MILLER GOODALL

ACOUSTICS - AIR QUALITY - LIGHTING

Noise Assessment

on behalf of

ENCYCLIS LTD

for the site at

LAND OFF MARSH LANE, INCE, CHESHIRE

REPORT DATE: **11 SEPTEMBER 2023**

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Summary

A cumulative noise assessment has been undertaken to predict the potential impact of a proposed development consisting of an Energy Recovery Facility(ERF) and a newly proposed Carbon Capture Facility(CC Facility) as part of the Protos industrial site at Land off Marsh Lane, Ince, Cheshire. This is required by the Environment Agency to support the approval for an Environmental Permit for the development.

Measurements were made at locations representative of the nearest residential dwellings to the proposed site to identify the pre-development background sound levels. Historical background sound-level data from the previous survey undertaken by RSK for the ERF Environmental Permitting Variation have also been referenced. Indicative sound power level data provided by Fichtners Ltd for the CC Facility and the results of the ERF noise impact report for a variation application to existing environmental permit have been used to predict the potential impact of noise from likely activities associated with the combined operation of the ERF and CC Facility.

A noise model has been assembled for the proposed development site, the results from which are provided within this report.

It has been found that noise resulting from the combined operations of the ERF and CC Facility will have a low impact with respect to BS4142:2014 at all identified noise-sensitive receptors.

Record of changes

Prepared By:	Will Wright MIOA	**Reviewed By:**	Michael Rickard MIOA
Signed:		**Signed:**	
Date:	11 September 2023	**Date:**	11 September 2023

Version	Date	Change	Initials
1	5 September 2023	-	WW
2	8 September 2023	Removed irrelevant guidance. Updated site boundary. Corrected terminology at client's request	WW
3	11 September 2023	Updated proposed construction detail for Turbine Hall and Compressor Hall internal plant housing	WW

Contents

1 Introduction

1.1 An Environmental Permit (EP) (Ref: EPR/LP3132FX) was granted by the Environment Agency (EA) for the Protos Energy Recovery Facility (ERF) (herein referred to as the Facility) on 16 September 2011. This EP replaced the EP for the Facility (Ref: TP3135LS) originally granted by the EA on 21 December 2006 to Peel Environmental Ince Limited.

1.2 The EP (EPR/LP3132FX) has been varied 8 times. The latest variation to the EP was granted by the EA to Encyclis Limited (Encyclis) on 02 May 2023 to incorporate the requirements of the Waste Incineration BREF review process. Within this application, Encyclis is applying for a variation to the EP to incorporate the proposed carbon capture (CC) facility to capture the carbon dioxide (CO2) produced by the ERF for sequestration.

1.3 In October 2021, the Department for Business, Energy and Industrial Strategy (BEIS) announced funding for two regional carbon capture hubs, HyNet in the northwest of England and the East Coast Cluster in the North East. The ERF comprises two incineration lines. Encyclis is proposing to install a CC facility with two lines; one to extract the CO2 from the emissions produced by each line of the ERF. The proposed CC facility will form part of the North West of England Cluster project. The proposed CC facility is projected to capture up to 412,500 tonnes of CO2 from the flue gases for transmission and storage off-shore in the Liverpool bay sub-sea aquifer.

1.4 Miller Goodall Ltd has on behalf of Encyclis Ltd, undertaken a noise assessment in respect of the cumulative impact of noise from the proposed facility off Marsh Lane in Cheshire. RSK previously assessed the ERF as a stand-alone site in a noise impact assessment for a variation application to an existing environmental permit, however, the proposals did not include the CC facility which was not yet proposed at the time.

1.5 This report seeks to support the new application for the variation of the existing Environmental Permit to include for the proposed CC Facility

1.6 This noise assessment reassesses the noise impact of the combined operations of the ERF and CC Facility.

2 Site Description

2.1 The site is located at Land off Marsh Lane, Ince, Cheshire. The site location is shown outlined in red in Appendix 1.

2.2 The immediate surrounding site area is predominantly a mix of rural and industrial with urban areas approximately 1.7 km west (Ince), 1.1 km southwest (Elton) and 2.2 km southeast (Helsby). The is a residential farmhouse located 1.3 km northwest (Holme Farm) and 1.7 km southeast (Spring Farm).

2.3 At this time, the ERF is under construction having been granted approval following the aforementioned RSK noise impact assessment.

3 Proposed Development

3.1 The proposal is to construct a carbon capture facility which is to process the gas output from approved ERF and return the recaptured carbon to the HyNet carbon capture pipeline. The site of the proposed CC Facility is located within the Protos site, Ince, Cheshire. Protos RRP is a 130-hectare development site, allocated as a major resource recovery hub comprising various plots for use in connection with the recycling, recovery and reprocessing of waste materials.

3.2 The Proposed Scheme has not yet been defined, however, is currently proposed to comprise multiple process units arranged in process format, including air coolers, heat exchanger and pumphouse, reboiler, desorber, absorber, direct contact cooler, booster fan, CO2 treatment and compression, and 2 gas flue stacks.

