ODOUR IMPACT ASSESSMENT

EMAQ, (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems, (amendment DEFRA, 2005)

Commercial Odour

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REPORT DETAILS

Report Title	Odour Assessment
Site Address	1 Chapel Hill Road Tilehurst RG31 5BT
Project No.	NALPRO260722.01a
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QUALITY ASSURANCE

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Assessment Summary

A commercial property (herein referred to as the site) is applying for planning permission for the installation of extraction flue to the side elevation of the property to facilitate the new use to operate and cook Indian takeaway food and is required to confirm their proposed external flue complies with external odour guidance. The client has completed an odour assessment at 1 Chapel Hill Road Tilehurst RG31 5BT

An odour assessment is required to assess the likely impact from odour generated during the cooking process from a new extraction system is to be installed. The ducting exiting on the ground floor and terminating to the side of the property above the eaves.

The environmental health department of the local planning authority is likely to have concerns of odour emissions from the use of the extraction fan unit on neighbouring sensitive residential properties during the daytime.

With respect to odour, it has been identified that providing that the recommendations are taken into account, there should not be a loss of amenity at the existing residential receptors in the vicinity of the extraction flue and as long as a system similar to the one recommended in the OMP are implemented, this would consist of using the “best practicable means” and would prevent statutory nuisance occurring.

As long as the proposed extraction system is properly maintained on a regular basis, it is highly unlikely that odour would become an issue in the future.

1. Proposal

1.1 A commercial property (herein referred to as the site) is applying for planning permission for an extraction flue to the side elevation of the property to facilitate the new use to and would like the ability to cook Indian takeaway food and is required to confirm their proposed external flue complies with external odour guidance. The client has completed an odour assessment at 1 Chapel Hill Road Tilehurst RG31 5BT.

1.2 An odour assessment is required to assess the likely impact from odour generated during the cooking process from a new extraction system is to be installed. The ducting exiting on the ground floor and terminating to the side of the property above the eaves.

1.3 The environmental health department of the local planning authority will raise concerns of odour emissions from the use of the extraction fan unit on neighbouring sensitive residential properties during the daytime.

2. Existing Context

2.1 The site (single storey) is set within a commercial/residential row of two storey attached building located along a busy main street. The site is surrounded by a mixture of commercial shops, restaurants, residential buildings, school, and apartments on the top floors.

2.2 The environmental health department of the local planning authority is likely to raise concerns of odour emissions from the use of the fan extraction unit venting on sensitive residential properties during the daytime at the side of the site.

3. Policy and Guidance

Odour Technical Guidance

- EMAQ, (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems, an amendment of the original DEFRA document published in 2005, deals specifically with the control of kitchen odours.

- Guidance on the Assessment of Odour for Planning, Version 1.1 Institute of Air Quality Management (IAQM), 2018. The IAQM published the 'Guidance on the Assessment of Odour for Planning' document in July 2018. This guidance specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity.

3.1 The magnitude of odour impact depends on a number of factors and the potential for adverse impacts varies due to the subjective nature of odour perception. The FIDOL acronym is a useful reminder of the factors that can be used to help determine the degree of odour pollution:

- Frequency of detection - frequent odour incidents are more likely to result in adverse impacts;

- Intensity as perceived - intense odour incidents are more likely to result in adverse impacts;
- Duration of exposure - prolonged exposure is more likely to result in adverse impacts;
- Offensiveness - more offensive odours have a higher risk of resulting in adverse impacts; and,
- Receptor sensitivity - (The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor.)

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

4. Nearest Sensitive Receptor Locations

4.1 The nearest sensitive receptors (NSRs) have been identified as residential apartment on the first floors and two-story properties within 20 meters at the rear of the site.

5. Odour Assessment

Introduction

5.1 This odour assessment relates to the potential future odour emanating from any kitchen extraction system associated with the change of use development, and the potential odour impacts on any sensitive receptors in close proximity to the extract flue.

Nature and Effect of Odour

5.2 Odour is perceived by our brains in response to chemicals present in the air we breathe. Odour is the effect that those chemicals have upon us. Humans have sensitive senses of smell, and they can detect odour even when chemicals are present in very low concentrations. Most odours are a mixture of many chemicals that interact to produce what we detect as an odour.

5.3 Different life experiences and natural variation in the population can result in different sensations and emotional responses by individuals to the same odorous compounds. Because the response to odour is synthesised in our brains, other senses such as sight and taste, and even our upbringing, can influence our perception of odour and whether we find it acceptable, objectionable, or offensive.

