APPENDIX 12-2

WIND TURBINE OPERATIONAL NOISE REPORT

tnei

A specialist energy consultancy

Appendix 12-2

Wind Farm Operational Noise Report

Seskin Wind Farm, Co. Carlow

EDF Renewables Ireland

IE102-008-R0
01 May 2024

CLIENT'S DISCRETION

EDF renewables

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Executive Summary

TNEI Services Ltd was commissioned by MKO on behalf of EDF Renewables Ireland Ltd (the Applicant) to undertake an operational noise assessment for the proposed Seskin Wind Farm (hereinafter referred to as 'the Proposed Project). The noise assessment was undertaken to assess the potential impact of operational noise from the Proposed Project on the nearest noise sensitive receptors, which are primarily scattered residential dwellings.

The Irish Government Department of Environment Heritage and Local Government document '*Wind Energy Development Guidelines, 2006*' (WEDG 2006, also referred as DoEHLG 2006) are the current guidelines for setting noise limits for wind energy developments. The information relating to noise in the WEDG 2006, is very limited and it is widely agreed that the limits proposed in the WEDG 2006 were drafted to broadly align with the UK guidance ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms'.* In 2013, the UK guidance was supplemented by a document produced by the Institute of Acoustics *'A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise'* (IOA GPG). Reference has been made to guidance contained in ETSU-R-97 and the IOA GPG to supplement the WEDG 2006.

The operational noise assessment has been undertaken in three stages:

- Stage 1 – establish the Total WEDG Noise Limits for nearby receptors based on measured background noise levels;
- Stage 2 – undertake a cumulative assessment based on likely predictions for all relevant turbines in the area (existing and proposed) and Total WEDG Noise Limits; and
- Stage 3 – establish the Proposed Projects Site Specific Noise Limits (at levels below the Total WEDG Noise Limits, where limit apportionment is required) and compare the noise predictions from the Proposed Development on its own against the proposed Site Specific Noise Limits.

Background noise monitoring was undertaken at seven noise sensitive receptors in proximity to the Proposed Wind Farm. The monitoring locations were selected to be representative of the noise sensitive receptors located closest to the Proposed Wind Farm.

Wind speed and direction data were measured using a LIDAR unit located within the Proposed Wind Farm site. The wind data measured at 100m and 110m height was used to calculate hub height wind speeds (at 105 m). These hub height wind speeds were then standardised to a height of 10m in accordance with current good practice.

There are 158 NSRs within the 2km search area around the Proposed Wind Farm, the NSRs are mainly residential properties with only a few derelict buildings and one church. Of the identified NSRs a total of 18 NSRs were chosen as Noise Assessment Locations (NALs). The NALs were chosen to represent the noise sensitive receptors located closest to the Proposed Wind Farm. The modelling results for the NALs has been presented within the main body of this report whilst an assessment for all NSRs has been included within an Annex to the report. For the assessment locations where no background noise measurements were undertaken, noise data collected at proxy locations deemed representative of the expected background noise environment was used to assess the wind turbine noise impact at those receptors. For clarity all NSRs are also labelled with the letter 'H' (Houses) within the rest of the Environmental Impact Assessment Report (EIAR).

Analysis of the measured noise and wind data were undertaken in accordance with the WEDG 2006, ETSU-R-97 and current good practice to determine the pre-existing background noise environment and to establish the daytime and night-time noise limits at each of the NALs.

Two sets of noise limits have been derived; the Total WEDG Noise limits apply to the cumulative noise level of all turbines operating in the area including the Proposed Project, whilst the Site-Specific Noise limits apply to operational noise from the Proposed Project only.

Based on the guidance in the WEDG 2006, at the majority of NALs, the daytime Total WEDG Noise Limit was set at 40 dB(A) where background noise levels were <30 dB, and 45 dB(A) or background plus 5 dB whichever is the greater where background noise levels were >30 dB. The night time Total WEDG Noise Limit has been set at 43 dB(A) or background plus 5 dB whichever is the greater. At NALs where noise limits have already been set due to the nearby permitted Bilboa Wind Farm and White Hill Wind Farm, the consented noise limits included within the planning conditions for the wind farms were used to set the Total WEDG Noise Limits.

The 'Site-Specific Noise Limits' were derived to take account of the proportion of the Total WEDG Noise Limit that has been allocated to, or could theoretically be used by, other wind farm developments (operational or consented) in proximity to the Proposed Wind Farm.

Predictions of wind turbine noise for the Proposed Wind Farm were made, based upon the sound power level data for a candidate wind turbine, the Vestas V150 which has a 150m rotor diameter, a maximum rated output capacity of 6.0 MW, serrated trailing edge blades and a hub height of 105m. In order to consider the full design envelope for the Proposed Wind Farm, additional modelling was undertaken using two other candidates; the Siemens-Gamesa SG 6.6-155 with a 155m rotor diameter, a maximum rated output capacity of 6.6 MW and a hub height of 102.5m and the Nordex N149 with a 149m rotor diameter with a maximum rated output capacity of 5.7 MW, serrated trailing edge blades and a hub height of 105m. The Vestas V150 turbine has been chosen as the candidate for the main assessment as it resulted in the highest predicted levels of the candidates being considered and therefore provides the precautionary scenario . For completeness, predictions for the other two candidates have been included within Annex 5. These candidate turbine models are considered representative of the type of turbine that could be installed at the Proposed Wind Farm site.

Modelling was undertaken using the ISO 9613: 1996 *'Acoustics – Attenuation of sound during propagation outdoors Part 2: General method of calculation'* noise prediction model which accords with current good practice and is considered to provide a realistic impact assessment. For the other schemes, predictions have been undertaken using sound power level data for the installed turbines or a suitable candidate. The models of turbines were identified through an online search.

A cumulative assessment was undertaken at the NALs where predictions from the Proposed Wind Farm were found to be within 10 dB of the noise predictions from all other wind farm developments. The assessment of likely cumulative noise levels undertaken at the NALs shows that the Proposed Wind Farm can operate concurrently with the other wind farm developments in the area, whilst meeting the Total WEDG Noise Limit, at all NALs. At NAL15 a marginal exceedance was initially predicted in full mode for a candidate turbine during the daytime period at 6 ms^{-1} (0.7 dB) but predictions in this assessment have been reduced assuming mitigation in the form of mode management, in order to ensure that the cumulative noise predictions (from the combined operation of all schemes detailed above) operate within the Total WEDG Noise Limit. NALs 4-6 were assessed separately due to existing noise limits and being in very close proximity to the permitted Bilboa Wind Farm, these are discussed further below.

Site-Specific Noise Limits have also been derived that take account (where required) of the other wind farm developments (at all NALs except NALs 4-6). Where wind turbine immission from the other wind turbines at a given receptor were found to be at least 10 dB below the Total WEDG Noise Limit, it is

considered that they will be using a negligible proportion of the limit, as such it was considered appropriate to allocate the entire noise limit to the Proposed Project . For the receptors where turbine predictions were found to be within 10 dB of the Total WEDG Noise Limit, apportionment of the Total WEDG Noise Limits was undertaken in accordance with current good practice.

Predicted noise levels indicate that wind turbine noise immission were below the Site Specific Noise Limits. At NAL15 initial predicted noise levels marginally exceeded Site Specific Noise Limit in full mode in daytime at 6 ms^{-1} (0.8 dB) but this was mitigated via the use of low noise modes. The use of Site Specific Noise Limits for the operational phase would ensure that the Proposed Project could operate concurrently with other operational wind farm developments in the area and would also ensure that the Proposed Project's individual contribution could be measured and enforced if required.

At NAL4, NAL5 and NAL6 (located between the permitted Bilboa Wind Farm and the Proposed Wind Farm) noise limits for the permitted Bilboa Wind Farm have already been established. On that basis, a Cumulative Noise Condition has been proposed for these receptors whereby the Proposed Project would be conditioned to ensure that the cumulative wind turbine noise from the combined operation of the permitted Bilboa Wind Farm and the Proposed Project would be below the Cumulative Noise Limit (equal to the Total WEDG Noise Limit). In the event that noise from the permitted Bilboa Wind Farm increased to use a greater amount of the Cumulative Noise Limit than predicted, then the Proposed Project would then need to operate to a proposed set of more restrictive Backstop Noise Limits, which in this case would be more restrictive and potentially require a combination of low noise mode and switch-off in specific wind conditions (if backstop is triggered).

Should planning permission be granted for the Proposed Project it would be appropriate to include a set of noise related planning conditions, which detail the noise limits applicable to the Proposed Wind Farm. A suggested planning condition has been included in Annex 9 of this report.

There are a range of wind turbine models that would be appropriate for the Proposed Project. The candidate wind turbines used for the noise assessment were chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Project receive consent, the final choice of wind turbine would be subject to a competitive tendering process. The final choice of wind turbine will, however, have to meet the noise limits determined and contained within any condition imposed.

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ANNEXES

1 Introduction

1.1 Brief

1.1.1 TNEI was commissioned by MKO on behalf of EDF Renewables Ireland Ltd to undertake an operational noise assessment for the proposed Seskin Wind Farm (hereinafter referred to as 'the Proposed Project'). The following steps summarise the noise assessment process for wind turbine noise:

- Measure and analyse existing background noise levels and present the measured noise data with reference to existing government guidance and the recommendations of the Department of Environment Heritage and Local Government (DoEHLG), which are contained in the '*Wind Energy Development Guidelines, 2006'* [(1)] (WEDG 2006, also referred as DoEHLG 2006), in conjunction with the guidance produced by the United Kingdom's Department of Trade and Industry Noise Working Group on Noise from Wind Turbines. Reference has also been made to guidance contained within ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms'* [(2)] and *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* [(3)] (IOA GPG) to supplement the WEDG 2006;
- Determine the Total WEDG 2006 Noise Limits applicable to all wind farms in the area;
- Assess and undertake a cumulative noise assessment, where required, to take account of other proposed, consented or operational schemes near to the Proposed Project;
- Derive Site Specific Noise Limits for the Proposed Project and, where applicable a Cumulative Noise limit. These derived noise limits will be suitable for inclusion in the noise related planning condition should Carlow County Council be minded to grant planning permission;
- Undertake predictions of the operational wind turbine noise immission that will be incident at neighbouring noise sensitive receptors from the Proposed Wind Farm, considering noise data for candidate wind turbine models;
- Compare predictions of the operational wind turbine noise immission from the Proposed Wind Farm on its own against the Site Specific Noise Limits; and
- Assess the impact of noise from the Proposed Project with reference to existing government guidance and the recommendations of the Department of Environment Heritage and Local Government, which are contained in the WEDG 2006.

1.2 Background

1.2.1 The Proposed Project is located within an area east of The Butts in County Carlow. The approximate Irish Transverse Mercator (ITM) reference for the centre is 663789, 669366 and the proposed layout is comprised of 7 wind turbines as shown on Figure A1.1 in Annex 1.

1.2.2 In the absence of a confirmed turbine model and in order to consider the full design envelope for the site, this noise assessment has modelled three candidate turbines, the Vestas V150 6.0 MW with serrated trailing edge blades and a hub height of 105m, the Nordex N149

5.7 MW with serrated trailing edge blades and a hub height of 105m and the Siemens Gamesa SG 6.0-155, 6.6 MW with serrated trailing edge blades and a hub height of 102.5m.

1.2.3 These candidate turbine models are considered representative of the type of turbine that could be installed at the Proposed Wind Farm. The Vestas V150 turbine has been chosen as the candidate for the main assessment as it resulted in one of the highest predicted levels of the candidates being considered at the key wind speed range and therefore provides a precautionary scenario for modelling.

1.2.4 The noise assessment has also considered nearby wind farm schemes that are operational, permitted and proposed (planning application submitted). The nearby schemes found to be relevant and therefore considered in the assessment are summarised in Table 1.1.

Table 1.1 Cumulative Wind Farm Developments

Wind Farm/ Wind Turbine	Number of Turbines	Status	Make and Model of Turbine Considered in Modelling
Gortahile Wind Farm	8	Operational	Nordex N90 2500 HS 2.5MW, 80 m hub. Standard blades.
Bilboa Wind Farm	5	Permitted	Vestas V117 4.2 MW SO2, 78 m hub, serrated blades
White Hill Wind Farm	7	Permitted	Vestas V162 6.2MW, 100 m hub, serrated blades

1.2.5 Figure A1.1a in Annex 1 shows the location of the nearby wind farms in proximity to the Proposed Project.

1.2.6 For the purposes of assessing the above wind farms (detailed in Table 1.1) operating in conjunction with the Proposed Project the following terms have been referred to throughout the assessment:

- **'Total WEDG Noise Limits'**; defined as being the limit that should not be exceeded by the cumulative operation of all wind farm developments, including the Proposed Project; and
- **'Site Specific Noise Limits'**; defined as being the limit that is specific to the Proposed Project only, and derived through the apportionment (where required), of the 'Total WEDG Noise Limits' in accordance with current good practice (IOA GPG).

1.2.7 Note that the term 'noise emission' relates to the sound power level emitted from each wind turbine, whereas the term 'noise immission' relates to the sound pressure level received at any receptor location, due to the operation of the wind turbines. All references to dB refer to A weighted decibel levels, unless otherwise stated. Wind speeds are standardised to 10 m height and grid coordinates are in ITM unless otherwise stated. A full glossary of terms is provided in Section 8.

2 Noise Planning Policy and Guidance

2.1 Overview of Noise Planning Policy and Guidance

2.1.1 In assessing the potential noise impacts of the Proposed Project, the following guidance and policy documents have been considered:

- National Planning Policy;
- Local Policy;
- Department of Environment Heritage and Local Government (DoEHLG) '*Wind Energy Development Guidelines,'* 2006 (WEDG 2006,also referred as DoEHLG 2006) ;
- ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms'*; and
- Institute of Acoustics *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (IOA GPG) May 2013.

2.2 National Planning Policy

2.2.1 The National Planning Framework 'Project Ireland 2040' (4) was adopted on 29 May 2018. The document sets out a number of National Policy Objectives, of which number 65 relates to noise.

2.2.2 National Policy Objective 65 states:

'*Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans.'*

2.2.3 The document does not contain specifics with regards to the assessment of noise. Rather, it states (page 5):

'The National Planning Framework, is a planning framework to guide development and investment over the coming years. It does not provide every detail for every part of the country; rather it empowers each region to lead in the planning and development of their communities, containing a set of national objectives and key principles from which more detailed and refined plans will follow.'

2.2.4 Accordingly, it is necessary to look at regional and local guidance and policy for further direction.

2.3 Regional Spatial and Economic Strategies (RSES) 2026 and 2031

2.3.1 The Southern RSES (applicable to Co. Carlow) provides a high-level development framework for the Southern Regional Assembly of Ireland, supporting the implementation of the National Planning Framework. In relation to renewable energy, it includes a Regional Policy Objective (RPO) 221 which states:

'RPO 221 Renewable Energy Generation and Transmission Network

a. Local Authority City and County Development Plans shall support the sustainable development of renewable energy generation and demand centres such as data centres which can be serviced with a renewable energy source (subject to appropriate environmental assessment and the planning process) to spatially suitable locations to ensure efficient use of the existing transmission network;

b. The RSES supports strengthened and sustainable local/community renewable energy networks, micro renewable generation, climate smart countryside projects and connections from such initiatives to the grid. The potential for sustainable local/community energy projects and micro generation to both mitigate climate change and to reduce fuel poverty is also supported;

c. The RSES supports the Southern Region as a Carbon Neutral Energy Region.'

2.3.2 The RSES does not include any information specific to wind turbine noise.

2.4 Local Policy

2.4.1 The Carlow County Development Plan (2022-2028) was adopted 4th July 2022. Chapter 7 'Climate Action and Energy' of the Plan sets out the Council's approach to climate action and energy in the County and states that the local authority aims to:

'combat climate change and its impacts in the County by promoting and supporting policies and objectives which contribute towards a transition to a low-carbon and climate resilient future, and which focus on reducing greenhouse gas emissions and energy demands through appropriate and effective climate mitigation and adaptation measures.'

2.4.2 Chapter 7.1 'Climate Change Mitigation in Carlow' (Section 7.10.1 – RE. P1) states that the Council:

'*encourage and facilitate the production of energy from renewable sources, such as from wind, solar, bioenergy, hydroelectricity, and geothermal, subject to compliance with proper planning and environmental considerations.'*

2.4.3 The Council has stated in Chapter 7 (7.10.3.1 – Wind Energy):

'site suitability is an important factor in determining the suitability of wind farms, having regard to possible adverse impacts associated with, for example, residential amenities', and, 'challenges to the development of onshore wind include noise limits.'

2.5 Wind Energy Development Guidelines, 2006

2.5.1 The current guidelines for setting noise limits are detailed in the Department of Environment Heritage and Local Government (DoEHLG), 'Wind Energy Development Guidelines, 2006' (WEDG 2006).

2.5.2 The information relating to noise in the WEDG 2006 is very limited. For example, there is no guidance on where or how to measure background noise levels and how to correlate these with wind speed on the Proposed Wind Farm. There is also no mention of how to consider cumulative effects. The WEDG 2006 guidelines do, however, include guidance on how to derive limits for daytime and night-time periods.

2.5.3 The daytime limits take account of existing background noise levels and include a fixed limit of 45 dB or background + 5 dB, whichever is the greater, except in low background noise environments where a fixed minimum limit in the range 35-40 dB should be considered. TNEIs interpretation of these limits is that turbine noise should not exceed:

- 45 dB $L_{A90,\ 10\ min}$ or background noise + 5 dB, whichever is the greater, for daytime hours (applicable where background noise levels are greater than 30 dB L_{A90}), or,
- 35 to 40 dB $L_{A90,\ 10\ min}$ where background noise is less than 30 dB L_{A90};

2.5.4 The WEDG states that a 'fixed limit of 43dB(A) will protect sleep inside properties during the night', however, whilst it is not explicit within the WEDG guidance, the addition of a night-time 'background noise +5 dB' parameter is commonly applied in wind turbine noise assessments. This is detailed in numerous examples of planning conditions issued by local authorities and An Bord Pleanála. On that basis, the night-time noise limits used in this assessment have been based on 43 dB or background noise + 5 dB, whichever is the greater.

2.5.5 It is widely agreed that the limits proposed in the WEDGs were drafted to broadly align with the UK guidance ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms'. In 2013, this UK guidance was supplemented by a document produced by the Institute of Acoustics' (IOA) 'A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise' (IOA GPG). Given the lack of detail in parts of the WEDG, information contained in ETSU-R-97 and the IOA GPG is often used to supplement the WEDGs and to inform wind farm noise assessments in Ireland.

Draft WEDG 2019

2.5.6 It is noted that the WEDG are currently under review and a set of 'draft WEDG 2019' were issued for consultation in December 2019. Significant concerns were raised during the public consultation process on the Draft WEDG 2019 Guidelines, including by a group of wind farm acousticians (5), regarding the noise section of the draft guidelines and how the authors had misinterpreted existing guidance and incorporated a number of errors within the technical approaches proposed. In light of these concerns, and the fact that significant changes would need to be made before they could be adopted, an assessment using the Draft WEDG 2019 Guidelines is not, in our opinion, technically feasible or appropriate and has not therefore been undertaken.

2.5.7 Timelines for the conclusion of the WEDG 2019 review are still unclear however the Government of Irelands Climate Action Plan 2024 (6) includes a 2024 Action (EL/24/5) to 'Publish the Revised Wind Energy Development Guidelines for onshore wind.' No timescales for completion are provided.

2.5.8 At time of writing therefore, the DoEHLG 2006 Guidelines remain the relevant statutory guidelines and, as a result, they have been used for this assessment, appropriately supplemented by the guidance in ETSU-R-97 and the IOA GPG, which are considered by TNEI to represent current best practice. This report has been prepared by suitably qualified Acousticians, affiliated with the IOA. Based on our experience of undertaking wind farms noise assessment projects with a combined rated capacity of >5 GW, TNEI consider the use of these documents to represent best available evidence.

2.6 ETSU-R-97 The Assessment and Rating of Noise from Wind Farms

2.6.1 As wind farms started to be developed in the UK in the early 1990's, it became apparent that existing noise standards did not fully address the issues associated with the unique characteristics of wind farm developments and there was a need for an agreed methodology for defining acceptable noise limits for wind farm developments. The methodology was developed for the former Department of Trade and Industry (DTI) by the Working Group on Noise from Wind Turbines (WGNWT).

2.6.2 The WGNWT comprised a number of interested parties including, amongst others, Environmental Health Officers, wind farm operators, independent acoustic consultants and legal experts who:

'…between them have a breadth and depth of experience in assessing and controlling the environmental impact of noise from wind farms.'

2.6.3 In this way it represented the views of all the stakeholders that are involved in the assessment of noise impacts of wind farm developments. The recommendations of the WGNWT are presented in the DTI Report – ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms (1996).'

2.6.4 The basic aim of the WGNWT in arriving at the recommendations was the intention to provide:

'Indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding to the costs and administrative burdens on wind farm developers or local authorities.'

2.6.5 ETSU-R-97 makes it clear from the outset that any noise restrictions placed on a wind farm must balance the environmental impact of the wind farm against the national and global benefits that would arise through the development of renewable energy sources:

'The planning system must therefore seek to control the environmental impacts from a wind farm whilst at the same time recognising the national and global benefits that would arise through the development of renewable energy sources and not be so severe that wind farm development is unduly stifled.'

2.6.6 ETSU-R-97 states that noise limits should reflect the variation in both turbine source noise and background noise with wind speed. Absolute lower limits, different for daytime and night-time, are applied where low levels of background noise are measured. The wind speed range that should be considered ranges between the cut-in wind speed for the turbines (usually about 2 to 3 ms-1) and up to 12 ms-1, where all wind speeds are referenced to a 10 metre measurement height.

2.6.7 Separate noise limits apply for daytime and for night-time. Daytime limits are chosen to protect a property's external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

2.6.8 The daytime noise limit is derived from background noise data measured during so-called 'quiet periods of the day', which comprise weekday evenings (18:00 to 23:00), Saturday afternoons and evenings (13:00 to 23:00) and all day and evening on Sundays (07:00 to

23:00). Multiple samples of 10 minute background noise levels using the LA90,10min measurement index are logged continuously over a range of wind speed conditions. These measured noise levels are then plotted against concurrent wind speed data and a 'best fit' curve is fitted to the data to establish the background noise level as a function of wind speed. The ETSU–R-97 daytime noise limit, sometimes referred to as a 'criterion curve', is then set at a level 5 dB(A) above the best fit curve over the desired wind speed range; subject to an appropriate daytime fixed minimum limit.

2.6.9 The night-time noise limit is derived from background noise data measured during the night-time periods (23:00 to 07:00), with no differentiation being made between weekdays and weekends. The 10 minute LA90 noise levels measured over the night-time periods are plotted against concurrent wind speed data and a 'best fit' correlation is established. The night-time noise limit is also based on a level 5 dB(A) above the best fit curve over the 0 – 12 ms-1 wind speed range, with a fixed minimum limit of 43 dB LA90.

2.6.10 The exception to the setting of both the daytime and night-time fixed minimum limits occurs where a property occupier has a financial involvement in the wind farm development. Paragraph 24 of ETSU-R-97 states:

'The Noise Working Group recommends that both day and night-time lower fixed limits can be increased to 45 dB(A) and that consideration should be given to increasing the permissible margin above background where the occupier of the property has some financial involvement in the wind farm.'

2.6.11 ETSU-R-97 provides a robust basis for determining the noise limits for wind turbine(s) and since its introduction has become the accepted standard for such developments across the UK.

2.6.12 As detailed above, for this assessment the ETSU-R-97 guidance has been used to supplement the guidance provided within the WEDG. The noise limits have been derived in accordance with WEDG 2006.

2.7 Current Good Practice

A Good Practice Guide on the Application of ETSU-R-97

2.7.1 In May 2013, the Institute of Acoustics issued 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOA GPG). The document provides guidance on background noise data collection, data analysis and limit derivation, noise predictions, cumulative issues, reporting requirements and other matters such as noise related planning conditions.

2.7.2 The Authors of the IOA GPG sets out the scope of the document in Section 1.2:

"This guide presents current good practice in the application of the ETSU-R-97 assessment methodology for all wind turbine developments above 50 kW, reflecting the original principles within ETSU-R-97, and the results of research carried out and experience gained since ETSU-R-97 was published. The noise limits in ETSU-R-97 have not been examined as these are a matter for Government."

2.7.3 The guidance document was endorsed by all Governments within the UK.

2.7.4 As with ETSU-R-97, for this assessment the recommendations included in the IOA GPG have been used to supplement the guidance provided within the WEDG.

2.7.5 The IOA GPG refers to six Supplementary Guidance Notes and where applicable these have also been considered in this report.

2.7.6 To summarise, the assessment of operational noise from the Proposed Project has been undertaken in accordance with WEDG 2006, with reference to the guidance presented in ETSU-R-97 and the IOA GPG where appropriate.

2.8 WSP BEIS Report

2.8.1 In February 2023, WSP published 'A review of noise guidance for onshore wind turbines' ('WSP BEIS report') (7), The report, which was subsequently re-issued as version 4 in May 2023, was commissioned by (the former) UK Government Department for Business, Energy & Industrial Strategy (BEIS). The primary aim of the review was to make a recommendation on whether, in view of government policies on noise and Net Zero, and available evidence, the existing UK guidance requires updating.

2.8.2 The WSP BEIS report concluded that:

'the guidance would benefit from further review and updating of the aspects identified. This could be supported by currently available evidence, which is summarised in this report. However, the study has also highlighted gaps in the state of knowledge, which should be addressed by further research, to support any updates to the guidance.'

2.8.3 A series of recommendations are made regarding further research whilst some additional suggestions are included regarding the development of new or updated guidance. The following recommendation is included on page 26 of the WSP BEIS report:

'*the separation of the 'policy position' (addressing the balance between controlling noise impact and enabling renewable energy development), 'technical guidance' (application of the assessment approach), and 'technical justification' (the supporting evidence) into discrete, linked documents'*

2.8.4 The WSP BEIS report notes at the outset that 'Any views expressed within it do not necessarily represent the views of the UK government or the governments of any of the devolved administrations'. The report does state on page 25 that:

'Consideration should be given to including a clear position statement in guidance confirming the intended policy balance between protection from noise impact, and enabling of renewable energy development (to achieve Net Zero), linked with the wider policies that underpin the government approach to noise management.'

2.8.5 At time of writing there has been no official response to the report from BEIS or any of the new UK Government departments which are being created to replace BEIS. In the event that a decision is made to follow up on the recommendations within the WSP BEIS report, it is unknown how new guidelines would account for the UK Governments' Net Zero targets nor is there any indication of timescales within which updated guidance would be produced.

2.8.6 The guidance contained within ETSU-R-97 and the IOA GPG has therefore been used to supplement the WEDG 2006.

3 Potential Impacts

3.1 Operational Noise Sources

3.1.1 Wind turbines may emit two types of noise; Firstly, aerodynamic noise is a more natural sounding 'broadband' noise, albeit with a characteristic modulation, or 'swish', which is produced by the movement of the rotating blades through the air. Secondly, mechanical noise may emanate from components within the nacelle of a wind turbine. Potential sources of mechanical noise include gearboxes or generators.

3.1.2 Aerodynamic noise is usually perceived when the wind speeds are fairly low, although at very low wind speeds the blades either do not rotate, or rotate very slowly, and so negligible aerodynamic noise is generated. In higher winds, aerodynamic noise may be masked by the normal sound of wind blowing through the trees and around buildings. The level of this natural 'masking' noise relative to the level of wind turbine noise is one of the several factors that determine the subjective audibility of the wind turbines (8).

3.1.3 The potential impact assessed in this report consider the overall noise levels of wind farms inclusive of expected Normal Amplitude Modulation (NAM) and tonality, as described in ETSU-R-97. Other topics relating to operational wind farm noise characteristics, such as Low Frequency Noise (LFN) and Other Amplitude Modulation (OAM) are discussed below.

