

Environmental Noise Assessment

Proposed McDonald's with drive thru
Horton Road
Devizes
SN10 2GJ



On Behalf of 

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1	16-1-26	Proposed Site Layout Plan updated to P004C
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1 Executive Summary

It is proposed to construct a new single storey McDonald's restaurant (NG50) at the former garage site on the junction of Horton Road and A361, Devizes, SN10 2GJ. The new restaurant will have a drive thru lane with side-by-side Customer Order Displays (COD) and 37 designated car parking spaces. It is proposed to trade 24-hours per day.

This Noise Impact Assessment, which has been commissioned by McDonald's, to accompany the planning application to assess the potential impact of noise created by vehicles using the drive thru lane & dedicated parking spaces, from the roof plant as well as from deliveries, against existing sound levels.

McDonald's site lies on a finger of land running into the roundabout at the junction of Horton Road and the A361 on the northern periphery of Devizes. To the south across Horton Road are houses and immediately the north of the roundabout are a small number of houses too. Immediately to the east is a larger area of land which has recently been granted permission for industrial/commercial uses and there are existing industrial businesses further along the A361 to the north of the site.

A week long survey, has been carried out to establish current ambient sounds, which can be classified as being "*moderate*" at 59 dB L_{Aeq} during the day dropping back to 52 dB L_{Aeq} overnight and were controlled predominately by traffic passing along the A361 and Horton Road. Background sound levels were in the mid-50's dB L_{A90} during the day, dropping to mid-30's dB L_{A90} by night.

This existing environmental soundscape will provide a high degree of masking of both fixed plant and site activity noise given a reasonable separation distances to the neighbours, however the table below does set out the mitigation measures being required for this site;

Mitigation Item	Required
Limit trading hours	×
Acoustic boundary fence required	×
Plant attenuation –	
kitchen extract fan discharge silencer 900 x 900 x 2100mm long	✓
kitchen extract fan acoustic enclosure	✓
FAI silencers on AHU's S1 & S2 1200mm long	✓
Exhaust silencers on Beverage cell and general kitchen extract fans	✓
Danfoss chiller & freezer condensers can to be used	✓
ABS drinks cooler condenser can be installed	✓
Customer Order Displays fitted with ambient level control	✓
Limit deliveries hours to between the hours of 7am to 11pm	✓

Table 1 summary of mitigation requirements

With these mitigation measures in place noise from the proposed development can be minimised and reduced to prevent any *adverse impact* on the neighbours.

2 Introduction

2.1 Overview

It is proposed to construct a new single storey McDonald's restaurant (NG50) at the former garage site on the junction of Horton Road and A361, Devizes, SN10 2GJ. The new restaurant will have a drive thru lane with side-by-side Customer Order Displays (COD) and 37 designated car parking spaces. It is proposed to trade 24-hours per day.

This Noise Impact Assessment, which has been commissioned by McDonald's, accompanies this planning application for a drive-thru restaurant and assesses the potential impact of noise created by vehicles using the drive thru lane & dedicated parking spaces, from the roof plant as well as from deliveries, against existing sound levels.

2.2 Objectives

To monitor existing sound levels closest to the neighbours and assess the likely mitigation that will be required to protect any adverse impacts on the neighbours from the noise generated by this proposed development.

Customer vehicles using the drive thru lane, making their orders at the Customer Order Displays as well as parking in the 28 dedicated parking spaces and 3 EV charging bays, outside the restaurant will inevitably make some noise that could impact on the neighbours. The sound of the three weekly deliveries will also need to be considered and whether deliveries at night are appropriate. These sources will be individually and collectively assessed within this report.

The restaurant requires mechanical services equipment to ventilate the kitchen and keep the building warm in winter and cool in summer. This equipment will be located on the roof of the single storey restaurant building. Noise from this equipment will also be looked at and suitable mitigation detailed to ensure it does not disturb the neighbours.

This report will set out a summary of the necessary mitigation measures that will be required to ensure compliance with local and National planning policy.

3 Planning Policy

3.1 Wiltshire Council

Wiltshire Council's Local Plan (pre-Submission Draft 2020-2038) July 2023 address noise from developments in *Policy 98 - Ensuring High Quality Design and Place Shaping*, stating;

A high standard of design is required in all new developments, including extensions, alterations, and changes of use of existing buildings. This will be achieved through:

.....

viii. having regard to the compatibility of existing land and building uses in the vicinity of the proposed development, the impact of the development on the amenities of existing occupants, and ensuring that appropriate levels of amenity are achievable within the development itself, including the consideration of vehicle parking, access and movement, internal and external space standards, private outdoor space, waste storage and collection, privacy, overshadowing, mass and height (overbearing), vibration, and pollution (e.g. light intrusion, noise (including vibration), smoke, odour, fumes, effluent, waste or litter);

.....

Typically, the Wiltshire EHO recommends that the proposed development should aim for operational rating levels not exceeding 5dB below the existing background noise levels. However, it is noted that this is not part of a policy and that a deviation to this aspiration might be considered.

3.2 National Planning Policy Framework (NPPF)

The NPPF¹ sets out governmental planning policy for England. The NPPF states that, with respect to noise, planning policies and decisions should aim to;

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquility which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

¹ Revised December 2024

The Framework also states that consideration should be given to the Noise Policy Statement for England².

3.3 Noise Policy Statement for England (NPSE)

The NPSE aims to “Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development” and has three aims;

- Avoid significant adverse impacts on health and quality of life from environmental, neighbor and neighborhood noise within the context of Government policy on sustainable development
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbor and neighborhood noise within the context of Government policy on sustainable development
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighborhood noise within the context of Government policy on sustainable development.

NPSE shares the definitions from existing guidance. The WHO – Guidelines for Community Noise (2009), introduced the concepts of NOEL/LOAEL, where;

NOEL No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise.

LOAEL Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development... .. This does not mean that such adverse effects cannot occur."

² NPSE published by DEFRA March 2010

Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change. No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits.

3.4 Planning Practice Guidance (PPG)

Further guidance was published by Department for Communities & Local Government in March 2014 relating to Noise and is known as Planning Practice Guidance (PPG) and requires Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

Noise is rated within this guidance in terms of its "Observed Effect Level" and provides the following table giving examples;

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any changes in behaviour or attitude. Can slightly effect the acoustic character of the area but not such that there is a perceived change in quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep depreciation/awakening: loss of appetite. Significant. Medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 2 PPG Observed Effect Levels

3.5 BS7445 Description and measurement of environmental noise

BS7445-2:1991 (*description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*) describes methods for the acquisition of data which provide descriptors that enable;

- a description of the environmental noise in a specified area of land to be made in a uniform way;
- the compatibility of any land use activity or projected activity to be assessed with respect to existing or predicted noise.

The requirements of this Standard will be used to ensure consistency in sound measurements and their interpretation.

3.6 BS4142 Method for rating and assessing industrial and commercial sound

BS4142:2015+A:2019 provides a method for assessing the likely impact industrial and commercial noise will have on residential neighbour that depends on the margin by which the Rating Level of the specific sound exceeds the back ground sound and the context in which the sound occurs.

The table below details the likely impact based on the excess of the background;

Difference between background sound and Rating Level	BS4142 Assessment
+10 dB	Indication of a significant adverse impact
+ 5 dB	Indication of an adverse impact
0 dB	Indication of low impact

Table 3 BS4142 impacts

BS4142 requires that character penalties, if any tonality, intermittency, impulsivity or “other characteristics” are present in the noise are added to the assessed $L_{Aeq,T}$ level of plant noise to provide a Rating Level (L_{ArTr}).

The table below summarizes acoustic feature penalties;

Acoustic Feature	Correction dB		
	Just perceptible	Clearly perceptible	Highly perceptible
Tonality	2	4	6
Impulsivity	3	6	9
Intermittency		3	
Other characteristics		3	

Table 4 acoustic feature corrections

These penalties are additive, however the combine correction, for a clearly audible source would not be expected to be greater than 10 dB. Where the source is no louder than the background and has no readily perceptible features the Rating Level is often equal to the $L_{Aeq,T}$ level.

3.7 IEMA Guidelines for Environmental Noise Impact Assessment

The Institute of Environmental Management & Assessment (IEMA) has published its *Guideline for environmental Noise Impact Assessment*³, which addresses the key principles for noise impact assessments and provides guidance for assessing the impact of noise.

The IEMA guidance recognizes that each situation is unique and care should be taken when applying quantitative criteria that the context of the site, its environs and the nature the noise sources to be assessed are considered.

The table below sets out effect levels for changes in sound level (L_{Aeq}) for receptors of great and some sensitivity. However, these only applies to sources with broadly similar characteristics;

Category	Changes in sound level L_{Aeq} at receptor of great sensitivity
Very substantial	+10 dB
Substantial	+5 dB
Moderate	+3 to 5 dB
Slight	+3 to 5 dB (receptor of some sensitivity)
None/Not Significant	<3 dB

Table 5 Effect descriptors

In assessing the impact of noise created by the proposed development the increase in average noise level can be used to classify the likely impact, as shown the table below;

Changes in sound level	Category
0 dB	No impact
+3 dB	Just perceivable
+5 dB	Noticeable
+10 dB	Twice as loud

Table 6 showing perceptions to change in sound levels

An example of how the impact arising from a change in sound levels could be evaluated is presented in table below⁴.

