

Odour Assessment
Land East of Showell Farm, Chippenham

Client: Hallam Land

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Executive Summary

Redmore Environmental Ltd was commissioned by Hallam Land to provide an Odour Assessment in support of a planning application for a residential-led mixed use development on land East of Showell Farm, Chippenham.

The development is located 100m west of Chippenham Water Recycling Centre which is operated by Wessex Water. Odour emissions from the facility have the potential to cause a reduction in amenity for future residents of the scheme and act as a constraint to planning consent. As such, an Odour Assessment was undertaken in order to consider baseline conditions at the site, evaluate potential odour effects and identify any mitigation required to control impacts to an acceptable level.

Four Field Odour Surveys were undertaken in accordance with Wessex Water's methodology to evaluate baseline conditions at the site. The findings of the Field Odour Surveys indicated that impacts as a result of odour emissions from Chippenham Water Recycling Centre and other potential sources in the local area were not significant in accordance with the relevant criteria.

Dispersion modelling was also undertaken in order to quantify odour concentrations across the development as a result of emissions from the Water Recycling Centre. This was completed using emission rates quantified through a number of surveys at the facility and information provided by Wessex Water. The results were compared with the relevant odour benchmark level.

The results of the modelling indicated that predicted odour concentrations were above the relevant odour benchmark level at a number of receptors selected to represent proposed residential areas of development. The dispersion modelling assessment was undertaken using a conservative inputs.

The dispersion modelling assessment was supported by four Field Odour Surveys undertaken in collaboration with Wessex Water. The results of the surveys demonstrated strong odours were detected over short periods of time on the parcel of land directly to the west of the Water Recycling Centre, where no residential development will occur. At areas of future residential development and therefore relevant exposure, no distinct or strong odours were detected during any surveys. Based on the survey observations, it is considered that the odour model was likely overpredicting odour impacts across the proposed development site and impacts are considered to be not significant.

Based on the assessment results, odour is not considered to represent a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

- 1.1.1 Redmore Environmental Ltd was commissioned by Hallam Land to provide an Odour Assessment in support of a planning application for a residential-led development on land East of Showell Farm, Chippenham.
- 1.1.2 The development is located in the vicinity of the Chippenham Water Recycling Centre (WRC). Odour emissions from the facility have the potential to cause a reduction in amenity for future residents of the scheme. As such, an Odour Assessment was undertaken in order to consider baseline conditions at the site, evaluate potential odour effects and identify any mitigation required to control impacts to an acceptable level.

1.2 Site Location and Context

- 1.2.1 The development site is located on land at Showell Farm, Chippenham, at National Grid Reference (NGR): 391160, 170900. Reference should be made to Figure 1 for a map of the site and surrounding area.
- 1.2.2 The proposals comprise the following:
- "Outline Planning Application for up to 400 dwellings (Class C3 use), land for a local centre accommodating commercial business and service uses (Class E use), drinking establishment and hot food takeaway (Sui Generis); and local community uses (Class F2); open space and landscaping to include natural green space, amenity green space, area of formal play, allotments and community orchard, sustainable drainage infrastructure including attenuation basins; cycle and pedestrian routes; parking; utilities infrastructure and ground remodelling. All matters reserved except for the formation of a new vehicular access and cycle and pedestrian access including emergency access, onto B4528".
- 1.2.3 Reference should be made to Figure 2 for the parameter plan.
- 1.2.4 The site is located to the south-west of Chippenham WRC which is operated by Wessex Water (WW). This facility has the potential to cause odour emissions during normal

operation and associated amenity effects at the proposed development. As such, a two-stage Odour Assessment has been undertaken to determine baseline conditions at the site and consider its suitability for the proposed end use. This included a Field Odour Survey and a Dispersion Modelling Assessment. The findings are detailed in the following report.

1.3 Planning Context

1.3.1 It is noted that reserved matters approval following outline planning permission (reference: 20/02335/REM) was granted by Wiltshire Council (WC) on 18th March 2025 for Phase 5 of the wider Rowden Park, Chippenham, development. The scheme will comprise the erection of 134 residential dwellings, public open space, play space and associated landscaping and infrastructure. Reference should be made to Figure 1 for the location of the scheme.

1.3.2 The outline application for the Rowden Park development (reference: 14/12118/OUT) was supported by odour dispersion modelling reported within the Environmental Impact Assessment submitted alongside the application. The results of the assessment demonstrated potential 'substantial adverse impacts' across the development site and at existing sensitive receptors. However, due to the absence of odour complaints from existing sensitive receptors in the area, the following comments were made by the Environmental Health Officer (EHO) for Wiltshire Council (WC):

"Acknowledges the concerns raised by Wessex Water, however is of the belief that modelling has over-predicted the impact which is reflected by a limited complaint history in the area. It is accepted that dwellings may experience a slight odour from time to time but there is no evidence to suggest this would be at levels sufficient enough to raise concern or objection."

1.3.3 Therefore, it is previously noted that odour was not considered a constraint to the adjacent development.

2.0 ODOUR BACKGROUND

2.1 Odour Definition

2.1.1 The Institute of Air Quality Management (IAQM) guidance¹ defines odour as:

"[...] the human olfactory response (perception followed by psychological appraisal) to one, or more often a complex mixture of, chemical species in the air."

2.1.2 The stated definition is considered to be relevant in the context of this assessment.

2.2 Odour Impacts

2.2.1 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 **FIDOL** acronym (also stated as **FIDOR** in Environment Agency (EA) guidance²) is a useful reminder of the factors that will determine the degree of odour pollution. These are described by the IAQM³ as follows:

- **F**requency - how often an individual is exposed to odour;
- **I**ntensity - the individual's perception of the strength of the odour;
- **D**uration - The overall duration that individuals are exposed to an odour over time;
- **O** odour unpleasantness - Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/ intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score; and,
- **L**ocation - The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors.

¹ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

² H4: Odour Management, EA, 2011.

³ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

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

2.2.3 The FIDOL 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.

2.3 Odour Legislative Control

2.3.1 The main requirement with respect to odour control from premises not authorised under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as WRCs, 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."

2.3.2 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 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). The only defence is to show that the process to which the nuisance has been attributed and its operation is being controlled according to best practicable means (BPM). The term BPM is defined as:

- "Practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;
- The "means" to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;
- The test is to apply only so far as compatible with any duty imposed by law; and,
- The test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.

2.3.3 It should be noted that where an operator can demonstrate that BPM is being applied, or where an agreed degree of abatement deemed to be BPM is added, this will not necessarily result in the total elimination of odours.

2.4 Odour Benchmark Levels

2.4.1 There is no statutory limit in the UK for ambient odour concentrations, whether set for individual chemical species or for mixtures. However, a number of indicative criteria have been utilised for the assessment of potential impacts. These are discussed in the following Sections.

Environment Agency Criteria

2.4.2 The EA has issued guidance on odour⁴ which contains indicative benchmark levels for use in the assessment of potential impacts from facilities regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments.

2.4.3 Benchmark levels are stated as the 98th percentile (%ile) of hourly mean concentrations in European odour units (ouE) over a year for odours of different offensiveness. In practice this is the 175th highest hourly average recorded in the year. This parameter reflects the previously described FIDOR factors, where an odour is likely to be noted on several occasions above a particular threshold concentration before an annoyance occurs. EA odour benchmark levels are summarised in Table 1.

⁴ H4: Odour Management, Environment Agency, 2011.

Table 1 Odour Benchmark Levels

Relative Offensiveness of Odour	Benchmark Level as 98 th %ile of 1-hour Means (ou _E /m ³)
Most offensive odours: - Processes involving decaying animal or fish - Processes involving septic effluent or sludge - Biological landfill odours	1.5
Moderately offensive odours: - Intensive livestock rearing - Fat frying (food processing) - Sugar beet processing - Well aerated green waste composting	3.0
Less offensive odours: - Brewery - Confectionery - Coffee roasting - Bakery	6.0

2.4.4 It should be noted that the EA Guidance H4 has been withdrawn. However, the IAQM retains reference to this document. As such, application of the descriptors within the EA Guidance H4 is still considered to represent best practice. In addition, the provided definitions of odour offensiveness and how this is categorised are still considered to be relevant in the context of this assessment

Wastewater Industry Research

2.4.5 In addition to the levels shown in Table 1, the wastewater industry has published an in-depth study through the United Kingdom Waste Industry Research (UKWIR) into the correlation between modelled odour impacts and human response (dose-effect). This was based on a review of the relationship between reported odour complaints and modelled odour impacts at nine WRCs in the UK with ongoing odour complaints. The findings of this research (and subsequent UKWIR research) indicated the following:

- At modelled exposures of below 5ou_E/m³ as a 98th %ile of 1-hour means, complaints are relatively rare, at only 3% of the total registered;

- At modelled exposures between 5ou_E/m³ and 10ou_E/m³ as a 98th %ile of 1-hour means, a significant proportion of total registered complaints occur, 38% of the total; and,
- The majority of complaints occur in areas of modelled exposure greater than 10ou_E/m³ as a 98th %ile of 1-hour means, 59% of the total.

Chartered Institute of Water and Environmental Management

2.4.6 The Chartered Institute of Water and Environmental Management (CIWEM) has released a Position Statement on the Control of Odour which provides guidance on likely responses to odour concentrations. These are summarised in Table 2.

Table 2 CIWEM Odour Guidance

Odour Concentration as 98 th %ile of 1-hour Means (ou _E /m ³)	Response
Less than 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
5 - 10	Complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance
Greater than 10	Complaints are highly likely and odour exposure at these levels represents an actionable nuisance

Planning Case Law

2.4.7 A 5ou_E/m³ impact criterion has accepted as being appropriate for avoidance of significant risk of annoyance and a low risk of nuisance in a number of planning applications involving WwTWs (e.g. Newbiggin, JS Bloor Ltd, Leighton Linsalde, etc).

2.4.8 In addition, the following precedents from previous planning appeals support the use of the 3.0ou_E/m³ benchmark level:

- Low Road, Cockermouth (APP/G0908/A11/2151737) - The inspector concluded that "Should odours fall within medium offensiveness, rather than low, the C98,1hour 3ou_E/m³ level modelled by the appellant indicates that it would not impinge on the appeal dwellings" (i.e. 3ou_E/m³ represented acceptable odour conditions)";

- Land between Upthorpe Road and Hepworth Road, Stanton (APP/E3525/A/11/2162837) - The Inspector concluded "I consider that a more appropriate threshold in this case is 3 - 5 ouE/m³ [...]"; and,
- Land South of Le Neubourg Way, Gillingham, Dorset (APP/N1215/W/15/3005513) - The Inspector wrote: "[...] I conclude that the appropriate parameter to apply in this case is the 3ouE/m³ contour line; a more restrictive approach would preclude from development areas which are comparable in odour terms with extensive areas of existing housing in Gillingham."

Department for Environment, Food and Rural Affairs Guidance

2.4.9 In order to provide some context to the odour benchmark values, the Department for Environment, Food and Rural Affairs (DEFRA) have provided the following descriptors⁵:

- 1ouE/m³ is the point of detection;
- 5ouE/m³ is a faint odour; and,
- 10ouE/m³ is a distinct odour.

2.4.10 An odour at a strength of 1ouE/m³ is, in reality, so weak that it would not normally be detected outside the controlled environment of an odour laboratory by the majority of people (that is individuals with odour sensitivity in the "normal" range - approximately 96% of the population⁶). 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. These include:

- 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

⁵ Odour Guidance for Local Authorities, DEFRA, 2010.

⁶ Odour Guidance for Local Authorities, DEFRA, 2010.

background odours such as those from traffic, vegetation, grass mowing etc, can provide background odour concentrations from 5 to 60ouE/m³ or more⁷;

- The recognition threshold may be about 30ouE/m³ ⁸, 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 National Planning Policy

2.5.1 The revised National Planning Policy Framework⁹ (NPPF) was published in December 2024 and updated in February 2025. The document sets out the Government's planning policies for England and how these are expected to be applied.

2.5.1 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to odour:

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.5.2 Chapter 12 of the NPPF details objectives in relation to achieving well-designed place. It states that:

"Planning policies and decisions should ensure that developments:

[...]

⁷ Odour Guidance for Local Authorities, DEFRA, 2010.

⁸ Odour Guidance for Local Authorities, DEFRA, 2010.

⁹ NPPF, Ministry of Housing, Communities and Local Government, 2025.

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesions and resilience."

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

2.6 Institute of Air Quality Management Guidance

2.6.1 The IAQM have published 'Guidance on the Assessment of Odour for Planning V1.1'¹⁰. This specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity. The assessment methodology outlined in the document has been utilised throughout this report where relevant.

2.7 Wessex Water Odour Risk Assessment Procedure Document

2.7.1 WW have produced a procedure for undertaking odour risk assessments, 'TRTWG669'¹¹. The procedure provides guidance on how to assess baseline odour impact and potential risk at new development as a result of emissions from existing and expanding WRCs. The assessment methodology for Field Odour Surveys and Dispersion Modelling Assessment outlined in the document has been utilised throughout this report where relevant.

¹⁰ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

¹¹ TRTWG669 Odour impact and odour risk assessment procedure for existing WRCs/STC/SPSs, proposed new expansion/development of a site and potential encroachment around/near a site, Issue 6, WW, 2023

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The development has the potential to expose future residents to any existing odour issues at the site. A two-stage assessment has therefore been undertaken in accordance with the IAQM 'Guidance on the Assessment of Odour for Planning'¹² and the WW 'TRTWG669'¹³ document. This comprised the following elements:

- Four Field Odour Surveys in order to determine baseline conditions at the site; and,
- A Dispersion Modelling Assessment in order to quantify potential impacts as a result of odour emissions from Chippenham WRC.

3.1.2 A summary of the methodology is provided in the following Sections.

3.2 Field Odour Surveys

Background

3.2.1 An adverse effect of odour exposure, such as annoyance or loss of amenity, is subjective and is not something that can be wholly defined or assessed by scientific methods alone. An assessment can therefore be strengthened by including a subjective assessment of prevailing odour conditions by those directly affected or by experienced, trained, observers.

3.2.2 Sensory testing techniques use the human nose as the analytical sensor to enable the odour magnitude (as either intensity or concentration), frequency, duration and offensiveness of the odour to be recorded at a particular location at a specific time. This is a sound approach considering that no analytical instrument can currently give a unified measure of a complex mixture of compounds that quantifies it as a whole in the same way that a human experiences odour. Sensory testing also allows the character of

¹² Guidance on the Assessment of Odour for Planning, IAQM, 2018.

