sharps acoustics

Church Field Road, Sudbury

Review of noise issues in relation to proposed residential development

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1.0 Introduction

1.1 Sharps Acoustics LLP (SAL) has been commissioned by Babergh District Council (BDC) to carry out a review of noise issues relating to an application for a Residential and Care Home Development at Land North of Church Field Road, Sudbury.

1.2 The planning application for this proposed development was accompanied by a noise assessment report and, following comments and queries by the Council's Environmental and Planning Departments, additional submissions were made by the application in relation to noise. SAL have reviewed the noise assessment and subsequent submissions, the emails between the applicant and the Council which relate to noise.

1.3 SAL have also carried out survey work in the vicinity of the site and have considered noise from the existing uses and potential noise from possible uses in order to consider whether, if the proposed residential and care home development were to go ahead, this would impose an unreasonable restriction on adjacent uses and prospective adjacent uses.

1.4 This report describes relevant policy and guidance relating to this matter; details of survey work and noise modelling carried out by SAL; and presents our findings and conclusions.

2.0 Assessment Methodology and Criteria

National Planning Policy Framework (NPPF) (2021)

2.1 Government planning policy in relation to noise is contained in the National Planning Policy Framework (NPPF). The relevant paragraph from this (paragraph 185) states:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason …"*

2.2 The requirement to avoid significant impacts and to mitigate and reduce to a minimum other adverse effects was originally recommended in the Noise Policy Statement for England (NPSE), which is discussed below.

2.3 Paragraph 187 of the NPPF provides policy requirements in relation to the agent of change principle; the situation which occurs when a new noise sensitive development is proposed adjacent to existing businesses which produce noise. It states:

> *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

Noise Policy Statement for England (NPSE)

2.4 The 2010 DEFRA publication *'Noise Policy Statement for England'* (NPSE) sets out policy advice applicable to the assessment and management of noise, including environmental noise. The NPSE states three policy aims, which are:

- *"avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

2.5 All three of these aims are to be considered in the context of Government policy on sustainable development.

2.6 The first two aims require that no significant adverse impact should occur and, where noise falls between the lowest observable adverse effect level (LOAEL) and the significant observed adverse effect level (SOAEL), then according to the NPSE:

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

2.7 The NPSE notes that, *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times".*

2.8 The NPSE describes the Government's "guiding principles of sustainable development", listing the following as underpinning their sustainable development strategy:

- ensuring a strong, healthy and just society;
- using sound science responsibly;
- living within environmental limits;
- achieving a sustainable economy; and
- promoting good governance.

2.9 Thus, noise should not be considered in isolation; the economic and social benefit of a proposed development should be considered alongside the potential adverse effects from noise.

Planning Practice Guidance on Noise (PPG: Noise)

2.10 The Government first published their Planning Practice Guidance on noise (PPG) in March 2014, with the most recent version issued in July 2019. The PPG provides guidance on the interpretation and implementation of planning policy, as contained in the NPPF and the NPSE.

2.11 The use of the lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL) for the assessment of noise impacts is reinforced in the PPG, which seeks to define human perception at these effect levels.

2.12 The PPG describes the LOAEL as the level at which *"noise can be heard and causes small changes in behaviour, attitude or other physiological response"* and it is *"present and intrusive"*. Below this level, the PPG describes the NOAEL, or No Observed Adverse Effect Level, which it notes *"can be heard but does not cause any change in behaviour, attitude or other physiological response"* as the noise is *"present but not intrusive"*. The NOAEL is not included in the NPSE and is introduced in the PPG. Below the NOAEL, the PPG describes the NOEL, or No Observed Effect Level, where noise is *"not present"* and has *"no effect"*.

2.13 The PPG describes the LOAEL as the:

> *"… boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)."*

2.14 Significant observable adverse effects, i.e. those occurring at or above the SOAEL, are described as *"present and disruptive"* and the PPG states that above the SOAEL:

> *"… the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused."*

2.15 The PPG also provides guidance on the agent of change under the heading, "How can the risk of conflict between new development and existing businesses or facilities be addressed?", suggesting that where there is potential conflict between a proposed new development adjacent to existing businesses, that:

> *"… the applicant (or 'agent of change') will need to clearly identify the effects of existing businesses that may cause a nuisance (including noise, but also dust, odours, vibration and other sources of pollution) and the likelihood that they could have a significant adverse effect on new residents/users. In doing so, the agent of change will need to take into account not only the current*

actvities that may cause a nuisance, but also those activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made."

2.16 The guidance also states that:

"The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified."