Long-term Impact Classification	Short-term Impact Classification	Sound level change dB L_{pAeqT} (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

Table 7 showing relative significance in change of sound levels

From this it can be seen that for changes in, traffic noise for example, in the long term of less than 3 dB can be considered to have a *negligible impact*.

³ Iema Guideline for Environmental Noise Impact Assessment version 1.2 (November 2014)

⁴ Source HS2 Phase 1 Environmental Statement

3.8 Noise Criteria for on-site activity

The table below sets out the appropriate Standards by which each element of noise from the proposed development should be assessed by;

Noise Element	Assessment Standards	Criteria
Fixed plant	BS4142	<i>Rated level</i> no greater than background sound level
HGV deliveries	BS4142	<i>Rated level</i> no greater than background sound level
Customer cars on site	WHO Daytime	55 dB L _{Aeq} external amenity areas, 50 dB L _{Aeq} external sensitive facades
	WHO Night time	45 dB L _{Aeq} external sensitive facades & 60 dB L _{AFmax}
	IEMA	Ensure a Negligible Impact provided change in sound level less than 3 dB L _{Aeq}

Table 8 showing assessment criteria

4 Description potential noise impacts

The application, under consideration here, is to develop a plot of land forming part of a Business Park, to create a McDonald's restaurant with drive thru lane open 24 hours a day.

The key noise impacts that this application raised are;

- Noise from external plant required to ventilate and condition the kitchen & customer areas as well as provide cooling for any food storage.
- Noise from HGV vehicle deliveries 3 times a week,
- Noise from the customer vehicles coming and going from the site.

The closest residential dwellings are some 50m from the centre of the site to the north across the A361 and will have full view of the site, as well as the south, across Horton Road, where the site will be visible from upper floor windows only, through trees alongside the road.

5 Development Plan

The proposed site layout is shown on SCUR architects drawing No. 9045-SA-2029-P004G, an extract of which is shown below and a full copy at the rear of this report.

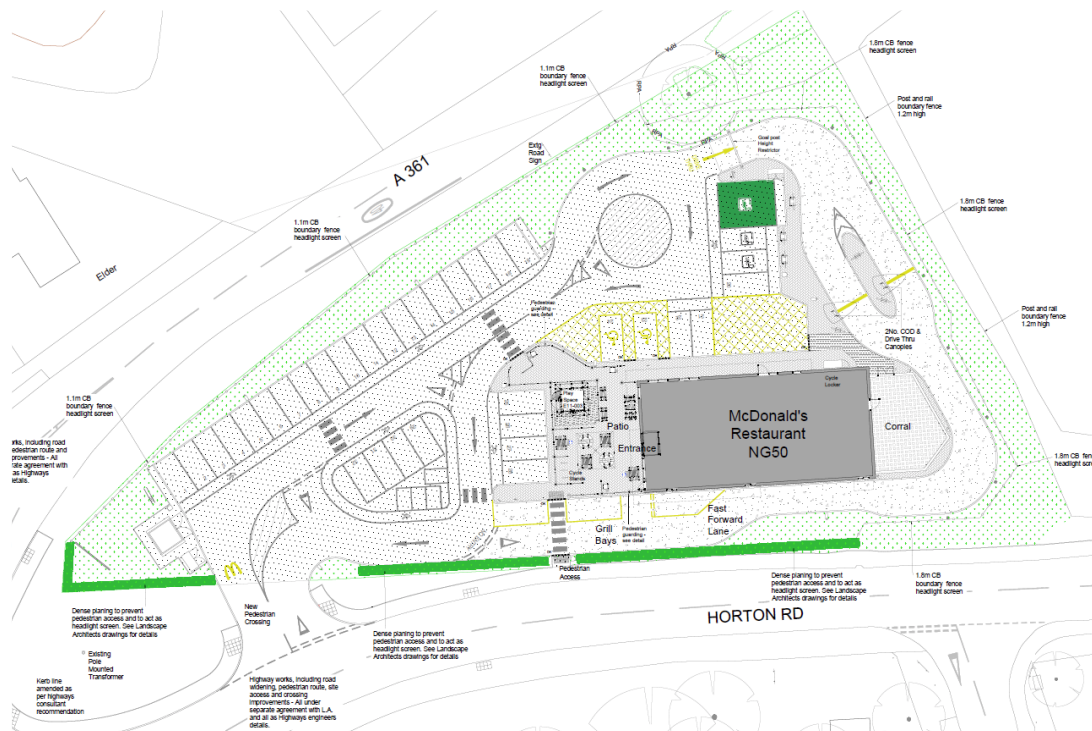


Figure 1 extract of proposed site plan

The aerial view below shows the site and the land uses around it;



Figure 2 land uses around McDonald's site

6 Sound Measurements

A logging sound level meter (SLM) was set up on the southern side of Horton Road, in front of the back garden fences of the houses on Bailey Close, as shown on the aerial view below;



Figure 3 aerial view and SLM

The photograph below shows the view from the measurement position back to the existing garage site;



Figure 4 photograph showing view from the slm toward the site

The sound meter/pre-amp/microphone was calibrated using a hand held calibrator before and after the survey which ran from Tuesday 8th April 2025 for a week, with no adverse variants being observed.

Details of the equipment used are given in the table below.

Meter Make	Model	Serial No.	Calibration Date	Calibration Certificate No.	Calibration due date
Rion	NL31	01273081	12-8-24	1166211	12-8-26
Rion	NC74	34794316	6-6-24	11663294	6-6-25

Table 9 showing measurement equipment details

The weather during the survey was fine with variable light winds and generally suitable for repeatable environmental sound measurement⁵.

6.1 Sound measurements

The chart below shows the L_{Aeq} sound levels recorded;

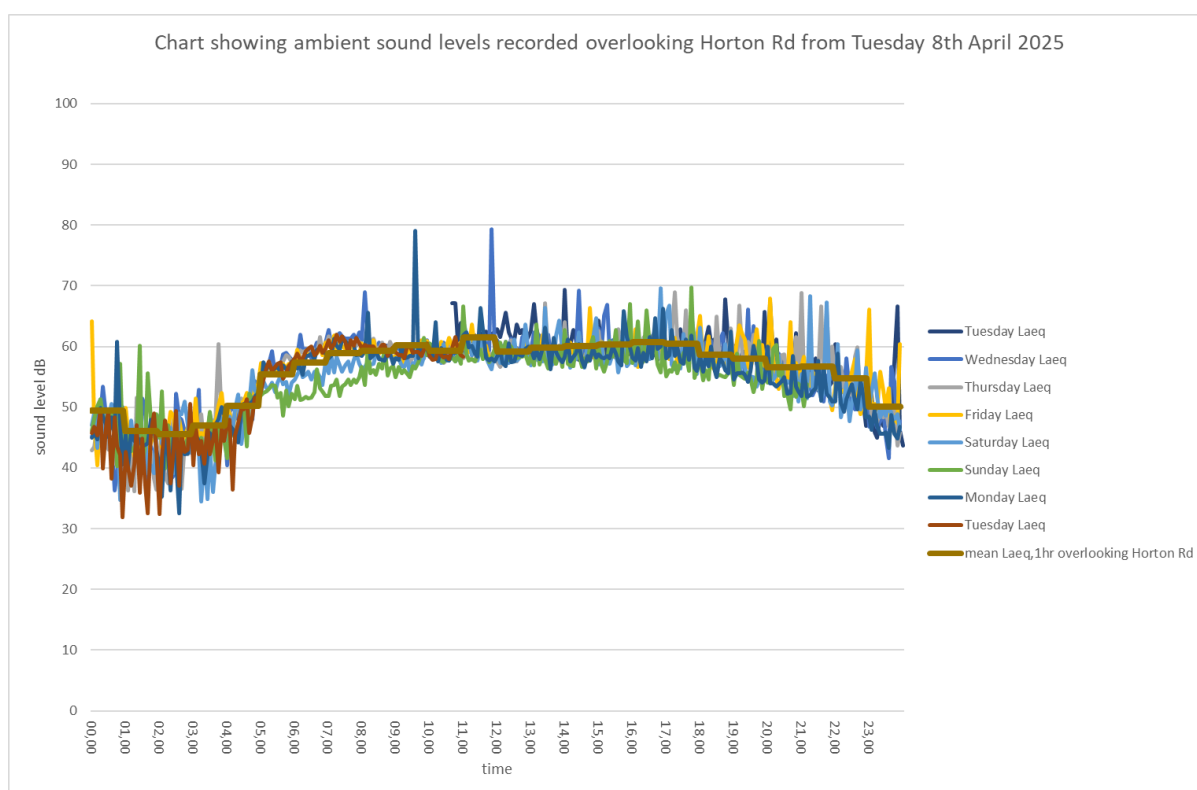


Figure 5 showing recorded LAeq levels

Figure 5 shows the L_{Aeq} levels in low 60's dB during the day, dropping back to upper 40's dB overnight.