¹³ TRTWG669 Odour impact and odour risk assessment procedure for existing WRCs/STC/SPSs, proposed new expansion/development of a site and potential encroachment around/near a site, Issue 6, WW, 2023

the odour to be assessed, which is a great benefit when there are a number of different odour sources.

- 3.2.3 Subjective sensory tests, such as the Field Odour Survey, should not automatically be considered inferior to quantitative ambient monitoring. When carried out to a rigorous, well-designed methodology, the results of such sensory surveys can be expected to be robust and reproducible.

Field Odour Survey Procedure

- 3.2.4 Four sensory tests was carried out at a number of survey locations on 7th September 2023, 20th May 2024, 19th June 2024 and 18th September 2024. Each survey was undertaken in collaboration with Wessex Water Regional Scientific Officer James Humphries, who attended and witnessed each survey.
- 3.2.5 For the first three surveys, locations were selected based on the closest area of the parameter plan to the WRC and the area where the odour plume was first detected. As shown in the parameter plan presented in Figure 2, this area does not include residential development and the results are therefore considered to provide a worst-case assessment of baseline conditions at the development as a result of emissions from the facility on the day of monitoring.
- 3.2.6 The exact monitoring locations for the survey were agreed with James Humphries of WW on the day of each survey and followed a grid pattern across the determined odour plume. The survey locations for Field Odour Survey 1, conducted on 7th September 2023, are summarised in Table 3 and shown visually in Figure 3.

Table 3 Field Odour Survey 1 Locations

Position	NGR (m)	
	X	Y
1	391537	170972
2	391489	171054
3	391490	171119
4	391483	171183

Position	NGR (m)	
	X	Y
5	391530	171126
6	391568	171057
7	391599	171011
8	391626	170951
9	391713	170912
10	391678	170987
11	391654	171029
12	391635	171069
13	391617	171103
14	391589	171151
15	391536	171246
16	391668	171120
17	391731	171120
18	391747	171031

3.2.7 The survey locations for Field Odour Survey 2, conducted on 20th May 2024, are summarised in Table 4 and shown visually in Figure 4.

Table 4 Field Odour Survey 2 Locations

Position	NGR (m)	
	X	Y
1	391521	170982
2	391559	170978
3	391588	170966
4	391618	170961
5	391669	170939
6	391707	170937

Position	NGR (m)	
	X	Y
7	391703	170978
8	391681	170987
9	391654	170998
10	391623	171003
11	391592	171005
12	391537	171012
13	391535	171047
14	391571	171048
15	391612	171043
16	391640	171043
17	391677	171032
18	391699	171039
19	391720	171086
20	391693	171130

3.2.8 The survey locations for Field Odour Survey 3, conducted on 19th June 2024, are summarised in Table 5 and shown visually in Figure 5.

Table 5 Field Odour Survey 3 Locations

Position	NGR (m)	
	X	Y
1	391528	170926
2	391526	170877
3	391465	170929
4	391557	170936
5	391524	171056
6	391571	171019

Position	NGR (m)	
	X	Y
7	391618	170980
8	391650	170949
9	391663	170985
10	3	1
11	391596	171042
12	391539	171083
13	391530	171130
14	391581	171160
15	391612	171104
16	391641	171114

3.2.9 The fourth Field Odour Survey was undertaken at positions representative of the closest area of residential development to the WRC. The survey locations for Field Odour Survey 4, conducted on 18th September 2024, are summarised in Table 6 and shown visually in Figure 6.

Table 6 Field Odour Survey 4 Locations

Position	NGR (m)	
	X	Y
1	391355	170882
2	391345	170918
3	391328	170967
4	391368	170976
5	391383	170941
6	391393	170902
7	391400	170842
8	391453	170827

Position	NGR (m)	
	X	Y
9	391508	170811
10	391533	170892
11	391514	170923

3.2.10 Monitoring was undertaken over a 5-minute period at each position. For each test location, the start time of the observation period, meteorological conditions and the attributes of the odour were recorded as follows:

- The assessor breathed normally, inhaling ambient air samples through the nose every 10-seconds, to give 30 samples over the 5-minute observation period;
- For each sample, the odour intensity was recorded using the scale outlined in Table 7.

Table 7 Field Odour Survey - Odour Intensity Scale

Odour Strength	Intensity Level	Comments
No odour/not perceptible	0	No odour when compared to the clean site
Slight/very weak	1	There is probably some doubt as to whether the odour is actually present
Slight/weak	2	The odour is present but cannot be described using precise words or terms
Distinct	3	The odour character is barely recognisable
Strong	4	The odour character is easily recognisable
Very strong	5	The odour is offensive. Exposure to this level would be considered undesirable
Extremely strong	6	The odour is offensive. An instinctive reaction would be to mitigate against further exposure

- At the end of the observation period at the test location, the odour unpleasantness was noted by classifying it as unpleasant, neutral (neither pleasant nor unpleasant) or pleasant. This assumed that at least some of the 30 samples were of intensity 3 or more (i.e. the odour is at least 'barely recognisable');
- The odour descriptor and meteorological conditions were also noted;

- The pervasiveness/extent of the odour at the test location was assessed by calculating the percentage odour time, $t_{\geq 4}$, which is the number of samples where odour was recognisable divided by the total number of samples (i.e. 30). Note that 'recognisable odour' is where the odour strength exceeds the recognition threshold and is definitely recognisable by the assessor i.e. the assessor is capable of definitely identifying its quality/character, which corresponds to an intensity of 4 or more; and,
- The average odour intensity (I_{mean}) over the test period was calculated and the maximum intensity (I_{max}) noted.

3.2.11 The following additional factors were also adopted to safeguard the quality of the sensory assessments in line with the WW procedure document 'TRTWG669'¹⁴:

- To perform a sniff test, the assessors must have had an odour acuity test to the standard EN: 13725:2003 and been verified as being with the required acceptance level of 20 to 80ppb N-Butanol, with a Standard Deviation of ± 4 within the last 12 months. A copy of the assessor's certificate is provided in Appendix 2;
- Surveys are to be completed between the months of April and September;
- To reduce the likelihood of odour fatigue, odour assessors should always carry out the field odour survey before making any works site visit, inspection or walk-through survey;
- The odour assessor would not have undertaken the assessment if they had a cold, sore throat, sinus trouble, etc;
- The odour assessor was not hungry or thirsty;
- The odour assessor did not work within half an hour of the end of their last meal;
- The odour assessor did not smoke or consume strongly flavoured food or drink, including coffee, for at least half an hour before the field odour survey was carried out, or during the survey;
- The odour assessor did not consume confectionery or soft drinks for at least half an hour before the field odour survey was carried out, or during the survey;
- Scented toiletries, such as perfume/aftershave were not used on the day of the field odour survey; and,
- The vehicle used during the field odour survey did not contain any deodorisers.

¹⁴ TRTWG669 Odour impact and odour risk assessment procedure for existing WRCs/STC/SPSs, proposed new expansion/development of a site and potential encroachment around/near a site, Issue 6, WW, 2023

Odour Exposure

3.2.12 Following completion of the Field Odour Surveys, the matrix outlined in Table 8 was utilised to determine the level of odour exposure at each monitoring location.

Table 8 Field Odour Survey - Odour Exposure

Average Intensity (I_{mean})	Percentage Odour Time ($t_{\geq 4}$)				
	$\leq 10\%$	11% to 20%	21% to 30%	31% to 40%	$\geq 41\%$
6	Large	Very Large	Very Large	Very Large	Very Large
5	Medium	Large	Large	Very Large	Very Large
4	Small	Medium	Medium	Large	Large
3	Small	Medium	Medium	Medium	Medium
2	Small	Small	Medium	Medium	Medium
1	Small	Small	Small	N/A	N/A

3.2.13 It should be noted that I_{mean} was rounded to the nearest whole number.

3.2.14 The following overriding considerations also affect the scoring of the odour annoyance impact:

- If $I_{\text{mean}} = 0$, then the odour effect can for practical purposes be considered **negligible**; and,
- If $I_{\text{mean}} = 1$ but $t_{\geq 4} = 0\%$, then the odour effect can for practical purposes be considered **negligible**.

Significance of Odour Effect

3.2.15 Following the determination of the odour exposure level, the significance of effect was determined through the interaction with receptor sensitivity, as outlined in Table 9.

Table 9 Field Odour Survey - Odour Receptor Sensitivity

Sensitivity	Description
High	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	Surrounding land where: • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or, • People would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land Examples may include places of work, commercial/ retail premises and playing/ recreation fields
Low	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 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

3.2.16 The assessment matrix is provided in Table 10.

Table 10 Field Odour Survey - Odour Effect Significance

Overall Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
Very Large	Substantial	Substantial	Substantial
Large	Moderate	Moderate	Substantial
Medium	Slight	Slight	Moderate
Small	Negligible	Negligible	Slight
Negligible	Negligible	Negligible	Negligible

3.3 Dispersion Modelling

3.3.1 Chippenham WRC may result in odour emissions during normal operation. These were assessed in accordance with the following stages:

- Identification of source parameters;
- Identification of odour emission rates;
- Dispersion modelling of odour emissions; and,
- Comparison of the modelling results with the relevant criteria.

3.3.2 The following Sections outline the methodology and inputs used for the assessment.

Dispersion Model

3.3.3 Dispersion modelling was undertaken using ADMS-6.0 (v6.0.2.0), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

3.3.4 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

3.3.5 The model requires input data that details the following parameters:

- Assessment area;
- Process conditions;
- Pollutant emission rates;
- Terrain information;
- Building dimensions;
- Meteorological data;
- Roughness length (z_0); and,

- Monin-Obukhov length.

3.3.6 These are detailed in the following Sections.

Odour Sources

3.3.7 Potential odour sources were identified during a Site Visit to Chippenham WRC by Redmore Environmental on 7th September 2023 which was completed under the supervision of Wessex Water Regional Scientific Officer James Humphries.

3.3.8 The majority of odour sources at the WRC are open area sources which are summarised in Table 11. Reference should be made to Figure 7 for a map of the source locations.

Table 11 Area Sources

Source		Shape	Release Height (m)	Diameter	Total Exposed Area (m ²)
S1	Unthickened Sludge Tank (SST01)	Circular	0.0	8.5	56.8
S2	Thickened Sludge Tank (SST02)	Circular	2.0	6.0	28.3
S3	Unthickened Sludge Tank (SST03)	Circular	2.0	6.0	28.3
S4	Unthickened Sludge Tank (Overspill) (SST04)	Circular	2.0	24.0	452.4
S5	Primary Settlement Tank (PST01)	Circular	2.0	25.0	490.9
S6	Primary Settlement Tank (PST02)	Circular	2.0	25.0	490.9
S7	Final Settlement Tank (FST01)	Circular	1.0	28.0	615.8
S8	Final Settlement Tank (FST02)	Circular	1.0	28.0	615.8
S9	Final Settlement Tank (FST03)	Circular	1.0	28.0	615.8
S10	Final Settlement Tank (FST04)	Circular	1.0	28.0	615.8
S11	Works Inlet	Rectangular	2.0	-	112.0
S12	Inlet Distribution Channel	Rectangular	1.0	-	45.0
S13	Aeration Lanes	Rectangular	2.0	-	956.0

Source		Shape	Release Height (m)	Diameter	Total Exposed Area (m ²)
S14	Anoxic Tank	Polygon	2.0	-	155.9
S15	Sludge Recirculation Chamber	Rectangular	0.0	-	4.0
S16	Sludge Recirculation Chamber	Rectangular	0.0	-	4.0
S17	Sludge Recirculation Chamber	Rectangular	0.0	-	4.0
S18	Sludge Recirculation Chamber	Rectangular	0.0	-	4.0
S19	Sludge Recirculation Chamber	Rectangular	0.0	-	4.0

3.3.9 One volume source was included within the assessment to represent potential fugitive odour emissions from a door serving the Gravity Belt Thickener (GBT) Building. This is summarised in Table 12.

Table 12 Volume Sources

Source		Length	Width	Height	Total Volume (m ³)
S22	GBT Building	10.5	3.0	6.0	189.0

Odour Emission Rates

3.3.10 Odour emission rates for each source were provided by WW based on monitoring undertaken at the site on 21st April 2015 and 3rd August 2021. These are summarised in Table 13 for the area sources.

Table 13 Odour Emission Rates - Area Sources

Odour Source	21 st April 2015 Odour Emission Rates (ou _E /m ² /s)	3 rd August 2021 Odour Emission Rates (ou _E /m ² /s)
Inlet Works	9.5	118.2
Primary Settlement Tanks	3.7	14.8

Odour Source	21 st April 2015 Odour Emission Rates (ou _E /m ² /s)	3 rd August 2021 Odour Emission Rates (ou _E /m ² /s)
Anoxic Tank	1.6	6.8
Aeration Lane	0.4	0.6
Final Settlement Tank	0.4	0.8
Raw (un-thickened) Sludge Tank	75.4	142.9
Thickened Sludge Tank	56.4	36.5

3.3.11 As shown in Table 13, emission rates were variable between the surveys, with the 2021 data demonstrating higher releases for the majority of sources than the 2015 survey. WW have confirmed that the WRC was operating normally on both occasions and these variations have been observed at other facilities and are caused by a number of factors. In order to provide a worst-case and robust assessment, the higher emission rates from the 2021 survey have been utilised within the assessment.

3.3.12 Table 14 summarises the odour concentrations measured for the GBT Building for both monitoring surveys.

Table 14 Odour Emission - Volume Sources

Odour Source	21 st April 2015 Odour Concentration (ou _E /m ³)	3 rd August 2021 Odour Concentration (ou _E /m ³)
GBT Building	127,959	690,045

3.3.13 WW provided the results of third-party odour sampling undertaken on 3rd August 2021. During the monitoring, the GBT extraction system was observed to be ineffective with no recordable flow rate at the external release points. The limited ventilation is likely to have contributed to the higher measured odour concentrations within the building. As such, for the purpose of this assessment, the odour concentration measured during the 2015 survey was utilised to calculate emissions which is considered to be more representative of typical internal conditions.

3.3.14 A summary of the odour emissions rates utilised within the assessment for each defined source is provided in Table 15.

