

Project New Wing Pizzeria

Subject Design and Access Statement: Building Services Description

Project no 045387

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Overview

The British Museum require an upgrade of an existing ventilation system that is serving an electric oven currently used for making pizzas within the New Wing Pizzeria restaurant. The existing arrangement has been in place since 2015, however over time the ceiling around the existing canopy have begun to discolour which is an indicator of insufficient ventilation extraction rates.

A subsequent survey confirmed that ventilation provision is inadequate and therefore a new system has been designed to ensure extract and make-up air provisions satisfy DW-172 (the Standard for kitchen ventilation systems). The minimum extract rates have been established utilising the thermal convection method norm.



Figure 01, Existing oven and canopy

The remedial works for this proposal will:

- Replace the existing canopy of the oven (figure 01)
- Disconnect and remove the associated extract duct serving the canopy. The extract ductwork that remains predates the pizza oven and shall remain to serve the prep and pot wash areas as was originally intended.
- Install a new Halton induction oven canopy, incorporating removable high efficiency grease filters, extract connections and a make-up air connection.
- A dedicated make-up air fan and duct arrangement shall be installed within the 1970s ceiling. Fresh air is drawn from ground level via an existing vertical services void, the air is then delivered directly to the new oven canopy. The air intake will be discretely positioned underneath and flush with 2nd floor slab overhang. The intake louvre colour proposed is black or brown (tbc), subject to approval from the Authority.
- A new high velocity extract duct system complete with a high temperature extract fan shall be installed within the voids in the 1970s ceiling (figure 4). This fire rated duct system shall exit at the North elevation of the building directly above an existing extract louvre, and shall turn and rise vertically up as a ventilation stack fixed to the façade. The termination point shall be a minimum 1m above the existing parapet via a dedicated stack terminal.

The kitchen canopy is an induction type, with both extract and supply air connections. This effectively means that it is operated independently from the general restaurant ventilation system and will prevent odours migrating within the wider the restaurant and servery area.

Both the kitchen extract and supply air fans have been chosen to meet the acceptable noise criteria for a restaurant setting (45dB(A) limit) in line with CIBSE Guidelines. The kitchen extract fan selection has a breakout noise of 38dB(A) and complete with silencers both on the intake and outlet sides. The silencers are complete

with a special high temperature lining. The supply air fan runs with a noise breakout of 37dB(A), this fan arrangement includes a silencer at the outlet (room side) position only.

A number of alternative plant locations were assessed prior to the development of the current proposal. The key challenge was finding a discreet routing for the exhaust terminal location and the positioning of the fan. The prospect of adding louvres to the southern and western elevations to exhaust were discounted in part due to the presence of glazed rooflights which provide natural light both to the staff restaurant and pizzeria restaurant levels. There is little prospect for bringing services across an open void internally. Furthermore, neither elevation contains existing surface mounted or HVAC building openings, meaning any intervention would be unsightly. Several surveys were undertaken to find a route internally and mount the fan within the existing roof plant. There is a fully operational commercial kitchen above the pizzeria restaurant which is complete with a suite of kitchen ventilation provisions. All existing service routes large enough to pass through the proposed extract duct to the roof slab are occupied and specifically designed to accommodate the existing plant. The commercial kitchen ceiling voids are already extremely congested to the point where any internal routing of a Ø300mm duct was deemed un-installable. The proximity to existing ventilation supply air louvres prevented a simple louvre termination on the North elevation. Therefore the only logical solution is provision of an external ventilation stack. The termination positions have been carefully selected to align with existing external building services, which include condensers, kitchen extract fans and air handling plant. Slightly further afield, but within the vicinity there are roof top chillers, combustion flues and large diameter pipework as well as other smaller services installations. The new termination point is directly adjacent the existing kitchen extract air handling unit No.1, and is a general improvement over the existing exhaust point, which is within a narrow alley adjacent to a portacabin structure. The pizzeria exhaust shall discharge in a vertical manner which is recommended for good pollutant dispersion in such applications. There are no operable windows in the immediate vicinity, hence the strategic location of the existing main kitchen plant.

The external ductwork and support brackets shall be painted in a matt black colour to aid in masking their presence.



Figure 2, Western View point over existing kitchen plant and flue terminal indicator



Figure 3, Western View within plant compound



Figure 4, Vent stack to terminate 1m above the edge parapet, behind the edge protection.



Figure 5, Vent stack exit point to external from ground level perspective

The extract air stream typically associated with electric pizza ovens has been assessed against published literature from the Building Engineering Services Association, DEFRA and Halton. The extract air typically associated with electric pizza ovens is low in terms of grease emissions. Figure 6 adjacent from a Halton study provides a useful comparison of emissions by cooking type. Furthermore, pizza or Italian restaurants as a general category are deemed low in terms of odour emissions.

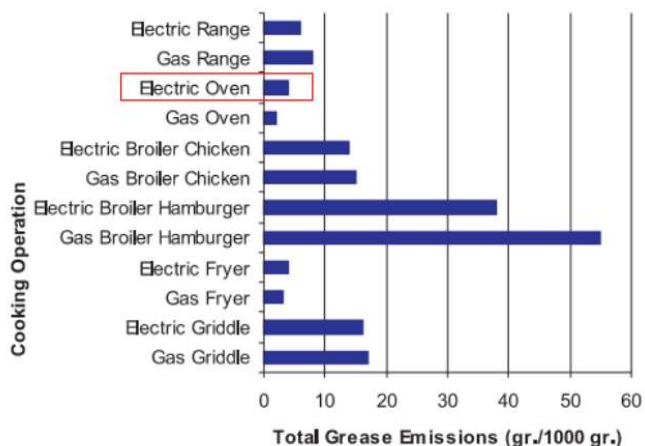


Figure 6. Cooking type grease emissions.

Source: Halton Kitchen Design Guide

Although withdrawn in 2015, the odour risk assessment tool within the DEFRA publication: *Control of Odour and Noise from Commercial Kitchen* still offers a clear framework for assessing the requirement for odour control. The risk assessment criterion is included within the following tables. A score of **17** has been attained utilising the method outlined in the risk assessment below.

The existing pizzeria is not known to have resulted in any complaints from odours since the installation was complete in 2015. With the overall improvement to the exhaust arrangement, coupled with the relative remoteness to the nearest external receptors and the general low extract air volume of 580l/ no additional odour control measures are proposed in relation to this single oven arrangement.

The key standards used in this design are CIBSE Guides A & B, DW 172, CEN/TR 16798 Part 4.

DEFRA: Odour Risk Assessment Tool

Impact Risk	Odour Control	Significant Score*
Low to Medium	Low level Odour Control	Less Than 20
High	High Level odour Control	20 to 35
Very High	Very High Level Odour Control	More than 35

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

Criteria	Score	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 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge.
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away.
Cooking Type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips.
	High	7	Kebab, Vietnamese, Thai or Indian.
	Medium	4.	Cantonese, Japanese or Chinese
	Low	1	Most pubs, Italian, French, Pizza or steakhouse.