3.2 Infrasound, Low Frequency Noise and Vibration

3.2.1 The term infrasound can be defined sound in the frequency range below 20 Hz, while low frequency noise (LFN) is typically in the frequency range 20 – 200 Hz (7). An average young healthy adult has an audible range from 20 Hz to 20,000 Hz, although the sensitivity of the ear varies with frequency and is most sensitive to sounds with frequencies between 500 Hz and 4,000 Hz. Wind turbines do produce low frequency sounds (8), but our threshold of hearing at such low frequencies is relatively high and they therefore go unnoticed. Infrasound from wind turbines is typically at levels below that of the noise generated by wind around buildings and other obstacles.

3.2.2 In 2004, the former DTI commissioned The Hayes McKenzie Partnership to report on claims that infrasound or LFN emitted by wind turbine generators (WTGs) were causing health effects. Of the 126 wind farms operating in the UK, five had reported LFN problems, therefore, such complaints are an exception, rather than a general problem that exists for all wind farms. Hayes McKenzie investigated the effects of infrasound and LFN at three wind farms for which complaints had been received and the results were reported in May 2006 (9). The report concluded that:

- 'infrasound associated with modern wind turbines is not a source which will result in noise levels which may be injurious to the health of a wind farm neighbour;
- low frequency noise was measurable on a few occasions but below the existing permitted Night-time Noise Criterion. Wind turbine noise may result in internal noise levels within a dwelling that is just above the threshold of audibility, however at all sites it was always lower than that of local road traffic noise;

- that the common cause of complaint was not associated with LFN, but the occasional audible modulation of aerodynamic noise especially at night. Data collected showed that the internal noise levels were insufficient to wake up residents at these three sites. However once awoken, this noise can result in difficulties in returning to sleep.'

3.2.3 The Applied and Environmental Geophysics Research Group at Keele University was commissioned by the Ministry of Defence (MOD), the DTI and the British Wind Energy Association (BWEA) to undertake microseismic and infrasound monitoring of LFN and vibrations from wind farms for the purposes of siting wind farms in the vicinity of Eskdalemuir in Scotland. Whilst the testing showed that vibration can be detected several kilometres away from wind turbines, the levels of vibration from wind turbines were so small that only the most sophisticated instrumentation can reveal their presence and they are almost impossible to detect. In response to allegations of adverse health effects and articles in the popular press, the report's authors expressed concern over the way in which their work had been misinterpreted and issued a rebuttal statement (10) in August 2005:

'Vibrations at this level and in this frequency range will be available from all kinds of sources such as traffic and background noise – they are not confined to wind turbines. To put the level of vibration into context, they are ground vibrations with amplitudes of about one millionth of a millimetre. There is no possibility of humans sensing the vibration and absolutely no risk to human health.'

3.2.4 In response to concerns that wind turbines emit infrasound and cause associated health problems, Dr Geoff Leventhall, Consultant in Noise Vibration and Acoustics and author of the Defra Report on Low Frequency Noise and its Effects, said in the article in the Scotsman ('Wind farm noise rules 'dated'- James Reynolds, 5 August 2005'):

'I can state quite categorically that there is no significant infrasound from current designs of wind turbines.'

3.2.5 An article (11) published in the IOA Bulletin (March/April 2009) concluded that there is no robust evidence that either low frequency noise (including 'infrasound') or ground-borne vibration from wind farms, has an adverse effect on wind farm neighbours.

3.2.6 Work (12) by Dr Leventhall looked at infrasound levels within the ear compared to external sources and concluded:

'The conclusion is that the continuous inner ear infrasound levels due to internal sources, which are in the same frequency range as wind turbine rotational frequencies, are higher than the levels produced in the inner ear by wind turbines, making it unlikely that the wind turbine noise will affect the vestibular systems, contrary to suggestions made following the measurements at Shirley. The masking effect is similar to that in the abdomen (Leventhall 2009). The body, and vestibular systems, appear to be built to avoid disturbance from the high levels of infrasound which are produced internally from the heartbeat and other processes. In fact, the hearing mechanisms and the balance mechanisms, although in close proximity, have developed to minimise interaction (Carey and Amin 2006).'

3.2.7 During a planning Appeal (PPA-310-2028, Clydeport Hunterston Terminal Facility, approximately 2.5 km south-west of Fairlie, 9 Jan 2018), the health impacts related to LFN associated with wind turbines were considered at length by the appointed Reporter (Mr M Croft). The Reporter considered evidence from Health Protection Scotland and the National Health Service. In addition, he also considered LFN surveys undertaken by the Appellant and

the Local Authority, both of which demonstrated compliance with planning conditions and did not identify any problems attributable to the turbine operations; some periods with highest levels of low frequency noise were in fact recorded when the turbines were not operating.

3.2.8 The Reporter concluded that:

- The literature reviews by bodies with very significant responsibilities for the health of local people found insufficient evidence to confirm a causal relationship between wind turbine noise and the type of health complaints cited by some local residents;
- The NHS's assessment is that concerns about health impact are not supported by good quality research; and
- Although given the opportunity, the Community Council failed to provide evidence that can properly be set against the general tenor of the scientific evidence.

3.2.9 The WSP BEIS Report notes on page 113 that:

'Several studies have investigated the claimed links between adverse health symptoms and infrasound emissions from wind turbines. Although some experimental studies have linked infrasonic signals with activation of physiological sensory processing315,316 , these have tended to be based on signals that are not representative of wind turbine infrasound. There remains no compelling evidence of adverse health effects associated with wind turbine infrasound exposure at sound frequencies and levels expected to be present at noise-sensitive receptor locations in the vicinity of wind farms.'

3.2.10 The WSP BEIS Report goes on to note on page 114 that:

'Overall, the findings from the existing evidence base indicate that infrasound from wind turbines at typical exposure levels has no direct adverse effects on physical or mental health, and reported symptoms of ill-health are more likely to be psychogenic in origin.'

3.2.11 It is noted that research into infrasound is ongoing but the WSP BEIS report concluded that:

'It is expected that further evidence from ongoing studies into wind turbine infrasound effects will emerge soon, in particular from the NHMRC studies in Australia. However, based on the existing scientific evidence, it does appear probable that the above findings will not be contradicted by newer evidence.'

3.2.12 Since the publication of the WSP BEIS report, the study that was granted funding by NHMRC (the National Health and Medical Research Council of Australia) was published in the Environmental Health Perspectives (EHP) journal which is published by the United States National Institute of Environmental Health. The study (14) aimed to test the effect of exposure to 72 hours of infrasound (designed to simulate a wind turbine infrasound signature) exposure on human physiology, particularly sleep. The study concluded that:

'Our findings did not support the idea that infrasound causes WTS[1]. High level, but inaudible, infrasound did not appear to perturb any physiological or psychological measure tested in these study participants.'

[1] WTS stands for Wind Turbine Syndrome which is a term for adverse human health effected related to the proximity of wind turbines.

3.2.13 It is therefore not considered necessary to carry out specific assessments of LFN and it has not been considered further in the noise assessment.

3.3 Amplitude Modulation of Aerodynamic Noise (AM)

3.3.1 In the context of wind turbine noise, amplitude modulation describes a variation in noise level over time; for example, observers may describe a 'whoosh whoosh' sound, which can be heard close to a wind turbine as the blades sweep past. Amplitude Modulation of aerodynamic noise is an inherent characteristic of wind turbine noise and was noted in ETSU-R-97, on page 68:

'The modulation or rhythmic swish emitted by wind turbines has been considered by some to have a characteristic that is irregular enough to attract attention. The level and depth of modulation of the blade noise is, to a degree, turbine-dependent and is dependent upon the position of the observer. Some wind turbines emit a greater level of modulation of the blade noise than others. Therefore, although some wind turbines might be considered to have a character that may attract one's attention, others have noise characteristics which are considerably less intrusive and unlikely to attract one's attention and be subject to any penalty.

This modulation of blade noise may result in a variation of the overall A-weighted noise level by as much as 3dBA (peak to trough) when measured close to a wind turbine. As distance from the wind turbine [or] wind farm increases, this depth of modulation would be expected to decrease as atmospheric absorption attenuates the high frequency energy radiated by the blade.'

3.3.2 The Acoustics community has sought to make a distinction between the AM discussed within ETSU-R-97, which is expected at most wind farms and as such may be considered as 'Normal Amplitude Modulation' (NAM), compared to the unusual AM that has sometimes been heard at some wind farms, hereinafter referred to as 'Other Amplitude Modulation' (OAM). The term OAM is used to describe an unusual feature of aerodynamic noise from wind turbines, where a greater than normal degree of regular fluctuation in sound level occurs at the blade passing frequency, typically once per second. In some literature it may also be referred to as 'Excess Amplitude Modulation' (EAM). It should be noted that the noise assessment and rating procedure detailed in ETSU-R-97 fully takes into account the presence of the intrinsic level of NAM when setting acceptable noise limits for wind farms.

3.3.3 On 16 December 2013, RenewableUK (RUK) released six technical papers (13) on OAM, which reflected the outcomes of research commissioned over the previous three years, together with a template planning condition. Whilst this research undoubtedly improved understanding of Other Amplitude Modulation (OAM) and its effects, it should be noted that at the time of writing it has not been endorsed by any relevant body such as the Institute of Acoustics (IOA).

3.3.4 On 22 January 2014, the IOA released a statement regarding the RUK research and the proposed planning condition to deal with the issue of amplitude modulation from a wind turbine and stated:

'This research is a significant step forward in understanding what causes amplitude modulation from a wind turbine, and how people react to it. The proposed planning condition, though, needs a period of testing and validation before it can be considered to be good practice. The IOA understands that RenewableUK will shortly be making the analysis tool publicly available on their website so that all

interested parties can test the proposed condition, and the IOA will review the results later in the year. Until that time, the IOA cautions the use of the proposed planning condition.'

3.3.5 In April 2015, an Amplitude Modulation Working Group (AMWG) formed by the IOA issued a discussion document entitled 'Methods for Rating Amplitude Modulation in Wind Turbine Noise'. The document presented three methods that can be used to quantify the level of AM at a given measurement location. After extensive consultation a preferred method of measuring OAM was recommended by the IOA in a report called 'Final Report - A Method for Rating Amplitude Modulation in Wind Turbine Noise' dated 9th August 2016, which details a preferred method for practitioners to measure and rate AM near operational wind farms. The method calculates an amplitude modulation depth value in decibel (dB) for any given 10 minute period, and the executive summary states:

'The AMWG has not addressed the question of what level of AM in wind turbine noise (when measured by a specific metric) is likely to result in adverse community response or how that response should be evaluated. The psycho-acoustic aspects of AM are not within the scope of this study, but the proposed metric is intended to assist with such further research.'

3.3.6 On 3 August 2015, the UK Department for Energy and Climate Change (DECC), now the Department for Business, Energy and Industrial Strategy (BEIS), commissioned independent consultants WSP Parsons Brinkerhoff to carry out a literature review on OAM (which they refer to simply as AM). The stated aims were as follows:

- 'To review the available evidence on Amplitude Modulation (AM) in relation to wind turbines, including but not limited to the research commissioned and published by RenewableUK in December 2013;
- To work closely with the Institute of Acoustics' AM working group, who are expected to recommend a preferred metric and methodology for quantifying and assessing the level of AM in a sample of wind turbine noise data;
- To review the robustness of relevant dose response relationships, including the one developed by the University of Salford as part of the RenewableUK study, on which the correction (or penalty) for amplitude modulation proposed as part of its template planning condition is based;
- To consider how, in a policy context, the level(s) of AM in a sample of noise data should be interpreted, in particular determining at what point it causes a significant adverse impact;
- To recommend how excessive AM might be controlled through the use of an appropriate planning condition; and
- To consider the engineering/cost trade-offs of possible mitigation measures.'

3.3.7 Their report (17), 'Wind Turbine AM Review – Phase 2 Report' was published in August 2016 at the same time as the release of the IOA AMWG Final Report, and concluded that there is sufficient robust evidence that excessive AM leads to increased annoyance from wind turbine noise and recommended that excessive AM is controlled through a suitably worded planning condition, which will control it during periods of complaint. Those periods should be identified by measurement using the metric proposed by the IOA, and enforcement action would rely upon professional judgement by Local Authority Environmental Health Officers, based on the duration and frequency of occurrence. It is not clear within the body

of the report what evidence the authors relied upon to arrive at their conclusions, although the Executive Summary states (page 4);

'It is noted that none of the Category 1 or 2 papers have been designed to answer the main aim of the current review in its entirety. The Category 1 studies have limited representativeness due to sample constraints and the artificiality of laboratory environments, whereas the Category 2 studies generally do not directly address the issue of AM WTN exposure-response. A meta – analysis of the identified studies was not possible due to the incompatibility of the various methodologies employed. Notwithstanding the limitations in the evidence, it was agreed with DECC that the factors to be included in a planning condition should be recommended based on the available evidence and supplemented with professional experience'.

3.3.8 The report states that any planning condition must accord with existing planning guidance, and should be subject to legal advice on a case by case basis. Existing guidance would include compliance with the six tests of a planning condition, which in Ireland are embodied in Development Management Guidelines 2007 Chapter 7. The report's authors did not dictate a particular condition to be used but did suggest that any condition should include the following elements (p5):

- 'The AM condition should cover periods of complaints (due to unacceptable AM);
- The IOA-recommended metric should be used to quantify AM (being the most robust available objective metric);
- Analysis should be made using individual 10-minute periods, applying the appropriate decibel 'penalty' to each period, with subsequent analysis;
- The AM decibel penalty should be additional to any decibel penalty for tonality; and
- An additional decibel penalty is proposed during the night-time period to account for the current difference between the night and day limits on many sites to ensure the control method works during the most sensitive period of the day.'

3.3.9 In 2017 a potential noise related planning condition which included consideration of OAM was published in the Acoustics Bulletin magazine (by the IOA) written by a number of acousticians working in the field of wind farm noise in the UK. The approach outlined in the document was not subject to any wider consultation nor has it been endorsed by the IOA, the UK Government or Scottish Government. The lack of robust information regarding the second element is highlighted in the article itself which notes:

'Whilst local authorities and developers have waited for a planning condition that could be applied to newly consented wind farms, or to those already consented but with a suspensive condition, the report Wind Turbine AM Review (WTAMR) by WSP/Parsons Brinckerhoff for DECC arguably did not provide that. In addition there have been a number of comments on WTAMR that we consider should be addressed. The introductory sections and the conditions text represent the broad consensus view of those whose names appear below, following a period of discussion, compromise and agreement. This approach is proposed based on the current state of understanding, but may be subject to modification in light of new research and further robust information.'

'As various people before us have discovered, the derivation of a penalty is not easy. There is not sufficient reliable research to be confident that a penalty system would always provide a fair indication of the impact of AM.'

3.3.10 The article goes on to note that:

'However, to do nothing would be unfair on those wind farm neighbours adversely affected by AM and, in any case, there seems to be general agreement amongst many stakeholders on all sides of the debate that a robust condition including AM is required.'

3.3.11 The topic of AM from wind turbine noise was considered again in the UK in 2022, with a review of evidence commissioned by the UK Government published in the WSP BEIS report 'A review of Noise Guidance for Onshore Wind Turbines,' (October 2022). The report notes that the IOA preferred metric provides a suitable approach to measure and quantify AM near operational wind farms (whilst noting that work is ongoing to refine the approach) but also highlights that further work is required to develop a robust mechanism for controlling AM that can be incorporated into a planning condition. In relation to the potential for a penalty scheme to control AM, the WSP BEIS report notes on page 208 that:

'In practice, the details of applying such a penalty scheme are complicated by the complexities of wind turbine sound measurements. These often involve a considerable amount of data filtering and data aggregation to address the practical difficulties of measuring a highly variable source, which is often also at a level that is relatively low compared with other, fluctuating residual sounds present in the acoustic environment. Such details will need to be carefully considered in further study, and the example planning condition proposed by a group of IOA members in 2017 should be considered as a starting point.'

3.3.12 Until such a 'further study' is completed, and additional guidance is published, the approach set out in the IOA GPG remains valid, the document states (paragraph 7.2.10):

'7.2.1 The evidence in relation to "Excess" or "Other" Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM.'

3.3.13 Persistent OAM can be a source of nuisance to wind farm neighbours. Indeed, in a recent decision of the Irish High Court on the 8th of March 2024, the court found that frequent and sustained periods of OAM arising from the operational Ballyduff Wind Farm was an unreasonable interference with a neighbour's use and enjoyment of their property which was located approximately 359 m from the nearest turbine. The issue of damages and/or an injunction were held over for later determination by the court but in the meantime, the court directed all parties to engage in mediation with a view to devising 'appropriate mitigation measures and if possible, to resolve all outstanding issues between them'. In summary, therefore, where OAM arises mitigation is possible and is the appropriate response.

3.3.14 As a summary, a significant amount of research has been undertaken in relation to OAM and key outcomes of the research are that:

- It is clear that OAM, if it occurs frequently and for sustained periods, it has the potential to result in adverse impacts for wind farm neighbours;
- It is not currently possible to predict if and when OAM will occur at a proposed wind farm site. On sites where OAM has been identified it occurs intermittently and varies in terms of severity;
- There are methodologies available that can be used to measure and quantify OAM, in particular the method produced by the Amplitude Modulation Working Group (AMWG), which was formed by the Institute of Acoustics. The methodology was presented in a report 'Methods for Rating Amplitude Modulation in Wind Turbine Noise' which was published in April 2015;

- Whilst it is possible to measure and quantify OAM using the AMWG methodology (which provides an AM rating for each 10 minute period), further study is still required to help quantify what level of OAM, if any, is acceptable. This is complicated by the fact that it is unclear whether a small amount of OAM that occurs regularly is likely to be more (or less) annoying than a large amount of OAM that occurs very infrequently; and
- Notwithstanding a lack of a defined threshold detailing what level of OAM is acceptable, there are measures available which have been shown to mitigate OAM should it occur. Measures can include:
    - Changes to the operation of the relevant wind turbine(s) by changing parameters such as blade pitch;
    - Addition of blade furniture (such has vortex generators) to alter the flow of air over the wind turbine blades; and, in extreme cases,
    - Targeted wind turbine shutdowns in specific conditions where OAM is found to occur.

  Where mitigation is required, it needs to be designed on a site-specific basis.

4 Methodology

4.1 Assessing Operational Noise Impact

4.1.1 To undertake an assessment of the operational noise impact in accordance with the requirements of the WEDG and additional guidance / best practice, the following steps are required:

- Specify the location of the wind turbines for the Proposed Project;
- Measure the background noise levels as a function of on-site wind speed at a selection of representative Noise Monitoring Locations (NML);
- Identify the locations of all nearby noise sensitive receptors (NSRs) and select a sample of relevant Noise Assessment Locations (NAL). For each NAL, identify the most representative measured background noise dataset;
- Establish for each NML the 'Total WEDG Noise Limits' on analysis of the measured background noise levels;
- Specify the likely noise emission characteristics of the wind turbines for the Proposed Project and all nearby cumulative wind turbines;
- Calculate the likely noise immission levels due to the cumulative operation of all relevant wind turbines and compare it to the Total WEDG Noise Limits;
- Determine the Site Specific Noise Limits, which take account of the noise limit already allocated to, or could theoretically be used by, other wind farm developments in the area; and
- Calculate the likely noise immission levels due to the operation of the Proposed Project on its own and compare it to the Proposed Project's Site Specific Noise Limits.

4.1.2 In order to fully consider cumulative noise, the assessment has been split into three separate stages:

- Stage 1 – determine existing Total WEDG Noise Limits, which are already set for other wind farms within the vicinity of the Proposed Project at each NAL or establish the Total WEDG Noise Limits for each NAL (where noise limits are not already set) based on the measured background noise levels;
- Stage 2 – undertake a cumulative assessment where noise predictions from the Proposed Project are within 10 dB of the total noise predictions from the other wind farms/turbines within the area and compare to the Total WEDG Noise Limits; and
- Stage 3 – establish the Proposed Project's Site Specific Noise Limits (at levels below the Total WEDG Noise Limits, where limit apportionment is required) and compare the noise predictions from the Proposed Project on its own against the proposed Site Specific Noise Limits.

4.1.3 There are a range of turbine makes and models that may be appropriate for the Proposed Project. In the absence of a confirmed turbine model, this noise assessment models three candidate wind turbines, the Vestas V150, 6.0 MW, the N149, 5.7 MW and the Siemens Gamesa SG6.0-155, 6.6 MW which all fall within the turbine parameter range of the

Proposed Project. The final selection of turbine will follow a competitive tendering process and thus the final model of turbine may differ from those on which this assessment has been based. However, the final choice of turbine will be within the turbine parameter range of the Proposed Project and be required to comply with the noise limits which have been established for the site.

4.2 Consultation

4.2.1 Scoping responses were sent to MKO from various parties and noise and vibration was a consideration in some of the responses. Noise and vibration was mentioned in responses from Transport Infrastructure Ireland, Carlow County Council, Kilkenny County Council and HSE Environmental Health between December 2022 and March 2023.

4.2.2 The considerations raised by Transport Infrastructure Ireland are all covered in this EIAR, the response stated:

'The EIAR/EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)).'

4.2.3 The considerations raised by Carlow County Council are all covered in this EIAR, the response stated:

'Noise, Vibration and Dust: Suitably scaled mapping should be provided which accurately identifies existing and proposed noise and dust monitoring stations relative to sensitive receptors. The assessment of noise impacts needs to consider noise generated from construction activities and operational noise e.g. rotating turbine noise and blade swish noise. Noise associated with the construction of access roads and cable routes should be assessed, and should include restrictions on the hours of operation to prevent noise nuisance at dwellings and other adjoining land uses/sensitive locations.'

4.2.4 The considerations raised by Kilkenny County Council included a request to confirm the exact model of wind turbine. As detailed in Section 1.7.3 in Chapter 1 of this EIAR, various types and sizes of wind turbine (within a proposed range) have been selected and considered in the relevant sections of the EIAR, including this noise and vibration chapter. It is also noted within its scoping response that a specific noise limit should be adopted (45 dB(A) L90 day and 43 dB(A) L90 night) and this has been considered in this EIAR by using the fixed minimum limits in the DoEHLG 2006, however, other criteria such as background +5 dB have also used in this EIAR in line with current best practice.

4.2.5 All other relevant points detailed in the Scoping Response are covered in this EIAR, the Kilkenny County Council full response on noise and vibration stated:

'With respect to EIAR scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR, which may affect the national road network. The developer/scheme promoter should have regard, inter alia, to the following:

…

The EIAR/EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)).'

'During the construction, operation & decommissioning stages, the applicant should ensure that all operations on site are carried out in a manner such that noise, dust, reflectance, shadow flicker, air emissions and/or odours do not result in significant impairment of, or significant interference with, amenities or the environment beyond the site. The following are recommendations for consideration by the planning authority:
a. The hours of work for the site should be:
i. 07:00 to 19:00 Monday to Friday.
ii. 07:00 to 13:00 Saturdays.
b. The applicant shall confirm the exact model of Wind Turbine being proposed for this site. The proposed model of Wind Turbine shall be considered in the Seskin Wind Farm Environmental Impact Assessment Report (EIAR).
c. The applicant should submit an Operations Manual for the written agreement of the Planning Authority:
…
iii. The applicant should insure that all activities at the site shall not give rise to noise levels off site at the nearest occupied dwellings, which exceed the following sound pressure limits;
• DAY: 45dB(A) LA90 (10 minutes).
• NIGHT: 43dB(A) LA90 (10 minutes).
d. Within six months of commissioning the Wind Turbines referred to in this application, the applicant should undertake noise monitoring in order to determine the extent and characteristics of noise levels arising from the Wind Farm in the vicinity of the nearest occupied dwellings. The results should be forwarded to the Planning Authority.'

4.2.6 The considerations raised by HSE Environmental Health are covered in this EIAR except the request to consider the draft WEDG 2019 guidance. Given the limitations of the Draft WEDG 2019 Guidelines explained in this EIAR (section 12.2), the Draft WEDG 2019 Guidelines have not been used and instead the WEDG 2006 supplemented by best practice guidance from ETSU-R-97 and the IOA GPG has been used for the assessment. The full response from HSE Environmental Health stated :

'The potential impacts for noise and vibration from the proposed development on all noise sensitive locations must be clearly identified in the EIAR. The EIAR must also consider the appropriateness and effectiveness of all proposed mitigation measures to minimise noise and vibration. A baseline noise monitoring survey should be undertaken to establish the existing background noise levels. Noise from any existing turbines in the area should not be included as part of the background levels. In addition, an assessment of the predicted noise impacts during the construction phase and the operational phase of the proposed renewable energy development must be undertaken which details the change in the noise environment resulting from the proposed development. The Draft Revised Wind Energy Development Guidelines were published in December 2019. Whilst these have yet to be adopted, any proposed wind farm development should have consideration of the draft Guideline.'

4.3 Stage 1 Assessment Methodology – Setting the Total DoEHLG 2006 Guidelines Noise Limits

Identify Existing Noise Limits

4.3.1 Noise limits have already been established at receptors immediately near both the Proposed Wind Farm and the permitted Bilboa Wind Farm and White Hill Wind Farm, via planning conditions set for the two wind farms. The existing Gortahile Wind Farm is further to the north, beyond the permitted Bilboa Wind Farm, so there are no receptors immediately near both the Proposed Wind Farm and the existing Gortahile Wind Farm, hence the existing Gortahile Wind Farm existing noise limits have not been reviewed.

4.3.2 The permitted Bilboa Wind Farm, Condition 13 states:

'13. (a) The operation of the proposed development, by itself or in combination with any other permitted wind energy development, shall not result in noise levels, when measured externally at nearby noise sensitive locations, which exceed:

(a) Between the hours of 0700 and 2300:

i. the greater of 5 dB(A) L90,10min above background noise levels, or 45 dB(A) L90,10min, at wind speeds of 4m/s or greater

ii. 40 dB(A) L90,10min at all other wind speeds

(b) 43 dB(A) L90,10min at all other times.

4.3.3 Similarly, the permitted White Hill Wind Farm Condition 8 states:

'8. The operation of the proposed development, by itself or in combination with any other permitted wind energy development, shall not result in noise levels, when measured externally at nearby noise sensitive locations, which exceed:

(a) Between the hours of 7am and 11pm:

i. the greater of 5 dB(A) L90,10min above background noise levels, or 45 dB(A) L90,10min, at wind speeds of 5m/s or greater

ii. 40 dB(A) L90,10min at all other wind speeds

(b) 43 dB(A) L90,10min at all other times where wind speeds are measured at 10m above ground level.

…'

4.3.4 The conditions broadly align with the WEDG 2006 criteria except they state a specific wind speed (i.e. 4 ms-1 or 5 ms-1) from which a fixed minimum of 45 dB applies during the daytime period. For consistency, these limits have been adopted when assessing the receptors located closest to the permitted Bilboa Wind Farm and White Hill Wind Farm.

Wind Shear

4.3.5 Wind shear can be defined as 'the change in the relationship between wind speed at different heights'. Due to wind shear, wind speeds recorded on one meteorological mast at different heights usually vary, generally the higher the anemometer the higher the wind speed recorded. For example, if a wind speed of 4 ms-1 is recorded at 80m height, 3.5 ms-1 may be recorded at 40m and 2.5 ms-1 may be recorded at 10m.

4.3.6 Hub height wind speed is the key wind speed for a wind farm noise assessment, as it is the wind speed at hub height which will determine the noise emitted by the wind turbines and informs the turbine control system. Ideally, both wind turbine noise predictions and background noise level measurements should refer to hub height wind speed (or a representation thereof), ensuring that there is no discrepancy between the wind speed at which the noise is emitted and the wind speed at which the corresponding background noise is measured.

4.3.7 The IOA GPG states that one of three methods of wind speed measurement may be adopted. For this assessment wind speeds were recorded by a LIDAR device for a range of heights between 39m and 200m. In line with 'Method A' of Section 2.6.3 of the IOA GPG, the wind speed data recorded at the two heights closest to hub height (100m and 110m) were used to calculate hub height wind speeds (105m) which was then standardised to 10m height.

Noise Impact Criteria in the WEDG

4.3.8 Analysis of the measured noise and wind data has been undertaken in accordance with ETSU-R-97 and current good practice to determine the pre-existing background noise environment and to establish the daytime and night-time Total WEDG Noise Limits for each NAL.

4.3.9 The Total WEDG Noise Limits for the daytime have been set at:

- 40 dB(A) where background noise levels are below 30 dB; and,
- 45 dB(A) or background noise plus 5 dB, whichever is the greater, where background noise levels are greater than 30 dB (or where wind speed greater than 4 ms-1 or 5 ms-1 respectively near Bilboa and White Hill wind farms).

4.3.10 Total WEDG Noise Limits for the night-time period have been set at:

- 43 dB(A) or background plus 5 dB, whichever is the greater.

4.3.11 This 'Total' WEDG Noise limit relates to noise from all wind farm developments in the area (including the Proposed Project). The limit was chosen with due regard to the guidance in the WEDG and with due consideration given to the limits already adopted for other wind farm developments in the area.

4.3.12 The acceptable limits for wind turbine operational noise are clearly defined for all time periods by the application of the WEDG methodology. Consequently, the test applied to operational noise is whether or not the predicted wind turbine noise immission levels at nearby noise sensitive properties lie below the WEDG Noise Limits. Depending on the levels of background noise, the satisfaction of the WEDG derived limits can lead to a situation whereby, at some locations under some wind conditions and for a certain proportion of the time, the wind turbine noise would be audible.

4.4 Stage 2 Assessment Methodology – Likely effects & cumulative assessment

4.4.1 The WEDG 2006 do not include any information on the assessment of cumulative noise impacts, therefore, the guidance provided within the IOA GPG has been adopted, which contains a detailed section on cumulative noise and where a cumulative assessment is required. Section 5.1.4 and 5.1.5 of the IOA GPG state:

'During scoping of a new wind farm development consideration should be given to cumulative noise impacts from any other wind farms in the locality. If the proposed wind farm produces noise levels within 10 dB of any existing wind farm/s at the same receptor location, then a cumulative noise impact assessment is necessary.

Equally, in such cases where noise from the proposed wind farm is predicted to be 10 dB greater than that from the existing wind farm (but compliant with ETSU-R-97 in its own right), then a cumulative noise impact assessment would not be necessary.'

4.4.2 A cumulative assessment was undertaken at each of the chosen NALs by undertaking noise predictions for the Proposed Wind Farm as well as the permitted Bilboa Wind Farm, the permitted White Hill Wind Farm and the existing Gortahile Wind Farm.

Noise Prediction Model

4.4.3 The ISO 9613-2: 1996 'Acoustics – Attenuation of sound during propagation outdoors Part 2: General method of calculation' (15) model algorithm provides a robust prediction method for calculating the noise immission levels at the nearest receptors. A European Commission (EC) research project into wind farm noise propagation over large distances, published as 'Development of a Wind Farm Noise Prediction Model,' JOULE project JOR3-CT95-0051 in 1998, identified a simplified version of ISO 9613-2 as the most suitable at that time, but the full method has been used for this assessment.

4.4.4 Guidance on noise prediction and propagation modelling is not provided within the WEDG, however, the IOA GPG recognises the standard as appropriate for the prediction of wind turbine noise.

4.4.5 There is currently no standard approach to specifying error bands on noise predictions, however, Table 5 of ISO 9613-2 suggests, at best, an estimated of accuracy of ± 3 dB(A). The work undertaken as part of the EC research study concluded that the ISO 9613-2 algorithm reliably predicted noise levels that would generally occur under downwind propagation conditions. The error bands referenced in the ISO standard itself relate to the general application of the standard. Additionally, wind farm specific studies have been undertaken to validate the use of the standard to predict wind farm noise and these are referenced in Section 4 of the IOA GPG, which goes on to conclude that:

'The outcome of this research has demonstrated that the ISO 9613-2 standard in particular, which is widely used in the UK, can be applied to obtain realistic predictions of noise from onshore wind turbines during worst case propagation conditions (i.e. sound speed gradients due to downwind conditions or temperature inversions), but only provided that the appropriate choice of input parameters and correction factors are made.'

4.4.6 TNEI's experience of undertaking compliance monitoring for operational wind farms indicates that the predictions undertaken using the guidance in the IOA GPG show a good correlation with measured levels.

4.4.7 The ISO 9613-2 model can take account of the following factors that influence sound propagation outdoors:

- Geometric divergence;
- Atmospheric absorption;
- Reflecting obstacles;
- Screening;
- Vegetation; and
- Ground attenuation.

4.4.8 The model uses as its acoustic input data the octave band sound power output of the turbine and calculates, on an octave band basis, attenuation due to the factors above, as appropriate.

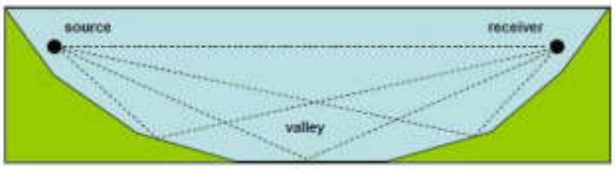
4.4.9 The IOA GPG quotes a comparative study undertaken in Australia that indicated ISO 9613-2 can, in some conditions, under-predict ground attenuation effects and the potential for additional reflection paths 'across a valley', whilst slightly over-predicting on flat terrain. It should be noted, however, that the wind farm layouts studied were untypical for Ireland, with rows of turbines spreading over 10 km on an elevated ridge. It also should be noted that no correction for background contribution was undertaken and the monitoring locations in the study were located as far as 1.7 km from the nearest turbine, where turbine noise may be at similar levels to background noise and therefore difficult to differentiate. For the study's modelling work topographic height data was included as an input, which is consistent with ISO 9613-2 methodology generally, but not with how barrier attenuations are calculated using the topography data as part of the requirements of the IOA GPG.

The model used in this assessment does not model barrier attenuation using the method in ISO 9613-2, but instead uses the guidance in the IOA GPG to consider whether any topographical corrections are required as set out below in Sections 4.4.10 to 4.4.13. Any differences in ground height between the receptors and the turbines are considered when calculating the propagation distance between each source and receiver.

4.4.10 The IOA GPG discusses the potential for topographical screening effects of the terrain surrounding a wind farm and the nearby noise sensitive receptors. Although barrier screening effects in ISO 9613-2 can make corrections of up to 15 dB, the IOA GPG states that where there is no line of sight between the highest point on the rotor and the receiver location a reduction of no more than 2 dB may be applied.

4.4.11 The IOA GPG also states that a 'further correction of +3 dB should be added to the calculated overall A-weighted level for propagation 'across a valley', i.e. a concave ground profile or where the ground falls away significantly between a turbine and the receiver location.' The potential reflection paths are illustrated in Schematic 4.1 below.

Schematic 4.1: Multiple reflection paths for sound propagation across concave ground



Source : IOA GPG, page 21, Figure 5

4.4.12 A formula from the JOULE Project JOR3-CT95-0051 dated 1998 is suggested for determining whether a correction is required.

$$h_m \geq 1.5 \times (\text{abs}(hs - hr) / 2)$$

where h_m is the mean height above the ground of the direct line of sight from the receiver to the source (as defined in ISO 9613-2, Figure 3), and h_s and h_r are the heights above local ground level of the source and receiver respectively).

4.4.13 The calculation of h_m requires consideration of the digital terrain model and needs to be performed for each path between every turbine and every receiver. Interpretation of the results of the calculation above and the subsequent inclusion of a concave ground profile correction requires careful consideration with any topographical variation considered in the context of a site.

Noise Propagation Parameters

4.4.14 The noise immission levels have been calculated using the full ISO 9613-2 model with a receiver height of 4.0m above local ground level, mixed ground (G=0.5) and air absorption based on a temperature of 10 °C and 70% relative humidity. The modelling parameters reflect current good practice as detailed within the IOA GPG.

4.4.15 The wind turbine noise immission levels are based on the LA90,10 minute noise indicator in accordance with the recommendations in the WEDG, which were obtained by subtracting 2 dB(A) from the turbine sound power level data (LAeq indicator).

4.4.16 A topographical assessment has been undertaken between each NSR and wind turbine location to determine whether any concave ground profiles exist between the source and receiver. Analysis undertaken using a combination of CadnaA (16) and an Excel model found that if the formula in the IOA GPG is applied directly, a +3 dB correction was not required for the Proposed Project wind turbines. However, it is required for several wind turbines at several NALs due to other wind farms as summarised in Annex 6.

4.4.17 In addition, an assessment has been undertaken to determine whether any topographical screening effects of the terrain occur where there is no direct line of sight between the highest point on the turbine rotor and the receiver location. Upon analysis of each NSR, it was found that a barrier correction of -2dB applies for only one of the Proposed Project wind turbines at a distant location NAL17. And it is also required for several nearby wind turbines at six NALs as detailed in Annex 6.

4.4.18 The cumulative assessment has taken into account directivity effects in line with good practice. The directivity of wind turbines has been recognised for some time. Building on earlier work by NASA, in 1988 Wyle Laboratories studied sound propagation using an omnidirectional loudspeaker source elevated 80ft above ground, in upwind, downwind and cross wind situations, and in both flat and hilly terrain, then compared those measurements

to measured data from actual wind turbines. Their study quantified directivity factors for a limited frequency range, but was unable to conclusively demonstrate the anticipated directivity effects on real wind turbines. It also highlighted, but was unable to explain, measured differences observed between flat and hilly terrain.

4.4.19 Hubbard (1990) (IOA GPG Section 4.4.3) described a number of factors believed to influence propagation and directivity, notably refraction caused by vertical wind and temperature gradients. In the downwind direction the wind gradient causes the sound rays to bend toward the ground, whereas in the upwind direction the rays curve upward away from the ground. Upwind of the turbine this results in a region of increased attenuation termed the 'shadow zone'. The excess attenuation is frequency dependent, with lowest frequencies least attenuated. Relating this to the earlier NASA studies, Hubbard noted that the distance from the source to the edge of the shadow zone is related to the wind speed gradient and the elevation of the source, which for a typical turbine source was calculated to be approximately 5 times the source height.

4.4.20 This observation was adopted in the IOA GPG, which states (in Section 4.4.2) 'Such reductions (due to "shadow zone" refraction effects) will in practice only progressively come into play at distances of between 5 and 10 turbine tip heights', while Section 4.4.3 of the IOA GPG provides graphical examples of increasing broadband directivity with increasing tip height scaling in both flat and hilly terrain, without qualifying either of those designations.

4.4.21 The IOA GPG recommends (Section 4.4.1) that directivity attenuation factors adopted in any assessment should be clearly stated. The TNEI noise model can consider the effect of directivity and in line with current good practice the attenuation values used are in detailed in Table 4.1 These are based upon the examples given in the IOA GPG (Section 4.4.2), using interpolation where required.

Table 4.1 Wind Directivity Attenuation Factors used in Modelling

Direction (º)	0	15	30	45	60	75	90	105	120	135	150	165
Attenuation dB(A))	-10	-9.9	-9.3	-8.3	-6.7	-4.6	-2	0	0	0	0	0
Direction (º)	180	195	210	225	240	255	270	285	300	315	330	345
Attenuation (dB(A))	0	0	0	0	0	0	-2	-4.6	-6.7	-8.3	-9.3	-9.9

4.5 Stage 3 Assessment Methodology – Site-Specific Noise Limits

4.5.1 *Summary Box 21 of the IOA GPG states:*

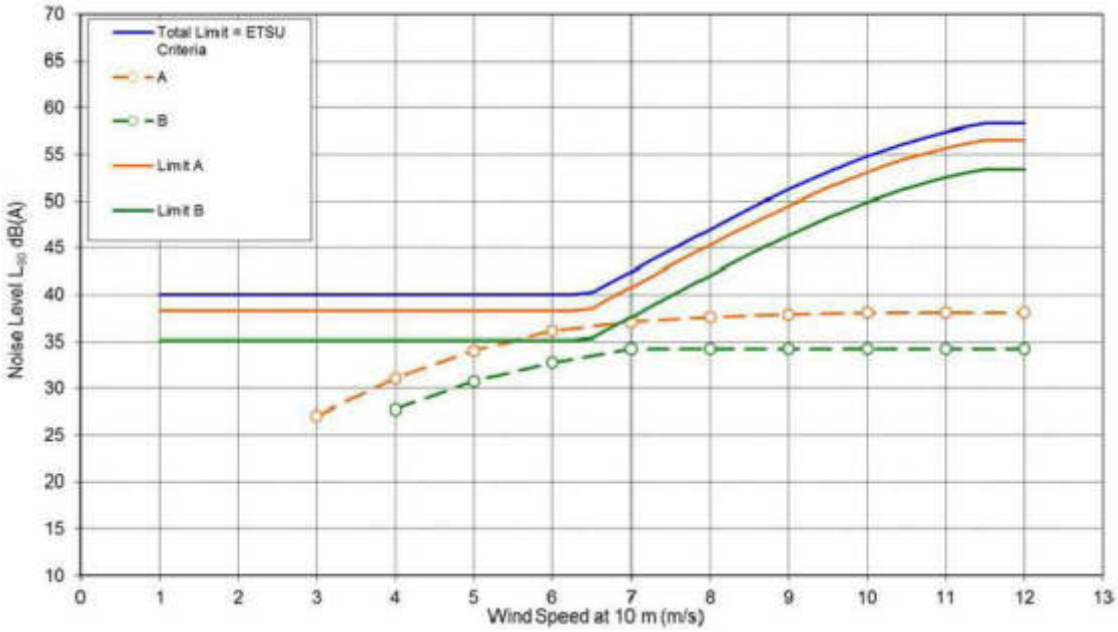
'Whenever a cumulative situation is encountered, the noise limits for an individual wind farm should be determined in such a way that no cumulative excess of the total ETSU-R-97 noise limit would occur.'

4.5.2 In order to determine Site-Specific Noise Limits at receptors in proximity to the Proposed Project (where required), the guidance detailed within Section 5.4 of the IOA GPG has been considered. The options detailed within Section 5.4 of the IOA GPG are summarised below.

Limit Apportionment

4.5.3 Limit apportionment considers the noise limit already allocated to other wind farms in the area. This approach is demonstrated in Graph 4.1 below which is reproduced from the Section 5.4 of the IOA GPG. In this example the total limit (shown in blue) is shared between two proposed wind farms (A and B). The two noise limits for a given receptor (the solid orange and green lines) when added together equate to the total noise limit, and the predicted levels for each wind farm (the dashed lines) meet the specific limits established for each wind farm.

Graph 4.1: Limit Apportionment Example



Significant Headroom

4.5.4 The limit derivation can also be undertaken with consideration of the amount of headroom between another schemes'(s) predictions and the Total Noise Limit. With regard to this, Section 5.4.11 of the IOA GPG states:

'In cases where there is significant headroom (e.g. 5 to 10 dB) between the predicted noise levels from the existing wind farm and the Total Noise Limits, where there would be no realistic prospect of the existing wind farm producing noise levels up to the Total Noise Limits, agreement could be sought with the LPA as to a suitable predicted noise level (including an appropriate margin to cover factors such as potential increases in noise) from the existing wind farm to be used to inform the available headroom for the cumulative assessment without the need for negotiation or cumulative conditioning. This may be the case particularly at low wind speeds.'

4.5.5 With this in mind, and where appropriate, for the sole purpose of calculating site specific limits a cautious additional 2 dB buffer has been added to the wind turbine noise predictions from the nearby wind farm schemes. This is considered to be a suitable buffer in accordance with Section 5.4.11 of the IOA GPG.

10 dB Rule

4.5.6 Where predicted wind turbine noise levels from the nearby wind farm/ turbine schemes are found to be >10 dB below the Total WEDG Noise Limits then it has been deemed appropriate to allocate the entire noise limit to the Proposed Development.

4.5.7 Further information on the approaches adopted for the setting of the Site Specific Noise Limits is provided in the Stage 3 assessment section below.

4.6 Cumulative Noise Limits

4.6.1 Section 5.75 of the IOA GPG provides some guidance on cumulative noise conditioning. It states that:

'There may be scenarios where the existing wind farm operator cannot negotiate with subsequent wind farm developers, even though in reality the actual noise output from the existing wind farm is below the total ETSU-R-97 limits. In this situation, it has been suggested that a planning condition could be constructed that places cumulative impacts responsibilities on any subsequent wind farm developers, i.e. if noise levels from the existing wind farm increase (but are maintained within the existing wind farm's noise conditions) then noise levels from the second wind farm will have to reduce in compensation to ensure that cumulative noise limits are not breached. Such an approach places considerable risk on the second wind farm developer and to date the IOA-NWG is not aware of it being accepted in practice.'

4.6.2 Since the IOA GPG was issued in May 2013, cumulative noise conditions have been adopted on several schemes in the UK. TNEI has successfully demonstrated at Public Inquiry (Tullymurdoch Wind Farm (Planning Reference: PPA-340-2073)) how a cumulative condition could work in practice when there was no other suitable option, and the approach was accepted by the Reporter. A cumulative condition was also adopted in the Windy Standard III Wind Farm Section 36 Consent (issued 23 March 2021, reference WIN-170-2003) and also Whitelaw Brae Wind Farm Section 36 Consent (issued December 2017, reference WIN-140-4).

4.6.3 The use of Cumulative Noise Limits would allow the Proposed Development to use the 'spare limit' available at a given receptor. In the event that noise from existing wind farm(s) were to exceed the Cumulative Noise Limits, the operator of the Proposed Project would have to reduce the output of that scheme such that it resulted in a negligible contribution at the receptor. For the Proposed Project to have a negligible additional contribution it would need to comply with Backstop Noise Limits which have been derived to be 10 dB below the Cumulative Noise Limit.

4.6.4 Depending on the final choice of turbine, achievement of the more restrictive Backstop Noise Limits may require the use of mode management; this would involve lowering the noise output (restricting the turbine(s)) for certain wind speeds and wind directions.

5 Baseline

5.1 Identification of Potential Noise Receptors

5.1.1 A desk-based review was undertaken to identify potential receptors within proximity to the Proposed Wind Farm. Of the identified receptors, a total of seven Noise Monitoring Locations (NMLs) were selected as being appropriate locations to determine a representative baseline. The NMLs were located to the north, east, south and west of the Proposed Wind Farm.

5.1.2 The NMLs were selected following a detailed review of the area using aerial photography and where possible the locations were selected to ensure minimal influence from other noise sources such as local watercourses and vegetation.

5.2 Background Noise Survey

5.2.1 Background noise monitoring was undertaken for the purposes of setting the WEDG Noise Limits. Data was recorded over the period 26th January 2023 to 5th April 2023 at each of the NMLs simultaneously.

5.2.2 Details of the exact monitoring periods, the rationale behind the exact kit location and the dominant noise sources observed at each of the NMLs are detailed in the Field Data Sheets (FDS) and installation report included in Annex 2.

5.2.3 The NML is the position that the sound level meter was sited at each property, as shown on Figure A1.1 (Annex 1) and summarised in Table 5.1 below.

Table 5.1 Noise Monitoring Locations

NML	X (ITM)	Y (ITM)
NML1	664333	670281
NML2	664721	669755
NML3	665105	668234
NML4	663548	667162
NML5	662658	668128
NML6	662547	669183
NML7	662653	670357

5.3 Noise Monitoring Equipment

5.3.1 Section 2.4 of the IOA GPG includes information on the type and specification of noise monitoring equipment that should be used for background noise surveys and states:

5.3.2 ‘Noise measurement equipment and calibrators used on site should comply with Class 1/Type 1 of the relevant standard(s). Enhanced microphone windscreens should be used.

Standard windshields of a diameter of less than 100mm cannot be relied upon to provide sufficient reduction of wind noise in most circumstances.'

5.3.3 The noise monitoring equipment used for the background noise survey meets with the requirements of the IOA GPG. Details of the noise monitoring equipment used, the calibration drift recorded and photographs at each NML are detailed in the FDS included in Annex 2. The IOA GPG states that for calibration drift greater than 1 dB, the measurements should be discarded. The maximum calibration drift recorded during the noise survey was 0.4 dB as detailed in the FDS (included in Annex 2) therefore no correction has been applied to the noise data.

5.3.4 Copies of the calibration/conformance certificates for the sound level meters and sound level calibrator used for the noise survey are included in Annex 3. All sound level meters conform to Class 1/Type 1.

5.3.5 The microphones were mounted between 1.2 m and 1.5 m above local ground level and were situated at least 3.5 m from dwellings where possible 'in an area frequently used for rest and relaxation' (Section 2.5.1 of IOA GPG), and away from obvious local sources of noise such as boiler flues, fans and running water. At all locations, the sound level meters were situated as far away from hard reflective surfaces such as fences and walls as practicable.

5.3.6 All measurement systems were set to log the LA90 and LAeq noise levels in ten-minute intervals continuously over the deployment period.

5.4 Meteorological Data

5.4.1 The WEDG state on Page 29 that:

'Noise limits should be applied to external locations, and should reflect the variation in both turbine source noise and background noise with wind speed.'

5.4.2 ETSU-R-97 states on Page 84 that:

'*background noise measurements should be correlated with wind speed measurements performed at the proposed site, such that the actual operating noise levels from the turbines may be compared with the noise levels that would otherwise be experienced at a dwelling*.'

5.4.3 Concurrent wind speed and direction were recorded at several heights above the ground using a LIDAR unit, which was located within the site (ITM grid reference 663858, 669397). The meteorological data was collected and provided by the applicant. The unit was installed on 31st January 2023, a few days after deployment of the noise kits, therefore the noise data collected between 26th and 31st January was excluded from the assessment as no wind data was available for this period. Average 10 minute wind speed and direction data were collected over the same time period as the noise data to provide the analysis of the measured background noise as a function of wind speed and direction.

5.4.4 Tipping bucket rain gauges were installed at NML3 and NML5 for the duration of the noise survey to record periods of rainfall, time synchronised to the sound measurements. As per the recommendations in Section 3.1.9 of the IOA GPG, the rain data was analysed and any 10 minute period that contained registered rainfall events, plus the preceding 10 minute

period, was excluded. All excluded rainfall periods are shown on Figures A1.2a – A1.2g (Annex 1) as blue squares.

5.4.5 In accordance with the IOA GPG, methodology A, has been adopted for this assessment which involved using data collected at 41m and 110m on the meteorological mast which were used to calculate hub height (105m) wind speeds which, in turn, were standardised to a height of 10m above ground.

5.5 Influence of Existing Turbines on Background Measurements

5.5.1 ETSU-R-97 states that background noise levels should be determined such that they are not influenced by existing turbine noise, whilst the IOA GPG details that, in situations where measurement locations are potentially influenced by existing turbine noise, the following approaches can be adopted:

1. The existing wind turbines can be switched off (assuming the applicant has control of those turbines and noting that there would be associated cost implications);
2. The contribution of the wind turbines can be accounted for by filtering the measured data by direction (only including background data when a receptor is upwind of the wind turbines) or by subtracting predicted turbine noise from the measured levels;
3. Limits can be set using 'proxy' datasets measured at location(s) outside of the influence of the wind turbines; or
4. Limits can be set using data collected as part of previous background noise assessments undertaken before the wind turbines were operational, providing the equipment and both noise and meteorological data obtained are appropriate.

5.5.2 The closest operational wind farm to the NMLs is the existing Gortahile Wind Farm which is over 2.5 km away at its closest point and was not heard during site visits. The contribution to overall background noise levels from the existing Gortahile Wind Farm at the NMLs used for this assessment is judged to be negligible and therefore this has not been considered further.

5.6 Directional Filtering of Background Noise

5.6.1 In Section 3.1.22 of the IOA GPG the need to directionally filter background noise data is discussed. Where a receiver is located upwind of a dominant local noise source whilst also being systematically downwind of the turbines then it may be necessary to filter background noise data particularly when this corresponds to the prevailing wind direction.

5.6.2 For all NMLs, no directional filtering was required.

5.7 Analysis of Measured Data

5.7.1 Time series graphs are provided in Annex 4, which show the variation in measured wind speed/direction and noise level over the monitoring period. These graphs also show where data was excluded, either due to rainfall, birdsong (dawn chorus) or manual exclusions due to atypical data.

5.7.2 At NML4, following analysis it was found at wind speed below 5ms-1 during the daytime period that there was a split in the data points with two distinctive bands of points. Therefore, the band with data points having the highest noise levels (above 35dB) was discarded as a cautious measure and this is clearly shown in the figure A1.2d. From on-site observations, the possible reason for this higher band is the presence of trees and shrubs around the gardens providing favourable bird habitat, hence birdsong in low winds was more audible during the daytime period and low wind at this location when compared to the other locations. At this location there was also five loud and active dogs, and a tractor and quad bike heard in the adjacent field.

5.8 Prevailing Background Noise Level

5.8.1 Table 5.2 and *extrapolated *where derived minimum occurs at lower wind speeds and where insufficient data points at higher wind speed, see Table 5.1 below for details*

5.8.2 Table 5.3 summarise the derived prevailing background noise levels from the baseline survey.

Table 5.2 Summary of Prevailing Background Noise Levels during Quiet Daytime Periods (dB(A))

NML	Prevailing Background Noise Level $L_{A90,10\ min}$											
	1	2	3	4	5	6	7	8	9	10	11	12
NML1	18.6	21.1	22.9	24.7	26.7	29.4	32.7	36.6	40.7	44.6	47.6	48.8
NML2	20.9	23.3	24.9	26.2	27.8	30.0	32.9	36.4	40.4	44.4	48.0	50.4
NML3	26.8	27.5	28.5	29.7	31.2	32.9	34.9	37.2	39.7	42.5	45.6	48.9
NML4	22.9	24.2	26.0	28.3	30.9	33.8	36.9	40.0	43.0	46.0	48.6	50.9
NML5	30.5*	30.5	30.6	31.2	32.1	33.5	35.2	37.4	39.9	42.8	46.1	49.8
NML6	25.3	25.7	26.3	27.0	27.9	29.2	30.8	33.0	35.8	39.3	43.7	43.7*
NML7	27.5	27.7	28.1	28.8	29.6	30.9	32.6	34.8	37.5	41.0	45.1	50.1

**extrapolated where derived minimum occurs at lower wind speeds and where insufficient data points at higher wind speed, see Table 5.1 below for details*

Table 5.3 Summary of Prevailing Background Noise Levels during Night-time Periods (dB(A))

NML	Prevailing Background Noise Level $L_{A90,10\ min}$											
	1	2	3	4	5	6	7	8	9	10	11	12
NML1	18.6*	18.6	18.8	20.6	23.6	27.4	31.7	36.0	40.1	43.4	45.8	46.6
NML2	21.1*	21.1*	21.1	22.4	24.9	28.2	32.0	36.0	39.8	43.1	45.6	46.9
NML3	23.2*	23.2	23.6	24.8	26.9	29.5	32.6	36.0	39.4	42.9	46.1	48.9

NML	Prevailing Background Noise Level $L_{A90,10\ min}$											
	1	2	3	4	5	6	7	8	9	10	11	12
NML4	20.1*	20.1*	20.1	22.2	25.6	29.9	34.4	38.7	42.4	45.3	47.2	47.9
NML5	22.2*	22.2*	22.2	23.1	25.2	28.2	31.7	35.4	39.2	42.7	45.5	47.5
NML6	20.3*	20.3	20.7	21.8	23.5	25.7	28.3	31.3	34.6	38.0	41.6	45.2
NML7	22.6*	22.6*	22.6	23.3	25.0	27.5	30.4	33.7	37.1	40.4	43.3	45.7

**extrapolated where derived minimum occurs at lower wind speeds, see Table 5.1 below for details*

5.8.3 A series of graphs are presented for each of the NMLs to illustrate the data collected, these are included as Figures A1.2a – A1.2g (Annex 1). There is a set of graphs for each NML, which show the range of wind speeds and directions recorded during the survey, the 10 minute average wind speed plotted against the recorded LA90, 10min noise level, and a calculated 'best fit' polynomial regression line for both quiet daytime and night-time periods. Each Figure also includes a table with the number of measured data points per integer wind speed bin and the prevailing measured background noise level.

5.8.4 The background noise levels have been calculated using a best fit polynomial regression line of no more than a fourth order through the measured LA90, 10min noise data, as required by ETSU-R-97 and the IOA GPG.

5.8.5 In line with the recommendations included in Section 3.1.21 of the IOA GPG, for all NMLs the polynomial background curve for low wind speed conditions have been restricted at wind speeds below that where the derived minimum occurs. Sufficient data was collected up to 12 ms-1 for all locations except NML6 in daytime which was up to 11 ms-1.

5.8.6 The low wind restriction assumptions used for each location are illustrated on the Figures, where the final regression analysis curve is shown as a continuous black line and the original polynomial line of best fit is shown as a dashed black line. A summary is also included in Table 5.4 below.

Table 5.4 Analysis of Measured Datasets

NML	Quiet Daytime	Night-time
NML1	No restrictions applied	Restricted below 2 ms^{-1} (as curve was increasing slightly at 1ms^{-1})
NML2	No restrictions applied	Restricted below 3 ms^{-1} (as curve was increasing slightly at 1-2 ms^{-1})
NML3	No restrictions applied	Restricted below 2 ms^{-1} (as curve was increasing slightly at 1 ms^{-1})
NML4	No restrictions applied	Restricted below 3 ms^{-1} (as curve was increasing slightly at 1-2 ms^{-1})
NML5	Restricted below 2 ms^{-1} (as curve was increasing slightly for 1 ms^{-1})	Restricted below 3 ms^{-1} (as curve was increasing slightly at 1-2 ms^{-1})
NML6	Extrapolated at 12 ms^{-1} based on 11 ms^{-1} value (as no data at 12 ms^{-1}).	Restricted below 2 ms^{-1} (as curve was increasing slightly at 1 ms^{-1})

NML	Quiet Daytime	Night-time
NML7	No restrictions applied	Restricted below 3 ms^{-1} (as curve was increasing slightly at 1-2 ms^{-1})

5.8.7 The number of data points measured in each wind speed bin for each receptor once exclusions were applied, are summarised in Figures A1.2a – A1.2g (Annex 1). The Figures also show the final prevailing background noise levels which have been determined following the analysis detailed above.

6 Noise Assessment Results

6.1 Noise Sensitive Receptors and Noise Assessment Locations

6.1.1 A total of 18 NSRs were chosen as NALs to represent the individual or clusters of NSRs located closest to the Proposed Wind Farm. Predictions of noise at the NALs ensures that the assessment reports the precautionary (loudest) noise immission level expected at each group of NSRs. The noise impact assessment results for the NALs are presented within the main body of this report, however, an assessment for the individual NSRs has also been included within Annex 5 for completeness. Each NAL and NSR are shown on Figure A1.1 (Annex 1).

6.1.2 Table 6.1 details which NML has been used to set noise limits for each NAL. Figure A1.1 is colour coded to show which NML has been used to set noise limits at the other NSRs.

Table 6.1 Noise Assessment Locations

Noise Assessment Location (NAL)	X (ITM) (m)	Y (ITM) (m)	Elevation (m above sea level)	Approximate Distance to Nearest Seskin Turbine (m)	Background Noise Monitoring Location Used
NAL1	662730	670033	242	844 (T1)	NML7
NAL2	662610	670156	240	1,008 (T1)	NML7
NAL3	663257	670292	257	695 (T1)	NML7
NAL4	663822	670342	271	718 (T2)	NML1
NAL5	664335	670312	289	746 (T2)	NML1
NAL6	664468	670252	290	768 (T2)	NML1
NAL7	664688	669900	290	739 (T2)	NML2
NAL8	664705	669725	284	709 (T3)	NML2
NAL9	664928	669208	266	730 (T3)	NML2
NAL10	664824	668894	270	710 (T3)	NML3
NAL11	664698	668149	271	767 (T5)	NML3
NAL12	664248	667759	266	737 (T7)	NML3
NAL13	663144	667630	263	710 (T7)	NML4
NAL14	662682	668090	251	933 (T6)	NML5

Noise Assessment Location (NAL)	X (ITM) (m)	Y (ITM) (m)	Elevation (m above sea level)	Approximate Distance to Nearest Seskin Turbine (m)	Background Noise Monitoring Location Used
NAL15	662840	669042	228	742 (T4)	NML6
NAL16	662555	669161	217	1028 (T4)	NML6
NAL17	661841	668376	210	1632 (T6)	NML5
NAL18	662611	667437	260	1240 (T7)	NML5

6.2 Noise Emission Characteristics of the Wind Turbines

6.2.1 This noise assessment models three candidate turbines for the Proposed Wind Farm within the turbine parameter range; the Vestas V150 6.0 MW with serrated trailing edge blades and a hub height of 105m, the Nordex N149 5.7 MW with serrated trailing edge blades and a hub height of 105m and the Siemens Gamesa SG 6.0-155, 6.6 MW with serrated trailing edge blades and a hub height of 102.5m. The Vestas V150 turbine has been chosen as the candidate for the main assessment as it resulted in one of the highest predicted levels of the candidates being considered at the key wind speed range and therefore provides a precautionary scenario.

6.2.2 The turbines considered in the cumulative assessment are summarised in Annex 6. Details of the sound power level, octave data and measurement uncertainty used for the turbines considered in this assessment are included in Annex 7. Due to the differences in the way in which levels are provided by the different manufacturers, TNEI has accounted for uncertainty using the guidance contained within Section 4.2 of the IOA GPG. Data for the candidate turbines used in this assessment has not been included due to data confidentiality. The detailed noise data would be available upon request subject to the signing of the appropriate Non-Disclosure Agreement.

6.2.3 The source data provided for each turbine does not indicate a tonal component and as such no tonal penalty (as envisaged in ETSU-R-97) was applicable. This is consistent with the guidance provided in the IOA GPG which states, in Section 4.2.7:

'It is highly unlikely that any specific information on tonality at representative receptor separation distances in accordance with the ETSU-R-97 methodology will be available at the planning application stage. When such information is available, it should be appropriately applied. It is standard to control the potential presence of tones in practice through the use of suitable planning conditions.'

6.2.4 Manufacturer noise level data is usually supplied based on a turbine of a specific hub height although the noise levels are presented as standardised to 10m height. The noise model used in this assessment alters turbine noise data to account for different hub heights, where applicable. The hub height modelled for the Proposed Wind Farm is 105 m. The hub heights considered for the other wind farm/turbine developments in the area are summarised in Annex 6.

6.2.5 The location of the Proposed Wind Farm turbines are shown on Figure A1.1 and grid references are included in Annex 6.

6.3 Stage 1 – Setting the Total WEDG Noise Limits

6.3.1 The WEDG Noise Limits have been established for each of the NALs as detailed in Table 6.2 and * for *NAL4,5,6 daytime, fixed at 45dB from 4ms^{-1} as per the noise condition included within the Bilboa Wind Farm Consent.*

*** for NAL17 and 18, fixed at 45dB from 5ms^{-1} as per the noise condition included within White Hill Wind Farm Consent.*

6.3.2 Table 6.3 below.

Table 6.2 WEDG Noise Limits Daytime

Location	Wind Speed (ms^{-1}) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
NAL2	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
NAL3	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
NAL4*	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
NAL5*	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
NAL6*	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
NAL7	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
NAL8	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
NAL9	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
NAL10	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
NAL11	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
NAL12	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
NAL13	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
NAL14	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
NAL15	40.0	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.7	48.7
NAL16	40.0	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.7	48.7
NAL17**	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
NAL18**	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8

** for NAL4,5,6 daytime, fixed at 45dB from 4ms^{-1} as per the noise condition included within the Bilboa Wind Farm Consent.*

*** for NAL17 and 18, fixed at 45dB from 5ms^{-1} as per the noise condition included within White Hill Wind Farm Consent.*

Table 6.3 WEDG Noise Limits Night-time

Location	Wind Speed (ms^{-1}) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
NAL2	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
NAL3	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
NAL4	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
NAL5	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
NAL6	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
NAL7	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9

Location	Wind Speed (ms^{-1}) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL8	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
NAL9	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
NAL10	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
NAL11	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
NAL12	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
NAL13	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
NAL14	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
NAL15	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
NAL16	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
NAL17	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
NAL18	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5

6.4 Stage 2 – Likely Effects and Cumulative Assessment

6.4.1 A likely cumulative noise assessment was undertaken at all NALs. Figures A1.3a-r (Annex 1) show the cumulative predictions (assuming a Vestas V150 as the candidate turbine for the Proposed Project) compared against the 'Total WEDG Noise Limits'. The individual contribution of all wind farms is also shown on the figures.

6.4.2 Table 6.4 and Table 6.5 below show a summary from the cumulative operation of all wind farms and when assuming a Vestas V150 for the Proposed Project.

6.4.3 The result of this likely cumulative noise assessment shows that the Proposed Project can operate concurrently with the nearby operational and consented wind farms, whilst still meeting the Total WEDG Noise Limits at all NALs. At NAL15, there was a marginal exceedance predicted during the daytime period at 6 ms-1, predicted noise levels have therefore been reduced to ensure that the limits are met, this would be achieved by the adoption of low noise modes, but this would only be required for a limited range of wind speeds and wind directions. The Tables show that, subject to the adoption of low noise modes to ensure compliance, the predicted wind turbine noise immission levels meet the Total WEDG Noise Limits under all conditions and at all locations for both daytime and night time periods.

Table 6.4 Total WEDG Compliance Table – Likely Cumulative Noise – Daytime

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	45	45	45	45	46	50.1	55.1
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.3	30.6	34.8	38.1	38.9	39.0	39.0	39.1	39.1	39.1
	Exceedance Level	-	-	-12.7	-9.4	-5.2	-6.9	-6.1	-6	-6	-6.9	-11	-16
NAL2	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	45	45	45	45	46	50.1	55.1
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.3	29.6	33.8	37	37.8	37.9	38	38	38	38
	Exceedance Level	-	-	-13.7	-10.4	-6.2	-8.0	-7.2	-7.1	-7.0	-8.0	-12.1	-17.1
NAL3	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	45	45	45	45	46	50.1	55.1
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.1	32.4	36.6	39.8	40.5	40.7	40.7	40.7	40.7	40.7
	Exceedance Level	-	-	-10.9	-7.6	-3.4	-5.2	-4.5	-4.3	-4.3	-5.3	-9.4	-14.4
NAL4	Total WEDG Noise Limit, L_{A90}	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.3	33.4	37.6	40.6	41.3	41.4	41.6	41.6	41.6	41.6
	Exceedance Level	-	-	-9.7	-11.6	-7.4	-4.4	-3.7	-3.6	-4.1	-8	-11	-12.2
NAL5	Total WEDG Noise Limit, L_{A90}	40	40	40	45	45	45	45	45	45.7	49.6	52.6	53.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.3	33.5	37.6	40.5	41.2	41.3	41.5	41.5	41.5	41.5
	Exceedance Level	-	-	-9.7	-11.5	-7.4	-4.5	-3.8	-3.7	-4.2	-8.1	-11.1	-12.3
NAL6	Total WEDG Noise Limit, L_{A90}	40	40	40	45	45	45	45	45	45.7	49.6	52.6	53.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.4	33.5	37.6	40.5	41.2	41.4	41.5	41.6	41.6	41.6
	Exceedance Level	-	-	-9.6	-11.5	-7.4	-4.5	-3.8	-3.6	-4.2	-8.0	-11.0	-12.2
NAL7	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	45	45	45	45.4	49.4	53	55.4
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.6	32.8	37	40.2	40.9	41	41.1	41.2	41.2	41.2
	Exceedance Level	-	-	-10.4	-7.2	-3	-4.8	-4.1	-4	-4.3	-8.2	-11.8	-14.2
NAL8	Total WEDG Noise Limit, L_{A90}	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.2	33.4	37.6	40.8	41.6	41.7	41.7	41.8	41.8	41.8
	Exceedance Level	-	-	-9.8	-6.6	-2.4	-4.2	-3.4	-3.3	-3.7	-7.6	-11.2	-13.6
NAL9	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	45	45	45	45.4	49.4	53	55.4
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.9	32.2	36.4	39.7	40.5	40.6	40.6	40.7	40.7	40.7

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-	-11.1	-7.8	-3.6	-5.3	-4.5	-4.4	-4.8	-8.7	-12.3	-14.7
NAL10	Total WEDG Noise Limit, L_{A90}	40	40	40	40	45	45	45	45	45	47.5	50.6	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.5	32.8	37.1	40.5	41.3	41.4	41.4	41.4	41.4	41.4
	Exceedance Level	-	-	-10.5	-7.2	-7.9	-4.5	-3.7	-3.6	-3.6	-6.1	-9.2	-12.5
NAL11	Total WEDG Noise Limit, L_{A90}	40	40	40	40	45	45	45	45	45	47.5	50.6	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.9	31.2	35.4	38.8	39.6	39.7	39.8	39.8	39.8	39.8
	Exceedance Level	-	-	-12.1	-8.8	-9.6	-6.2	-5.4	-5.3	-5.2	-7.7	-10.8	-14.1
NAL12	Total WEDG Noise Limit, L_{A90}	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.2	31.5	35.8	39.2	40	40.1	40.1	40.1	40.1	40.1
	Exceedance Level	-	-	-11.8	-8.5	-9.2	-5.8	-5	-4.9	-4.9	-7.4	-10.5	-13.8
NAL13	Total WEDG Noise Limit, L_{A90}	40	40	40	40	45	45	45	45	48	51	53.6	55.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.2	31.3	35.5	39.0	39.8	39.9	39.9	39.9	39.9	39.9
	Exceedance Level	-	-	-11.8	-8.7	-9.5	-6	-5.2	-5.1	-8.1	-11.1	-13.7	-16
NAL14	Total WEDG Noise Limit, L_{A90}	45	45	45	45	45	45	45	45	45	47.8	51.1	54.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.8	30.2	34.4	37.8	38.6	38.8	38.8	38.8	38.8	38.8
	Exceedance Level	-	-	-18.2	-14.8	-10.6	-7.2	-6.4	-6.2	-6.2	-9.0	-12.3	-16.0
NAL15	Total WEDG Noise Limit, L_{A90}	40	40	40	40	40	40	45	45	45	45	48.7	48.7
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.6	33	37.2	**40***	41.5	41.6	41.6	41.6	41.6	41.6
	Exceedance Level	-	-	-10.4	-7	-2.8	**0***	-3.5	-3.4	-3.4	-3.4	-7.1	-7.1
NAL16	Total WEDG Noise Limit, L_{A90}	40.0	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.7	48.7
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.2	30.5	34.8	38.2	39	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-12.8	-9.5	-5.2	-1.8	-6	-5.9	-5.9	-5.9	-9.6	-9.6
NAL17	Total WEDG Noise Limit, L_{A90}	45	45	45	45	45	45	45	45	45	47.8	51.1	54.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.5	28.7	32.7	36.2	37.2	37.2	37.2	37.2	37.2	37.2
	Exceedance Level	-	-	-18.5	-16.3	-12.3	-8.8	-7.8	-7.8	-7.8	-10.6	-13.9	-17.6
NAL18	Total WEDG Noise Limit, L_{A90}	45	45	45	45	45	45	45	45	45	47.8	51.1	54.8
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.3	29.3	33.4	36.8	37.8	37.8	37.8	37.8	37.8	37.8
	Exceedance Level	-	-	-17.7	-15.7	-11.6	-8.2	-7.2	-7.2	-7.2	-10.0	-13.3	-17.0

Location	Wind Speed (ms^{-1}) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
**Mode management applied*												

Table 6.5 Total WEDG Compliance Table – Likely Cumulative Noise – Night-time

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	43	45.4	48.3	50.7
	Predicted Cumulative Wind Turbine Noise L L_{A90}	-	-	27.3	30.6	34.8	38.1	38.9	39.0	39.0	39.1	39.1	39.1
	Exceedance Level	-	-	-15.7	-12.4	-8.2	-4.9	-4.1	-4	-4	-6.3	-9.2	-11.6
NAL2	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	43	45.4	48.3	50.7
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.3	29.6	33.8	37	37.8	37.9	38	38	38	38
	Exceedance Level	-	-	-16.7	-13.4	-9.2	-6.0	-5.2	-5.1	-5.0	-7.4	-10.3	-12.7
NAL3	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	43	45.4	48.3	50.7
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.1	32.4	36.6	39.8	40.5	40.7	40.7	40.7	40.7	40.7
	Exceedance Level	-	-	-13.9	-10.6	-6.4	-3.2	-2.5	-2.3	-2.3	-4.7	-7.6	-10
NAL4	Total WEDG Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.3	33.4	37.6	40.6	41.3	41.4	41.6	41.6	41.6	41.6
	Exceedance Level	-	-	-12.7	-9.6	-5.4	-2.4	-1.7	-1.6	-3.5	-6.8	-9.2	-10
NAL5	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	45.1	48.4	50.8	51.6
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.3	33.5	37.6	40.5	41.2	41.3	41.5	41.5	41.5	41.5
	Exceedance Level	-	-	-12.7	-9.5	-5.4	-2.5	-1.8	-1.7	-3.6	-6.9	-9.3	-10.1
NAL6	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	45.1	48.4	50.8	51.6
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.4	33.5	37.6	40.5	41.2	41.4	41.5	41.6	41.6	41.6
	Exceedance Level	-	-	-12.6	-9.5	-5.4	-2.5	-1.8	-1.6	-3.6	-6.8	-9.2	-10.0
NAL7	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.8	48.1	50.6	51.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.6	32.8	37	40.2	40.9	41	41.1	41.2	41.2	41.2

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-	-13.4	-10.2	-6	-2.8	-2.1	-2	-3.7	-6.9	-9.4	-10.7
NAL8	Total WEDG Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	30.2	33.4	37.6	40.8	41.6	41.7	41.7	41.8	41.8	41.8
	Exceedance Level	-	-	-12.8	-9.6	-5.4	-2.2	-1.4	-1.3	-3.1	-6.3	-8.8	-10.1
NAL9	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.8	48.1	50.6	51.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.9	32.2	36.4	39.7	40.5	40.6	40.6	40.7	40.7	40.7
	Exceedance Level	-	-	-14.1	-10.8	-6.6	-3.3	-2.5	-2.4	-4.2	-7.4	-9.9	-11.2
NAL10	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.4	47.9	51.1	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.5	32.8	37.1	40.5	41.3	41.4	41.4	41.4	41.4	41.4
	Exceedance Level	-	-	-13.5	-10.2	-5.9	-2.5	-1.7	-1.6	-3.0	-6.5	-9.7	-12.5
NAL11	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.4	47.9	51.1	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.9	31.2	35.4	38.8	39.6	39.7	39.8	39.8	39.8	39.8
	Exceedance Level	-	-	-15.1	-11.8	-7.6	-4.2	-3.4	-3.3	-4.6	-8.1	-11.3	-14.1
NAL12	Total WEDG Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.2	31.5	35.8	39.2	40	40.1	40.1	40.1	40.1	40.1
	Exceedance Level	-	-	-14.8	-11.5	-7.2	-3.8	-3	-2.9	-4.3	-7.8	-11	-13.8
NAL13	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43.7	47.4	50.3	52.2	52.9
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	28.2	31.3	35.5	39.0	39.8	39.9	39.9	39.9	39.9	39.9
	Exceedance Level	-	-	-14.8	-11.7	-7.5	-4	-3.2	-3.8	-7.5	-10.4	-12.3	-13
NAL14	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.2	47.7	50.5	52.5
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.8	30.2	34.4	37.8	38.6	38.8	38.8	38.8	38.8	38.8
	Exceedance Level	-	-	-16.2	-12.8	-8.6	-5.2	-4.4	-4.2	-5.4	-8.9	-11.7	-13.7
NAL15	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	43	43	46.6	50.2
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	29.6	33	37.2	40.7	41.5	41.6	41.6	41.6	41.6	41.6
	Exceedance Level	-	-	-13.4	-10	-5.8	-2.3	-1.5	-1.4	-1.4	-1.4	-5	-8.6
NAL16	Total WEDG Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.2	30.5	34.8	38.2	39	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-15.8	-12.5	-8.2	-4.8	-4	-3.9	-3.9	-3.9	-7.5	-11.1

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL17	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.2	47.7	50.5	52.5
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	26.5	28.7	32.7	36.2	37.2	37.2	37.2	37.2	37.2	37.2
	Exceedance Level	-	-	-16.5	-14.3	-10.3	-6.8	-5.8	-5.8	-7	-10.5	-13.3	-15.3
NAL18	Total WEDG Noise Limit, L_{A90}	43	43	43	43	43	43	43	43	44.2	47.7	50.5	52.5
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	27.3	29.3	33.4	36.8	37.8	37.8	37.8	37.8	37.8	37.8
	Exceedance Level	-	-	-15.7	-13.7	-9.6	-6.2	-5.2	-5.2	-6.4	-9.9	-12.7	-14.7

6.5 Stage 3 – Derivation of Site-Specific Noise Limits

6.5.1 In order to protect residential amenity, the initial recommendations are that cumulatively, all wind farms (including the Proposed Project) should operate within the Total WEDG Noise Limits.

6.5.2 To allow this to occur, a set of Site-Specific Noise limits for the Proposed Project have been derived for all NALs except NAL4-6 (near the permitted Bilboa Wind Farm) where a cumulative noise condition has been proposed instead.

6.5.3 The Site Specific Noise Limits have been derived to take account of the proportion of the noise limit that has been allocated to, or could theoretically be used by, other wind farm developments in proximity to the Proposed Project. Table 6.6 summarises the approach adopted at each NAL to derive the Site-Specific Noise Limits.

Table 6.6 Limit Derivation Strategy

NAL	Limit Derivation Strategy
NALs 1-3 and 7-18	The likely predictions level from other schemes were found to be within 10 dB of the Total Noise Limits at some wind speeds. As such, the limit has been apportioned based on a cautious prediction of cumulative turbine noise. The noise predictions for the nearby consented and operational schemes (permitted Bilboa Wind Farm, permitted White Hill Wind Farm and existing Gortahile Wind Farm) show that there is, in theory, significant headroom between the likely predicted levels and the Total WEDG Noise Limit (>5 dB). A +2 dB buffer was added to the turbine noise predictions for the nearby turbines; this is considered to be a suitable buffer in accordance with Section 5.4.11 of the IOA GPG and would represent a 60% increase in emitted noise levels from the other schemes. The 'cautious' predictions of nearby wind turbines noise were then logarithmically subtracted from the Total WEDG Noise Limit to determine the Site Specific Noise Limits. This in most cases, resulted in Site Specific Noise Limits only slightly below the Total WEDG Noise Limit.

6.5.4 A series of graphs to show the predicted wind turbine noise from the Proposed Project on its own (with three different candidate turbines) compared to the Site-Specific Noise Limits are included as Figures A1.4a – A1.4o (Annex 1). The Total WEDG Noise Limit are also shown on these figures to illustrate the difference with the Site-Specific Noise Limits.

6.5.5 Table 6.7 and Table 6.8 below summarise the figures and show the daytime and night-time Site-Specific Noise Limits, noise predictions for the Proposed Project(with a Vestas V150) and the exceedance level. A negative exceedance demonstrates compliance with the Site-Specific Noise Limits.

6.5.6 The Stage 3 assessment shows that the predicted wind turbine noise levels from the Proposed Project on its own meet the Site Specific Noise Limits at all locations. At NAL15,

there was a marginal exceedance initially predicted during the daytime period at 6 ms-1 (0.8 dB), predicted noise levels have therefore been reduced to ensure that the limits are met, this would be achieved by the adoption of low noise modes, but this would only be required for a limited range of wind speeds and wind directions. The Tables show that, subject to the adoption of low noise modes to ensure compliance, the predicted wind turbine noise immission levels meet the SiteSpecific Noise Limits under all conditions and at all locations for both daytime and night time periods.

In the event that planning permission is granted for the Proposed Project it would be appropriate to set noise limits equal to the Site Specific Noise Limits.