Table 15 Area Source Odour Emissions Rates Utilised in Model

Source		Odour Emission Rate (ou _E /m ² /s)
S1	Unthickened Sludge Tank (SST01)	142.9
S2	Thickened Sludge Tank (SST02)	36.5
S3	Unthickened Sludge Tank (SST03)	142.9
S4	Unthickened Sludge Tank (Overspill) (SST04)	142.9
S5	Primary Settlement Tank (PST01)	14.8
S6	Primary Settlement Tank (PST02)	14.8
S7	Final Settlement Tank (FST01)	0.8
S8	Final Settlement Tank (FST02)	0.8
S9	Final Settlement Tank (FST03)	0.8
S10	Final Settlement Tank (FST04)	0.8
S11	Works Inlet	118.2
S12	Inlet Distribution Channel	118.2
S13	Aeration Lanes	0.6
S14	Anoxic Tank	6.8
S15	Sludge Recirculation Chamber	14.8 ^(a)
S16	Sludge Recirculation Chamber	14.8 ^(a)
S17	Sludge Recirculation Chamber	14.8 ^(a)
S18	Sludge Recirculation Chamber	14.8 ^(a)
S19	Sludge Recirculation Chamber	14.8 ^(a)

Note: (a) In the absence of site-specific monitoring data, the measured emission rate for the primary settlement tanks was utilised to represent releases from the source, as advised by WW.

3.3.15 Due to the limited ventilation observed during odour sampling on 3rd August 2021, it was assumed that all odour emissions from the GBT Building occur as fugitive releases. As such, a single volume source was included within the model. The emission rate was calculated based on the internal odour concentration measured during the monitoring campaign undertaken in 2015 and the assumption that fugitive exchange to the external environment is equivalent to one complete building air change per hour. A summary of the input parameters is provided in Table 16.

Table 16 Volume Source Emission Rate

Source		Building Volume (m ³)	Odour Concentration (ou _E /m ³)	Volumetric Flow Rate at 1 Air Change/hr (m ³ /s)	Odour Emission Rate (ou _E /s)	Source Volume (m ³)	Volume Specific Emission Rate (ou _E /m ³ /s)
S20	GBT Building	1543.5	127,959	0.43	54862.4	189	290.3

Assessment Area

3.3.16 The assessment area was defined based on the development location and anticipated pollutant dispersion patterns. Ambient concentrations were predicted over NGR: 390800, 170500 to 392800, 172500. One Cartesian grid with a resolution of 20m was used within the model to produce data suitable for contour plotting using the Surfer software package.

3.3.17 Discrete receptor locations were selected to represent proposed residential areas, community leisure space and the local centre in order to provide a robust assessment of potential impacts at all land use classes present within the scheme. The sensitivity of each receptor was defined in accordance with IAQM criteria which is provided in Table 17.

Table 17 Odour Receptor Sensitivity

Sensitivity	Description
High	Surrounding land where: • Users can reasonably expect enjoyment of a high level of amenity; and, • People would reasonable 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	Surrounding land where: • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or, • People would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal patterns of use of the land • Examples may include places of work, commercial/retail premises and playing/recreation fields

Sensitivity	Description
Low	Surrounding land where: • The enjoyment of amenity would not reasonably be expected: or, • There is transient exposure, where the people would regularly 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

3.3.18 The modelled receptors and associated sensitivity are summarised in Table 18 and are presented in Figure 8.

Table 18 Sensitive Receptor Locations

Receptor / Type	Sensitivity	NGR (m)	
		X	Y
R1 - Leisure Space	Medium	391507.9	170957.2
R2 - Leisure Space	Medium	391551.3	170943.0
R3 - Leisure Space	Medium	391572.6	170876.5
R4 - Leisure Space	Medium	391592.1	170820.6
R5 - Residential	High	391469.7	170939.4
R6 - Residential	High	391515.8	170883.6
R7 - Residential	High	391538.9	170816.2
R8 - Residential	High	391539.8	170747.9
R9 - Residential	High	391534.5	170684.0
R10 - Leisure Space	Medium	391420.9	170950.1
R11 - Residential	High	391444.0	170876.5
R12 - Residential	High	391443.1	170804.6
R13 - Residential	High	391425.4	170740.8
R14 - Residential	High	391425.4	170677.8
R15 - Leisure Space	Medium	391321.4	170981.1
R16 - Residential	High	391340.1	170903.1
R17 - Residential	High	391356.0	170833.9

Receptor / Type	Sensitivity	NGR (m)	
		X	Y
R18 - Residential	High	391351.6	170745.2
R19 - Residential	High	391352.5	170680.5
R20 - Leisure Space	Medium	391271.8	170990.9
R21 - Residential	High	391266.4	170912.8
R22 - Residential	High	391247.8	170848.1
R23 - Residential	High	391220.3	170757.6
R24 - Residential	High	391202.6	170690.2
R25 - Leisure Space	Medium	391099.7	171006.9
R26 - Residential	High	391101.5	170900.4
R27 - Local Centre	High	391101.5	170778.9
R28 - Residential	High	391095.3	170702.6

Terrain Data

3.3.19 Ordnance Survey OS Terrain 50 data was included in the model for the site and surrounding area in order to take account of the specific flow field produced by variations in ground height throughout the assessment extents. This was pre-processed using the method suggested by CERC.

Meteorological Data

3.3.20 The TRTWG669 procedure document¹⁵ states the following requirement for meteorological data utilised in dispersion modelling:

"Odour modelling should be completed using the closest weather station to site that has a similar elevation".

¹⁵ TRTWG669 Odour impact and odour risk assessment procedure for existing WRCs/STC/SPSs, proposed new expansion/development of a site and potential encroachment around/near a site, Issue 6, WW, 2023

3.3.21 A review of meteorological stations concluded that there are no suitable meteorological stations in proximity to the site, due to significant elevation differences, or missing data. As such, a Numerical Weather Prediction (NWP) dataset centred upon the Chippenham WRC (NGR: 391803, 171232) was obtained over the period 1st January 2019 to 31st December 2023 (inclusive).

3.3.22 All meteorological files used in the assessment were provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 9 for wind roses of utilised meteorological records.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.3m was used within the model to describe the modelling extents and meteorological site. This is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'agricultural areas (max)'.

Monin-Obukhov Length

3.3.23 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-6 as being suitable for 'small towns, <50,000'.

Assessment Criteria

3.3.24 Predicted ground level odour concentrations were compared with the odour benchmark level of 3.0ouE/m³ as a 98th %ile 1-hour mean, based on previous planning case law and research undertaken by UKWIR.

Significance of Odour Impacts

3.3.25 The significance of impacts was assessed through the interaction of the predicted 98th %ile of 1-hour mean odour concentrations and receptor sensitivity, as outlined in the IAQM guidance¹⁶. The relevant assessment matrix is summarised in Table 19.

Table 19 Modelled Odour Impact

Odour Exposure Level as 98 th %ile of 1-hour Means (ouE/m ³)	Receptor Sensitivity		
	Low	Medium	High
Greater than 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
Less than 0.5	Negligible	Negligible	Negligible

3.3.26 The IAQM guidance¹⁷ states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the effect is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**. This has been considered to determine the overall significance of potential odour effects associated with the WRC.

Modelling Uncertainty

3.3.27 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;

¹⁶ Guidance on the Assessment of Odour for Planning V1.1, IAQM, 2018.

¹⁷ Guidance on the Assessment of Odour for Planning V1.1, IAQM, 2018.

- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

3.3.28 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model developed by CERC Ltd and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual site-specific meteorological data sets to take account of a range of conditions. The assessment was based on the worst-case year to ensure maximum concentrations were considered;
- Surface characteristics - The z_0 and Monin-Obukhov length were determined for use in the modelling based on the surrounding land uses and guidance provided by CERC;
- Emission rates - Emission rates were provided by WW based on recent monitoring work undertaken at the facility;
- Receptor locations - A Cartesian Grid was included in the model in order to predict odour concentrations over the site and provide suitable data for contour plotting; and,
- Variability - All model inputs are as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

3.3.29 Results were considered in the context of the relevant odour benchmark level and IAQM criteria. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

4.0 **ASSESSMENT**

4.1 **Field Odour Survey**

Field Odour Survey 1

- 4.1.1 Field Odour Survey 1 was undertaken on 7th September 2023 between 08:14 and 11:25. The meteorological conditions recorded during each survey are presented in Table 20.

Table 20 Field Odour Survey 1 Meteorological Conditions

Survey	Temperature (°C)	Average Wind Direction (°)	Average Wind Speed (m/s)	Cloud Cover
1	20	22	1.8	6
2	20	45	1.8	6
3	21	64	1.0	6
4	21	45	1.2	4
5	21	41	1.6	6
6	22	23	1.2	5
7	22	23	1.4	4
8	23	13	0.8	6
9	23	38	1.1	5
10	25	42	0.4	3
11	24	53	1.1	4
12	26	17	1.6	4
13	24	35	1.0	3
14	26	23	1.2	4
15	26	91	1.7	3
16	27	15	0.8	3
17	31	23	0.4	2
18	31	-(a)	-(a)	2

Note: (a) No wind data recorded

4.1.2 The survey results and odour exposure at each monitoring location are summarised in Table 21.

Table 21 Field Odour Survey 1 Results

Position	$f_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	0	N/A	No Odour	-
2	0	0	1	N/A	No Odour	-
3	0	0	1	N/A	No Odour	-
4	0	1	3	Unpleasant	Sludge / Wastewater	-
5	0	0	2	N/A	Grass	-
6	0	1	2	N/A	Wastewater	-
7	3	1	4	Unpleasant	Sludge	-
8	0	1	3	Unpleasant	Sludge	-
9	0	0	1	N/A	No Odour	-
10	0	1	3	Unpleasant	Sludge	-
11	0	0	2	N/A	No Odour	-
12	0	1	3	Unpleasant	Sludge / Sewage	-
13	0	1	2	N/A	Wastewater	-
14	0	1	2	N/A	Wastewater	-
15	0	0	1	N/A	No Odour	-
16	0	1	3	Unpleasant	Sewage	-
17	0	0	3	Unpleasant	Sludge	-
18	0	0	0	N/A	No Odour	-

4.1.3 Reference should be made to Figure 10 for a graphical representation of the findings. Raw data results for the survey are provided in Appendix 2.

Field Odour Survey 2

4.1.4 Field Odour Survey 2 was undertaken on 20th May 2024 between 09:55 and 13:35. The meteorological conditions recorded during each survey are presented in Table 22.

Table 22 Field Odour Survey 2 Meteorological Conditions

Survey	Temperature (°C)	Average Wind Direction (°)	Average Wind Speed (m/s)	Cloud Cover
1	13.7	77	2.0	0
2	13.7	60	2.4	0
3	13.7	35	2.4	0
4	14.4	115	2.3	0
5	14.9	70	2.2	0
6	15.2	124	2.4	0
7	15.8	141	1.6	0
8	16.1	57	2.6	0
9	16.1	87	2.2	0
10	16.6	58	2.1	0
11	17.0	174	2.2	0
12	17.4	75	2.5	0
13	17.3	155	2.8	0
14	17.7	46	2.6	0
15	17.7	71	2.5	0
16	18.0	75	1.7	0
17	18.8	73	1.8	0
18	18.7	91	2.1	0
19	20.1	104	1.3	0
20	20.7	71	0.9	0

4.1.5 The survey results and odour exposure at each monitoring location are summarised in Table 23.

Table 23 Field Odour Survey 2 Results

Position	$f_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	1	N/A	No odour	-
2	0	0	3	Unpleasant	Sludge / Sewage	Distinct sludge odour noted pre-test
3	0	0	2	N/A	No odour	Strong sludge odour noted pre-test
4	3	1	4	Unpleasant	Sludge / Sewage	Strong sludge odour noted pre-test
5	0	0	2	N/A	No odour	Distinct sludge odour noted pre-test
6	0	1	3	Unpleasant	Sludge / Sewage	Strong sludge odour pre-test
7	0	1	3	Unpleasant	Sludge / Sewage	Distinct sludge odour pre-test
8	0	0	1	N/A	No odour	-
9	0	0	2	N/A	No odour	Strong sludge odour pre-test
10	0	0	3	Unpleasant	Sludge / Sewage	Strong sludge odour pre-test
11	3	0	4	Unpleasant	Sludge / Sewage	-
12	0	1	3	Unpleasant	Sludge / Sewage	-
13	0	0	1	N/A	No odour	Strong sludge odour pre-test
14	10	1	4	Unpleasant	Sludge / Sewage	-
15	0	0	2	N/A	No odour	-
16	0	0	3	Unpleasant	Sludge / Sewage	Strong sludge odour pre-test
17	0	1	3	Unpleasant	Sludge / Sewage	Strong odour smell pre-test
18	0	1	3	Unpleasant	Sludge / Sewage	-

Position	f _{1≥4} (%)	I _{mean}	I _{max}	Unpleasantness	Odour Description	Notes
19	3	1	4	Unpleasant	Sludge / Sewage	-
20	0	0	1	N/A	No odour	-

- 4.1.6 Reference should be made to Figure 11 for a graphical representation of the findings. Raw data results for the survey are provided in Appendix 2.

Field Odour Survey 3

- 4.1.7 Field Odour Survey 3 was undertaken on 19th June 2024 between 09:42 and 12:35. The meteorological conditions recorded during each survey are presented in Table 24.

Table 24 Field Odour Survey 2 Meteorological Conditions

Survey	Temperature (°C)	Average Wind Direction (°)	Average Wind Speed (m/s)	Cloud Cover
1	15.5	-(a)	1.9	5
2	17.0	-(a)	1.5	5
3	16.2	63	1.8	5
4	16.4	60	2.0	5
5	15.6	33	2.5	5
6	16.1	57	2.4	5
7	16.0	61	2.4	5
8	17.6	58	2.4	5
9	16.8	77	2.6	5
10	16.3	58	2.4	5
11	17.4	76	2.0	5
12	17.4	-(a)	2.4	5
13	18.1	59	2.5	5
14	17.3	49	2.3	5
15	17.4	49	2.3	5

Survey	Temperature (°C)	Average Wind Direction (°)	Average Wind Speed (m/s)	Cloud Cover
16	19.3	45	2.6	5

Note: (a) No discernible wind direction

4.1.8 The survey results and odour exposure at each monitoring location are summarised in Table 25.

Table 25 Field Odour Survey 3 Results

Position	$f_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	2	N/A	No odour	-
2	0	0	0	N/A	No odour	Faint sewage odour post-test
3	0	0	1	N/A	No odour	-
4	0	0	0	N/A	No odour	-
5	0	0	1	N/A	No odour	-
6	0	0	3	Unpleasant	GBT /Sludge / Sewage	Strong sludge odour pre-test
7	0	0	3	Unpleasant	Sludge / Sewage	Strong sludge odour pre-test
8	0	0	1	N/A	No odour	-
9	0	0	0	N/A	No odour	-
10	0	1	3	Unpleasant	GBT / Sludge / Sewage	Very strong sludge odour pre-test
11	3	1	4	Unpleasant	Sludge / Sewage	-
12	0	0	1	N/A	No odour	-
13	0	1	3	Unpleasant	GBT / Sludge / Sewage	Faint sludge odour pre-test
14	7	2	4	Unpleasant	Sludge / Sewage	-
15	0	1	3	Unpleasant	GBT	-
16	3	1	4	Unpleasant	Sludge / Sewage	-

- 4.1.9 Reference should be made to Figure 12 for a graphical representation of the findings. Raw data results for the survey are provided in Appendix 2.