Assessment Methodology

5.4 The assessment of odour takes on the following aspects:

- A qualitative assessment of proposed odour emissions from the change of use development;
- An assessment taking into account the nature of the premises;
- The height and position of any proposed flue;
- The recommended exit velocity from the flue; and

- The distance between the proposed flue and the potential odorous emissions and the distance to the sensitive receptor.

Guidance on Control of Odours from Kitchens

5.5 The Department for Environment Food and Rural Affairs (DEFRA) originally published Guidance (now withdrawn) on the control of odours from kitchens. That guidance has been subsequently updated by 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems' (EMAQ, July 2018).

5.6 Although the guidance is not statutory, it provides very useful information on best practice techniques for the minimisation of odour nuisance from kitchen exhaust systems. This source of guidance and ACCON's own experience form the basis of the assessment to determine whether nearby occupiers of existing residential properties would consider that odour emanating from the kitchen extract flue is acceptable or not.

General Principles in Controlling Odour

5.7 The guidance is generally used for premises where food is cooked for patrons on or off the premises and where a kitchen is used to prepare and cook food. In these instances, a kitchen canopy extract system, are invariably present.

5.8 The main purpose of a kitchen canopy is to extract excess heat, steam, fats, smoke and odour arising from cooking processes. Removal of these unwelcome by-products of kitchen activity helps to achieve a reasonably comfortable and safe working environment, protect the working environment, as well as preventing the spread of the products from the kitchen area to other parts of the building.

5.9 Odours from cooking are contained both within the solid, liquid and gaseous material which is extracted by the kitchen canopy, and these different phases generally require different abatement techniques to reduce levels of odour to those levels which are acceptable to those in the vicinity. The extent to which any odour mitigation is required is dependent on the type of foods being prepared and cooked.

5.10 Commonly the kitchen extract canopy will contain the first line of odour control through the incorporation of coarse grease filters, which take out the largest grease particles from the extracted air stream. Such coarse grease filters tend to be a common feature of almost all kitchen canopy systems.

5.11 The type and levels of odour control required downstream of the canopy is very much dependent on a number of factors. The principle ones are:

- Type of food prepared. This is probably the most dominant factor as the type of food, and particularly any spices used, dictates the chemical constituents present in the exhaust air;

- Size of the cooking facility. The number of covers (for these premises, as no dining is included, the important aspect is the amount of general food output from the kitchen); and
- Types of cooking appliances used. This dictates the level of fat, water droplets and temperature within the ventilation air

5.12 The guidance includes two Tables which classify the odour and grease content of extract air according to the general cooking type and equipment used. These are reproduced in Appendix 3 (Table 2A and Table 2B). The information, in Appendix 3, has been used in this report to carry out the odour risk assessment in respect of the consented change of use development.

6. Odour Impact Assessment

6.1 Based on the observed location of the proposed external extraction system, this odour impact assessment and Odour Management Plan has been undertaken in accordance with the EMAQ guidance 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems'.

Risk Assessment

6.2 The guidance provides a means of risk assessing the impact of any catering establishment and proposed and existing uses. The key elements of the method are reproduced in Appendix 3. The method relies on scoring the proposal on four different aspects:

- **Dispersion** – where the extract vents to atmosphere are in relation to the building to which the vent is attached.
- **Proximity of receptors** – the location of the nearest residents;
- **The kitchen size** – number of covers, i.e. level of activity; and
- **Cooking type** – based on grease and odour loading.

6.3 The level of odour which is created by a premises will depend on the size of kitchen and type of cooking. These can be determined using categories which have been set out in the guidance and are replicated in Appendix 4.

6.4 The scores for each aspect are summed to derive an overall significance score, an impact risk, and a statement about the odour control requirement. The guidance has been utilised where possible to determine the risk of odour nuisance from the proposed change of use development, without any additional odour abatement in place.

6.5 The risk assessment provided in Table 1, is a worst-case scenario.

Table 1: Odour Risk Assessment – 1 Chapel Hill Road Tilehurst RG31 5BT

	Descriptor	Score	Impact Risk	Odour Control Requirement
Dispersion	Moderate	10	High	High level odour control
Proximity of Receptors	Close	10		
Size of kitchen/food cooking area	Small	1		
Cooking Type (Odour & grease loading)	High	7		
Total		28		

6.6 For the proposed flue extract system, discharging 1m above the eaves (Moderate, Score 10). There are receptors within 20m of the proposed flue extract (Close, Score 10).

6.7 The kitchen will be Small, less than 30 covers or small sized restaurant (Small, Score 1).

6.8 There will be the Indian cooking proposed to take place at the premises. Therefore, the cooking type is classed as High (Score 7).

6.9 The results of the overall assessment are potentially a High Risk.

7. The Odour Management Plan

7.1 Section 7 has quantified that as a worst case for the consented change of use development (provided the recommendations are taken into account) there is deemed to be a 'High' risk of potential nuisance and ordinarily a High level of odour mitigation would be recommended.

Proposed Ventilation and Extraction System

7.2 The proposals are for the installation of an external high-level flue extract to the side of the property, refer to plans in Appendix 2. The example mitigation requirements which could be used:

1. Carbon filtration (carbon filter with a 0.2 – 0.4 residence time), see attached example.

Maintenance Programme (Type, Frequency and Regime)

7.3 To minimize the risk of complaints, it is recommended that:

- A visual inspection of the ventilation system be carried out at least once a week. All metal surfaces should be checked to ensure that there is no accumulation of grease or dirt and that there is no surface damage;
- Cooker hoods and grease filters should be cleaned on a daily basis;
- Baffle type self-draining filters and collection drawers should be cleaned weekly, as a minimum. The cleaning period for mesh filters should be at least twice a week;
- Cleaning period for extract ductwork should as follows:

Use	No. hours use per day	Minimum cleaning interval
Heavy use	12-16	Every 3 months
Moderate use	6-12	Every 6 months
Light use	2-6	Annually

7.4 Based on the information provided, it is likely that the premises will be of Light to Moderate use and should be cleaned at least every 6 months.

- Periodic 'deep hygiene cleaning' should be undertaken by a specialist contractor. All accessible main ductwork runs and branches, including fitted equipment should be inspected and cleaned;
- All fans are to be maintained on a regular basis as recommended by the fan manufacturer; and
- Ventilation grilles, where fitted should have easily removable cores to facilitate cleaning.

Recommendations for maintenance of odour control system

7.5 If the system employs fine filtration and carbon filtration;

- Change fine filters every two weeks
- Change carbon filters every 4 to 6 months

7.6 Daily cleaning keeps the filters working at their optimum efficiency and will greatly reduce the number of service visits required throughout the year.

7.7 It will be important that the odour control methods are fully implemented and additionally, that the proposed OMP management measures and frequency of servicing is complied with. With respect to the servicing and maintenance regime, audit and service records should be maintained and made available to the Local Authority on demand.

8. Summary

8.1 With respect to odour, it has been identified that providing that the recommendations are taken into account, there should not be a loss of amenity at the existing residential receptors in the vicinity of the extraction flue and as long as the system similar to the ones recommended in the OMP are implemented, this would consist of using the "best practicable means" and would prevent statutory nuisance occurring.

8.2 If the proposed extraction system is properly maintained on a regular basis, it is highly unlikely that odour would become an issue in the future.

Appendices

APPENDIX A – Site Location

Site location

APPENDIX B – Classification of Odour and Grease Content of Extract Air from Commercial Kitchens

Table 2A: Table detailing the grease and odour content of various types of food

Catering establishment	Description	Odour content				Grease content			
		Low	Moderate	High	Very high	Low	Moderate	High	Very high
Tea shop		■				■			
Pizza restaurant	Herb		■				■		
Steakhouses	Fat		■				■		
French	Herbs/garlic		■				■		
Italian	Herbs/garlic		■				■		
Most pubs	Fat		■				■		
Chinese	Ginger, spices, oil		■					■	
Japanese	Spices, oil		■					■	
Cantonese	Spices, oil		■					■	
Indian	Spices, oil			■				■	
Thai	Spices, oil			■				■	
Vietnamese	Spices, oil			■				■	
Kebab	Fat cooking meat			■				■	
Fried Chicken	Oil, cooking meat				■				■
Pubs (fried)	Oil, cooking meat				■				■
Fish & chip	Oil				■				■
Fast food, burger	Oil, cooking meat				■				■

Table 2B: Table detailing the grease & moisture content of various cooking appliances

Cooking appliance	Grease loading			Moisture content		
	Light	Medium	Heavy	Light	Medium	Heavy
Cooking pots	■					■
Bains Marie	■					■
Steam ovens	■					■
Pizza ovens		■			■	
Bratt pans		■				■
Oven ranges		■			■	
Flat top grills		■			■	
Chip fryers		■			■	
Salamanders		■			■	
Charcoal			■		■	
Gas fired open grills			■		■	
Char boilers			■		■	
Chinese wok ranges			■			■

APPENDIX C – EMAQ Odour Impact Risk Assessment Methodology

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach.