Derivation of suitable assessment methodology and criteria

2.17 It is possible to apply objective standards to the assessment of noise and the design of new dwellings. Such guideline values are given in the World Health Organisation (WHO) document "Guidelines for Community Noise", 1999, and within British Standard (BS) 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233) which is principally intended to assist in the design of new dwellings.

2.18 Guideline values in BS8233 are described as "desirable" and, as such can be considered to represent a robust level below which there would be no adverse effect (so, more stringent than LOAEL). Similarly, the guideline values recommended by the WHO Guidelines are internal levels which would avoid <u>any</u> health effects such as annoyance or sleep disturbance. Accordingly, they too would result in levels below the LOAEL.

2.19 Table 2.1 below contains a summary of the recommended internal noise guideline levels necessary to achieve levels below (i.e. within) the LOAEL criterion.

Table 2.1: Internal design guidelines for noise from WHO / BS8233

Activity	Location	Period	
		Day (0700 to 2300 hours)	Night (2300 to 0700 hours)
Resting	Living Room	35dB $L_{Aeq,16hr}$	-
Dining	Dining Room	40dB $L_{Aeq,16hr}$	
Sleeping	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$

2.20 BS 8223:2014 considers outdoor areas and external amenity areas (gardens and patios), suggesting that, *"it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments."* However, the standard recognises that where design standards cannot be achieved for these traditional amenity spaces then the *'lowest practical levels'* should be achieved.

2.21 In addition to the guidance in BS8233, there is also guidance which assists with the assessment of the effects of existing industrial and commercial noise on proposed new residential developments in British Standard (BS) 4142: 2014+A1: 2019 *'Methods for rating and assessing industrial and commercial sound'* (BS4142).

2.22 There is a degree of ambiguity, overlap, and scope for interpretation, within BS8233 and BS4142. Professional judgment is required in applying the inter-twining provisions of these two documents in a way which accords with national planning policy and practice as well as technical guidance.

2.23 SAL opinion on how the guidance in these two standards should be interpreted when considering proposed new residential developments adjacent to existing commercial or industrial noise sources can be summarised, as follows:

- BS8233 is the primary source of guidance and assessment criteria for noise effects on proposed new residential developments. BS4142 provides a method for considering the penalties which may be applied to account for sounds with a specific, intrusive character to allow these to be assessed against the guidance in BS8233, which is intended only for sounds without a specific character.

- Noise levels within proposed habitable rooms of dwellings arising from activities at a nearby commercial or industrial site can be reduced to an acceptable level by the introduction windows and alternative means of ventilation (to enable windows to remain closed) with appropriate acoustic specifications.

- Higher noise levels in external amenity areas (such as residential gardens) from commercial or industrial sites (even those above the upper recommended guideline value from BS8233) should not necessarily result in a refusal of planning permission. If the development is otherwise desirable, provided it has been designed to achieve the lowest practicable levels in external amenity spaces, it may be allowed. In such circumstances, where there are residual high levels in external amenity areas, provision of alternative quiet areas nearby would be likely to partially offset this.

2.24 It follows, therefore, that where new residential development is proposed adjacent to an industrial or commercial site, the following steps should be taken:

- Measurement / prediction of the industrial noise at the proposed site and application of a penalty in accordance with the approach in BS4142.

- Where the industrial or commercial noise is extant, recognising that this forms a component of the acoustic environment. The assessment would then need to:

    - use other guidance and criteria (from BS8233) in addition to or as an alternative to guidance in BS4142, with the levels rated (by adding penalties as recommended in BS4142) to enable a comparison with levels in Table 2.1 above to provide design targets for desirable internal levels; and

    - compare predicted rated levels with guidance on external levels in paragraph 2.20 above, bearing in mind that, if the development is desirable and in a high noise area, it should not be prohibited, even if levels are above those provided as guideline levels.

3.0 Review of existing and permitted uses

3.1 Details of permitted uses for commercial and industrial sites near to the site were provided by BDC and SAL carried out a review of these to consider what noise levels currently exist and what noise levels might exist if the sites were to operate more intensively, as permitted. SAL also considered possible uses on land which is allocated for commercial / industrial use but which has not yet been developed.

3.2 Data from this review was used to produce two sets of noise contours; the first which shows existing noise in the area from road traffic and commercial and industrial uses and the second which shows potential noise, if the adjacent sites were to be developed / used at capacity (as a realistic worst case).

3.3 A map identifying adjacent site uses and a table which summarises these are provided as Figure A1 and Table A1 in Appendix A.

3.4 Noise survey work was also undertaken to assist with this process in August 2022. Details of the survey and results are provided in Appendix B.

