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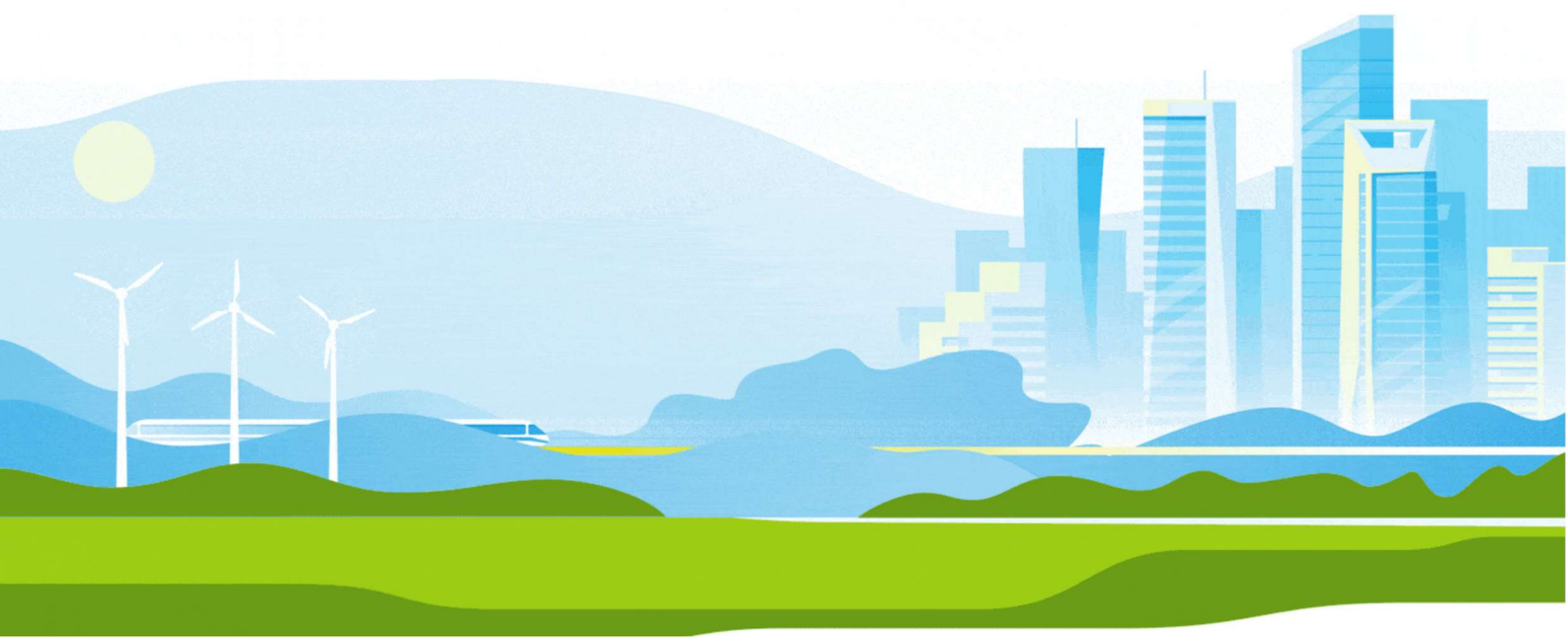
Odour Assessment: Jays Close, Basingstoke

Date: 17 November 2023



Quality Assurance

Client: Quantum Acoustics **Reference:** ODC_P1020A_A1-1 **Date Published:** 17 November 2023

Rev.	Date	Description	Prepared	Reviewed	Authorised
01	15/11/2023	Issued	LM	KK	AC

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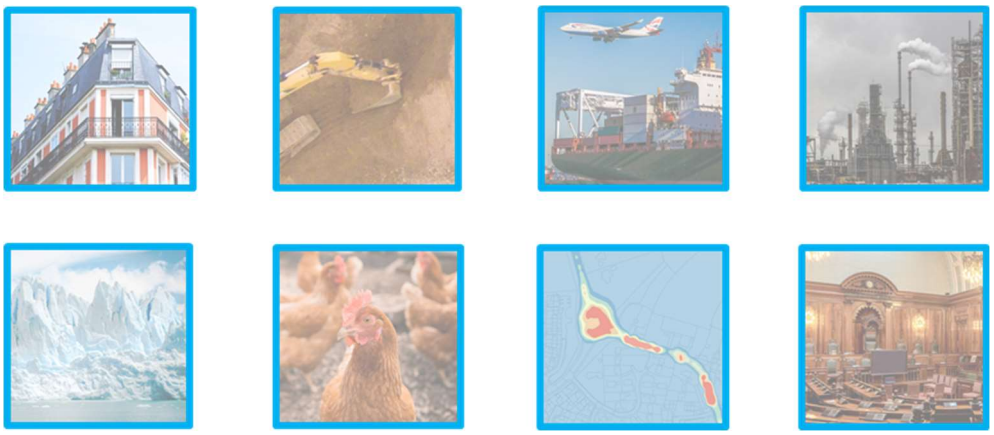
Experts in Odour, Air Quality, Climate Change and Meteorology



Contents

1. Introduction

1.1. Odour Consultants (ODC), part of KALACO Group Ltd, has been commissioned by Quantum Acoustics (the 'Client') to assess the odour impacts associated with the proposed development on Land At Jays Close, Basingstoke, Hampshire (herein the 'Facility').

1.2. The purpose of this assessment is to provide evidence to support the nuisance concern of odours that may originate from the Facility upon the local area. This report describes the Facility (Section 2), the scope of the assessment (Section 3), and a summary of the odour impacts (Section 4).

