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1 Introduction

1.1 Overview

Aval Consulting Group Ltd has been commissioned to carry an odour assessment for a proposed development on change of use of the first and loft floor from storage space to a 2-bedroom residential flat. The proposed site also provides space for car parking, waste and recycling area, and cycle storage.

This report will investigate the odour impacts from the surroundings on the proposed development. The main purpose of this report is to carry out an assessment to determine if the odour impact from the surrounding area is likely to have a detrimental impact on the residential amenity receptors within the proposed development.

The assessment was carried out in accordance with the Institute of Air Quality Management's (IAQM) "Guidance on the Assessment of Odour for Planning" (2018).

1.2 Site Location and Proposal Information

Figure 1.1 shows the proposed site location. The site is located along Market Street, surrounded by commercial and residential properties. There are several sources of odour from a range of sources, including the Chinese takeaway adjacent to the site.



Figure 1.1: Site Location (Source: Client)

1.3 Key Pollutant – Odour

IAQM guidance defines odour as a mixture of many chemicals which interact to produce a 'smell'. While odour-free air refers to air containing no odorous chemicals, fresh air is usually perceived as air containing no chemicals or contaminants that could be 'unpleasant'.

While odour is not strictly speaking an air pollutant, certain combinations of chemicals can affect the human olfactory response (perception followed by psychological appraisal) and cause a loss of amenity. Perception of an odour can be subjective to the individual whether it is found as acceptable, objectionable or offensive.

Odour can be produced from a number of industries including food outlets, production, recycling, waste handling, vehicle respraying, power plants, traffic emissions, agriculture etc.

Factors that influence control of odour from commercial kitchens include:

- Size of the cooking facility- This influences the intensity of the odour and volume of ventilation air to be handled;
- Type of food prepared – This affects the chemical constituents within the ventilation air; and
- Types of cooking appliances used: This dictates the level of fat, water droplets and temperature within the ventilation air.

For the purpose of the assessment, we are not aware of any control measures within nearby commercial properties, therefore, a conservative risk assessment has been carried out.

2 Methodology

2.1 Overview

The local authority requested that an odour assessment to be carried out for the proposed development. Hence an odour assessment has been carried out using the latest guidance produced by the IAQM.

2.2 IAQM Guidance

IAQM guidance is limited to assessing the effect of odour on amenity and not on human health. For exposure to odour to occur, there must be an emission source to the atmosphere, a pathway for the odour to travel and a receptor that could experience adverse effects. Therefore, the IAQM guidance is based upon Defra's Green Leaves 111 guidance¹ which presents the Source-Pathway-Receptor (S-P-R) concept. The S-P-R concept presents the hypothetical relationship between the source (S) of the odour, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected.

An example framework for conducting odour assessments is laid out in Appendix A of IAQM guidance and has been followed for this assessment.

It is recognised that in order to assess the magnitude of odour effects from a site it is necessary to estimate the odour generating potential of the site activity. The source odour potential takes into account the scale of the odour release (magnitude), how inherently odorous the emission is and the relative pleasantness/unpleasantness of the odour (its hedonic tone). Using Table A1 (Appendix A) the source odour potential can be categorised as small, medium or large.

Secondly, the effectiveness of the pollutant pathway for odour through the air versus the dilution/dispersion of the odorous emissions in the atmosphere needs to be estimated. Factors which may increase dilution and/or dispersion of the odour through the pathway will reduce the odour concentration at the receptor, thereby reducing exposure. Factors which need to be considered in this step are presented in Table A1 (Appendix A). The pollutant pathway can be categorised as ineffective, moderately effective or highly effective using Table A1 (Appendix A).

From this, IAQM guidance suggests that the risk of odour exposure (impact) for each receptor may be evaluated by combining the source odour potential and the pathway effectiveness using Table A2 (Appendix A).

IAQM guidance recommends classifying each receptor in terms of its sensitivity. Indicative examples of low, medium and high sensitivity receptors are given in Table A1 (Appendix A) and should be used in combination with professional judgement to assess the sensitivity of receptors to odour.

