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Project Reference : J1252/3
Date of Initial Issue : 17 October 2023
Revision : 2

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Planning Consent Information

Odour Assessment

Soul Foods Group

KFC & TACO BELL Restaurants
Units 3a &3b Parrs Wood Complex, Didsbury, Manchester M20 5PG

KFC

TACO BELL

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Document Control

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Job Number	J 1252 / 1253

Document Status and Review Schedule

Report No.	**Date**	**Status**	**Reviewed By**
KFC/TB1253/3-MD01	17/10/2023	Final	Mark Denton (Commercial Director)

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1. Introduction

1.1 This report sets out an odour risk assessment for a proposed restaurant redevelopment at Units 3a & 3b Parrs Wood Complex, Didsbury, Manchester, M20 5PG.

It should be noted that this assessment is based upon the fact that the new units are being formed from an existing single unit and the extract systems from the rear of the original unit to atmosphere at roof level >40m away are, wherever possible, being retained and adapted to serve the two new units, - as such allowances have been made for the mixed nature of the proposed connected units to more accurately reflect the combined nature of the kitchen extracts as proposed.

1.2 The report describes the methodology and findings of the odour risk assessment, and identifies the level of odour abatement that will be required to minimise the risk of odour impacts resulting from the operation of the proposed restaurant.

2. Odour Assessment

2.1 Defra's Guidance on the 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems' (Defra, 2005) contains an assessment procedure for identifying the potential risk of odour impacts from commercial kitchen operations. The results of this risk assessment can be used to determine a suitable level of odour abatement to be installed into a commercial kitchen.

2.2 The risk assessment for odours is split into the following four parts:

- dispersion;
- proximity to receptors;
- size of kitchen; and
- cooking type and grease loading.

2.3 Each part is given a risk rating score and the total risk rating denotes the level of odour abatement, which is likely to be required to prevent the kitchen from causing odour nuisance impacts. The following sections of this report outline each part of the risk assessment in relation to the proposed restaurant.

2.4 It should be noted that where assumptions have been made these are clearly stated in the risk assessment and are based on the professional experience of Denmech Ltd.

Dispersion

2.5 The risk rating for dispersion relates to the conditions under which kitchen extraction emissions are discharged. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

- VERY POOR (20) – Low level discharge, discharge into courtyard, or restriction on stack;
- POOR (15) – Discharge not low level, but below eaves, or discharge rate below 10 m/s;
- MODERATE (10) – Discharging 1 m above eaves at a rate of 10-15 m/s;
- GOOD (5) – Discharging 1 m above ridge at a rate of 15 m/s or more.

2.6 The risk rating for dispersion is judged to be MODERATE. Emissions will be emitted to atmosphere via dedicated, jet discharge cowls at high velocity (> 10 m/s) on the roof the building. The discharge of the systems(s) is adjacent to numerous existing other systems from adjacent commercial units and at a similar level to the roof of the closest residential / commercial properties some 40m distant.

Proximity to Receptors

2.7 The risk rating for proximity to receptors relates to the distance between the point of discharge of kitchen emissions and the nearest sensitive receptor locations. Sensitive receptor locations may be residential properties, commercial premises or frequently used public open spaces. The relevant risk ratings described in the guidance are shown

below. The risk score is shown in parentheses. For the purpose of this assessment, it is assumed that the proposed development has been built and is operational.

- CLOSE (10) – Closest sensitive receptor is less than 20 m from kitchen discharge;
- MEDIUM (5) – Closest sensitive receptor is between 20 and 100 m from kitchen discharge;
- FAR (1) – Closest sensitive receptor is more than 100 m from kitchen discharge.

2.8 The risk rating for the proximity to residential and/or commercial properties is judged to be MEDIUM; there are commercial premises situated between 20 and 100 m to the east and west of the proposed extract discharge.

Size of Kitchen

2.9 The risk rating for size of kitchen relates to the volume of food prepared by the kitchen and is described in terms of the capacity of the restaurant or take-away. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

- LARGE (5) – More than 100 covers or a large-sized take-away;
- MEDIUM (3) – Between 30 and 100 covers or a medium-sized take-away;
- SMALL (1) – Less than 30 covers or a small take-away.

2.10 The proposed combined restaurants will cater for up to 88 covers at any one time. The restaurants are thus judged to be MEDIUM in terms of the size of the kitchen.

Cooking Type and Grease Loading

2.11 The risk rating for cooking type and grease loading relates to the type of cooking methods employed in the kitchen and the type of food prepared. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

- VERY HIGH (10) – Pubs (those serving a 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.