⁵ <https://www.timeanddate.com/weather/@2651294/historic?month=4&year=2025>

The chart below shows the L_{Amax} values recorded;

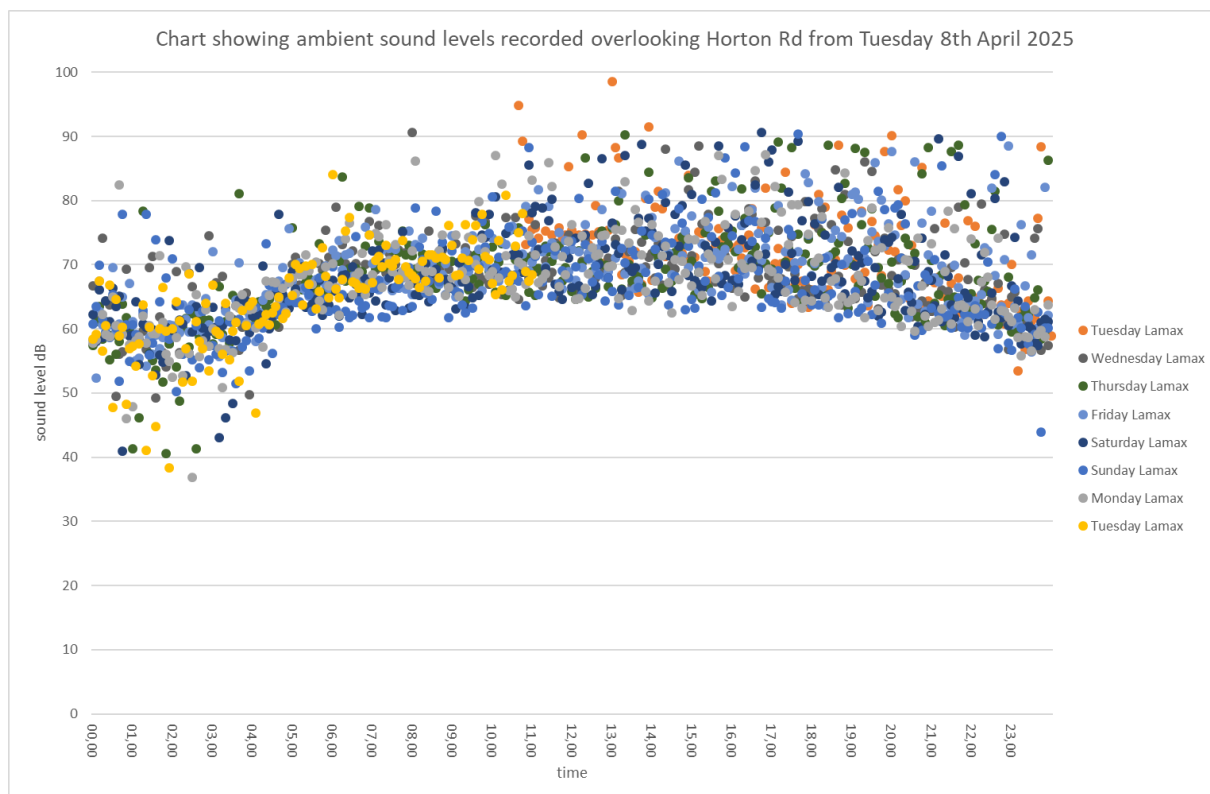


Figure 6 showing L_{Amax} values

This shows L_{Amax} levels ranged from 65 to 90 dB during the day and from 40 to 80 dB overnight.

The chart below shows the background sound levels (L_{A90}) values recorded;

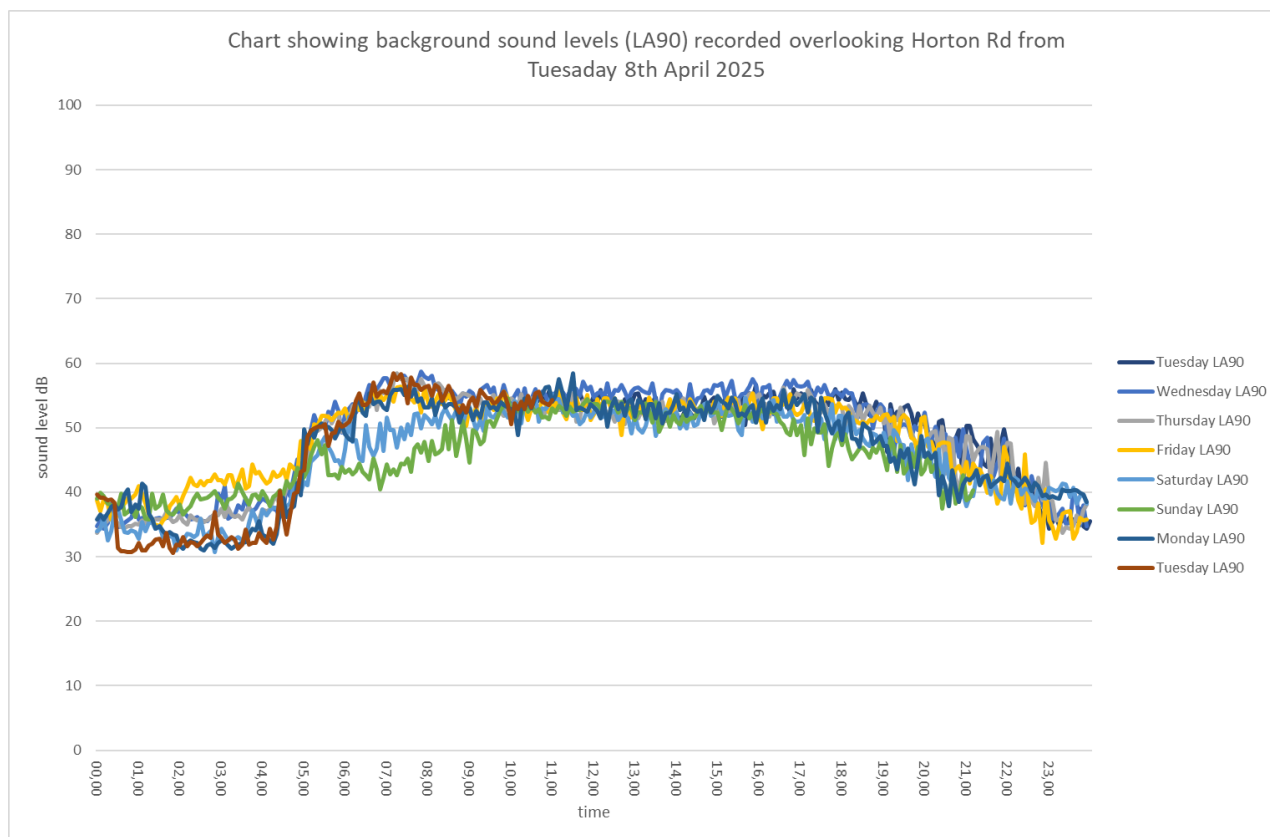


Figure 7 showing background sound levels

In accordance with the guidance set out in BS4142 a representative single number defining the “background sound level” can be obtained by considering the levels which most often occurred across the day and the night.

The chart over page shows the distribution of day and night time sound levels;

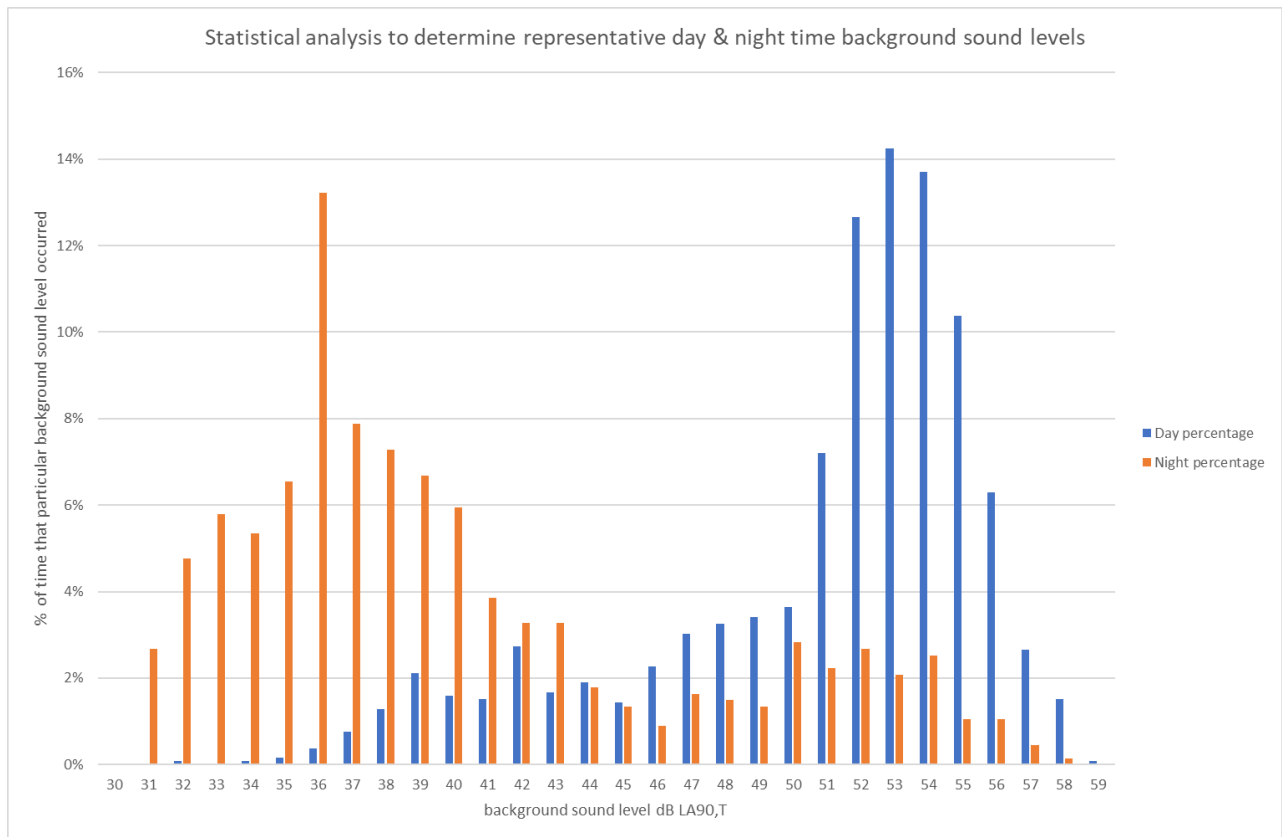


Figure 8 day & night time background sound level distributions

These charts show daytime background sound levels most frequently occurring was 53 dB L_{A90} daytime and 36 dB L_{A90} overnight.

7 Fixed Plant Noise

7.1 Plant location and prediction of noise levels

The plant will be located on the roof of the restaurant building (NG50 model type) and the mansard roof elements will fully screen the view of the plant from the ground. The typical layout of the plant is shown on CDM's drawings No. M1001 & 1002 copies of which are provided at the rear of this report.

The plant will consist of the kitchen extract fan E1, the kitchen supply air handling unit S1 (with three associated condenser units), the restaurant air handling units S2 (with its two associated condenser units), an ABS drinks machine cooler, a further three condenser units serving the manager's office, crew room and the door air curtain, plus a Chiller and a Freezer Condenser. There is also a small ASHP on the side of the Hot Water System (HWS) as well as Back of House (BOH) extract fan.

The kitchen extract fan and air handling units & condensers will run continuously, although each item of plant is inverter (or speed) controlled and will only work as hard as required. Speed of each will be controlled by the thermal load, the condensers will cycle on and off as required.

The level of sound created by all the plant running at full duty simultaneously as well as for typical night time operation⁶ has been calculated using iNoise implementing the requirements of ISO9613 Part 2⁷ and assuming the following noise control measures are fitted;

Noise Control Item	Dynamic insertion loss required					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
kit ext discharge silencer 900 x 900 x 2400mm long dB DIL	25	37	50	50	50	50
Kitchen extract fan acoustic enclosure dB R _w	22	32	38	45	43	40
AHU S1 & S2 FAI silencers 1200mm long	11	20	36	39	31	21
E3 Beverage Cell Extract 350 is 700mm long	10	15	21	26	24	18
E4 General kitchen extract 450id, 900mm long	10	15	21	26	24	18

Table 10 showing noise reduction requirements

The image below shows the restaurant building with the roof plant identified by red crosses;

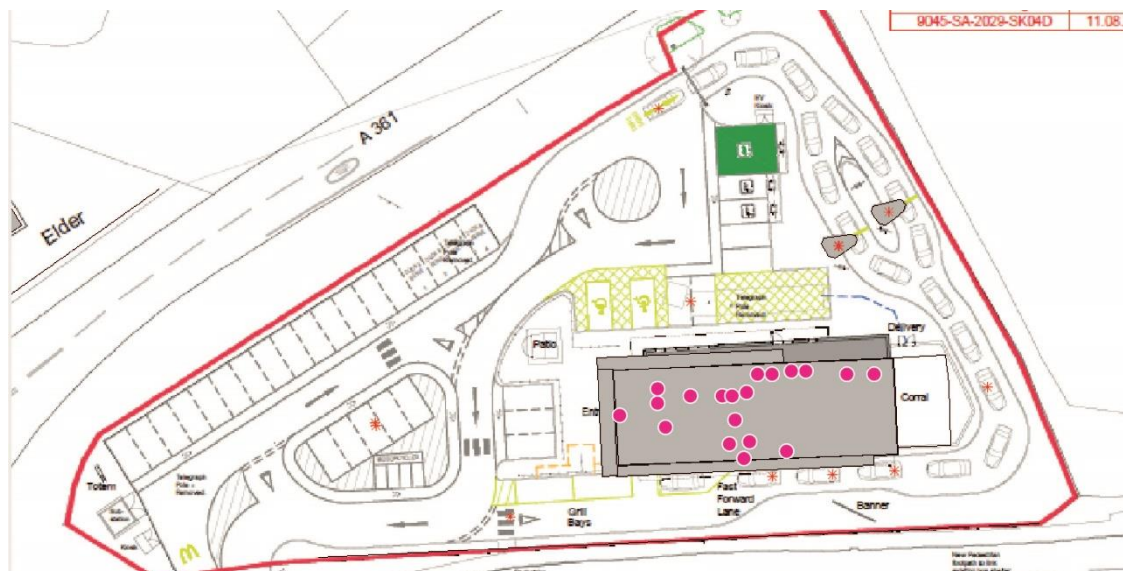


Figure 9 plan showing roof plant locations

⁶ Details of typical time night plant operation are shown in Appendix 1

⁷ ISO 9613-2:1996 (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation) including ISO/TR 17534-3:2015 (Acoustics - Software for the calculation of sound outdoors - Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1).

The table below shows the predicted plant sound levels at the neighbours⁸;

Location	Plant noise level	
	Day time dB L _{Aeq,T} at 1.5m AGL	Night time dB L _{Aeq,T} at 4.5m AGL
11 Bailey Close	33	32
12 Bailey Close	34	32
13 Bailey Close	34	32
14 Bailey Close	35	33
15 Bailey Close	35	33
16 Bailey Close	35	33
Elder	32	30

Table 11 showing predicted mitigated plant noise

This shows that the highest predicted day time plant noise levels will be outside the ground floor windows of Bailey Close, but will be no higher than 35 dB L_{Aeq,T} by day and 33 dB L_{Aeq,T} by night, both less than the background sound level.

A BS4142 assessment of these levels are provided later in this report.

8 McDonald's customer vehicle noise

8.1 Car Parking & drive thru noise

To assess whether the new customer activity will have an impact on the adjacent residents a comparison should be made between the noise generated by new McDonald's customers and the existing noise climate.

To make this assessment, a noise survey was carried out to identify the noise created by cars and vans using a drive thru lane of a McDonald's as well as parking up and using the restaurant itself (eating in).

The table over page shows the mean loudest recorded sound levels, activity duration, the calculated Single Exposure Level (L_{AE}) levels and derived sound power levels (L_{AE'w}) which will be subsequently used in the noise predictions;

⁸ Details of full calculations can be made available upon request

Element	Duration seconds	Sound Level at (m) dB L _{Aeq,T}	measurement distance measurement	L _{AE} dB	Derived L _{AE'w} dB
Drive Thru					
drive off street and stop at COD ⁹	10	65	5	75	97
make order with engine at idle	63	75	1	93	101
drive to Pay Point	6	67	5	75	97
pay at Pay Point with engine at idle	20	63	5	76	98
drive to Collection Point	8	67	5	76	98
collect food engine at idle	20	63	5	76	98
drive out and off down street	9	71	5	81	103
Parking					
drive in, back up, park, get out and shut 2 car doors get in car, shut 2 x doors & drive off	64	61	5	79	101
Vehicle Door Slam at 1m	1	88	1	88	96

Table 12 showing vehicle noise levels

ADL Traffic & Highways¹⁰ have estimated the number of customers, using the drive thru lane or customer vehicles parking up that can be expected to visit this new restaurant, through the week as well as on Saturdays.

⁹ Latest Customer Order Display operates on an automatic ambient level control so it is no louder than is required to be heard, when ambient levels are quieter in the evenings the play back volume of the member of staff will be reduced accordingly.

¹⁰ ADL Traffic & Highways Table A

The table below shows the predicted vehicle numbers on the site;

	Friday				Saturday			
	Total In	DT	Car Park	McDelivery	Total In	DT	Car Park	McDelivery
00:00	7	5	2	0	17	16	1	0
01:00	5	5	0	0	13	13	0	0
02:00	1	0	1	0	5	5	0	0
03:00	5	4	1	0	3	3	0	0
04:00	2	2	0	0	11	11	0	0
05:00	12	12	0	0	7	7	0	0
06:00	34	31	3	0	19	15	4	0
07:00	51	43	6	2	30	21	6	3
08:00	72	51	17	4	52	40	6	6
09:00	74	55	15	4	90	60	20	10
10:00	66	46	15	5	89	70	10	9
11:00	84	50	23	11	96	64	26	6
12:00	110	68	33	9	131	78	43	10
13:00	87	59	20	8	129	85	39	5
14:00	67	38	19	10	104	70	27	7
15:00	115	76	30	9	97	64	25	8
16:00	126	75	37	14	104	63	30	11
17:00	136	89	28	19	127	78	32	17
18:00	109	65	31	13	114	70	29	15
19:00	81	53	16	12	68	45	15	8
20:00	49	32	10	7	46	34	5	7
21:00	49	31	11	7	40	24	10	6
22:00	45	29	10	6	36	24	6	6
23:00	33	26	2	5	25	21	2	2
Total	1418	945	328	145	1454	981	337	136

Table 13 showing estimated customer numbers

This table shows that the busiest day of trading will be on a Saturday, when at lunch time from midday 78 customers can be expected to use the drive thru, 43 to park up and 10 McDeliveries to be made.

8.2 Noise predictions

The noise levels generated by the customer vehicle movements at the proposed development have been predicted in accordance with the noise prediction framework set out in ISO 9613-2 Acoustics - Attenuation of sound during propagation outdoors - Part 2 General method of calculation, using iNoise noise modeling software. Sound levels have been calculated for each of the nearest sensitive residential neighbours.

The model takes into account the distance between the sources and the receptors, reflections from building facades, attenuation from screens as well as atmospheric attenuation. The following modelling assumptions have been relied upon;

- G = 0 (hard ground)

- Air temperature 10 °C,
- Humidity 70%,
- Downwind propagation,

The image below shows the acoustic model for the calculation of car drive thru noise, the pink dots represent the various elements of the drive thru activity (Table 12 showing vehicle noise levels). The overall sound level created by a single vehicle, which will take approximately 2 minutes to arrive, order, collect and leave the drive thru lane, before being multiplied up for the number of vehicles predicted to pass through the drive thru lane in each hour.

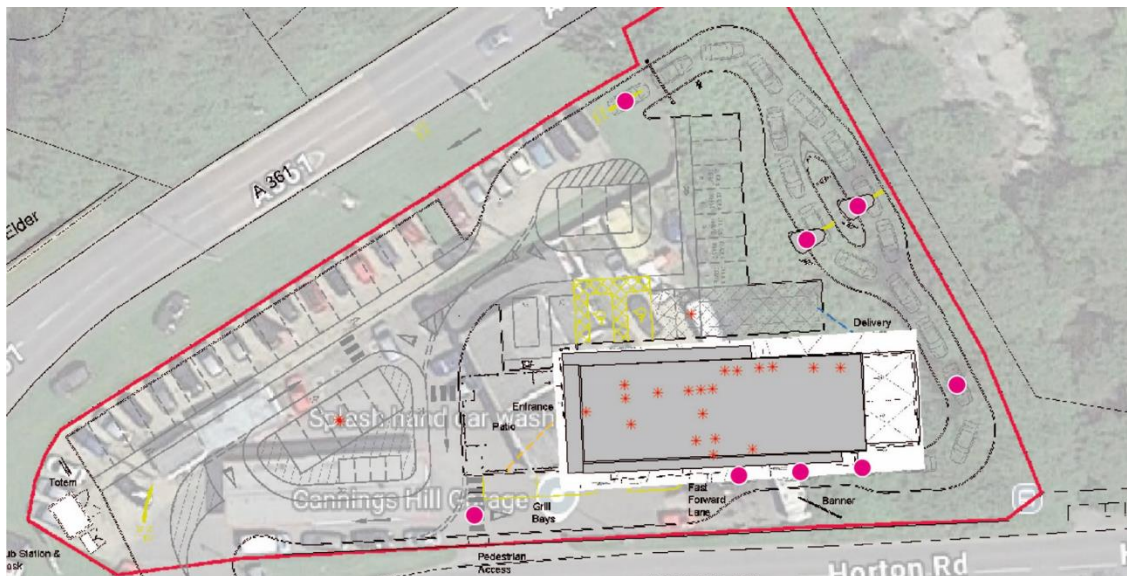


Figure 10 showing DT sources

The highest drive thru activity noise levels will be at the rear (north facing) windows of houses on Bailey Close.

The chart over page shows the mean existing measured ambient sound levels recorded, across 24-hours (orange line) with the dotted blue solid line representing the level of vehicle activity noise at Bailey Close. The dotted brown line represents increase in overall levels, with McDonald's trading, over the existing levels.

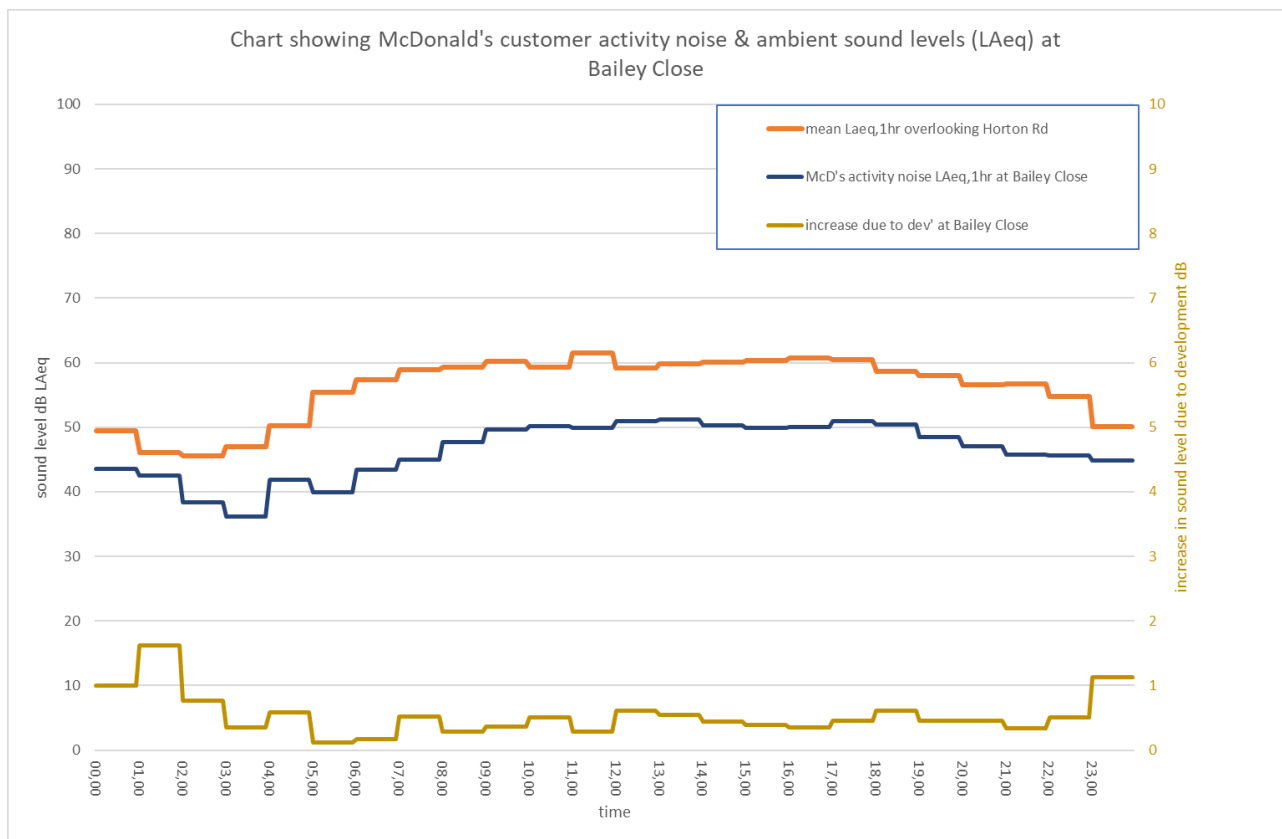


Figure 11 showing existing, proposed & increased sound levels

This shows the greatest increase will be less than 2 dB (reading from the right hand side Y axis). Increases of 3 dB or less can be considered to have a *negligible impact according to IEMA Guidelines*.

8.3 Car door slams

With the proposed opening hours being 24 hours per day, the restaurant will be trading through the night (11pm to 7am) when sleep disturbance should be considered.

Although the customers using the new restaurant car park will not be inherently noisy, the closing of car doors is an impulsive activity which could draw attention.

A range of car and van doors being firmly swung closed were checked and it was found that an event sound level of 88 dB L_{Amax} at 1m represented the upper end of the vehicles tested with a slamming action. An assumed sound power level of 96 dB L_{WA} was inputted into the noise model, with a car parking in the middle of the parking spaces¹¹ to houses opposite, as indicated by the pink dot on the aerial view below;

¹¹ the parking spaces outside the entrance to the restaurant are most likely to be most used, particularly during the quieter trading hours of the night

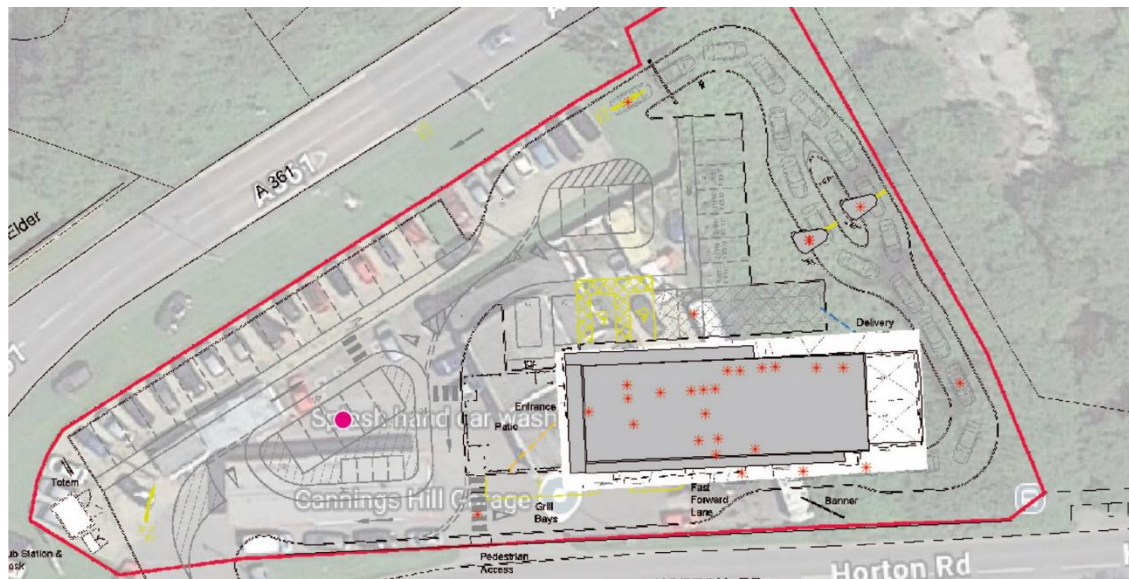


Figure 12 showing location of modelled door slam

The chart below shows the L_{Amax} events recorded along with the mean loudest door slam (orange line) from the McDonald's site at the houses on Bailey Close.

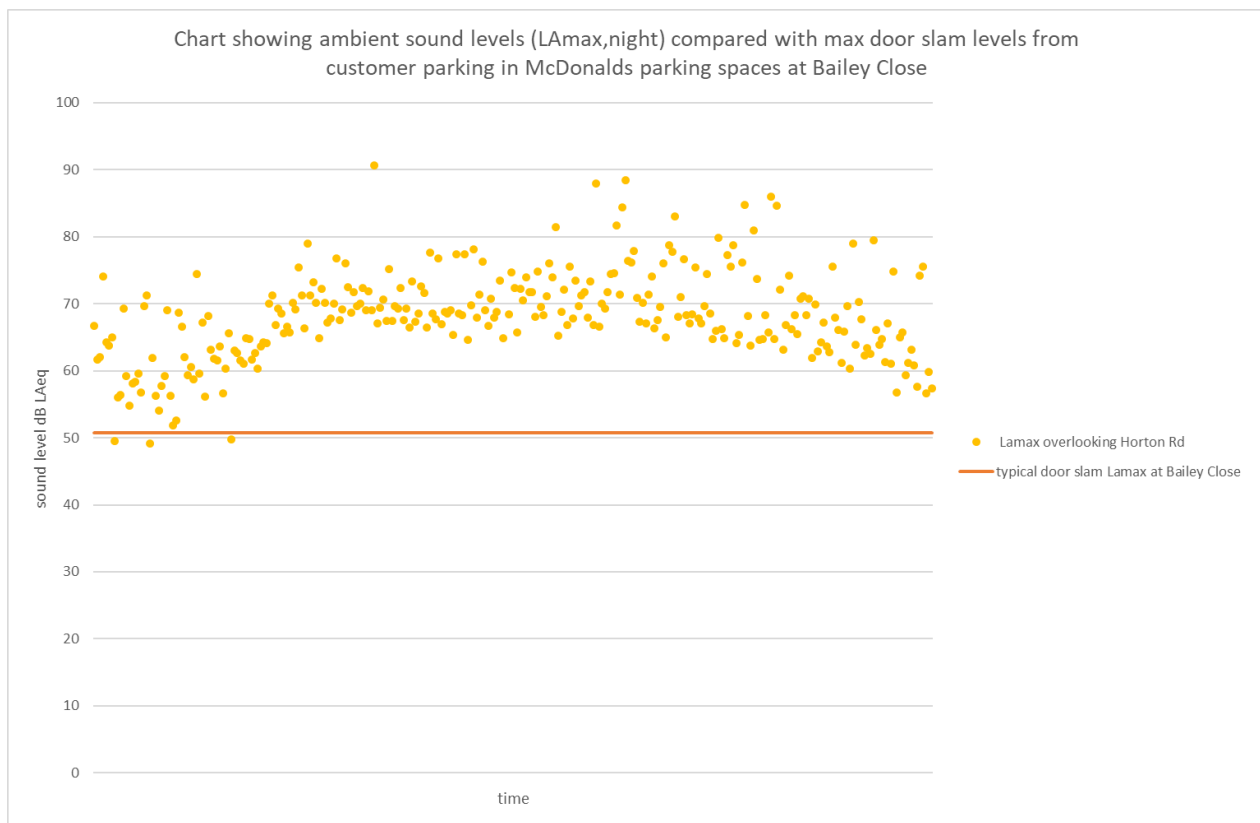


Figure 13 showing comparison between existing event levels & those from door slams

This shows that the maximum predicted door slam event level (51 dB L_{Amax}), is significantly less than the 60 dBA WHO derived criteria for the onset of internal sleep disturbance and less than current levels through both the day and night. Their impact can therefore be considered to be *negligible* according to IEMA Guidelines.

8.4 Delivery noise

The restaurant is likely to require 3 deliveries per week; these deliveries being carried out by Martin Brower UK.

Martin Brower is a McDonald's partner logistics company and supply all their restaurants nationally. They have recently won a Highly Commended award from the Noise Abatement Society *"for its understanding of the holistic spirit of Soundscape principles through a variety of sustained best practices to enable efficient servicing without causing noise disturbance."*

Martin Brower's delivery activities, the most recent being at Sheen Road, Bristol, have been surveyed, where a delivery activity sound level of 67 dB L_{Aeq,5minutes} (92 dB L_{AE}) at 5m was recorded.

Here delivery lorries will arrive at the McDonald's turning off roundabout on to Horton Road before pulling up across McDonald's car park and stopping on the northern side of the restaurant. Once the delivery has been completed the vehicle will reverse back before turning back through car park and on to the road network. The position of the parked delivery vehicle is indicated by a pink dot on the plan below;

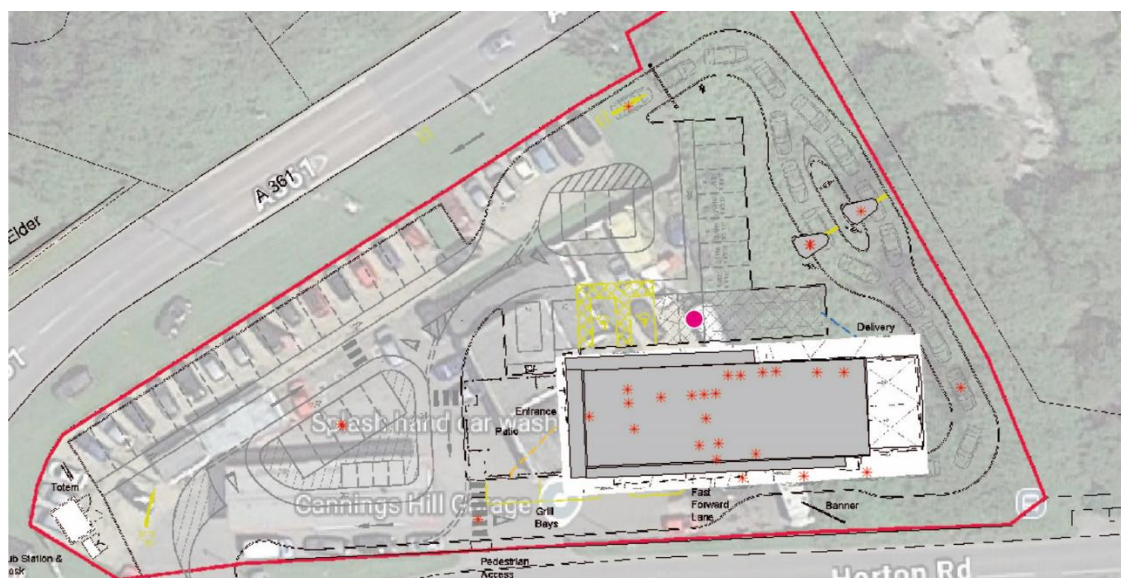


Figure 14 showing location of delivery vehicle

The table over page shows the noise contribution for the delivery activity (as a Rating Level according to BS4142)¹²;

Location	Delivery noise level	
	Day time dB L _{A,r,Tr} at 1.5m AGL	Night time dB L _{A,r,Tr} at 4.5m AGL
11 Bailey Close	16	26
12 Bailey Close	16	27
13 Bailey Close	16	26
14 Bailey Close	16	27
15 Bailey Close	16	26
16 Bailey Close	17	27
Elder	29	43

Table 14 showing predicted delivery noise levels

The night time level is higher than the day time one as the duration over which the activity is considered is only 15 minutes, whereas during the day (7am to 11pm) it's 1 hour and a 3dB *intermittency character penalty* (BS4142) has been added to the night time delivery levels to give the *Rating Level*.