Justification needs to be given for the selected categorisation of the source odour potential, pathway effectiveness, and receptor sensitivity. This typically involves some degree of quantitative assessment supplemented by the professional judgement of the air quality practitioner.

The likely magnitude of odour effect at specific receptor locations may be determined by combining the risk of odour exposure with the specific receptor sensitivity, as in Table A3 (Appendix A). The likely magnitude of odour effects may be classed as 'negligible', 'slight adverse', 'moderate adverse' or 'substantial adverse'.

The final step for most assessments is to estimate the overall odour effect on the surrounding area as a result of the site, development or process. This assessment must take into account the different

¹ Defra (2011): Guidelines for Environmental Risk Assessment and Management (Green Leaves 111)

magnitude of effects at different receptors and the total number of receptors that experience these different effects. IAQM guidance recommends the suggested descriptors for the total magnitude of odour effects, as reproduced in Table A3 (Appendix A). IAQM guidance suggests that “where the overall effect is greater than ‘slight adverse’, the effect is likely to be considered significant.”

3 Odour Impact Assessment

3.1 Overview

As discussed above, the odour impact assessment has been carried out following the IAQM guidance. Key information from the guidance is presented in Appendix A. The assessment has been divided into sub-sections to explain the outcome of each part of the assessment and how it was determined.

3.2 Receptor Sensitivity

The proposed site will be of residential nature. Therefore, based on the criteria presented in Table A1 in Appendix A, these receptors are considered to have high sensitivity. This has been presented in Table 4.1.

3.3 Source Odour Potential

Although the nearby sources of odour fall below a permitted process, the odour may not be considered neutral depending on perception of the receptor and could impact residential amenity. Based on Table A1 in Appendix A, it is assumed that the processes of the nearby odour sources are likely to have a low source odour potential. This has been determined using a conservative approach accounting for intermittent cooking odours that may occur from neighbouring food shops along Market Street, with consideration for changing winds and other meteorological factors.

3.4 Pathway Effectiveness

As previously mentioned the closest potential sources of odour are from the adjacent Chinese takeaway. The extraction system is not located along Market Street. The prevailing wind direction is predominantly West-Southwesterly in Heckmondwike. Therefore, as the development is located South of the source, the odour pathway effectiveness towards the identified receptors is considered to be 'Moderate' based on Table A1 in Appendix A.

3.5 Odour Exposure

The risk of odour exposure has been calculated using the IAQM criteria summarised in Appendix A: Table A2. As stated above, the source odour potential was considered to be "Medium" and the pathway effectiveness was considered to be 'Moderate'. Based on IAQM guidance, the risk of odour exposure for the concerned receptors is considered as 'Low Risk'.

3.6 Likely Magnitude Odour Effect

Table 3.1: Summary of likely odour effects at existing sensitive receptors

Receptor Details and Location	Receptor Sensitivity	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Likely Odour Effect
Residential receptors	High	Medium	Moderate	Low Risk	Slight adverse Effect

Based on the results above and the criteria in Table A2, odour exposure is considered to be a 'Low Risk' for the residential receptors. Based on the IAQM guidance, the likely odour effect from the

proposed development is considered to have a 'Slight Adverse Effect'. Therefore, based on IAQM guidance, the overall impact is considered to be low risk and mitigation measures are not considered necessary.

3.7 On-site Sniff Tests

To further confirm the findings in the previous sections, an on-site sniff test was carried out. The sniff test was undertaken on a weekday afternoon, when it was assumed that the nearby businesses were working at full capacity. The tests were carried out as per the guidance of IAQM 2018 and scores were allocated to each location based on Figure 3.3. The results are shown in Table 3.3.

The locations of the tests have been provided in Figure 3.2.