2.12 The proposed kitchens will produce varied foodstuffs ranging from Mexican cuisine consisting predominantly of nachos, burritos and fries, through to Fried Chicken, - the shared nature of the common discharge systems will have a diluting effect upon the worse scoring discharge and thus when a weighting is applied to account for this and the greater seating capacity of the Mexican style restaurant the risk is judged to be MEDIUM in terms of grease loading in the cooking emissions.

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Risk Assessment Summary

2.13 The odour risk assessment summary is shown in Table 1 for the proposed restaurant.

Table 1: Restaurant Kitchen Odour Risk Assessment Summary

Criteria	Risk Rating	Risk Score[1]	Description	Comments
Dispersion	Moderate	8	Discharging 1 m above eaves at a rate of 10-15 m/s.	Emissions will be emitted to atmosphere via high velocity cowls on the roof of the building. The discharge of the systems(s) is adjacent to numerous existing other systems from other commercial units and well above the level of the closest commercial properties some 40m distant.
Proximity to Receptors	Medium	3.5	Closest sensitive receptor is between 20 and 100 m from kitchen discharge.	There are residential properties Greater than 100m away across a major trunk road. as well as a commercial properties located approximately 40m distant to the exhaust vent at the West.
Size of Kitchen	Medium	3.5	Between 30 – 100 covers per day.	The proposed restaurants have seating capacities of 40[KFC] and 48[TB] so will cater for up to a maximum of 88 covers at any one time – this include external seating provision and it is not anticipated that this level of occupancy will be reached frequently.
Cooking Type and Grease Loading	Medium	4	Equivalent to a Cantonese, Italian, French restaurant.	The proposed kitchens will produce varied foodstuffs ranging from Mexican cuisine consisting predominantly of nachos, burritos and fries, through to Fried Chicken, - the shared nature of the common discharge systems will have a diluting effect upon the worse scoring discharge and thus when a weighting is applied to account for this and the greater seating capacity of the Mexican style restaurant the risk is judged to be MEDIUM in terms of grease loading in the cooking emissions.
TOTAL RATING	**Low/Med**	**19**	**A low to medium level of odour abatement required.**	

[1] Total Risk Score of <20 = Low to Medium Risk, 20 to 35 = High Risk; and >35 = Very High Risk.

2.14 The overall odour risk rating of the delivery outlet is 'low to Medium'. This denotes that it does not require a high level of odour control to eliminate the risk of odour impacts for nearby residential / commercial properties.

Recommended Odour Abatement System

2.15 This section of the report briefly outlines the odour control measures that would need to be installed on the kitchen extract system at the restaurant to provide optimal odour abatement and minimise the risk of odour impacts at surrounding properties.

2.16 The odour control measures suggested are those recommended within Defra's guidance on odours from commercial kitchens (Defra, 2005) for kitchens with a 'Low to medium' odour risk assessment score.

2.17 The guidance outlines that abatement systems that offer a Low to medium level of odour control may include:

- Odour control
- Grease Filtration (Baffle trap at kitchen extract hood)
- High level, high velocity vertical discharge to improve dilution and dispersion
- Fine filtration or ESP following by carbon filtration (carbon filters rated with a 0.1 second residence time).
- Fine filtration followed by counteractant/neutralising system to achieve the same level of control as 1.

2.18 In addition to this, the guidance states that the flue shall:

1. *Discharge the extracted air not less than 1 m above the roof ridge of any building within 20 m of the building housing the commercial kitchen.*

2. *If 1 cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1 m above the roof eaves or dormer window of the building housing the commercial kitchen. Additional odour control measures may be required.*

3. *If 1 or 2 cannot be complied with for planning reasons, then an exceptionally high level of odour control will be required.*

2.19 The flue exit will discharge emissions approximately 1 m above the roof eaves of the development building, and above the roof ridges of the nearest residential properties, and thus it is judged that a medium to low level of odour control will suffice in this instance.

Odour Abatement System

2.20 In accordance with the recommended odour abatement systems identified in paragraph 2.17, and following discussions with the client, the following odour abatement system has been identified as the most effective and feasible option that will be installed at the proposed restaurant. It is judged that the system identified in Table 2 will offer a suitable level of odour abatement and mitigate potential odour impacts at nearby sensitive locations as much as practicable.

2.21 It should be noted that the odour abatement system to be installed should be specified and designed by a suitably qualified contractor. It is imperative that, following commissioning, the system manufacturer/supplier provides comprehensive information regarding the maintenance of the system to ensure that optimal odour abatement performance is maintained during the restaurant's operation. It is also recommended that odour abatement efficiency testing is undertaken on the system following commissioning.

