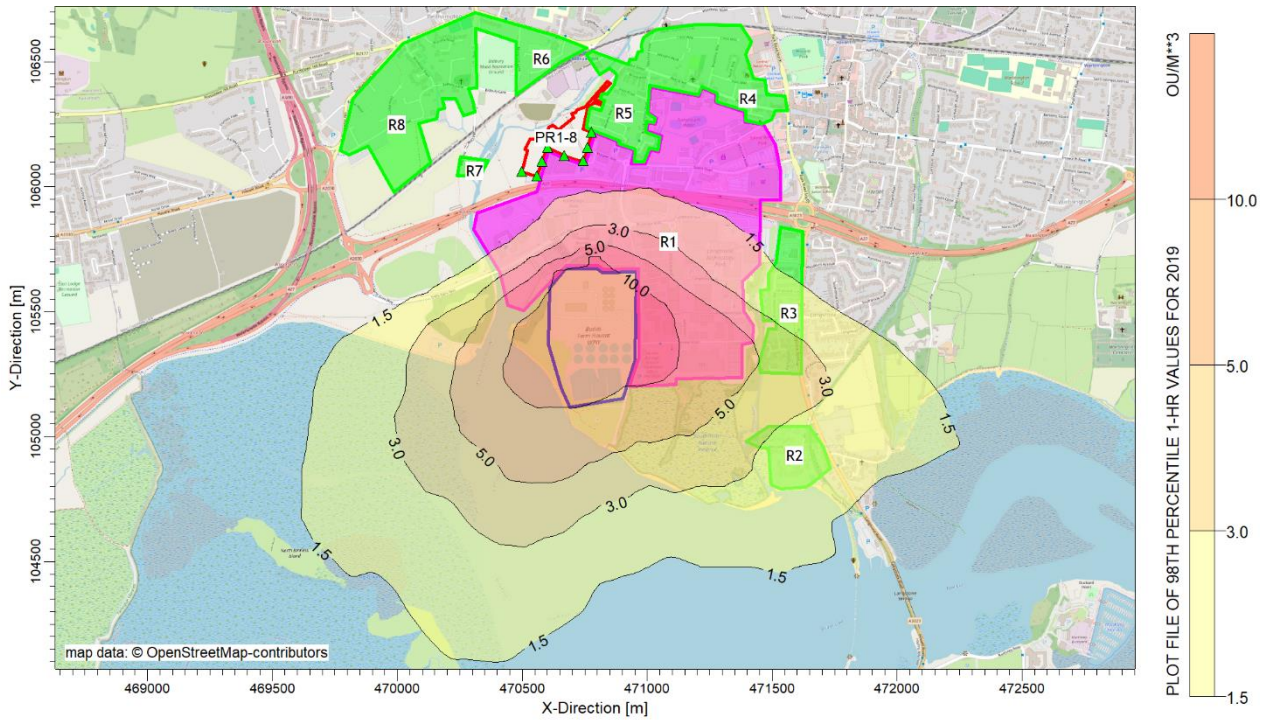


Figure B-2: Modelled C₉₈ 1-hour Odour Concentrations - 2020

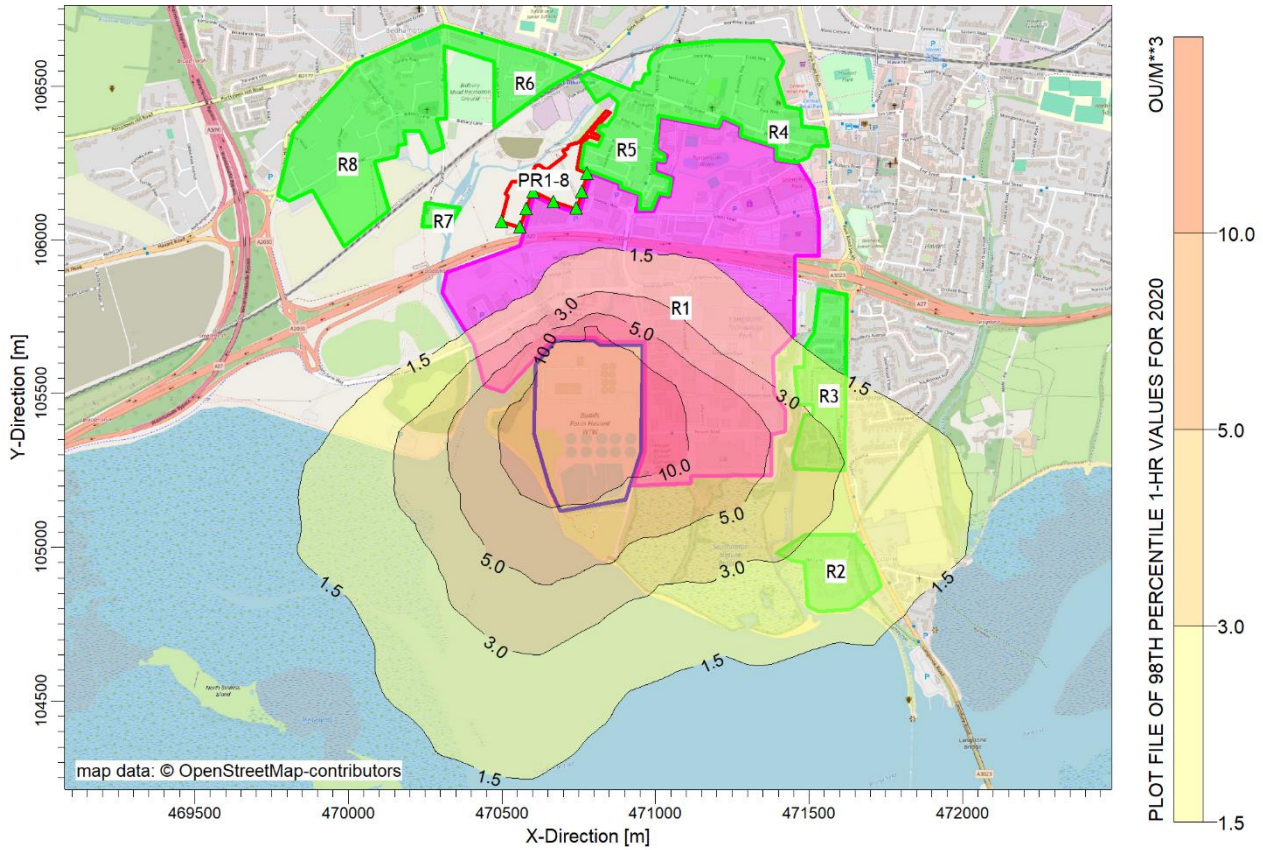


Figure B-3: Modelled C₉₈ 1-hour Odour Concentrations - 2021

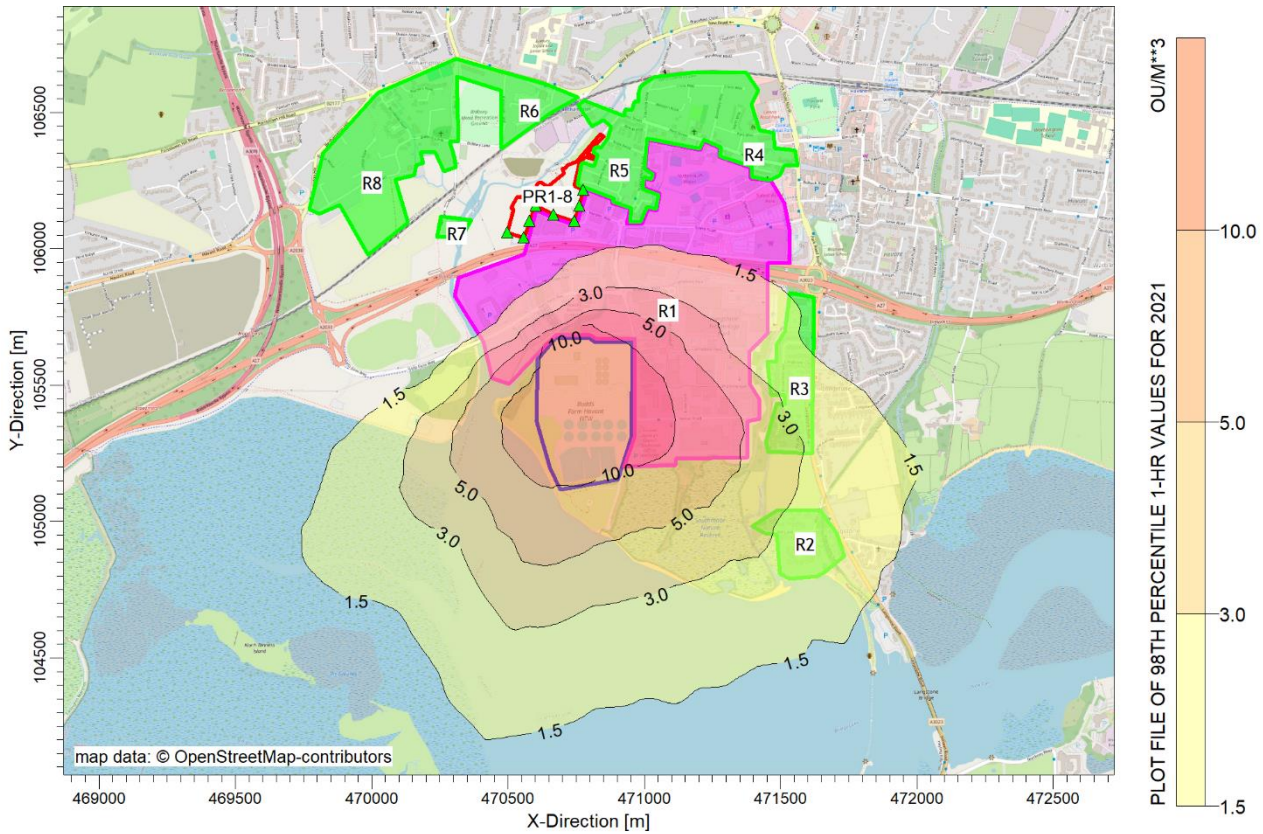
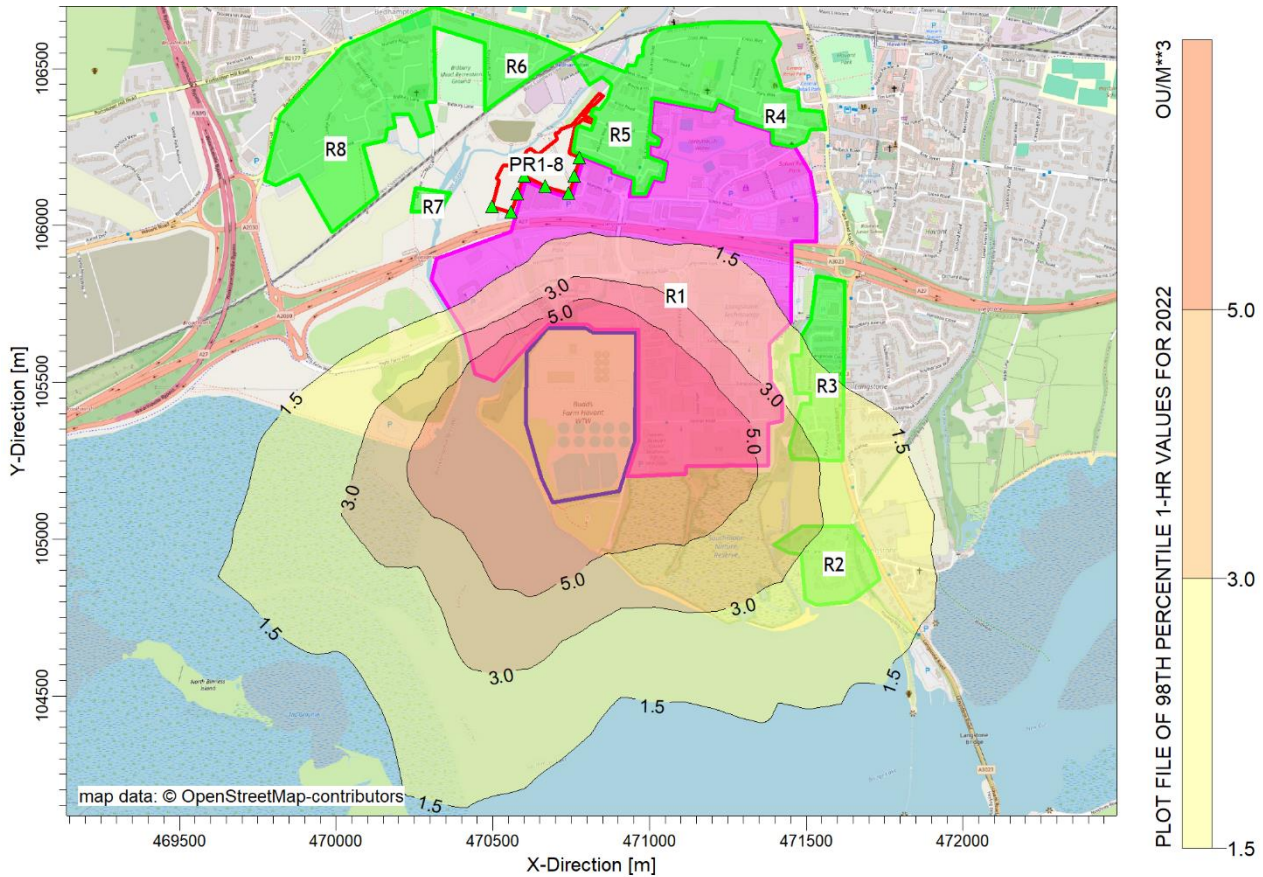


Figure B-4: Modelled C₉₈ 1-hour Odour Concentrations - 2022





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