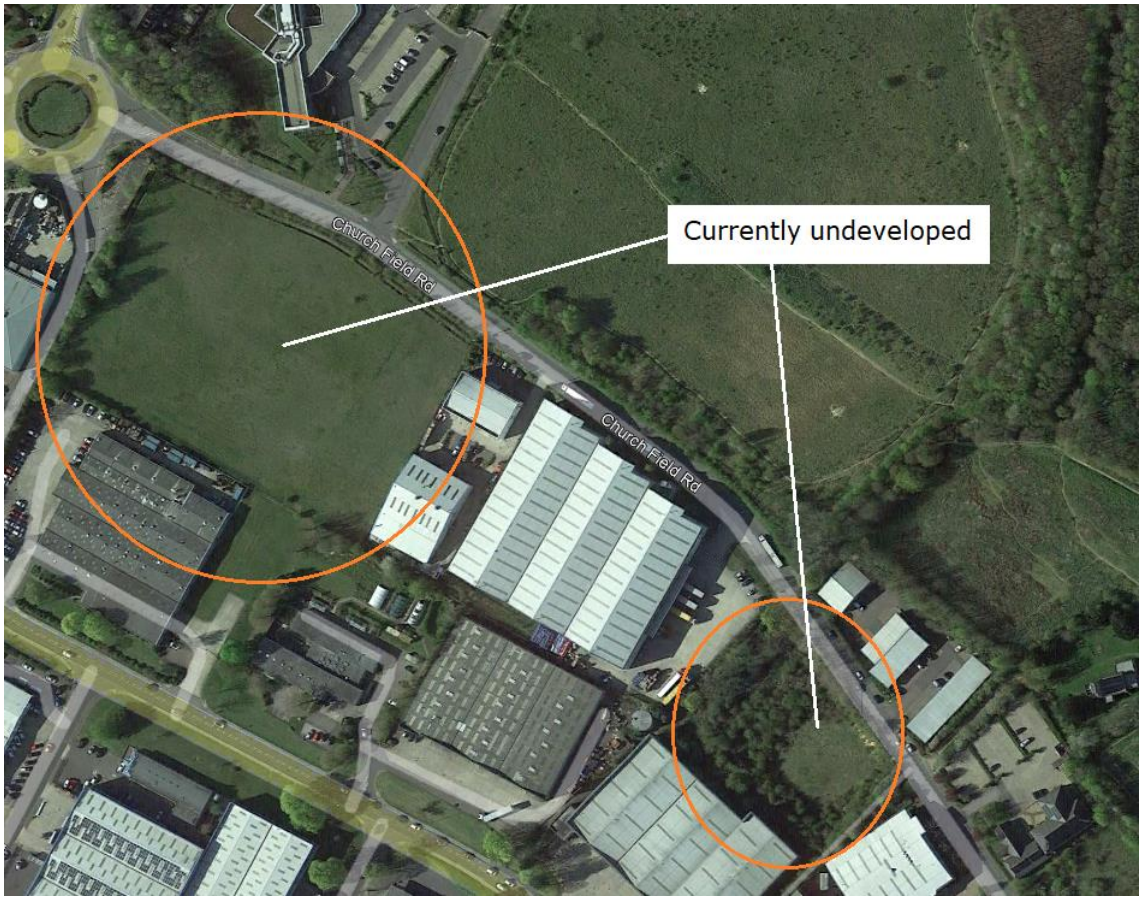
3.5 Noise levels based on this review (both measured levels and operating conditions permitted and as existing) were input into proprietary noise modelling software SoundPlan, which implements the common European methods of noise prediction to enable noise propagation around the site during the busiest periods of day and night to be predicted, taking account of local topography and presence of buildings in the area. In this instance, the noise predictions have been undertaken in accordance with the noise prediction framework set out in ISO9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation'. The noise model predicts noise propagation in the area and has been used to predict noise levels incident on proposed residential facades during both day and night time periods for:

- Existing patterns of operation, and
- Potential operations, if operating at capacity.

3.6 For modelling purposes, the proposed residential layout shown in the developer's plan 3898-0310-P09 has been used.

3.7 In order to produce the noise contours shown as potential levels, it has been assumed that the two sites shown in Figure 3.1 as "currently undeveloped" below might be brought into use as realistic worst case planning use class B8, 24/7 operations. It has been assumed that, in order to facilitate this, it would not be unreasonable and nor would it be likely to result in adverse effects at nearby existing receptors if screening of up to 4m were to be placed around the service yards, where required to control noise to existing noise sensitive uses.

Figure 3.1: Sites in the vicinity which are currently undeveloped



3.8 It is noted that the larger of these sites has recently been granted planning permission for use as a solar farm, so if this development comes forward, the assumed use described in 3.7 above would no longer exist there.