Table 2: Recommended Odour Abatement System

Abatement Stage	System	Comments
Emissions Discharge	High Level, high velocity discharge. Augmented by UV Ozone Treatment systems.	The flue will terminate above the eaves of surrounding buildings. It will be designed with a vertical discharge and high efflux velocity. The flue will not include anything to inhibit dispersion such as a rain cover or cowl. UV Ozone treatment incorporated to mitigate any residual odour risks

3. Proposed Odour Abatement System

3.1 In accordance with the recommendations set out in Table 2, an odour abatement system has been designed for the kitchen extraction systems to achieve a 'Medium to low level' of odour control. The Kitchen extract canopy will include a baffle filter to mitigate entrained grease and oil being transported along the extract duct system to atmosphere. A Ultra Violet Ozone treatment systems will be installed in the KFC extract system to mitigate odours within both extract streams. The terminal discharge arrangements will incorporate a high velocity vertical discharge cowl configured to ensure discharge velocities greater than 10 m/s

3.2 The proposed odour abatement system and flue design adheres to the recommendations of the odour risk assessment and meets the requirements of the Defra guidance on the control of odour and noise from commercial kitchen exhaust systems (Defra, 2005) for an odour abatement system achieving a 'low to medium level' of odour control.

3.3 A calculation illustrating the discharge velocities for the proposed flue design and description of the UV Ozone treatment system is appended to this report as Appendix A1.

Appendix 1. Odour Abatement System and Flue Specification

DW172 Calculated Extract Volumes * :

KFC: 2.3 m^3/s
TB: 0.65 m^3/s

Gross Kitchen Extract volume:

→ 3 m^3/s

Shared Kitchen extract duct sizes:

Ref	Size	Duty (Unit)	Volume (m^3/s)	Vel' (m/s)	ΔP1 Pa/m
1	300 x 500	[TB + KFC]	1.025	6.8	1.1
2	500x500	[KFC]	1.975	8	1.1

Jet cowl diffuser sizing and discharge velocities at balanced conveyed volumes:

Ref	Size (∅) (mm)	Duty (Unit)	Volume (m^3/s)	Vel' (m/s)	ΔP1 Pa/m
1	315	[TB + KFC]	1.025	**13.5**	5.5
2	450	[KFC]	1.975	**12.4**	4

Typical jet cowl diffuser to be installed at duct terminal:

* (DW 172 Calcs available upon request)

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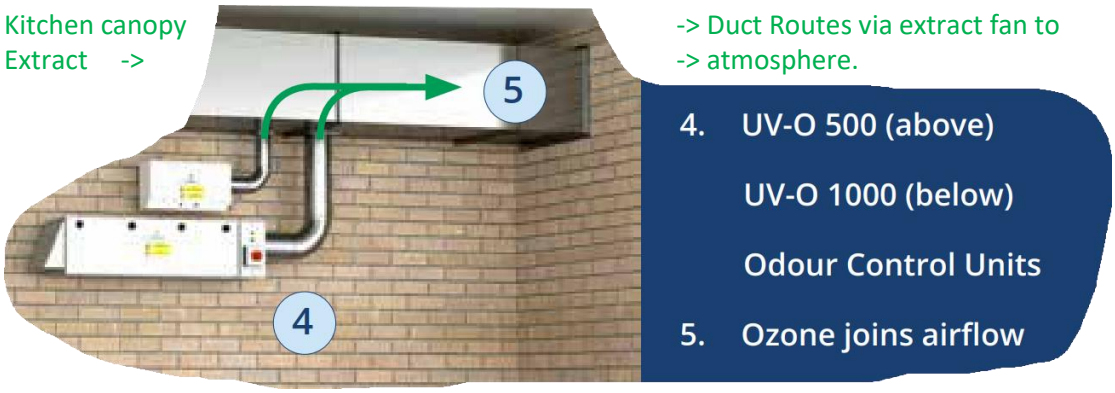
Ultra Violet Ozone Treatment system:

Oxidation using ozone and/or activated oxygen ions can be used to treat odour emissions from commercial kitchens processes. Such systems use electrostatic fields or UV lamps to convert atmospheric Oxygen into oxygen ions with a small amount of Ozone. A mixture of Oxygen ions and Ozone is introduced to the extracted airstream within the extract duct where a reaction occurs “capturing” and neutralising aromatics and pollutants. Odours are effectively oxidised within the duct and the treated air then expelled to atmosphere.

Typical treatment time for effective operation of this system is of the order of 5 – 20 Seconds – in this case the extended ducted systems at over 75m lends itself well to this application with duct velocities of upto 8 m/s the dwell time within the duct will be approaching 10 seconds. The high level high velocity discharge proposed in this case also is a sound design provision and well matched for the inclusion of this system.

Proposed UV Ozone system: