Celsa Manufacturing UK

Commercial Noise Assessment

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Revision	Date	Notes	Author	Checked	Approved
Ver.1-0	19/12/2024	E3822	SB	SP	ND

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1 INTRODUCTION

1.1 Entran Ltd has been commissioned by Earth & Marine Environmental Consultants Ltd to undertake an assessment of proposed activities pertaining to the operation of a proposed furnace the Celsa Manufacturing UK site at Celsa Manufacturing (UK) Ltd, Cardiff, Section Mill, Tremorfa Works, Seawall, Road, Tremorfa, Cardiff, CF24 5TH.

1.2 The assessment considers the potential impacts on the nearest sensitive receptors in the vicinity of the proposed site in accordance with the most relevant national and local standards and guidelines.

1.3 Details of the site, including plant quantities and expected usage, have been compiled based on information provided by the applicant and are understood to be representative of the proposed site activities.

1.4 This report is necessarily technical in nature and contains terminology relating to acoustics and noise. Therefore, a glossary together with a brief introduction to the subject of noise has been provided in Appendix A.

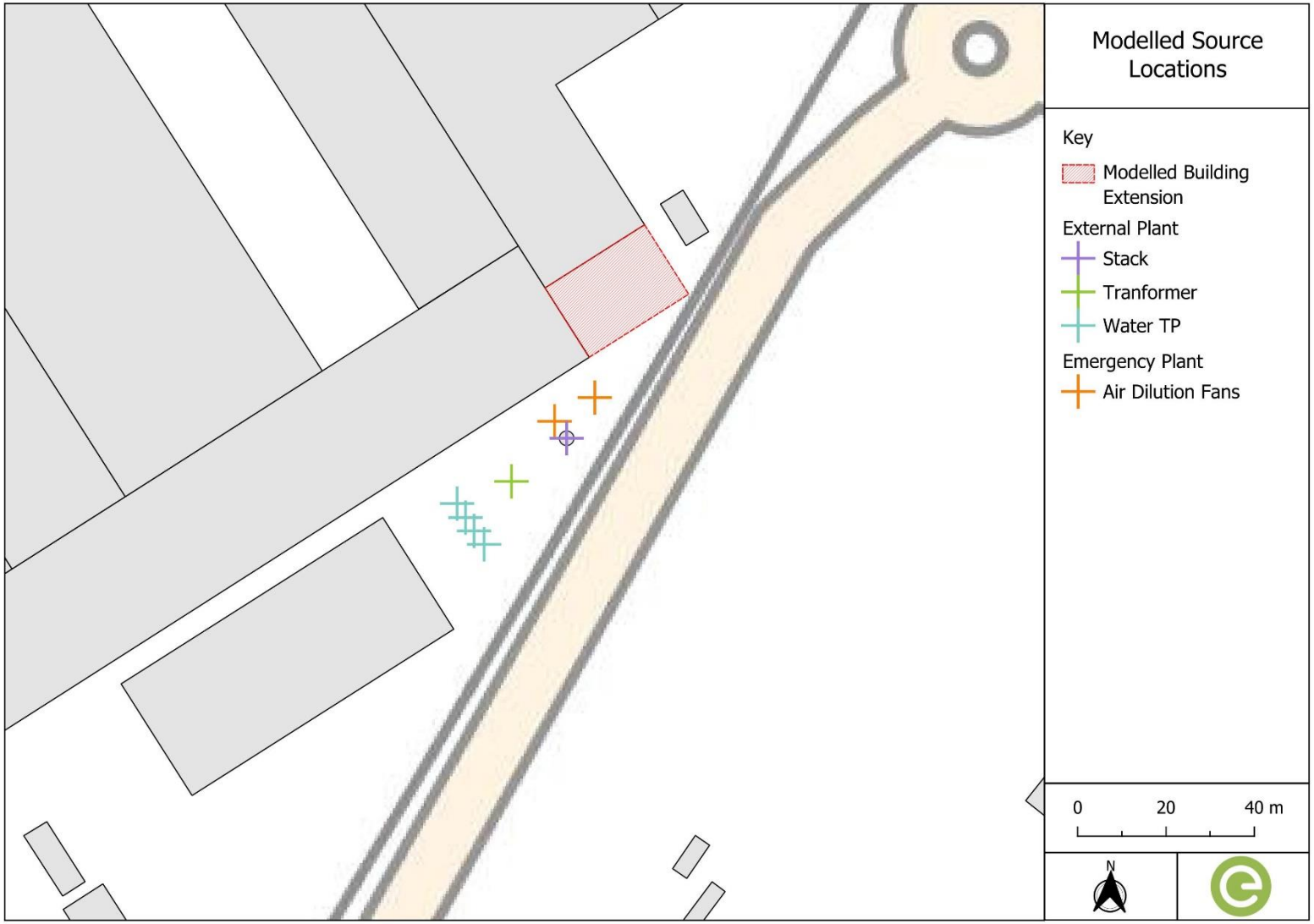
2 SITE DESCRIPTION

2.1 The Celsa Manufacturing site is located at Seawall Road in Cardiff and constitutes part of primary employment areas within the adopted Cardiff Local Development Plan. The site is part of the main Celsa production facility which comprises an extensive industrial complex that includes a mix of a number of large, enclosed buildings, open storage areas, Heavy Goods Vehicles (HGVs) parking aprons and areas of hardstanding.

2.2 The proposed furnace will be located to the south of the site, adjacent to Rover Way, and housed in a newly built extension. It is understood that the furnace will replace the existing furnace, which is currently operational.

2.3 The proposed potentially noise generating sources are understood to comprise the furnace and ancillary equipment, water treatment plant with 4 no. banks of cooler fans, 2 no transformers housed within a substation building, and 2 no. air dilution fans. The site layout is presented in Figure 1.

Figure 1: Site Location and Modelled Source Locations



3 ASSESSMENT METHODOLOGY

National Policy: Planning Policy Wales (PPW)

3.1 The Department of the Environment, Food and Rural Affairs (DEFRA), the Department for Communities and Local Government (DCLG) and the Welsh Government (WG) are responsible for all aspects of noise policy in Wales.

3.2 The aim of noise policy within Wales has been to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance to individuals due to noise can lead to sleep disturbance and adverse health effects.

3.3 Under the heading Air Quality and Soundscape, paragraph 6.7.3 of Planning policy Wales states:

"Certain sounds, such as those created by trees, birds or water features, can contribute to a sense of tranquillity whilst others can be reassuring as a consequence of their association with the normality of everyday activities. Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Noise action plans drawn up by public bodies aim to prevent and reduce noise levels where necessary and preserve soundscape quality where it is good."

3.4 Under the heading Framework for Addressing Air Quality and Soundscape, paragraphs 6.7.4 to 6.7.6 state:

"6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure148 to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing

development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must therefore:

• address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors.
• not create areas of poor air quality or inappropriate soundscape; and
• seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes."

The Welsh Government Noise and Soundscape Action Plan (2018)

3.5 The Noise and Soundscape Action Plan (NASP) outlines the Welsh Government's expectations for management of soundscapes.

3.6 The NASP identifies that industrial source are regulated by the Environmental Permitting (England and Wales) Regulations 2016 (EPR), with the methodology provided within BS 4142 commonly adopted for the identification of adverse impacts.

3.7 Methods for avoiding the potential for adverse impacts are provided within the NASP, which states: "*These include:*

"• locating new developments, whether noise-generating or noise-sensitive, to avoid noise issues arising in the first instance (in other words, through the planning system);

• increasing the distance between the source and receptors;

• preventing noise at source by good design and maintenance;

• using barriers or enclosures to prevent noise travelling, including through the use of green infrastructure;

• minimising or containing noise at source by observing good working and management practices; and

• avoiding noisy operations at certain times, such as at night".

The Welsh Government Technical Advice Note 11 Noise

3.8 The Welsh Government has published a series of Technical Advice Notes (TANs), including the October 1997 TAN 11 Noise. TAN 11 sets out the Welsh Government's policies on noise related planning issues, giving guidance to local authorities in Wales on the use of their planning powers to minimise the adverse impacts of noise. Specifically, it:

- outlines the considerations to be taken into account when determining planning applications for both noise-sensitive developments and for those activities which will generate noise;
- sets out noise exposure categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises on the use of planning conditions to minimise the impact of noise.

3.9 TAN 11 considers noise from industrial and commercial developments, which is relevant to the Proposed Development. It states in paragraph B17:

"B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987."