3.9 These levels were added to predicted road traffic noise levels (based on survey work carried out by SAL and that carried out by the developer's consultant) and noise contours were produced for day and night for each of these scenarios. The resultant noise contours are shown in Appendix C.

4.0 Discussion of findings and conclusions

4.1 The developer's consultant predicted day and night time noise levels incident on the facades of the closest proposed residential receptors from existing sources as 51dB, $L_{Aeq,T}$ and 41dB, $L_{Aeq,T}$, respectively. SAL predicts 55dB, $L_{Aeq,1h}$ and 45dB, $L_{Aeq,15\ mins}$ day and night time levels in the busiest day and night time periods. These levels are a similar, but a little higher than predicted by the developer's consultant.

4.2 It is SAL opinion that, whilst the developer's predicted level may represent accurately the conditions which they found at the time of their survey, it would be better if they adopted the more robust approach

of considering the worst case 1 hour and 15 minute periods at day and night, following the guidance in BS4142 on the assessment of industrial noise.

4.3 When the worst case potential noise levels are considered, SAL predict that day and night time levels at the most affected facades in the busiest day and night time periods would be 56dB, $L_{Aeq,T}$ and 50dB, $L_{Aeq,T}$, respectively.

4.4 In SAL opinion, a 3dB penalty should be added to the predicted industrial noise levels to account for its character, particularly at night, when it would be more dominant. This would result in worst case rating noise levels at noise sensitive facades of:

Day: 59dB, $L_{Ar,1h}$

Night: 53dB, $L_{Ar,15mins}$

4.5 Based on these levels, noise could be controlled in external amenity areas by provision of timber screens such as garden fences of a suitable design and height. The 2.5m high screens discussed in the developer's submissions would be likely to achieve this.

4.6 Internal noise levels would need to be reduced by 24dB in living rooms and 23dB in bedrooms at night. Suitable glazing and alternative means of ventilation (to allow windows to remain closed to control noise whilst still achieving adequate ventilation and cooling) would be required. Suitable systems would be readily available "off the shelf".

Conclusions

4.7 The original noise assessment report submitted by the developer considered the existing noise but did not fully take account of the potential noise from adjacent activities. Since the agent of change needs to clearly define the noise mitigation which is required for activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made, further work was needed to consider this. When all potential noise sources are considered, SAL have found that desirable noise levels can be achieved at the proposed development without affecting the operation (or potential operation) of existing nearby commercial and industrial uses.

4.8 In respect of future potential commercial occupiers, it would not be unreasonable to require some noise mitigation to be included within the design of any proposed noisy use at these locations, to reduce noise levels to existing noise sensitive receptors. The provision of a 4m high screen around a potential "worst case" use (a 24/7 warehouse), as assumed in the SAL model is neither unreasonable nor unusual, in our opinion and experience.

4.9 It is recommended that the developer uses the predicted rating levels in paragraph 4.4 above to finalise the noise mitigation design to external and internal areas and to submit a note which clearly defines the resultant noise mitigation scheme. This would ensure that, whatever might potentially happen on adjacent commercial and industrial sites, noise would be adequately controlled within their development.

Appendix A: Description of commercial / industrial uses near to the site

Figure A1: Aerial view of site and surroundings with adjacent uses identified

Table A1: Descriptions of adjacent uses and relevant planning controls

Site Occupier	1.Current Use 2.Permitted Use	Stated Opening/Contact Hours (as advertised on Website etc)	Opening hours Permitted by Planning Consent	Relevant Planning Conditions
Sudbury Community Health Centre (NHS Suffolk & North Essex)	1 Primary Health Care, GP, Pharmacy, Children's Services and Out of Hours Service 2 D1	Core Hours 08:00 to 20:00 Out of Hours 20:00 to 08:00	As stated	Plant **36dB** (day) **31dB** (night) at **existing** noise sensitive premises
Homebase	1 DIY and Gardening Retail store 2 Non-Food Retail No other use A2, A1, B1, B2, B8	09:00 to 19:00 hours Except Sunday/BH 10:00 to 16:00 Hours	08:00 to 20:00 hours Except Sunday/BH any 6 consecutive hours 08:00 to 20:00	
McDonalds	1 Restaurant		07:00 to 00:00 Hours	None
JCS Hi Torque	1 Factory and Offices 2 Light Engineering	08:00 to 17:00 Weekday except Friday 13:00 Hours Closed Sat & Sunday	No conditions for hours or noise	Pre 1974 decision documents in storage
Sudbury Community Hub (Leading Lives)	1 Social Care & Support 2.Not known	09:00 to 16:00 hours Closed Sat & Sunday		Pre 1974 decision documents in storage
White House	1.Storage and Distribution	08:30 17:30 Hours Closed Sat & Sunday		Pre 1974 decision documents in storage
Lait Storage	Storage and Distribution	None advertised		