1.3. The assessment has been carried out by ODC. Further details of the assessment authors are set out in Section 6.

2. The Facility

2.1. The site currently comprises of three warehouse units with permission for B1c, B2 use and B8 use with accompanying A3 units. Planning permission was granted under planning permission 21/02881/ROC and 19/02725/FUL and included the construction of 3 warehouse units (one B1, B2, and B8 unit and two Class A3 units).

2.2. The Facility comprises the proposed change of use of Unit 2 to Sui Generis and the construction of the necessary infrastructure including: tanker offloading shelter, bulk acid storage, fume scrubber, driver welfare room, control room, associated pipework, modifications to internal layout and a covered link between Units 1 & 3. The Facility is shown in Figure 1.

2.3. The Facility will provide necessary infrastructure to the existing battery manufacturing process at the site. This will involve the use of hydrochloric acid to adjust the acidity levels of the lithium chloride battery products, which will be pumped to the process from the Facility.

2.4. Due to the nature of the fumes emitted from 36% w/w hydrochloric acid, all bulk tank vents will be directed via a scrubber, which will neutralise the fumes, via a caustic liquor, before allowing them to pass to atmosphere. The scrubber will result in the acid being converted to salt.

2.5. Typically, the vapour will be vented to the system during vessel filling/tanker offloading, as well as for bulk tank diurnal breathing. The vent system will direct the acidic vapour to a scrubber in which it will be neutralised utilising a 10% w/w sodium hydroxide solution. The scrubbed air vapour will then be discharged to atmosphere. Spent liquor will be periodically discharged to the waste tank for offsite disposal. Both scrubbers will therefore predominantly release salt emissions, with the potential for a minimal residual emission of acid, which will be controlled via an environmental permit.

2.6. The Facility is located on an industrial business park where odours are not typically granted much concern, but the business park is surrounded by locations of relevant sensitive odour exposure, including offices, residential properties, schools, and nursing homes. For the purposes of this assessment, 24 sensitive locations have been considered to provide sufficient understanding of the potential odour risks upon the local area; these are shown in Figure 2.

Figure 1: The Facility

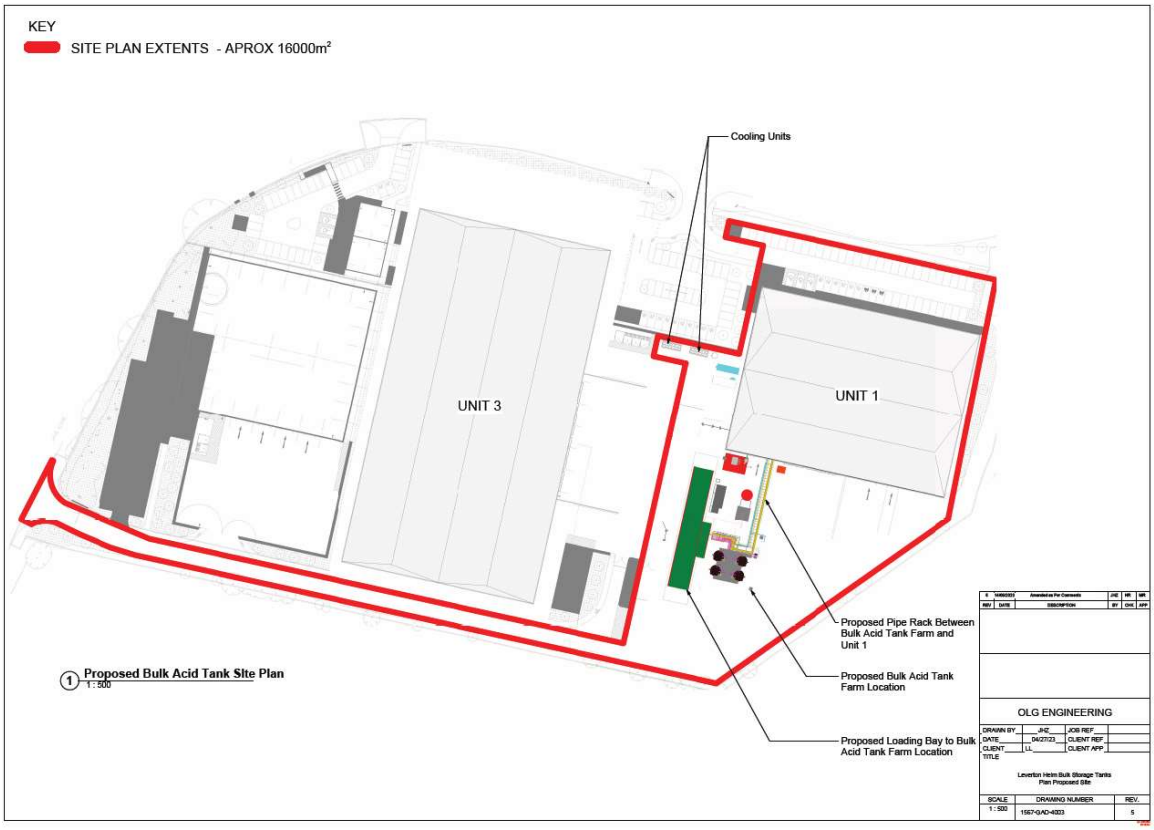


Figure notes: Plan provided by the Client

Figure 2: Facility, Odour Sources and Relevant Exposure

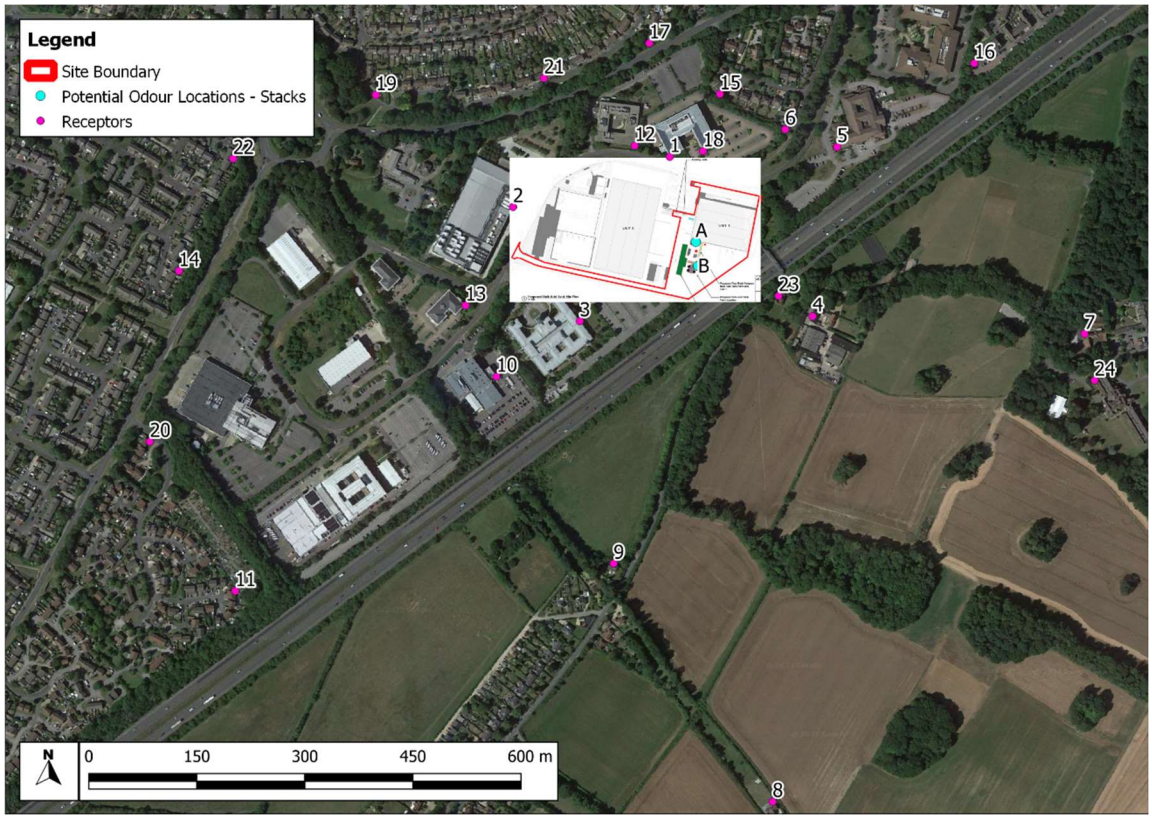


Figure notes: Imagery ©2023 Google. Map data ©2023.
Identified Potential Odour Sources: A. Process Scrubber Stack; B. Acid Storage Fume Scrubber Stack

3. Scope of assessment

3.1. The scope of assessment includes several elements, and this report is part of a series of documents addressing odour and should be read in conjunction with the latest version of each document. The scope and appended documents covered are set out below.

- Odour Policy and Legislation Context (Reference: ODC_P1020A_C1-1).
- Odour Risk Assessment (Reference: ODC_P1020A_E1-1).

4. Summary and Conclusions of the Impact Assessment

4.1. The human nose is very sensitive, and odours can cause nuisance, disamenity and annoyance. This can lead to psychological stress and anxiety, and some people can experience temporary symptoms such as dizziness, headaches, or nausea. Odours can cause these symptoms irrespective of whether the chemicals themselves are directly harmful to health.

4.2. Odour impact assessment is a challenging and subjective discipline. There are a number of odour assessment methods and tools that have been developed which are widely used in the UK, including desk-based methods, such as complaints analyses and qualitative risk assessments, through field odour testing (sniff testing) and dispersion modelling. Each has advantages and disadvantages and not all methods are appropriate in every case. This assessment utilises a desk-based method which is considered most appropriate for this study.

Odour Risk Assessment

4.3. A qualitative odour risk assessment of the impacts of newly introduced odour sources in the Facility upon the local area has been carried out (see appended document ODC_P1020A_E1-1). This included consideration of the types of odours released from the process (i.e. acids) and the abatement measures put in place to neutralise the fumes before their release to the atmosphere (i.e salts produced). The assessment took into account the likely pathways between the odour sources and local exposure, including meteorology, the characteristics of the odours, and the sensitivities of local exposures. This demonstrated that the odour sources will have negligible odour effects upon the local area, which would be considered not significant.

Overall Odour Statement

4.4. The odour effects associated with the Facility have been assessed using a desk-based methodology, consistent with guidance.

4.5. Two new odour sources, which are considered to have the potential to emit neutral and unpleasant odours have been identified in the Facility. The new potential odour sources are the scrubber stacks used to neutralise fumes as part of the manufacturing process.

4.6. Based on the odour risk assessment, the odour effects of the two scrubber stacks in the Facility have been determined to be 'not significant'.

5. Glossary

IAQM	Institute of Air Quality Management
ODC	Odour Consultants

6. Professional Experience

Dr Austin Cogan, MPhys (Hons) PhD CEnv MIEnvSc MIAQM

Austin is a Director and co-founder of ODC, is a Chartered Environmentalist and has over 15 years' experience in environmental sciences. His expertise covers odour surveys, desk-based analyses, computational modelling, and expert witness services. He has undertaken many hundreds of planning and permitting projects across the UK and abroad covering a diverse range of industries, including residential, commercial, retail, and leisure developments, transport infrastructure, landfill sites, mineral sites, airports, waste facilities, industrial facilities, power-generation facilities, sewage works and agricultural facilities. This has included provision of expert witness services at public inquiries and hearings. Austin has also been involved in a number of projects for JNCC, EA, GLA, National Highways and NGOs, undertaking research and development activities. He has contributed to many guidance documents, most recently for IAQM. Austin led the development of APS's AirChecker, a bespoke air quality conveyancing search report, and is an active member of the COPSO committee. Additionally, he led the development of officially licensed quality assured observational meteorological data at APS, which is used by most of the odour industry in the UK.