Impact Risk	Odour Control Requirement	Significance Score*
Low to medium	Low level odour control	<20
High	High level odour control	20-35
Very high	Very high level odour control	>35

*based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type.

Criteria	Descriptor	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10m/s
	Moderate	10	Discharging 1m above eaves at 10-15m/s
	Good	5	Discharging 1m above ridge at 15m/s
Proximity of receptors	Close	10	Closest sensitive receptor less than 20 m from kitchen discharge
	Medium	5	Closest sensitive receptor between 20-100m from kitchen discharge
	Far	1	Closest sensitive receptor greater than 100m from kitchen discharge
Size of kitchen	Large	5	More than 100 covers or large sized restaurant
	Medium	3	Between 30-100 covers or medium sized restaurant
	Small	1	Less than 30 covers or small restaurant
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish and chips
	High	7	Kebab, Vietnamese, Thai or Indian
	Medium	4	Cantonese, Japanese or Chinese
	Low	1	Most pubs, Italian, French, pizza or steakhouse

APPENDIX D – Specification for Carbon Filters

Carbon Discarbs and Panels

The Filter Business

Operational Criteria

As far as possible water vapour should be eradicated from the air-stream to eliminate condensation within the filter that could cause porous blockage causing a dramatic increase in resistance – this also applies to loose carbon, however humidity levels as high as 80% RH are normally acceptable providing no interstitial condensation takes place.

Air-stream temperatures entering the filter in excess of 40°c should be avoided. In the case of anticipating temperatures above this level steps should be taken to reduce the temperature to an acceptable level by fresh air bleed, cooling coil or heat exchanger. In catering and food preparation applications smoke and grease must be removed from the air-stream prior to entry into the carbon

Dwell Times

In order to ensure a carbon filter operates satisfactorily certain criteria need to be met which do not apply to particulate filters. The most important aspect is the "dwell time" (the period of time the air is in contact with the carbon). The minimum dwell time used is 0.1 seconds and this is shown below as maximum permissible airflow. The dwell time may increase considerably according to the contaminant to be removed.

Application

Carbon filtration is ideal for removing unpleasant or even dangerous odours and gases from a wide variety of sources. The ever increasing awareness of this problem from public health authorities and environmentalists has resulted in an increase in the use of the unique properties of activated carbon filtration.

Carbon will adsorb chemical molecules in the air stream in varying degrees according to the type of contaminant and the period of time the air remains resident in the carbon. Activated Carbon in its loose granular form can present problems as there is a tendency for granules to abrade one another, this causes both settlement of the carbon – creating potential bypass voids and produces carbon dust that can be re-entrained into the air-stream. The unique bonding method eradicates these problems by producing a solid and stable biscuit of consistent quality and dimensional stability that produces an even resistance. Once formed the biscuits are bonded in a rigid mitred 'U' channel Frame for a panel or into a galvanised steel case for the discarb.

Technical Information

Due to the complex nature of adsorption, carbon filters are generally designed to suit the application, however, the following information is given as an indication of the physical requirements for their use.

Filter Type	Typical Panel Size (HxWxD)	Maximum Permissable Airflow (m^3/s) at 0.1 sec dwell time	Resistance at 0.1 sec (pa)	Resistance at 0.2 sec (pa)
Panel Frame	595 x 595 x 20mm	0.07	100	50
Panel Frame	595 x 595 x 45mm	0.16	100	50
Panel Frame	600 x 600 x 22mm	0.07	100	50
Panel Frame	495 x 495 x 18mm	0.06	100	50
Discarb	597 x 297 x 597mm	0.52	130	65
Discarb	597 x 597 x 293mm	0.52	130	65
Discarb	597 x 198 x 597mm	0.34	130	65
Discarb	597 x 597 x 597mm	1.04	130	65

In our constant endeavour to seek product improvement The Filter Business reserve the right to modify designs or materials without prior notice. E&OE

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