Site Occupier	1.Current Use 2.Permitted Use	Stated Opening/Contact Hours (as advertised on Website etc)	Opening hours Permitted by Planning Consent	Relevant Planning Conditions
Da Ro Manufacturing	1 Manufacturing, design, and assembly 2 Unrestricted Employment Use	08:00 to 17:00 Hours Weekdays except Friday 14:00 Hours. Closed Sat & Sunday	None known	No conditions for hours or noise
Century Logistics	1 Storage and Distribution 2 Unrestricted Employment Use	06:00 to 21:00 Weekday Close Sat & Sunday	None known	No conditions for hours or noise
The Cloisters Various wholesale and commercial business	1 Industrial 2 Units for B1, B2 and B8 Use		No conditions for hours or noise	Units cannot be amalgamated

Appendix B: Survey details and results

Survey Details

Survey work was carried out in August 2022. A Fusion 01dB fully integrating sound level meter (Type 1) was used and a calibration check was carried out before and after the survey, with no drift apparent.

The survey locations were as shown in Figure A1 below. All measurements were free field measurements at a height of 1.5m above ground level. The ambient noise was dominated by road traffic. Meteorological conditions were generally suitable for the measurement of environmental noise with negligible wind and no rain.

For information purposes it can be noted:

- Measurements of sound level were all made with the A-weighting, which is a filter applied to the sound level meter to simulate the frequency response of the human ear, which is more sensitive to high frequency sound than low.
- L_{Aeq} is the equivalent continuous noise level which is a method of averaging the varying noise level over the time period into a single figure value. The LAeq has the same sound energy as the fluctuating level over that period. The LAeq is also known as the "ambient level" and in BS4142 the LAeq in the absence of the proposed development sound is known as the "residual level".
- L_{Amax} is the highest level within the measurement period.
- L_{A90} is the noise level exceeded for 90% of the time and is referred to as the background noise level.

Measurements were made in three locations around the site to determine existing ambient and background levels. These three locations are shown in Figure B1 below.

Figure B1: Survey locations 1 to 3

Survey results for each location are shown in Tables B1, B2 and B3 below.

Table B1: Measured levels at location 1

Date	Period	$L_{Aeq,T}$, dB	L_{AFmax}, dB	L_{A90}, dB
23rd Aug	07:52	41	51	38
	09:36	41	49	38
	10:36	42	52	38
	11:31	40	45	38
	14:00	41	53	39
	15:17	44	62	39
	16:40	42	53	39
	17:49	42	52	40
25th Aug	22:00	34	46	30
26th Aug	01:59	31	44	24
	03:00	27	37	22

Table B2: Measured levels at location 2

Date	Period	$L_{Aeq,T}$, dB	L_{AFmax}, dB	L_{A90}, dB
23rd Aug	07:27	54	63	47
	00:00	57	71	49
	09:45	55	68	48
	10:08	55	67	48
	11:05	56	67	49
	14:27	54	64	47
	15:47	55	64	49
	17:23	54	70	47
	18:16	55	64	48
25th Aug	22:30	47	64	33
26th Aug	02:30	45	67	23
	03:27	46	66	24

Table B3: Measured levels at location 3

Date	Period	$L_{Aeq,T}$, dB	L_{AFmax}, dB	L_{A90}, dB	L_{A10}, dB
23rd Aug	14:50	61	77	45	65
	16:06	62	78	46	66

Measurements adjacent to commercial and industrial uses were made in the locations shown in Figure B2 below.

Figure B2: Survey locations adjacent to commercial / industrial locations

Survey results for and observations made at each location adjacent to an industrial / commercial site are set out in Table B4 below.

Table B4: Noise levels and observations at commercial / industrial uses nearby

Site Occupier	Measurements and observations
Sudbury Community Health Centre (NHS Suffolk & North Essex)	Noise not discernible from external plant around site boundary except for just discernible in landscaped areas (private property) 10m in from Church Field Road pavement 9/8/22, daytime. Revisited 25/8/2022 2100 hours no discernible plant noise.
Homebase	No noise from yard or external plant apparent around site boundary. Two small wall mounted AC units on southern façade in access road for Homebase and Mc Donald's customers dominated by road traffic noise.
MacDonalds	Noise apparent from ventilation and AC plant but not measurable during daytime due to road traffic from North Road, shared car park and restaurant drive through. 48dB, $L_{Aeq,T}$ measured at car park exit (approximately 25m from plant)