Katya Kaczmarczyk, MBChB BSc (Hons) AMIEnvSc AMIAQM

Mrs Kaczmarczyk is a Consultant at ODC. She has over three years' experience conducting odour assessments for planning and permit applications as well as for nuisance complaints. She completed BSc Medical Biochemistry at the University of Leicester and continued her studies at the University of Warwick to complete a MBChB Medicine, working as a Doctor in the Southwest Deanery afterwards. Her focus is now on the effects on health and odour from pollution. Katya has experience of undertaking odour assessments for a diverse range of facilities, including sewage treatment works, livestock markets, commercial kitchens, slurry lagoons, slurry towers, mineral sites, landfill sites, and industrial facilities.

Liana Malynczakova, MSc BA (Hons) AMIEnvSc AMIAQM

Miss Malynczakova is a Graduate Consultant at ODC. She has recently completed a MSc Sustainability degree at University of Southampton where she was involved in a European research project on shipping emissions, drawing on her previous six months' research internship at the Air Quality Management Resource Centre (AQMRC) at University of the West of England (UWE) where she also completed BA Geography degree. She is currently gaining experience in undertaking odour, air quality, dust, climate change, indoor air quality and bioaerosol assessments for a wide range of developments for planning and permit applications and support for local authorities.

KALACO GROUP

Experts in Odour, Air Quality, Climate Change and Meteorology

- Air Quality Assessments for Planning Applications
- Air Quality Neutral
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- Feasibility Studies
- Local Plan Modelling

- Construction Dust
- Mineral Dust
- Dust Management

- Odour Risks
- Odour Modelling
- Odour Management

- Transport Schemes
- Industrial and Energy
- Agriculture and Waste

- EIA Air Quality Chapters
- Greenhouse Gas Assessments
- Climate Vulnerability

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Odour Policy and Legislation Context: Jays Close, Basingstoke

Client: Quantum Acoustics **Reference:** ODC_P1020A_C1-1 **Date Published:** 14 November 2023

Rev.	Date	Description	Prepared	Reviewed	Authorised
01	14/11/2023	Issued	LM	KK	AC

1. Introduction

1.1. Odour Consultants (ODC), part of KALACO Group Ltd, has been commissioned by Quantum Acoustics (the 'Client') to assess the odour impacts associated with the proposed development on Land At Jays Close, Basingstoke, Hampshire (herein the 'Facility'). This document sets out relevant context in terms of odour policy, legislation, guidance, and other useful information, which are material considerations.

2. Legislation

2.1. Odour legislation that are relevant to the Facility is set out in Table 1.

Table 1: Relevant Legislation

Legislation	Text
Statutory Nuisance	Part III of The Environmental Protection Act 1990 *(HMSO, 1990)* sets out what constitutes a Statutory Nuisance and the local authority's duties to investigate complaints and require remedial measures. The following can cause a Statutory Nuisance: *"dust, steam, smell or other effluvia arising on an industrial, trade and business premises and being prejudicial to health or a nuisance" or "fumes or gases are emitted from premises so as to be prejudicial to health or cause a nuisance".*
Table notes: -	

3. Policy

National Planning Policy

3.1. The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing & Communities, 2023) sets out planning policy for England. It includes advice on when odour should be a material consideration in development control decisions. The relevant paragraphs from the NPPF are set out in Table 2.

Table 2: Relevant Paragraphs of the NPPF

Paragraph	Text
55	"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition".
185	"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".
Table notes: -	

Regional Planning Policy

3.2. There is currently no relevant regional planning policy that applies to odour.

Local Planning Policy

3.3. The local authority, Basingstoke and Deane Borough Council (BDBC), have published one policy which relates to odour. The policy is set out in Table 4.

Table 3: Relevant Local Policies

Policy	Relevant Information
BDBC's Basingstoke and Deane Local Plan (2011 to 2029) (BDBC, 2016)	The BDBC's Local Plan (2016) sets out Borough's policies and plans for future planning and development to support economic growth whilst ensuring environmental protection and meeting the needs of the local population. Policy EM12 – Pollution states that: "*Development will be permitted provided that it does not result in pollution which is detrimental to quality of life or poses unacceptable risks to health or the natural environment. Development that would result in unavoidable pollution will only be permitted where measures to adequately mitigate these polluting effects can be implemented.*" It further states that if the development is sensitive to pollution, it will only be permitted in the following instances: *"a) There would be no detrimental impact on quality of life as a result of existing, historic, or nearby land uses and activities; and* *b) It would not lead to unacceptable risks to human health or the natural environment, as a result of existing, historic, or nearby land uses and activities; or* *c) Adequate remedial or mitigation measures are proposed and can be implemented."* In this instance, BDBC defines pollution as *"anything that affects the quality of land, air, water or soil, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light."*
Table notes: -	

4. Guidance

4.1. The Government and other professional bodies have published a number of guidance documents which relate to odour. Those most relevant to the Proposed Development are set out in Table 4.