The chart below shows the L_{A90,T} levels recorded on site along with the predicted delivery noise *Rated Levels* at the houses opposite on Elder.

¹² Full details of these calculations can be made available upon request, a 3 dB "other penalty" has been added to the predicted L_{Aeq,T} to give a Rating Levels L_{A,r,Tr} (BS4142:2014) for night time deliveries only

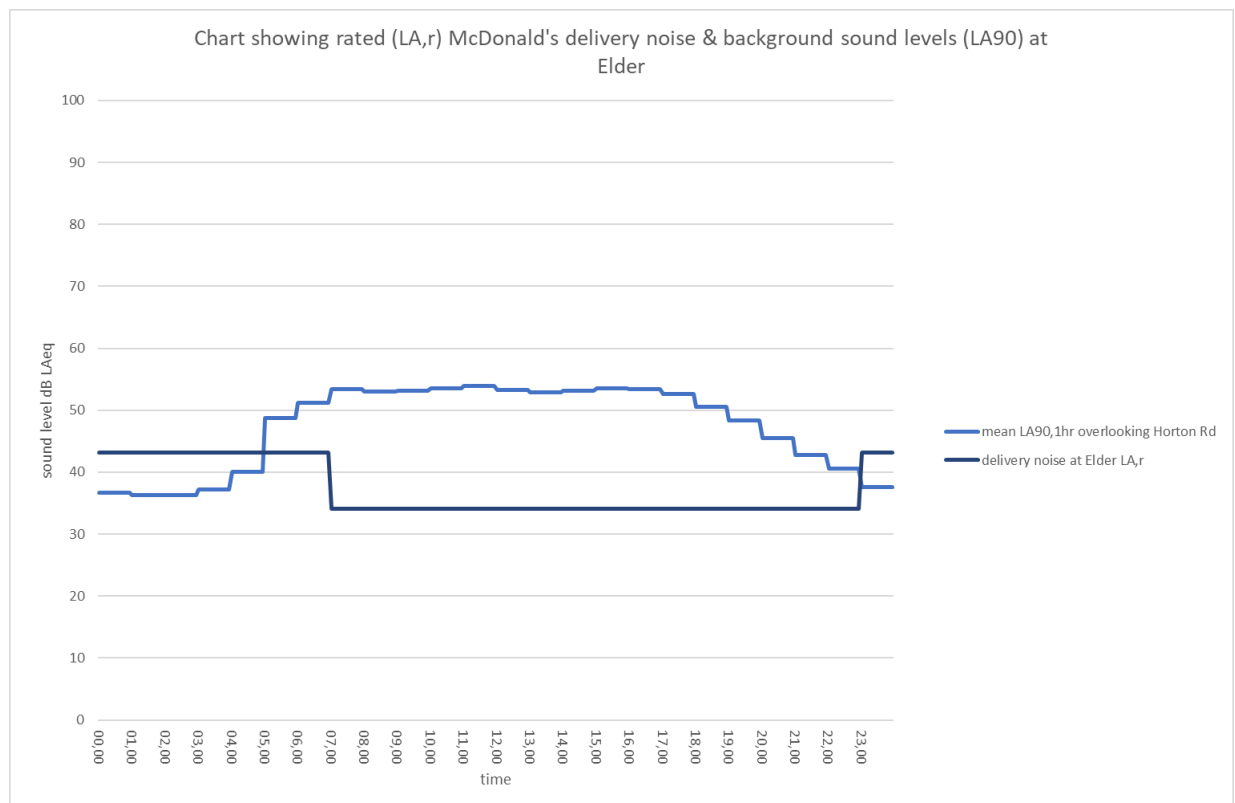


Figure 15 showing Rated delivery noise & background sound levels

This shows that *Rated delivery noise* will not be higher than the existing background sound level during the day but exceeds it at night. Therefore, to limit the impact of delivery noise, deliveries should be day time only, with none between 11pm and 7am.

9 Assessment of impacts

9.1 BS4142 assessment of impact of plant noise

BS4142:2015+A:2019 provides a method for assessing the likely impact industrial and commercial noise will have on residential neighbours. This Standard requires that *character penalties*, if any tonality, intermittency, impulsivity or “other characteristics” are present in the noise are added to the assessed $L_{Aeq,T}$ level of plant noise to provide a Rating Level.

Here the McDonald's plant will run without any tonality or discernable intermittency or impulsivity and at a level more than 10 dB below the day time background sound level and therefore will not attract any characteristic penalties. However, at night, some of the plant will run intermittently and this might be perceivable at times when the background sound level is considerably lower. Consequently, a 3 dB penalty needs to be added to the assessed $L_{Aeq,T}$ to give the Rating Level.

The table below shows the BS4142 assessment of plant noise:

Location

16 Bailey Close

	Day time	night time
Predicted plant noise level	36	33
character penalties		
tonality	0	0
impulsivity	0	0
intermittency	0	3
other characteristics	0	0
Plant Rating Level	36	36
Background sound level (lowest during day/night)	53	36
Excess over background	-17	0
Likely impact	very low	low

Figure 16 BS4142 assessment of plant noise

This shows that plant noise will have a “very low” impact during the day and a low impact overnight and complies with Wiltshire Council’s aims set out in Policy 98.

9.2 BS4142 assessment of impact of delivery noise

The impact of the noise created by deliveries to the restaurant can also be assessed using BS4142, the nearest sensitive dwellings, as shown in the table below;

Location	Elder	
	Day time	night time
Predicted delivery noise level ($L_{Aeq,T}$)	29	40
character penalties		
tonality	0	0
impulsivity	0	0
intermittency	0	3
other characteristics	0	0
Delivery Rating Level	29	43
Background sound level	53	36
Excess over background	-24	7
Likely impact	very low	adverse

Figure 17 BS4142 assessment of delivery noise

This shows that the noise created by deliveries during the day have a “very low” impact but a likely “adverse impact” at night (11pm to 7am), therefore, deliveries should be confined to day time hours only.

9.3 W.H.O. assessment of car door slam noise

The impact or otherwise of the sound generated by the slamming of car doors is not within the scope of BS4142, but the World Health Organization (W.H.O.) in their guidelines for

Community Noise (1999) states “For a good night’s sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night”. This being an inside sound level and if 15 dB is assumed to be the loss from a façade with an open window translates to an external level of 60 dB $L_{Amax,regular}$. The table below compares the predicted loudest door slam level at the closest neighbour;

Location	16 Bailey Close	
	Day time	night time
predicted max slam level $L_{Amax,f}$	46	49
W.H.O. internal criteria	NA	45
derived external criteria windows open	NA	60
exceedance	NO	

Figure 18 WHO assessment of slam levels

This shows that the highest door slam event levels are below the W.H.O. criteria, for the onset of sleep disturbance and significantly less than existing event levels, at the closest neighbours and therefore do not represent an *adverse impacts* and meets Wiltshire Council’s aims set out in Policy 98.

9.4 Assessment of customer vehicle movement noise

The assessment of the sound generated by the movement of customer vehicles is not within the scope of BS4142¹³, although it does cover “loading and unloading of goods and materials at industrial and/or commercial premises” and from “sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from fork-lift trucks, or that from train or ship movements on or around an industrial and/or commercial site.”

The institute of Environmental Management & Assessment provides Guidelines for Environmental Noise Impact Assessment both in absolute and relative terms, namely;

- If noise generated by customer vehicles using the restaurant is below 50 L_{pAeq} across the day (7am to 11pm) and 40 dB L_{pAeq} overnight, at the nearest residential dwelling, this can be considered to have No Observable Effect.
- An increase in noise level of 3 dB or less can be considered to be “negligible”

The table over page shows the comparison of these criteria with the predicted customer vehicle noise levels;

Location	16 Bailey Close	
	Day time	night time
Predicted customer vehicle activity noise (busiest hr day/quietest hr night)	51	36
lema absolute criteria for onset of LOAEL	50	40
meets absolute criteria	x	✓

¹³ BS4142:2014 + A1:2019 Scope 1.1

	existing ambient L_{Aeq} 17,00 & 03,00 hrs	61	47
relative change in noise level		< 1 dB	< 1 dB
	IEMA relative classification	Negligible	Negligible

Figure 19 absolute and relative assessment of customer vehicle noise

This table shows that the absolute level of noise created by the drive thru lane and vehicles parking up will fall below the IEMA criteria for the onset of adverse impacts, across the entire day and night. Therefore, do not represent an *adverse impact* and better Wiltshire Council's aims set out in Policy 98.

