

7 NOISE AND VIBRATION

CONTENTS

7 NOISE AND VIBRATION	7-I
7.1 Introduction.....	7-1
7.2 Statutory and planning context.....	7-2
7.3 Consultation undertaken	7-5
7.4 Approach to the assessment.....	7-7
7.5 Established, interim and future environmental baseline.....	7-16
7.6 Existing environment	7-17
7.7 Project characteristics and embedded mitigation.....	7-18
7.8 Assessment of effects	7-21
7.9 Further survey and monitoring requirements	7-27
7.10 Opportunities for enhancement.....	7-27
7.11 Cumulative effects	7-27
7.12 Summary of effects.....	7-29
7.13 References	7-30
7.14 Glossary	7-33

TABLES

Table 7.1 Legislation relevant to noise and vibration.....	7-3
Table 7.2 Policy relevant to noise and vibration	7-3
Table 7.3 Guidance relevant to Noise and Vibration	7-4
Table 7.4 Summary of the consultation in relation to noise and vibration	7-6
Table 7.5 Elements scoped out of the assessment	7-6
Table 7.6 Elements scoped into the assessment	7-7
Table 7.7 Background studies/surveys	7-8
Table 7.8 Residential NSRs	7-9
Table 7.9 SSSI and quiet area NSRs	7-9
Table 7.10 Receptor value and sensitivity	7-9
Table 7.11 Noise assessment criteria (construction noise)	7-10
Table 7.12 Definition of the magnitude of impact.....	7-12
Table 7.13 Determining significance of effects for noise and vibration	7-13
Table 7.14 Embedded mitigation measures	7-20
Table 7.15 Enclosures and attenuator performance.....	7-21
Table 7.16 Proposed Development predicted noise levels - residential receptors.....	7-22
Table 7.17 Proposed Development predicted noise levels – SSSI receptors	7-25
Table 7.18 Proposed Development predicted noise levels – quiet area receptors	7-26
Table 7.19 Cumulative impact summary.....	7-28
Table 7.20 Summary of effects	7-29

APPENDICES

Presented in Volume 3 of this Environmental Statement:

Appendix 7.1 Noise and Vibration Impact Assessment – Scrap Handling Facility

Appendix 7.2 Noise and Vibration Impact Assessment – EAF

Appendix 7.3 Noise & Vibration: Briefing Note

Appendix 7.4 Tata Steel UK Limited (Tata Steel) Soundscape

FIGURES

Presented in Volume 4 of this Environmental Statement:

Figure 7.1 Proposed Development (EAF + Scrap Phase One) Noise Contour Map

Figure 7.2 Proposed Development (EAF + Scrap Phase Two) Noise Contour Map

Figure 7.3 Proposed Development (EAF + Scrap Phase One Alternative) Noise Contour Map

Figure 7.4 Proposed Development (EAF + Scrap Phase Two Alternative) Noise Contour Map

7.1 Introduction

Overview

- 7.1.1 This chapter details the noise and vibration impact assessment of the construction and operation of the Electric Arc Furnace (EAF) Project (the Proposed Development) at the Applicant's Port Talbot Steel works in Port Talbot, South Wales.
- 7.1.2 This document should be read in conjunction with the following technical appendices:
- **Appendix 7.1: Noise and Vibration Impact Assessment – Scrap Handling Facility;** and
 - **Appendix 7.2: Noise and Vibration Impact Assessment – EAF,**
- 7.1.3 Two briefing document that summarise the technical information of the noise study for ease of reference have also been prepared and have been included as appendices to this Chapter of the ES:
- **Appendix 7.3: Noise and Vibration: Briefing Note; and**
 - **Appendix 7.4: Tata Steel UK Limited (Tata Steel) Soundscape Study.**

Background

- 7.1.4 The primary purpose of this noise and vibration assessment is to identify any likely adverse or significantly adverse airborne noise and / or vibration effects caused by the demolition, construction or operation of the Proposed Development at noise and vibration sensitive receptors. The noise and vibration assessment also develops noise control recommendations in order to reduce or avoid any likely adverse or significant adverse effects, where these are identified.
- 7.1.5 The noise and vibration assessments (and their associated figures and appendices) have been prepared by competent experts with relevant and appropriate experience.

Existing Site and activity description

The existing Port Talbot Steel works converts raw materials such as iron ores and coal to semi-finished steel (slab) and finished steel products through a range of separate processes. These range from:

- The importing of raw materials;
- Iron production within the Blast Furnaces;
- The Basic Oxygen Steelmaking (BOS) plant; and
- Sinter production within the Sinter Plant.

The above activities are termed the 'heavy end'. The 'heavy end' has operated for the majority of the preceding 50 + years. During 2024, the 'heavy end' has been switched off in stages. The cessation of the heavy end will happen irrespective of the Proposed Development proposal.

Proposed Development activity description

- 7.1.6 The Proposed Development comprises of the demolition of some existing buildings and structures, partial infill of the BOS lagoon, and construction of a new Electric Arc Furnace (EAF) based steel production facility (1 no. arc furnace, 2 no. ladle furnaces). The

Proposed Development also includes the construction of a scrap metal handling facility within the existing site adjacent to the proposed EAF.

- 7.1.7 The scrap handling facility is proposed to be developed in two phases:
- Phase One: providing facilities for receipt of furnace-ready scrap; and
 - Phase Two: providing scrap shredding, processing of internal arisings and waste processing equipment.
- 7.1.8 A full description of the Proposed Development is provided in **ES Chapter 2: Proposed Development**. The layout of the Proposed Development is provided in Figure C 2 in **Appendix 7.1** and **Appendix 7.2**. Further details regarding the proposed facilities, phases and processes that form part of the Proposed Development and are relevant to the noise and vibration assessment are contained in the technical reports in **Appendix 7.1** and **Appendix 7.2**.

Technical report description

- 7.1.9 The following two technical documents have been submitted alongside this ES chapter.
- **Appendix 7.1 Noise and Vibration Impact Assessment – Scrap Handling Facility.**
Provides the assessment of noise and vibration related to the part of the application for outline planning permission (with all matters reserved except for access and landscaping) for the construction of a scrap metal handling facility and associated scrap yards, scrap processing facility, underground and overground electrical infrastructure, and new and amended transport infrastructure, landscaping, and associated development.
 - **Appendix 7.2 Noise and Vibration Impact Assessment – EAF.**
Provides the assessment of noise and vibration related to the part of the application for full planning permission for the demolition of some existing buildings and structures, partial infill of the Basic Oxygen Steelmaking (BOS) lagoon, and construction of a new electric arc furnace-based steel production facility (one Electric Arc Furnace (EAF) and two Ladle Furnaces (LF)). The development includes an upgraded slag processing facility, chemical/material storage and transfer infrastructure and pipework and cabling (above and below ground), buildings, fume and dust treatment plant, water treatment facility and material handling systems. Electrical control rooms and power infrastructure. Offices and ancillary facilities together with new and amended transport infrastructure, landscaping and green infrastructure, and associated development.

Technical report assessment

- 7.1.10 The assessments scenarios provided within both **Appendix 7.1** and **Appendix 7.2** are considered to represent reasonable worst case assessment scenarios as the 'established baseline' ambient sound level includes noise contribution from the existing 'heavy end'.

7.2 Statutory and planning context

- 7.2.1 Relevant legislation, policy and guidance are shown in **Table 7.1**, **Table 7.2** and **Table 7.3** respectively below.

Table 7.1 Legislation relevant to noise and vibration

Document	Summary
The Control of Pollution Act 1974.	Part III of Control of Pollution Act (CoPA) 1974 gives local authorities powers to control construction site noise and vibration. Best practicable means (BPM) is defined in Section 72 of CoPA.
Environmental Protection Act 1990.	This Act introduced integrated pollution control to prevent pollution arising as a result of emissions to air, land or water. The Act empowers local authorities to address noise pollution, classifying excessive noise as a statutory nuisance.
The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 ("the 2017 Regulations")	The 2017 regulations transpose the amendments made to the Environmental Impact Assessment (EIA) Directive 2011/92/EU by Directive 2014/52/EU and make a number of significant changes to the EIA regime in Wales. Changes to the EIA regime in Wales mirror those in England and Scotland closely.
The Environment (Air Quality and Soundscapes) (Wales) Act 2024	The Act make provision for improving air quality in Wales; for a national strategy for assessing and managing soundscapes in Wales.

