

Application to Change Working Hours at
Paint Manufacturer

Poplars Farm, Broad Bridge Road, Aythorpe
Roding, Dunmow CM6 1RY



Noise Impact Assessment for Uttlesford
District Council, planning ref:
UTT/20/0561/FUL

TECHNICAL REPORT

37279-R1

Application to Change Working Hours at Paint Manufacturer

Noise Impact Assessment for Uttlesford District Council, planning ref: UTT/20/0561/FUL

Prepared for: Robin Stretton Anthony, Jane Alexandra House, 36a Church Street, Great
Baddow, Chelmsford, CM2 7HY

Site location: Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY

Table of Contents

1	INTRODUCTION	4
2	NOISE CRITERIA	5
	NATIONAL PLANNING POLICY FRAMEWORK (NPPF)	5
	NOISE POLICY STATEMENT FOR ENGLAND (NPSE)	6
	NATIONAL PLANNING PRACTICE GUIDANCE (PPG)	7
	BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND	8
3	ENVIRONMENTAL SURVEY SUMMARY	10
	BACKGROUND AND RESIDUAL SOUND LEVELS.....	10
4	NOISE IMPACT ASSESSMENT	11
	BACKGROUND AND ASSESSMENT METHODOLOGY (BS 4142:2014+A1:2019)	11
	STUDY OF SITE PROCESSES	11
	EXISTING/PROPOSED MITIGATION MEASURES	12
	CALCULATION OF SPECIFIC SOUND LEVELS	12
	MODELLED SCENARIOS.....	14
	PROPOSED REDUCTIONS TO SITE ACTIVITIES IN KEY HOUR	15
	BS 4142 ASSESSMENT	16
	STATEMENT OF UNCERTAINTY	21
5	PREDICTED NOISE IMPACTS AND PLANNING	23
6	CONCLUSIONS.....	24
	Appendix A: Glossary of Acoustic Terms	I
	Appendix B: Annotated Location Plan.....	II
	Appendix C: Scheme Designs	III
	Appendix D: Environmental Survey Summary.....	VI

Appendix E: Model Outputs	XIII
Appendix F: Acousticians Qualifications and Status	XVII



Cornwall Suite, Dencora Business Centre, Whitehouse Road, Ipswich IP1 5LT
 Tel: 01473 464 727 | info@sscmail.co.uk | www.soundsolutionconsultants.co.uk

VAT No. 844 9267 90 | Registration No. 5651834

Registered Address: 2 Lemons Hill, Tattingstone, Ipswich, Suffolk IP9 2NH

PROJECT NUMBER:	37279	DOCUMENT REFERENCE:	37279-R1
ORIGINATED		CHECKED	
D. Attwell BEng. (Hons) AMIOA Acoustic Consultant		J. Blakeley BSc. (Hons) MIOA Senior Acoustic Consultant	
RELEASE	DATE	CHANGE DESCRIPTION	
1	04/11/2021	Original release.	

Sound Solution Consultants Limited (SSC) do not accept any liability in the event of technical reports being used outside of their intended purpose detailed within our terms of engagement or if the report is being relied upon by a third party without direct consent or contract with SSC.

1 INTRODUCTION

1.1 A development has been approved at Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY (hereinafter, “The Site”). A plan highlighting the boundary of The Site has been provided in Appendix B with development proposal drawings in Appendix C.

1.2 The existing industrial site, Bedec Products Ltd., is located within a mixed-use commercial/residential area in a rural location, surrounded by agricultural fields. The three nearest noise sensitive receptors to industrial business have been noted as Poplars Barn, Poplars and Little Poplars, all located to the north of commercial site (as shown in Appendix C).

1.3 A development comprising the demolition of an existing chicken shed, erection of a new storage barn; temporary removal of frame and cladding of an existing storage barn; construction of a new access road and associated earth bunding, planting and a timber screen fence at Poplars Farm was granted permission by Uttlesford District Council within UTT/20/0561/FUL.

1.4 Condition 9 of the decision notice has been stated below:

“Commercial operations at the site shall not be carried out other than between the hours of 8.00am to 6.00pm Mondays to Fridays, 8.00am to 1.00pm on Saturdays and at no times on Sundays, Bank or Public Holidays.

REASON: In the interests of residential amenity protection in accordance with ULP Policy GEN4 of the Uttlesford Local Plan (adopted 2005).”

1.5 It has been disputed by the applicant that these working hours should have only related to the new development building at The Site and should not apply to the existing procedures. It has been understood that the business has manufactured paints, varnishes and similar coatings at The Site for over 30 years with no restriction on working hours; and this constraint to commercial operations starting before 8:00am has severe implications to the businesses’ working conditions.

1.6 An application to vary this condition to change the manufacturing hours to “7:00am to 5:00pm Monday to Friday, 7:00am to 1:00pm Saturday and no manufacturing on Sundays, Bank or Public Holidays” has been refused on grounds of “noise and disturbance impacts” (UTT/20/3259/FUL):

“...to allow an earlier operational start time and earlier operational finish time by the applicant, is considered unacceptable in terms of the noise and disturbance impacts that this requested variation in hours would have on neighbouring residential amenity at this rural location, without substantive evidence being submitted with the application to show to the contrary. As such, the proposal would be contrary to the implementation of Policies ENV11 and GEN4 of the Uttlesford Local Plan (adopted 2005).

1.7 This document has been prepared to inform of commercial noise impacts, specifically within the disputed daytime working hour between 07:00 – 08:00am, Monday – Saturday.

1.8 A Glossary of Acoustic Terms has been provided in Appendix A that may assist with the terminology used within this report.

2 NOISE CRITERIA

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.1 The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated June 2019.

2.2 The Framework replaced most planning policy, circulars and guidance including Planning Policy Guidance 24: Planning and Noise (1994). The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development.

2.3 Under the heading of "Conserving and Enhancing the Natural Environment", specific noise pollution aims are detailed in Section 170 of the NPPF. It is stated that planning policies and decisions should contribute to and enhance the natural and local environment by:

"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution..."

2.4 Considering "Ground Conditions and Pollution" it is also stated in Section 180 of the NPPF that planning policies and decisions should also ensure that any new development is appropriate for its location considering the likely effects of pollution on health, living conditions, the natural environmental, sensitivity of the site and wider area and impacts that could arise from the development. The aims in doing so should:

- 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;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.5 It is stressed that the above references to noise should not be considered in isolation and that the theme, referred to as the "golden thread" of sustainability that runs through the NPPF is integral to noise.

2.6 The NPPF acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.



NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

2.7 The Noise Policy Statement for England (NPSE) was published in March 2010. It sets out the long-term vision of government noise policy, which is fundamentally to: “Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development”. The vision is supported by three key aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and reduce to a minimum, other adverse impacts on health; and
- Where possible, contribute to the improvement of health and quality of life.

2.8 The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The NPSE adopts the following concepts, to help consider whether noise is likely to have “significant adverse” or “adverse” effects on health and quality of life:

SOAEL – Significant Observed Adverse Effect Level.

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

LOAEL – Lowest Observed Adverse Effect Level.

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

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.

2.9 The NPSE emphasises 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. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available (Defra, 2010).”

NATIONAL PLANNING PRACTICE GUIDANCE (PPG)

2.10 Revised Planning Practice Guidance was released in March 2014 to support the NPPF and last updated in July 2019. The Guidance stipulates that Local Planning Authorities' plan making and decision making 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.

2.11 The table below is in the Guidance to assist recognising “when noise could be a concern”.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Unnoticeable	No Effect	NOEL	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	
		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 sleep disturbance. Affects acoustic character of the area and creates a perceived change in quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		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 character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 – Planning Practice Guidance to Support National Planning Policy Framework.

BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

- 2.12 The British Standard BS 4142:2014 +A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound” describes methods for rating and assessing sound of an industrial or commercial nature. The scope of the standard includes relevant topics for commercial development, such as sound from fixed installations (mechanical and electrical plant and equipment). The standard is applicable to the determination of rating levels for sources of sound as well as ambient, background and residual levels. The Standard was amended in June 2019.
- 2.13 Certain acoustic features can increase the significance of impact that might be expected from a comparison of the specific sound level to the background sound level where these features are likely to affect perception and response. Where such features are present at the assessment location, a character correction (or penalty) to the specific sound level is made to obtain the rating level. This can be approached from subjective, objective and reference methods.
- + Tonality: A correction of 0dB to +6dB for sound ranging from not tonal to prominently tonal.
 - + Impulsivity: A correction of up to +9dB can be applied for sound that is impulsive.
 - + Intermittency: A penalty of +3dB can be applied if on/off conditions are readily distinctive within the reference time interval over the period of the greatest amount of on-time.
 - + Other characteristics: A penalty of +3dB can be applied in the absence of all other defined characteristics, where the specific sound contains a distinctive feature in the residual acoustic environment.
- 2.14 Character corrections are normally added arithmetically where more than one feature is present, however, if any single feature is dominant to the exclusion of others, then it may be appropriate to reduce the correction or apply a zero correction for the minor characteristics. The rating sound level is equal to the specific sound level if there are no acoustic features present or expected to be present.
- 2.15 The significance of sound depends upon both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. An initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level. The context of the development is important in assessing the impact.
- Typically, the greater this difference, the greater the magnitude of the impact.
 - A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.
 - The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse



impact. Where the rating level does exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

- 2.16 The scope of the Standard recognises that human response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact can depend on various factors such as the exceedance to the background level, its absolute level, time of day and change in environment, as well as local attitudes to the source of sound and character of the neighbourhood.



3 ENVIRONMENTAL SURVEY SUMMARY

- 3.1 An environmental survey has been undertaken between 22nd and 24th June 2021 to quantify sound levels at the development site in accordance with BS 4142. Details of the study have been provided in Appendix D with results summarised herein this section.
- 3.2 The initial site survey involved long-term measurements at the boundary of the site over typical working days, as well as a study of site activities, including close-to-source measurements of operations.
- 3.3 An additional baseline survey was conducted Sunday morning on October 3rd 2021, to quantify sound levels at the closest sensitive receptors in the absence of site activity. The survey period covered the critical hour of assessment, 07:00 – 08:00, on a day when the business was shut.