Field Odour Survey 4

- 4.1.10 Field Odour Survey 4 was undertaken on 18th September 2024 between 09:38 and 11:35. The meteorological conditions recorded during each survey are presented in Table 26.

Table 26 Field Odour Survey 2 Meteorological Conditions

Survey	Temperature (°C)	Average Wind Direction (°)	Average Wind Speed (m/s)	Cloud Cover
1	15.9	46	2.5	7
2	16.3	78	1.8	7
3	16.8	43	3.0	7
4	17.3	102	1.1	7
5	18.8	95	1.4	7
6	17.4	136	1.8	7
7	16.9	33	4.4	7
8	17.0	44	3.8	7
9	17.2	33	3.8	7
10	17.6	52	2.8	7
11	17.6	45	2.5	7

- 4.1.11 The survey results and odour exposure at each monitoring location are summarised in Table 27.

Table 27 Field Odour Survey 4 Results

Position	$f_{t \geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	2	N/A	No odour	-
2	0	0	2	N/A	No odour	-

Position	$f_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
3	0	1	2	N/A	No odour	-
4	0	0	1	N/A	No odour	-
5	0	0	0	N/A	No odour	-
6	0	0	2	N/A	No odour	-
7	0	0	1	N/A	No odour	-
8	0	0	1	N/A	No odour	-
9	0	0	1	N/A	No odour	-
10	0	0	1	N/A	No odour	-
11	0	0	2	N/A	No odour	-

4.1.12 Reference should be made to Figure 13 for a graphical representation of the findings. Raw data results for the survey are provided in Appendix 2.

Odour Exposure and Significance

4.1.13 Following completion of the four Field Odour Surveys, odour exposure at each of the monitoring locations was determined. This is summarised in Table 28.

Table 28 Field Odour Surveys - Odour Exposure Risk

Position	Odour Exposure			
	Field Odour Survey 1	Field Odour Survey 2	Field Odour Survey 3	Field Odour Survey 4
1	Negligible	Negligible	Negligible	Negligible
2	Negligible	Negligible	Negligible	Negligible
3	Negligible	Negligible	Negligible	Negligible
4	Negligible	Small	Negligible	Negligible
5	Negligible	Negligible	Negligible	Negligible
6	Negligible	Negligible	Negligible	Negligible
7	Small	Negligible	Negligible	Negligible

Position	Odour Exposure			
	Field Odour Survey 1	Field Odour Survey 2	Field Odour Survey 3	Field Odour Survey 4
8	Negligible	Negligible	Negligible	Negligible
9	Negligible	Negligible	Negligible	Negligible
10	Negligible	Negligible	Negligible	Negligible
11	Negligible	Small	Small	Negligible
12	Negligible	Negligible	Negligible	-
13	Negligible	Negligible	Negligible	-
14	Negligible	Small	Small	-
15	Negligible	Negligible	Negligible	-
16	Negligible	Negligible	Small	-
17	Negligible	Negligible	-	-
18	Negligible	Negligible	-	-
19	-	Small	-	-
20	-	Negligible	-	-

4.1.14 As shown in Table 28, odour exposure ranged between **negligible** and **small** across the positions during the first three surveys. Odour exposure was **negligible** at all locations during the fourth survey.

4.1.15 The sensitivity of each survey location was determined in accordance with the criteria outlined in Table 9 and based on the land use within the Parameter Plan as shown in Figure 2. The sensitivity of each receptor is shown Table 29.

Table 29 Field Odour Surveys - Survey Position Sensitivity

Position	Survey 1	Survey 2	Survey 3	Survey 4
1	Natural green space - Low	Natural green space - Low	Public open space - Medium	Residential - High
2	Natural green space - Low	Natural green space - Low	Residential - High	Residential - High

Position	Survey 1	Survey 2	Survey 3	Survey 4
3	Natural green space - Low	Natural green space - Low	Residential - High	Residential - High
4	Natural green space - Low	Natural green space - Low	Public open space - Medium	Residential - High
5	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
6	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
7	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
8	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
9	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
10	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
11	Natural green space - Low	Natural green space - Low	Natural green space - Low	Residential - High
12	Natural green space - Low	Natural green space - Low	Natural green space - Low	-
13	Natural green space - Low	Natural green space - Low	Natural green space - Low	-
14	Natural green space - Low	Natural green space - Low	Natural green space - Low	-
15	Natural green space - Low	Natural green space - Low	Natural green space - Low	-
16	Natural green space - Low	Natural green space - Low	Natural green space - Low	-
17	Natural green space - Low	Natural green space - Low	-	-
18	Natural green space - Low	Natural green space - Low	-	-
19	-	Natural green space - Low	-	-
20	-	Natural green space - Low	-	-

4.1.16 The significance of the odour exposure results for the Field Odour Surveys is summarised in Table 30.

Table 30 Odour Significance

Position	Odour Exposure			
	Field Odour Survey 1	Field Odour Survey 2	Field Odour Survey 3	Field Odour Survey 4
1	Negligible	Negligible	Negligible	Negligible
2	Negligible	Negligible	Negligible	Negligible
3	Negligible	Negligible	Negligible	Negligible
4	Negligible	Negligible	Negligible	Negligible
5	Negligible	Negligible	Negligible	Negligible
6	Negligible	Negligible	Negligible	Negligible
7	Negligible	Negligible	Negligible	Negligible
8	Negligible	Negligible	Negligible	Negligible
9	Negligible	Negligible	Negligible	Negligible
10	Negligible	Negligible	Negligible	Negligible
11	Negligible	Negligible	Negligible	Negligible
12	Negligible	Negligible	Negligible	-
13	Negligible	Negligible	Negligible	-
14	Negligible	Negligible	Negligible	-
15	Negligible	Negligible	Negligible	-
16	Negligible	Negligible	Negligible	-
17	Negligible	Negligible	-	-
18	Negligible	Negligible	-	-
19	-	Negligible	-	-
20	-	Negligible	-	-

4.1.17 As shown in Table 30, impacts were **negligible** at all locations across the four surveys.

Discussion

- 4.1.18 Four Field Odour Surveys were completed in the vicinity of the proposed development site. Each survey was completed in the presence of James Humpries, Scientific Officer for WW, who recorded meteorological conditions during the survey. The surveys were undertaken in line with WW's TRTWG669 guidance document.
- 4.1.19 As detailed in Table 20, 22, 24 and 26, low wind speeds and warm to high temperatures were experienced during all surveys. These can contribute to increased vaporisation and odour emissions, as well poor dispersion and dilution of emissions. In addition, the survey locations were downwind of the identified odour sources during each of the monitoring periods.
- 4.1.20 Site visits to the Chippenham WRC were conducted following completion of the first and second Field Odour Surveys. The WRC was operating normally during each visit with each of the four sludge tanks, including the large overspill sludge tank, at full capacity. It was further noted that the GBT Building was operating with the door open during both visits, allowing for the escape of fugitive odour emissions. As such, odour emissions during these tests were considered to be representative of high odour source potential across the site. Following the third and fourth survey, it was confirmed that the WRC had been operating at a similar level.
- 4.1.21 As detailed in Table 21, the odours detected during the first survey were mainly related to Chippenham WRC, with sludge being the most frequent odour detected. Raw sewage, linked to the GBT Building and inlet, and wastewater odours were also detected. However, when a distinct odour was detected, it was typically very short in duration. The survey was undertaken based on a previous masterplan where residential development was located on the parcel of land closest to the WRC. Survey Location 1, as shown in Figure 3 is considered most representative of the residential areas that are subject to this application. No odours relating to the WRC were detected at this location. The impact at all locations was considered to be **negligible**.
- 4.1.22 As detailed in Table 23, both distinct and strong odours were detected during the second survey, with sludge and sewage being the most frequent odours detected. The distinct and strong odours were typically very short in duration, however it is noted that they were also detected between the official survey times. Similarly to Survey 1, the location of the

sniff tests was conducted in the area closest to the WRC. This was in accordance with WW's sniff test procedure to locate the odour plume, which was only detected in this area. As such, whilst strong and distinct odours were detected, this is not an area of relevant exposure for the future development. Impacts during the second odour survey were **negligible** at all locations.

4.1.23 As detailed in Table 25, both distinct and strong were odours detected during the third survey and were mainly related to Chippenham WRC, with sludge and sewage being the most frequent odours detected. Two areas were tested during the third Field Odour Survey. Locations 1 to 4 were representative of the closest area of proposed residential development to the site. The impact at each of these locations was **negligible** with no distinct or strong odours detected throughout each survey. Additional survey locations were then undertaken on the land closest to the WRC following WW procedure. Distinct to strong odours detected, however, this is not considered to be an area of relevant exposure. The results demonstrate that with increased distance from the source, odour concentrations dispersed sufficiently to not be detected in the areas of relevant exposure.

4.1.24 A fourth Field Odour Survey was undertaken with the purpose of focussing on areas representative of future residential exposure as represented in Figure 6. As shown in Table 27, no odours were recorded throughout the survey and the impact on the area of relevant exposure was considered to be **negligible**.

4.1.25 Overall, the four Field Odour Surveys determined that distinct and strong odours are perceptible downwind of the boundary of the WRC. However, based on the evolution of the proposed site masterplan, as shown in Figure 2, and the results of Field Odour Surveys 3 and 4, there is adequate separation between the WRC and the closest areas of residential development to allow for the dispersal of odour emissions and no odours were detected in an area of relevant exposure. As such, the impact is considered to be **negligible** and **not significant**.

4.2 Dispersion Modelling Assessment

Predicted Odour Concentrations

4.2.1 Dispersion modelling of potential odour emissions from Chippenham WRC was undertaken using the input data specified previously. Predicted odour concentrations at the discrete receptor locations are summarised in Table 31. It should be noted that the odour concentrations are presented as a 98th %ile of 1-hour mean values over the relevant assessment year. The maximum concentration across the five years of results is highlighted in **bold**.

Table 31 Predicted Odour Concentrations

Receptor	Predicted 98 th %ile 1-hour Mean Odour Concentration (ou _E /m ³)				
	2019	2020	2021	2022	2023
R1	4.07	4.70	5.05	4.05	3.42
R2	5.11	5.26	6.10	4.30	4.00
R3	5.52	4.62	5.06	3.76	3.62
R4	4.78	3.75	4.33	3.24	3.30
R5	3.33	4.01	4.59	3.51	2.94
R6	4.10	4.08	4.47	3.35	3.08
R7	4.19	3.55	3.90	2.85	2.88
R8	3.35	2.77	3.29	2.46	2.47
R9	3.06	2.37	2.75	2.11	2.09
R10	2.96	3.45	3.96	3.37	2.60
R11	2.89	3.46	3.78	2.74	2.48
R12	2.90	3.16	3.51	2.37	2.32
R13	2.78	2.78	2.87	2.17	2.02
R14	2.32	2.32	2.50	1.76	1.78
R15	2.27	2.61	3.29	3.28	1.91
R16	2.31	2.57	3.07	2.71	1.93

Receptor	Predicted 98 th %ile 1-hour Mean Odour Concentration (ou _E /m ³)				
	2019	2020	2021	2022	2023
R17	2.12	2.69	2.97	2.24	1.94
R18	2.06	2.34	2.53	1.76	1.70
R19	1.95	2.06	2.28	1.58	1.50
R20	2.20	2.32	3.11	2.98	1.68
R21	1.83	2.18	2.63	2.62	1.69
R22	1.85	2.09	2.50	2.15	1.54
R23	1.50	1.93	2.22	1.70	1.43
R24	1.40	1.79	2.00	1.45	1.29
R25	1.69	1.43	2.15	2.30	1.26
R26	1.45	1.62	2.15	1.96	1.16
R27	1.43	1.57	1.94	1.70	1.14
R28	1.33	1.54	1.86	1.38	1.13

4.2.2 As shown in Table 31, predicted odour concentrations were above the relevant benchmark level of 3ou_E/m³ at 12 of the receptor locations across the five years assessed. Receptors modelled in the western half of the proposed development area were typically below the 3ou_E/m³ benchmark. Reference should be made to Figure 14 for a graphical representation of the worst-case year for predicted odour concentrations (2021) throughout the assessment extents.

Impact Significance

4.2.3 The significance of predicted odour impacts at the sensitive receptors is summarised in Table 32.

Table 32 Modelled Odour Impacts

Receptor	Odour Exposure Level as 98 th %ile of 1-hour Means (ou _E /m ³)	Receptor Sensitivity	Significance of Impact
R1	5 - 10	Medium	Moderate

Receptor	Odour Exposure Level as 98 th %ile of 1-hour Means (ouE/m ³)	Receptor Sensitivity	Significance of Impact
R2	5 - 10	Medium	Moderate
R3	5 - 10	Medium	Moderate
R4	3 - 5	Medium	Slight
R5	3 - 5	High	Moderate
R6	3 - 5	High	Moderate
R7	3 - 5	High	Moderate
R8	3 - 5	High	Moderate
R9	3 - 5	High	Moderate
R10	3 - 5	High	Moderate
R11	3 - 5	High	Moderate
R12	3 - 5	High	Moderate
R13	1.5 - 3	High	Slight
R14	1.5 - 3	High	Slight
R15	3 - 5	Medium	Slight
R16	3 - 5	High	Moderate
R17	1.5 - 3	High	Slight
R18	1.5 - 3	High	Slight
R19	1.5 - 3	High	Slight
R20	3 - 5	Medium	Slight
R21	1.5 - 3	High	Slight
R22	1.5 - 3	High	Slight
R23	1.5 - 3	High	Slight
R24	1.5 - 3	High	Slight
R25	1.5 - 3	Medium	Negligible
R26	1.5 - 3	High	Slight
R27	1.5 - 3	High	Slight

Receptor	Odour Exposure Level as 98 th %ile of 1-hour Means (ouE/m ³)	Receptor Sensitivity	Significance of Impact
R28	1.5 - 3	High	Slight

4.2.4 As shown in Table 32, the significance of odour impacts as a result of mitigated emissions from Chippenham WRC ranged between **negligible** and **moderate** at the receptor locations. The IAQM guidance¹⁸ states that only if the impact is **moderate** or **substantial**, the effect is considered **significant**. As such, based on the modelling results in isolation, impacts at the proposed development are considered to be **significant**.