Site Occupier	Measurements and observations
JCS Hi Torque	JCS manufacture Jubilee clips and other fasteners (very light engineering) Some external ventilation ducts evident and just discernible in Church Field Road when background is low but not measurable. Yard and loading activities located on boundary with Homebase and McDonalds restaurant so dominated by road traffic noise. One loading bay apparent plus staff car parking app 40 cars. Whilst in B&Q car park was able to discern 'Suttons' Tanker pump noise and measured 59dB, $L_{Aeq,T}$ (at approximately 40m from tanker).
Sudbury Community Hub (Leading Lives)	No external plant or equipment apparent. Premises is occupied by "Leading Lives" providing social care support for people with learning difficulties, Autism, and complex needs.
White House	No external plant or equipment apparent. 3 Loading bays, loading activity not measurable due to road traffic noise in North Road fronting premises.
Lait Storage	No external plant or noise discernible. 4 Loading bays but no activity observed as on 9, 23 and 25 Aug 2022.
Da Ro Manufacturing	Two factory buildings with integrated office reception at front. Unable to view/locate any external plant or equipment. No significant industrial noise but was able to discern noise on 22/8/2022 at 0643 hours from cutting and grinding: 41.5dB, $L_{Aeq,T}$ at boundary with Church Field Road.
Century Logistics	From research company employs warehouse staff in two shifts covering 0600 to 2200 hours. On arrival at site 9/8/22 at 0545 hours gates were open, and HGV parked along Church Field Road waiting. Four Loading docks to reverse onto, no forklift trucks outside in the yard Loading started after 0600 hours HGV entering and manoeuvring: 57dB, $L_{Aeq,T}$ at 35m HGV Loading: 55dB, $L_{Aeq,T}$ at 35m HGV engine left running and being loaded: 58dB, $L_{Aeq,T}$ at 35m
The Cloisters Various wholesale and commercial business	Units are small and comprise commercial, wholesale and service businesses. No external plant or equipment (except for small air source heat pumps) and no noise apparent during site day time visit on 9/8/2022.