Table 7.2 Policy relevant to noise and vibration

Document	Summary
Technical Advice Note (TAN) 11 Noise: October 1997. CL-01-15 Updates to TAN 11 Noise, Noise Action Plan (2013-18) Commitments	Technical Advice Note (TAN) 11 should be taken into account by local planning authorities in Wales in the preparation of development plans. This document provides guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.
CL-01-15 Updates to Tan 11 Noise - Noise Action Plan (2013-18) Commitments	Provides updates to TAN 11: Noise in relation to environmental permitting and the publication of revised policy and British Standards such as BS 414: 2014.
'Future Wales: the national plan 2040': 2019; updated in 2021	Future Wales is the national development framework for Wales. Policy 31 'South West Metro' states that ' <i>(...) the Welsh Government wishes to see development built in sustainable locations supported by active travel and public transport infrastructure and services to enable people to live active and healthy lives. This includes ensuring levels of air and noise pollution are reduced or at least minimised</i> '. This would mainly apply to transportation infrastructures.
Noise and Soundscape Action Plan, 2023-2028, Welsh Government	Noise and soundscape action plan is the Welsh Government's central noise policy document. It outlines the Welsh public sector's strategic policy direction in relation to noise and soundscape management for the next 5 years.
Neath Port Talbot County Borough Council Local Development Plan (2011-	Neath Port Talbot County Borough Council prepared a Local Development Plan (LDP) for the period 2011 to 2026, as required under the Planning and Compulsory Purchase Act 2004. This document ' <i>(...) guides the future</i>

Document	Summary
2026) (Adopted January 2016)	<i>development of an area, providing a clear vision for the County Borough setting out where, when and how much new development can take place over the next 15 years (2011-2026). The aim is to provide developers and the public with certainty about the planning framework for Neath Port Talbot.'</i>

Table 7.3 Guidance relevant to Noise and Vibration

Document	Summary
BS 5228-1 & -2: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites. Noise and Vibration'	The two parts of BS 5228 provide guidance on the control of noise and vibration on construction and open sites. BS 5228-1 contains a methodology for predicting construction noise levels taking both stationary and mobile noise sources into consideration within designated construction areas. BS 5228-1 also contains methodology for assessing construction noise levels, and methods of reducing noise emissions from construction sites. BS 5228-2 provides guidance on vibration levels that can be used to assess the likely impacts of construction activities on buildings and on humans.
BS 4142:2014+A1:2019 'Method for rating and assessing industrial and commercial sound'	BS 4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities. The rating method takes into account specific source characteristics, such as tonality, impulsivity and intermittency. The impact assessment procedure described in BS 4142 is based on the comparison of the rating sound level with the background sound level prevailing at the assessment locations.
BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'	BS 8233 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.
BS 7445-1:2003 'Description and measurement of environmental noise'	BS 7445 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.
Calculation of Road Traffic Noise (CRTN), 1988	CRTN sets out standard procedures for calculating noise levels from road traffic. The calculation method uses a number of input variables, including traffic flow volume, average vehicle speed and percentage of heavy duty vehicles (HDV), to predict the $L_{A10,18\text{hour}}$ or $L_{A10,1\text{hour}}$ noise level.
Design Manual for Roads and Bridges, LA 111 (DMRB)	LA 111 Noise and Vibration provides advice on the assessment of noise and vibration impacts due to road traffic.

Document	Summary
Calculation of Railway Noise (CRN) (1995), Department of Transport	Primarily concerned with the procedures for calculating noise from moving railway vehicles as defined in the Noise Insulation Regulations 1995 (Railways and Other Guided Transport Systems).
Additional railway noise source term for "Calculation of Railway Noise 1995", Department for Environment, Food & Rural Affairs (Defra)	Provides an update on CRN source terms for rolling noise and diesel locomotives.
Guidelines for Environmental Noise Impact Assessment (IEMA, 2014)	The Guidelines for Environmental Noise Impact Assessment provide specific guidance on how noise impact assessments fit within the Environmental Impact Assessment (EIA) process.
World Health Organisation (WHO) Guideline Values for Community Noise (Berglund and Lindvall, 1999)	Provides guidelines for environmental noise exposure. For community or environmental noise, the critical health effects (those effects which occur at the lowest exposure levels) are: sleep disturbance; annoyance (slight, moderate, high); and speech interference/communication disturbance.
Professional Planning Guidance on Planning and Noise (2017)	Guidance produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system.
International Standard ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'	ISO 9613-2 specifies an engineering method for calculating the attenuation of sound during outdoor propagation conditions. The methodology accounts for a number of physical effects including: geometrical divergence, atmospheric absorption, ground effects, reflections from surfaces, and screening by obstacles.
Institute of Estuarine and Coastal Studies (IECS)'Construction and Waterflow: Defining Sensitivity, Response, Impacts and Guidance' 2009	The IECS 2009 report (Cutts et al., 2009) defines disturbance in the general context as discrete events that disrupt ecosystem, community or population structures or in some way alter resource levels i.e. food and space. It may also influence the survival of individual birds and reduce the function of the Site either for roosting or feeding.
Natural England, 'A Review of the Effects of Noise on Birds – Version 1' 2018	This guidance note describes the nature of the effects of noise on birds and provides a literature review of present studies and broad measures of mitigation. This includes the application of generic thresholds for potentially harmful noise levels (or increases in noise levels), and measures to help mitigate noise effects on birds.

7.2.2 Further details of the legislation, policy and guidance stated above can be found in **Appendix 7.1** and **Appendix 7.2**.

7.3 Consultation undertaken

7.3.1 The scope of this assessment has been established through pre-application meetings with Neath Port Talbot Council (NPTC) and Natural Resources Wales (NRW).

7.3.2 **Table 7.4** provides a summary of the consultation undertaken to inform the Noise and Vibration assessment to date.

Table 7.4 Summary of the consultation in relation to noise and vibration

Body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
NPTC	Meetings on 18 April 2024 and 15 May 2024	General approach to baseline monitoring and acoustic assessment of the Proposed Development – (Acoustic Assessment Method Statement - EAF Project - 2062419-RSKA-MS-001-(04) - Draft - 20 May 2024). Informal response from NPTC following document review confirmed agreement with the methodology and proposals is provided in Appendix B of Appendix 7.1 and Appendix 7.2.
NRW	9 May 2024	Informal response comments to assessment approach and methodology.

Elements scoped out of the assessment

- 7.3.3 The elements shown in **Table 7.5** are not considered to give rise to likely significant effects as a result of the Proposed Development and have therefore not been considered within this assessment.

Table 7.5 Elements scoped out of the assessment

Element Scoped Out	Description
Vibration during operation phase.	The Proposed Development has a very low potential to generate any operational vibration emissions. As the nearest residential receptor is more than 500 m away (on Bypass Street) from the Site there is limited potential for vibration to be perceptible. For the reason above, operational vibration and the potential adverse impact from vibration emissions are not considered any further in this assessment.
Freight vehicle movements via the port.	The Proposed Development is not expected to have freight deliveries through the Port Talbot port. For the reason above, freight via the Port Talbot port is not considered any further in this assessment.

Elements scoped into the assessment

- 7.3.4 The elements shown in **Table 7.6** are considered as having the potential to give rise to likely significant effects as a result of the Proposed Development and are therefore considered within this assessment.

Table 7.6 Elements scoped into the assessment

Element Scoped In	Justification
Noise and vibration from the construction activities.	Temporary noise and vibration impacts associated with construction activities could result in adverse impacts.
Noise and vibration from heavy goods vehicle (HGV) movements associated with construction activities.	Temporary noise effects associated with construction traffic on the public highway.
Noise from road traffic vehicle movements associated with the operation of the Proposed Development.	Noise generated by operational traffic (heavy good vehicles and passenger vehicle movements etc.) on existing local routes, potentially affecting existing noise sensitive receptors (NSRs).
Noise from rail traffic vehicle movements associated with the operation of the Proposed Development.	Noise generated by operational rail traffic on existing and proposed rail line local routes, potentially affecting existing noise sensitive receptors (NSRs).
Noise from the operation of the Proposed Development.	Noise from the operation of the Proposed Development including noise arising from the existing unchanged processes on site, as well as the new or altered noise generating equipment associated with the Proposed Development and operation of the new scrap handling facility

7.3.5 Following further consultation with NPTC and NRW, specific discussions were held around the subject of Soundscape, and also a briefing document to summarise the technical information of the noise study for ease of reference. The following documents have been prepared and sit as appendices to this Chapter of the ES:

- Appendix 7.3 – A7.3 Noise and Vibration: Briefing Note
- Appendix 7.4 – Tata Steel UK Limited (Tata Steel) Soundscape Study

7.4 Approach to the assessment

Study area

7.4.1 The Study Area for the assessment varies depending on the effect under assessment, and in accordance with the relevant standards and guidance. A summary of the Study Areas adopted for the assessment is provided below:

- Construction Noise: The Study Area considered for the construction phase is 300m from the Site;
- Construction Vibration: The Study Area considered for the construction phase is 100m from the closest construction activity with the potential to generate vibration, in line with guidance from DMRB;

- Rail Noise: The Study Area considered for the railway noise is up to 300 m from the rail movements within the Site, in line with the quoted ranges within CRN;
- Road Traffic Noise: Off-site receptors within 50m of any potentially affected route (defined as any route potentially experiencing a road traffic noise level change of +/-1 dB Short Term); and
- Operational Noise: Noise effects arising from the operational project, will be limited to 1000m from the Site.

7.4.2 Figure C 1 in **Appendix 7.1** and **Appendix 7.2** provides an overview of the Site location and the study areas described above.

Background studies/surveys

7.4.3 **Table 7.7** summarises all studies/surveys that have been undertaken to inform the assessment presented within this chapter.

Table 7.7 Background studies/surveys

Study/survey	Overview	Date of completion
Baseline noise survey	A baseline noise survey of the Site and the surrounding area was undertaken in 2022. Details are provided in Appendix D of Appendix 7.1 and Appendix 7.2 . The baseline data is be considered relevant to provide context relating to the existing acoustic environment and the 'established baseline', with respect to both the ambient sound level (dB $L_{Aeq, T}$) and individual sound events (dB L_{AFmax}).	April 2022
Baseline noise survey – ecological receptors	Two baseline sound surveys were undertaken at ecological receptors. Details are provided in Appendix 7.1 and Appendix 7.2 .	May 2024
Baseline noise survey – proxy background sound measurement	A baseline sound survey was undertaken at a comparable alternative measurement position (proxy) to represent the existing acoustic environment in the absence of the specific sound source (Tata Steel UK Limited (Tata Steel) Port Talbot Steelworks). Details are provided in Appendix 7.1 and Appendix 7.2 .	June 2024
Soundscape Assessment	Day and night-time observation surveys undertaken at each NSR location. Details are provided in Appendix 7.1 and Appendix 7.2 .	June 2024

Noise sensitive receptors

7.4.4 The nearest residential noise sensitive receptors (NSR) to the Proposed Development are identified in **Table 7.8**.

Table 7.8 Residential NSRs

NSR Ref.	Description	Type of Receptor	Easting	Northing
R1	Residential properties at West End	Residential	277127	188899
R2	Residential properties at Prince Street	Residential	277641	188331
R3	Residential properties at Brynhyfryd Road	Residential	278365	187088
R4	Residential properties at Longland Lane	Residential	279273	186115
R5	Residential properties at Eglwys Nunydd	Residential	280190	184858

- 7.4.5 Other areas of interest considered within this assessment include the nearby Site of Special Scientific Interest (SSSI) and quiet areas as identified in Policy EN10 of the Neath Port Talbot County Borough Council Local Development Plan (2011–2026), as identified in **Table 7.9**.

Table 7.9 SSSI and quiet area NSRs

NSR Ref.	Description	Type of Receptor	Easting	Northing
R6	Margam Moors	SSSI	278040	185241
R7	Eglwys Nunydd reservoir	SSSI	279744	184949
R8	Vivian Park	Quiet Area	275023	190020
R9	Talbot Memorial Park / Parc Coffa Talbot	Quiet Area	277393	189282

- 7.4.6 All NSRs identified within **Table 7.8** and **Table 7.9** are identified graphically in Figure C 3 of Appendix C within **Appendix 7.1** and **Appendix 7.2**.

Value of receptors

- 7.4.7 Receptor sensitivity has been categorised for a range of receptor types as set out in **Table 7.10**, which has been informed by guidance contained in the following documents:
- DMRB LA 111; and
 - Guidelines for Environmental Noise Impact Assessment.

Table 7.10 Receptor value and sensitivity

Receptor Sensitivity	Type of Receptor
High	Residential properties (including gardens), educational establishments, hospitals, places of worship, hotels, children's nurseries, nursing homes, quiet areas (designated under noise and soundscape plan 2023–2028).
Medium	Commercial premises, halls, public municipal areas, bars and restaurants, SSSI.
Low	Industrial premises.
Negligible	All other areas such as those used primarily for agricultural purposes.

Assessment methodology

Construction noise assessment methodology

- 7.4.8 The significance criteria given in Annex E of BS 5228-1 have been used to assess the potential for noise effects during the construction phase. Section E.3.2 details the 'ABC Method' of determining the potential significance of noise effects. This method defines threshold noise levels for different time periods which are dictated by the pre-construction ambient noise levels. If the construction phase noise levels exceed the appropriate threshold value, then a potential significant effect is indicated.
- 7.4.9 On the basis of the measured ambient sound levels from the baseline survey, the following threshold levels have been determined in accordance with the ABC method as shown in **Table 7.11**.

Table 7.11 Noise assessment criteria (construction noise)

Noise Sensitive Receptors/ Nearest Monitoring Location	Threshold values as per BS5228 Table E.1 ($L_{Aeq,T}$)		
	Daytime	Evenings and weekends	Night-time
R1	65	60	56
R2	65	60	55
R3	65	55	55
R4	65	60	56
R5	70	65	60
R6*	55 ($L_{Aeq, T}$ and L_{AFmax})**		
R7*	55 ($L_{Aeq, T}$ and L_{AFmax})**		
Note: * Magnitude criteria not based on guidance from BS 5228; ** Magnitude criteria based on both $L_{Aeq, T}$ and L_{AFmax} for ecological receptors.			

Construction vibration assessment methodology

- 7.4.10 Construction works comprising activities such as compaction and hydraulic breaking can produce ground-borne vibration, which may be felt in nearby residential properties.
- 7.4.11 BS 5228-2 provides guidance on vibration levels that can be used to assess the likely impacts of construction activities. Annex E of the standard gives empirical formulae for the prediction of the resultant peak particle velocity (PPV) vibration levels for various types of work.

Construction traffic assessment methodology

- 7.4.12 The methodology contained within the Calculation of Road Traffic Noise Memorandum (CRTN) has been used to calculate the noise levels associated with increased road traffic flows, with the BS 5228-1 haul road calculation formula used for local road links on the basis that the minimal pre-development flows would mean that it would be beyond the scope of CRTN. The CRTN method uses a number of input variables, including traffic

flow volume, vehicle speed, percentage of heavy goods vehicles, type of road surface, site geometry and the presence of noise barriers or acoustically absorbent ground, to predict road traffic noise levels.

- 7.4.13 The CRTN traffic assessment focuses on the change in noise levels that are likely to occur on road links as a result of the construction phase works. Traffic noise predictions have been carried out at notional receptors located 10m from the edge of the carriageway and 1.5m above ground level to determine the change in noise level. Notional receptors are used because it is the change in traffic noise level that is of interest, not the absolute noise levels at any given receptor. The predicted changes in noise level would occur at noise-sensitive receptors along each of the roads considered, regardless of whether they have been specifically considered or not.
- 7.4.14 The significance criteria for the construction phase traffic flow fluctuations are based on the magnitude of impact values set out in Table 3.17 of DMRB LA 111.

Operational noise assessment methodology

- 7.4.15 The operational noise assessment methodology has been undertaken in accordance with BS 4142:2014+A1:2019 'Method for rating and assessing industrial and commercial sound'. BS 4142:2014+A1:2019 provides a method for rating industrial and commercial sound and assessing the resulting impacts upon surrounding receptors. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities. The rating method considers specific acoustic characteristics of the noise source, such as tonality, impulsivity and intermittency.
- 7.4.16 Operational phase impacts have been predicted using a computer noise model of the Proposed Development, using SoundPLAN v9.0. The model adopts the calculation method in ISO 9613-2, which is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The calculation method considers the mechanisms of noise propagation, including geometrical divergence (also known as distance loss or geometric damping), atmospheric absorption, ground effect, reflection from surfaces and screening by obstacles, barriers and buildings.
- 7.4.17 The ISO 9613-2 method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the noise-sensitive receptor e.g., downwind propagation or equivalent, propagation under a moderate ground-based temperature inversion as commonly occurs at night.
- 7.4.18 The following quantitative assessment scenarios have been undertaken, the results of which are provided within this ES:
- Proposed Development + established baseline background ambient sound level vs established background ambient sound level;
 - Proposed Development maximum noise events vs established baseline maximum event analysis; and
 - Proposed Development cumulative assessment (with other known projects).
- 7.4.19 Full details of the modelling methodology are provided in **Appendix 7.1** and **Appendix 7.2**.

Magnitude of impact

7.4.20 The magnitude of the impact within this preliminary assessment has been described using the following scale:

- Large;
- Medium;
- Small; and
- Negligible.

7.4.21 Although the lowest measure of magnitude of impact is defined as 'negligible', it should be noted that noise and vibration levels may still be audible/perceptible if defined as negligible during the construction and operational phases of the Proposed Development.

7.4.22 The criteria in **Table 7.12** have been adopted for the assessment of magnitude of impact.

Table 7.12 Definition of the magnitude of impact

Effect	Magnitude of Impact			
	Negligible	Small	Medium	Large
Construction – Noise (core hours only^{1, 2})	Table 7.11-10 dB	Equal to criteria provided in Table 7.11.	Table 7.11 + 5 dB	Table 7.11 +10 dB
Construction – Road traffic noise	Less than 1.0 dB increase in road traffic noise	1.0 to 2.9 dB increase in road traffic noise	3.0 to 4.9 dB increase in road traffic noise	Greater than or equal to 5.0 dB increase
Construction – Vibration²	Less than 0.3 mm/s PPV	0.3 to less than 1.0 mm/s PPV	1.0 to 9.9 mm/s PPV	Greater than or equal to 10 mm/s PPV
Operation - Noise³	Project specific sound level results in no increase in ambient sound level, and project rating level below or equal to existing background	Project specific sound level results in less than 3 dB increase in ambient sound level, and project rating level of up to 5 dB above existing background	Project specific sound level results 3-5 dB increase in ambient sound level, and project rating level of 5-10 dB above existing background	Project specific sound level results in more than 5 dB increase in ambient sound level, and project rating level more than 10 dB above existing background
Operation – Road traffic noise (short-term)⁴	< 1.0 dB change	1.0 - 2.9 dB change	3.0 - 4.9 dB change	Greater than or equal to 5.0 dB
Operation and/or Construction Noise (SSSI)⁵	Below 55 dB	Between 50 & 70 dB	> 70 dB	> 85 dB

Effect	Magnitude of Impact			
	Negligible	Small	Medium	Large
Designated Quiet Areas	Below 50 dB L _{Aeq} , 16 hour	Between 50 and 55 dB L _{Aeq} , 16 hour	Between 55 and 60 dB L _{Aeq} , 16 hour	> 60 dB L _{Aeq} , 16 hour
<i>Notes:</i> 1 Construction phase noise levels are based on a time period 'T' which equates to the duration of a working day on site e.g core hours of weekdays between 0700 – 1900 and Saturday between 0700 – 1300); 2 Construction noise, construction traffic noise and construction vibration shall constitute a likely significant effect where it is determined that a high or medium effect will occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months; 3 Operational noise would only be considered significant where a significant adverse impact is indicated following consideration of context in line with BS 4142:2014+A1:2019. The predictions need to satisfy both test (i.e. the 'and') and where either test is not met within a criteria, the lower 'magnitude of impact' criteria would apply. 4 Where roadside receptors with a high sensitivity to noise will experience high façade noise levels (> 68 dB L_{A10,18hr}), a noise change of 1.0 dB or greater will constitute a significant effect; and 5 Although not specifically stated within the guidance, magnitude criteria based on both L_{Aeq, T} and L_{AFmax} for ecological receptors.				

Determination of significance

- 7.4.23 The overall significance of an effect is determined by combining the sensitivity of the receptor and magnitude of impact (as presented in **Table 7.13**). The assessment of significance relies on best practice and the relevant published standards and guidance documents as defined in **Section 7.2**.
- 7.4.24 The significance of an effect is reported as either 'significant' or 'not significant'. Where significance of effect is assessed as 'negligible' or 'minor', the effect is not significant. Where the significance of effect is assessed as 'moderate' or 'major', the effect may be significant.

Table 7.13 Determining significance of effects for noise and vibration

Sensitivity of receptor	Magnitude of impact			
	Large	Medium	Small	Negligible
High	Major*	Moderate*	Minor	Negligible
Medium	Moderate*	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible
<i>Note:</i> * With respect to operational noise, effects are only considered to be significant where a significant adverse impact is indicated following consideration of context in line with BS 4142:2014+A1:2019.				

Limitations of the assessment

- 7.4.25 The assessment assumes the use of standard construction techniques and practices commensurate for works of this nature. The final techniques, plant selection and programme would be determined by 'the Applicant' and their contractors, in consultation with relevant bodies prior to commencement of construction.

- 7.4.26 Construction activities would involve the use of a range of working methods, for which an estimate of the expected noise levels over a representative period has been prepared, in accordance with industry best practice. Noise levels from the construction works experienced by a receptor would vary over time as the distances to noise producing plant and the type of construction activity change.
- 7.4.27 Information related to the construction programme, phasing and specific plant items has not been provided. A detailed construction noise and vibration assessment will be required when this information becomes available. The assessment is based on construction activities taking place during daytime (07.00–19.00 Monday to Friday, 07.00–13.00 Saturday) only with no work on Sundays or Bank Holidays. Further detailed assessments will be required if evening or night-time operation is expected. It is assumed that this will be secured through a suitably worded planning condition.
- 7.4.28 At this stage in the design, specific noise source data is not available for all of the proposed plant and equipment. To inform the operational phase assessment, prospective equipment suppliers have provided information regarding the expected plant/equipment installations, including typical sound emission data. The resulting information has been used as part of the assessment to demonstrate that a workable solution can be achieved which does not result in significant adverse effects.
- 7.4.29 The operational assessment methodology requires specific locations to be modelled for operational phase noise sources, which has been achieved by producing a sound propagation model of the Proposed Development drawings and 3D design model. The propagation model is an approximation of the design drawings and 3D model with the inclusion of noise source assumption data.
- 7.4.30 Detailed design information is not available at this stage. Noise data, positioning and dimensions of specific sound sources are proportionate to the level of information available at this stage. The source assumptions and design assumptions used to inform the assessment are required to be verified during the detailed design of the Proposed Development to ensure that any changes to the design or proposed plant and equipment do not impact the assessment conclusions provided within this ES chapter. It is assumed that this will be secured through a suitably worded planning condition.

Design basis and assumptions

Construction noise

- 7.4.31 The Proposed Development includes the demolition of existing buildings and structures and the construction of a new EAF steel production facility and scrap handling facility. The construction team identified a list of primary construction activities for assessment purposes. However, these consider the EAF and the scrap facilities together. The activities include:
- Task 1 Demolition works (demolition, internal building demolition, foundations and substructure works);
 - Task 2 Piling works (piling will be required for the construction of the proposed commercial and industrial uses);
 - Task 3 Earthworks (site preparation, ground remediation, earth works and landscaping);
 - Task 4 Civil enabling works (road works);

- Task 5 Concreting works (building erection and superstructure works);
- Task 6 Structural steel erection work (building erection, superstructure works, construction and fit-out);
- Task 7 Mechanical erection work (building erection, superstructure works, construction and fit-out); and
- Task 8 Electrical work (construction and fit-out).

- 7.4.32 An indication of the proposed task methodology, working hours and plant lists for each construction activity is shown in Appendix D of Appendix 7.1 and Appendix 7.2. It should also be noted that data relating to number of plant items and on-time utilisation for each construction activity is based on professional judgement.
- 7.4.33 An overview of the assumptions made relating to the positioning of each of the mobile plant and equipment used at the Proposed Development is provided graphically in Figure C4 within Appendix 7.2.
- 7.4.34 Construction noise predictions are considered worst case, as they assume all plant within a given construction task are undertaken at the shortest separation distance from the receptor. In reality this is unlikely to be the case, therefore noise levels and associated impacts are likely to be lower than those predicted.
- 7.4.35 It should be noted that the majority of the construction works will be undertaken 07:00–19:00 Monday to Friday and 07:00–13:00 on Saturdays. No works are currently scheduled to occur outside of the above hours.

Construction vibration

- 7.4.36 It is understood that the works identified with the potential to generate discernible levels of vibration would be Task 1 'Demolition Works', Task 2 'Piling Works' and Task 3 'Earthworks'. The proposed demolition works, the operation of the drilling and piling rigs as well as the rolling and compaction activities could generate perceptible levels of vibration in close proximity to the construction site.
- 7.4.37 Due to the large distances separating the vibratory activities and the identified residential receptors, of over 500 m, the impact is likely to be negligible and has not been considered further.

Construction traffic

- 7.4.38 The construction traffic noise assessment considers the change in ambient noise levels at existing receptors as a result of changes in the 18-hour average annual weekday traffic (AAWT) traffic flows between the potential future traffic flows with and without the construction traffic.
- 7.4.39 The traffic data is presented in Table E1 of Appendix E in **Appendix 7.1** and **Appendix 7.2**. The construction traffic data considers construction traffic data for both the EAF and for the scrap handling facility proposals. The future traffic flows provided also include committed developments in the vicinity of the Site.

Operational noise

- 7.4.40 Details of operational phase noise emissions for the scrap handling facility and for the EAF that have been used to inform this chapter are provided in **Appendix 7.1** and **Appendix 7.2** respectively.
- 7.4.41 An overview of the assumptions made relating to the positioning of each of the activities proposed as part of the scrap handling facility are provided graphically in Figure C4 and Figure C5 in **Appendix 7.1**. Where activities may be carried out in multiple locations, presented results represent the highest predicted noise emissions at each NSR.
- 7.4.42 Estimated operational on-times have been discussed and confirmed with the EAF Project team and are considered to represent a typical worst case scenario for the proposal.
- 7.4.43 All noise source assumptions have been derived following review of available information or project meetings and agreed as appropriate with the Applicant.
- 7.4.44 Embedded mitigation measures included within the design are summarised in **Table 7.14** and **Table 7.15**.

Operational traffic noise

- 7.4.45 The road traffic noise assessment considers the change in ambient noise levels at existing receptors as a result of changes in the 18-hour AAWT traffic flows between the potential future traffic flows with and without the Proposed Development.
- 7.4.46 The traffic data is presented in Table F1 of Appendix F within **Appendix 7.1** and **Appendix 7.2**. The operational traffic data considers operational traffic data for both the EAF and for the scrap handling facility proposals. The future traffic flows also include committed developments in the vicinity of the Site.

Operational rail noise

- 7.4.47 All rail traffic movements associated with the Proposed Development are considered and assessed as part of the scrap handling facility. All assumptions relating to rail traffic movements are contained within **Appendix 7.1**.

7.5 Established, interim and future environmental baseline

Established baseline

- 7.5.1 The existing acoustic environment relating to the 'established baseline' (i.e. the steelworks with the 'heavy end' as operating in early 2024 and for the majority of the preceding 50+ years) is represented in the baseline monitoring that was undertaken by RSK Acoustics in 2022.
- 7.5.2 The 'established baseline' remains a relevant reference point for the assessment and is used to report the significance of effects for the assessment provided within this ES chapter.

Interim baseline

- 7.5.3 The 'interim baseline' is the steelworks as it will operate at the time of the planning determination following the closure of the 'heavy end'.

- 7.5.4 The period between the 'heavy end' being switched off and the operation of the 'Proposed Development' (subject to planning permission and environmental permitting) will result in an interim period of time where neither the 'heavy end' nor the Proposed Development are operational.
- 7.5.5 During this period, the site will continue to undertake activities associated with steel manufacturing in the Hot mill and Cold mill and it is anticipated that the Applicant's steelmaking activity at Port Talbot would generate less noise than compared with the existing activity (which includes the 'heavy end').
- 7.5.6 This is expected to occur as the majority of the noisier external plant and equipment associated with the steelmaking process are directly linked to the operation of the 'heavy end'. This conclusion is considered to be appropriate based on the common sense understanding of the site operation, the anticipated contribution to noise emissions from the 'heavy end' and following detailed discussion with the Applicant.
- 7.5.7 Based on the above, the noise emissions generated during the interim baseline period (following the switching off of the 'heavy end') are expected to reduce across the Site and at nearby NSRs. This is particularly relevant at dwellings situated closest to the 'heavy end' such as Taibach off West End (R1) and Prince Street (R2), where 'heavy end' activities are observed to be the dominant noise source at times.
- 7.5.8 Based on the reduction in noise levels, the potential change would be considered as a short-term benefit within the nearby areas and at NSRs.
- 7.5.9 Impacts are compared to the interim baseline because the closure of the 'heavy end' infrastructure will happen regardless of whether the EAF is approved and constructed, and will pre-date the EAF commencing operations. These impacts are reported for context to indicate what may be expected to occur through the interim baseline period. However, in common with other chapters of the ES, the assessments of effects reported in **Section 7.8** of this chapter is based on a comparison against the established baseline.

Future baseline

- 7.5.10 In order to ensure that the Proposed Development is assessed against a realistic future baseline scenario, i.e. what the baseline conditions are likely to be once the Proposed Development is operational, a description of the likely future baseline conditions is provided below. The 'future baseline' considers the foreseeable future changes to environmental factors, such as:
- The shutdown of the 'heavy end' (expected October 2024); and
 - Non-Tata Steel UK Limited (Tata Steel) land use changes in the wider area.
- 7.5.11 Where noise emissions from the existing Port Talbot Steelworks contribute to the acoustic environment, the assessment of the 'future baseline' is to be defined by the 'interim baseline' acoustic environment (without the 'heavy end') with the addition of the Proposed Development.

7.6 Existing environment

- 7.6.1 Baseline monitoring was undertaken at various positions representative of nearby NSRs during 2018, 2019 and 2022. Following consultation with NPTC it was agreed that the

previously gathered baseline data from 2022 is considered representative of the acoustic environment (established baseline i.e. including 'heavy end') at nearby NSRs.

- 7.6.2 As it was not possible to shut down the existing site operations, the data collected during the previous baseline surveys does not have a background sound level (dB $L_{A90, T}$) without contribution from the specific sound source (Port Talbot Steelworks).
- 7.6.3 The baseline data from 2022 is therefore considered relevant to provide context relating to the acoustic environment (established baseline i.e. including 'heavy end'), with respect to both the ambient sound level (dB $L_{Aeq, T}$) and individual sound events (dB L_{AFmax}).
- 7.6.4 Additional noise monitoring was undertaken in June 2024 at a comparable alternative measurement position (proxy) that has been used to represent the existing acoustic environment (established baseline) in the absence of the specific sound source (Port Talbot Steelworks).
- 7.6.5 The proxy monitoring location was decided upon following three separate baseline surveys, whereby two of the monitoring positions / period results were discarded due to contribution from unknown and significant sound sources nearby. The final proxy location was considered appropriate as it was within a comparable residential area, a similar distance from the M4 motorway to the identified NSRs and did not include contribution from the specific sound source i.e. the Port Talbot Steelworks.
- 7.6.6 The statistical analysis of the data collected at the proxy measurement position resulted in background sound levels of 51 dB $L_{A90, 1 \text{ hour}}$ and 38 dB $L_{A90, 15 \text{ minutes}}$. These are considered representative of the background sound level for both daytime and night-time, respectively.
- 7.6.7 Further details of the baseline noise surveys are provided within Section 3 and Appendix D of both **Appendix 7.1** and **Appendix 7.2**.

7.7 Project characteristics and embedded mitigation

Embedded mitigation construction phase (including construction traffic) – noise and vibration

- 7.7.1 Mitigation during the demolition and construction phases of the Proposed Development will include Best Practicable Means (BPM) as defined under Section 72 of the CoPA to minimise noise and vibration impacts.
- 7.7.2 Examples of such measures are presented below:
 - Provision of a construction environmental management plan, a construction noise and vibration management plan or relevant equivalent;
 - Prior consent agreement for any works outside weekday and Saturday core hours, where there is potential for significant adverse effects;
 - Contact details for nominated site contact for local residents to deal with complaints and engaging with local residents;
 - Selection of quiet and low noise equipment and methodologies;
 - Optimal location of acoustic screening, where required to minimise noise adverse effects;
 - Optimal location of equipment, where required to minimise noise disturbance at nearby NSRs;

- The provision of acoustic enclosures around static plant, where required to minimise noise adverse effects; and
- Use of less intrusive alarms, such as broadband vehicle reversing warnings.

7.7.3 Although significant vibration effects are considered unlikely, we understand that the contractor will apply BPM as defined under Section 72 of the CoPA to minimise any potential vibration impact.

7.7.4 An Outline Construction Environmental Management Plan (CEMP) has been prepared and is provided in **Appendix 2.1**. This document would form a basis for a full CEMP during the construction stage.

Embedded mitigation operational phase (Noise)

7.7.5 Other than the embedded mitigation measures identified within this document, the Proposed Development will implement an operational Noise and Vibration Management Plan (ONVMP) which will include details of the Proposed Development noise control strategy.

7.7.6 The ONVMP will allow for ongoing clarification and optimisation of the mitigation strategy required for the Proposed Development. It is anticipated that the Proposed Development will be subject to a planning condition requiring the submission of the ONVMP and noise control requirements to NPTC, prior to operation of the Proposed Development.

7.7.7 Following the completion of a process to identify applicable noise control measures in order to minimise the potential for adverse noise impacts, it was confirmed that the noise control measures identified within **Table 7.14** are to be embedded as part of the proposed design for the Proposed Development.

7.7.8 The Proposed Development has been designed sympathetically with noise emissions taken into consideration (through iterative design studies during the development of the ES¹), and has embedded noise control measures, in accordance with Best Available Technique (BAT²) and with relevant sector specific guidelines (BREF Documents³). BAT references will be considered within the noise study prepared separately in support of the Environmental Permit Variation Application.

¹ This includes plant choice (lower noise emitting), enclosures, barriers and layout. Embedded measures and the acoustic specification has been optimised to meet as low as level as reasonable and feasible, taken account of BAT (see below). Through the preparation of the ES this included refinement of the LF sound emission data which has meant overall offsite impacts being reduced. The level of attenuation is the optimised value, with any additional benefits being negligible beyond these values.

² Guidance Noise and vibration management: environmental permits (As prepared by environment Agency England, and adopted by Wales)

³ BREF Ferrous Metals Processing Industry, 2.3 (a,c) and 2.6 of Annex I to the Industrial Emissions Directive 2010/75/EU. BREF Iron and Steel Production, and Best Available Techniques (BAT) Reference Document for Waste Treatment

Table 7.14 Embedded mitigation measures

Element	Summary of control measures
Scrap handling facility	15m high noise control barrier; Shear enclosure – indicative reduction 20 dB; Shredder localised barrier or enclosure – indicative reduction 10 dB; Non-ferrous localised barrier – indicative reduction 5 dB; and Hammer mill / shredder enclosure – indicative reduction 15 dB. These measure will be optimised through development of the ONVMP at detailed design, with final measures ensuring impacts are no greater than those presented within this document
Existing BOS Plant Building	Strategic enhancement of existing BOS building façade cladding (to become the EAF building) to a total effective weighted sound reduction index of 48 dB R_w^1 . This measure will be optimised through development of the ONVMP at detailed design, with final measures ensuring impacts are no greater than those presented within this document. This may include internal EAF enclosures (a 'doghouse') or a combination of internal enclosure and/or strategic cladding.
Continuous Steel building	Optimized cladding ranging from 28-48 dB R_w .
Compressor house	Enhancement of building façade cladding to a total effective weighted sound reduction index of 48 dB R_w .
Louvers	Louvers assumed to be a minimum of 300 mm deep, single bank and acoustically treated to achieve a minimum of ~20 dB R_w^1 .
Access routes / doors	All access doors assumed to be acoustically treated to achieve a minimum of 30 dB R_w^1 . Location, number and specification of access doors / openings to be determined at detailed design.
Any building not requiring specific noise control measures	External roof and wall panel system used to achieve a minimum of 28 dB R_w .
Main fan / blower	Enclosure performance of 45 dB R_w^2 ; and Inline attenuator ³ .
MHS booster fan	Enclosure performance of 35 dB R_w^2 ; and Inline attenuator ³ .
LF Fan	Enclosure performance of 47 dB R_w^2 ; and Outlet attenuator ³ .
Temporary boilers	Enclosure of temporary boiler required limiting noise source emission level to a maximum of 86 dB L_{wA} or 68 dB $L_{Aeq, T}$ at 10m distance.
Notes: 1 Façade areas that require enhancement are detailed in Appendix G of Appendix 7.2; 2 Exact location, number and specification performance required to be confirmed during detailed design; and 3 Assumed performance of enclosures and attenuators provided in Table 7.1515 below.	

7.7.9 The locations of the scrap handling facility barriers are provided in Figure C4 and Figure C5 in **Appendix 7.1**.

7.7.10 The performance of the enclosures and attenuators identified as part of the embedded mitigation provided in Table 7.1414 are detailed below in **Table 7.15**.

Table 7.15 Enclosures and attenuator performance

Element	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Main Fan Enclosure	-17	-23	-35	-50	-50	-50	-50	-50
MHS Booster Fan Enclosure	-14	-19	-23	-32	-43	-50	-50	-50
LF Fan Enclosure	-20	-25	-40	-48	-50	-50	-50	-50
Main Fan Outlet Attenuator (Stack side)	-14	-21	-35	-46	-48	-38	-23	-19
MHS Booster Fan - Inlet Attenuator	-3	-7	-11	-18	-20	-12	-9	-7
LF Fan - Outlet Attenuator (exposed duct side)	-4	-11	-25	-36	-38	-28	-13	-9

7.8 Assessment of effects

Construction noise assessment

- 7.8.1 An initial prediction of the likely construction noise levels for each activity is presented in **Appendix 7.1** and **Appendix 7.2**. The noise levels are given in terms of the construction noise in isolation, without any contribution from ambient noise levels, in accordance with the methodology in BS 5228+A1:2014.
- 7.8.2 Based on a 'high' receptor sensitivity for residential dwellings and a 'small' impact magnitude for construction phase noise levels, this would represent a **minor** temporary adverse effect, which is **not significant**.
- 7.8.3 Additionally, based on a 'medium' receptor sensitivity for SSSI receptors and a 'negligible' impact magnitude, for the construction phase noise levels, this would represent a **negligible** temporary adverse effect which is **not significant**.

Construction vibration assessment

- 7.8.4 The setback distance between the vibratory compaction works involving large plant items and the existing residential properties is anticipated to be over 500 m for the closest receptors. On this basis, vibratory compaction works are unlikely to give rise to vibration levels which could result in disturbances for occupants of the adjacent properties i.e. PPV <0.3 mm/s.
- 7.8.5 Based on a 'high' receptor sensitivity for residential dwellings and a 'negligible' impact magnitude, the predicted construction phase vibration levels would correspond to a **negligible** temporary adverse effect, which is **not significant**.

Construction traffic noise assessment

- 7.8.6 The predicted change in noise levels, between the 'Construction Phase' scenario and the 'established baseline' scenario, based on the traffic flow predictions along all the road

links, is provided in Appendix F – Traffic Noise Assessment (Input Data and Results) of **Appendix 7.1** and **Appendix 7.2**.

- 7.8.7 Calculations indicate that the change in noise levels due to construction traffic is likely to be below 1 dB at all noise sensitive receptors.
- 7.8.8 Therefore, based on a 'high' receptor sensitivity for residential or quiet area receptors and a 'negligible' impact magnitude, for the operational traffic noise, this would represent a **negligible** temporary adverse effect which is **not significant**.
- 7.8.9 Additionally, based on a 'medium' receptor sensitivity for SSSI receptors and a 'negligible' impact magnitude, for the construction traffic noise, this would represent a **negligible** adverse effect which is **not significant**.

Operational noise assessment – human (residential)

- 7.8.10 **Table 7.16** below provides the predicted results for the Proposed Development at the nearest noise residential receptors. This assumes worst case night-time operations for the Proposed Development (including both the EAF and Scrap handling facility operating simultaneously). Noise contour plots can be found in in **Figure 7.1** to **Figure 7.4**.
- 7.8.11 In accordance with the BS 4142 assessment methodology, where certain features of the specific noise level can increase the significance of impact of a sound level, a character correction is applied to provide a 'Rating Level'. The characteristics of the specific sound that would attract a character correction are tonality, impulsivity, intermittency (as defined by BS 4142) or other characteristic features that are readily discernible against the residual acoustic environment.
- 7.8.12 All rating level results presented include a +6 dB character correction, which is relevant for the comparison with the background sound level (dB L_{A90, T}). The +6 dB character correction relates to the potential for impulsive noise events being clearly perceptible at NSRs during the night-time. Due to the nature of the existing environment, and the nature of the source emissions in terms of audibility (not readily distinguishable in the residual environment), we do not believe an intermittency penalty is warranted.
- 7.8.13 The predicted specific sound levels from both phases of the scrap handling facility are shown to be equivalent to the same at nearby NSRs (within 1 dB) (**Appendix 7.1** provides the description of the phases associated with the scrap handling facility in **Paragraph 7.1.6**. The following results and analysis could therefore be applied to both phases of the scrap handling facility noise emissions in-combination with the EAF.

Table 7.16 Proposed Development predicted noise levels - residential receptors

NSR	Proposed Development		Background Sound Level (dB L _{A90, T})	
	Specific Sound Level dB L _{Aeq, Tr}	Rating Level dB L _{Ar, Tr}	Daytime	Night-time
R1	34	40	51	38
R2	37	43	51	38
R3	36	42	51	38

NSR	Proposed Development		Background Sound Level (dB $L_{A90, T}$)	
	Specific Sound Level dB $L_{Aeq, Tr}$	Rating Level dB $L_{Ar, Tr}$	Daytime	Night-time
R4	33	39	51	38
R5	28	34	51	38

- 7.8.14 The overall predicted rating levels are shown to be significantly below the background sound level (dB $L_{A90, T}$) during the daytime at all NSRs.
- 7.8.15 During the night-time, the predicted Proposed Development rating levels are below the background sound level at R5. According to BS 4142 this is an indication of the specific source having a low impact, depending on the context.
- 7.8.16 The Proposed Development night-time results exceed the background sound level (dB $L_{A90, T}$) by 1 dB (R4), 2 dB (R1), 4 dB (R3) 5 dB (R2)⁴. A difference of around +5 dB is likely to be an indication of adverse impact, with a difference of +10 dB or more likely to be an indication of significant adverse impact, depending on context. According to BS 4142 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.
- 7.8.17 Following the initial estimate of impact, the following contextual considerations have been identified:
- Scrap material handling and movement already occurs onsite during both day and night-time. During the night-time, the existing scrap material can be moved from stockpiles to the scrap handling area behind the existing BOS plant up to four times per hour;
 - The existing site operates using similar mobile plant activities during both the day and night-time. Based on night-time observations of the existing activity from nearby NSRs, similar existing activities to those proposed are audible at times;
 - The proposed Consteel conveyor will receive scrap materials into an enclosed area with open access routes throughout the day and night-time period, it is expected that events related to the delivery of scrap material will be clearly audible at nearby NSRs and are considered as part of the character correction applied within the assessment;
 - Clearly audible impulsive events are already present at nearby NSRs due to the scrap material handling discussed above. This has the potential to limit the impact of this aspect of the activity at nearby NSRs;
 - The highest predicted L_{AFmax} levels at NSRs are in the order of 50 dB L_{AFmax} (loudest predicted is 52 dB L_{AFmax} at R3). Assuming a 12 dB attenuation from an open window, the internal noise levels would be below 45 dB L_{AFmax} during the night-time (World Health Organisation (WHO) criteria);

⁴ Initial draft of the ES indicated offsite levels of +7 dB at R3 however though evolution of design and greater certainty in sound emission data, new data has been provided for the LF meaning off site contributions being reduced, resulting in all levels being no more than 5dB above the proxy background. The LF data is now based on measurements at a similar site, calibrated for the Proposed Development.

- Based on the data collected during the baseline monitoring survey, all NSRs are subject to levels of above 50 dB L_{AFmax} individual event levels on a regular basis. For example, at R3 an average of over 900 events between 50 – 55 dB L_{AFmax} , 400 events between 55 – 60 dB L_{AFmax} and over 150 events between 60 – 65 dB L_{AFmax} were measured over each night-time period;
 - Guidance provided within Professional Practice Guidance (ProPG) indicates that it normally requires internal noise levels higher than 45 dB L_{AFmax} before significant adverse effects such as behavioural awakenings, difficulty getting to sleep, premature awakenings or difficulty getting back to sleep generally occur. Although the ProPG guidance is provided primarily relating to the design of new residential developments, it is considered that the Proposed Development's embedded mitigation is a representation of good acoustic design. The embedded mitigation measures aim to both avoid the potential significant adverse effects of individual noise events on sleep i.e. behavioural awakenings, and to appropriately mitigate and minimise the physiological adverse effects from individual noise events on sleep;
 - As predicted individual noise events result in internal levels of below the threshold of 45 dB L_{AFmax} in bedrooms during the night-time, the effects of individual noise events on sleep are not considered as significant;
 - The EAF will incorporate a wide range of embedded mitigation measures to reduce potential noise impacts and an environmental management plan that includes measures to ensure that all activities are undertaken in accordance with Best Practicable Means;
 - Both historically and up until the present day, the Site and surrounding area have been subject to noise emissions from industrial activities at Port Talbot Steel works both from the Applicant's activities, as well as various other existing industrial activities;
 - The highest calculated specific sound level (39 dB $L_{Aeq,Tr}$) at the worst affected façade of the identified NSRs falls below the relevant criteria in World Health Organisation and BS8233 guidelines with respect to noise levels in external amenity areas (daytime only); and
 - When the specific sound levels are compared with the prevailing average ambient sound levels (see Table D 13 of **Appendix 7.1** and **Appendix 7.2**), the specific sound levels are shown to be at least 10 dB below the average ambient sound levels at each NSR aside from R3. This indicates that the Proposed Development would not contribute to the average ambient sound levels at the NSRs
- At R3, the Proposed Development specific sound levels are shown to be 9 dB lower than the prevailing average ambient sound levels (see Table D 13 of **Appendix 7.1** and **Appendix 7.2**). This indicates that the Proposed Development would result in a less than 1 dB increase in ambient sound levels at R3.

7.8.18 After consideration of the predicted rating levels in the assessment, the rating level is determined to exceed the background sound level by up to 5 dB. The levels are considered to be 'medium' in magnitude but after accounting for context these are unlikely to give rise to a significant adverse effect, so are not significant.

7.8.19 The predicted specific sound levels in the assessment indicate an ambient sound level change of less than 1 dB levels, which are considered as 'small' in magnitude.

- 7.8.20 Therefore, based on a 'high' receptor sensitivity for residential dwellings and a 'medium' impact magnitude for operational phase noise levels, this would represent a **moderate** adverse effect, which is **significant**. However, based on the consideration of the context of the Site as described in **Paragraph 7.8.17** above, specifically the less than 1 dB increase in ambient sound levels, professional judgement has been applied in line with **Table 7.13**, and the effect is considered to be **not-significant**.

Operational noise assessment – SSSI receptors

- 7.8.21 **Table 7.17** provides the predicted results for the Proposed Development at nearby SSSI receptors.

Table 7.17 Proposed Development predicted noise levels – SSSI receptors

NSR	Prediction Results (dB)		Magnitude Impact
	L _{Aeq, T}	L _{AFmax}	
R6	34	48	Negligible
R7	28	41	Negligible

- 7.8.22 Average predicted noise levels during the operational scenario at the ecological receptors range between 28 dB L_{Aeq, T} and 34 dB L_{Aeq, T}. Although the applicable criteria for ecological receptors are concerned with the impact of construction related noise, predicted noise levels are considerably below the adopted 55 dB (A) threshold and consequently considered not significant.
- 7.8.23 Maximum predicted noise levels during the operational scenario at the ecological receptors range between 41 dB and 48 dB L_{AFmax}. Based on an analysis of the measured L_{AFmax} events during the baseline survey, both SSSI areas are subject to levels well in excess of the predicted L_{AFmax} levels (existing individual event levels are regularly above 55 dB L_{AFmax}).
- 7.8.24 Based on the predicted levels below the 55 dB L_{AFmax} threshold and the existing habituation of individual noise events in excess of both the predicted L_{AFmax} levels and the 55 dB L_{AFmax} threshold, it is considered unlikely that the Proposed Development would result in significant effects on the ecological receptors.
- 7.8.25 Therefore, based on a 'medium' receptor sensitivity for SSSI receptors and a 'negligible' impact magnitude for the operational phase noise levels, this would represent a **negligible** adverse effect, which is **not significant**.

Operational noise assessment –quiet area receptors

- 7.8.26 **Table 7.18** provides the predicted results for the Proposed Development at nearby quiet area receptors.

Table 7.18 Proposed Development predicted noise levels – quiet area receptors

NSR	Prediction Results (dB)		Magnitude Impact
	L _{Aeq, T}	L _{AFmax}	
R8	28	40	Negligible
R9	29	38	Negligible

7.8.27 Predicted noise levels during the operational scenario at the quiet area receptors are considerably below the adopted 50 dB (A) threshold and consequently considered not significant.

7.8.28 Therefore, based on a 'high' receptor sensitivity for quiet area receptors and a 'negligible' impact magnitude for the operational phase noise levels, this would represent a **negligible** adverse effect, which is **not significant**.

Operational traffic noise assessment

7.8.29 The predicted change in noise levels, between the 'Future with Development' scenario and the 'established baseline' scenario, is provided in Table E2 of Appendix E in **Appendix 7.1** and **Appendix 7.2**.

7.8.30 Calculations indicate that the change in noise levels due to operational traffic is likely to be less than 1 dB at all noise sensitive receptors.

7.8.31 Therefore, based on a 'high' receptor sensitivity for residential or quiet area receptors and a 'negligible' impact magnitude, for the operational traffic noise, this would represent a **negligible** adverse effect which is **not significant**.

7.8.32 Additionally, based on a 'medium' receptor sensitivity for SSSI receptors and a 'negligible' impact magnitude, for the operational traffic noise, this would represent a **negligible** adverse effect which is **not significant**.

Proposed mitigation

Construction (including construction traffic) phase

7.8.33 No additional mitigation is considered to be necessary.

Operational (including operational traffic) - Noise

7.8.34 No additional mitigation is considered to be necessary.

Residual effects

Construction (including construction traffic) phase

7.8.35 No additional mitigation relating to construction noise or vibration has been proposed for the Proposed Development. Therefore, the residual effects for both residential and SSSI receptors are consistent with **Paragraph 7.8.2** and **Paragraph 7.8.3** respectively and are considered to be **not significant**.

Operational (including operational traffic) phase

- 7.8.36 No additional mitigation relating to operational noise has been proposed for the Proposed Development. Therefore, the residual effects for residential receptors, SSSI and quiet area are consistent with the conclusions of **Paragraph 7.8.20**, **Paragraph 7.8.25** and **Paragraph 7.8.28** are considered to be **not significant**.

7.9 Further survey and monitoring requirements

- 7.9.1 Following the 'heavy end' shutdown, a further quantitative baseline sound survey is to be undertaken in order to provide further clarification of the 'interim baseline' acoustic environment (anticipated to occur during Q4 2024). The results of this will be used to inform the proposed ONVMP and Proposed Development noise control strategy.
- 7.9.2 The clarification of the 'interim baseline' acoustic environment will allow for ongoing refinement of the ONVMP. The ONVMP will provide further certainty relating to the specific sound level emissions from the Port Talbot Steelworks site (including the Proposed Development and without the 'heavy end') and the mitigation strategy required for the Proposed Development.
- 7.9.3 It is anticipated that the Proposed Development will be subject to a planning condition requiring both the submission of the ONVMP and noise control requirements to NPTC, prior to the operation of the Proposed Development.
- 7.9.4 The ONVMP will include reference to the below operational and mitigation scenarios:
- EAF + interim baseline ambient sound level vs established baseline ambient sound level;
 - Scrap handling facility + interim baseline ambient sound level vs established baseline ambient sound level; and
 - Proposed Development + interim baseline ambient sound level vs established baseline ambient sound level.

7.10 Opportunities for enhancement

- 7.10.1 The clarification of the 'interim baseline' acoustic environment will result in a realistic understanding of the quantitative contribution of the 'heavy end'. The ongoing development of the noise management plan for the Proposed Development, in reference to the 'interim baseline' acoustic environment, is likely to provide opportunities for a further refined design and mitigation strategy for the Proposed Development.

7.11 Cumulative effects

A number of developments have been identified in the area surrounding the Proposed Development with the potential to act cumulatively in noise terms. A summary of such projects and the potential for cumulative noise impact is presented in **Table 7.19**. This accounts for the proximity of the project to the Proposed Development (within 5 km from the Proposed Development site based on professional judgement), summary of any noise studies undertaken, location of any shared (or common) receptors, magnitude of emissions and potential operational status/hours. 'Common receptors' are considered to

be those with the potential to experience noise from either development, typically in between two developments.