4.3 Overall Significance

4.3.1 The results of the dispersion modelling assessment, as shown in Figure 14, predict exceedances of the 3ouE/m³ benchmark across the eastern parcels of residential development. The assessment was completed in accordance with WW guidance and monitoring data. It is noted that the assessment was undertaken utilising several worst-case parameters as follows:

- Odour emission rates were based on the monitoring undertaken on 3rd August 2021. As shown in Table 13, these were significantly higher for a number of sources than those previously recorded in 2015. The two odour monitoring surveys at the WRC represent the conditions relevant to the specific date and time of survey and highlight the variability of odour emissions from the site; and,
- The dispersion modelling assumed the odour concentrations were consistent 24-hours per day. This included sludge tanks being 100% full and the GBT building with an open door and operational throughout the year. In reality, the operation and capacity of the WRC will vary throughout each day and week.

4.3.2 As such, it is considered that the model is overpredicting odour concentrations from the WRC. This is supported by the four Field Odour Surveys undertaken between September 2023 and September 2024. As demonstrated in Section 4.1 and Appendix 2, strong and distinct odours were detected frequently but for short durations within the parcel of land adjacent to the west of the WRC. As shown in the Parameter Plan in Figure 2, this area is

¹⁸ Guidance on the Assessment of Odour for Planning V1.1, IAQM, 2018.

not considered to be of relevant exposure for the future proposed development as it will remain as natural green space.

- 4.3.3 During the third Field Odour Survey strong and distinct odours were detected in close proximity to the WRC, however at locations of relevant exposure for future residential development, no odours were detected. Similarly, in the fourth Field Odour Survey, no odours were detected at any location, all of which were representative of future residential receptors. This suggests that adequate dispersion of odour emissions from the WRC occurs over the distance to the proposed residential receptors.
- 4.3.4 Site visits of the WRC were conducted following the first and second Field Odour Surveys to understand the level of operation and potential odour source during each survey. During each visit, the GBT Building was in operation with the door open allowing fugitive odour emissions and each of the four sludge tanks were full. As such, the surveys were conducted during a period of high odour potential from the WRC and therefore the results are considered to be representative of worst-case odour emissions.
- 4.3.5 It is further noted that the following the completion of the Field Odour Surveys, Phase 5 of the Rowden Park development has been granted. As shown in Figure 14, a similar level of odour concentrations are predicted across the adjacent development site, however odour was not considered a constraint to granting planning permissions. As stated in Section 1.3, a similar conclusion to the previously undertaken odour dispersion modelling overpredicting impacts in the vicinity of the WRC was reached by WC's EHO.
- 4.3.6 On the balance of the above, it is considered that odour impacts at the proposed residential receptors will be **negligible to slight** across the site depending on location. In line with the IAQM guidance¹⁹, the impact is considered to be **not significant**.

¹⁹ Guidance on the Assessment of Odour for Planning V1.1, IAQM, 2018.

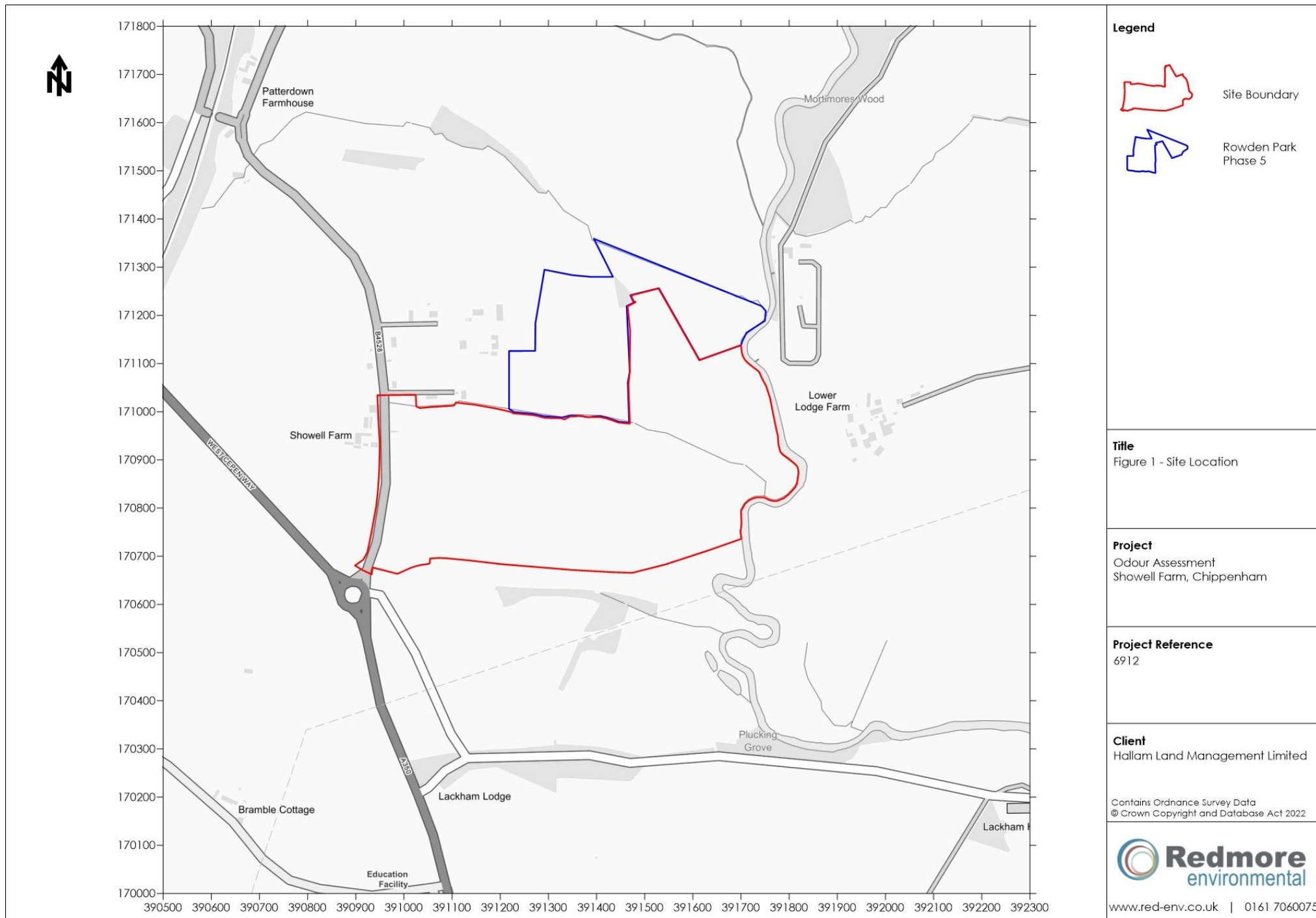
5.0 CONCLUSION

- 5.1.1 Redmore Environmental Ltd was commissioned by Hallam Land to provide an Odour Assessment in support of a planning application for a residential-led mixed use development on land East of Showell Farm, Chippenham.
- 5.1.2 The development is located in the vicinity of the Chippenham WRC. Odour emissions from the facility have the potential to cause a reduction in amenity for future residents of the scheme. As such, an Odour Assessment was undertaken in order to consider baseline conditions at the site, evaluate potential odour effects and identify any mitigation required to control impacts to an acceptable level.
- 5.1.3 Four Field Odour Surveys were undertaken in accordance with Wessex Water's 'TRTWG669' methodology in order to evaluate baseline conditions at the site. The results indicated that impacts were **negligible** at all locations during all Surveys. No odours were detected in areas of relevant exposure of future residential development.
- 5.1.4 The results of the modelling indicated that predicted odour concentrations were above the relevant odour benchmark level at a number of receptors selected to represent proposed residential areas of development. The dispersion modelling assessment was undertaken using a conservative inputs.
- 5.1.5 The dispersion modelling assessment was supported by four Field Odour Surveys undertaken in collaboration with WW. The results of the surveys demonstrated strong odours were detected over short periods of time on the parcel of land directly to the west of the WRC, where no residential development will occur. At areas of future residential development and therefore relevant exposure, no distinct or strong odours were detected during any surveys. Based on the survey observations, it is considered that the odour model was likely overpredicting odour impacts across the proposed development site and impacts are considered to be **not significant**.
- 5.1.6 Based on the assessment results, odour is not considered to represent a constraint to planning consent for the development.

6.0 **ABBREVIATIONS**

ADMS	Atmospheric Dispersion Modelling System
BPM	Best Practicable Means
CERC	Cambridge Environmental Research Consultants
CIWEM	Chartered Institute of Water and Environmental Management
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EHO	Environmental Health Officer
$I_{\max}$	Maximum odour intensity
I_{mean}	Average odour intensity
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
OU _E	European Odour Units
STW	Sewage Treatment Works
$t_{\geq 4}$	Percentage Odour Time
UKWIR	United Kingdom Waste Industry Research
WC	Wiltshire Council
WRC	Water Recycling Centre
WW	Wessex Water
z_0	Roughness length
%ile	Percentile

Figures





Legend

- Site Boundary (29.97ha)
- Other Land in the Applicant's Control
- Proposed Land Uses**
- Total Residential Development - 10.45ha
 - Residential Development
Height up to 12.5m (3 storeys) from existing ground level including green infrastructure
 - Residential Development
Height up to 10m (3 storeys) from existing ground level including green infrastructure
 - Local Centre - 0.2ha
Height up to 10m (3 storeys) from existing ground level including green infrastructure
 - Retained Shelter Shield and Enclosure Wall
- Green Infrastructure**
 - Open Space, when included
Height up to 12.5m (3 storeys) from existing ground level including green infrastructure
 - Natural Green Space
 - Existing Vegetation to be Retained
Subject to detailed impact assessment
- Indicative Location of Scale
- ★ Indicative Location of Attenuation Basin
- ★ Indicative Location for Community Gardens/Allotments
- ★ Indicative Location for Formal Area of Play
- ★ Indicative Location for Informal Area of Play
- ★ Indicative Location for Orchard Planting
- Access and Movement**
 - Proposed Vehicular, Cycle and Pedestrian Access
 - Proposed Emergency Vehicle, Pedestrian and Cycle Access
 - Potential Pedestrian/Cycle Access
 - Indicative Locations for Vehicular Access Between Development Parcels
 - Existing Public Right of Way Retained