Table 4: Relevant Guidance

Guidance	Relevant Information
Defra Statutory Nuisance Guidance	The Government has published guidance on how to investigate and establish the existence of a statutory nuisance (2021). This guidance states: *"Councils must look into complaints about smells from industrial, trade and business premises that could be a 'statutory nuisance' (covered by the Environmental Protection Act 1990).* *For the smell to count as a statutory nuisance it must do one of the following:* *unreasonably and substantially interfere with the use or enjoyment of a home or other premises injure health or be likely to injure health. If they agree that a statutory nuisance is happening, has happened or will happen in the future, councils must serve an abatement notice. This requires whoever's responsible to stop or restrict the smell. The notice will usually be served on the person responsible but can also be served on the owner or occupier of the premises".*
Planning Practice Guidance	The National Planning Policy Framework (NPPF) is supported by Planning Practice Guidance on air quality (2019). Paragraph 001 Reference ID: 32-001-20191101 states: *"As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity".*
Guidance on the assessment of odour for planning	The Institute of Air Quality Management (IAQM) have produced 'guidance on the assessment of odour for planning' (2018). This is the latest odour guidance published in the UK and is the only UK odour guidance which contains a method for estimating the significance of potential odour impacts for planning applications.
Guidance on Hedonic Scores	The unpleasantness of odours is rated by hedonic tones, for which different types of odours are given scores. Hedonic scores for a range of pleasant and unpleasant odours are set out in the Environment Agency (EA) science report reviewing odour character and thresholds (2007)and are repeated in the more recent odour guidance published by the Scottish Environment Protection Agency (SEPA) (2010).
Table notes: -	

5. Other Useful Information

Domestic Fireplaces and Smoke Control Zones

5.1. Basingstoke does not contain any smoke control zones (2023), but it is recommended that residents follow the Defra guidance on burning solid fuels (2022).

6. Glossary

BDBC	Basingstoke and Deane Borough Council
EA	Environment Agency
IAQM	Institute of Air Quality Management
NPPF	National Planning Policy Framework
ODC	Odour Consultants
SEPA	Scottish Environmental Protection Agency

7. References

BDBC. (2016). Basingstoke and Deane Local Plan (2011 to 2029).

Defra. (2021). Guidance, nusiance smells: how counmcils deal with complaints. *Defra.*

DEFRA. (2022). Solid Fuel Association Burn Better Campaign. *Retrieved from https://solidfuel.co.uk/defra-burn-better-campaign/*

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IAQM. (2018). Guidance on the assessment of odour for planning. *London: IAQM.*

Ministry of Housing, Communities & Local Government . (2019). Planning Practice Guidance .

SEPA. (2010). Odour Guidance 2010.

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Odour Risk Assessment: Jays Road, Basingstoke

Client: Quantum Acoustics **Reference:** ODC_P1020A_E1-1 **Date Published:** 17 November 2023

Rev.	Date	Description	Prepared	Reviewed	Authorised
01	17/10/2023	Issued	LM	KK	AC

1. Introduction

1.1. Odour Consultants (ODC), part of KALACO Group Ltd, has been commissioned by Quantum Acoustics (the 'Client') to assess the odour impacts associated with the proposed development on Land At Jays Close, Basingstoke, Hampshire (herein the 'Facility').

1.2. This document sets out the findings of a qualitative odour risk assessment of the impacts of odour sources associated with the Facility upon relevant sensitive exposure in the local area.

2. Assessment Methodology

2.1. The qualitative odour risk assessment has been carried out in accordance with the methodology set out in the Institute of Air Quality Management (IAQM) guidance on the assessment of odour for planning (IAQM, 2018).

2.2. Odour impacts will only occur where there is odour exposure, i.e. where there is an odour emission source, a pathway for odour to travel through the air, and the presence of sensitive receptors (people) to detect the odour. The scale of the impact is determined by parameters collectively known as the FIDOL factors (Environment Agency, 2007). These are:

- Frequency – how often odours are present. This usually depends on the operational use of the property.
- Intensity – the perceived magnitude (strength) of the odour. This is normally expressed qualitatively using terms such as faint or strong.
- Duration – the length of time that odours are present and whether they are continuous or sporadic.
- Offensiveness – a judgement of the unpleasantness of odours. This is normally described using the Hedonic tone rating system, where positive scores are pleasant and negative numbers unpleasant (ranging between -3.75 and 3.53), as set out in the Environment Agency (EA) science report reviewing odour character and thresholds (Environment Agency, 2007) and are

repeated in the more recent odour guidance published by the Scottish Environment Protection Agency (SEPA) (2010).

- Location – the sensitivity of exposure at a certain location and the relevance of weather conditions.

2.3. The risk-based assessment approach set out by the IAQM utilises the FIDOL factors to derive an overall risk that depends on the probability of there being odour exposure together with the likely consequence if it were to transpire.

Methodology

2.4. The odour risk assessment involves several steps which are described below:

Step 1 – Identify the source odour potential

2.5. This takes account of the scale and nature of the odorous processes; the continuity, intensity and offensiveness of odour releases; and any odour control measures that are used.

Step 2 – Identify the pathway effectiveness

2.6. There are three important considerations for the pathway effectiveness; the proximity of receptors to the odour sources, meteorology (such as the prevailing wind direction) and whether there are any barriers between the odour sources and the receptors (such as buildings, vegetation, terrain, etc.).

2.7. Odour annoyance or nuisance may occur at any location where people could experience an adverse effect, noting that people vary in their sensitivities to odour. The IAQM odour guidance (IAQM, 2018) sets out receptor locations based upon their sensitivities to odour.

- High sensitivity receptors represent locations where people can reasonably expect enjoyment of a high level of amenity and be present for extended periods, such as residential properties, schools, hospitals and tourist attractions.
- Medium sensitivity receptors represent locations where people would expect to enjoy a reasonable level of amenity and be present for irregular short periods, such as places of work, commercial/retail premises and recreation areas.
- Low sensitivity receptors represent locations where people would not expect a reasonable level of amenity enjoyment and would be present for only transient periods, such as industrial premises, farms, footpaths and roads.

Step 3 - Derive the likely odour effect at each receptor and the overall potential odour effects

2.8. For each receptor, the source odour potential is combined with the pathway effectiveness to obtain a risk of odour impact. Following the IAQM guidance (2018) and using professional judgement, the dose is defined using the matrix in Table 1.

Table 1: Matrix to assess the risk of odour exposure (i.e. dose)

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

2.9. This in turn is combined with the receptor sensitivity to determine the likely odour effect. This approach is based upon an effect ≈ dose x response relationship. Following the IAQM guidance (2018) and using professional judgement, the odour effect is defined using the matrix in Table 2.

Table 2: Matrix to assess the magnitude of odour effect

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

Significance Criteria

2.10. There are currently no statutory standards in the UK covering the release or subsequent impacts of odours, nor any formal assessment criteria for quantifying odours. In the absence of formal criteria, the significance of the impacts has been judged based on the professional experience and taking account of the IAQM odour guidance (2018), which should be read in conjunction with this report.

3. Desk-Based Qualitative Risk Assessment

Introduction

3.1. Potential odour impacts may only occur where there is odour exposure, i.e. where there is an emission source of odour, a pathway for odour to travel through the air and the presence of sensitive receptors (people) to detect the odour. The scale of the impact is determined by parameters collectively known as the FIDOL factors. The risk-based assessment approach set out by the IAQM uses these parameters to derive an overall risk that depends on the probability of there being odour exposure together with the likely consequence if it were to transpire. The assessment involves several steps which are described below.

Source Odour Potential

3.2. The first step is to identify the source odour potential. This takes account of the scale and nature of the odorous processes; the continuity, intensity, and offensiveness of odour releases; and any odour control measures that are used.

3.3. The Facility is located within an industrial business park, surrounded by offices, residential properties, schools, and nursing homes. Potentially odorous sources within the Facility are individually labelled in Figure 1 (Locations A and B). The identified odour sources and source odour potentials are described further in Table 3.

Figure 1: Potential Odour Sources

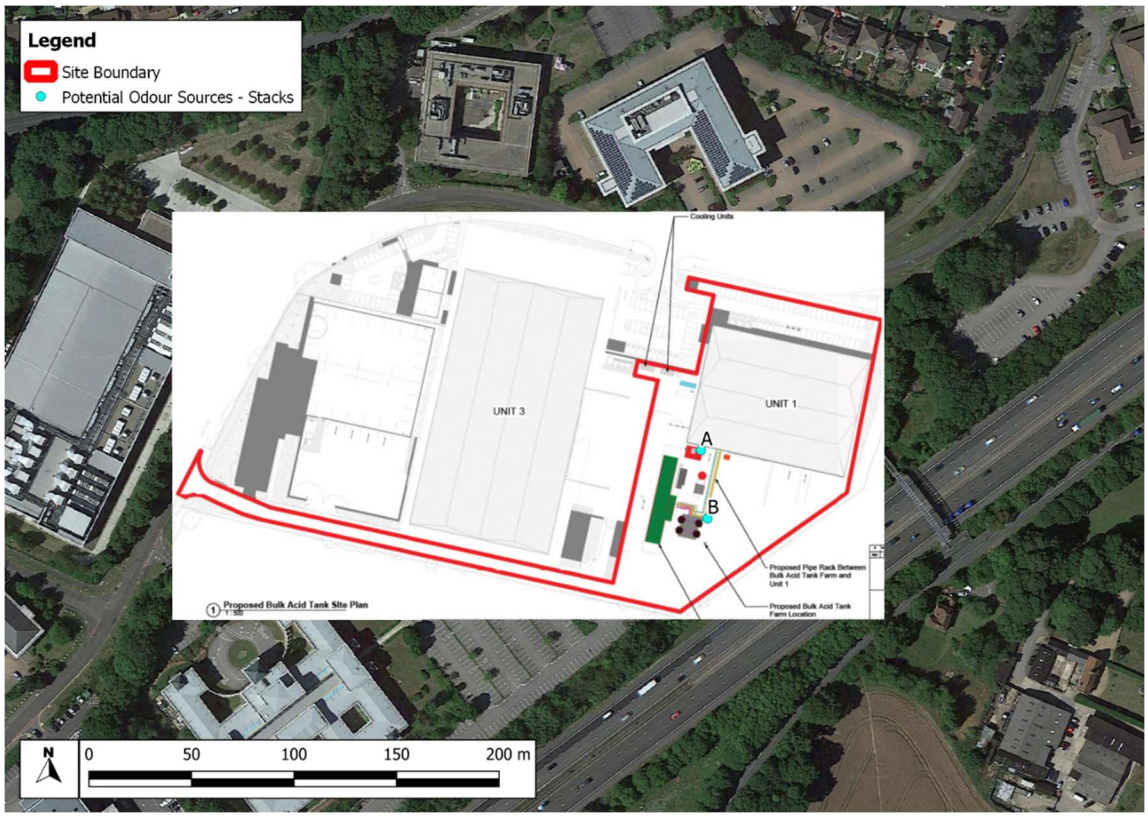

Figure notes: Imagery ©2023 Google. Map data ©2023. Site Plan provided by the Client. .
Identified Potential Odour Sources: A. Process Scrubber Stack; B. Acid Storage Fume Scrubber Stack

Table 3: Identification of Odour Sources and Overall Source Odour Potential

Odour Source	Scrubber Stacks
Description	Both stacks (process scrubber stack and the acid fume scrubber stack) will be emitting by-products of the battery manufacturing process which utilises hydrochloric acid (36% w/w), however both stacks will operate an abatement system of scrubbers to mitigate as much residual acid from the manufacturing process as possible. It is expected that these filters will be monitored, maintained and replaced when needed, and will always be in place when the stacks are in operation. Both stacks will be subject to a permit. When acid is being pumped into the storage tanks, it is expected that the scrubbers will also be in operation and the tanks will "breathe" via an external scrubber such that any vapour displaced during tank filling and diurnal breathing is suitably abated prior to release into the atmosphere.
Frequency and Duration	The Facility is operational during its standard working hours. It is thus assumed that it is operational for most of the year, including weekends, unless specified otherwise.
Intensity and Offensiveness	The majority of the acid emissions will be abated by the scrubbers, which will result in salt particles being emitted. There may however, be some minimal residual acid emissions. Acid odours are considered to be best represented by the following hedonic scores: Chemical (-1.64), sharp, pungent, acid (-2.34), and sour, vinegar (-1.26). The acid emissions will therefore be moderately unpleasant. There are no representative hedonic scores for salt odours within guidance, however, based on professional judgement, the salt emissions are considered to have a neutral hedonic score. The emissions will be exhausted vertically from tall stacks with exhaust flow rates of 4,000 m^3/hr and 1,500 m^3/hr, for stacks A and B respectively. These are considered good initial dispersion conditions, helping to minimise odour effects upon the local area. The intensity of the emissions is likely to vary between weak to distinct.
Odour Source Potential	There are two potential sources, both being part of the same process, and both being mitigated by fume scrubbers. The source odour potential is considered to be Small, as appropriate abatement will be applied and maintained, thus mitigating the unpleasant acidic fumes.
Table notes:	

3.4. The details of each source have been considered and a summary of the odour source potentials are presented in Table 4.

Table 4: Source Odour Potential

Source	Odour Source	Source Type	Source Odour Potential
1	Process Scrubber Stack	Manufacturing/Industrial	Small
1	Acid Storage Fume Scrubber Stack	Manufacturing/Industrial	Small
Table notes:			

Pathway Effectiveness

3.5. The second step is to identify the pathway effectiveness. There are three important considerations for the pathway effectiveness:

- the proximity of receptors to the odour sources,
- meteorology (such as the prevailing wind direction); and

- whether there are any barriers between the odour sources and the receptors (such as buildings, vegetation, terrain, etc.).

3.6. The odour concerns relate to potential odour effects upon the local area and residents from the two new sources of odour. The desk-based qualitative risk assessment identifies the risk of odour effects in the local area.

3.7. Meteorological data has been taken from the Odiham Meteorological Station for the years 2018 to 2022, which is considered representative of the conditions at the Facility in Basingstoke. Figure 2 presents a wind rose showing the frequency of wind speeds and directions measured at the meteorological station. This demonstrates that the prevailing wind is from the southwest.

3.8. Odours will be transported by the wind and, in general, will not be detectable at locations upwind of the source (i.e. to the southwest of the Facility). The exception to this is during calm wind conditions when odours may disperse gradually in all wind directions.

Figure 2: Five-year average wind rose of wind speed and direction for 2018 – 2022

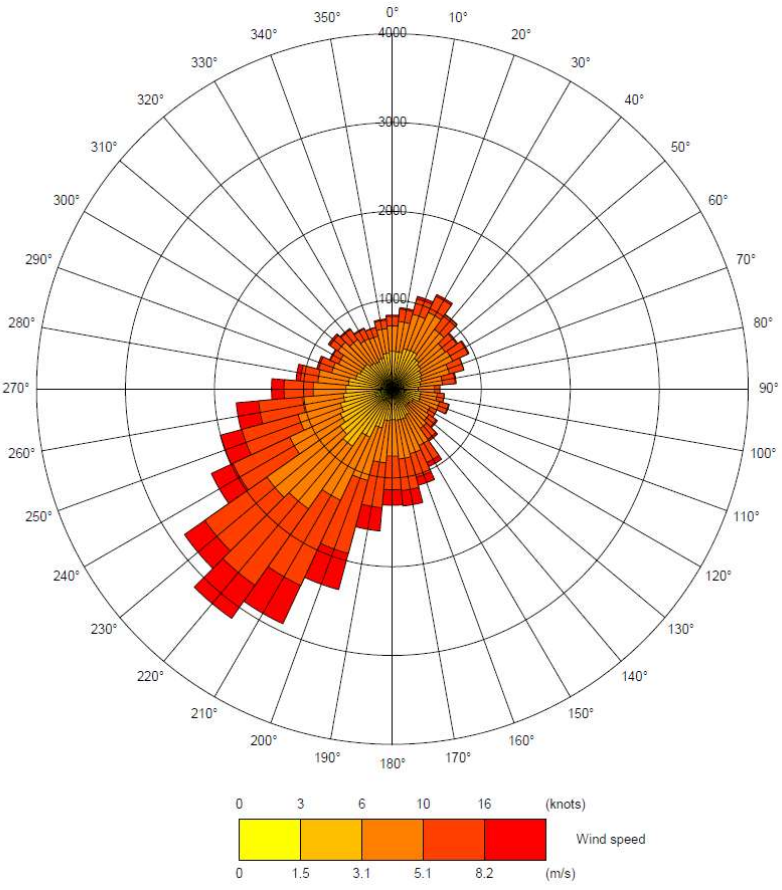

Figure notes:

3.9. The effectiveness of the odour pathways between the odour sources and the sensitive receptor is summarised in Table 5 which follows the IAQM risk-based assessment methodology (2018).

3.10. The pathway effectiveness was considered at the receptor from each identified odour source separately. The assessment has identified an Ineffective pathway from most odour sources

(receptors 7 – 8, 10 – 11, 13 – 14, 19 – 22, and 24), a Moderately effective pathway for receptors 1, 3 – 6, 15, 17 – 18, and 23, and an Ineffective to Moderately effective pathway for receptors 2, 9, 12 and 16.

Table 5: Summary of Effectiveness of Odour Pathway

Receptor	Approximate Distance from Source (m)	Approximate Direction from Source (°)	% Winds from Source	Pathway Effectiveness
1	123	346	5.6	Moderately effective pathway
2	258	288	2.9	Ineffective to Moderately effective pathway
3	181	245	4.1	Moderately effective pathway
4	174	122	3.8	Moderately effective pathway
5	236	56	11.6	Moderately effective pathway
6	199	39	13.8	Moderately effective pathway
7	545	103	2.5	Ineffective pathway
8	750	172	1.8	Ineffective pathway
9	429	196	4.6	Ineffective to Moderately effective pathway
10	319	241	2.2	Ineffective pathway
11	784	235	4.2	Ineffective pathway
12	158	332	2.2	Ineffective to Moderately effective pathway
13	327	260	1.6	Ineffective pathway
14	718	269	1.2	Ineffective pathway
15	207	9	3.7	Moderately effective pathway
16	459	57	11.6	Ineffective to Moderately effective pathway
17	282	348	3.0	Moderately effective pathway
18	126	5	6.6	Moderately effective pathway
19	488	298	1.3	Ineffective pathway
20	799	250	1.9	Ineffective pathway
21	309	317	1.6	Ineffective pathway
22	652	283	1.3	Ineffective pathway
23	120	123	3.8	Moderately effective pathway
24	573	109	2.0	Ineffective pathway
Table notes:				

Potential Odour Effects

3.11. The final step derives the likely odour effect at the receptor and the overall potential odour effects. For each source, the source odour potential is combined with the pathway effectiveness to obtain a risk of odour impact. This in turn is combined with the receptor sensitivity to determine the likely odour effect. This process follows the IAQM risk-based assessment methodology (2018) and professional judgement outlined in paragraph 2.3.

3.12. This methodology is based upon an effect ≈ dose x response relationship. Initially the dose (i.e. risk of impact) is identified. This is defined by combination of the source odour potential and the pathway effectiveness (see Table 1). The magnitude of the effects depends on the risk of odour and the sensitivity of the receptor (see Table 2).

3.13. The doses for the receptors in the local area take account of the odour arising from residual fumes released through the abated stacks. Despite a difference in odour pathway effectiveness, all of the receptors (1 – 24) are exposed to small dose of odour, which are considered to be of Negligible risk, as shown in Table 6.

3.14. The response depends on the sensitivity of the receptor, which for residential properties, schools, and care homes is High. The sensitivity of receptors in work-place setting is Medium. Combining the dose with the sensitivity gives the odour effect. The potential odour effects from the two scrubber stacks are presented in Table 6. The overall odour effects are considered to be Negligible.

Table 6: Effectiveness of Odour Pathway

ID	Risk of Odour Impact (Dose)		Receptor Sensitivity	Likely Odour Effect
	Source Odour Potential	Risk of Odour Impact		
1	Small	Negligible Risk	Medium	Negligible Effect
2	Small	Negligible Risk	Medium	Negligible Effect
3	Small	Negligible Risk	Medium	Negligible Effect
4	Small	Negligible Risk	Medium	Negligible Effect
5	Small	Negligible Risk	Medium	Negligible Effect
6	Small	Negligible Risk	High	Negligible Effect
7	Small	Negligible Risk	Medium	Negligible Effect
8	Small	Negligible Risk	High	Negligible Effect
9	Small	Negligible Risk	High	Negligible Effect
10	Small	Negligible Risk	Medium	Negligible Effect
11	Small	Negligible Risk	High	Negligible Effect
12	Small	Negligible Risk	Medium	Negligible Effect
13	Small	Negligible Risk	Medium	Negligible Effect
14	Small	Negligible Risk	High	Negligible Effect
15	Small	Negligible Risk	High	Negligible Effect
16	Small	Negligible Risk	High	Negligible Effect
17	Small	Negligible Risk	High	Negligible Effect
18	Small	Negligible Risk	Medium	Negligible Effect
19	Small	Negligible Risk	High	Negligible Effect
20	Small	Negligible Risk	High	Negligible Effect
21	Small	Negligible Risk	High	Negligible Effect
22	Small	Negligible Risk	High	Negligible Effect
23	Small	Negligible Risk	High	Negligible Effect

24	Small	Negligible Risk	High	Negligible Effect
Table notes:				

4. Significance of Odour Effects

4.1. Following the IAQM odour guidance (2018), the potential odour effects arising from the production of batteries at the Facility are judged to be 'not significant'.

4.2. The professional judgement that the odour effects will be 'not significant' takes account of the assessment that the desk-based qualitative odour risk assessment has demonstrated 'Negligible' odour effects from the potential odour sources in the Facility.

5. Summary of Odour Risk Assessment

5.1. A qualitative odour risk assessment of the impacts of newly introduced odour sources in the Facility upon the local area has been carried out. This included consideration of the type of the odour source arising from the production of batteries on site, and the abatement measures put in place to neutralise the fumes before their release to the atmosphere. The assessment has demonstrated that the odour sources will have negligible odour effects upon a variety of sensitive receptors, which would be considered not significant.

6. Glossary

EA	Environment Agency
FIDOL	Frequency, Intensity, Duration, Offensiveness, Location
IAQM	Institute of Air Quality Management
ODC	Odour Consultants
SEPA	Scottish Environment Protection Agency

7. References

Environment Agency. (2007). *Review of odour character and thresholds, Science Report: SC030170/SR2.*

IAQM. (2018). *Guidance on the assessment of odour for planning.* London: IAQM.

SEPA. (2010). *Odour guidance 2010.*