Table 6.7 Site-Specific Noise Compliance Table – Daytime

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.9	39.6	44.8	44.8	44.7	44.7	45.8	50.0	55.1
	Proposed Project Wind Turbine Noise L_{A90}	-	-	25.9	29.3	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-	-	-14.0	-10.6	-6.0	-7.7	-6.9	-6.7	-6.7	-7.8	-12.0	-17.1
NAL2	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.9	39.6	44.8	44.8	44.8	44.7	45.8	50.0	55.1
	Proposed Project Wind Turbine Noise L_{A90}	-	-	24.4	27.8	32.1	35.6	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-	-	-15.5	-12.1	-7.5	-9.2	-8.4	-8.3	-8.2	-9.3	-13.5	-18.6
NAL3	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.7	39.3	44.6	44.6	44.6	44.5	45.6	50.0	55.1
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.5	30.9	35.2	38.7	39.5	39.6	39.6	39.6	39.6	39.6
	Exceedance Level	-	-	-12.4	-8.8	-4.1	-5.9	-5.1	-5.0	-4.9	-6.0	-10.4	-15.5
NAL7	Site-Specific Noise Limit, L_{A90}	39.8	39.8	39.8	39.6	38.8	44.4	44.4	44.3	44.7	49.1	52.9	55.3
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.9	31.3	35.6	39.1	39.9	40.0	40.0	40.0	40.0	40.0
	Exceedance Level	-	-	-11.9	-8.3	-3.2	-5.3	-4.5	-4.3	-4.7	-9.1	-12.9	-15.3
NAL8	Site-Specific Noise Limit, L_{A90}	39.8	39.8	39.8	39.7	39.2	44.6	44.6	44.5	44.9	49.2	52.9	55.4
	Proposed Project Wind Turbine Noise L_{A90}	-	-	28.8	32.2	36.5	40.0	40.8	40.9	40.9	40.9	40.9	40.9
	Exceedance Level	-	-	-11.0	-7.5	-2.7	-4.6	-3.8	-3.6	-4.0	-8.3	-12.0	-14.5
NAL9	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.9	39.7	44.8	44.8	44.8	45.2	49.3	53.0	55.4
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.9	31.3	35.6	39.1	39.9	40.0	40.0	40.0	40.0	40.0
	Exceedance Level	-	-	-12.0	-8.6	-4.1	-5.7	-4.9	-4.8	-5.2	-9.3	-13.0	-15.4
NAL10	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.9	44.9	44.9	44.8	44.8	44.8	47.4	50.5	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	28.9	32.3	36.6	40.1	40.9	41.0	41.0	41.0	41.0	41.0
	Exceedance Level	-	-	-11.0	-7.6	-8.3	-4.8	-3.9	-3.8	-3.8	-6.4	-9.5	-12.9
NAL11	Site-Specific Noise Limit, L_{A90}	40.0	40.0	40.0	39.9	44.9	44.9	44.9	44.9	44.9	47.4	50.6	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.2	30.6	34.9	38.4	39.2	39.3	39.3	39.3	39.3	39.3
	Exceedance Level	-	-	-12.8	-9.3	-10.0	-6.5	-5.7	-5.6	-5.6	-8.1	-11.3	-14.6
NAL12	Site-Specific Noise Limit, L_{A90}	40.0	40.0	40.0	39.9	44.9	44.9	44.9	44.9	44.9	47.4	50.6	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.6	31.0	35.3	38.8	39.6	39.7	39.7	39.7	39.7	39.7

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-	-12.4	-8.9	-9.6	-6.1	-5.3	-5.2	-5.2	-7.7	-10.9	-14.2
NAL13	Site-Specific Noise Limit, L_{A90}	39.9	39.9	39.9	39.9	44.9	44.8	44.7	44.7	47.9	50.9	53.6	55.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.0	30.4	34.7	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-12.9	-9.5	-10.2	-6.6	-5.7	-5.6	-8.8	-11.8	-14.5	-16.8
NAL14	Site-Specific Noise Limit, L_{A90}	45.0	45.0	45.0	45.0	44.9	44.7	44.7	44.7	44.7	47.6	51.0	54.8
	Proposed Project Wind Turbine Noise L_{A90}	-	-	26.2	29.6	33.9	37.4	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-	-	-18.8	-15.4	-11.0	-7.3	-6.5	-6.4	-6.4	-9.3	-12.7	-16.5
NAL15	Site-Specific Noise Limit, L_{A90}	40.0	40.0	40.0	39.9	39.8	39.6	44.8	44.8	44.8	44.8	48.6	48.6
	Proposed Project Wind Turbine Noise L_{A90}	-	-	29.2	32.6	36.9	**39.6***	41.2	41.3	41.3	41.3	41.3	41.3
	Exceedance Level	-	-	-10.8	-7.3	-2.9	**0.0***	-3.6	-3.5	-3.5	-3.5	-7.3	-7.3
NAL16	Site-Specific Noise Limit, L_{A90}	40.0	40.0	40.0	39.9	39.8	39.6	44.9	44.8	44.8	44.8	48.6	48.6
	Proposed Project Wind Turbine Noise L_{A90}	-	-	26.5	29.9	34.2	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-	-	-13.5	-10.0	-5.6	-1.9	-6.4	-6.2	-6.2	-6.2	-10.0	-10.0
NAL17	Site-Specific Noise Limit, L_{A90}	45.0	45.0	45.0	44.9	44.8	44.6	44.5	44.5	44.5	47.5	51.0	54.7
	Proposed Project Wind Turbine Noise L_{A90}	-	-	20.9	24.3	28.6	32.1	32.9	33.0	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-24.1	-20.6	-16.2	-12.5	-11.6	-11.5	-11.5	-14.5	-18.0	-21.7
NAL18	Site-Specific Noise Limit, L_{A90}	44.9	44.9	44.9	44.9	44.8	44.4	44.3	44.3	44.3	47.4	50.9	54.7
	Proposed Project Wind Turbine Noise L_{A90}	-	-	22.6	26.0	30.3	33.8	34.6	34.7	34.7	34.7	34.7	34.7
	Exceedance Level	-	-	-22.3	-18.9	-14.5	-10.6	-9.7	-9.6	-9.6	-12.7	-16.2	-20.0

**Mode management applied*

Table 6.8 Site-Specific Noise Compliance Table – Night-time

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.8	42.7	42.6	42.6	42.6	45.2	48.2	50.6
	Proposed Project Wind Turbine Noise L_{A90}	-	-	25.9	29.3	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-	-	-17.1	-13.6	-9.2	-5.6	-4.7	-4.6	-4.6	-7.2	-10.2	-12.6
NAL2	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.8	42.7	42.6	42.6	42.6	45.2	48.2	50.6
	Proposed Project Wind Turbine Noise L_{A90}	-	-	24.4	27.8	32.1	35.6	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-	-	-18.6	-15.1	-10.7	-7.1	-6.2	-6.1	-6.1	-8.7	-11.7	-14.1
NAL3	Site-Specific Noise Limit, L_{A90}	42.9	42.9	42.9	42.9	42.7	42.4	42.3	42.3	42.3	45.0	48.1	50.6
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.5	30.9	35.2	38.7	39.5	39.6	39.6	39.6	39.6	39.6
	Exceedance Level	-	-	-15.4	-12.0	-7.5	-3.7	-2.8	-2.7	-2.7	-5.4	-8.5	-11.0
NAL7	Site-Specific Noise Limit, L_{A90}	42.9	42.9	42.9	42.8	42.5	42.1	41.9	41.9	44.0	47.7	50.4	51.8
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.9	31.3	35.6	39.1	39.9	40.0	40.0	40.0	40.0	40.0
	Exceedance Level	-	-	-15.0	-11.5	-6.9	-3.0	-2.0	-1.9	-4.0	-7.7	-10.4	-11.8
NAL8	Site-Specific Noise Limit, L_{A90}	42.9	42.9	42.9	42.9	42.6	42.4	42.3	42.3	44.3	47.8	50.5	51.8
	Proposed Project Wind Turbine Noise L_{A90}	-	-	28.8	32.2	36.5	40.0	40.8	40.9	40.9	40.9	40.9	40.9
	Exceedance Level	-	-	-14.1	-10.7	-6.1	-2.4	-1.5	-1.4	-3.4	-6.9	-9.6	-10.9
NAL9	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.8	42.7	42.7	42.7	44.6	48.0	50.5	51.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.9	31.3	35.6	39.1	39.9	40.0	40.0	40.0	40.0	40.0
	Exceedance Level	-	-	-15.1	-11.6	-7.2	-3.6	-2.8	-2.7	-4.6	-8.0	-10.5	-11.9
NAL10	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.9	42.8	42.7	42.7	44.2	47.8	51.1	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	28.9	32.3	36.6	40.1	40.9	41.0	41.0	41.0	41.0	41.0
	Exceedance Level	-	-	-14.1	-10.6	-6.3	-2.7	-1.8	-1.7	-3.2	-6.8	-10.1	-12.9
NAL11	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.8	44.3	47.8	51.1	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.2	30.6	34.9	38.4	39.2	39.3	39.3	39.3	39.3	39.3
	Exceedance Level	-	-	-15.8	-12.4	-8.0	-4.4	-3.6	-3.5	-5.0	-8.5	-11.8	-14.6
NAL12	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.8	44.2	47.8	51.1	53.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.6	31.0	35.3	38.8	39.6	39.7	39.7	39.7	39.7	39.7

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-	-15.4	-12.0	-7.6	-4.0	-3.2	-3.1	-4.5	-8.1	-11.4	-14.2
NAL13	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.8	42.6	42.5	43.3	47.2	50.2	52.1	52.9
	Proposed Project Wind Turbine Noise L_{A90}	-	-	27.0	30.4	34.7	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-16.0	-12.5	-8.1	-4.4	-3.5	-4.2	-8.1	-11.1	-13.0	-13.8
NAL14	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	42.9	42.8	42.6	42.5	42.5	43.8	47.5	50.4	52.4
	Proposed Project Wind Turbine Noise L_{A90}	-	-	26.2	29.6	33.9	37.4	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-	-	-16.8	-13.3	-8.9	-5.2	-4.3	-4.2	-5.5	-9.2	-12.1	-14.1
NAL15	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	42.9	42.8	42.7	42.7	42.7	42.7	46.5	50.1
	Proposed Project Wind Turbine Noise L_{A90}	-	-	29.2	32.6	36.9	40.4	41.2	41.3	41.3	41.3	41.3	41.3
	Exceedance Level	-	-	-13.8	-10.4	-6.0	-2.4	-1.5	-1.4	-1.4	-1.4	-5.2	-8.8
NAL16	Site-Specific Noise Limit, L_{A90}	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.7	42.7	42.7	46.5	50.2
	Proposed Project Wind Turbine Noise L_{A90}	-	-	26.5	29.9	34.2	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-	-	-16.5	-13.1	-8.7	-5.1	-4.3	-4.1	-4.1	-4.1	-7.9	-11.6
NAL17	Site-Specific Noise Limit, L_{A90}	42.9	42.9	42.9	42.9	42.7	42.3	42.1	42.1	43.6	47.4	50.4	52.4
	Proposed Project Wind Turbine Noise L_{A90}	-	-	20.9	24.3	28.6	32.1	32.9	33.0	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-22.0	-18.6	-14.1	-10.2	-9.2	-9.1	-10.6	-14.4	-17.4	-19.4
NAL18	Site-Specific Noise Limit, L_{A90}	42.9	42.9	42.9	42.8	42.6	42.1	41.8	41.8	43.3	47.3	50.3	52.4
	Proposed Project Wind Turbine Noise L_{A90}	-	-	22.6	26.0	30.3	33.8	34.6	34.7	34.7	34.7	34.7	34.7
	Exceedance Level	-	-	-20.3	-16.8	-12.3	-8.3	-7.2	-7.1	-8.6	-12.6	-15.6	-17.7

6.6 Cumulative Noise Limits

6.6.1 At NALs 4-6, noise limits for the permitted Bilboa Wind Farm have already been established. On that basis Cumulative Noise Limits have been proposed whereby the Proposed Project would be conditioned to ensure that the cumulative wind turbine noise (from the combined operation of permitted Bilboa Wind Farm and the Proposed Project) would be below the Cumulative Noise Limit. At NALs 4-6, as demonstrated in Table 6.4 and Table 6.5, the cumulative noise immissions are below, or equal to, the Total WEDG Noise Limit (which is the same as the Cumulative Noise Limit), thus indicating that all schemes can operate concurrently at these receptors. If the situation arose whereby noise levels from the permitted Bilboa Wind Farm increased to use a greater amount of the noise limits than predicted, then the Proposed Project may then need to implement mitigation to reduce noise levels to ensure that the Cumulative Noise Limit is met. In the event that noise from the permitted Bilboa Wind Farm used all of the Cumulative Noise limit, noise from the Proposed Project would need to be reduced such that it has a negligible additional contribution. In order to enable this to be enforced, Backstop Noise Limits have been derived which are 10 dB below the Cumulative Noise Limits.

6.6.2 Figures A8.1a-A8.1c (Annex 8) include graphs which show the predicted wind turbine noise from the Proposed Project compared to the Backstop Noise Limits at NAL4-6. The graphs show the Total WEDG Noise Limit (Cumulative Noise Limit) (solid red line), Backstop Noise Limit (dashed orange line with triangles) and the predicted wind turbine noise from the Proposed Project (for three candidate wind turbines, solid blue and dashed blue lines with markers).

6.6.3 As shown on Figures A8.1a-A8.1c, in the event that the Proposed Project needed to operate to the Backstop Noise Limits, mitigation would be required during the daytime and night time period, and the exceedance are shown in Tables A8.1 and A8.2 of Annex 8. The mitigation would potentially require a combination of low noise mode and switch-off in specific wind condition (if backstop is triggered).

6.6.4 The results presented are based on the worst case wind direction. A set of suggested Noise Conditions are presented within Annex 9 which present Site Specific Noise Limits for NALs 1-3 and 7-18 and Cumulative Noise Limits and Backstop Noise Limits for NALs 4-6. A flow chart illustrating how this would be implemented is also included.

6.7 Summary and Conclusions

6.7.1 This report has assessed the potential impact of operational noise from the Proposed Project on nearby Noise Sensitive Receptors (NSRs) using the guidance contained within the WEDG 2006. Reference was also made to guidance contained in ETSU-R-97 and the IOA GPG to supplement the WEDG 2006.

6.7.2 Background noise monitoring was undertaken by TNEI at 7 no. locations neighbouring the Proposed Project. A total of 158 NSRs were identified, of which 18 chosen as Noise Assessment Locations (NALs). For the assessment locations where no background noise measurements were undertaken, noise data collected at proxy locations considered representative of the background noise environment was used to assess the noise impact at those receptors.

6.7.3 Concurrent wind speed data was collected using a LIDAR unit located within the Proposed Project site. The data collected at 100m and 110m height, which were used to calculate hub height wind speeds (105m), were then standardised to 10m height in accordance with current good practice.

6.7.4 Analysis of the measured data was undertaken to determine the pre-existing background noise environment and to establish the daytime and night-time noise limits for each of the assessment locations. A 'Total WEDG Noise Limit' of 40 dB(A), where background noise levels are below 30 dB, and 45 dB or background noise plus 5 dB, whichever is the greater, where background noise levels are above 30 dB was set for the daytime. A limit of 43 dB(A) or background noise plus 5 dB, whichever is the greater, was used for night time. The exception being at NALs located in proximity to the nearby permitted Bilboa Wind Farm and permitted White Hill Wind Farm as limits have been already set at those NALs therefore the criteria detailed within the planning consents for those schemes was adopted.

6.7.5 Predictions of wind turbine noise for the Proposed Project were made, based upon the sound power level data for the Vestas V150 6.0 MW, Nordex N149 5.7MW and Siemens Gamesa SG 6.0-155 which are candidate turbines that fall within the range of turbine dimensions proposed as part of the application. The V150 and N149 have been assumed with a proposed hub height of 105m and the SG 6.0-155 with a proposed hub height of 102.5m. These candidate turbine models are considered representative of the type of turbine that could be installed at the Proposed Wind Farm site.

6.7.6 There are a number of operational and consented wind farms in proximity to the Proposed Wind Farm. A cumulative assessment was undertaken where predicted levels from the Proposed Project were found to be within 10 dB of the predicted cumulative levels from other wind farm developments in the area. Predicted cumulative levels noise levels from all turbines in the area (i.e. the permitted Bilboa Wind Farm, the permitted White Hill Wind Farm, and the existing Gortahile Wind Farm) and the Proposed Wind Farm indicate that for neighbouring dwellings, wind turbine noise would meet the Total WEDG Noise Limit at all receptors. At NAL15 initial predicted noise levels with a candidate wind turbine in full mode exceeded marginally the Total WEDG Noise Limit in daytime at 6ms-1 (0.7 dB) but the use of low noise modes2 was assumed to mitigate this marginal exceedance.

[2] This involves operating turbines in low noise mode. This usually involves restricting the rotor speed with a corresponding reduction in noise emissions and electrical power generation.

6.7.7 Site-Specific Noise Limits were also been derived for the Proposed Proejct at all NALs excluding NAL4-6. In deriving the Site-Specific Noise Limits consideration was given to the noise limit already allocated to or which could theoretically be used by other operational and permitted wind farms in proximity to the Proposed Wind Farm. An assessment was undertaken to determine whether the Proposed Wind Farm could operate within the 'Site-Specific Noise Limits' and it was found that at all receptors turbine noise immissions were below the Site-Specific Noise Limits when considering all threes candidate turbines. At NAL15 initial predicted noise levels when assuming a candidate in full mode exceeded the daytime Site-Specific Noise Limit marginally at 6 ms-1 (0.8 dB) in daytime, however the use of low noise modes was assumed to mitigate this exceedance so the predicted levels presented in this report meet the limits.

6.7.8 The use of Site-Specific Noise Limits for the operational phase would ensure that the Proposed Project could operate concurrently with other operational wind farm developments in the area and would also ensure that the Proposed Project's individual contribution could be measured and enforced if required.

6.7.9 For completeness, the cumulative noise predictions for all other NSRs have been included within Annex 5.

6.7.10 NAL4, NAL5 and NAL6 are located between the permitted Bilboa Wind Farm and the Proposed Project and limits were already established. On that basis a Cumulative Noise Condition has been proposed whereby the Proposed Porject would be conditioned to ensure that the cumulative wind turbine noise (from the combined operation of the permitted Bilboa Wind Farm, and the Proposed Project) would meet the Cumulative Noise Limit. In the event that the noise immission from the permitted Bilboa Wind Farm increased to use a greater amount of the Cumulative Noise Limit than predicted, then the Proposed Project may then need to operate to a proposed more restrictive Backstop Noise Limits which would be set at 10 dB below the Cumulative Noise limits and require mitigation. The mitigation would potentially require a combination of low noise mode and switch-off in specific wind condition (if backstop is triggered).

6.7.11 The wind turbine models assumed in this assessment were chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Project receive planning permission, the final choice of wind turbine would be subject to a competitive tendering process and the final choice of wind turbine would, however, have to meet the noise limits in the noise assessment. A suggested noise related planning condition has been included in Annex 9.

7 Glossary of Terms

Amplitude Modulation: a variation in noise level over time; for example, observers may describe a 'whoosh whoosh' sound, which can be heard close to a wind turbine as the blades sweep past.

Attenuation: the reduction in level of a sound between the source and a receiver due to any combination of effects including: distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.

Background Noise: the noise level rarely fallen below in any given location over any given time period, often classed according to daytime, evening or night-time periods. The L_{A90} indices (see below) is often used to represent the background noise level.

Bin: subset or group into which data can be sorted; in the case of wind speeds, bins are often centred on integer wind speeds with a width of $1ms^{-1}$. For example the $4ms^{-1}$ bin would include all data with wind speeds of 3.5 to $4.5ms^{-1}$.

Dawn Chorus: noise due to birds which can occur at sunrise.

Broadband Noise: noise with components over a wide range of frequencies.

Decibel (dB): the ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. A logarithmic scale is used in noise level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level.

dB(A): the ear has the ability to recognise a particular sound depending on its pitch or frequency. Microphones cannot differentiate noise in the same way as the ear, and to counter this weakness the noise measuring instrument applies a correction to correspond more closely to the frequency response of the human ear. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise. Some typical subjective changes in noise levels are:

- A change of 3 dB(A) is just perceptible;
- A change of 5 dB(A) is clearly perceptible;
- A change of 10 dB(A) is twice (or half) as loud.

Directivity: the property of a sound source that causes more sound to be radiated in one direction than another.

Frequency: the pitch of a sound in Hz or kHz. See Hertz.

Ground Effects: the modification of sound at a receiver location due to the interaction of the sound wave with the ground along its propagation path from source to receiver. Described using the term 'G', and ranges between 0 (hard), 0.5 (mixed) and 1 (soft).

Hertz (Hz): sound frequency refers to how quickly the air vibrates, or how close the sound waves are to each other (in cycles per second, or Hertz (Hz)).

L_w: is the sound power level. It is a measure of the total noise energy radiated by a source of noise, and is used to calculate noise levels at a distant location. The L_{WA} is the A-weighted sound power level.

L_{eq}: is the equivalent continuous sound level, and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. The $LA_{eq,T}$ is the A-weighted equivalent continuous sound level over a given time period (T).

L_{90}: index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background noise level. The $L_{A90,10min}$ is the A-weighted background noise level over a ten minute measurement sample.

Noise emission: the noise energy emitted by a source (e.g. a wind turbine).

Noise immission: the sound pressure level detected at a given location (e.g. the nearest dwelling).

Night-time Hours: ETSU-R-97 defines the night-time hours as 23.00 to 07.00 every day.

Quiet Daytime Hours: ETSU-R-97 defines the amenity hours as 18.00 to 23.00 Monday to Friday, 13.00 to 23.00 on Saturdays and 07.00 to 23.00 on Sundays.

Sound Level Meter: an instrument for measuring sound pressure level.

Sound Power Level: the total sound power radiated by a source, in decibels.

Sound Pressure Level: a measure of the sound pressure at a point, in decibels**.**

Standardised Wind Speed: a wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m using a roughness length of 0.05 for standardisation purpose (in accordance with the IEC 61400-11 standard).

Tonal Noise: noise which covers a very restricted range of frequencies (e.g. a range of ≤20 Hz). This noise can be more annoying than broadband noise.

Wind Shear: the increase of wind speed with height above the ground.

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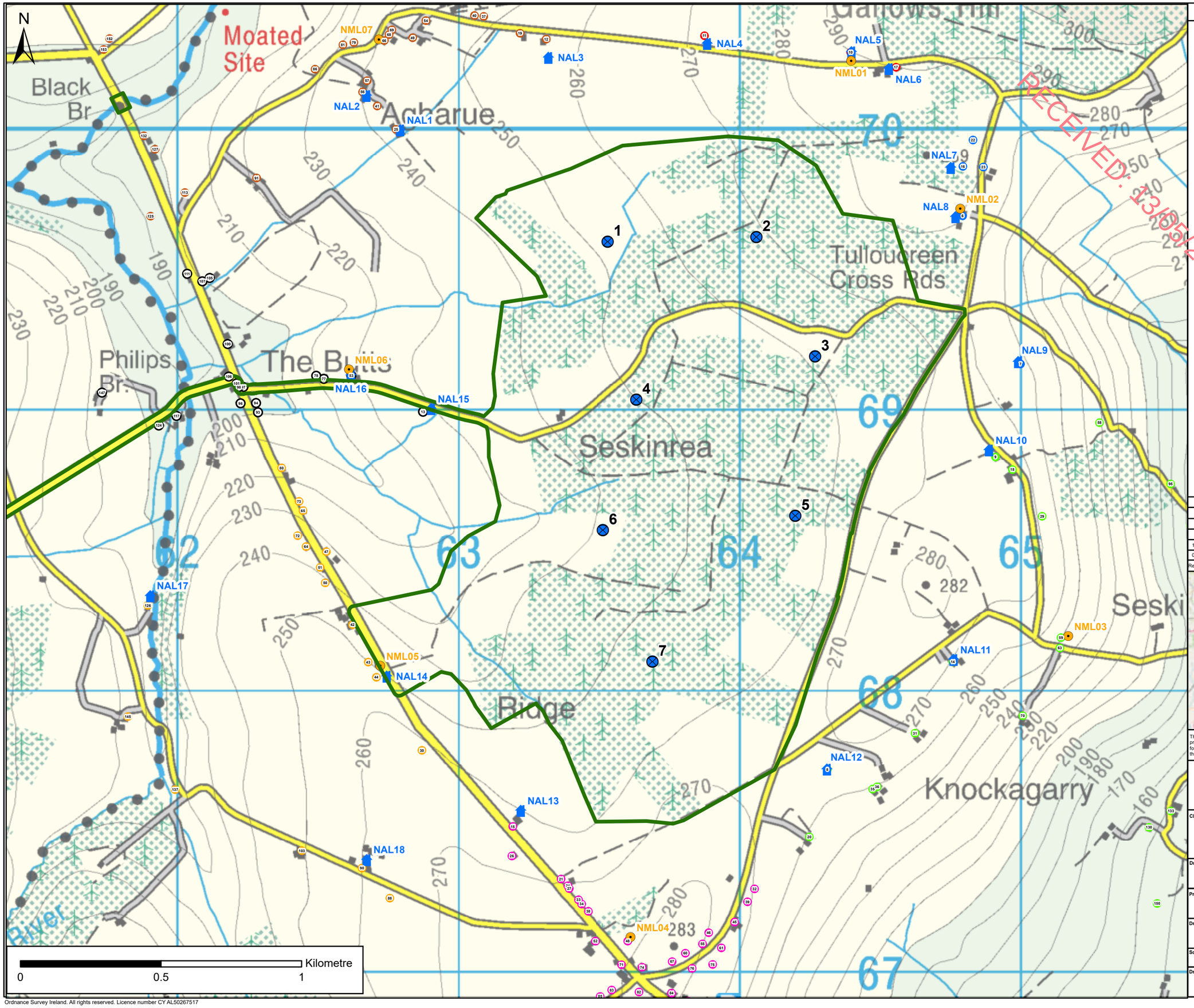
Annex 1 – Figures



LEGEND

- Proposed EIAR Site Boundary
- Noise Monitoring Locations (NMLs)
- Noise Assessment Locations (NALs)

Wind Farms

- Seskin (Proposed Project)
- White Hills (Permitted)
- Bilboa (Permitted)
- Gortahile (Existing)

Noise Sensitive Receptors (NSRs)

- NSRs Represented By Noise Monitoring Location (NML) 1
- NSRs Represented By Noise Monitoring Location (NML) 2
- NSRs Represented By Noise Monitoring Location (NML) 3
- NSRs Represented By Noise Monitoring Location (NML) 4
- NSRs Represented By Noise Monitoring Location (NML) 5
- NSRs Represented By Noise Monitoring Location (NML) 6
- NSRs Represented By Noise Monitoring Location (NML) 7

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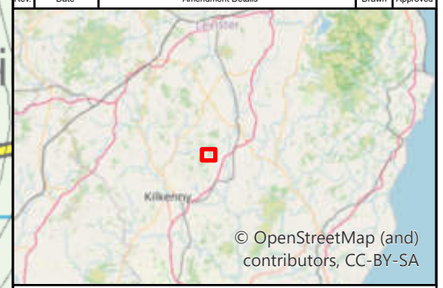
0	11/03/2024	FIRST ISSUE	ST	MC



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Drawing Status: FOR PLANNING

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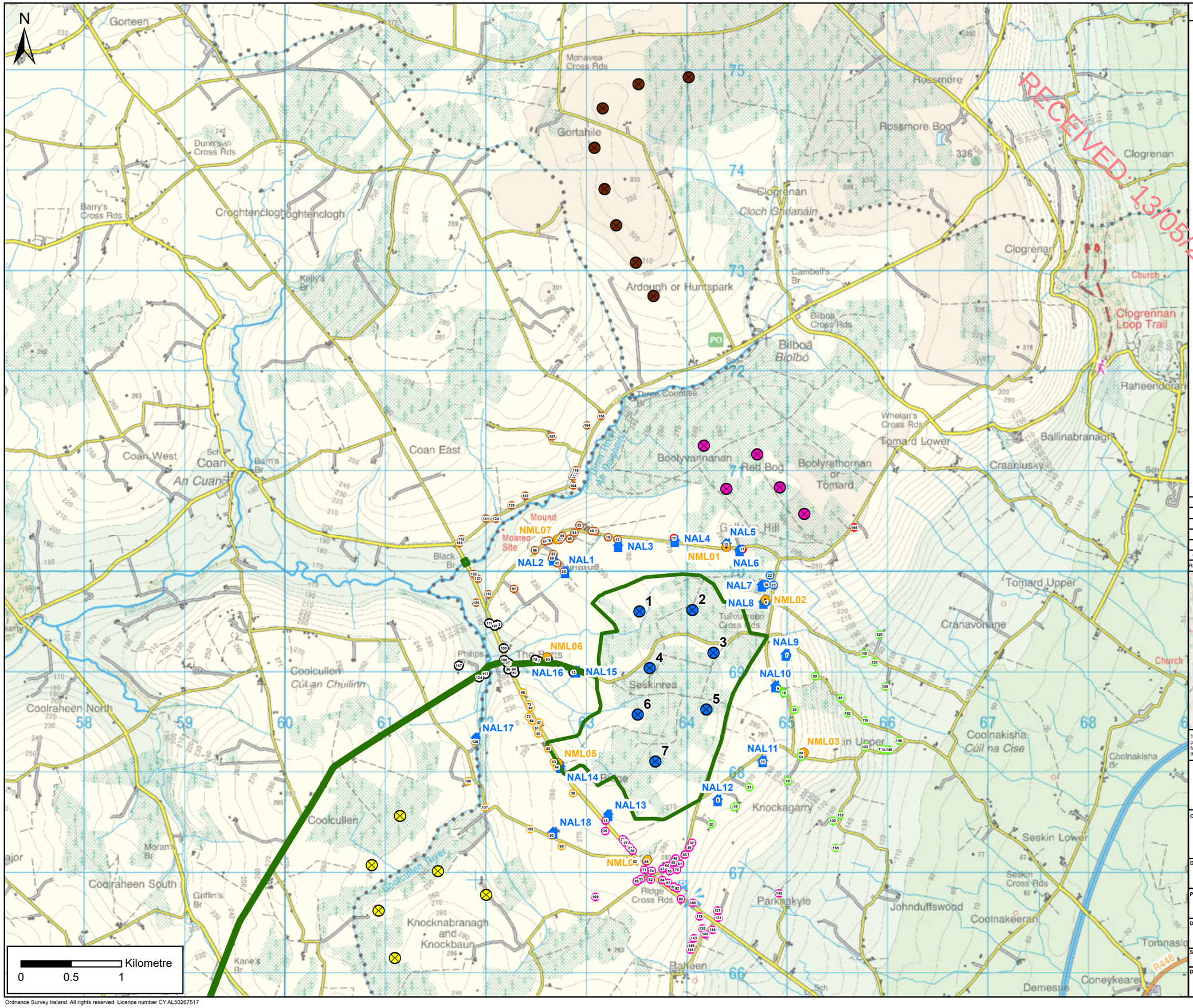