Table 7.19 Cumulative impact summary

Project	Type	Cumulative Impact	Comments
Land At Baglan Way Port Talbot	Industrial	No	- Following mitigation at the Site, noise levels from the Proposed Development are > 10 dB below the committed development at common receptors.
Land off J38 of the M4, Margam	Metal Processing Facility	No	- Following mitigation at the Site, noise levels from the Proposed Development at in the order of 5 dB below those predicted at Longlands House. - The cumulative impact would result in a cumulative specific noise level of 40 dB. - Cumulative impact is considered non-significant following review of the background sound level and prevailing ambient sound levels which are dominated by nearby industrial activities such as BOC and Western Bio Energy.
Crown Wharf Port Talbot Docks Port Talbot SA13 1RA (Project Dragon)	Sustainable Aviation Fuel (SAF) production facility	No	- Noise predictions from this project are >10 dB above the Proposed Development predictions at common receptors e.g. west end - The Proposed Development will not contribute to the overall specific sound level at common receptors based on the predicted specific source levels.
Y Bryn Wind Farm	Wind Farm	No	- Some common receptors identified - At low windspeeds (less than 5ms⁻¹) noise predictions from this project are approximately 10 dB below Proposed Development predictions at common receptors.
Mynydd Ty-Talwyn Energy Park	Wind Farm & Solar	No	- At low windspeeds (less than 5ms⁻¹) noise predictions from this project are approximately 10 dB below Proposed Development predictions at common receptors
Eirlys Solar Farm	Solar Farm	No	- No noise assessment available; - Located 4km to north of Proposed Development; and - No impact identified.

P Fields Site	Energy Infrastructure	No	- Significant cumulative effects are unlikely based on the activity proposed; and - It is expected that the contractor would apply BPM as defined under Section 72 of the CoPA to minimise noise and vibration impacts.
National Grid Margam Substation extension and cable connection construction	Energy Infrastructure	No	- No noise assessment available; - Significant cumulative effects are unlikely based on the activity proposed; and - It is expected that the contractor would apply BPM as defined under Section 72 of the CoPA to minimise noise and vibration impacts.

7.11.1 It can be seen from **Table 7.19** there are no known projects in the vicinity of the Proposed Development with the potential to give rise to significant cumulative noise effects. This is mainly down to the distance of projects from the Proposed Development, low project noise emissions, and the lack of common receptors.

7.11.2 Given the above, the potential for cumulative effects as a result of the Proposed Development and other known projects is considered as negligible, and therefore **not significant**.

7.12 Summary of effects

7.12.1 **Table 7.20** provides a summary of the findings of the assessment.

Table 7.20 Summary of effects

Environmental factor	Receptor	Impact	Potential effect	Additional mitigation proposed	Residual effect
Construction phase					
Noise	Residential Receptors	Small	Minor	No additional mitigation proposed	Minor (not significant)
	SSSI Receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
Vibration	Residential Receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
Road traffic noise	Residential Receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
Operational phase					

Noise	Residential receptors	Medium	Moderate	No additional mitigation proposed	Moderate (not significant*)
	SSSI receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
	Quiet areas	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
Road traffic noise	Residential receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
	SSSI receptors	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
	Quiet areas	Negligible	Negligible	No additional mitigation proposed	Negligible (not significant)
Note: *Based on professional judgement and the context of the Site (Para 7.8.20).					

7.13 References

Berglund, Birgitta, Lindvall, Thomas, Schwela, Dietrich H & World Health Organization. Occupational and Environmental Health Team. (1999). Guidelines for community noise. World Health Organization. Available at: <https://apps.who.int/iris/handle/10665/66217>

CL-01-15 'Updates to TAN 11 Noise, Noise Action Plan (2013-18) Commitments'. Llywodraeth Cymru Welsh Government (2015). Available at: <https://www.gov.wales/updates-technical-advice-note-tan-11-noise-cl-01-15>

Cutts, N., Phelps, A. and Burdon, D. 2009. 'Construction and waterfowl: Defining Sensitivity, Response, Impacts and Guidance'. Report to Humber INCA, Institute of Estuarine and Coastal Studies, University of Hull.

Department of Transport (1995). Calculation of Railway Noise. HMSO

Department of Transport and Welsh Office (1988). Calculation of Road Traffic Noise. HMSO

Drewitt, A., Hawthorne, E., Sauders, R. and Anthony, S. 2018. 'A Review of the Effects of Noise on Birds – Version 1'. Natural England

Environment (Air Quality and Soundscapes) (Wales) Act 2024. Llywodraeth Cymru Welsh Government (2023). Available at: <https://www.legislation.gov.uk/asc/2024/2>

Environmental Protection Act 1990. UK Government (1990). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>

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

Institute of Environmental Management and Assessment (2014) Guidelines for Environmental Noise Impact Assessment. Available online: <https://www.iema.net/download-document/236678>

International Organization for Standardization (1993). Acoustics – Attenuation of sound during propagation outdoors - Part 1: Calculation of the absorption of sound by the atmosphere (ISO 9613-1:1993);

International Organization for Standardization (2024). Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors (ISO 9613-2:2024:);

Noise and Soundscape Plan for Wales 2023-2028. Llywodraeth Cymru Welsh Government (2023). Available at <https://www.gov.wales/noise-and-soundscape-plan-for-wales-2023-2028>.

Planning Guidance (Wales) Technical Advice Note (Wales) 11: Noise (1997). Llywodraeth Cymru Welsh Government (1997). Available at: <https://www.gov.wales/technical-advice-note-tan-11-noise>

Planning Policy Wales (PPW) Edition 12 (2024). Llywodraeth Cymru Welsh Government (2024). Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf>

Technical Advice Note (TAN) 11: Air Quality, Noise and Soundscape (consultation draft). Llywodraeth Cymru Welsh Government (2023). Available at: <https://www.gov.wales/revised-planning-guidancerelation-air-quality-noise-and-soundscape>

The British Standards Institution (1990). Evaluation and measurement for vibration in buildings — Part 1: Guide for measurement of vibrations and evaluation of their effects on buildings (7385-1:1990)

The British Standards Institution (1993). Evaluation and measurement for vibration in buildings — Part 2: Guide to damage levels from groundborne vibration (7385-2:1993)

The British Standards Institution (2009). Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1: 2009 + A1:2014)

The British Standards Institution (2009). Code of practice for noise and vibration control on construction and open sites –Part 2: Vibration (BS 5228-2: 2009 + A1:2014)

The British Standards Institution (2013). Electroacoustics. Sound level meters – Specifications (BS EN 61672-1:2013)

The British Standards Institution (2014). Electroacoustics. Octave-band and fractional-octave-band filters – Specifications (BS EN 61260-3:2016 - TC)

The British Standards Institution (2014). Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142:2014+A1 2019)

The British Standards Institution (2018). Electroacoustics. Sound calibrators. (BS EN IEC 60942:2018)

Professional Practice Guidance on Planning & Noise – New Residential Development (2017). Association of Noise Consultants.

The Control of Pollution Act 1974. UK Government (1974). Available at: <https://www.legislation.gov.uk/ukpga/1974/40/contents>

The Highways Agency, Scottish Government, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2011). Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, HD 213/11 revision 1. Noise and Vibration (2011).

The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. UK Government (2017). Available at: <https://www.legislation.gov.uk/wsi/2017/567>

7.14 Glossary

Terms	Definitions
Ambient Noise Level $L_{Aeq,T}$: dB	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. The ambient sound comprises the residual sound and the specific sound when present.
dB	Decibel. Scale for expressing sound pressure level. It is defined as 20 times the logarithm of the ratio between the root mean square pressure of the sound field and a reference pressure i.e. 2×10^{-5} Pascal.
dB(A)	A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies. Example sound levels include: 140 dB(A) Threshold of pain 120 dB(A) Threshold of feeling 100 dB(A) Loud nightclub 80 dB(A) Traffic at busy roadside 60 dB(A) Normal speech level at 1m 40 dB(A) Quiet office 20 dB(A) Broadcasting studio 0 dB(A) Median hearing threshold (1000 Hz)
Background Sound Level $L_{A90,T}$: dB	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.
Proposed Development Baseline Terms	The ' established baseline ' The steelworks with 'heavy end' as operating in early 2024 and for the majority of the preceding 50+ years. The ' interim baseline ' The steelworks as they will operate at the time of planning determination with the closure of the 'heavy end'.
Frequency	The repetition rate of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted as kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20kHz.
$L_{Aeq,T}$	This is defined as the notional steady sound level over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
Rating Level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound.
Residual Sound:	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level $L_r = L_{Aeq,T}$: dB	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.

R_w	Weighted sound reduction index. A single-number index which characterises the frequency dependent airborne sound insulation performance of building elements determined under laboratory conditions.
Sound insulation	The reduction or attenuation of airborne sound by a solid element between source and receiver.
Sound pressure level L_p dB	Sound pressure level is given by the formula $L_p = 10 \log \left(\frac{p}{p_0} \right)^2$ where p is the root mean square sound pressure, in pascals (Pa); p_0 is the reference sound pressure (20 μPa)
Specific sound source	Sound source being assessed.
Specific sound level $L_s = L_{Aeq,Tr}$ dB	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.