BACKGROUND AND RESIDUAL SOUND LEVELS

- 3.4 The ‘typical’ background sound levels have been reported in this section in accordance with BS 4142 at Positions 1, 2 and 3, shown in Appendix D. The measurement locations were used to describe the underlying climate at the boundary of the nearest noise sensitive receptors (NNSRs) during typical operating periods, and specifically within the contested morning hour.
- 3.5 In line with Section 8.1.4 of BS 4142, the monitoring duration should reflect the range of background noise levels for the period assessed. In practice, there is no single level for background sound as this is a fluctuating parameter, although a representative value of the period should be used. Note this is not either the lowest or mean average value of dB L_{A90, 15min}.

Measurement Data		Free Field Sound Pressure Level, dB L _{A90, T} re. 20µPa		
Position	Time HH:MM	Range	Representative	Period Description
1	08:00 – 18:00	25 - 45	34	Typical working day
2	07:00 – 08:00	26 - 30	29	Critical hour
3	07:00 – 08:00	28 - 33	31	Critical hour

Table 2 – Background sound level summary, dB L_{A90, T}.

- 3.6 The residual sound level data in this section have been summarised from raw data in Appendix D, generally in accordance with the requirements of BS 4142. The snapshots of environmental sound at Positions 2 and 3 are taken to be representative of the underlying noise climate without the development in operation and are used to evaluate the environmental noise impact for the development.

Measurement Data		Free Field Sound Pressure Level, dB L _{Aeq, T} re. 20µPa		
Position	Time HH:MM	Range	Representative*	Period Description
1	08:00 – 18:00	30 - 52	46	Typical working day
2	07:00 – 08:00	50 - 55	53	Critical hour
3	07:00 – 08:00	50 - 56	54	Critical hour

* Representative values of residual have been noted at times of representative background sound.

Table 3 – Residual sound level summary, dB L_{Aeq, T}.

4 NOISE IMPACT ASSESSMENT

BACKGROUND AND ASSESSMENT METHODOLOGY (BS 4142:2014+A1:2019)

- 4.1 Within the Decision Notice of application UTT/20/0561/FUL, a condition was included which restricted the operating hours of the existing commercial site to *“8.00am to 6.00pm Mondays to Fridays, 8.00am to 1.00pm on Saturdays and at no times on Sundays, Bank or Public Holidays.”* - Condition 9.
- 4.2 The business has disputed that it had always operated earlier than the newly imposed working hours (for approximately 30 years) and that restricting site activities from starting until this later time would have significant detrimental impact on the manufacturing processes and the contracted working hours of hired staff.
- 4.3 An application¹ to amend these restrictions to *“7:00am to 5:00pm Monday to Friday, 7:00am to 1:00pm Saturday and no manufacturing on Sundays, Bank or Public Holidays”* was submitted and later refused on grounds of *“noise and disturbance impacts”*; and that *“substantive evidence”* was required to demonstrate neighbouring residential amenity could be adequately protected.
- 4.4 The following assessment has exclusively considered the potential of noise impact at the nearest sensitive receptors within the critical morning period, 07:00 – 08:00, outside the permitted working hours, defined in Condition 9.
- 4.5 The impact of activity noise from the industrial site on the surrounding sensitive receptors would depend on several factors, including (but not limited to) the time of day, frequency of occurrence and nature of sound sources, as well as overall sound levels (which could be controlled via screening and limiting activities/usage of equipment in the assessment time period).
- 4.6 It has been recognised that the suitable methodology for the assessment of commercial noise impact on residential receptors can be found within BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.
- 4.7 The numerical assessment has been provided below for relevant periods of proposed operation, following the definition of specific sound levels.

STUDY OF SITE PROCESSES

- 4.8 To understand the potential impact of commercial activities in relation to Bedec Production Ltd.’s site operations, a survey of existing conditions has been undertaken on 22nd and 24th July 2021.
- 4.9 Operations at The Site have been noted to include paint manufacturing items (functioning within a central warehouse), forklifts manoeuvring (both internally and externally) moving products between warehouses and storage units, as well as loading/unloading delivery lorries, and static plant items, primarily located within a single plant room.

¹ Application Ref No. “UTT/20/3259/FUL” - Uttlesford District Council

- 4.10 Sound measurements were taken over a wide range of conditions, to establish realistic worst-case scenarios with machinery operating at full capacity, as well as investigating the difference in noise emission when re-locating certain sources and testing factory doors in open and closed states.
- 4.11 A summary of measured activities has been provided in octave bands in Table D1 within Appendix D. All measurements were made using a Class 1 sound level meter at 1.5 m above ground level in free field locations.

EXISTING/PROPOSED MITIGATION MEASURES

- 4.12 Following the initial site inspection, a review of existing site conditions and potential mitigation measures was carried out. A noise impact assessment² was produced by SSC to address Condition 12 of application UTT/20/0561/FUL, which outlined several recommended measures to minimise the effects of industrial noise at the closest residential receptors, including alterations to existing plant items, plant room procedures and commensurate bunding design.
- 4.13 Since submission of the document, it has been understood that the following remedial works have been put in place:
- 4.13.1 An intermittent hissing pipe has been relocated to a position on the west façade of the plant room, significantly screening the source from the receptor.
- 4.13.2 Similarly, the industrial plant room has been re-vented out to west, whereby the plant room door can now remain fixed closed during plant operating hours.
- 4.13.3 At the time of writing, the proposed bunding design is still awaiting approval by Uttlesford District Council (in relation to Condition 12). It is however understood that the connected EHO has recommended this document for approval.
- 4.14 These constraints/amendments to site operations have been included into the predictive noise modelling, discussed in the following Section (with exception of Item 1 in Table 5, which has been included to demonstrate the “historic situation” prior to these amendments).

CALCULATION OF SPECIFIC SOUND LEVELS

- 4.15 To understand a specific sound level for the purposes of assessment between 07:00 – 08:00, it has been necessary to make some level of assumption to the potential usage times / “on-times” in a realistic worst-case hour (determined as the correct reference time interval for daytime assessment).
- 4.16 All internal activities could operate continuously and simultaneously within the warehouse buildings (both existing and proposed).

² Noise Impact Assessment “36833 R1” – Sound Solution Consultants (SSC), dated 30/07/2021.

4.16.1 All fixed plant has also been assumed to operate continuously in a realistic worst-case hour.

4.16.2 Forklifts have been modelled to operate for 15 minutes of the hour with an additional 30 minutes of use for unloading/loading of a heavy goods delivery vehicle (HGV).

4.17 A summary of the industrial activities at The Site and the assumed on-times of warehouse processes, yard activity, and fixed plant operations have been shown in Table 4 below.

Description	Assumed on-time of activity in worst-case hour (%)
Manufacturing Room - Maximum Operations	100
Plant room - Maximum Operations	100
Filling and labelling	100
Special Order/Tinting Room)	100
Hissing Pipe external to Plant Room	5
Forklift operations around site	25
Unloading / loading of HGV using forklifts in southern yard	50
Diesel pump	100
Crusher	100

Table 4 – Assumed on-time of commercial activities in realistic worst-case hour.

4.18 Due to the complexity of multiple site conditions/development phases; sound sources and receptors at The Site, sound pressure level predictions have been undertaken using IMMI V2020-3 using the measured activity levels provided in Appendix D for input data. Calculations for emission have been made in accordance with ISO 9613, describing an industry standard method for environmental noise prediction as applicable to commercial operations.

4.19 It has been noted that the success of any noise model would be dependent on the software user to generate both valid and representative results, accounting for proposed topography and form. Equated values have been verified by manual calculation methods as to ensure that the modelled results have been considered accurate for the scope of this report, to absolve the likelihood of modelling error.

4.20 The following, general modelling assumptions have been made when reviewing the sound level emission from existing and proposed noise generating units at the nearest noise sensitive receptors (NNSRs):

- Site geometry and proposed development layout has been taken from architectural scheme drawings presented in Appendix C, extracted in AutoCAD (.DXF) vector format.
- Simplified building structures have been modelled on the site.
- Surface attenuation factors have been assumed as a worst-case, hard ground. The attenuation factor has been taken as $G = 0.0$ for G_s , G_m and G_r (the ground types in the source region, middle region and receiver region as defined by ISO 9613-2).
- Receiver locations have been taken 1.5 m and 4.5 m above relative ground level at the façades of the nearby dwellings.



MODELLED SCENARIOS

4.21 A number of scenarios have been simulated within the noise model for the critical hour of assessment (07:00 – 08:00), including historical conditions, existing operations, and potential future activities.

4.22 Sound pressure levels have been calculated to the closest three dwellings, at ground floor (GF) and first floor (1F) heights, relative to identified window locations, as presented in the Table below and illustrated within model results in Appendix E. Where more than one façade location has been used, the highest-predicted value of sound pressure level has been reported.

Noise Propagation Model Results - Predicted Noise Levels at NNSRs (Various Conditions)								
#	Scenario Modelled	Details	Predicted sound pressure level at receptors, dB L _{Aeq, T} re. 20 µPa					
			Little Poplars		Poplars		Poplars Barn	
			GF	1F	GF	1F	GF	1F
1	Historic Situation	Before proposed bunding mitigation/recommended changes to plant room (as reviewed in SSC Report ³).	36	41	34	37	40	37
2	Current Situation	Before proposed bunding but after recommended changes to plant room	32	37	34	35	40	39
3	Existing Activities (Post Bunding)	After proposed mitigation scheme: bunding with 1.8 m screen atop ridge.	30	35	34	35	40	39
4	Future Activities (Post Bunding)	After Proposed Mitigation/changes to plant room / New southern building built	31	36	34	36	40	40

Table 5 – Summary of results from noise model over the various simulated scenarios / phases of development.

4.23 The proposed development, granted within (UTT/20/0561/FUL), has been noted to include expansions to the rear forecourt, whereby site operations might slightly vary to make use of this increased yard area to the south. The proposal also comprises the erection of a new storage building at the southern end of the development site, which would reflect some sound from these activities towards the closest receptors.

4.23.1 Due to the above changes (possible variations in site activity and the inclusion of new reflecting surfaces) it has been predicted that the overall sound level at the nearest receptors could marginally increase by approximately 1 dB in the worst-case, when compared to the existing operations (with the proposed mitigation scheme) as shown in Item 4 in Table 5.

³ Noise Impact Assessment “36833 R1” – Sound Solution Consultants (SSC), dated 30/07/2021.