LEGEND

- Proposed EIAR Site Boundary
- Noise Monitoring Locations (NMLs)
- Noise Assessment Locations (NALs)

Wind Farms

- Seskin (Proposed Project)
- White Hills (Permitted)
- Bilboa (Permitted)
- Gortahile (Existing)

Noise Sensitive Receptors (NSRs)

- NSRs Represented By Noise Monitoring Location (NML) 1
- NSRs Represented By Noise Monitoring Location (NML) 2
- NSRs Represented By Noise Monitoring Location (NML) 3
- NSRs Represented By Noise Monitoring Location (NML) 4
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- NSRs Represented By Noise Monitoring Location (NML) 7

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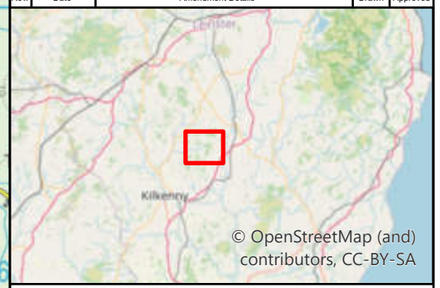

Client: EDF renewables

Drawing Status: FOR PLANNING

Project Title: SESKIN WIND FARM, CO. CARLOW

Drawing Title: FIGURE A1.1A - CUMULATIVE WIND FARM LOCATIONS

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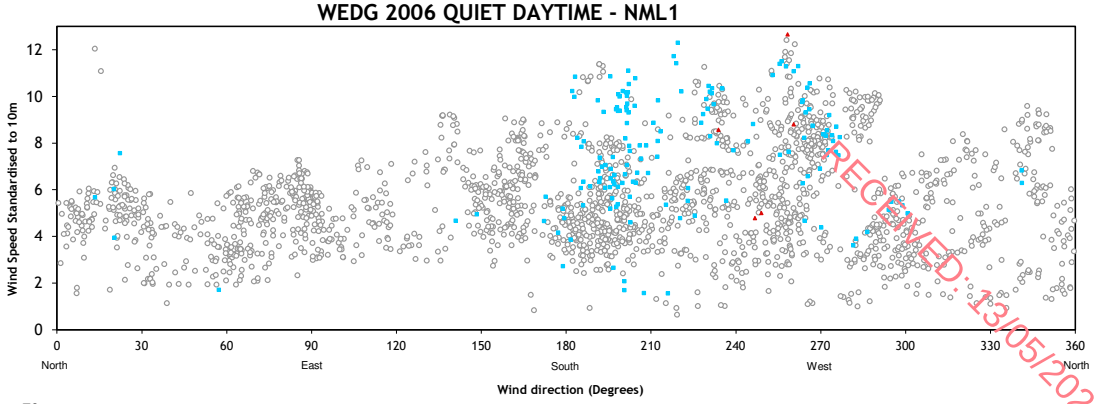
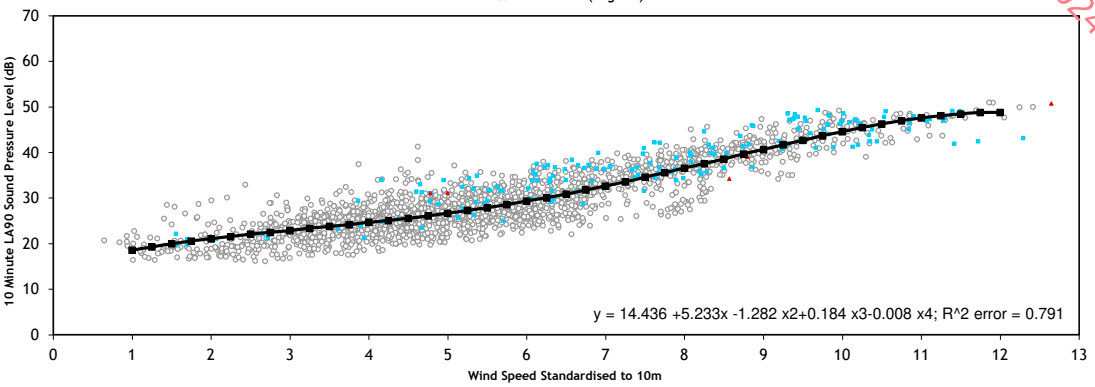
WEDG 2006 QUIET DAYTIME - NML1

Wind Conditions Quiet Daytime



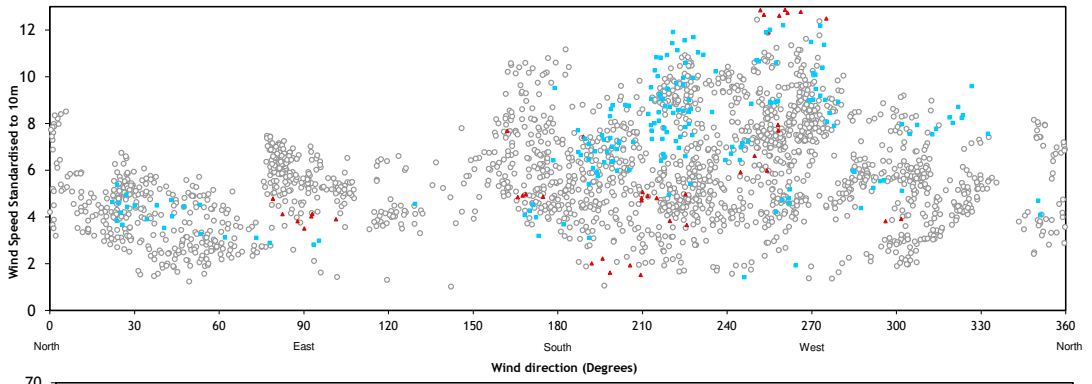
Regression Analysis Quiet Daytime



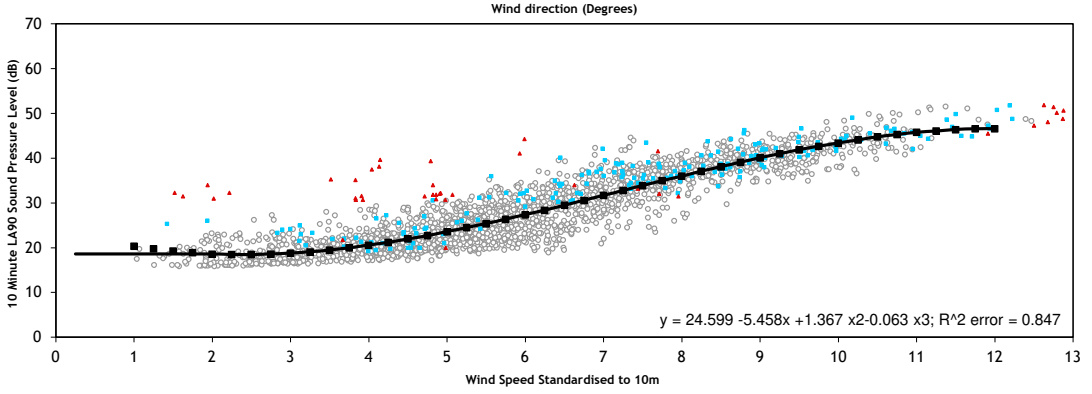
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	78	229	355	425	333	178	197	119	62	21	7	2004
Prevailing Background	21.1	22.9	24.7	26.7	29.4	32.7	36.6	40.7	44.6	47.6	48.8	

WEDG 2006 NIGHT-TIME - NML1

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	82	178	318	426	361	256	197	156	96	31	5	2106
Prevailing Background	18.6	18.8	20.6	23.6	27.4	31.7	36	40.1	43.4	45.8	46.6	

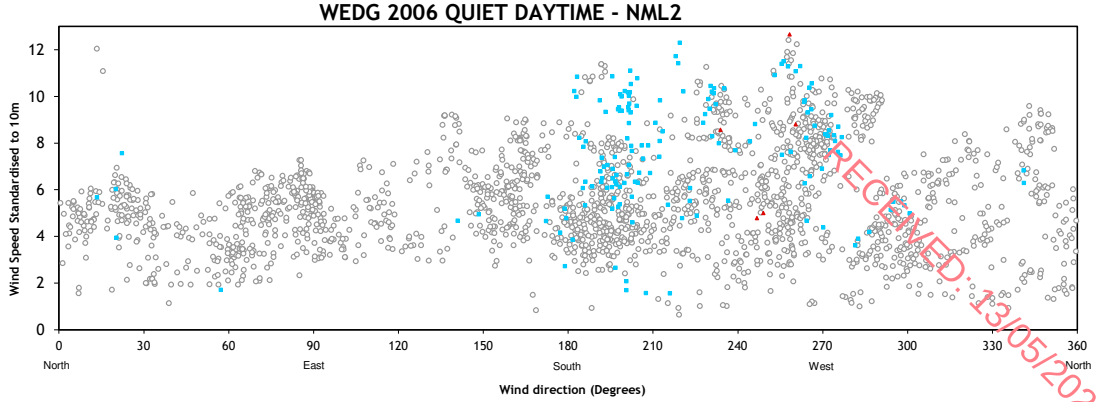
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate (Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

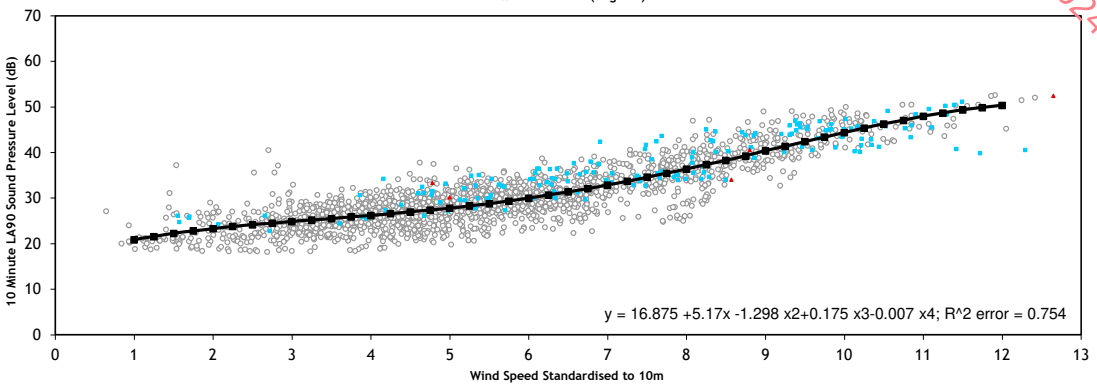
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML1
Figure Number	A1.2a
Drawn	CB
Checked	MC
Date	29/08/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML2

Wind Conditions Quiet Daytime



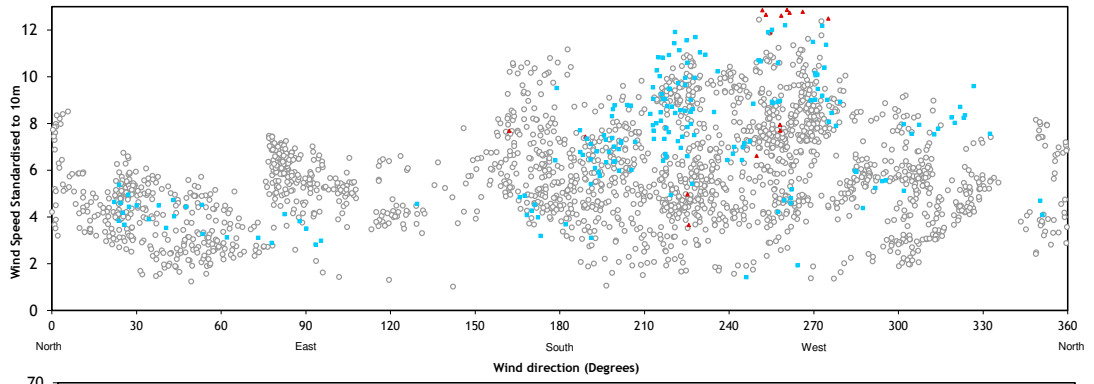
Regression Analysis Quiet Daytime



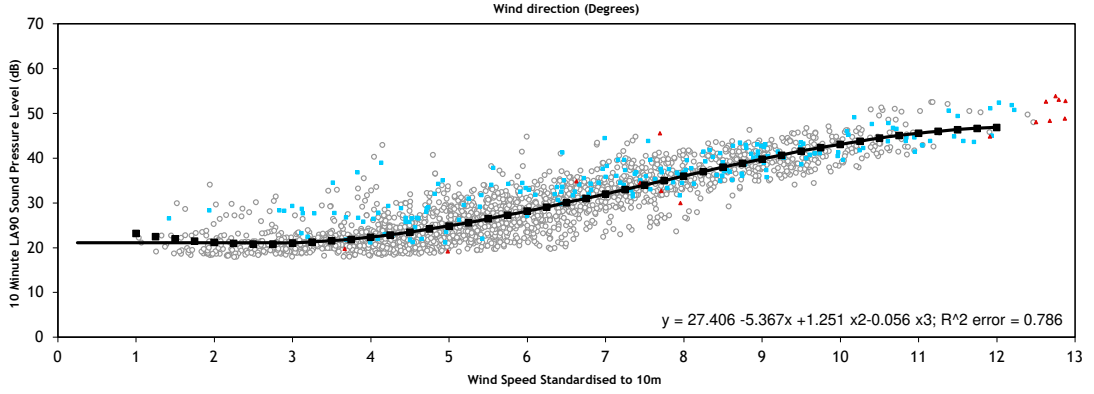
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	78	229	355	425	333	178	197	119	62	21	7	2004
Prevailing Background	23.3	24.9	26.2	27.8	30	32.9	36.4	40.4	44.4	48	50.4	

WEDG 2006 NIGHT-TIME - NML2

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	87	178	324	434	363	256	197	156	96	31	5	2127
Prevailing Background	21.1	21.1	22.4	24.9	28.2	32	36	39.8	43.1	45.6	46.9	

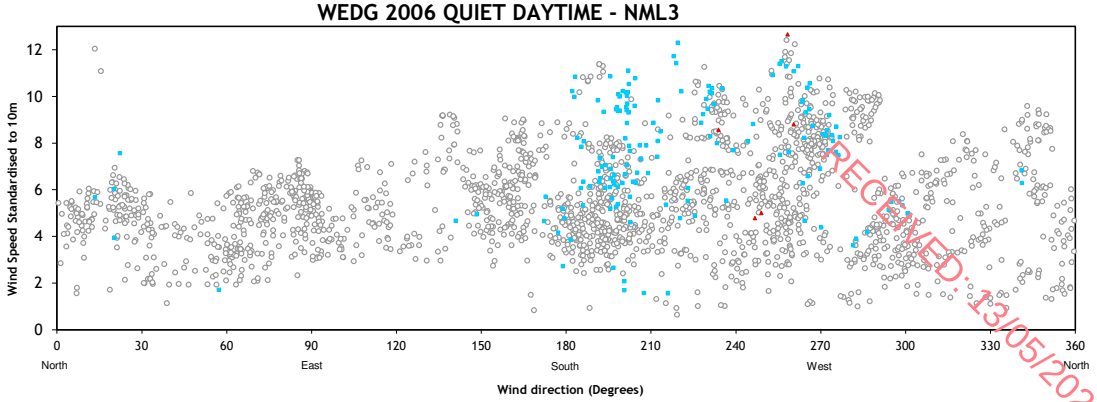
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

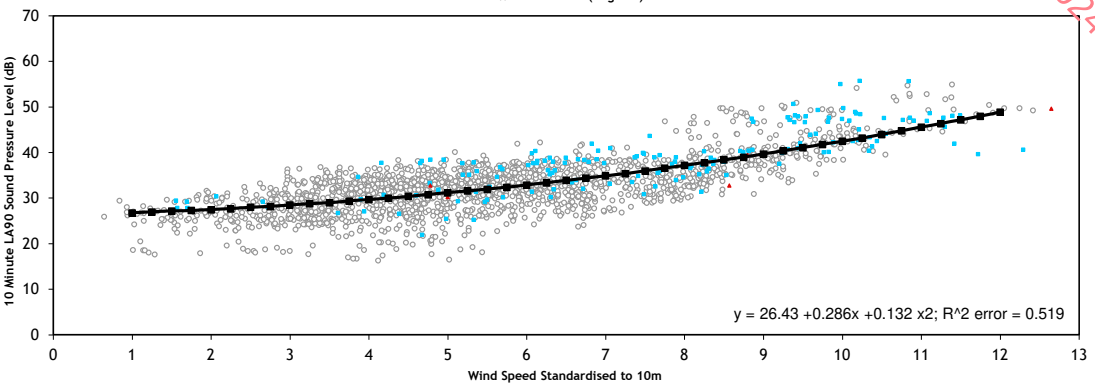
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML2
Figure Number	A1.2b
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML3

Wind Conditions Quiet Daytime



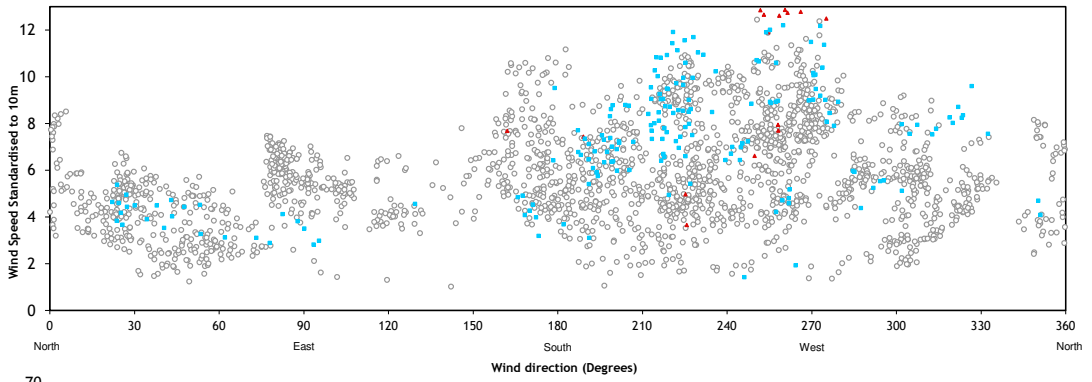
Regression Analysis Quiet Daytime



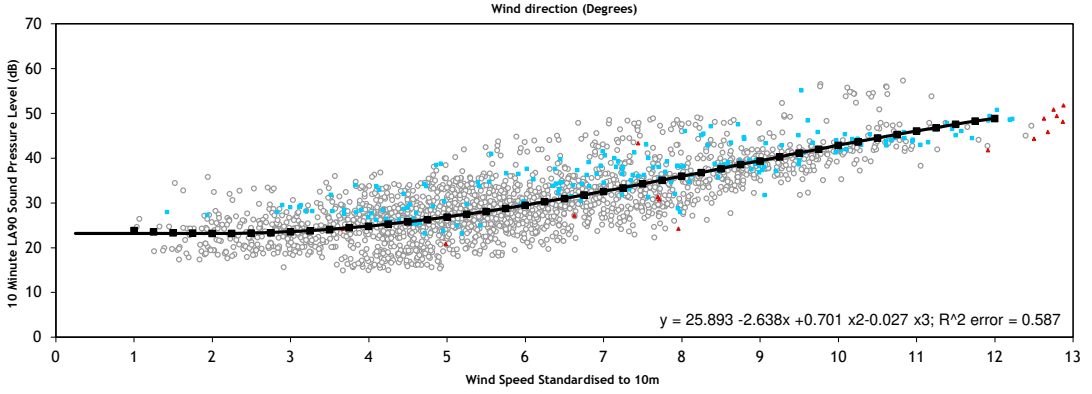
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	78	229	355	425	333	178	197	119	62	21	7	2004
Prevailing Background	27.5	28.5	29.7	31.2	32.9	34.9	37.2	39.7	42.5	45.6	48.9	

WEDG 2006 NIGHT-TIME - NML3

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	87	178	324	434	363	256	197	156	96	31	5	2127
Prevailing Background	23.2	23.6	24.8	26.9	29.5	32.6	36	39.4	42.9	46.1	48.9	

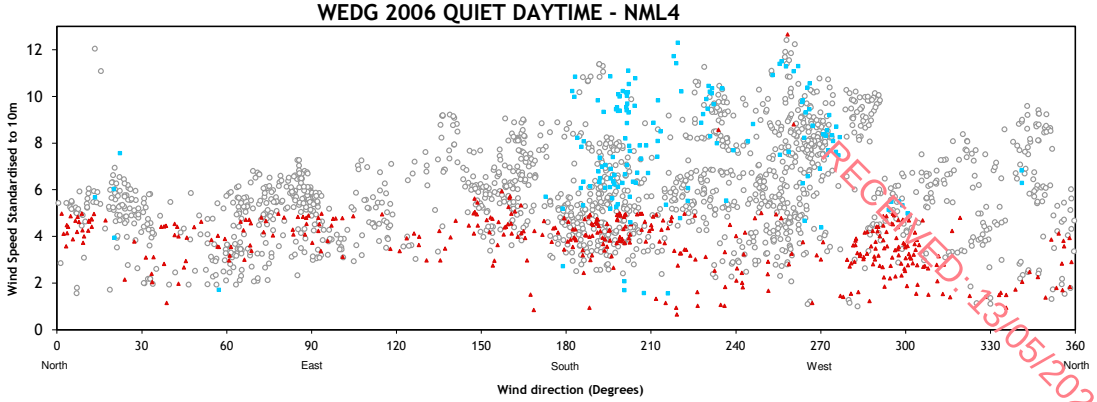
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

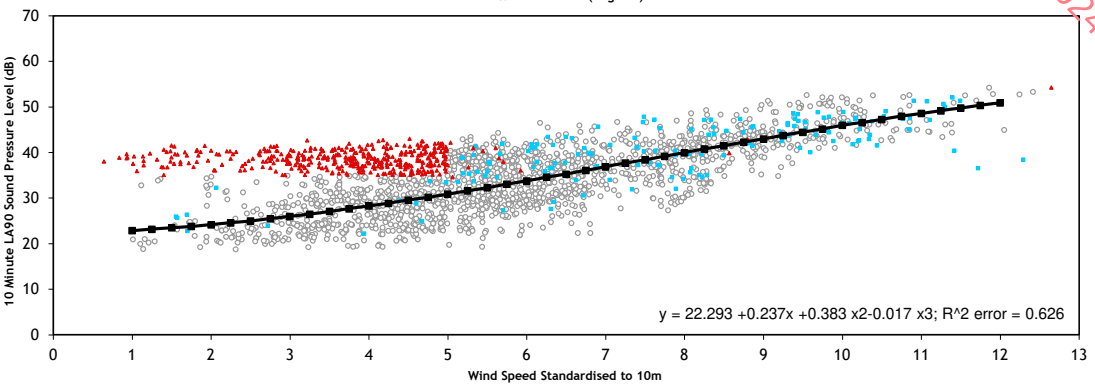
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML3
Figure Number	A1.2c
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML4

Wind Conditions Quiet Daytime



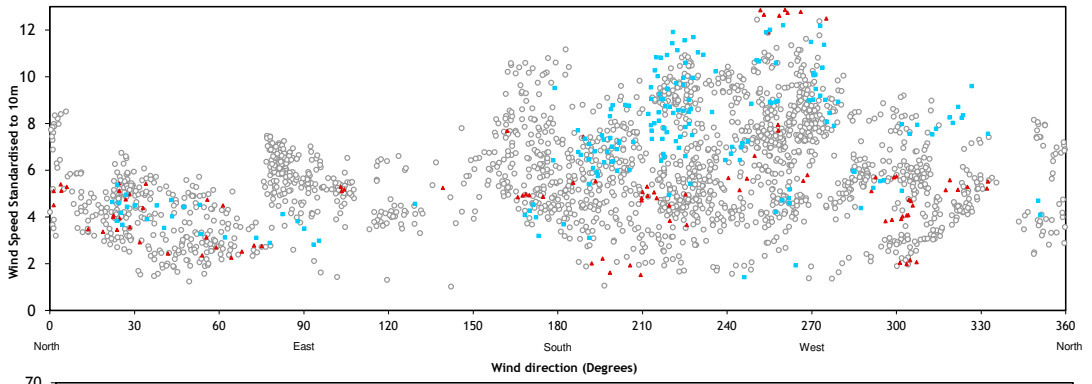
Regression Analysis Quiet Daytime



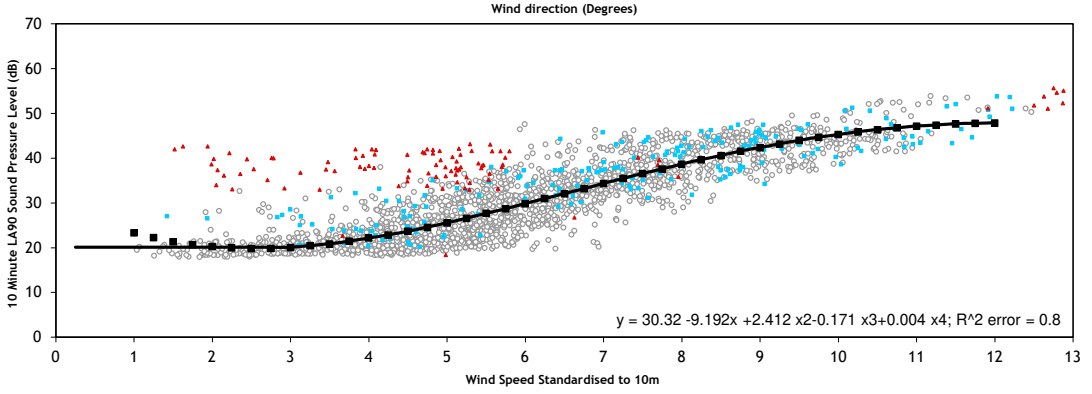
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	45	142	213	333	329	178	197	119	62	21	7	1646
Prevailing Background	24.2	26	28.3	30.9	33.8	36.9	40	43	46	48.6	50.9	

WEDG 2006 NIGHT-TIME - NML4

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	75	169	310	399	353	256	197	156	96	31	5	2047
Prevailing Background	20.1	20.1	22.2	25.6	29.9	34.4	38.7	42.4	45.3	47.2	47.9	

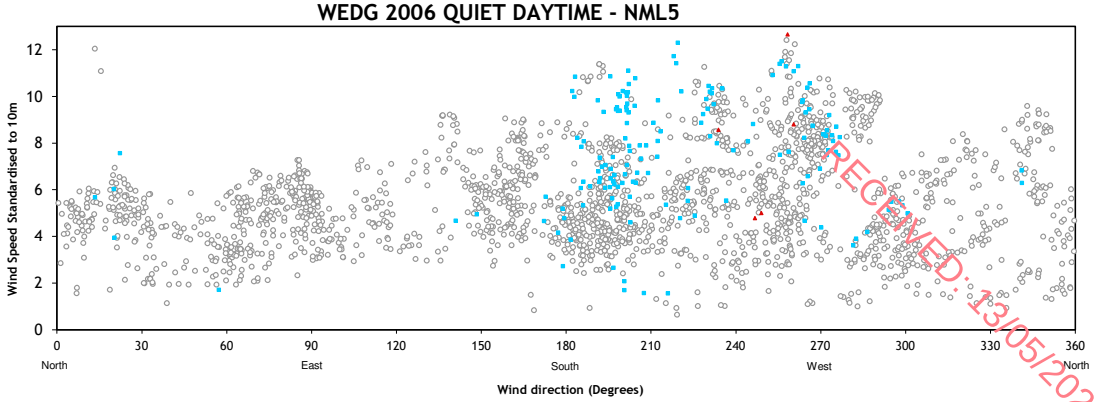
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

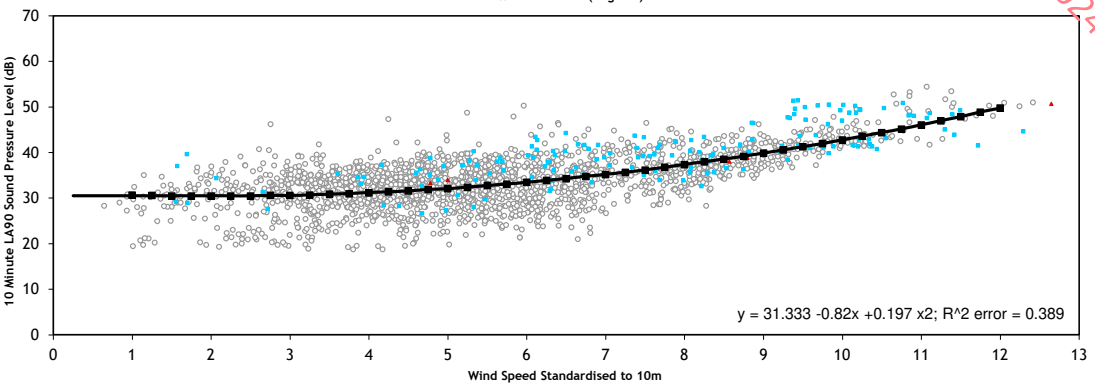
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML4
Figure Number	A1.2d
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML5

Wind Conditions Quiet Daytime



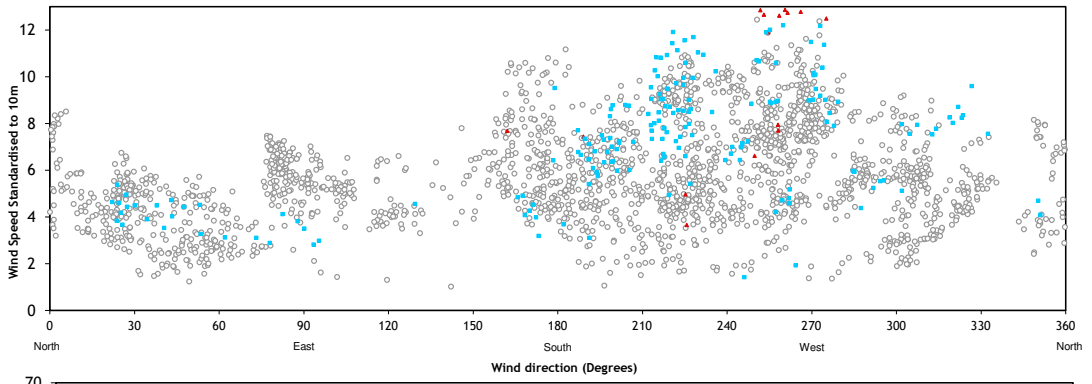
Regression Analysis Quiet Daytime



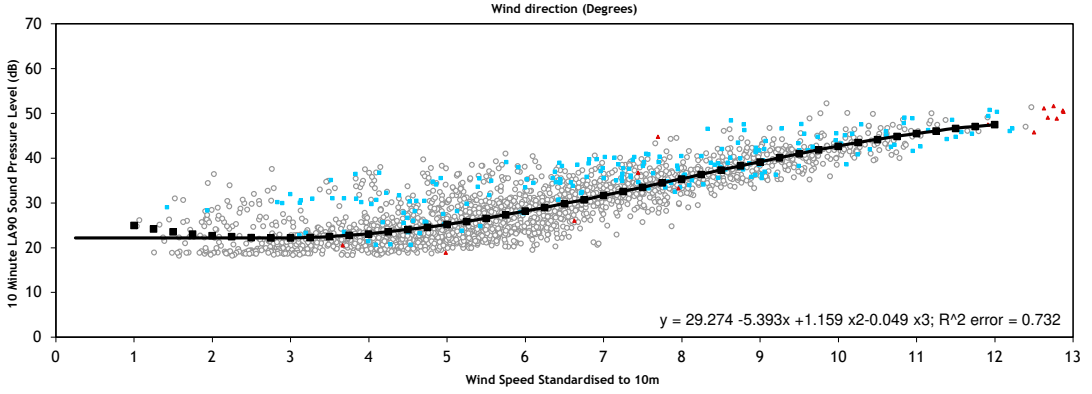
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	78	229	355	425	333	178	197	119	62	21	7	2004
Prevailing Background	30.5	30.6	31.2	32.1	33.5	35.2	37.4	39.9	42.8	46.1	49.8	

WEDG 2006 NIGHT-TIME - NML5

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	87	178	324	434	363	256	197	156	96	31	5	2127
Prevailing Background	22.2	22.2	23.1	25.2	28.2	31.7	35.4	39.2	42.7	45.5	47.5	

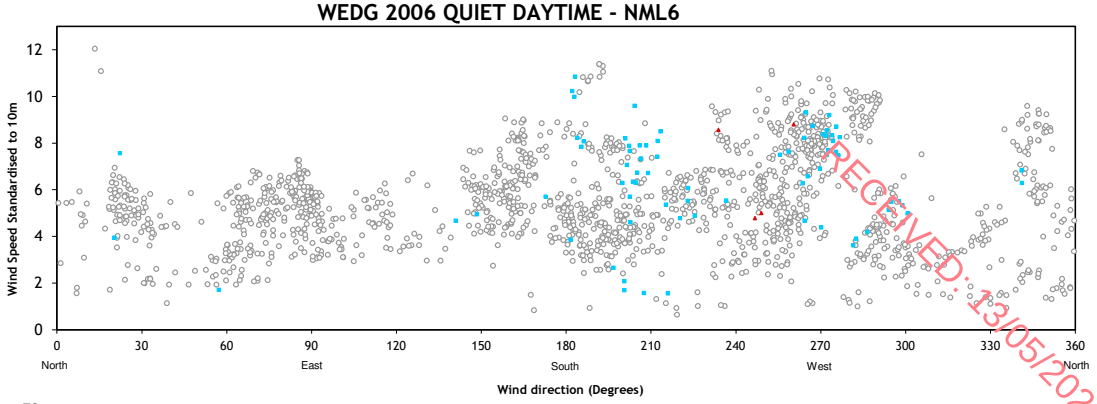
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

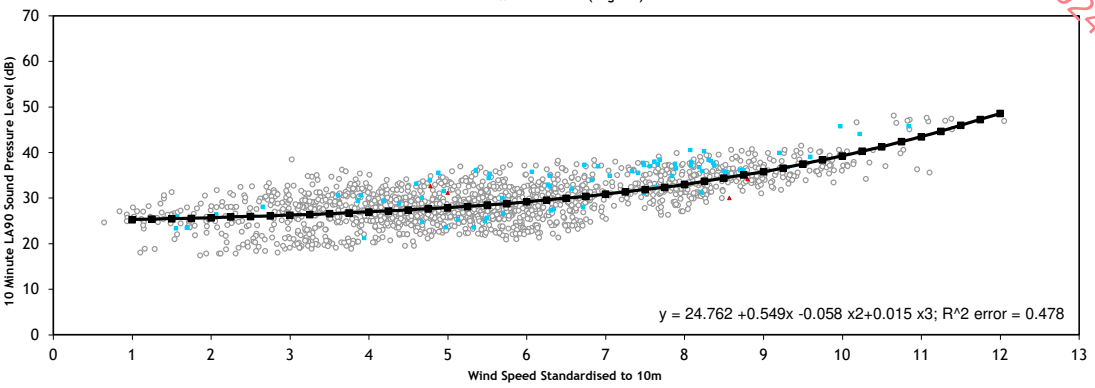
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML5
Figure Number	A1.2e
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML6

Wind Conditions Quiet Daytime



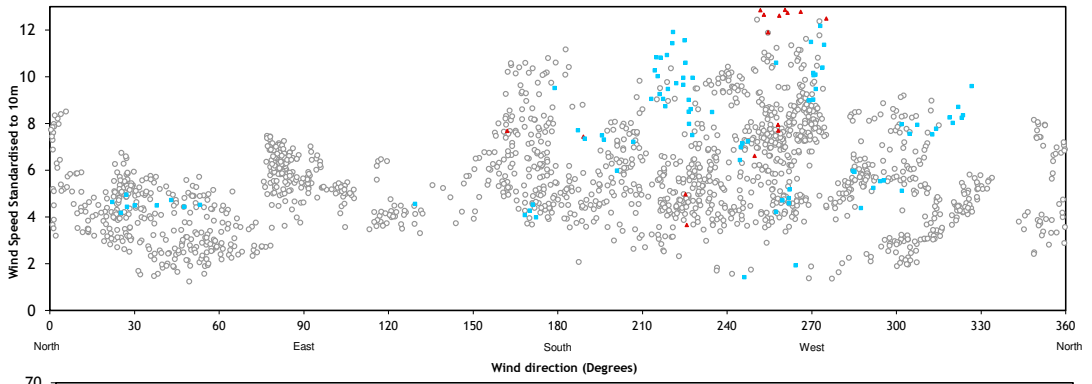
Regression Analysis Quiet Daytime



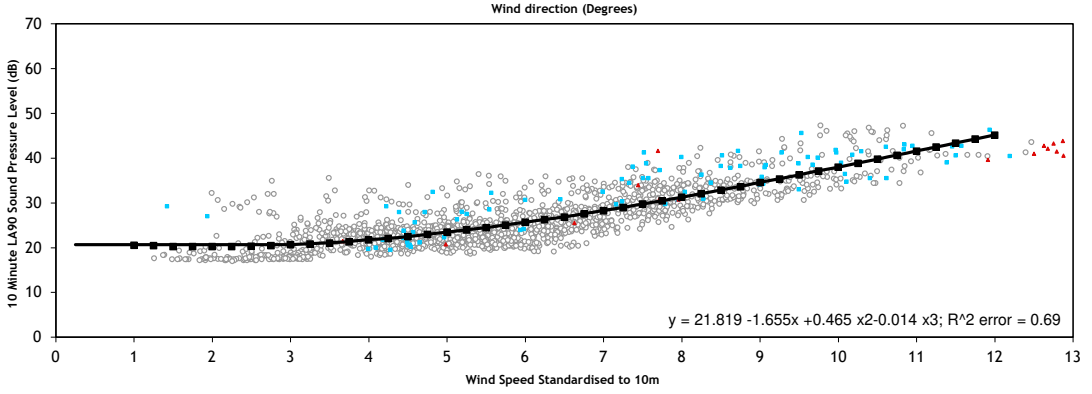
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	66	166	264	346	283	127	170	96	38	15	1	1572
Prevailing Background	25.7	26.3	27	27.9	29.2	30.9	33	35.8	39.3	43.5	48.6	

WEDG 2006 NIGHT-TIME - NML6

Wind Conditions Night-Time



Regression Analysis Night-Time



Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	63	153	280	364	287	207	165	84	56	21	5	1685
Prevailing Background	20.7	20.7	21.8	23.5	25.7	28.3	31.3	34.6	38	41.6	45.2	

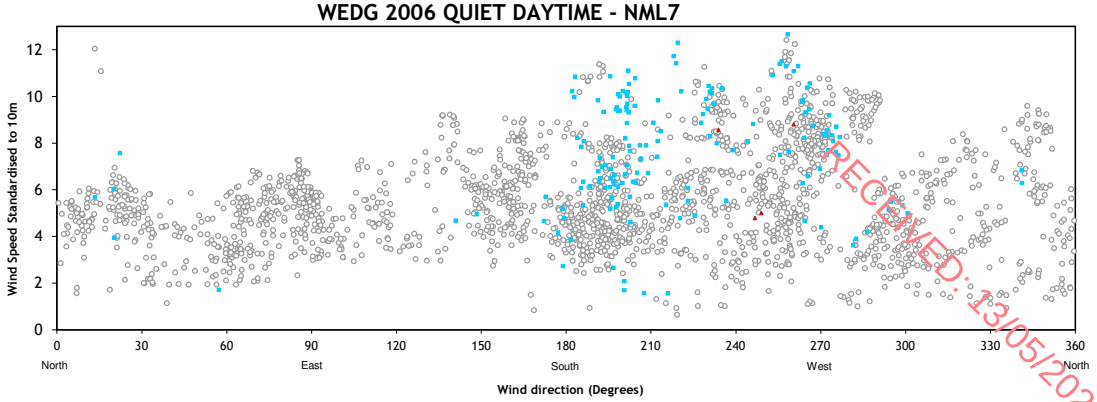
Legend:

- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

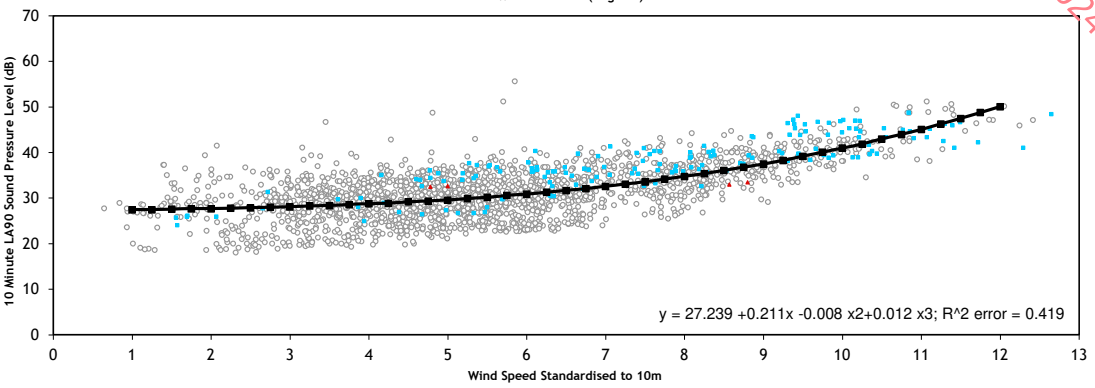
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML6
Figure Number	A1.2f
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

WEDG 2006 QUIET DAYTIME - NML7

Wind Conditions Quiet Daytime



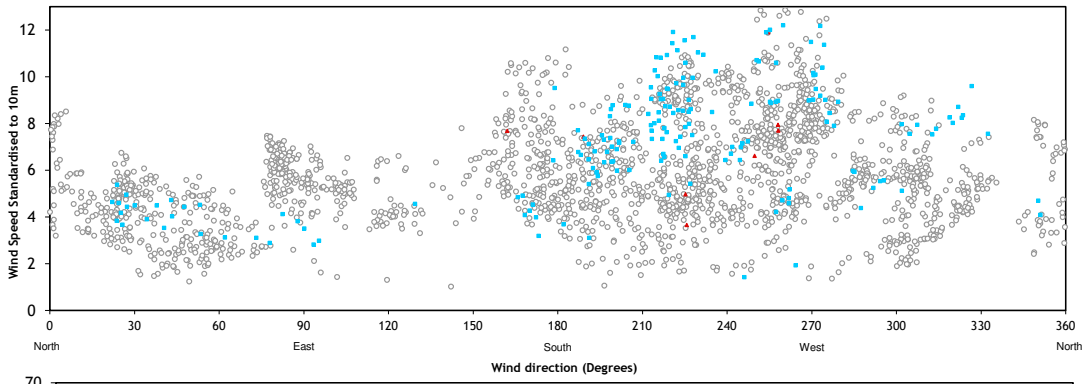
Regression Analysis Quiet Daytime



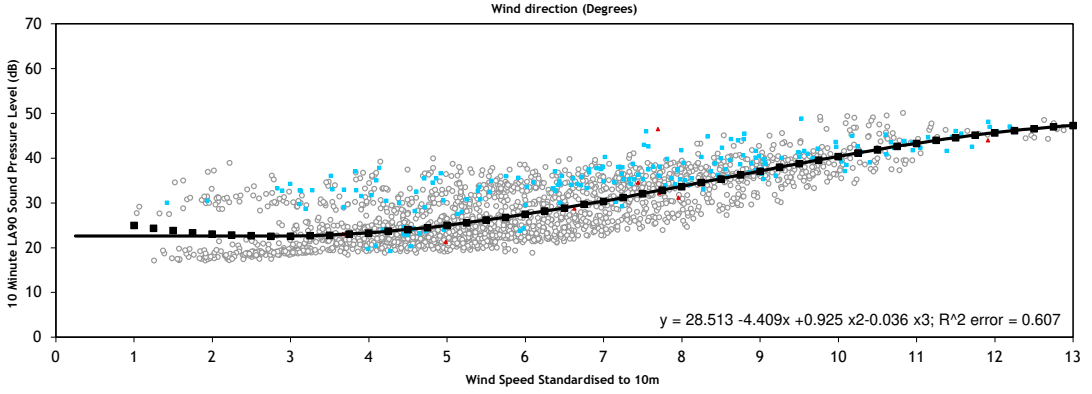
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	78	229	355	425	333	178	197	119	62	21	7	2004
Prevailing Background	27.7	28.1	28.8	29.6	30.9	32.6	34.8	37.5	41	45.1	50.1	

WEDG 2006 NIGHT-TIME - NML7

Wind Conditions Night-Time



Regression Analysis Night-Time



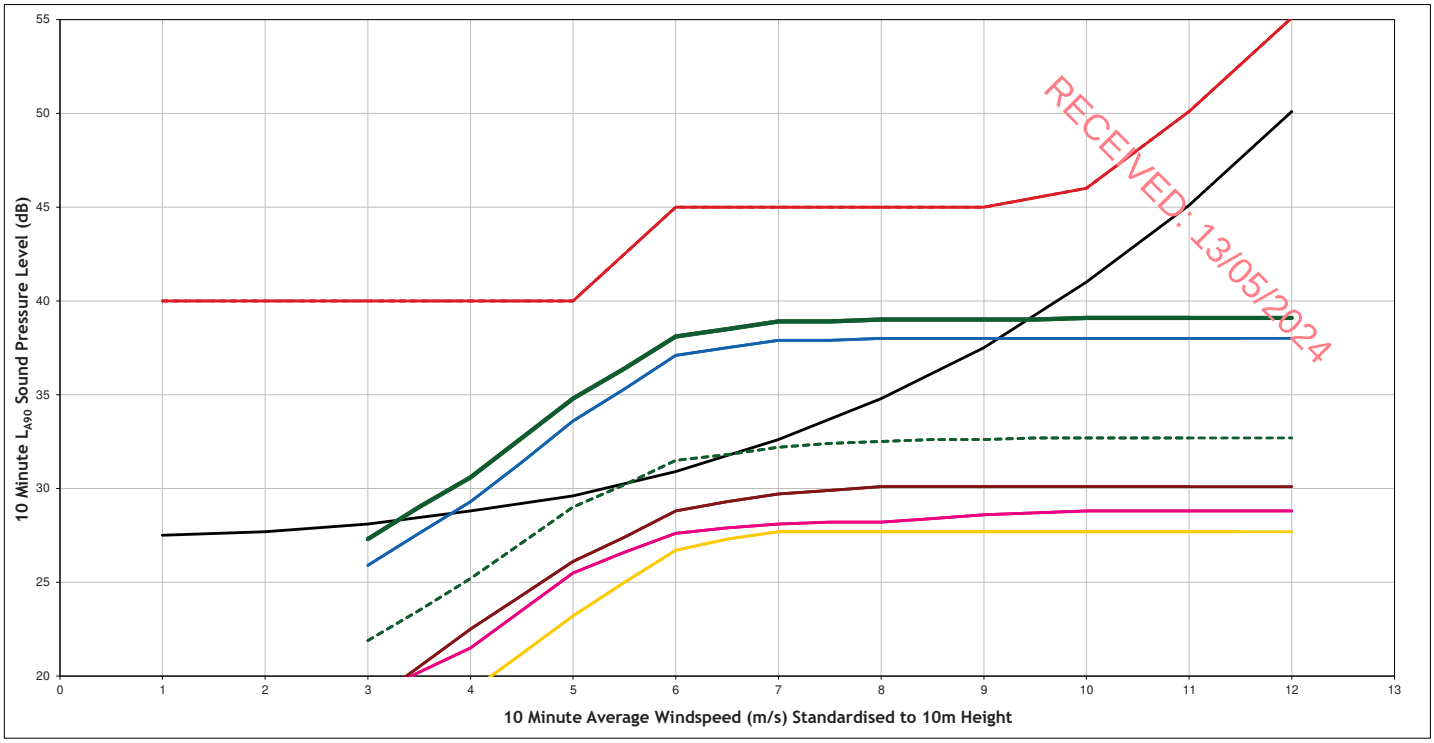
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	Total
Number of data points	87	178	324	434	363	256	197	156	96	31	5	2127
Prevailing Background	22.6	22.6	23.3	25	27.5	30.4	33.7	37.1	40.4	43.3	45.7	

Legend:

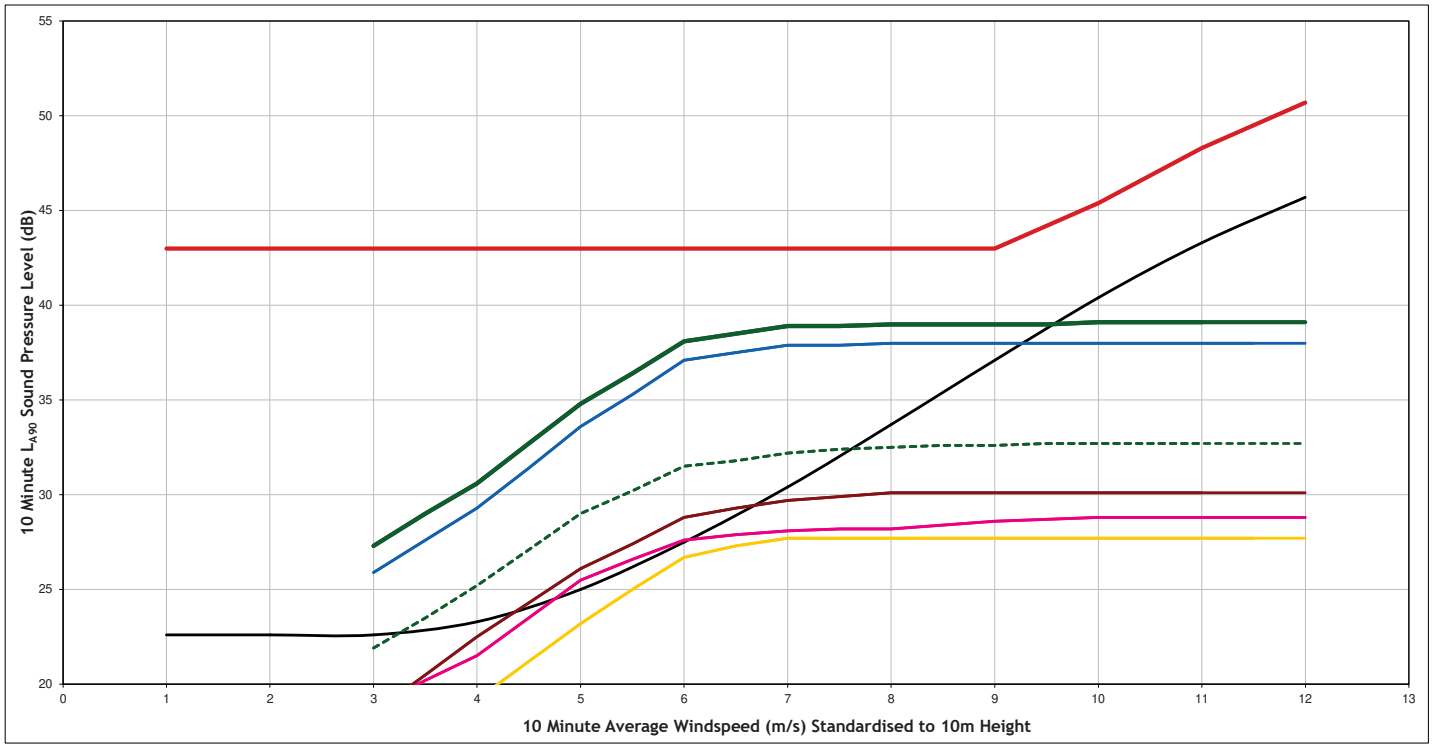
- L_{A90} 10 Minute Measurement Point
- Line of best fit
- Line of best fit flat lined where appropriate(Prevailing Background)
- Excluded Data-Manual exclusion
- Excluded Data-Rain

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Wind Conditions&Regression Analysis NML7
Figure Number	A1.2g
Drawn	CB
Checked	MC
Date	11/09/2023
Document Reference	IE00102-BG models