Appendix C: Noise contours

Figure C1: Predicted day time noise levels – existing

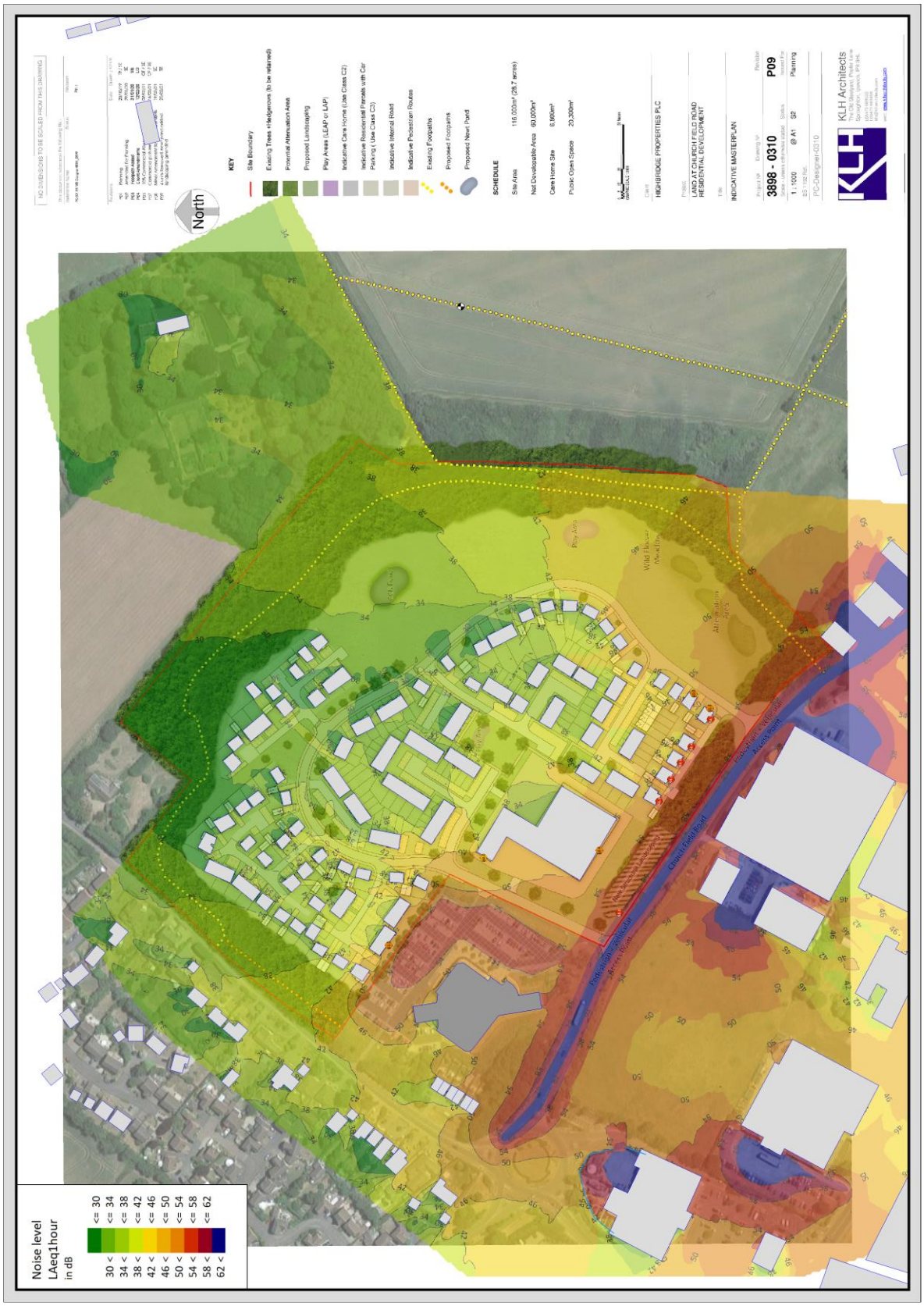


Figure C2: Predicted night time noise levels – existing