PROPOSED REDUCTIONS TO SITE ACTIVITIES IN KEY HOUR

- 4.24 In addition to the mitigation scheme, and plant room changes proposed in noise report “36833 R1”, to minimise the risk of noise impact, Bedec Products Ltd. have investigated all other possible measures to reduce sound emissions to these receptors during this critical hour of assessment (07:00 – 08:00).
- 4.25 An iterative mitigation approach has been employed, whereby each site process has been independently analysed to determine which operations could be controlled/mitigated/relocated for this period to reduce overall noise levels at sensitive receptors.
- 4.26 It has been established that the primary operations with the likelihood to cause noise impact would be forklift movements (in certain areas within The Site) and the operation of paint processing machinery within the manufacturing building (located at the centre of The Site).
- 4.27 In addition to the proposed mitigation scheme and alterations to the plant room (described above) the following scenarios have therefore been considered within the critical hour of assessment (07:00 - 08:00):
- 4.27.1 Shutter doors to the central manufacturing building kept closed.
- 4.27.2 Forklift activity restricted along the western “corridor” of The Site.
- 4.27.3 An additional scenario has been simulated, whereby all manufacturing operations are moved to the new warehouse building to at the southern end of the site. This concept would require amendments to planning/licencing of building usage.
- 4.28 The above measures have been modelled in detail and resultant sound levels in Table 6, identified as Scenarios “5” – “7”.
- 4.29 Each of the scenarios described in Table 5 and Table 6 have been illustrated in the annotated proposal drawing, Figure C3 in Appendix C for ease of reference.

Noise Propagation Model Results - Predicted Noise Levels at NNSRs (restricted operations)								
#	Scenario Modelled	Details	Predicted sound pressure level at receptors, dB L _{Aeq, T} re. 20 µPa					
			Little Poplars		Poplars		Poplars Barn	
			GF	1F	GF	1F	GF	1F
5	Future Operations Restricted (Post Bunding)	Manufacturing shutter door kept closed	30	35	34	35	40	40
6	Future Operations Restricted (Post Bunding)	Shutter door closed / No forklifts along west alleyway (no restrictions along east alleyway or new service yard)	30	34	31	34	32	35

Noise Propagation Model Results - Predicted Noise Levels at NNSRs (restricted operations)								
#	Scenario Modelled	Details	Predicted sound pressure level at receptors, dB L _{Aeq, T} re. 20 µPa					
			Little Poplars		Poplars		Poplars Barn	
			GF	1F	GF	1F	GF	1F
7	Future Operations (Restricted/Altered)	All manufacturing moved to new southern building / No forklifts along west alleyway	28	33	29	33	31	34

Table 6 – Summary of results from noise model over the various simulated scenarios involving different mitigation measures.

- 4.30 The results have shown that specific revisions to site operations in this hour could meaningfully reduce sound levels at the closest receptors.
- 4.31 Where the final item in Table 6 may require a variation in planning/building licencing; on balance, Scenario 6 has been viewed as the most suitable method to minimise sound levels in the contested hour. This scenario would include the restriction of shutter door usage and west corridor forklift activity (in addition to the measures described in 4.12 - 4.14 above).
- 4.32 Scenario 6 has been assessed using the methodology provided in BS 4142. The worst-case specific sound levels for assessment have therefore been defined as 34 dB L_{Aeq, T} at Poplars and Little Poplars, and 35 dB L_{Aeq, T} at Poplars Barn.

BS 4142 ASSESSMENT

- 4.33 The following numerical assessments have been provided in accordance with BS 4142 to provide a comparison between the rating sound level of the industrial operations at The Site (between 07:00 – 08:00) against the background sound level in the absence of site activities.

BS 4142 assessment of industrial site activity between 07:00 – 08:00 for Scenario 6 (in Table 6)				
Result	Little Poplars	Poplars	Poplars Barn	Commentary
Background sound level, dB L _{A90, T}	29	29	31	Estimated as representative from background sound levels measured between 07:00 – 08:00 on a Sunday when The Site was closed; results summarised in Table D5 and Appendix D.
Residual sound level, dB L _{Aeq, T}	53	53	54	Representative based on the range of measured levels in Table D5, as occurring during times of background sound.
Reference time interval	1-hour	1-hour	1-hour	Relevant time interval for assessment period during the day, as established in BS 4142. Interval 07:00 – 08:00 in the morning in context to disputed hour of operation.

BS 4142 assessment of industrial site activity between 07:00 – 08:00 for Scenario 6 (in Table 6)				
Result	Little Poplars	Poplars	Poplars Barn	Commentary
Specific sound level dB $L_{Aeq, T}$	34	34	35	Based on the highest predicted sound level incident on the receptors for Scenario 6, as shown in Table 6.
Acoustic feature correction, dB	3	3	3	Tonality from forklift reverse alarms and some occasional impulsivity could be “just noticeable” at all receptors.
Rating level, dB $L_{Ar, Tr}$	37	37	38	The rating level is equal to the specific sound level plus acoustic feature corrections.
Excess of rating level over background sound level	8	8	7	
Assessment indicates likely indication of: *depending on the context	Adverse*	Adverse*	Adverse*	Where the rating level exceeds the background sound level by around +5 dB, this is likely to be an indication of an adverse impact, <u>depending on the context</u> . A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, <u>depending on the context</u> .
Uncertainty of the assessment	Low			See Statement of Uncertainty.

Table 7 – Numerical assessment in accordance with BS 4142 at nearest noise sensitive locations in worst-case hour (07:00 – 08:00) for “Scenario 6”: Future operations with proposed bunding and restricted site activities (as described in Table 6).

4.34 The numerical assessments in Table 7 have highlighted the likelihood of an adverse noise impact at the nearest noise sensitive locations during the critical hour of daytime operation (07:00 – 08:00), where the rating sound level is predicted to lie 7 - 8 dB above the representative background sound level.

4.35 It has been acknowledged that the significance of sound of an industrial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

4.36 The concept of “context” has been notably emphasised in Section 11 of BS 4142 when considering numerical impacts established from applying the standard and the assessment of industrial noise on the surrounding receptors must consider the following:

- The existing context of the area/historical sound levels at the receptors in relation to The Site.
- The character and level of the residual sound compared to the character and level of the specific sound.

- The absolute sound levels at the closest sensitive receptors.
- The sound levels experienced within the sensitive receptors, accounting for an open window condition, and whether the dwellings incorporate design measures that secure good internal conditions, such as façade insulation or mechanical ventilation.
- Any mitigation measures and whether actions have illustrated a best practicable means of reducing the likelihood of noise impact.

The above contextual factors have been considered separately below.

Existing Context of the Area/Historical Business Operations

4.37 It has been understood that the industrial processes that take place at The Site have not drastically changed over the course of its operation. The business has operated without restrictions within the land space for approximately 30 years, and therefore the character of the historic/existing sound field would be inclusive of these industrial activities.

4.37.1 Consequently, the operation of The Site between 07:00 – 08:00 should not be considered distinct from the operations throughout the other hours of the day, where site activities have always occurred within this period.

4.37.2 It can therefore be surmised that the surrounding receptors would not experience any change in noise impact were the application (UTT/20/3259/FUL) to be accepted.

4.37.3 Nevertheless, to demonstrate due diligence, the business has consented to examine site operations in this critical period and incorporate mitigation to minimise noise levels incident on the neighbouring receptors.

Existing Residual Sound Levels

4.38 The existing residual sound field in the absence of business activities has been noted to include regular aircraft flyovers (being directly under the Stanstead flightpath), agricultural sources and occasional transport noise from the surrounding roads.

4.39 It has been established that between 07:00 – 08:00 the measured residual sound level at the receptors are approximately 17 dB above the predicted rating level from industrial operations.

4.39.1 Where predictions have provided large differences between the residual sound level over the specific sound level, of > 10 dB(A), then it has been realised in context that the ambient sound level should not change by any perceptible degree due to the operations at The Site.

4.39.2 It has been further reviewed in context that significant masking would be afforded by the residual sound, such that industrial activities would be largely indistinguishable for the majority of the time within this period, and therefore likely to have a low level of affect.



Absolute Sound Levels

4.40 It has been established that both the measured background sound levels and the predicted rating sound levels at the receptors would be low. Section 11 of BS 4142 has notably informed that in circumstances such as this, absolute sound levels may have more relevance than relative metrics (compared to the measured background level):

“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

4.40.1 Although The Site processes have only operated/seek to operate within the daytime hours (07:00 – 17:00), this has been considered relevant where concern has been raised to the impact on residents attempting to sleep/rest within their homes in the early hours of the morning.

4.40.2 Absolute sound levels have therefore been considered as contextually relevant and can be readily compared to the latest industry guidance to establish the degree of risk/impact on residential receptors.

Internal Ambient Noise Levels Within Receptors

4.41 Following the above, it has been deemed relevant to assess absolute sound levels within the sensitive premises.

4.42 As shown in Table 6, it has been predicted that the highest incident sound levels at the receptors would occur at first-floor height, with the resulting specific sound levels assessed numerically within Table 7.

4.43 The receptors have not been acknowledged to contain any particular sound insulation provisions that would allow residences to keep windows closed (e.g., mechanical ventilation), therefore an open window assessment for internal ambient noise levels should be considered in context.

4.43.1 It could be expected that residents may choose to leave windows open during this hour in the morning, where a conservative level difference of approximately 13 dB would be expected inside the dwelling through a partially open window, below the levels predicted outside of this window, as listed in Table 6. With a 13 dB insertion loss, the resultant ambient sound level from industrial activities within a 1F room would be 23 dB, $L_{Ar, Tr}$ at Poplars and Little Poplars, and 23 dB $L_{Ar, Tr}$ at Poplars Barn.

4.43.2 The sound from industrial activities would only occur within daytime hours, however The Council have shown concern to residents potentially resting within this hour in the morning. Therefore, to inform an absolute worst-case, the guidance within ProPG (2017)⁴, as derived

⁴ Professional Practice Guidance on Planning and Noise (2017)

from BS 8233:2014⁵ and WHO (1999)⁶, recommends an internal sound level of < 30 dB L_{Aeq, 8 h} for a bedroom at night (based on environmental transport noise); 7 - 8 dB above this predicted rating level from proposal activities in a worst-case hour of the day.

- 4.43.3 The sound levels from industrial activity would be considerably lower than internal amenity criteria values in the open window situation considered above, even in the illustrated worst-case: factoring in the correction due to character and comparing against a night-time criterion.

Mitigation Measures

- 4.44 Significant mitigation measures have been considered within this report and within the previous noise assessment document, "36833 R1". An iterative design process has provided a refined mitigation scheme, as outlined below:
- 4.44.1 Remedial works have included the relocation of noisy equipment and building ventilation to allow for a closed plant room.
- 4.44.2 Mitigation in the form of earth bunding and solid screening has been proposed, following extensive modelling work (pending application approval).
- 4.44.3 In addition to the above measures, as a conscientious measure to reduce sound levels incident at the nearest noise sensitive receptors within the critical hour: between 07:00 and 08:00, it has been proposed that: shutter doors to the existing manufacturing building would be kept closed and forklift operations would not occur along the western alley of The Site.
- 4.45 **The combined measures listed above (both implemented and proposed) have been shown effectively reduce the incident sound levels at the closest receptors. The business has illustrated a commitment to achieve the lowest level of noise impact as far as might reasonably be practicable, without significantly impeding manufacturing processes at the established site.**
- 4.45.1 It should be noted that the proposed reductions to site operations between 07:00 – 08:00 (as described in Scenario 6 of Table 6) has not been viewed as required mitigation measure. The established manufacturing business has formerly operated without restriction within this hour of assessment, and therefore the existing sound field should be characterised by the industrial activities already present in the area.
- 4.45.2 The proposed restrictions to site activities should therefore be realised as a conscientious measure to reduce the sound levels incident at the neighbouring receptors, below those sound levels predicted prior to development proposals (as shown in Table 5).

⁵ BS 8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings

⁶ The World Health Organisation Guidelines for Community Noise (1999)



BS 4142 Assessment Conclusions in Context

- 4.46 The possibility of an adverse acoustic effect has been considered reduced in relation to context regarding the resulting level (both absolutely and relative to the existing environment).
- 4.47 As emphasised above, the existing environment should be considered to include sounds of an industrial nature where the established industrial business has previously/historically operated within the contested morning period of 07:00 – 08:00. The acoustic character of the area would therefore not be altered by industrial activity taking place within the critical hour of assessment.
- 4.48 Notwithstanding, it has been considered that significant masking would be afforded by the residual sound from the surrounding noise sources. Where any industrial noise remains audible, as may occasionally be perceptible during periods of low residual sound (i.e. intermittent breaks in residual activity including air and road traffic), then it has been considered possible in context for some very minor level of effect.
- 4.49 Where the predicted rating sound levels and background sound levels have been shown to be low, in accordance with BS 4142, it has been reviewed that the absolute sound levels from the industrial activity are relevant in determining noise impact.
- 4.50 In the event that nearby residents open their windows within the assessment period, the rating sound levels from industrial activity would be considerably lower than internal amenity criteria values (established in BS 8233:2014 and WHO (1999)), even in the illustrated worst-case.
- 4.51 **The consideration of context relevant to the assessed sound sources has been viewed to support the notion of a “low impact” assessment in accordance with BS 4142 whereby the possible effects of the proposal have been considered in context. Mitigation, by means screening, relocation/management of specific activities, and keeping shutter doors closed throughout the period of assessment has been viewed support a sustainable and low impact development.**

STATEMENT OF UNCERTAINTY

- 4.52 Uncertainty inevitably limits the accuracy associated with all steps of any noise assessment, including measurement, calculation, or prediction. Factors include, but are not limited to:
- The inherent accuracy limitation of methodology in Standards and guidance.
 - Variability in meteorological conditions.
 - The accuracy of sound source input data of a calculation.
- 4.53 It is imperative to minimise the uncertainty to a level commensurate with the intention of the assessment objective. Measures taken in this assessment to minimise uncertainty are:
- Baseline sound levels have been measured over a reasonably long period and therefore provide a good indication of representative background and residual sound levels.



- Sound level measurements were undertaken in accordance with recognised Standards, using a tall environmental windshield and were undertaken during reasonable weather conditions e.g. acceptably low wind speeds and precipitation.
- A direct measurement location was used and is considered to provide a representative basis for background noise levels at the nearest receiver locations to the development.
- Field calibration checks were undertaken before and after measurements to record very low levels of equipment drift.
- The sound source data has been provided from site measurements.
- The calculations have been conservative as not to under-predict the resulting impacts.

4.54 The aforementioned measures have been considered to reduce uncertainty to a level considered not to have any significance to the outcome of this assessment.

5 PREDICTED NOISE IMPACTS AND PLANNING

- 5.1 Concern has been noted to the potential “noise and disturbance impacts” from site activities between 07:00 – 08:00 on the amenity of nearby residential receptors, in relation to the application for a variation in working hours at The Site, within UTT/20/3259/FUL.
- 5.2 The evaluated noise impacts in this report should be considered by Uttlesford District Council mindful of the National Planning Policy Framework and Noise Policy Statement for England, which currently define the policy and decision-making requirements for planning and noise.
- 5.3 In deciding a suitable planning outcome, it must be recognised that noise management is a complex issue and at times requires complex solutions. There is no European or national noise limit which must be met. To assist in defining what level of noise impacts should be acceptable in sustainable development, the NPSE refers to established concepts from toxicology that are currently being applied to noise impacts.
- 5.4 The NPSE suggests that noise levels above the SOAEL should be avoided and that if noise levels fall between the LOAEL and SOAEL all reasonable steps should be taken to minimise and mitigate adverse effects while also considering the guiding principles of sustainable development. This does not mean that adverse effects cannot occur from a noise-generating development.
- 5.5 The range of noise impacts reviewed for the proposed development have been deemed acceptable with respect to overarching requirements for planning and noise, where resulting impacts have been anticipated around the LOAEL threshold of the NPSE.
- 5.6 **It has been established that industrial sound resulting from the established business would be largely unnoticeable, or, just perceptible during the morning hour of assessment. In the worst-case, it is possible for the sound to be audible within periods of low residual sound, but in context, the activity sound is not expected to cause any change in behaviour or attitude.**
- 5.7 In accordance with overarching planning requirements, measures have been satisfactorily considered to “mitigate and minimise adverse impacts on health and quality of life” which can be secured on the development by conditional approval, if necessary, to include:
- 2 m tall earth bunding along the northern boundary of The Site, with a 1.8 m solid screen along the apex of the bund (as illustrated in Figure C2 in Appendix C of this report).
 - Regular maintenance of plant room remedial works, as described in report “36833 R1”.
 - Restriction to site activities between 07:00 – 08:00:
 - No opening of the manufacturing shutter doors within this period.
 - No operation of forklifts along the western corridor of The Site within this period.

6 CONCLUSIONS

- 6.1 Condition 9 of application UTT/20/0561/FUL included a restriction to the operating hours of both the proposed development and the existing processes at the commercial site at Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY: *“8.00am to 6.00pm Mondays to Fridays, 8.00am to 1.00pm on Saturdays and at no times on Sundays, Bank or Public Holidays.”*
- 6.2 The business disputed that it had always operated earlier than the newly imposed working hours and that restricting activities between 07:00 – 08:00 would have significant detrimental impact on the manufacturing processes and the contracted working hours of hired staff.
- 6.3 An application to vary this condition to include this morning hour was refused on grounds of “noise and disturbance impacts” (UTT/20/3259/FUL), where evidence was required to show this could be moderated.
- 6.4 An assessment of environmental sound levels has been carried out at Poplars Farm. Environmental sound levels have been taken from site surveys at the boundary of the development site, representative of the sound levels at the nearest noise sensitive receptors.
- 6.5 Extensive computer simulation and predictive modelling has been employed to determine potential measures to minimise sound levels from industrial activities at the closest sensitive receptors; whereby the greatest reductions were resultant of a combined mitigation scheme, by means of screening, relocation, and management of specific activities within the critical period of sensitivity.
- 6.6 A recommended mitigation scheme has been outlined which would incorporate:
- 6.6.1 2 m tall sound bunding along the northern boundary of the site (with a 1.8 m solid screen along the apex).
 - 6.6.2 Remedial works to the existing plant room.
 - 6.6.3 Restriction of specific forklift activities (along the west corridor of the site) and of shutter doors being opened within the critical hour between 07:00 – 08:00.
- 6.7 A noise impact assessment has been carried out in line with BS 4142 methodology. Cumulative rating sound levels have been predicted at the nearest residential receptors, based on measurements and operations defining the development emission of existing/proposed use.
- 6.8 With consideration to the recommended mitigation measures, in the worst-case, the numerical assessment in Section 4 has predicted rating levels 7 - 8 dB above the representative background sound level at these receptors during the contested daytime working hour of 07:00 – 08:00.
- 6.9 It has been established that industrial sound resulting from the established business would be largely unnoticeable, or, just perceptible during the morning hour of assessment, where absolute sound levels have been reviewed as being as, or more relevant than comparative metrics, in accordance with BS 4142. The likely acoustic effects have been established about the LOAEL threshold of the NPSE, such that it may be occasionally audible within periods of low residual

sound, but in context, the activity sound is not expected to cause any change in behaviour or attitude.

6.10 The sound sources associated with the industrial site have been viewed to support the notion of a “low impact” assessment in accordance with BS 4142, where the predicted noise impacts have been modified when considering the context of the site. Additionally, a practicable means of minimising noise emissions has been demonstrated.

6.11 Where concern has been noted to potential noise impact between the hours of 07:00 – 0800, within the refusal decision of UTT/20/3259/FUL, substantive evidence has been provided to demonstrate that operations at the industrial site could be controlled, (if necessary, via condition), to accord with a low impact on nearby receptors.

Appendix A: Glossary of Acoustic Terms

'A' weighting dB(A): Correction applied to the frequency range of a noise in order to approximate the response of the human ear. Noise measurements are often A-weighted using an electronic filter in the sound level meter.

Attenuation: Sound reduction, measured in decibels (dB).

Ambient Sound: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.

Background sound level: A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Calibration: A check of the function of a sound level meter by comparing the meter reading with a known sound pressure level.

Decibel (dB): The unit of sound level and noise exposure measurement. The range of audible sound pressures is approximately 0 dB to 140 dB.

Frequency (Hz): The pitch of the sound, measured in Hertz.

LAeq,T: The A-weighted equivalent continuous sound pressure level during a period. It is the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period, T.

Octave-bands: A division of the frequency range into recognised bands.

Rating level, LAr,Tr: The specific sound level plus any adjustment for the character of the sound.

Residual sound: Ambient sound remaining in the absence of the specific sound or that it is suppressed as not to contribute to the ambient sound level.

Residual sound level, Lr or Leq,T: The equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given reference time interval, T.

Sound pressure level (SPL): The basic measure of sound, expressed in decibels, usually measured with an appropriate frequency weighting (e.g. the A-weighted SPL in dB(A)).

Sound power level (Lw): The sound energy radiated per unit time by a sound source measured in watts (W). Sound power can be weighted (e.g. A-weighted) and is not influenced by environmental or physical factors such as weather or distance.

Specific sound: Sound source being assessed.

Specific sound level, Ls or Leq,T: The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval, T.



Appendix B: Annotated Location Plan

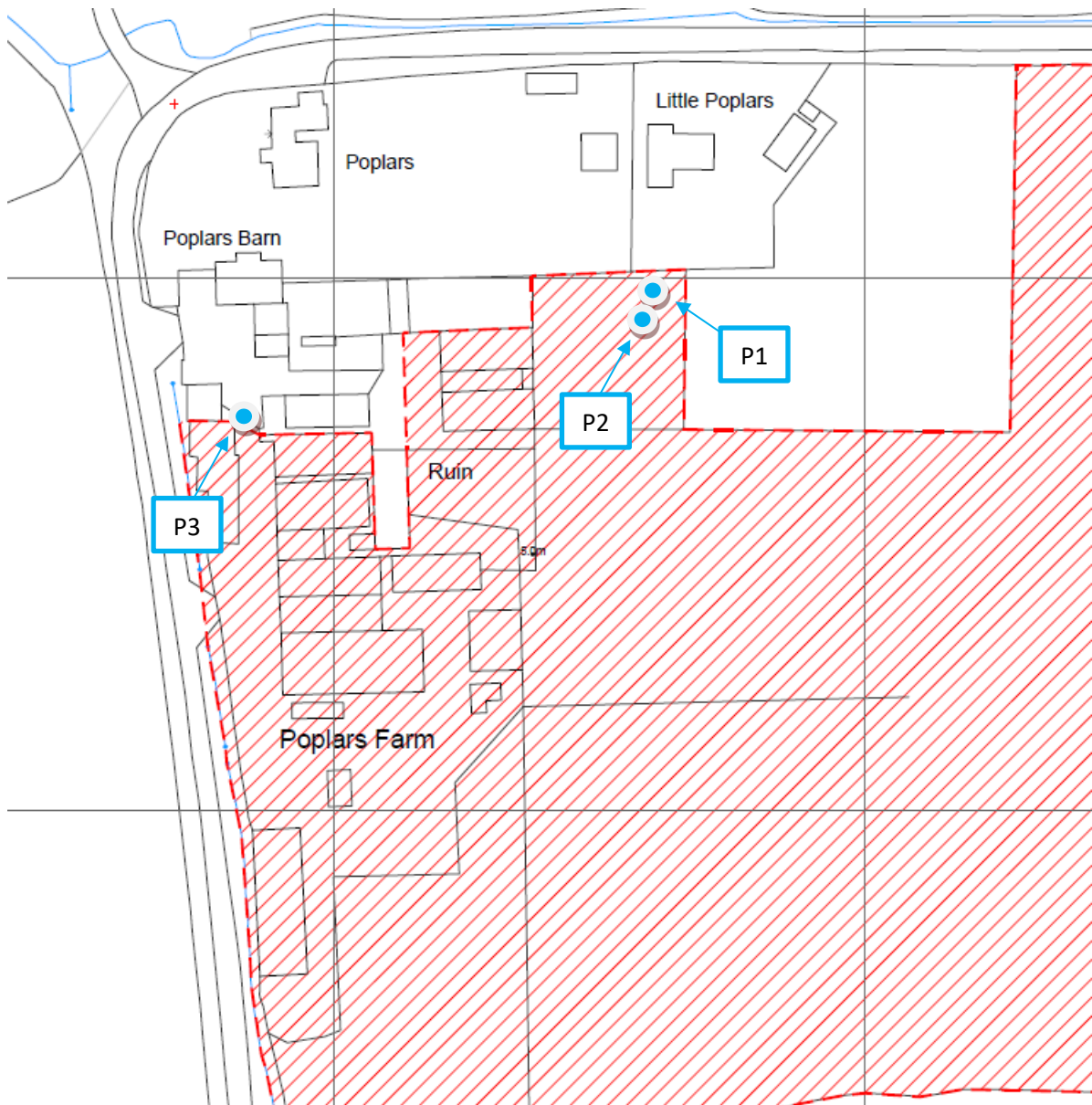


Figure B1 – Location plan, with measurement position annotated.

Appendix C: Scheme Designs



Figure C1 – Location plan with granted development to south.

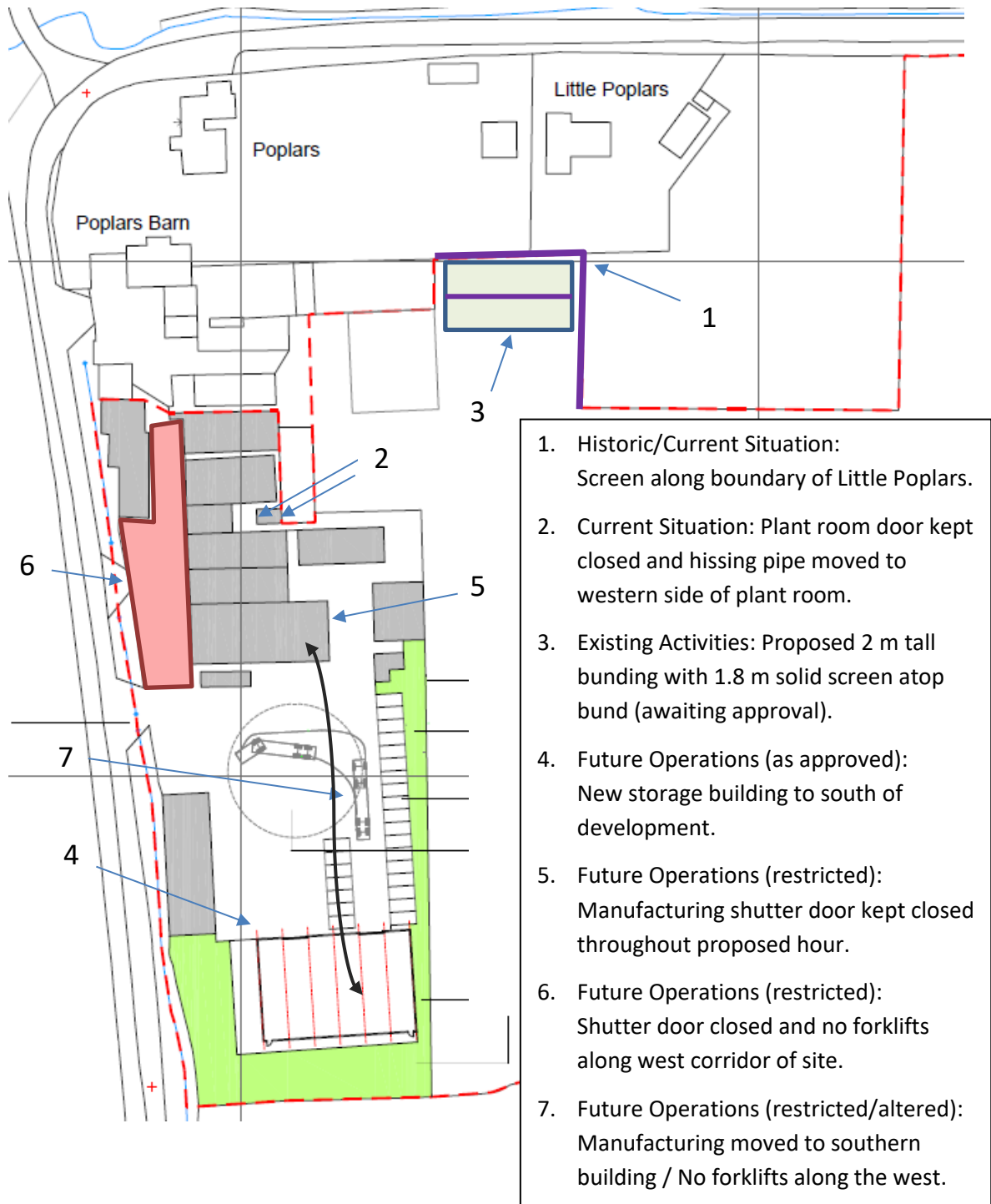


Figure C3 – Mitigation measures considered and modelled

Appendix D: Environmental Survey Summary

The equipment used conforms to BS EN 61672-1:2003 (Class 1) for sound level meters and BS EN 60942 (Class 1) for sound calibrators; with at least traceable calibration history valid; no greater than two years for sound level meters and one year for sound calibrators, relevant to the times of the site assessment.

Position	Manufacturer	Model No.	Description	Serial No.
1 (Survey 1)	Larson Davis	LxT (ST)	3 rd octave band sound level meter	4170
		PRMLxT1L	Microphone preamplifier (low range)	36076
		337B02	½" electret microphone	151485
2 (Survey 2)	Larson Davis	LxT (SE)	3 rd octave band sound level meter	3934
		PRMLxT1L	Microphone preamplifier (low range)	29332
		337B02	½" electret microphone	146990
3 (Survey 2)	Larson Davis	LxT (ST)	3 rd octave band sound level meter	4170
		PRMLxT1L	Microphone preamplifier (low range)	36076
		337B02	½" electret microphone	151485
All	Larson Davis	CAL200	Sound level calibrator	11165

Table D1 – Sound monitoring equipment.

Validation checks at the end of the survey demonstrated acceptable drift across all parts of the study, across the sound level measurement equipment used, of ≤ 0.20 dB. Interval data was recorded at the measurement location at 1-minute and 15-minute periods, time synchronised to BST.

Weather conditions at the times of site attendance were deemed acceptable for surveying.

Survey 1: 22/06/2021 (weekdays)			
Weather conditions	Start	Finish	Additional comments
Wind velocity	< 4 m/s Average	< 2 m/s Average	None
Wind direction	N	N	
Cloud cover/rain	100 %, no rain	80 %, no rain	
Temperature	13 °C	14 °C	

Table D2 – Recorded weather conditions over Survey 1.

Survey 2: 03/10/2021 (Sunday)			
Weather conditions	Start	Finish	Additional comments
Wind velocity	< 4 m/s Average	< 3 m/s Average	None
Wind direction	NE	NE	
Cloud cover/rain	100 %, no rain	50 %, no rain	
Temperature	10 °C	11 °C	

Table D3 – Recorded weather conditions over Survey 2.

A brief description of the sound field at the residential boundaries has been provided below:

Survey 1 (while site was operating)

Incident sound was observed predominantly from natural sounds such as birdsong and wind in trees. Intermittent aircraft activity dominated the sound field during flyovers from Stanstead airport (The Site notably resides beneath flight path).

A constant whine from industrial Plant Room could be heard when natural sound levels dropped. Intermittent sudden hissing sound occurs every few minutes (approximately 1 - 3 mins of every hour) – emitted from pipe associated with Plant Room. Forklift reverse sirens were occasionally just audible from industrial site, in addition to quiet clatters.

Survey 2 (while site was not operating)

Incident sound was observed predominantly from natural sounds such as birdsong and wind in trees. Intermittent aircraft activity dominated the sound field during flyovers from Stanstead airport. A full breakdown of site notes has been provided in the Table below:

Time period	Site Notes
07:00 - 07:15	2 positions representative of closest sensitive receptors First 5 mins - just birdsong and natural noise sources and distant aircraft. Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:06 - 07:07, 07:12 - 07:13, and 07:14 - 07:15) - 3x in period.
07:15 - 07:30	Birdsong still dominant in between aircraft flyovers. Distant aircraft and distant road traffic noise also audible. Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:18 - 07:19, 07:25 - 07:26, 07:27 - 07:28, 07:29 - 07:30) - 4x in period. Vehicle on road at 07:29.
07:30 - 07:45	More distant aircraft in this period. Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:33 - 07:34, 07:39 - 07:40) - 2x in period Vehicle on road at 07:34 Cockerel crows at 07:44
07:45 - 08:00	Aircraft flyover (slightly different flight route) taking off from Stansted. Source dominates for approximately 1 minute (occurrences at 07:50 - 07:51, 07:52 - 07:53, 07:55 - 07:56, 07:59 - 08:00) - x4 in period

Table D4 – Site Notes: Survey 2.

Time period	Site Notes	Position 2			Position 3		
		dB	dB	dB	dB	dB	dB
		L _{Aeq, T}	L _{A90, T}	L _{Amax(F)}	L _{Aeq, T}	L _{A90, T}	L _{Amax(F)}
07:00 - 07:15	2 positions representative of closest sensitive receptors First 5 mins - just birdsong and natural noise sources and Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:06 - 07:07, 07:12 - 07:13, and 07:14 - 07:15) - 3x in period.	54	26	69	54	28	69
07:15 - 07:30	Birdsong still dominant inbetween aircraft flyovers. Distant aircraft and distant road traffic noise also audible. Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:18 - 07:19, 07:25 - 07:26, 07:27 - 07:28, 07:29 - 07:30) - 4x in period. Vehicle on road at 07:29.	55	30	70	56	33	72
07:30 - 07:45	More distant aircraft in this period. Aircraft flyover (directly overhead) taking off from Stansted, heading east. Source dominates for approximately 1 minute (occurrences at 07:33 - 07:34, 07:39 - 07:40) - 2x in period Vehicle on road at 07:34 Cockerell crows at 07:44	50	29	68	50	31	67
07:45 - 08:00	Aircraft flyover (slightly different flight route) taking off from Stansted. Source dominates for approximately 1 minute (occurrences at 07:50 - 07:51, 07:52 - 07:53, 07:55 - 07:56, 07:59 - 08:00) - x4 in period	51	30	67	51	32	68
Average over hour:		53	29	69	54	31	69

Table D5 – Summary of measured sound levels between 07:00 – 08:00 at Positions 2 and 3 in the absence of site activity (Survey 2).



Figure D1 Photo highlighting long-term Measurement Position 1 (Survey 1).



Figure D2 Photo highlighting long-term Measurement Position 1 (Survey 1).



Figure D3 – Photo highlighting short-term Measurement Position 2 (Survey 2).



Figure D4 – Photo highlighting short-term Measurement Position 3 (Survey 2).

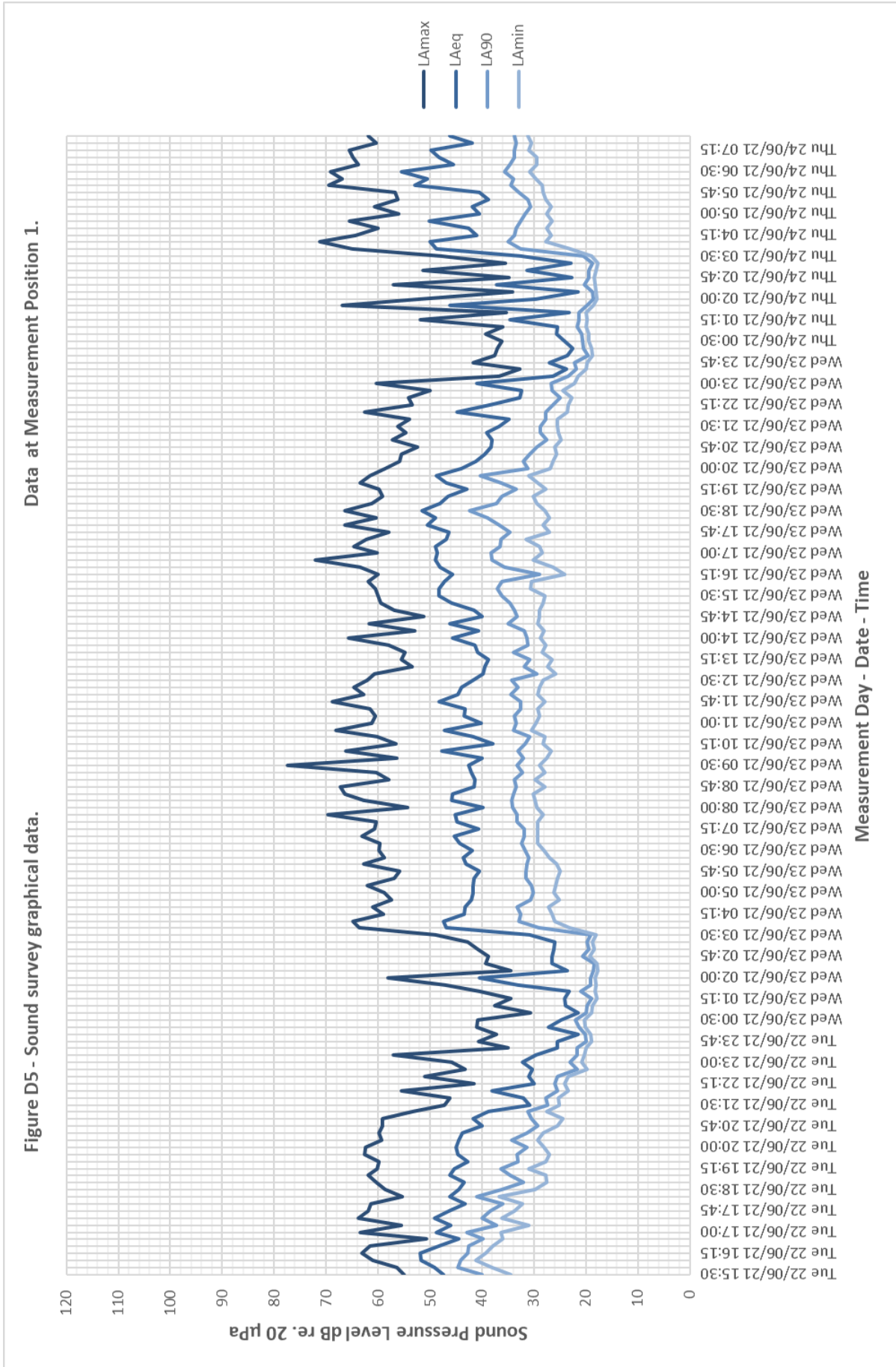


Figure D5 - Sound survey graphical data.

Description	Measurement Distance From Source (m)	Sound Pressure Levels, Leq dB re. 20µPa												
		1/1 Octave, Frequency (Hz)												L _{Aeq, T}
		8	16	32	63	125	250	500	1k	2k	4k	8k	16k	
IANL Manufacturing Room - Maximum Operations	N/A	58	59	59	65	74	75	83	81	76	72	63	55	85
IANL Plant room - Maximum Operations	N/A	58	59	59	70	74	69	72	69	67	64	57	46	74
IANL filling and labelling	N/A	60	59	57	58	60	63	63	63	62	61	55	47	69
IANL Special Order/Tinting Room)	N/A	61	56	57	53	57	59	55	55	55	52	48	38	61
External to Plant Room (open door)	2	55	53	56	63	64	60	64	61	59	53	45	34	66
External to Plant Room (closed door)	2	55	52	54	57	61	52	56	48	46	44	40	32	56
Hissing Pipe external to Plant Room	3	68	55	51	55	57	53	55	62	70	75	73	68	78
Forklift entering Manufacturing Room (horn blasts twice)	2	58	52	60	57	60	64	67	63	69	71	51	43	75
Forklift moving pallets and maneuvering around yard	8	69	65	75	74	65	60	60	61	61	56	49	37	66
Unloading / loading of HGV using forklift	5	69	68	78	77	66	64	66	69	65	63	58	46	73
Diesel pump	2	57	60	62	60	58	67	68	63	53	47	39	31	68
Crusher	2	62	65	63	66	60	60	72	79	67	66	59	51	80
External to Manufacturing Room - Open aperture	5	65	55	58	58	58	56	65	63	57	51	40	28	67
External to Manufacturing Room - Closed rolling doors	5	52	58	58	56	56	53	57	55	48	40	31	22	58

Table D6 – Summary of measured sound pressure level results of industrial processes.

Appendix E: Model Outputs

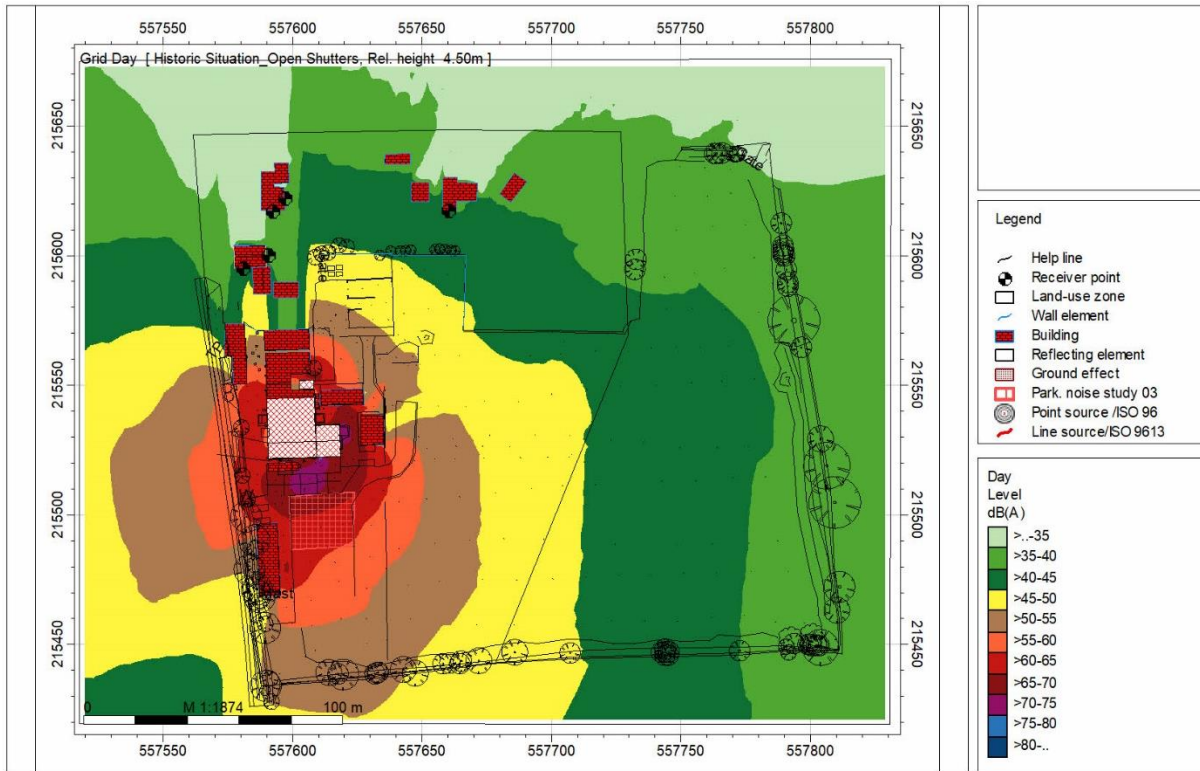


Figure E1 - Noise Contour at 4.5 m grid height: “Scenario 1”: Historical Situation.

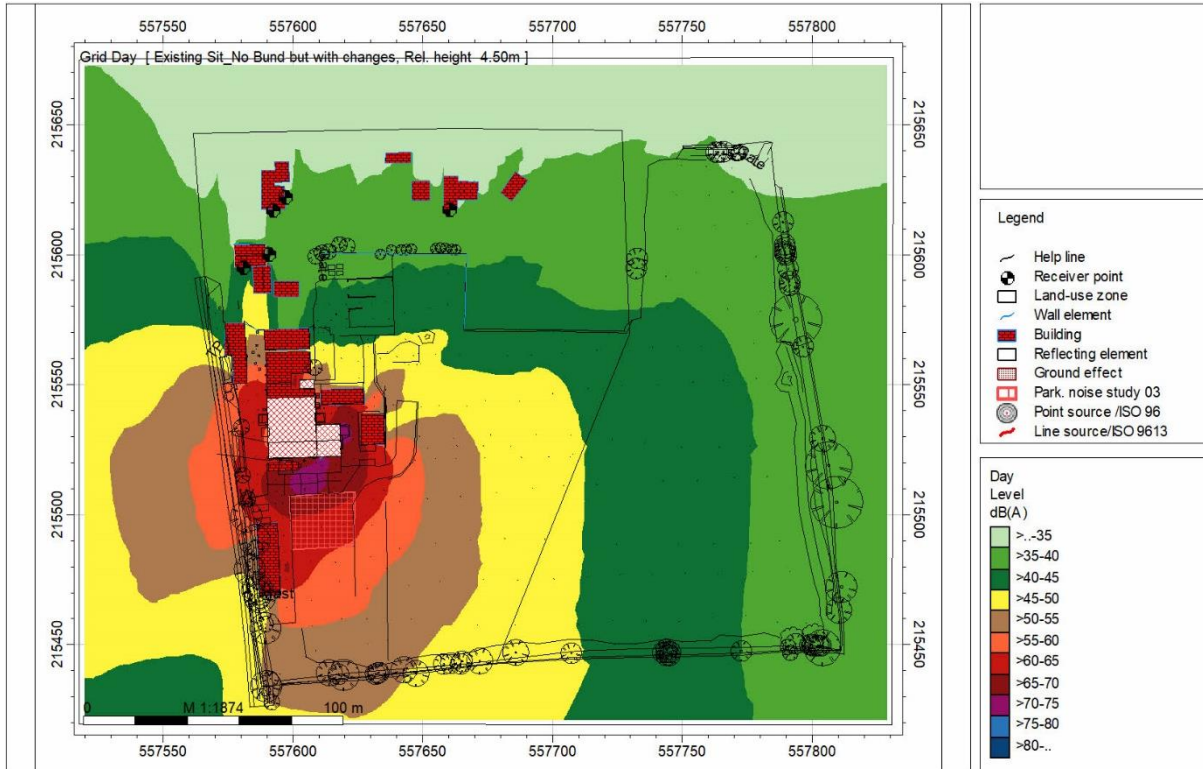


Figure E2 - Noise Contour at 4.5 m grid height: “Scenario 2”: Current situation.

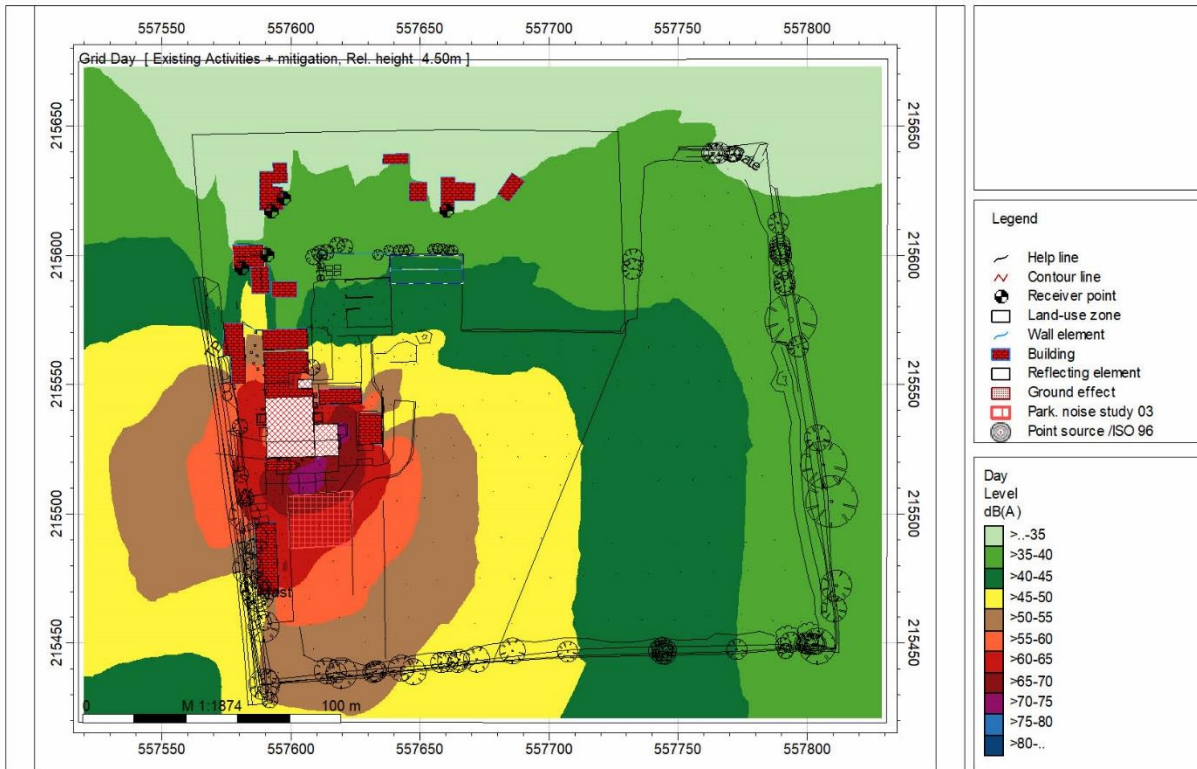


Figure E3 - Noise Contour at 4.5 m grid height: “Scenario 3”: Current situation with proposed mitigation.

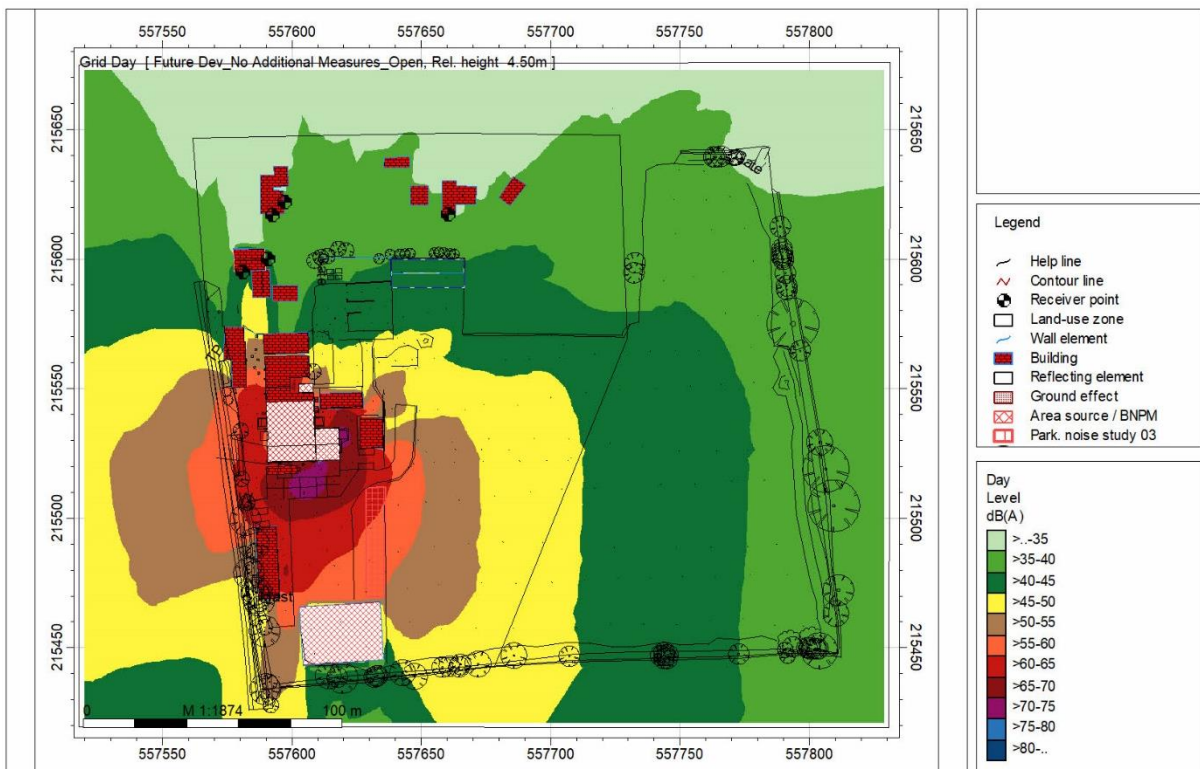


Figure E4 - Noise Contour at 4.5 m grid height: “Scenario 4”: Future development.

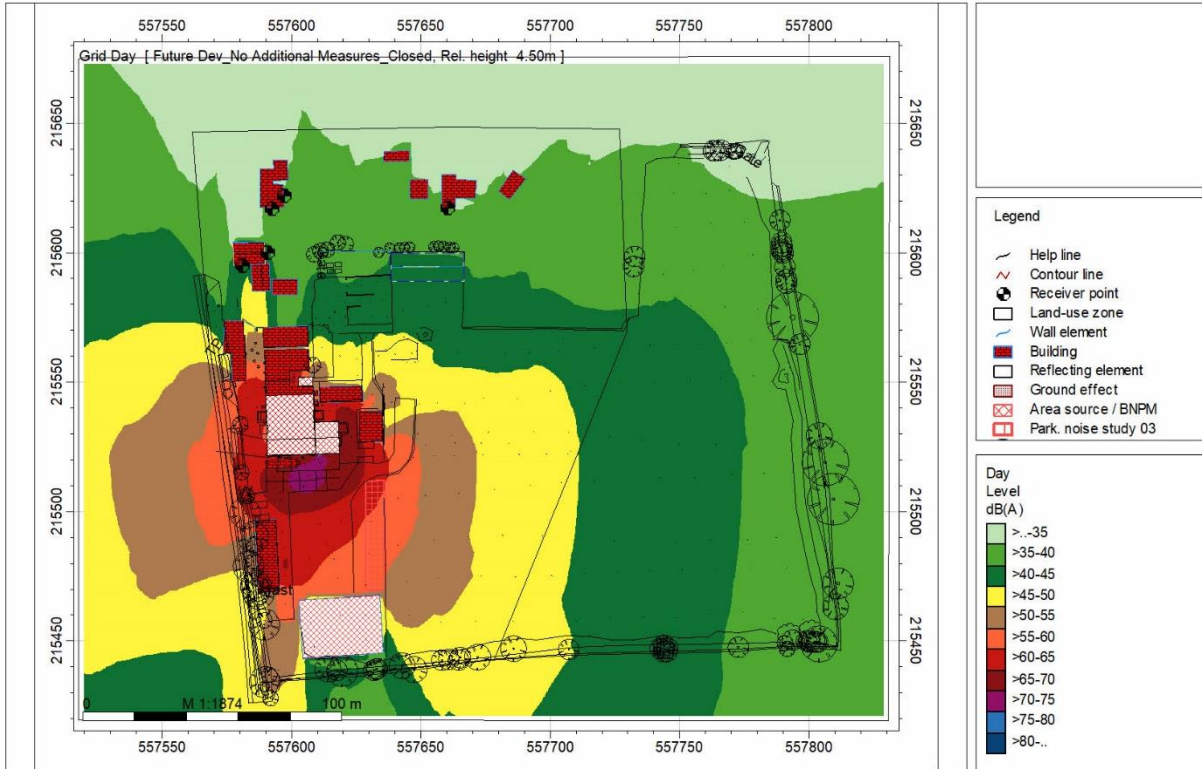


Figure E5 - Noise Contour at 4.5 m grid height: "Scenario 5": Future development with manufacturing shutter doors kept closed.

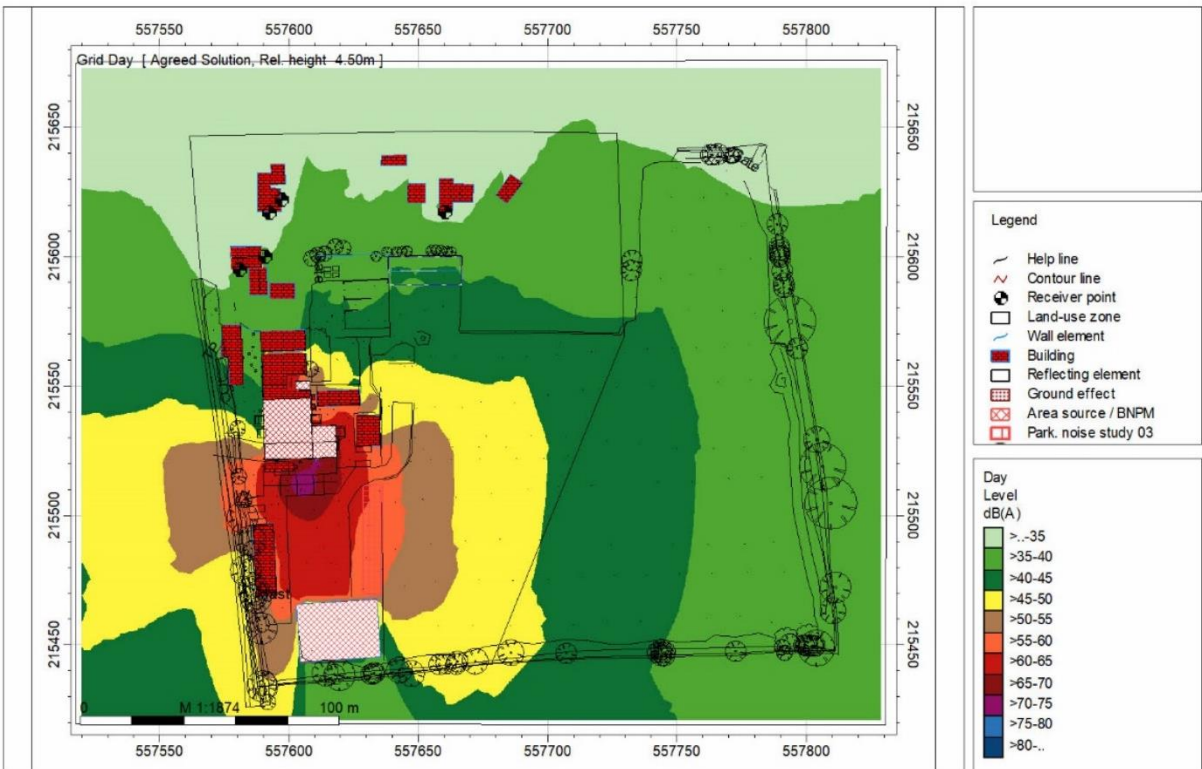


Figure E6 - Noise Contour at 4.5 m grid height: "Scenario 6": Future development with manufacturing shutter doors kept closed and forklift movements restricted along west of site.

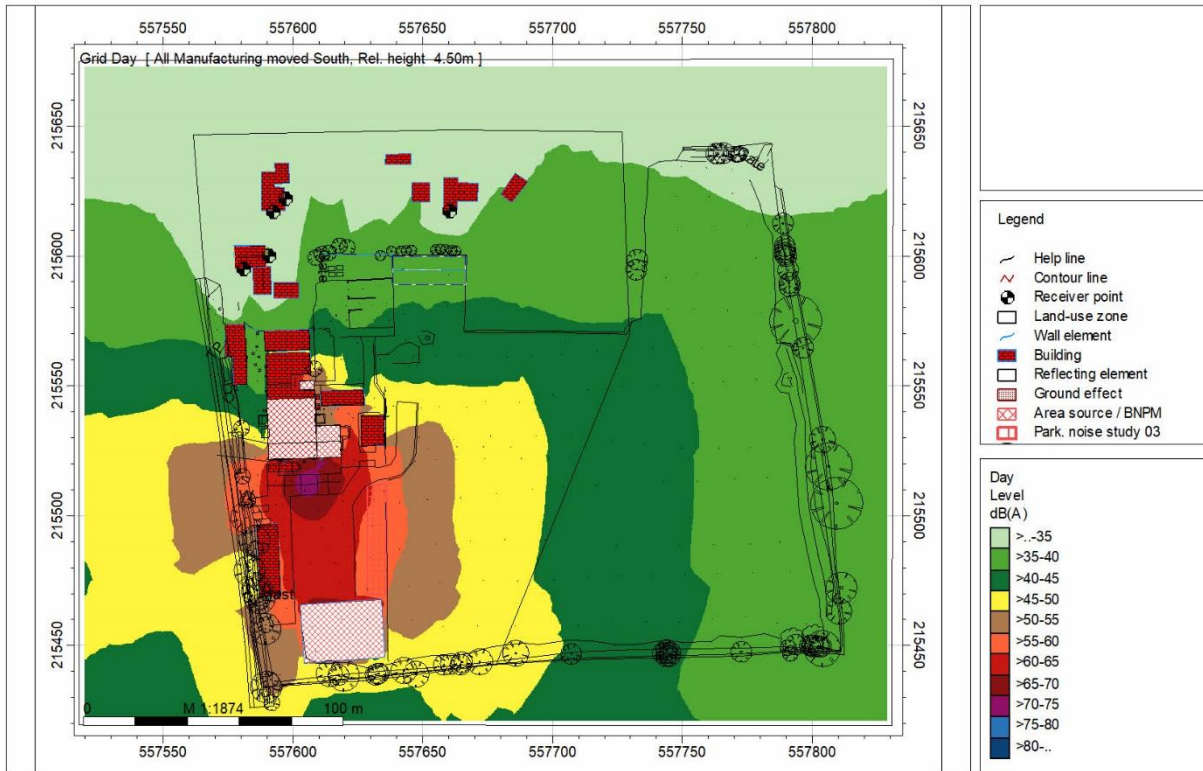


Figure E7 - Noise Contour at 4.5 m grid height: "Scenario 7": Future development with all manufacturing moved to south and forklift movements restricted along west of site.

Appendix F: Acousticians Qualifications and Status

Dominic Attwell BEng. (Hons) AMIOA

Position Held: Acoustic Consultant.

Qualifications: BEng. (Hons) Audio Acoustics.

Affiliations: Member of the Institute of Acoustics.

Acoustics Experience: 5 years.

Approved

James Blakeley BSc. (Hons) MIOA

Position Held: Senior Acoustic Consultant.

Qualifications: BSc. (Hons) Audio Technology.

Affiliations: Member of the Institute of Acoustics.

Acoustics Experience: 9 years.