3.3 The proposal will also require some additional infrastructure within the Protos ERF site, and changes to the elevations of the Protos ERF, e.g. to connect the above ground ducts to the ERF Stack.

4 Policy Context

4.1 Noise Policy Statement for England

4.1.1 The Noise Policy Statement for England (NPSE[1]), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse effects on health and quality of life;
- mitigate and minimise adverse effects on health and quality of life; and

[1] Noise Policy Statement for England, Defra, March 2010

- where possible, contribute to the improvement of health and quality of life."

4.1.2 The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and the quality of life occur.

4.1.3 The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the Statement). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case:

"…all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development".

4.1.4 Importantly, the NPSE goes on to state:

"This does not mean that such adverse effects cannot occur".

4.1.5 The Statement does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that:

"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available"

4.1.6 It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF[2]) initially published in March 2012, was updated in July 2021. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"[3].

[2] National Planning Policy Framework, Ministry of Housing, Communities and Local Government, July 2021

[3] Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

4.2.2 The revised NPPF advises that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives). One of these is an environmental objective which is described in par. 8 (c):

> *"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

4.2.3 At par. 174 we are advised that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by*:
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*

4.2.4 Par. 185 goes on to state:

> *"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."*

4.2.5 Par. 187 seeks to ensure that any development does not prejudice the legally permitted operations and activities of other, existing non-residential uses, stating:

> *"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."*

4.3 Planning Practice Guidance – Noise

4.3.1 As of March 2014, a Planning Practice Guidance[4] for noise was issued which provides additional guidance and elaboration on the NPPF, the guidance was updated in July 2019. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

- 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.

4.3.2 In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

> *"…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation".*

4.3.3 Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;

[4] Planning Practice Guidance – Noise, https://www.gov.uk/guidance/noise--2 22nd July 2019.

- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

4.3.4 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

> *"Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed".*

4.3.5 The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

5 Environment Agency Consultation

5.1.1 As part of the pre-application discussions with the EA the approach was agreed. This included agreement that the following receptors would be considered:

Table 1: Receptors Agreed by the EA

Receptor	Location	Distance (and orientation) from the ERF
R1	Holme Farm	1108m (NW)
R2	Marsh Lane	1600m (W)
R3	Spring Farm	1780m (SE)
R4	Smith Lane, Helsby	2450m (SE)
R5	Station Road, Helsby	2200m (SE)
R6	Moor Lane, Hapsford	2165m (S)
R7	Mimosa Close	1100m (SW)

5.2 The following approach was agreed with the EA:

"Encyclis understands that an application for a variation is required to demonstrate that a 'change in impact' is not significant. Encyclis has developed its approach to assessing the noise impacts associated with the CC facility based on this requirement.

Whilst the background noise levels were determined in the 2016 noise survey, due to the changes to the local noise environment highlighted previously, Encyclis is proposing to undertake additional noise monitoring to validate whether there has been any change to the local noise environment. A noise meter has recently been deployed in a back garden in Helsby, and subject to suitable meteorological conditions, this will provide long-term noise monitoring to understand the baseline noise levels in Helsby (representative of R4 and R5 from the 2016 survey). In addition, subject to suitable meteorological conditions, Encyclis is proposing to undertake short term attended surveys at receptor locations R1, R2, R3, & R7 covering night time and weekend periods. The proposed background monitoring will be utilised to validate the 2016 survey as being representative of the

current noise environment, or inform the assessment, as appropriate. It is not proposed to undertake further background monitoring at R6 due to its distance from the Facility, and the very low impacts which were predicted in the 2019 EP variation at this receptor location.

To assess the noise impacts of the CC, Encyclis is proposing to model CC facility, utilising recognised noise modelling software (CadnaA), to determine the noise impacts of the CC facility on receptors. The impacts of the CC facility will then be added to the predicted impacts from the 2019 EP variation to determine the overall change in noise impacts associated with the combined ERF and CC facility.

The findings of the background monitoring and modelling will be presented within a single technical report."

6 Acoustic Standards and Guidance

6.1 BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

6.1.1 BS 4142:2014+A1:2019[5] provides guidance on the assessment of the likelihood of complaints relating to noise from industrial sources. It replaced the 1997 edition of the Standard in October 2014 and was amended in June 2019. The amended version corrected a number of printing errors and further clarified that the standard is used to assess external noise levels, and not internal noise levels (although this can form part of the discussion regarding context). The key aspects of the Standard are summarised below.

6.1.2 The standard presents a method of assessing potential noise impact by comparing the noise level due to industrial sources (the Rating Level) with that of the existing background noise level at the nearest noise sensitive receiver in the absence of the source (the Background Sound Level).

6.1.3 The Specific Noise Level - the noise level produced by the source in question at the assessment location - is determined and a correction applied for certain undesirable acoustic features such as tonality, impulsivity or intermittency. The corrected Specific Noise Level is referred to as the Rating Level.