Title

Figure 2 - Parameter Plan

Project

Odour Assessment
Showell Farm, Chippenham

Project Reference

6912

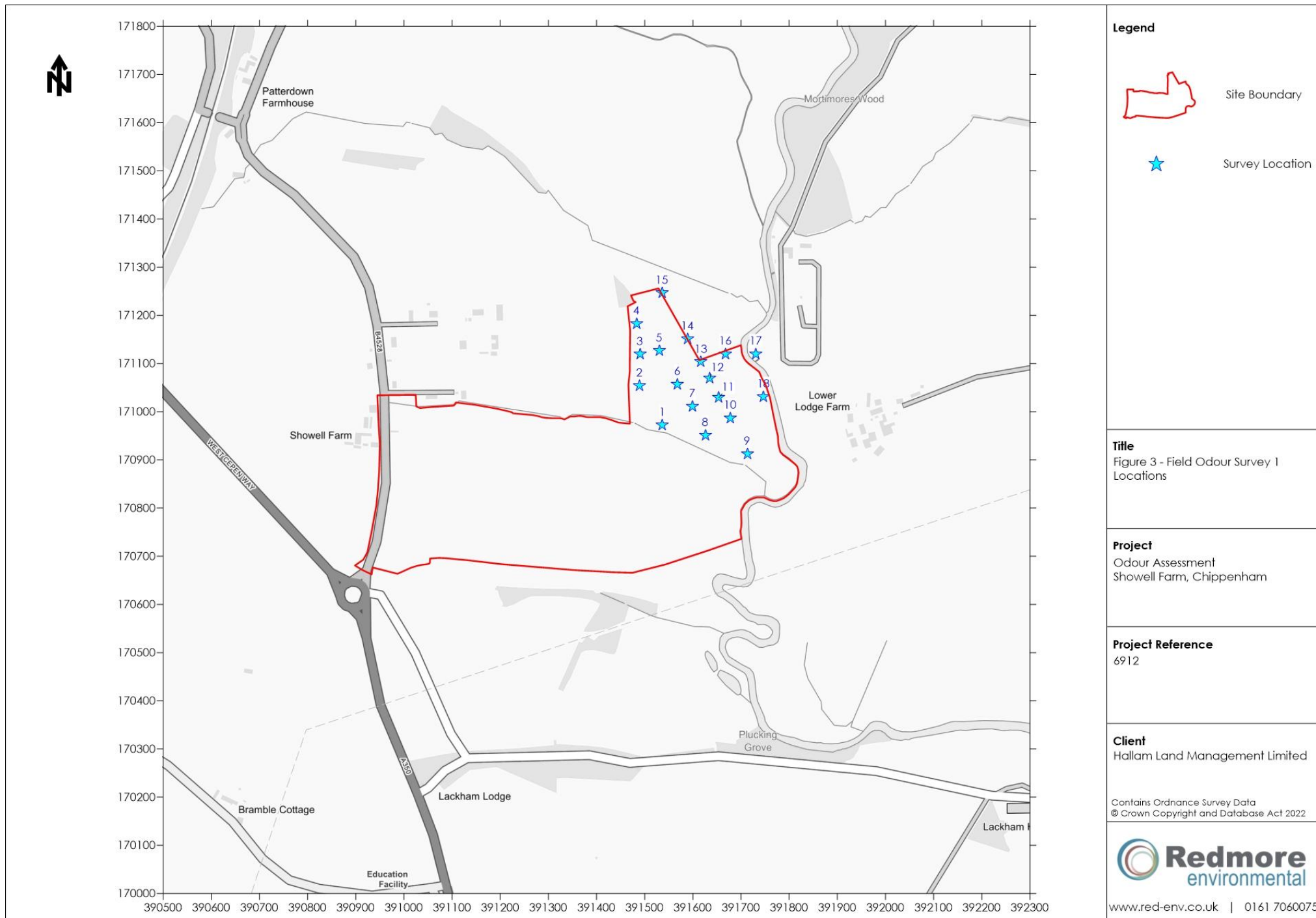
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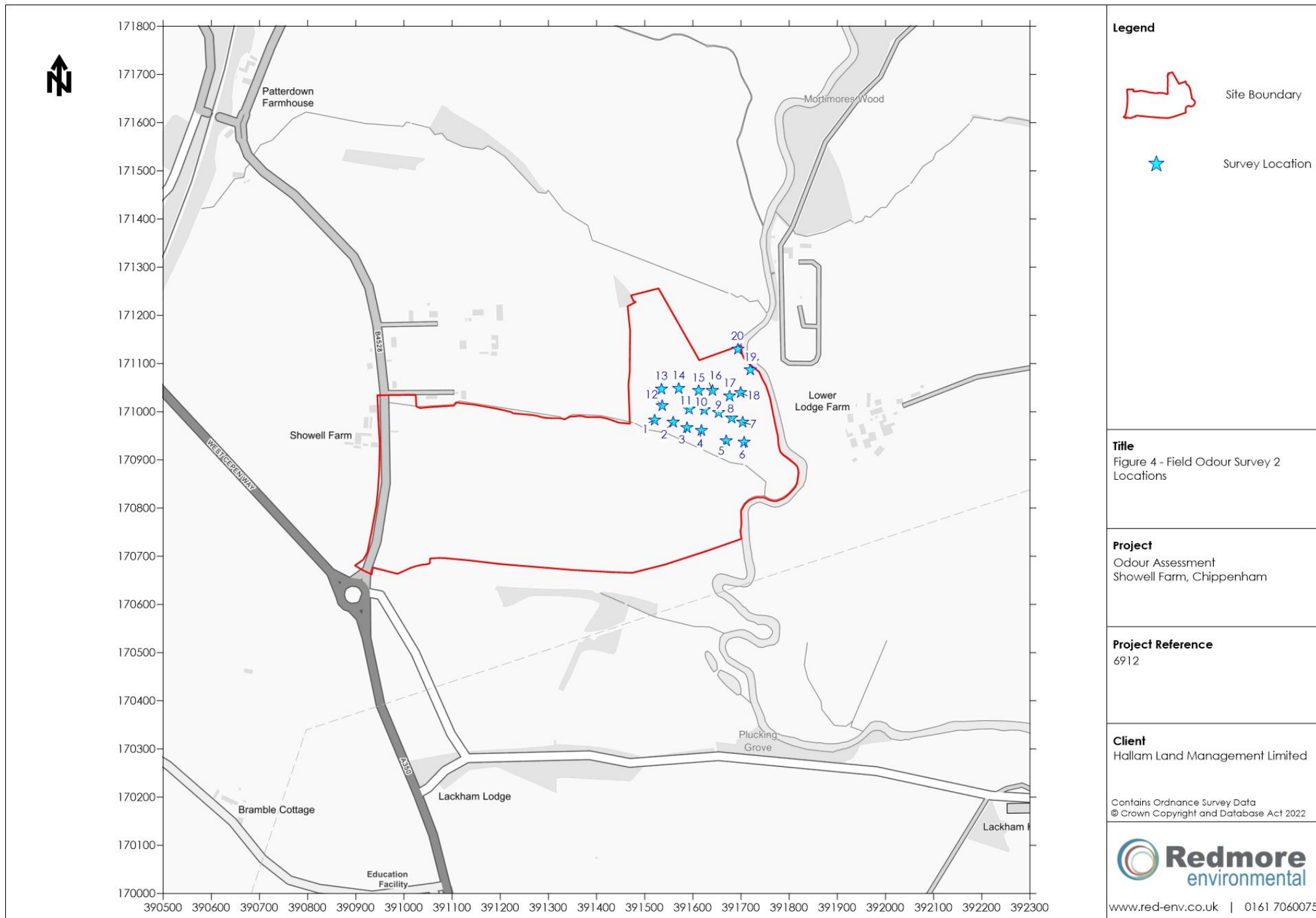
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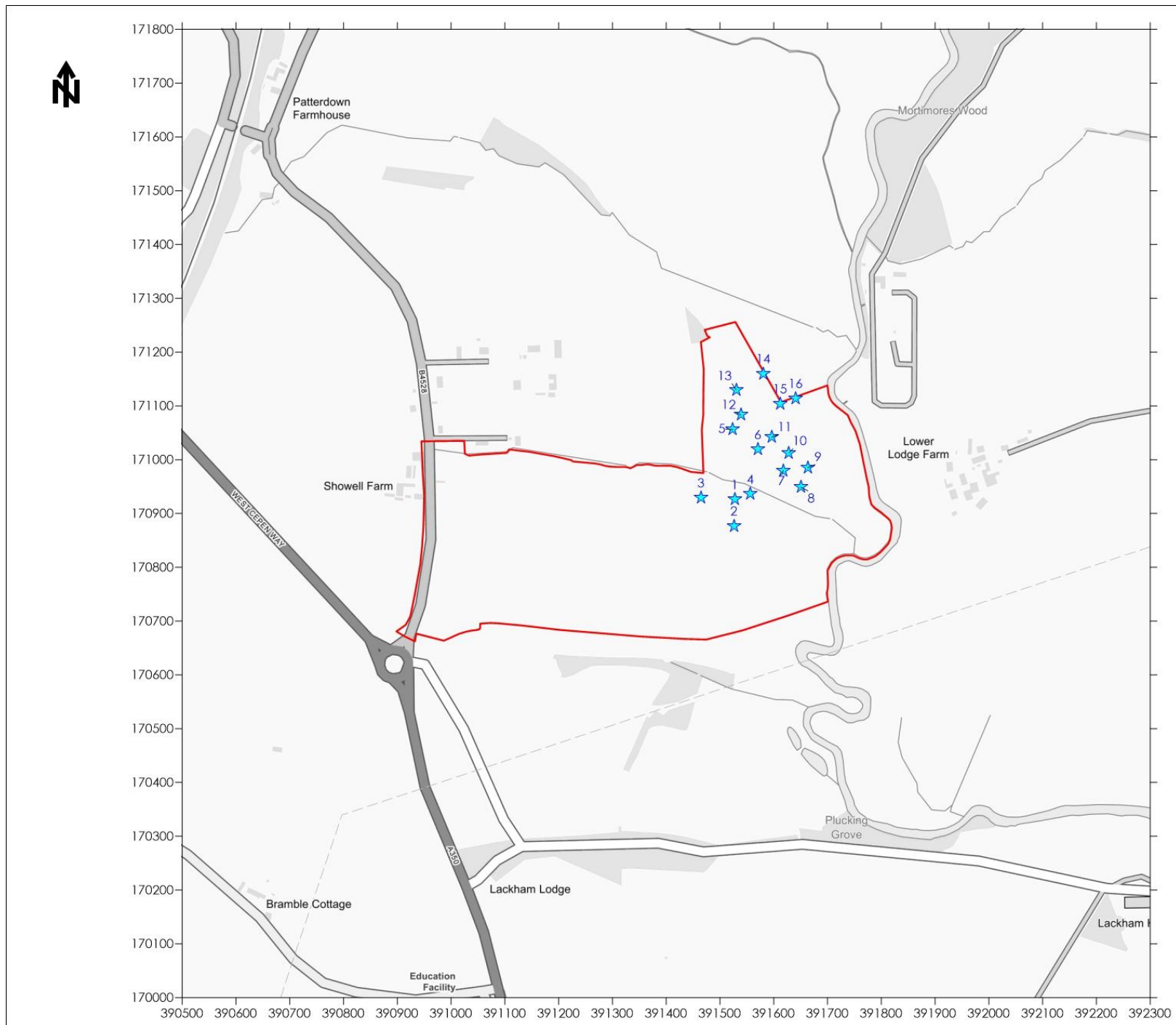
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Legend



Site Boundary



Survey Location

Title

Figure 5 - Field Odour Survey 3
Locations

Project

Odour Assessment
Showell Farm, Chippenham

Project Reference

6912

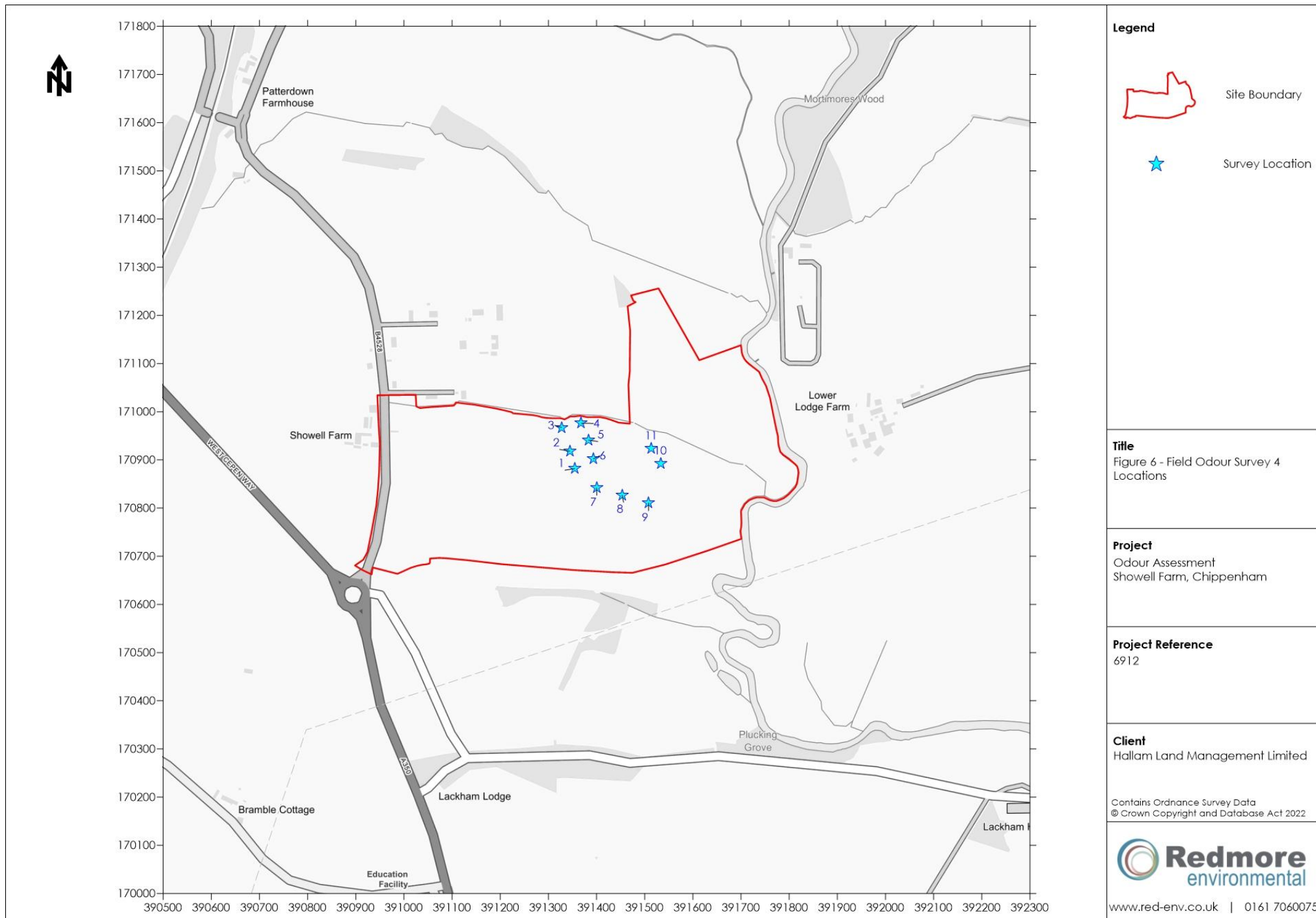
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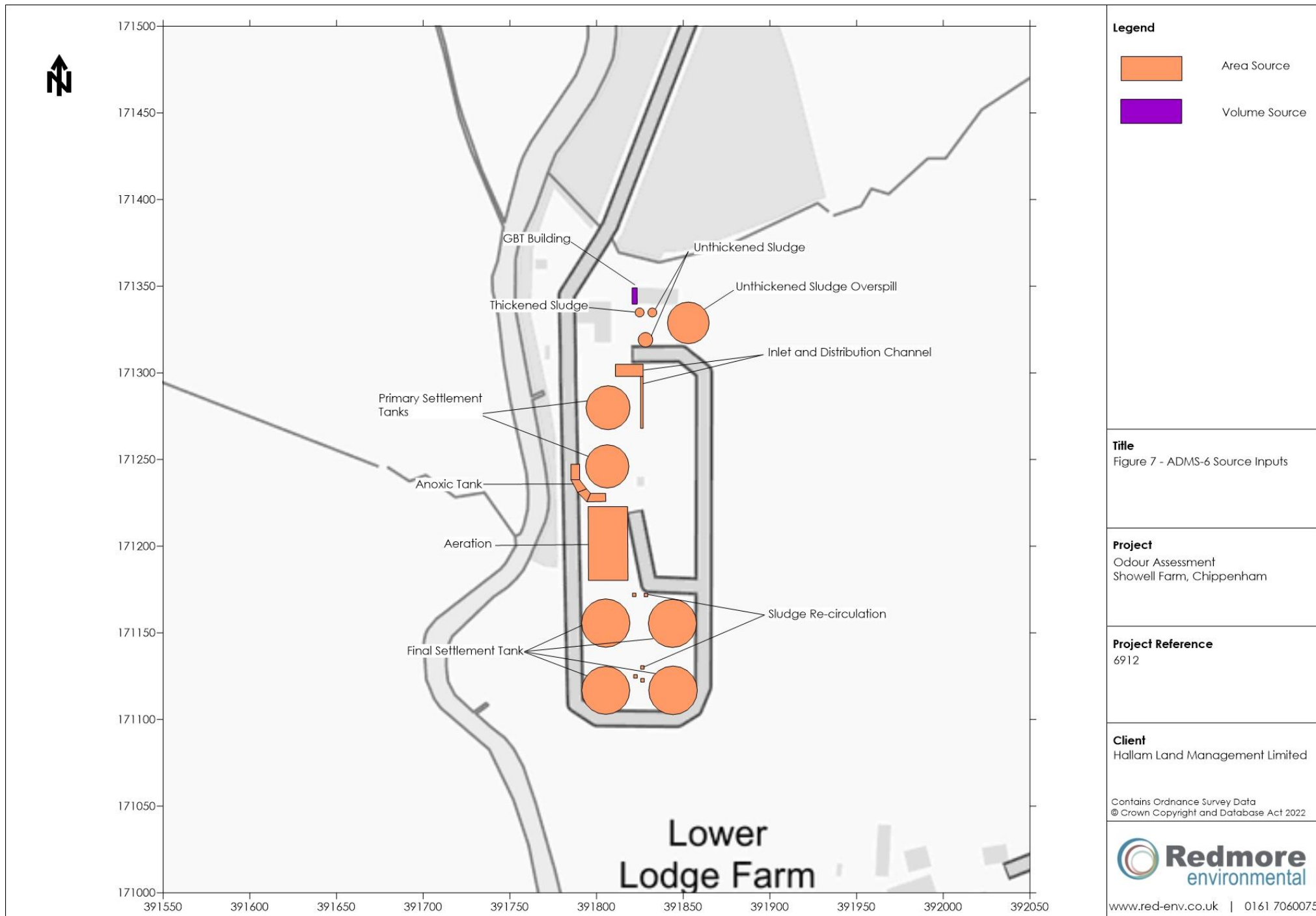
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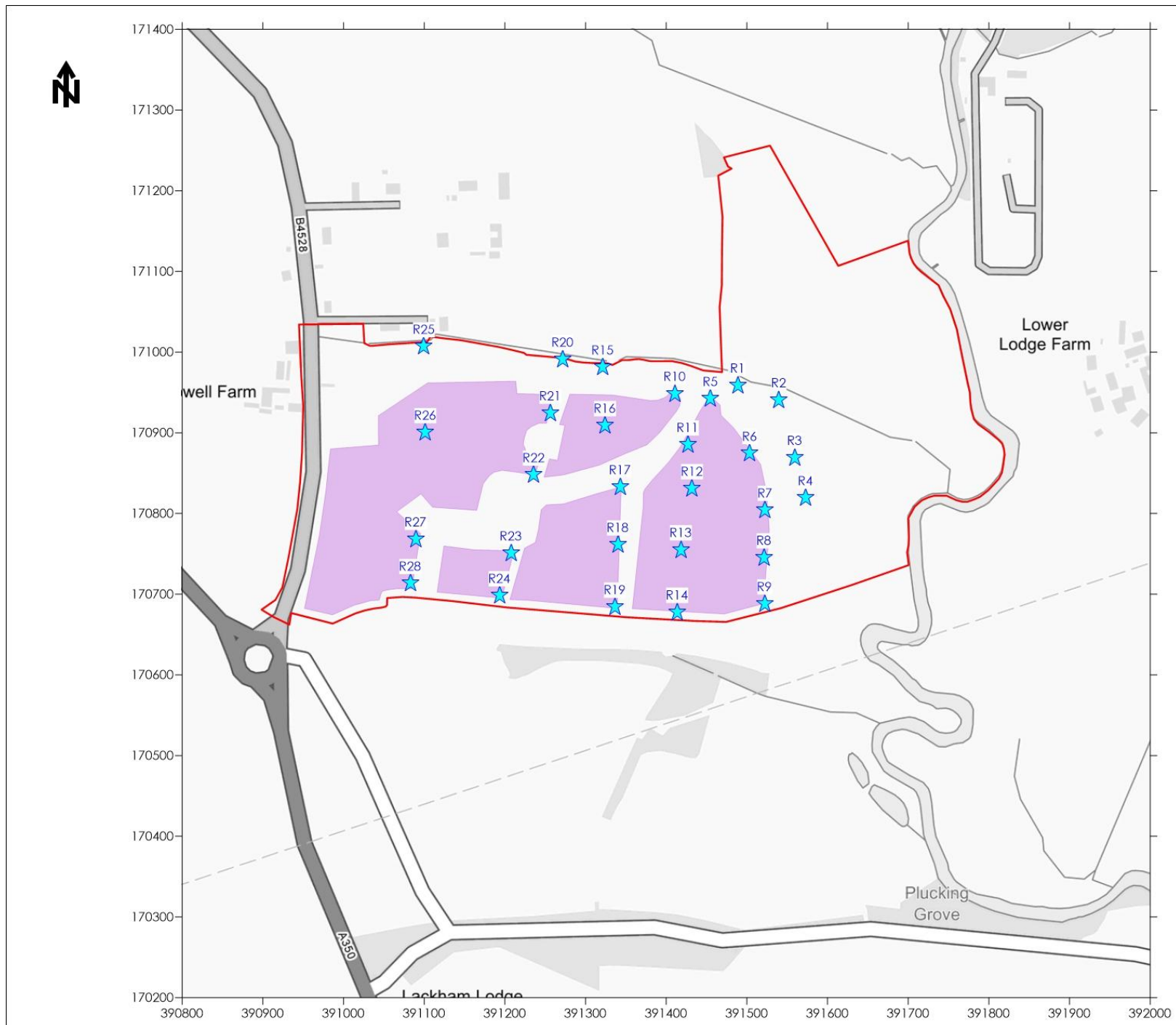
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Legend