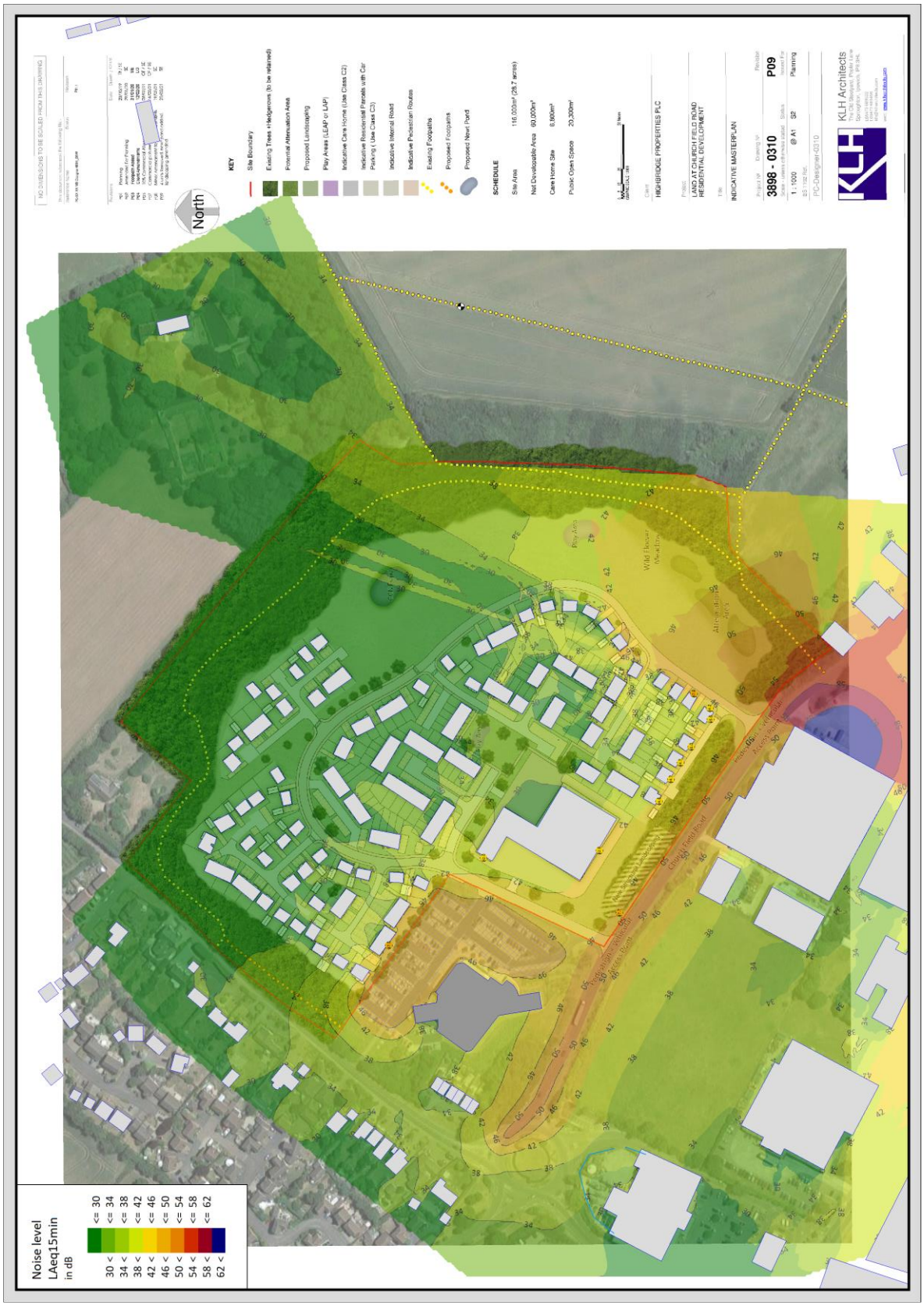


Figure C3: Predicted day time noise levels – potential

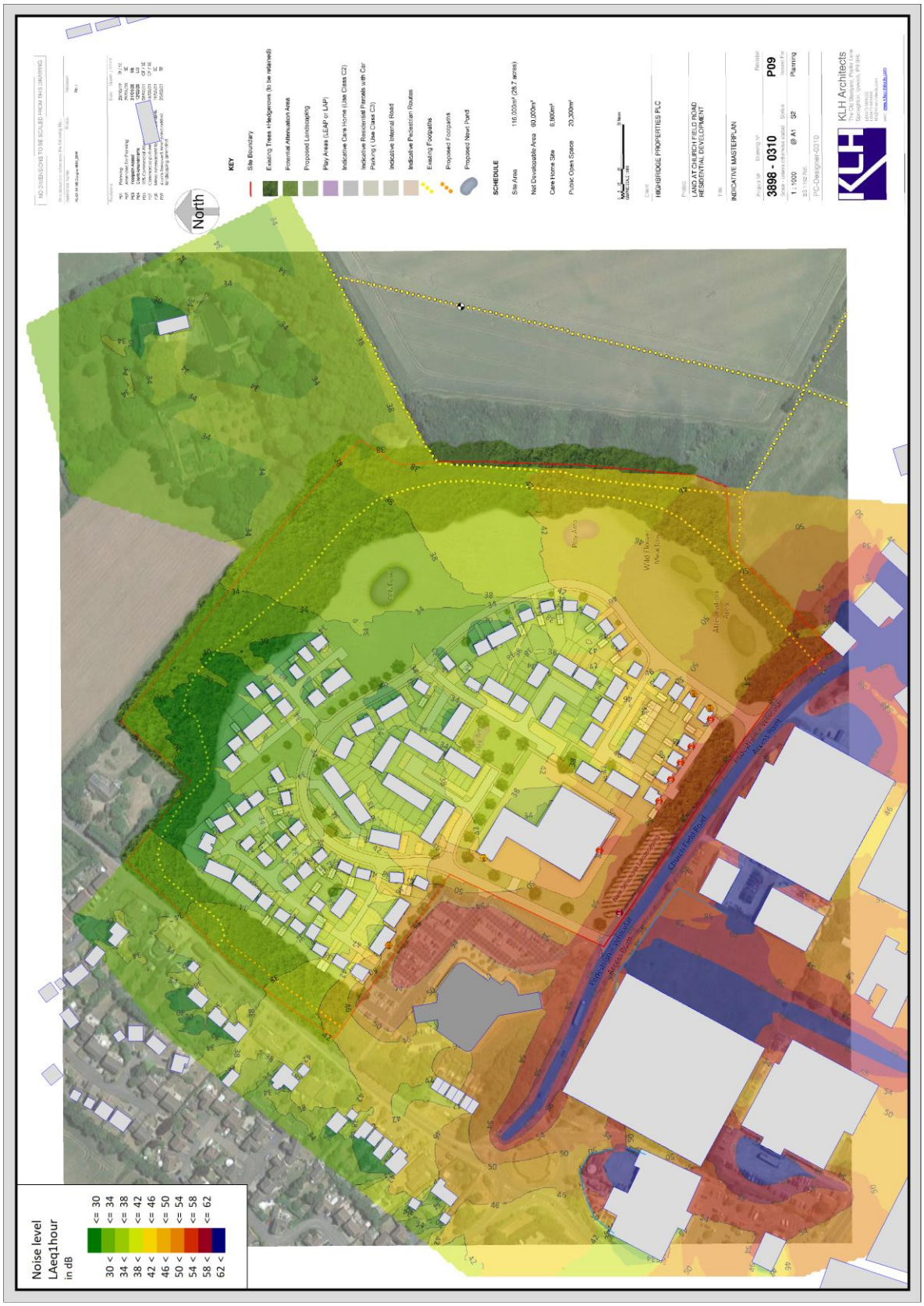


Figure C4: Predicted night time noise levels – potential