[5] BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

6.1.4 In order to assess the noise impact, the Background Sound Level is arithmetically subtracted from the Rating Level. The standard states the following:

- *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 a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.*

6.1.5 In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014+A1:2019 edition places emphasis upon an appreciation of the context, as follows:

> *An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.*

6.1.6 The 2014 edition of BS 4142 also introduced a requirement to consider and report the uncertainty in the data and associated calculations and to take reasonably practicable steps to reduce the level of uncertainty.

7 Noise Survey

7.1 Measurements of Existing Noise Sources

7.1.1 Noise measurements were undertaken at locations consistent with the agreed receptors in accordance with BS 7445-1: 2003[6] by Will Wright and Will Bateman of Miller Goodall Ltd. The calibration of the sound level meter was checked before and after measurements with negligible deviation (<0.1 dB). Details of the equipment used are shown in Table 2, below.

Table 2: Noise monitoring equipment

Equipment Description	Type Number	Manufacturer	Serial No.	Date Calibrated	Calibration Certification Number
Class 1[7],[8] Integrating Real Time 1/3 Octave Sound Analyser	NOR 140	Norsonic	1407510	15/12/2021	05552/1
Microphone	NOR 1225	Norsonic	384687	15/12/2021	05552/1
Class 1 Calibrator[9]	NOR 1251	Norsonic	34123	13/10/2022	05972/1
Class 1[10],[11] Integrating Real Time 1/3 Octave Sound Analyser	NOR 140	Norsonic	1406017	03/11/2021	05520/1
Microphone	NOR 1225	Norsonic	358159	03/11/2021	05520/1
Class 1 Calibrator[12]	Type 4231	Brüel & Kjær	2478249	09/09/2022	05925/1
Class 1[13],[14] Integrating Real Time 1/3 Octave Sound Analyser	NTi XL2-TA	NTi Audio	A2A-15860-E0	27/02/2023	06143/1
Microphone	NTi MC230A	NTi Audio	A16445	27/02/2023	06143/1

[6] BS 7445-1: 2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures

[7] IEC 61672-1 (2002) Electroacoustics – Sound level meters Part 1: Specifications

[8] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

[9] IEC 60942 (2003) Electroacoustics – Sound calibrators

[10] IEC 61672-1 (2002) Electroacoustics – Sound level meters Part 1: Specifications

[11] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

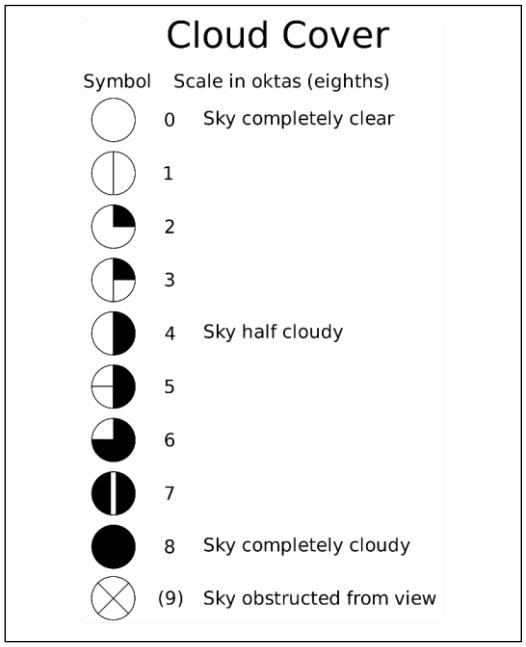
[12] IEC 60942 (2003) Electroacoustics – Sound calibrators

[13] IEC 61672-1 (2002) Electroacoustics – Sound level meters Part 1: Specifications

[14] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

7.1.2 Background and ambient noise monitoring was undertaken at the times specified in Table 3, below. Weather conditions were determined both at the start and on completion of the survey. It is considered that meteorological conditions were appropriate for environmental noise measurements. Measurement locations are shown in Appendix 1.

Table 3: Dates, times and weather conditions during noise measurements

Measurement Locations	Date/Time	Weather conditions		
		Description	At Start of Survey	On Completion
P1	21/08/23, 02:00 to 04:00	Temperature:	14 °C	14 °C
		Precipitation:	Dry	Dry
		Cloud cover (oktas):	1	1
		Any fog/snow/ice?	No	No
		Any damp roads/wet ground?	No	No
		Wind speed:	3 m/s	4 m/s
		Wind direction:	Variable, generally north	
		Temp. inversion conditions?	No	No

7.1.3 For the long-term measurement at Hallastone Road, Helsby, over a period of 7 days between 28th July and 3rd August 2023, weather was variable with a period of winds above 5m/s on Saturday 29th July. The period expected to be quietest in terms of background sound levels is expected to be the Sunday 30th July night-time/Monday 31st July morning. During this period the weather was dry with wind speeds between 2 and 5 m/s with no precipitation.

7.1.4 Measurements were taken at times considered to be representative of the periods during which the existing residential receptors would experience the lowest levels of background sound levels. Measurements were made under free-field conditions at a height of 1.5 m above local ground level.