-  Site Boundary
-  Receptor
-  Residential Area

Title

Figure 8 - Model Receptor Locations

Project

Odour Assessment
Showell Farm, Chippenham

Project Reference

6912

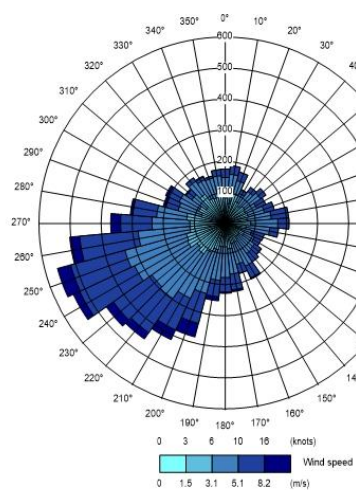
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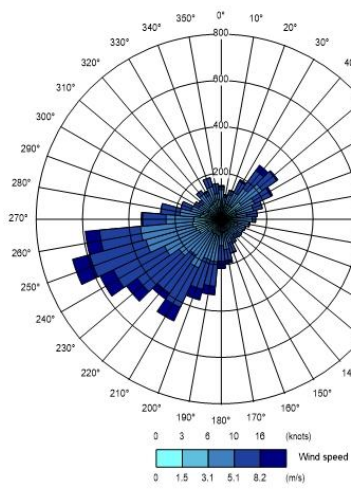
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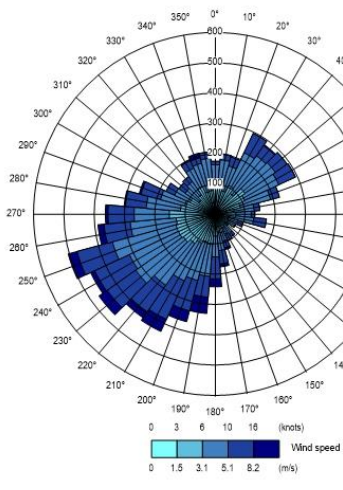
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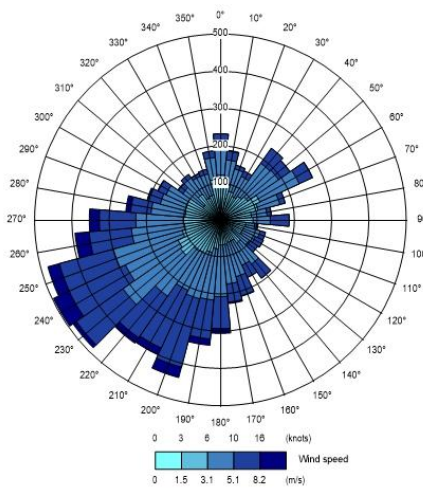
2019 Meteorological Data



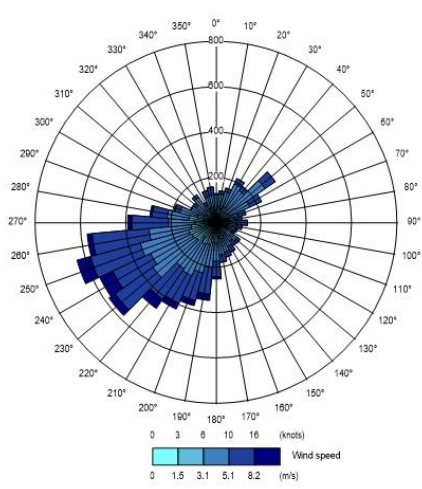
2020 Meteorological Data



2021 Meteorological Data



2022 Meteorological Data



2023 Meteorological Data

Legend

Title

Figure 9 - Wind Roses of 2019 to 2023 NWP Data

Project

Odour Assessment
Showell Farm, Chippenham

Project Reference

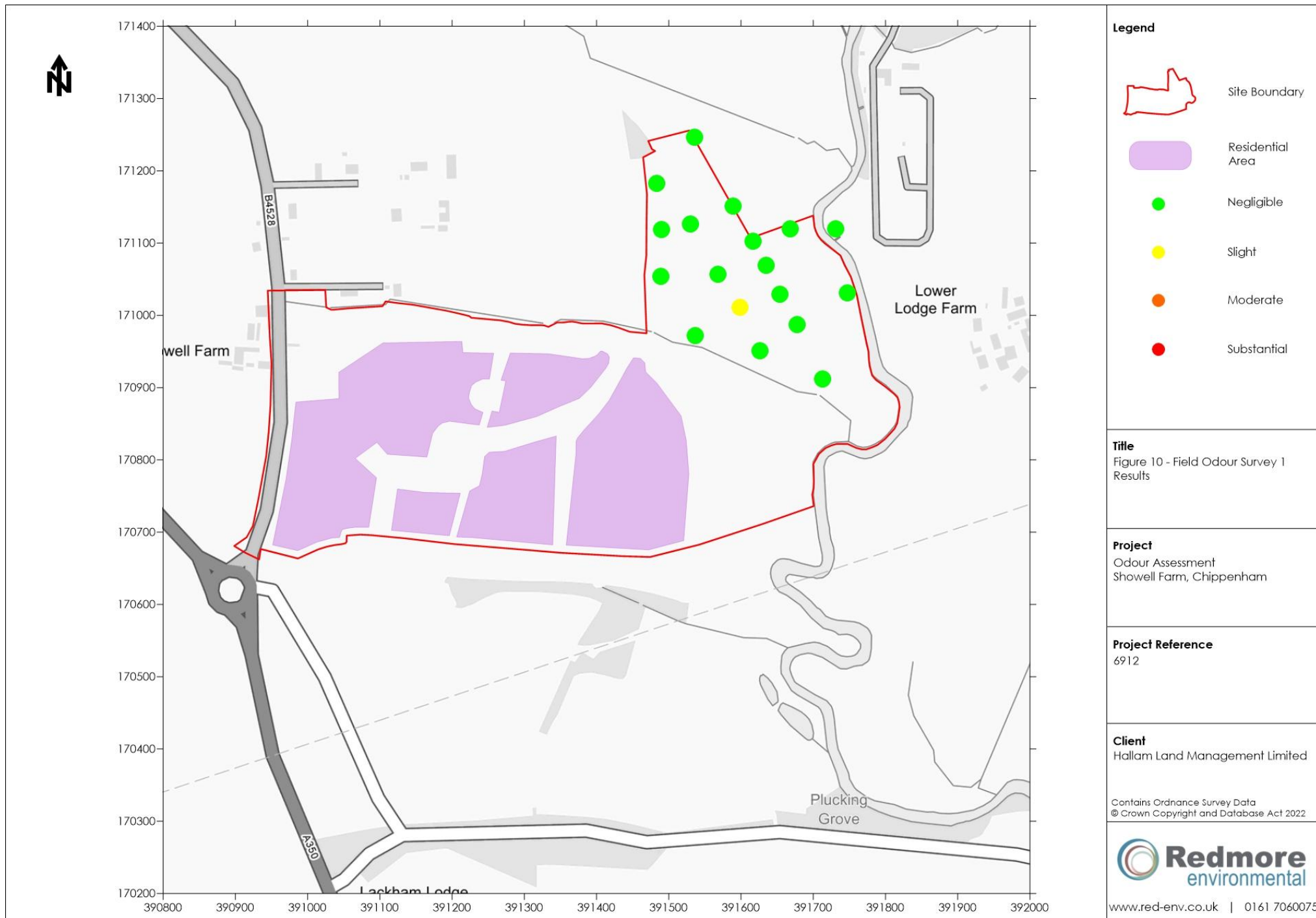
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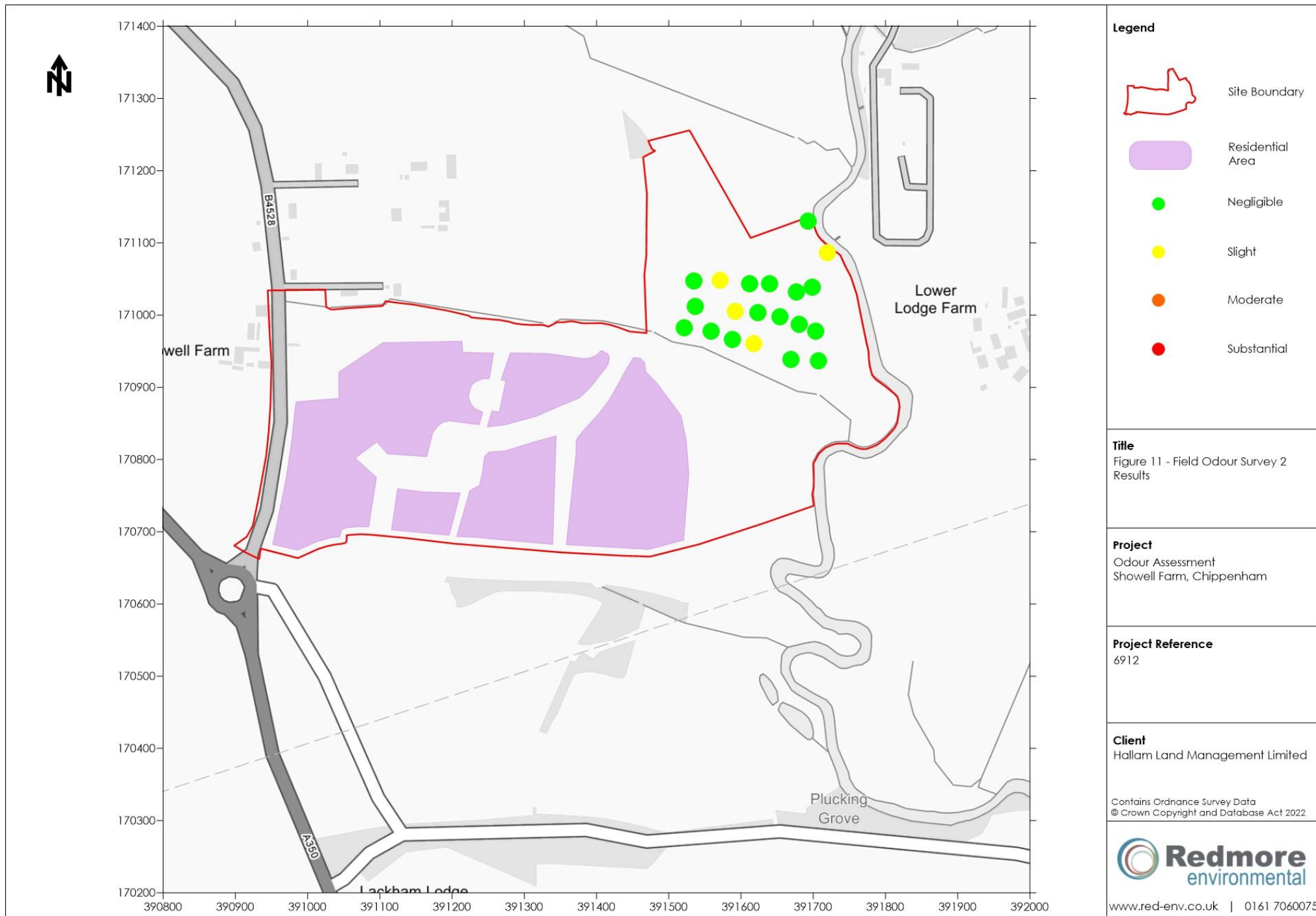
Client

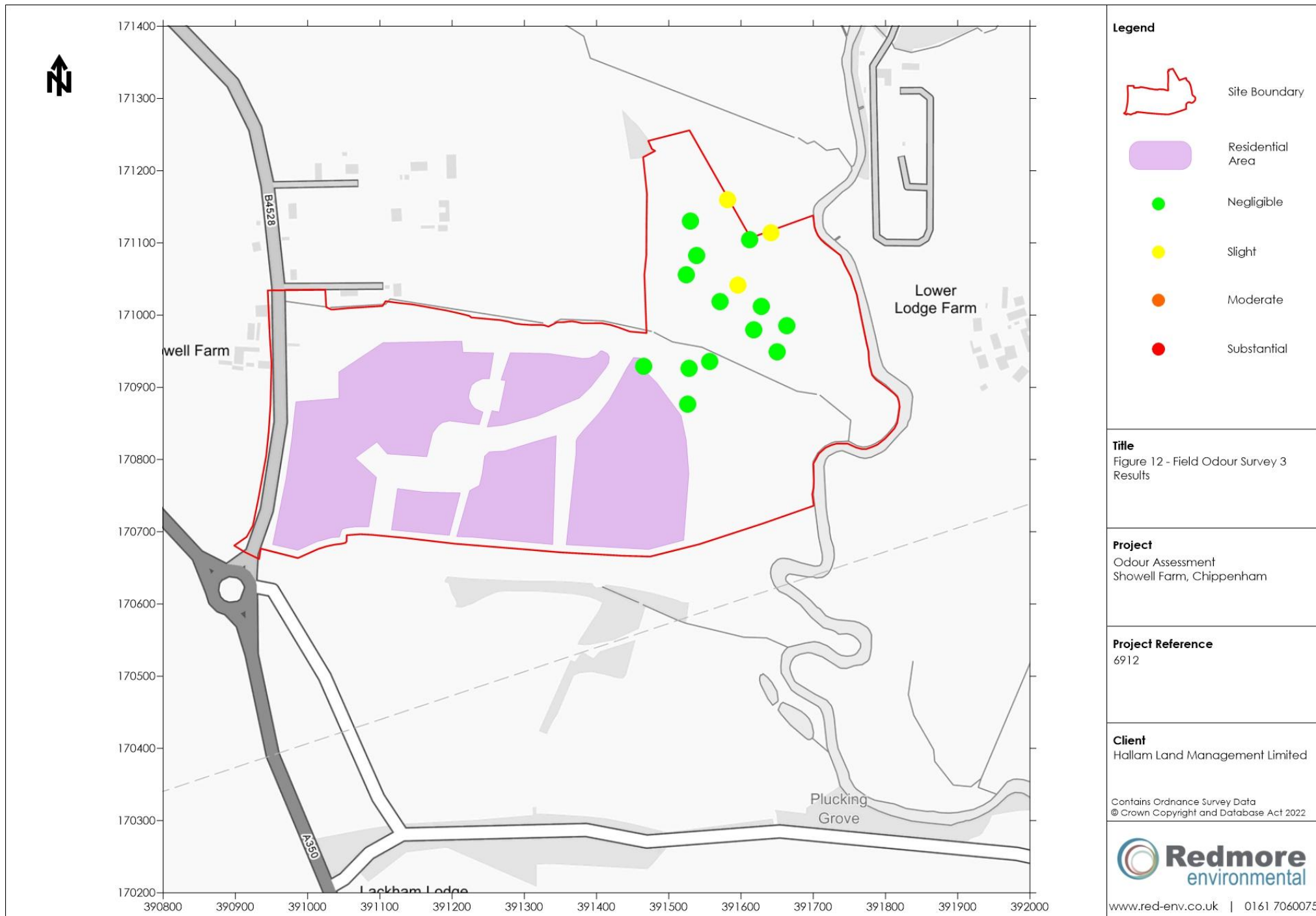
Hallam Land Management Limited



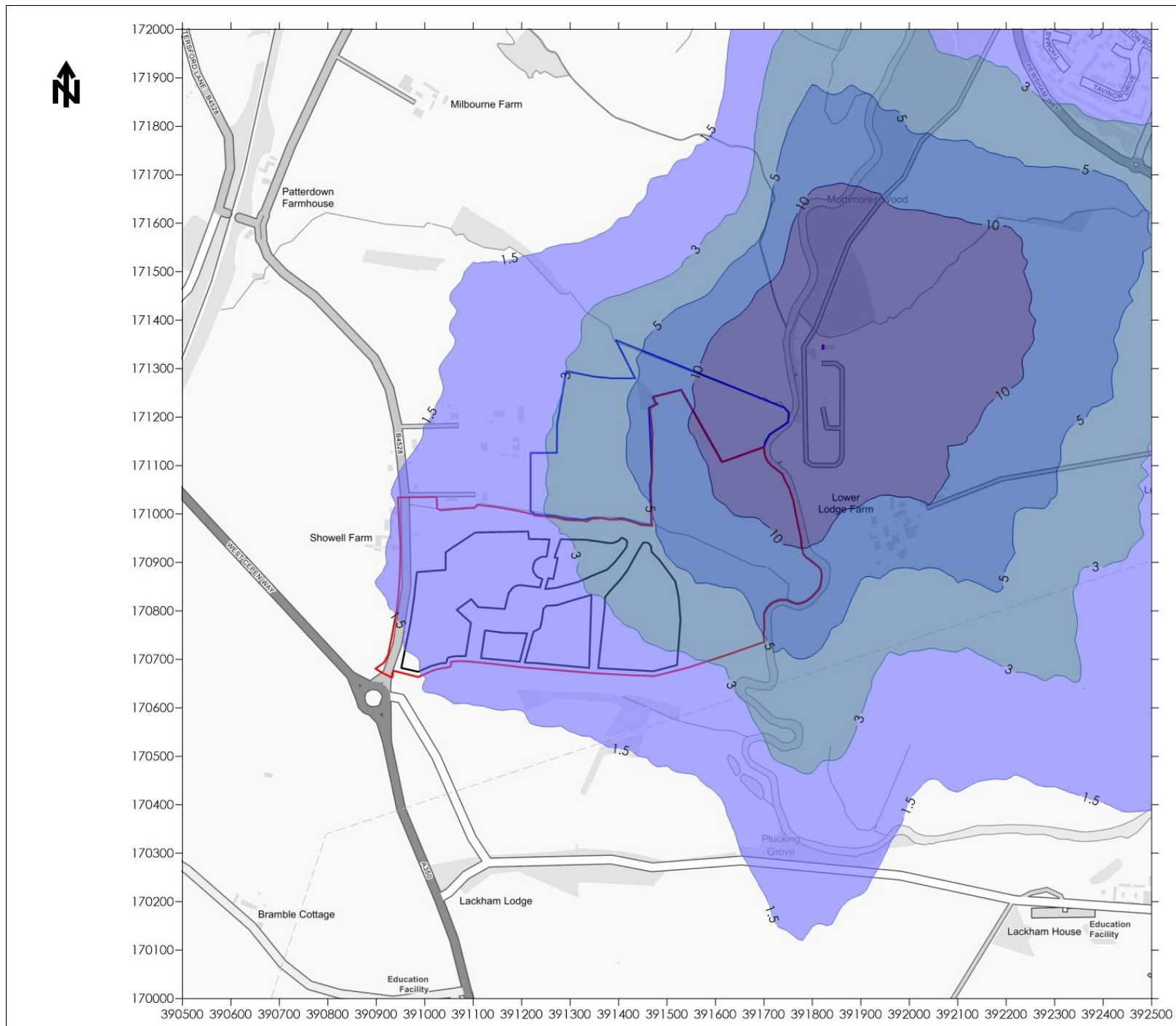
www.red-env.co.uk | 0161 7060075



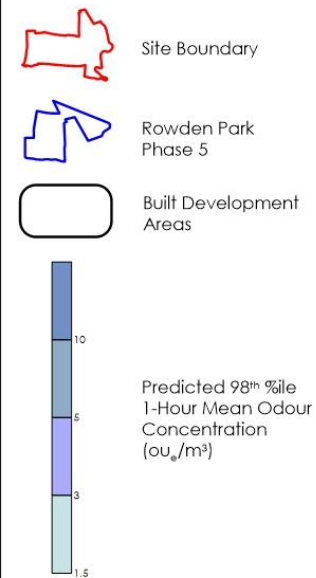








Legend



Title

Figure 14 - Predicted 98th %ile 1-Hour Mean Odour Concentrations (ou_e/m³) 2021 Meteorological Data

Project

Odour Assessment
Showell Farm, Chippenham

Project Reference

6912

Client

Hallam Land Management Limited

Contains Ordnance Survey Data
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Appendix 1 - Odour Acuity Certificate



Olfasense UK Ltd
Unit 6 & 7
Anglo Office Park
Bristol BS15 1NT
United Kingdom
Companies House Cardiff
2900894

+44 (0)1225 868869
uk@olfasense.com
www.olfasense.com

Acuity Test Certificate

Organisation	TRC Companies Ltd
Contact	Alex Crayton
Address	Work.Life, 20 Red Lion Street London WC1R 4PQ
Telephone	07846 174160
Participant Name	Alex Crayton
Date	29/03/2023

Criteria Assessed	Acceptable Range	Participants Results
Average of ITE (10^{ITE})	$20 \leq 10^{\text{ITE}} \leq 80$	31.43
Standard deviation of ITE (10^{SITE})	$10^{\text{SITE}} \leq 2.3$	1.43

Participants Acuity Result	Qualified
----------------------------	-----------

Result clarification:

Acuity testing was carried out in accordance with standard BS EN 13725:2003 'Air quality – Determination of odour concentration by dynamic olfactometry'.

Assessor Alex Crayton qualified as a panel member as their sensitivity to the reference material n-butanol fell within the defined bandwidth according to BSEN 13725 guidelines; also the repeatability of their responses resulted in a standard deviation that was below the limit specified.

Sam Boyle

Laboratory Supervisor





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Acuity Test Certificate

Organisation	Redmore Environmental Ltd
Contact	Ceri Haines
Address	Serendipity Labs, Building 7 Exchange Quay Salford M5 3EP
Telephone	0161 706 0075
Participant Name	Alex Crayton
Date	17/06/2024

Criteria Assessed	Acceptable Range	Participants Results
Average of ITE (10 ^{YITE})	20≤10 ^{YITE} ≤80	59.58
Standard deviation of ITE (10 ^{SITE})	10 ^{SITE} ≤ 2.3	1.61

Participants Acuity Result	Qualified
----------------------------	-----------

Result clarification:

Assessor Alex Crayton **qualified** as a panel member as their sensitivity to the reference material n-butanol fell within the defined bandwidth according to BSEN 13725 guidelines; also the repeatability of their responses resulted in a standard deviation that was below the limit specified.

Acuity testing was carried out in accordance with standard BS EN 13725:2022 ‘Stationary source emissions – Determination of odour concentration by dynamic olfactometry and odour emission rate’. The test was carried out over one day, which is the only variation to the standard.

Josh Evans

Laboratory Supervisor



Appendix 2 - Raw Field Our Survey Results

[illegible]

[illegible]

Table A2.3 Field Odour Survey 3 Results

Location	Survey																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	2	1	0	0	1	2	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
6	1	0	0	0	3	2	0	2	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	3	1	0	1	2	1	0	0	1	1	3	2	2	1	0	0	0	0	0	0	1	2	1	2	1	2	3	3	2	1
11	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	3	1
12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	2	1	0	0	0	0	1	1	1	0	0	0	1	3	3	3	2	2	3	1	0	3	3	2	0	0	3	2	3	2
14	3	2	2	2	1	1	2	0	0	0	2	3	2	2	3	4	4	3	3	3	2	1	0	0	0	0	0	0	0	0
15	0	0	0	2	0	0	1	0	0	1	3	2	0	0	2	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0
16	3	1	1	0	0	2	0	0	0	0	0	0	0	1	1	0	0	0	3	4	3	3	2	2	3	2	1	1	2	1

Table A2.4 Field Odour Survey 4 Results

Location	Survey																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	0	0	0	0	0	0	1	1	0	1	1	0	2	1	1	0	1	0	1	1	0	1	0	0	0	0	1	1	0	0
2	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	1	1	2	1	0	0	0	0	0
3	0	0	0	2	1	0	0	0	0	1	1	0	0	0	1	2	1	0	2	1	0	0	0	0	1	1	0	0	0	1
4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	2	2	1	0	0	0	1	0	0	1	0	0	0
7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
10	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	0	1
11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	2	1	1	0	0	0	1