Figure 3.2 Sniff Test Locations (Source: Google Map)

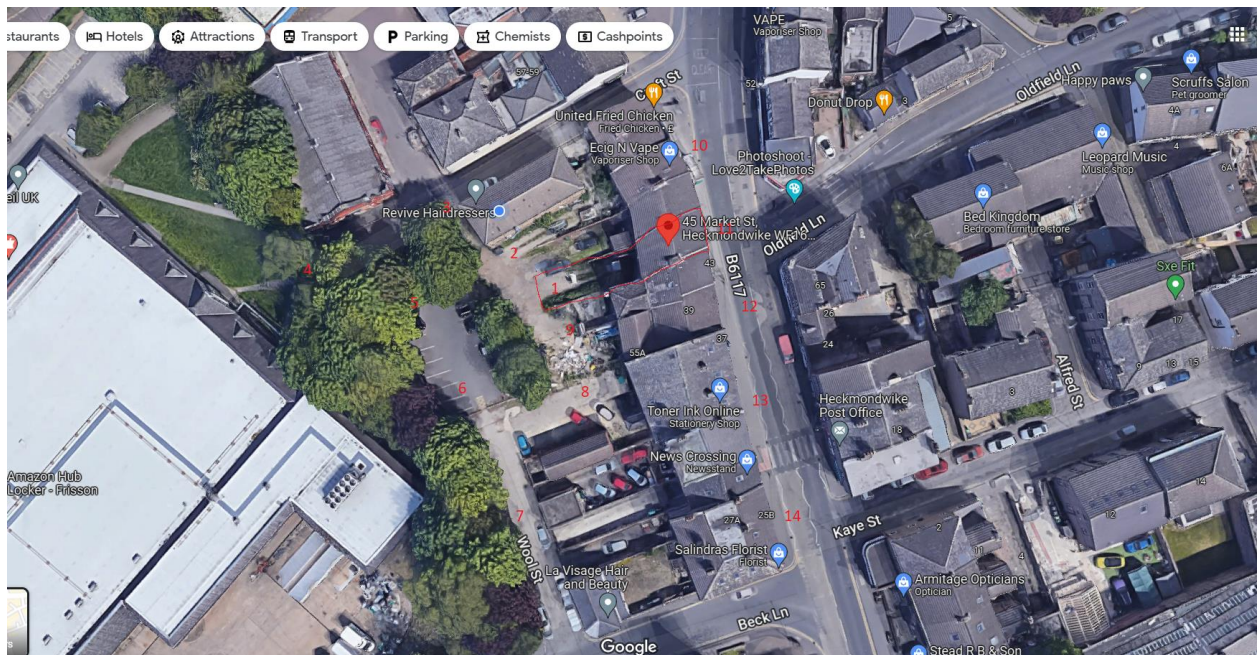


Figure 3.3 Table extract from IAQM 2018 showing intensity levels and scoring methodology for sniff tests

Odour Strength	Intensity Level	Comments
No odour/not perceptible	0	No odour when compared to the clean site
<i>The Odour Detection Threshold (ODT) of $1 \text{ ou}_\text{e} \cdot \text{m}^{-3}$ is somewhere between 0 and 1</i>		
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
<i>VDI 3940 says that the recognition threshold intensity is generally 3-10 times higher than the ODT (i.e. $3\text{-}10 \text{ ou}_\text{e} \cdot \text{m}^{-3}$)</i>		
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

A summary of the results are presented in Table 3.3 and Table 3.4.

Table 3.3 Sniff Test Results Summary

Location (Surrounding area)	Odour Intensity Level	Comments
1	2	Vegetation odour
2	2	Vegetation odour
3	3	Sour/ Sulfur
4	4	Sour/ Sulfur
5	3	Tree/ car
6	2	Tree/ car
7	3	Rubbish
8	2	Vegetation odour
9	2	Slight cooking odour
10	4	Car fumes
11	3	Car fumes
12	3	Car fumes
13	3	Car fumes
14	3	Car fumes

Table 3.4: Sniff test undertaken within the site itself.