7.1.5 The measurement locations are detailed below and indicated in Appendix 1.

- MP1 Gated Driveway of Holme Farm on the intersection with Marsh Lane.
- MP2 Marsh Lane in Ince at the northern end of the village.
- MP3 On Rake Lane just southwest of Spring Farm.
- MP4 Mimosa Close, Elton.
- MP5 Rear Garden of Number 18 Hallastone Road, Helsby.

7.1.6 The noise sources within the vicinity of the measurement locations are summarised in Table 4, below:

Table 4: Description of noise sources affecting the site

Measurement Locations	Noise Sources
MP1	Occasional aircraft, Distant continuous industrial plant, Distant road traffic noise
MP2	Occasional aircraft, Distant continuous industrial plant, Distant road traffic noise
MP3	M56 motorway traffic noise
MP4	M56 motorway traffic noise
MP5	M56 motorway traffic noise

7.2 Monitoring Results

7.2.1 A summary of the broadband measurement data is provided in Table 5 below with full data available on request. All data are sound pressure levels in dB re 20 μPa.

Table 5: Summary of noise measurements

Measurement Location	Attended or Unattended Monitoring	Period	$L_{Aeq,T}$ dB	$L_{A90,15min*}$ dB
MP1 Holme Farm	Attended	Night-time (02:00-02:30)	**44**	**43**
MP2 Marsh Lane – Ince	Attended	Night-time (02:37-03:07)	**44**	**43**
MP3 Spring Farm	Attended	Night-time (02:34-02:56)	**57**	**52**
MP4 Mimosa Close - Elton	Attended	Night-time (03:26-03:56)	**51**	**46**
MP5 Hallastone Road	Unattended	Night-time (28/07/2023 – 03/08/2023)	**49**	**37**

* Lowest measured

7.2.2 Each measurement period consisted of sequential 125 ms samples which therefore allowed the variation in noise level over time to be assessed.

7.2.3 The 125 ms noise levels have not been presented in this report but are kept on file for future reference.

7.3 Determination of Background Sound Levels

7.3.1 When compared against the 2016 survey measurement data, the night-time LA90 levels measured in 2023 are generally similar or lower, except for at Mimosa Close where background levels appear to have increased by 4dB. The measured 2023 data validates that the 2016 data is representative at Holme Farm, Marsh Lane(Ince), Spring Farm and Mimosa Close. The 2023 night-time LA90, in Helsby, however, is 11dB lower than measured in 2016. For a conservative assessment, it is the view of the consultant that the 2023 night-time background sound level data is carried forward for the assessment. It is considered that measured 2016 data is appropriate to be carried forward for the assessment of daytime sound levels.

8 Noise Modelling

8.1.1 Prediction of noise levels at sensitive receptors was carried out using CadnaA software package.

8.1.2 The general horizontal plan information of the area surrounding and including the proposed development site was imported from Open Street Maps[15]. This was used to determine road positions, building footprint areas and relative locations and is considered accurate to within 5%. Building height information was based on site observations.

8.1.3 The following parameters were assigned to the model:

- Propagation of noise using algorithms within ISO 9613: 1993 *Acoustics - Attenuation of sound during propagation outdoors*.
- Default ground absorption G = 0.6 (equivalent to the mainly rural grassy areas with mix of tarmacked urban areas, consistent with the dominant ground cover at the site).
- Ground attenuation: spectral all sources
- No adverse meteorological effects
- Two orders of reflection
- Topographical data was obtained using NextMap Britain 2 m or DEFRA LIDAR contours for the site and surrounding assessment area.

8.1.4 The Turbine Hall and Compressor Hall will be located within a steel frame structure with cladding. A minimum indicative construction and predicted sound reduction indices of the elements making up the building envelope of the Turbine Hall and Compressor Hall have been assumed as follows:

- External walls assumed to be at least 25 dB R_w – eg. Kingspan AWP/60[16] with no Lining
- 150mm deep acoustic Louvres assumed for airflow on walls - 11 dB R_w
- Access doors, assumed to be 30 dB R_w - eg. solidcore 25kg/m^2 surface density and closed
- Roof assumed to be at least 18 dB R_w – eg. 0.6mm Metal Cladding[17]

[15] https://www.openstreetmap.org

[16] Kingspan Acoustic Performance Guide June 2005

[17] INSUL sound insulation modelling software results for "Roof Cladding Styleline"

8.1.5 The octave band L_w source data shown in Table 6 were imported directly into the model. This data was provided by Fichtner Consulting Engineers Ltd as indicative sound power level data for the various mechanical plant items proposed at the CC Facility.

Table 6: Noise source data used within CadnaA

Description and No. units	Enclosed/ External	Sound Power Level (per item), dB at Octave Band Centre Frequency, Hz									dB(A)
		31.5	63	125	250	500	1k	2k	4k	8k	
Booster fans (2 no)	External	83	86	83	83	82	78	78	77	71	85
Direct contact cooler (2 no)	External	83	86	83	83	82	78	78	77	71	85
Absorber (2 no)	External	83	86	83	83	82	78	78	77	71	85
Stripper (2 no)	External	83	86	83	83	82	78	78	77	71	85
Back pressure turbine hall (1 no)	Enclosed	75	70	75	73	74	75	75	69	64	80
Heat exchanger building (2 no)	Enclosed	82	85	82	82	81	77	77	76	70	84
Compressor hall (3 no)	Enclosed	75	70	75	73	74	75	75	69	64	80
Electrical equipment (1 no)	Enclosed	99	96	99	77	75	74	72	71	66	85
Cooling fans (882 no)	External	84	84	84	79	78	80	72	63	53	83
Hybrid coolers (2 no)	External	80.2	90.9	99.6	102.1	104.8	106.1	102.5	100.8	97.9	110.0

8.1.6 Graphic outputs from the noise model indicating the noise contours and the highest predicted broadband L_{Aeq} noise levels at the nearest noise sensitive receivers are shown in Appendix 3.

8.2 Previous EP Variation Noise Impact Assessment Model Results

8.2.1 Results from previous EP variation application noise report[18] in the form of resultant operational plant noise are provided in the table below. These figures include the recommended mitigation measures provided in the previous EP variation noise report.

Table 7: RSK ERF Model Results at Receptors

Receptor ID	Sensitive Location	Predicted Noise levels / L_{Aeq} dB	
		Daytime	Night time
R1	Holme Farm	31	29
R2	Ince (Marsh Lane)	33	31
R3	Spring Farm	27	24
R4	Helsby (Smithy Lane)	23	21
R5	Helsby (Station Road)	24	22
R7	Elton (Mimosa Close)	32	30

[18]Fichtner Consulting Engineers - Energy from Waste Facility - Industrial Noise Assessment - 297109-01(00) – dated April 2018

8.3 CC Facility Modelled Results

8.3.1 Results from the noise model created by Miller Goodall Ltd. for the CC Facility are provided below. The CC facility plant is proposed to operate 24 hours a day, 7 days a week. Therefore the results are the same for both day and night-time periods and are presented in a single column.

Table 8: Miller Goodall CC Facility Model Results at Receptors

Receptor ID	Sensitive Location	Predicted Noise levels / L_{Aeq} dB
R1	Holme Farm	31
R2	Ince (Marsh Lane)	29
R3	Spring Farm	30
R4	Helsby (Smithy Lane)	<22*
R5	Helsby (Station Road)	23
R7	Elton (Mimosa Close)	34

*outside lower limits of model area (unable to calculate at this distance; however the level at the calculation boundary is 22 dBA).

8.4 Combined ERF and CC Facility Modelled Results

8.4.1 Results from both facilities have been summed logarithmically in order to determine the total operational sound level at each receptors during the day and night time periods. These are presented in the table below.

Table 9: Combined Model Results at Receptors

Receptor ID	Sensitive Location	Combined Predicted Noise levels / L_{Aeq} dB	
		Daytime	Night time
R1	Holme Farm	34	33
R2	Ince (Marsh Lane)	34	33
R3	Spring Farm	32	31
R4	Helsby (Smithy Lane)	25	24
R5	Helsby (Station Road)	27	26
R7	Elton (Mimosa Close)	36	35

8.5 BS 4142:2014+A1:2019 Assessment

8.5.1 A BS 4142 noise impact assessment has been undertaken in order to assess the potential noise impact at the identified receptors closest to the proposed facility and is detailed in this section of the report.

8.5.2 The following BS 4142 assessment has considered the daytime and night time impact. Daytime background sound levels have been taken from the RSK noise impact report and the night time background sound levels are based on Miller Goodall surveyed levels.

8.5.3 Based on the above assumptions, the BS 4142 assessment of noise impacts at the most affected locations from the proposed facility is shown in Table 10 below:

Table 10: BS 4142:2014 Noise Impact Assessment

Receptor	Period	Noise Level / dB		
		Background / L_{A90}	Predicted Rating Level / $L_{Aeq,T}$	Difference
Holme Farm	Day	45	34	-11
	Night	43	33	-10
Ince (Marsh Lane)	Day	42	34	-8
	Night	43	33	-10
Spring Farm	Day	60	32	-28
	Night	52	31	-21
Helsby (Smithy Lane)	Day	52	25	-27
	Night	37	24	-13
Helsby (Station Road)	Day	48	27	-21
	Night	37	26	-11
Elton (Mimosa Close)	Day	55	36	-19
	Night	46	35	-11

8.5.4 Third-octave band data is not available to determine whether any tonality will be present. All operational noise is associated with continuous mechanical plant which is unlikely to exhibit impulsivity or intermittency.

8.5.5 It can be seen from the above table that the initial estimate of noise impact of the business park, based on the BS 4142 methodology, indicates a likelihood of low noise impact at all of the identified receptors.

9 Conclusions

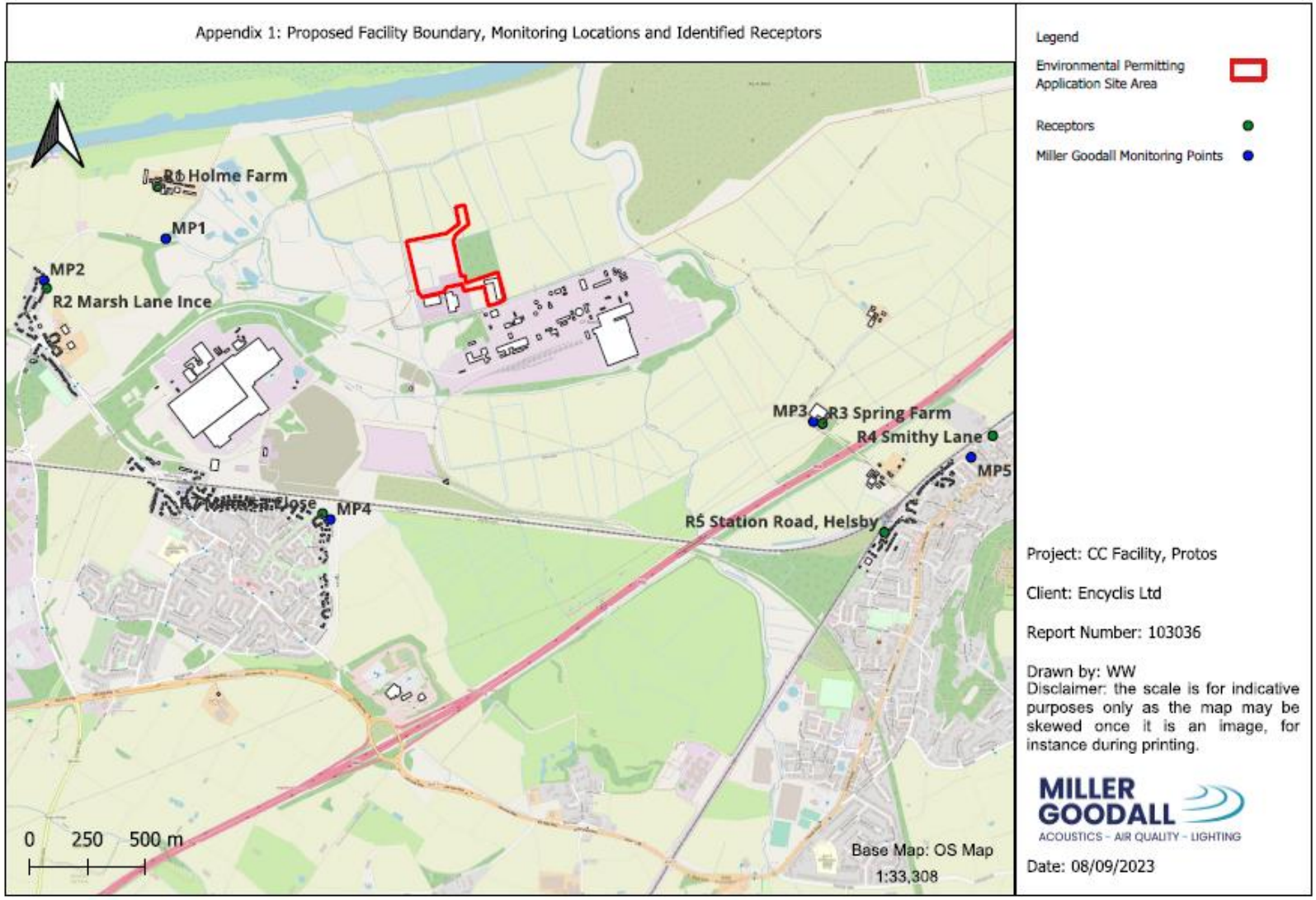
9.1 A noise assessment has been undertaken at the site of a proposed development of land to support an environmental permitting variation application. Measurements have been taken to determine the ambient and background sound levels at the dwellings nearest the site. The measured background data and plant sound level data provided by Fichtner Consulting Engineers Ltd. has been used to predict the impact of the proposed facility on the identified receptors.

9.2 Noise modelling was used to predict the noise levels at the nearest dwellings and when assessed to BS 4142 the combined ERF and CC Facility operational Rating Level was found to be no higher than 8 dB below the prevailing background sound level in the worst-case which suggests that complaints are unlikely.

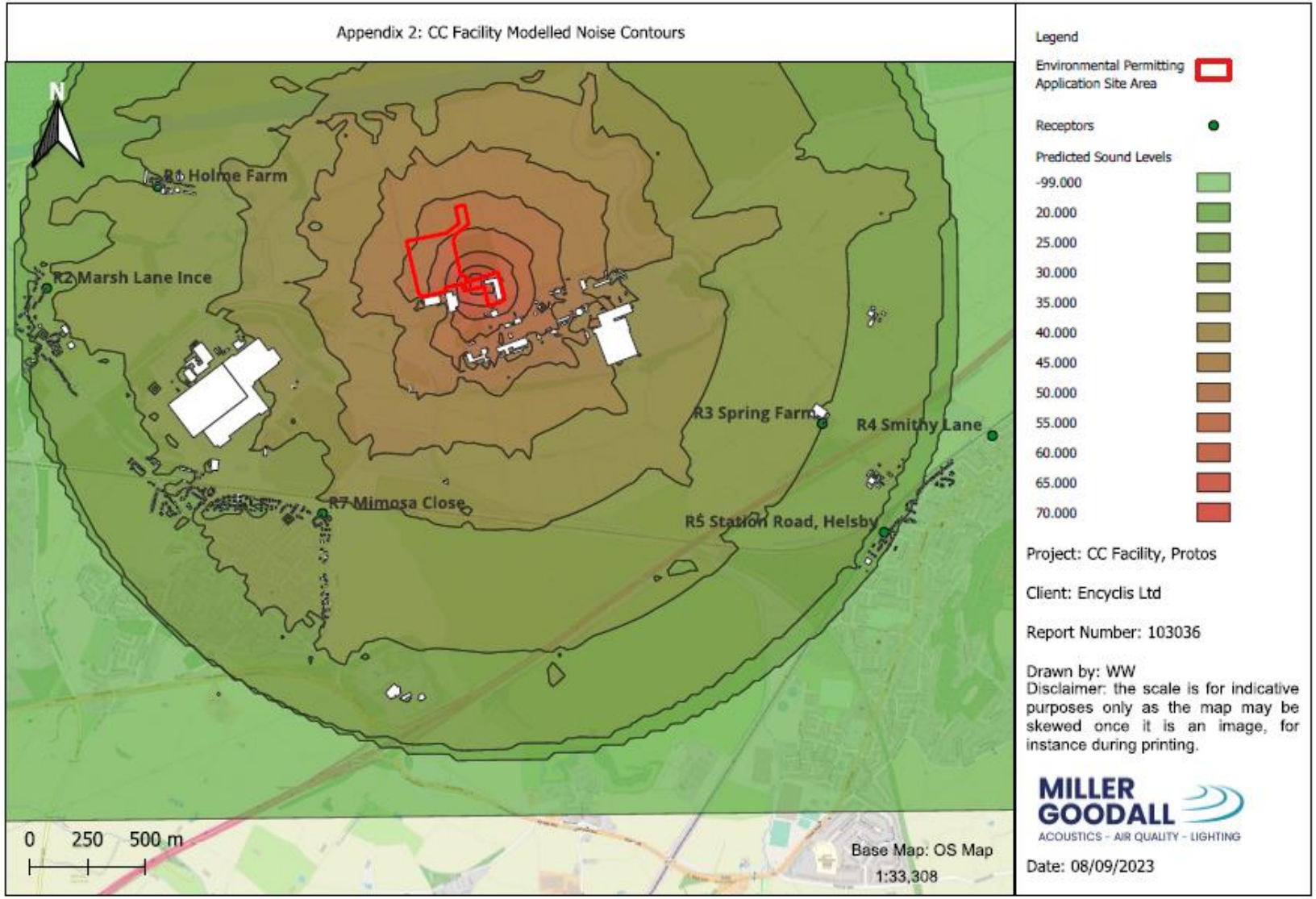
9.3 Given the proposed facility operational noise has been predicted to have a low noise impact, it is the consultant's view that noise should not cause a material constraint to the approval of the proposed facility EP variation application.

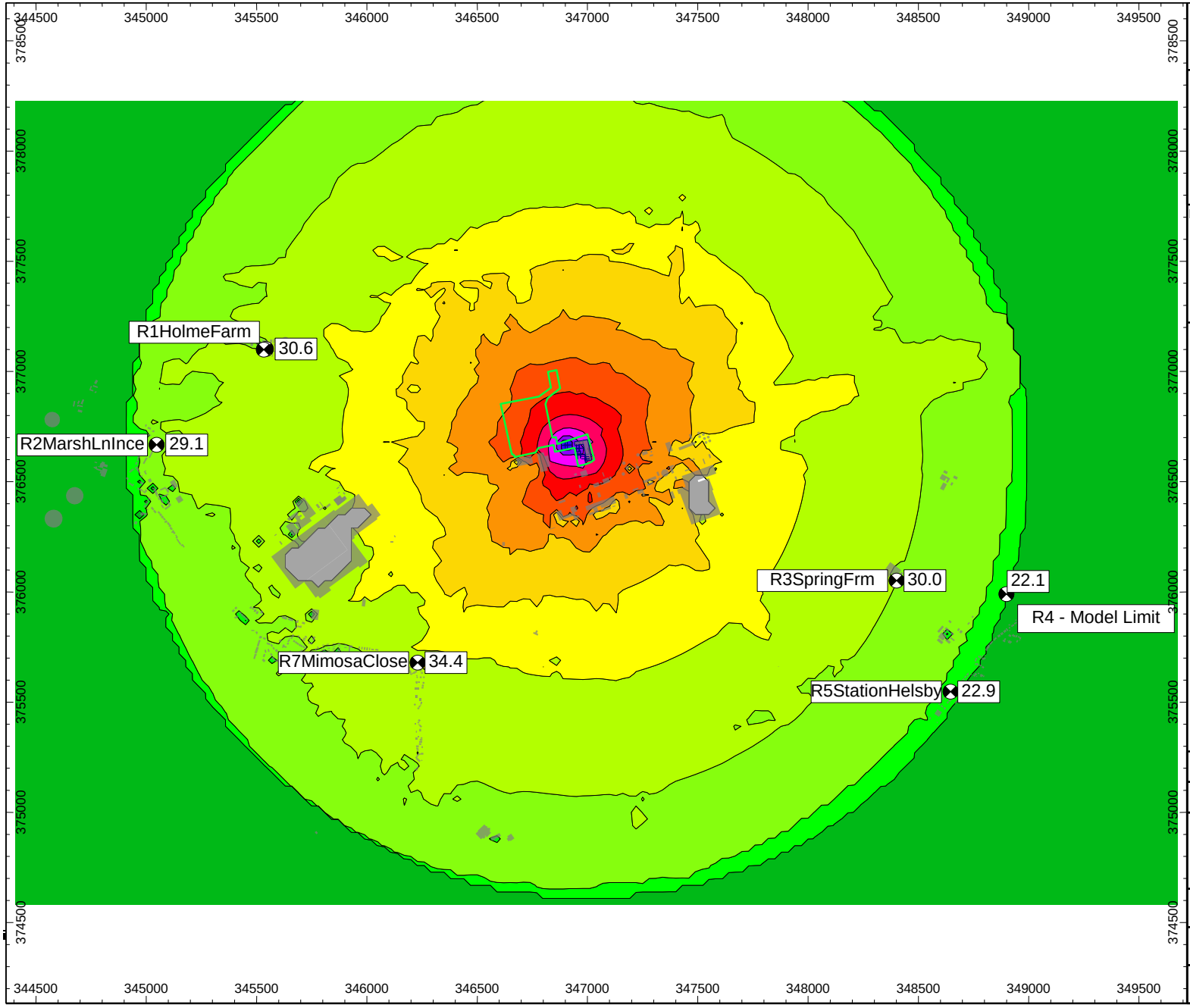
APPENDICES

Appendix 1: Site Boundary and Measurement Positions



Appendix 2: CC Facility Noise Model Graphics





Appendix 2.b - Predicted LAeq,T from CC Facility Operations at Identified Receptors

Miller Goodall Ltd
Ashworth House
Deakins Business Park
Egerton, Bolton
BL7 9RP
Tel: 01204 596166
E-mail: info@millergoodall.co.uk
www.millergoodall.co.uk

Drawing Notes:

- Grid Prediction to 4 m AOD
- All Plant in Operation
- 0.6 Ground Absorption

Noise Contour Colour Legend:

- -99 <= ... < 20 dB LAeq,16hr
- 20 <= ... < 25 dB LAeq,16hr
- 25 <= ... < 30 dB LAeq,16hr
- 30 <= ... < 35 dB LAeq,16hr
- 35 <= ... < 40 dB LAeq,16hr
- 40 <= ... < 45 dB LAeq,16hr
- 45 <= ... < 50 dB LAeq,16hr
- 50 <= ... < 55 dB LAeq,16hr
- 55 <= ... < 60 dB LAeq,16hr
- 60 <= ... < 65 dB LAeq,16hr
- 65 <= ... < 70 dB LAeq,16hr
- 70 <= ... < 75 dB LAeq,16hr
- 75 <= ... < 80 dB LAeq,16hr
- 80 <= ... < 85 dB LAeq,16hr
- 85 <= ... < 90 dB LAeq,16hr
- 90 <= ... < 95 dB LAeq,16hr

Rev.	Date	Purpose	Drawn By	Approved By
1	08/09/2023	Initial Issue	WW	MR

MILLER GOODALL
ACOUSTICS - AIR QUALITY - LIGHTING

Project: Protos Carbon Capture, Ince

Client: Encyclis Ltd.

Scale @ A3: 1:17000

Report Number: 103036

Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μPa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is usually only perceptible under controlled conditions.

dB L_A

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014+A1:2019 it is used to define background noise level.

$L_{Aeq,T}$ The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

L_{Amax} The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event.

NOEL No observed effect level: the level of noise exposure below which no effect at all on health or quality of life can be detected.

LOAEL Lowest observed adverse effect level: the level of noise exposure above which adverse effects on health or quality of life can be detected.

SOAEL Significant observed adverse effect level: the level of noise exposure above which significant adverse effects on health or quality of life can be detected.

R_w Single number rating used to describe the sound insulation of building elements and is defined in BS EN ISO 10140-2: 2010 (formerly BSEN ISO 140-3:1995). It is derived by measurement under laboratory conditions and does not take into account the effects of flanking transmissions.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