9.5 Summary of Impact Assessment

The table below summaries these noise criteria for each element of the assessment;

Noise Element	Requirement		Sound levels	Complies
	Criteria	Comment		
Fixed plant	No greater than background		Existing background 53 dB $L_{A90,Day}$ & 36 dB $L_{A90,Night}$ Predicted plant levels 36 dB $L_{Ar,Tr(Day)}$ & 36 dB $L_{Ar,Tr(Night)}$ with HVAC mitigation	✓ With HVAC mitigation
HGV deliveries	No greater than background		Predicted HGV levels 29 dB $L_{Ar,Tr(Day)}$ but 43 dB $L_{Ar,Tr(Night)}$ and therefore night time deliveries should be excluded	✓ No night time deliveries
Customer cars on site	50 & 40 dB L_{Aeq} externally sensitive facades, day and night respectively		51 dB L_{AeqDay} and 36 dB $L_{Aeq,night}$ at external facades	✓ No additional mitigation measured required
	Less than 60 dB L_{AFmax}		Predicted door slam 49 dB L_{AFmax}	✓
	L_{Aeq} increase with development < 3 dB	IEMA criteria or negligible impact	Increase with development < 3 dB	✓

Table 20 summary of criteria & predicted sound levels

This shows that Wiltshire Council's aims set out in Policy 98, are met by this application.

10 Uncertainty effects on assessment conclusions

There is a degree of uncertainty at each stage of these assessments, most will be small and not all additive, but if the uncertainty was large and the assessment conclusion was on the threshold of acceptability, then it might change the assessment outcome.

10.1 Residential neighbours existing sound climate

The magnitude of the impact of fixed plant and customer vehicle noise on the neighbours has been based on the results of an on-site ambient noise survey, where levels were monitored in a location representative of that experienced by the neighbours.

Any on-site sound survey will only provide a snap shot of historical levels. For these levels to provide the basis upon which future impacts can be assessed, then the snap shot should, at the very least, cover the hours under assessment and during normal circumstances. Measuring next to a road which has temporary traffic lights in place may well understate sound levels when the traffic is passing freely, for example, should be avoided.

Here the survey was conducted over a full week, during clement weather conditions. The background sound levels did drop as low as 36 dB $L_{A90,T}$ in the small hours, a level which is comparatively low given the site's close proximity to the road.

10.2 Assessment of plant noise

The plant to be used on the roof of the proposed McDonald's restaurant has been tried and tested on countless other McDonald's around the country and the noise levels used in this assessment for the plant can be relied upon.

The maximum noise that all the plant running at 100% duty will create here, has been compared with the minimum representative day time background sound levels, and a sensible degree of diversity has been included for the operation of the plant at night. Practically at 3am in the morning, when the background is at its quietest, all the plant will not be running flat out. The air-conditioning, fans and condensers will be ticking over and even the main kitchen extract fan will automatically reduce in speed when there will be just a few orders being cooked.

The mitigation requirements set out in this report are therefore robust and will not be adversely effected by uncertainty.

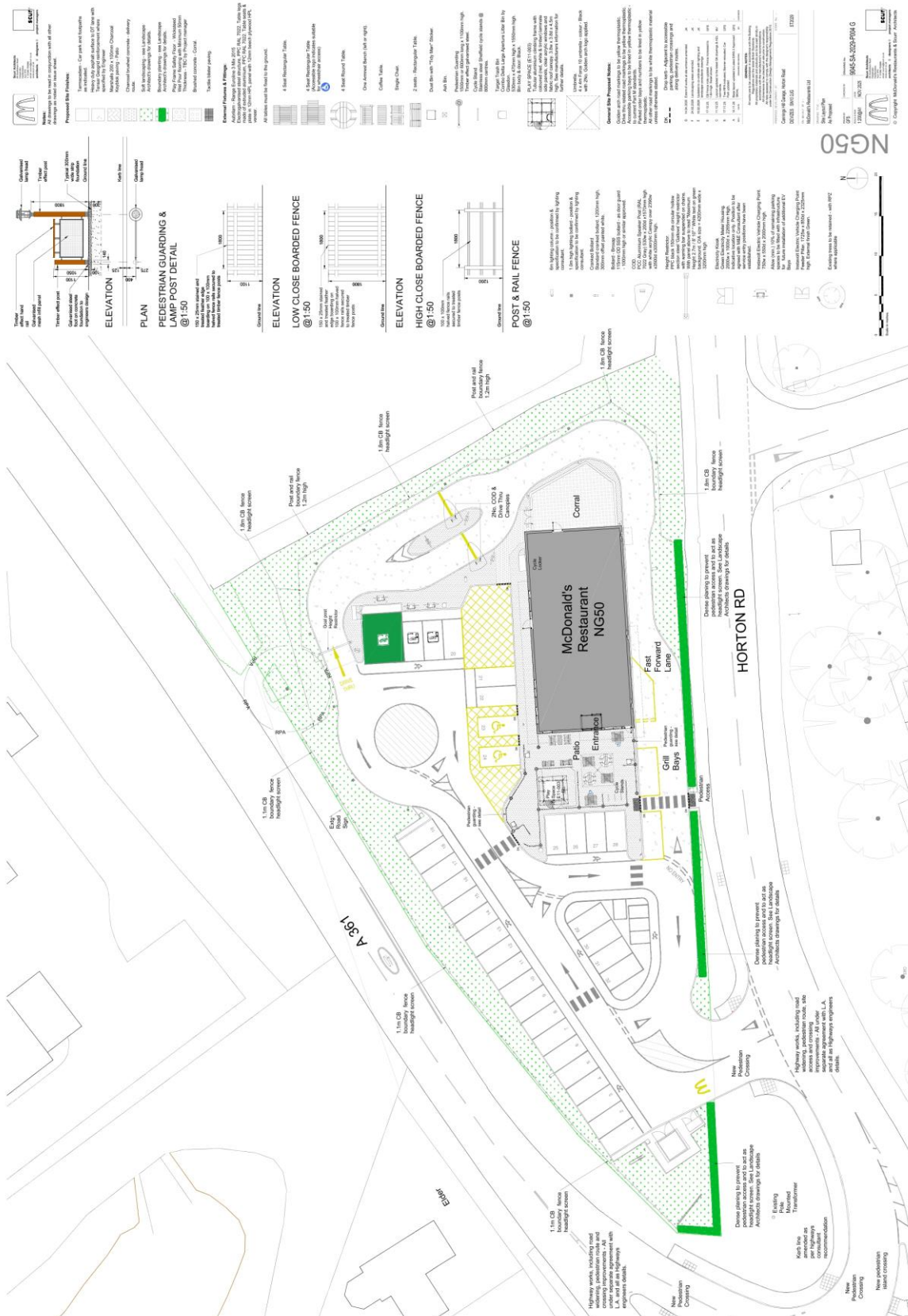
10.3 Assessment of customer vehicle noise

The noise data for customer vehicle movement noise has been developed and tested over many years and has been shown to provide a reliable prediction. The ambient sound levels recorded by the on-site survey are higher than the noise that customers will create as they move slowly around the drive thru lane and car park of the restaurant. So that even with the small natural variations in ambient levels, that will occur day to day, summer to winter, ambient sound levels can still be expected to be far higher than the predicted McDonald's' noise levels.

Whilst the estimates for likely peak customer numbers provided by McDonald's' traffic engineers ADL Traffic & Transport are just that, estimates, they have been arrived at having studied hundreds of other restaurants and are unlikely to underestimate them sufficiently to make any acoustic difference. It should be noted that if 25% more customers were to use the drive thru lane in any one hour than those estimated, it will only increase levels by 1 dB.

The assessment conclusion is for a *negligible impact*, from customer vehicle noise, and uncertainty is unlikely to change this.

Site Layout Plan drg No. 9045-SA-2029-P004G



[illegible]



Appendix 1 – schedule of plant noise data

System	Ma/ke /model	Units	Sound levels									
				63Hz dB	125Hz dB	250Hz dB	500Hz dB	1KHz dB	2KHz dB	4KHz dB	8KHz dB	
	Weatherite IL200	Lw	80	73	80	81	78	72	70	69	66	
	PUZ-ZM250YKA	62 dBA at 1m	70	72	68	66	67	62	60	64	50	
	PUZ-ZM250YKA	62 dBA at 1m	70	72	68	66	67	62	60	64	50	
	PUZ-ZM200YKA	60 dBA at 1m	68	70	66	65	60	58	62	48		
	Manitowoc CVD11200A	Lw	74	63	72	71	70	69	66	65	62	
	Weatherite IL120	Lw	80	72	79	82	79	73	70	69	66	
	PUZ-ZM250YKA	62 dBA at 1m	70	72	68	66	67	62	60	64	50	
	PUZ-ZM250YKA	62 dBA at 1m	70	72	68	66	67	62	60	64	50	
	W&W BCW385	Lw 1.9m3/s @1200Pa	96	100	97	96	96	89	85	83	78	
		Lp,1m case b/o	79	86	82	78	78	71	69	67	56	
	helios GBW EC 355	Lw	72		68	73	71	66	64	59	50	
	Helios RDW 450	Lw	78		85	79	73	74	70	63	54	
	Helios RDW 355	Lw	75		83	71	73	70	67	58	50	
	JEHS-0200-B2-M-1	Lw	68	57	66	65	65	62	61	60	58	
	Freezer Condenser	Lw	73	72	71	70	69	68	65	65	62	
	DH1/C1 Door heater condenser	Lw	66	78	68	65	64	60	57	53	51	
	AC1/C1 Office	Lw	59	71	64	58	57	53	50	46	44	
	AC2/C1 crew room	Lw	59	71	64	58	57	53	50	46	44	
	ASHP/C1	Lw (53 LpA at 1m)	61	72	66	60	59	55	52	48	46	