3.10 The 1987 version of BS8233 was superseded in 1999 and the 1997 version of BS4142 was superseded in 2014.

British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

3.11 British Standard BS 4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound* is intended to be used for the assessment of whether sound of industrial and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. The Standard, which was updated in 2014, states that such sound can include:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and,
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

3.12 The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or calculated sound level from the source in question, the *'specific sound level'*, at the assessment position with the background sound level. Where sound contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific sound to obtain the '*rating level*' that reflects the contextual setting of the site.

3.13 To assess the likelihood of complaints, the measured background sound level is subtracted from the rating level. BS 4142 states:

'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; and,*
- *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.'

The Institute of Environmental Management & Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014)

3.14 The Institute of Environmental Management and Assessment (IEMA) have recently published the '*Guidelines for Environmental Noise Impact Assessment*'. The guidelines are applicable to noise impact assessment for any scale of development proposal, including core principles to achieve effectively integration with the EIA, and provide advice on the issues that need to be considered in a noise impact assessment and whether the appropriate conclusions are being reached. The factors include:

The appropriateness of the noise parameters used for the situation;

- The reference time period used in making the assessment;
- The level, character and frequency content of the noise sources under investigation; and,
- How the predicted noise levels relate to relevant Standards and guidelines.

3.15 The guidelines also recommend that the assessor should determine the degree of impact based on evidence derived from the assessment.

The Professional Practice Guidance on Planning and Noise (2017)

3.16 The '*Professional Practice Guidance on Planning and Noise'* (ProPG) was produced by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) to provide acoustical practitioners with guidance on the management of noise within the planning system in England.

3.17 The reparation of the ProPG acknowledges and reflects the Government's overarching NPSE, the NPPF and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance. It provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- encourage the process of good acoustic design in and around new residential developments;
- outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- promote appropriate noise exposure standards; and
- assist the delivery of sustainable development.

4 AMBIENT AND BACKGROUND SOUND LEVELS

4.1 Ambient sound data was obtained in 2019 as part of the application for an existing Celsa Manufacturing permit. Background sound levels at the nearby residential receptors without any contribution from the Rover Way site were identified as part of the permit application. These background sound levels have been adopted for this assessment to ensure a cautious consideration of excess over the background sound levels. Night-time background sound levels have been identified with consideration to the Sunday morning levels, based on correlation between night time and Sunday morning ambient noise levels.

4.2 An updated survey was undertaken in 2021 and presents measurements representative of the extant ambient environment, inclusive of current on-site activities. These measurements have been adopted for consideration of both context and perceptibility over the extant environment.

4.3 The previously identified background sound levels and extant ambient sound levels are presented in Table 1 below.

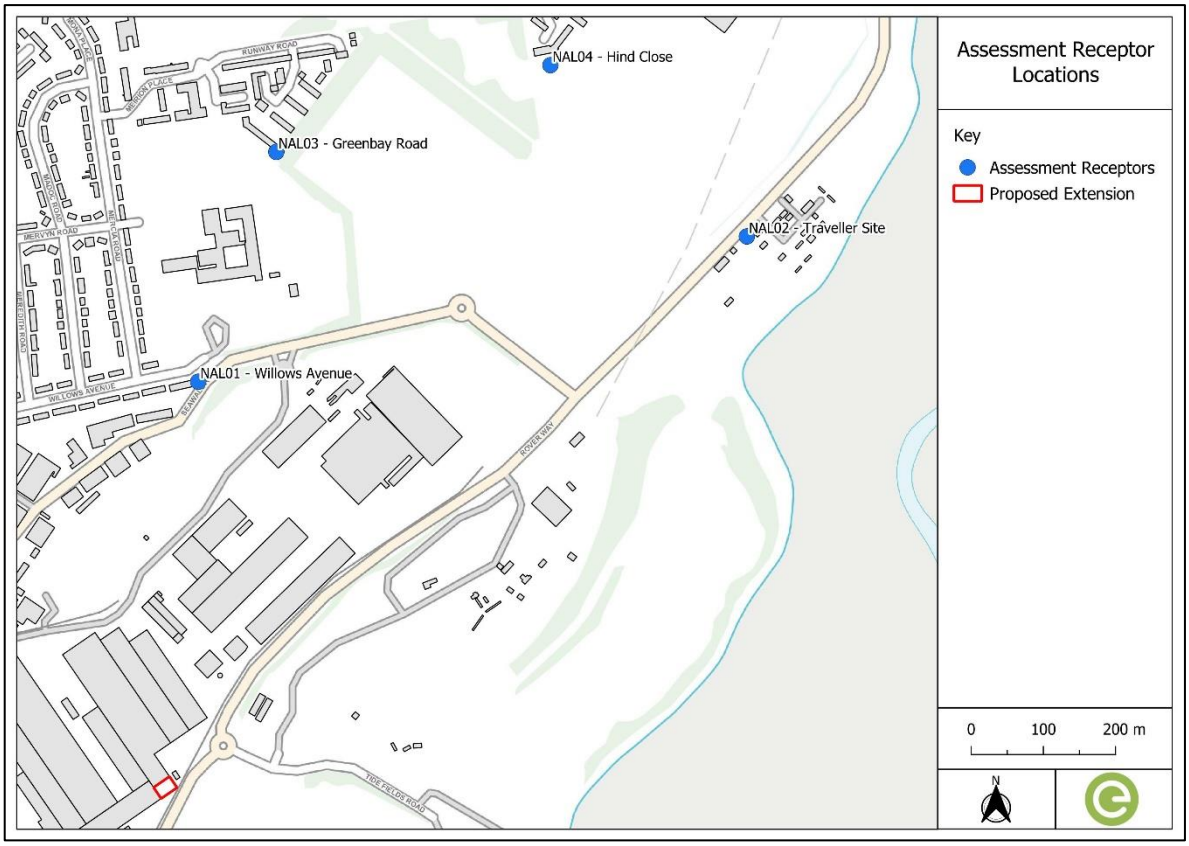
Table 1: Adopted Ambient and Background Sound Data

Receptor ID	Sound Pressure Level, dB	
	Weekday	Night
Background Sound Level, dB $L_{A90,T}$		
NAL01 - Willows Avenue	50	43
NAL02 - Traveller Site	66	48
NAL03 - Greenbay Road	39	37
NAL04 - Hind Close*	39	37
Ambient Sound Level, dB $L_{Aeq,T}$		
NAL01 - Willows Avenue	66	60
NAL02 - Traveller Site	75	70
NAL03 - Greenbay Road	55	48
NAL04 - Hind Close*	55	48

** Ambient Levels at NAL03 adopted as representative of NAL04*

4.4 The assessment receptors representative to the site location are presented in Figure 2.

Figure 2: Assessment Receptor Locations



4.5 The previously identified background sound levels have been adopted to allow assessment in accordance with BS 4142 and to determine the likelihood of adverse effects relating to the proposed development. These levels have been adopted to allow a cautious consideration of the likelihood of impacts in the absence of the current on-site activities.

4.6 The ambient noise levels obtained during the supplementary survey have been adopted for consideration of context and perceptibility against the current ambient environment.

5 ASSESSMENT

Computer Noise Modelling

5.1 The potential for impacts arising from the proposed activities has been determined by calculation of likely noise levels during the proposed on-site activities. The previously obtained background sound levels have been adopted to provide assessment criteria for assessment in accordance with BS 4142.

5.2 Noise emission levels from the Proposed Development have been calculated using predictive computer noise modelling. The noise modelling software (Cadna-A) uses algorithms based on ISO 9613 'Attenuation of sound during outdoor propagation' to predict noise levels generated at receiver locations by noise sources.

5.3 Sound levels have been calculated at nearby noise sensitive receptor locations as presented in Figure 2. Plant items have been modelled at the locations presented in Figure 1.

5.4 Source data has been derived based on information provided by the applicant. Internal monitoring data obtained as part of a noise at work assessment was provided for the existing furnace room. The highest octave band level for each measurement was adopted as a cautious representation of sound within the furnace room. On this basis, the source sound power level for internal items was calibrated such that the internal reverberant level is equal to the measured noise levels. A +3 dB correction has then been added to account for any uncertainty.

5.5 No exhaust data has been provided and therefore as a cautious assumption the source level for the exhaust stack has been modelled as equal to the derived internal sound power level.

5.6 There are two 11kv transformers proposed to be housed within a substation building. Schneider electric provide a standard sound level for transformers based on kVA ratings. No kVA rating has been made available. However, example 11kv to 415v step down transformers are rated for capacities up to 600 kVA. On this basis, a value of 62 dB has been adopted for the transformers. The value given by schneider electric is taken to be a sound pressure level at 10m. For the purpose of maintaining a cautious assessment attenuation due to the substation building has not been considered

5.7 A water treatment plant is proposed, which will have four banks of cooling fans. A sound power level of 104 dB was provided for the water treatment plant. It is assumed that this is the level per bank of fans. Accordingly, four sources have been modelled at 104 dB each.