Location (Interior)	Odour Intensity Level	Comments
Ground floor- Front of Shop	1	Paper/ copier
Ground floor- Rear Storage	0	No smell detected
1st Floor - Room 1	0	No smell detected
1st Floor – Kitchen	0	No smell detected
1st Floor - Toilet	0	No smell detected

It should be noted that there was only a very slight odour at the proposed development site which related to the photocopier within the shop. The only time that an odour was detected was when stood at the rear of the Chinese takeaway, one inside the building of the proposed development site, this was not detectable. All other odours detected

With regards to the previous sections of this report, it has been determined that the impact risk of odour is low risk and therefore no mitigation would be required. Following the site visits, it was observed that odours are present within the area however odour at the receptor site was not detected.

There are other residential properties within the area who are likely to be exposed to a similar level of odours from the nearby sources. Therefore the proposed development is not considered to be out of context within the area.

4 Conclusions

This report provides an assessment of the potential odour impact for the proposed development at 45 Market Street, West Yorkshire WF16 0EU.

A qualitative assessment of the odour effects has been undertaken for the proposed scheme. Based on the recommendations in Section 2 and as per the results presented in Section 4 of this report, it was found that there is a low risk of odour exposure and that the residual odour impact is considered to have a slight adverse effect. The result of the sniff test confirmed there was only a slight odour present externally at the proposed development site and no odour was detected upon entering the building. No mitigation measures are deemed necessary.

It can, therefore, be concluded that the proposed development is not considered to conflict with any national, regional, or local planning policy in relation to operational phase odour impact on existing receptors.

Appendix A: Relevant extract from IAQM Guidance

Table A1: Examples of risk factors for odour source, pathway and receptor sensitivity based on IAQM (2018)

Source Odour Potential	Pathway Effectiveness	Receptor
Factors affecting the source odour potential include: • The magnitude of the odour release (taking into account odour-control measures) • How inherently odorous the compounds are, • The unpleasantness of the odour.	Factors affecting the odour flux to the receptor are: • Distance from source to receptor • The frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind) • The effectiveness of any mitigation/control in reducing flux to the receptor • The effectiveness of dispersion/ dilution in reducing the odour flux to the receptor topography and terrain.	For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles:
Large Source Odour Potential Magnitude – Larger Permitted processes of odorous nature or large STWs; materials usage hundreds of thousands of tonnes/m³ per year; area sources of thousands of m². The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known. • Unpleasantness – processes classed as “Most offensive” in Table 5; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score. • Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice.	Highly Effective Pathway for Odour Flux to Receptor • Distance – receptor is adjacent to the source/site; distance well below any official set-back distances. • Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). • Effectiveness of dispersion/dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.	High Sensitivity Receptor - Surrounding land where: • Users can reasonably expect enjoyment of a high level of amenity; and • The 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.

Source Odour Potential	Pathway Effectiveness	Receptor
Medium Source Odour Potential • Magnitude – smaller Permitted processes or small Sewage Treatment Works (STWs); materials usage thou- sands of tonnes/m³ per year; area sources of hundreds of m². • The compounds involved are moderately odorous. • Unpleasantness – processes classed in H4 as “Moderately offensive”; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score. Mitigation/control – some mitigation measures in place, but significant residual odour remains.	Moderately Effective Pathway for Odour Flux to Receptor • Distance – receptor is local to the source. Where mitigation relies on dispersion/dilution – releases are elevated, but compromised by building effects.	Medium Sensitivity Receptor– Surrounding land where: • Users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and
Small Source Odour Potential • Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m³ per year; area sources of tens m². • The compounds involved are only mildly odorous, having relatively high ODTs where known. • Unpleasantness – processes classed as “Less offensive” in H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score. • Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.	Ineffective Pathway for Odour Flux to Receptor • Distance – receptor is remote from the source; distance exceeds any official set-back distances. • Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). • Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents >3m above ridge height) and are not compromised by surrounding buildings.	Low Sensitivity Receptor– surrounding land where: • The enjoyment of amenity would not reasonably be expected; or • There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial, farms, footpaths and roads.

Table A2: Risk of odour exposure (impact) at the specific receptor location based on IAQM (2018)

		Source Odour Potential		
		Small	Medium	Large
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

Table A3: Likely magnitude of odour effect at the specific receptor location based on IAQM (2018)

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

Appendix B: Drawings

[Please see planning portal for the most up to date drawings.]