5.8 Two air dilution fans are also proposed and would be active only in emergency scenarios. For this cautious assessment the fans have been included within the modelled scenario. The source level for the fans is given as 85 dBA at 1.5m.

5.9 A summary of the on-site plant items and representative sound power levels are presented in Table 2.

Table 2: Plant Items and Source Levels

Plant Item	Modelled Sound Power Level, L_{WA}
Furnace Building (internal)	125.9
Stack	110.9*
Transformers	90.0
Water treatment plant	104.0
Air dilution fans	96.5

** in-stack silencer required to achieve modelled sound power or lower*

5.10 The plant assumptions and sound power levels have been used to calculate specific sound pressure levels at the closest residential receptor locations. The plant is understood to be operational 24/7 and sound levels have been calculated at both ground and first floor level. The source data and calculated propagation contours are presented in Appendix B and C, respectively. The calculated specific sound levels are presented in Table 3.

Table 3: Calculated Specific Sound Levels

Receptor ID	Specific Sound Level, dB
NAL01 - Willows Avenue	34
NAL02 - Traveller Site	35
NAL03 - Greenbay Road	35
NAL04 - Hind Close	33

5.11 BS 4142 requires that an acoustic feature correction is applied to the specific sound level in order to obtain a rating level $L_{Ar,Tr}$ at the identified receptor. Where applicable, the correction is applied in order to consider the effect of additional acoustic characteristics present in the source of interest. The correction is applied based on tonality, impulsivity and intermittency that may be perceptible at the receptor location.

5.12 Calculated specific sound levels for proposed activities indicate that sources will not be readily distinctive against the acoustic environment. The supplementary survey undertaken

in 2021 also indicates that ambient levels are dominated by road traffic and unaffected by the current activities on the Celsa site. Accordingly, no feature correction has been applied for derivation of the rating level.

Proposed Activities

5.13 The rating levels for the proposed plant items, in isolation from the extant on-site activities, and subsequent BS 4142 assessment are presented for each assessment period in Table 4.

Table 4: Calculated Rating Levels, $L_{Ar,Tr}$ and BS 4142 Assessment

Receptor ID	Specific Sound Level	Acoustic Feature Correction	Rating Level	Background Sound Level	Excess Over Background
Weekday					
NAL01 - Willows Avenue	34	0	34	50	-16
NAL02 - Traveller Site	35	0	35	66	-31
NAL03 - Greenbay Road	35	0	35	39	-4
NAL04 - Hind Close	33	0	33	39	-6
Night					
NAL01 - Willows Avenue	34	0	34	43	-9
NAL02 - Traveller Site	35	0	35	48	-13
NAL03 - Greenbay Road	35	0	35	37	-2
NAL04 - Hind Close	33	0	33	37	-4

5.14 The calculated rating levels do not exceed the background sound levels during all assessment periods. BS 4142 indicates that where the rating level does not exceed the background sound level the impact of the specific sound level is likely to be low.

5.15 The rating levels pertaining to the proposed plant items are unlikely to result in impacts at the nearby residential receptors.

Comparison Against Existing Activity and Ambient Environment

5.16 The current on-site activities are understood to operate under existing consent and are currently operational. The change in the extant ambient environment has been calculated to consider the likelihood that the proposed activities are perceptible over the existing environment.

5.17 The combined ambient noise levels, including the extant environment and proposed activities, are presented in Table 6.

Table 6: Combined Ambient Sound Levels

Receptor ID	Combined Ambient Sound Pressure Level, dB	
	Weekday	Night
NAL01 - Willows Avenue	66	60
NAL02 - Traveller Site	75	70
NAL03 - Greenbay Road	55	48
NAL04 - Hind Close	55	48

5.18 The combined ambient noise levels are not calculated to increase the extant ambient noise levels. The change in existing ambient sound levels is presented in Table 7.

Table 7: Increase in Ambient Sound Levels

Receptor ID	Increase of Ambient Noise Level Over Baseline, dB	
	Weekday	Weekend
NAL01 - Willows Avenue	0	0
NAL02 - Traveller Site	0	0
NAL03 - Greenbay Road	0	0
NAL04 - Hind Close	0	0

Context

5.19 The BS 4142 assessment requires consideration of context and any uncertainty that may be applicable to the assessment.

5.20 The calculated specific sound levels pertaining solely to the proposed activities are sufficiently below both the background and residual levels. The calculated sound levels indicate that the proposed plant items are unlikely to be perceptible against the existing environment at the identified residential receptors and therefore no impacts are calculated due to the introduction of the proposed plant.

5.21 The calculated levels are not significantly high as to increase the extant ambient environment, which is identified in the 2021 baseline survey as dominated by road traffic and unaffected by the current activities on the Rover Way site.

5.22 The ambient noise survey indicates that current activities are not clearly perceptible at the receptor locations. The combined sound levels indicate that the introduction of the proposed activities would not increase the site sound emissions and therefore would not give rise to perceptible change.

5.23 Consideration of context and the calculated sound levels indicates that the proposed activities are unlikely result in an adverse impact. The introduction of the proposed activities is not calculated to present new impacts over the existing on-site activities.

Uncertainty – BS 4142

5.24 The calculation of the specific level is based on available information, data obtained from existing surveys and source data assumptions based on similar equipment. Any changes in source data, activities, plant items or processes will affect the results of this assessment. Based on the information provided, it is understood that the assessment is reasonably representative of proposed activities.

5.25 The building extension is understood to house only furnace related plant items and therefore the workplace noise monitoring is understood to be representative of noise arising from an industrial furnace. Changes to internal plant items would affect this assumption and may increase the associated noise levels.

5.26 A -15 dB broadband attenuation has been applied to the exhaust stack and attenuation will be required to ensure the modelled source sound power level can be suitably controlled. The stack attenuation may not be required following finalisation of the design and can be revisited at a time where more information is available.

5.27 The transformers have been modelled as a point source at the location of the substation building. Any attenuation due to the substation building has been considered and therefore noise from the transformers may be quieter than the value modelled for this assessment.

5.28 The air dilution fans have been included within the modelling scenario. However, the fans would only run in case of an emergency and would therefore not typically generate sound.

5.29 The adopted background sound levels were obtained in the absence of current on-site activities and have been adopted to allow consideration of the combined on-site activities as well as proposed items. The excess of the proposed activities alone over the current environment is likely to be lower than identified within this assessment. However, it is appropriate to assess against these levels to allow cautious consideration of the proposed plant as well as representative consideration of the combined sound levels.

5.30 A compound with a solid continuous brick wall is situated immediately south of NAL02 and would provide screening to this receptor. Sound levels at this area may therefore be lower than calculated within this assessment. Consideration has not been made to any possible screening such as barriers, walls or fences that may be situated in the surrounding area.

6 APPROPRIATE MEASURES JUSTIFICATION (PROPOSED EQUIPMENT)

6.1 Attenuation is required to the exhaust stack in order to reduce the likelihood of impacts from the introduction of the building extension. The exact required will be identified following specification of specific plant items.

6.2 The assessment indicates that the proposed plant items will not introduce additional impacts over the existing on-site activities. Accordingly, the measures applied to the proposed items are considered to be appropriate and BAT requirements are considered to be met.

7 CONCLUSIONS

7.1 An assessment has been undertaken for the potential impacts attributable to the sound emitted from the proposed building extension at Celsa Manufacturing (UK) Ltd, Cardiff, Section Mill, Tremorfa Works, Seawall, Road, Tremorfa, Cardiff, CF24 5TH.

7.2 Information provided by the applicant has been used alongside available source assumptions to calculate specific and rating sound levels attributable to the proposed and existing activities at the nearest receptors.

7.3 Based on the information as presented within this assessment, the excess of the calculated rating over the background sound level indicates that there is low likelihood of newly introduced adverse impacts due to the proposed new activities.

7.4 Consideration of the combined sound levels, inclusive of current on-site activities indicates that adverse impacts are unlikely at nearby residential receptors during operation of the consented on-site activities.

7.5 The assessment has been undertaken based on the information provided and the associated calculations as detailed within this report. The calculations indicate that additional significant impacts, over the current likely impacts due to existing on-site activities, are unlikely.

APPENDIX A – INTRODUCTION TO NOISE

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB.

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs. For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest.

In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}. This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 5 minutes during the night. The noise levels are commonly symbolised as $_{A90(1hour)}$ and $L_{A90(5mins)}$. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

Table A1: Glossary of Terms

Term	Definition
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,F}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the 'average minimum' noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Residual Noise Level	The ambient noise remaining at a given position in a given situation when specified sources are suppressed to a degree such that they do not contribute to the ambient noise level ($L_{Aeq,T}$)
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval ($L_{Aeq,T}$)
Rating Noise Level	The specific noise level plus any adjustment for the characteristic features of the noise ($L_{Ar,Tr}$).

APPENDIX B – SOURCE DATA

Appendix B1: Octave Band Source Sound Levels

Plant/Item	Octave Band Noise Level dB re. $2x10^{-5}$ Pa. per Octave Band, Hz									dB
	31.5	63	125	250	500	1000	2000	4000	8000	
Measured Furnace Internal, SPL	*64.1*	*64.1*	*71.9*	*83.6*	*92.0*	*85.5*	*83.8*	*80.2*	*74.3*	*92.1*
Furnace Source Assumption, Lw	86.5	86.5	100.1	115.2	125.6	119.8	118.2	112.5	104.6	125.9

Appendix B2: Broadband Source Sound Levels

Plant Item	L_{WA}
Transformers	90.0
Water treatment plant	104.0
Air dilution fans	96.5

Appendix B3: Façade Material Details

Element	Item	Octave Band Centre Frequency								
		31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
SRI										
Roller Doors	Ascot Roller Doors	14	14	14	17	18	15	19	19	19
Kingspan Cladding	Kingspan 1000Rw	20	20	18	20	24	20	29	39	47
Absorption Coefficient, α										
Roller Doors	Ascot Roller Doors	0.5	0.5	0.5	0.35	0.15	0.05	0.05	0	0
Kingspan Cladding	Kingspan 1000Rw	0.15	0.15	0.45	0.7	0.85	0.9	0.9	0.75	0.6
Concrete	Rough Concrete	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.07	0.07

Appendix B4: Extension Details

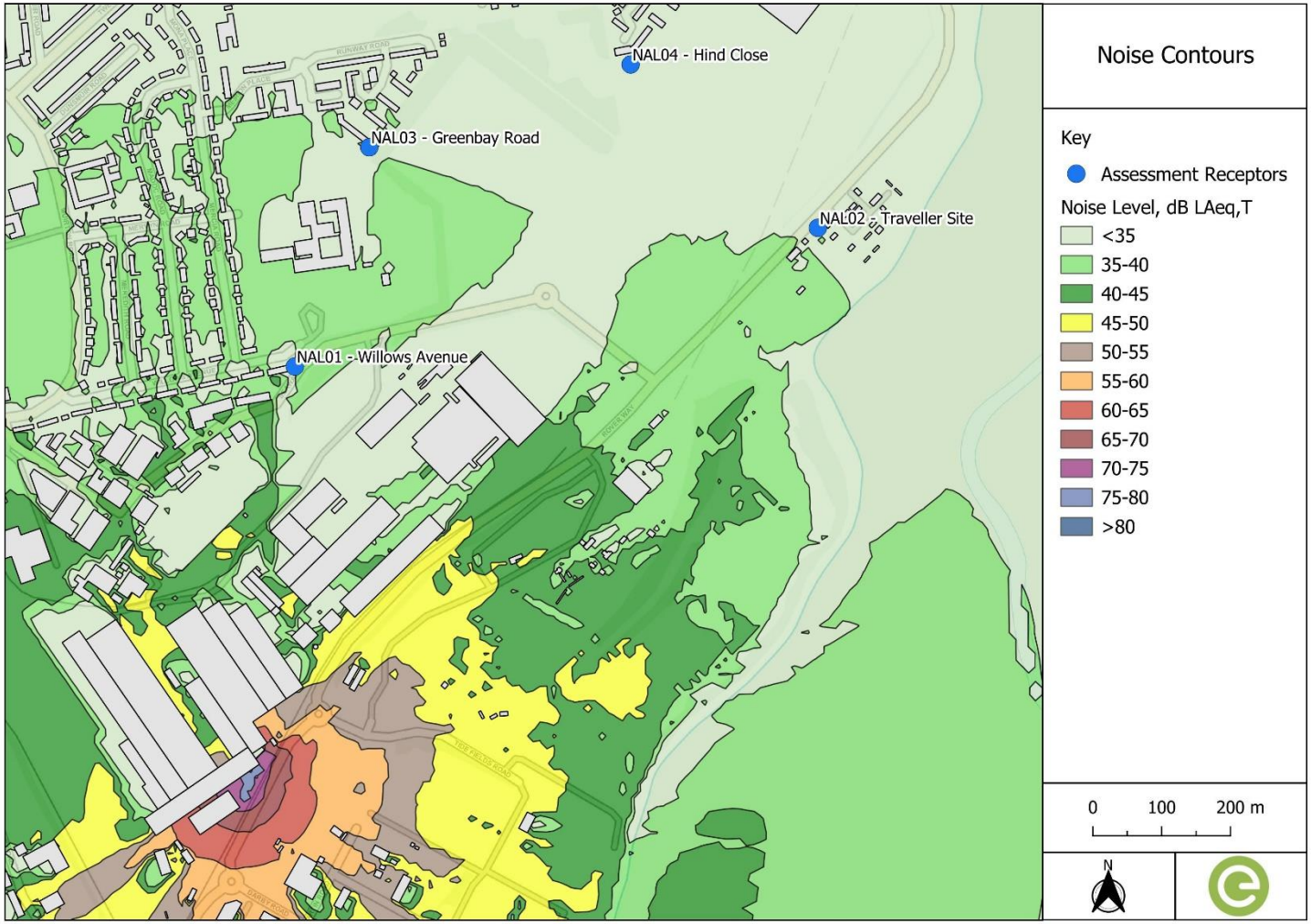
Radiating Surface	Element	Length	Width	Height	Items
N Façade	Panelling	-	18.65	15	Kingspan Cladding
E Façade	Panelling	26.75	-	15	Kingspan Cladding
	Door	-	1	2.1	Roller Doors
	Roller Door	-	8	6	Roller Doors
S Façade	Panelling	-	18.65	15	Kingspan Cladding
	Door	-	1	2.1	Roller Doors
W Façade	Panelling	26.75	-	15	Kingspan Cladding
Floor	Floor	26.75	18.65	-	Concrete
Roof/Ceiling	Roof/Ceiling	26.75	18.65	-	Kingspan Cladding

Appendix B5: Modelled Octave Band Sound Power Levels

Source	Octave Band Sound Level Power Level, dB L_{WA}								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Building_E	66.6	66.6	76.4	86.1	90.5	87.9	77.3	63.7	49.8
Building_S	69.5	67.7	77.4	87.1	91.5	89.0	78.5	66.7	57.6
Building_W	66.7	66.7	76.4	86.1	90.6	88.0	77.6	66.1	57.4
Building_N	68.2	68.2	77.9	87.6	92.0	89.5	78.9	65.3	51.4
Building_Roof	69.1	69.1	78.9	88.6	93.0	90.4	79.8	66.2	52.3
Stack Outlet (2 no.)	86.5	86.5	100.1	115.2	125.6	119.8	118.2	112.5	104.6

APPENDIX C – FIGURES

Appendix C1: Noise Contour, Proposed Extention,1.5m



APPENDIX D – PERMITTING REQUIREMENT: COORDINATE INFORMATION

Appendix D1: Coordinate Data, Point Sources

Plant Item	Coordinates		Height, m
	X	Y	
Stack	175970.5	321027.8	60.1
Water TP	175954.8	321003.5	6.0
Water TP	175951.7	321005.5	6.0
Water TP	175948.7	321007.6	6.0
Water TP	175945.8	321009.9	6.0
Transformers	175960.3	321015.7	2.0
Air Dilution Fan	321024.9	175974.2	2.0
Air Dilution Fan	321033.9	175979.9	2.0

Appendix D2: Coordinate Data, Sound Emitting Buildings

Plant Item	Coordinates		Height, m
	X	Y	
Furnace Building (Extension)	321054.3	176004.1	15
Furnace Building (Extension)	321032.2	175989	15
Furnace Building (Extension)	321021.7	176004.4	15
Furnace Building (Extension)	321043.8	176019.5	15

Appendix D3: Coordinate Data, Receptors

Receptor ID	Coordinates	
	X	Y
NAL01 - Willows Avenue	321083.6	176566.4
NAL02 - Traveller Site	321843.7	176767.6
NAL03 - Greenbay Road	321191.8	176884.6
NAL04 - Hind Close	321571.6	177004.8