Daytime - NAL1



Night Time - NAL1



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL1
Figure Number	Figure A1.3a
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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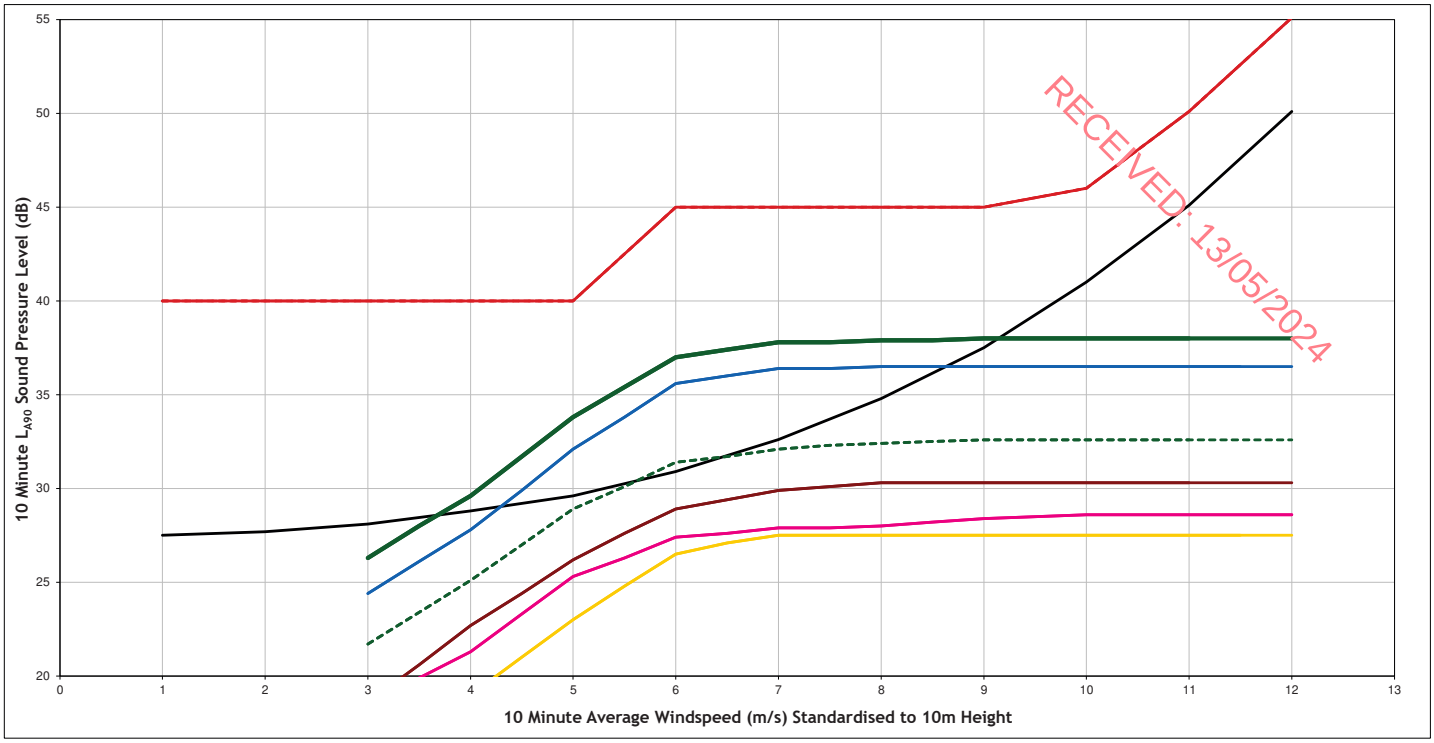
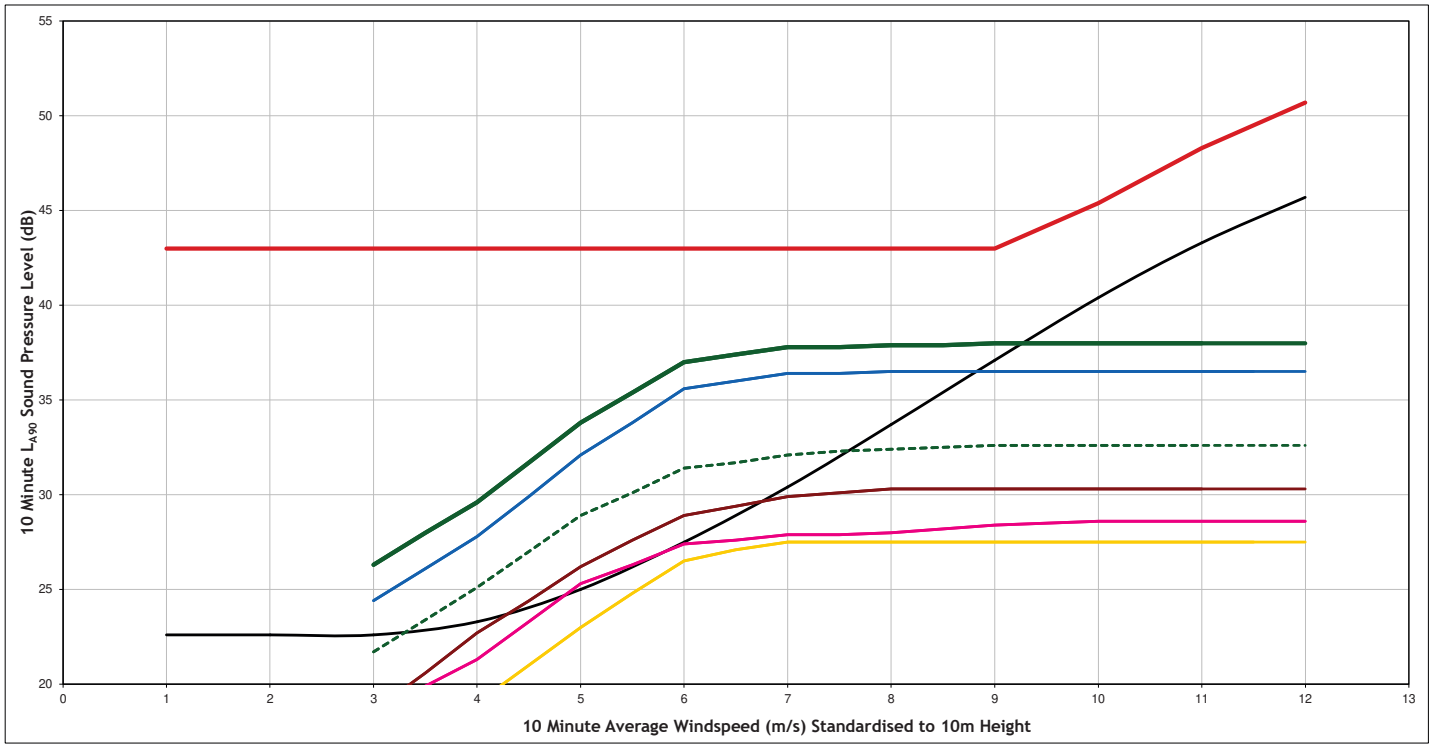
Daytime - NAL2



Night Time - NAL2



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL2
Figure Number	Figure A1.3b
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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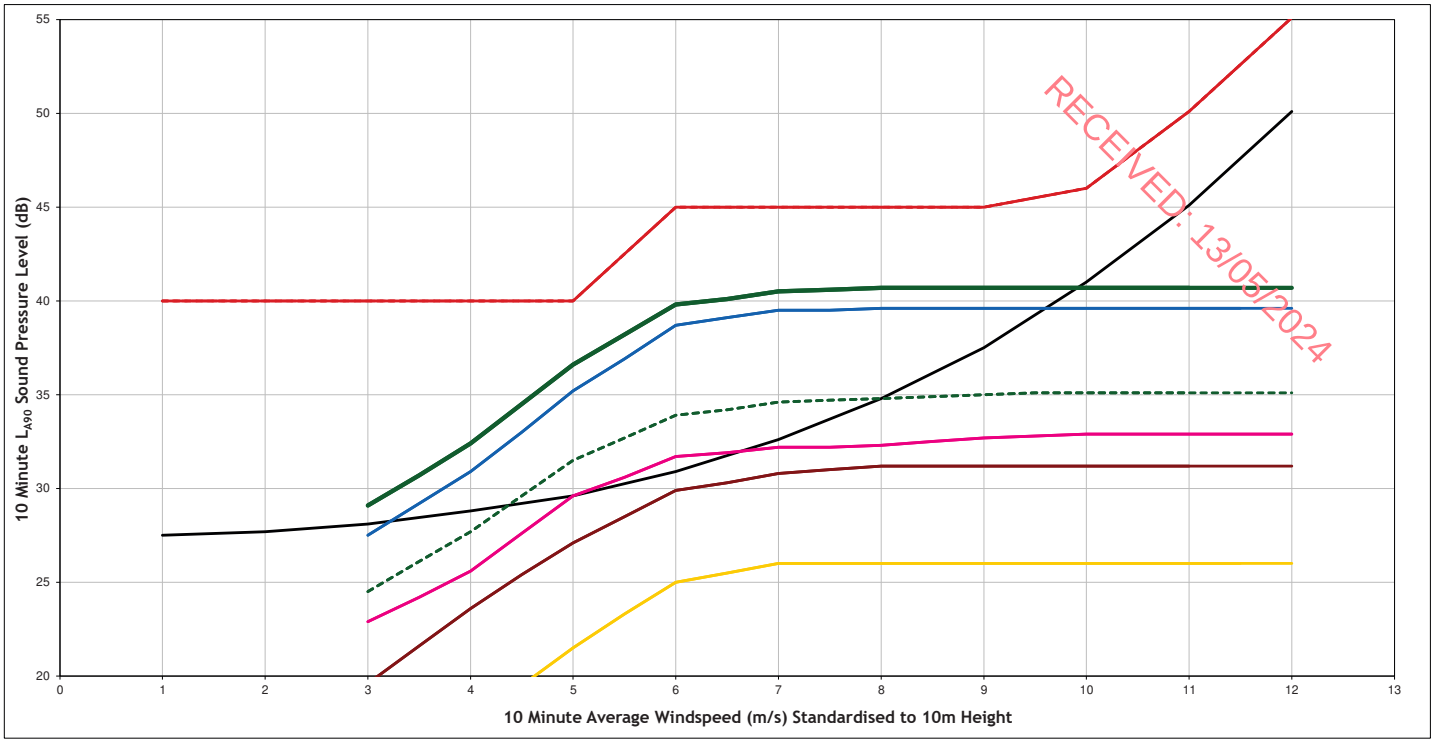
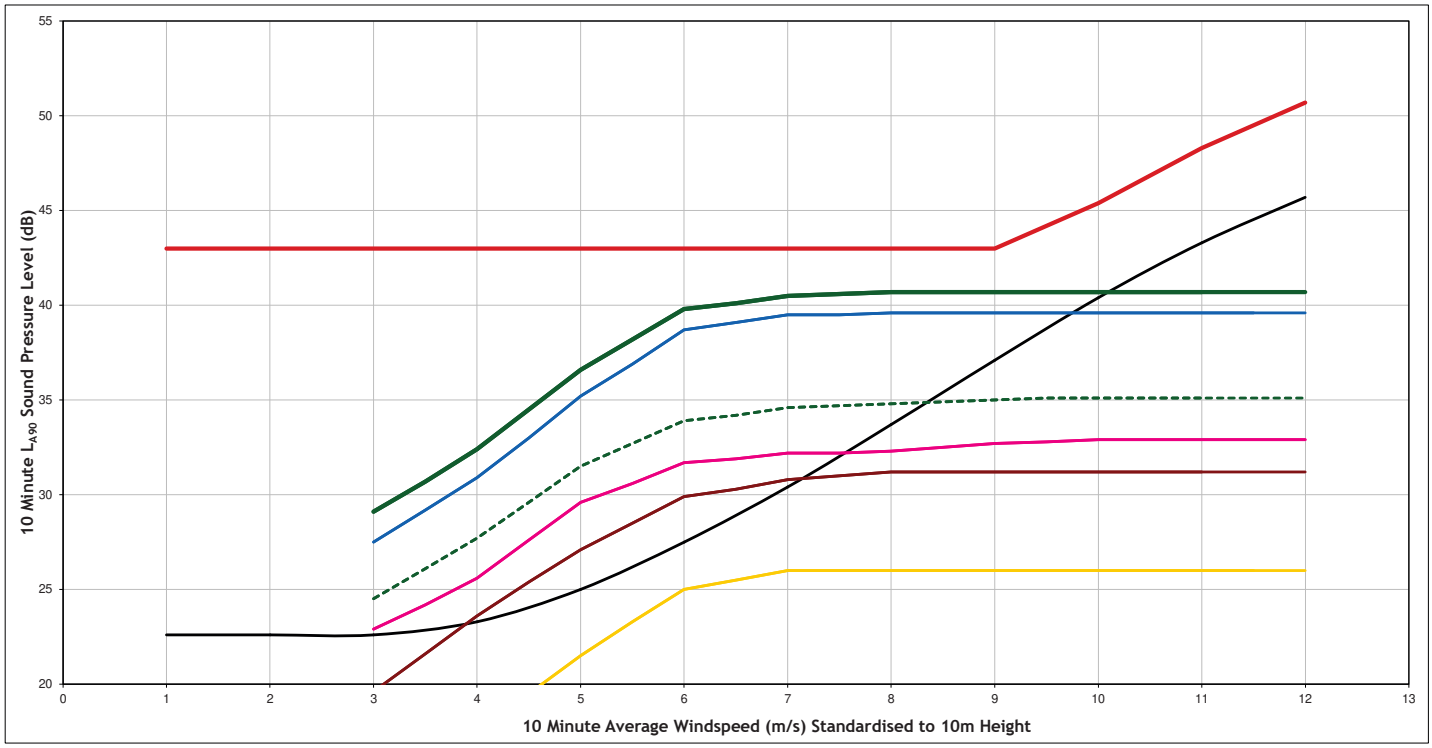
Daytime - NAL3



Night Time - NAL3



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL3
Figure Number	Figure A1.3c
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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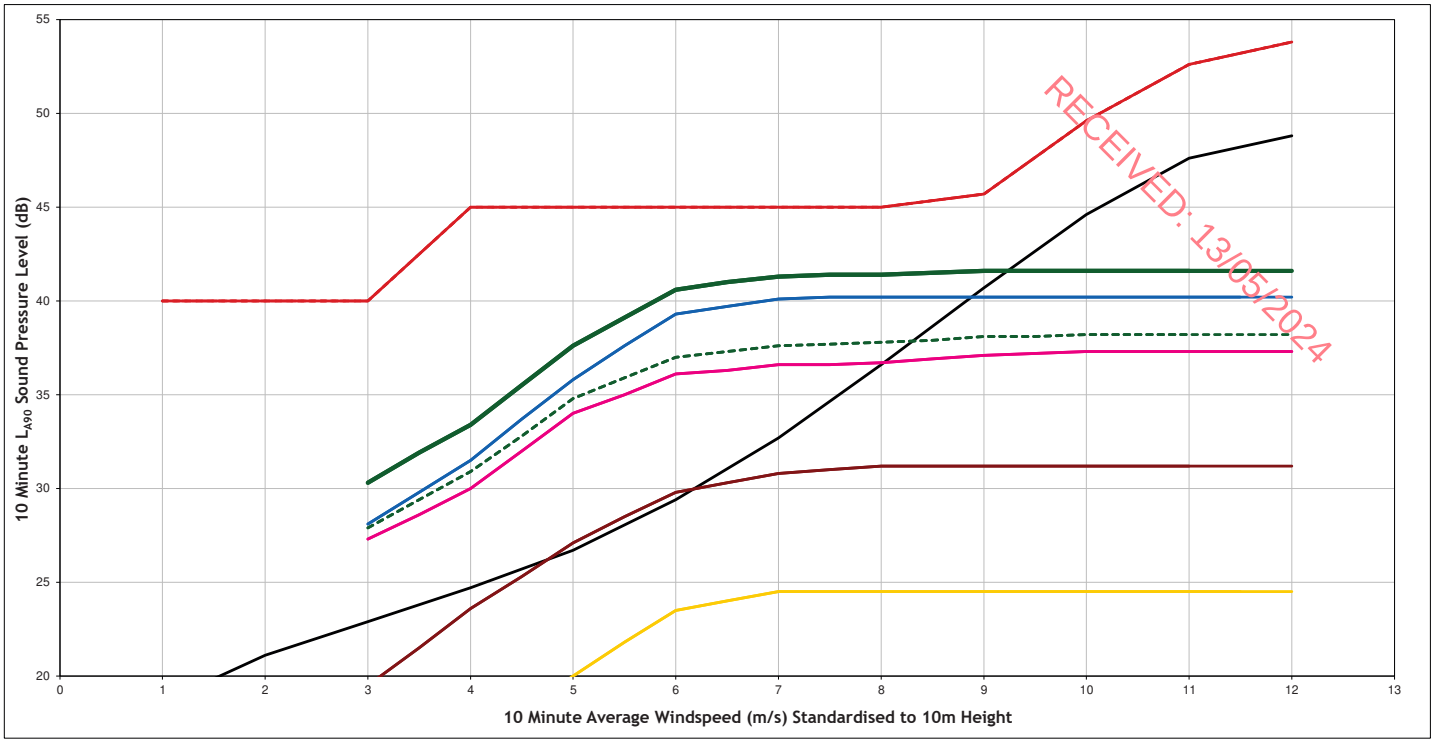
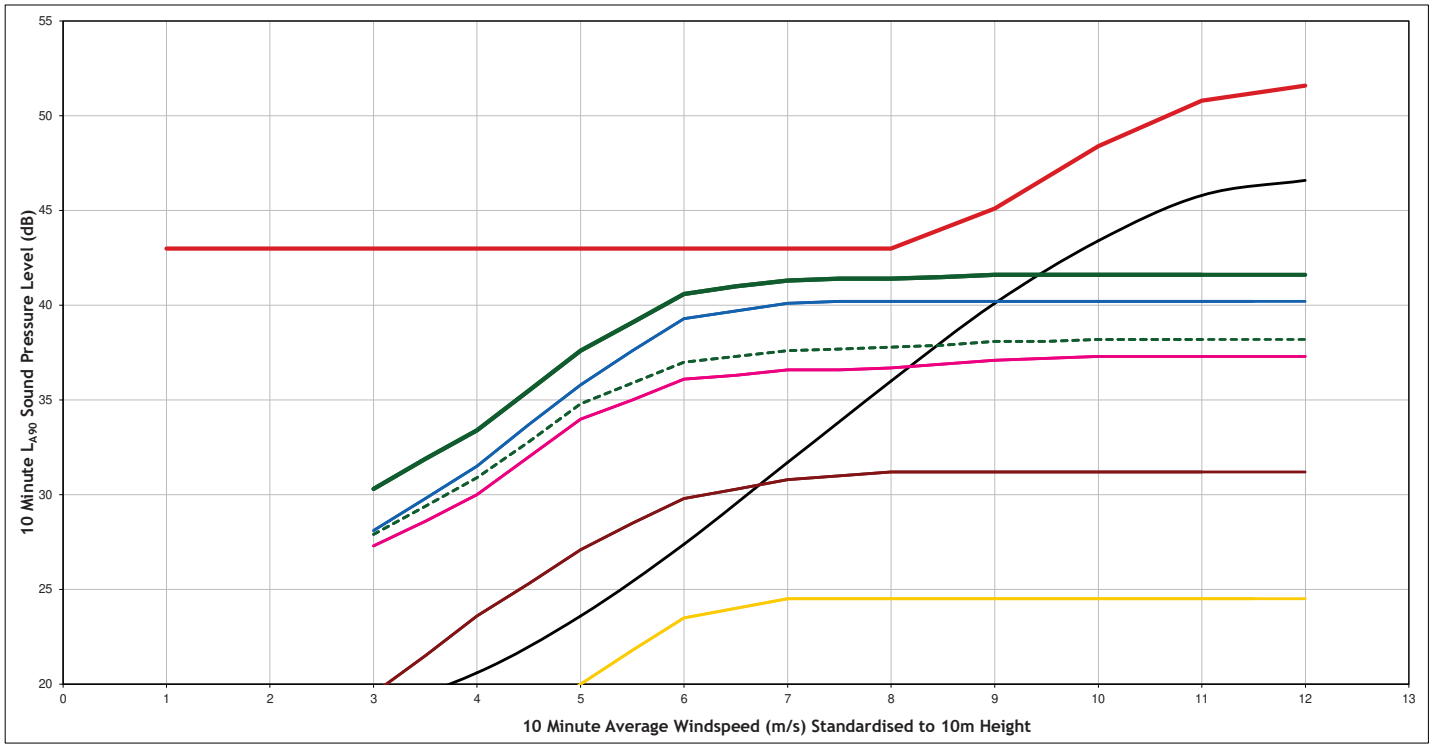
Daytime - NAL4



Night Time - NAL4



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL4
Figure Number	Figure A1.3d
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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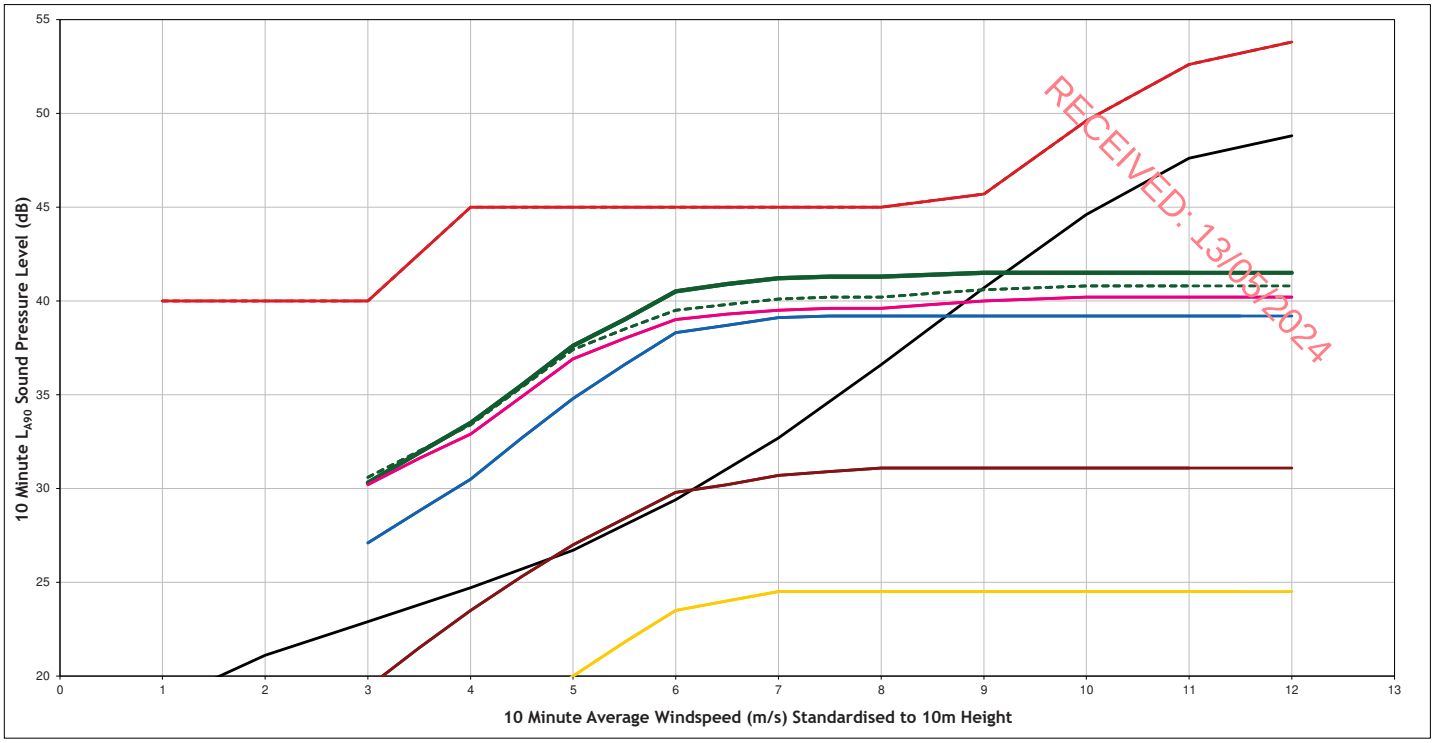
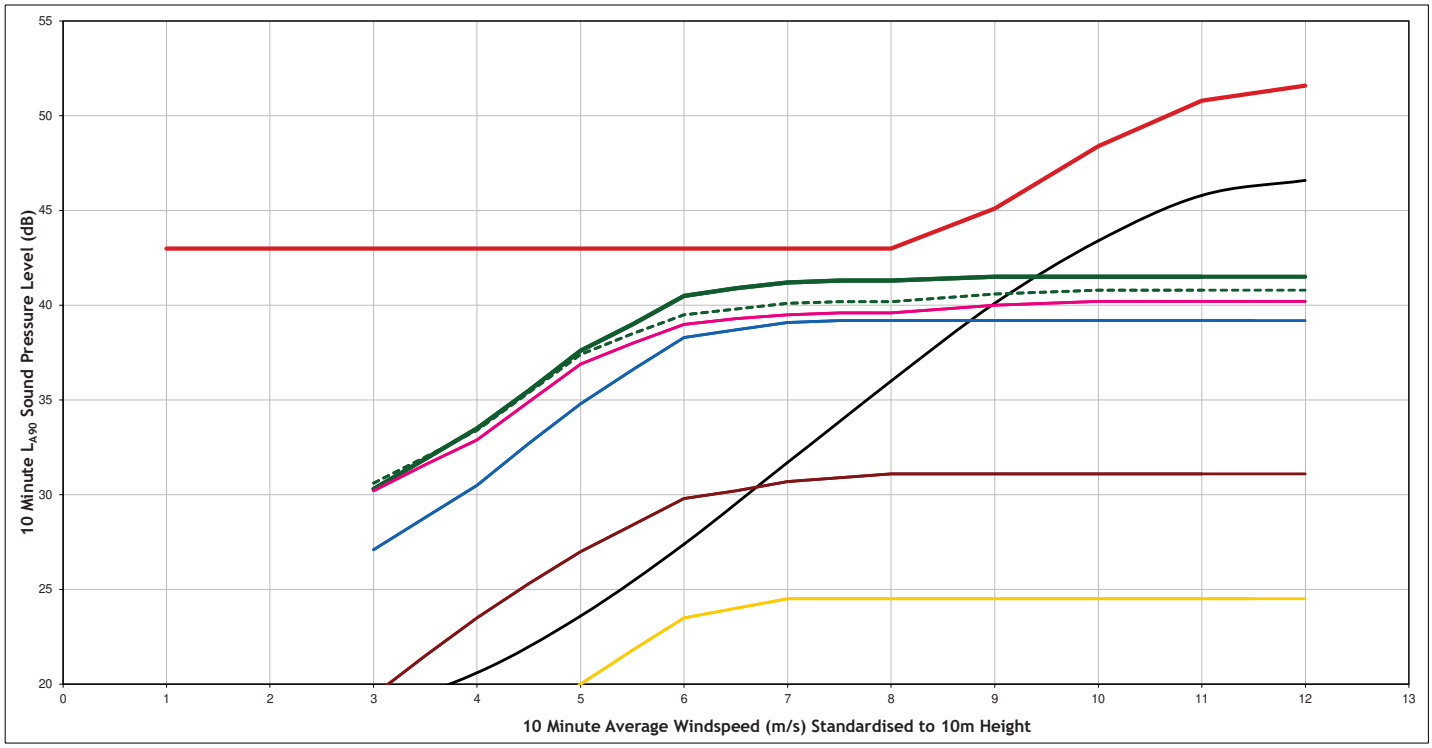
Daytime - NAL5



Night Time - NAL5



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL5
Figure Number	Figure A1.3e
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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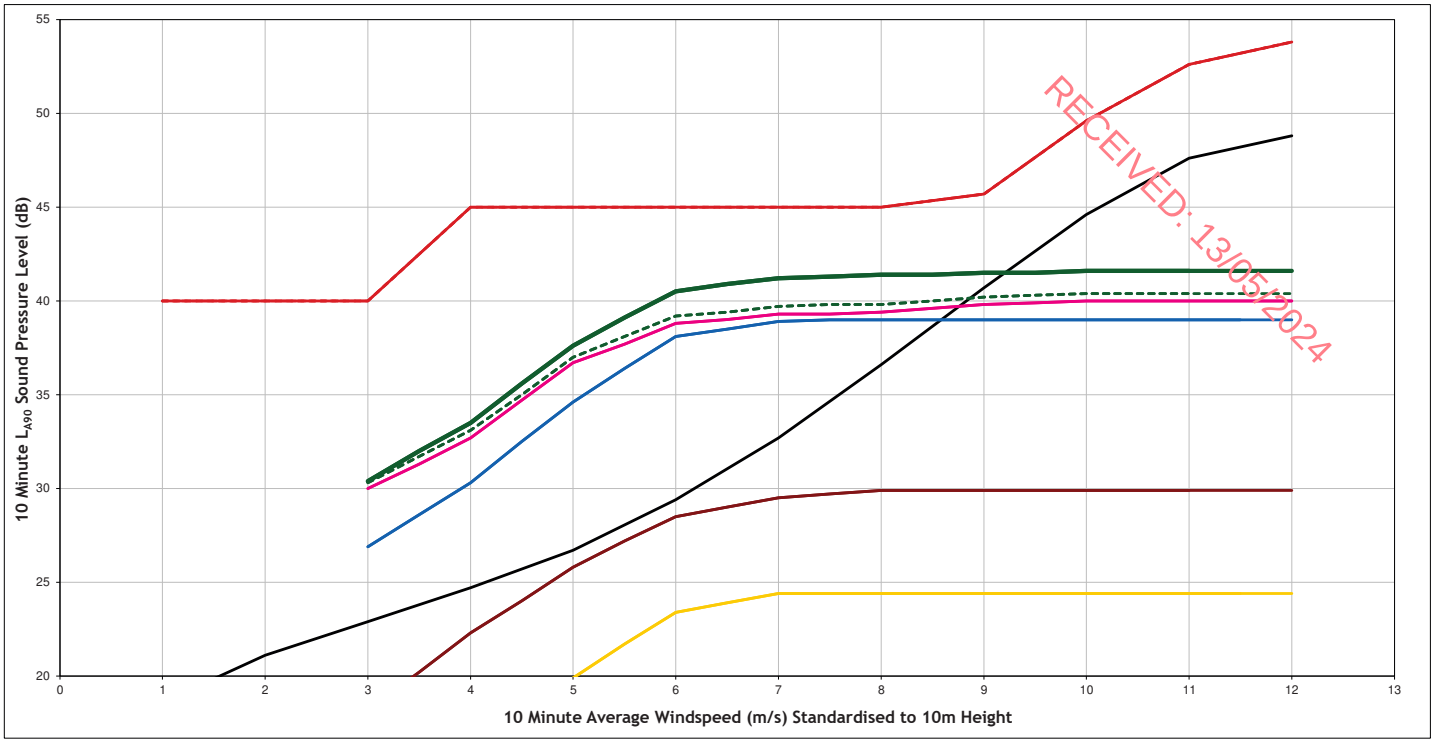
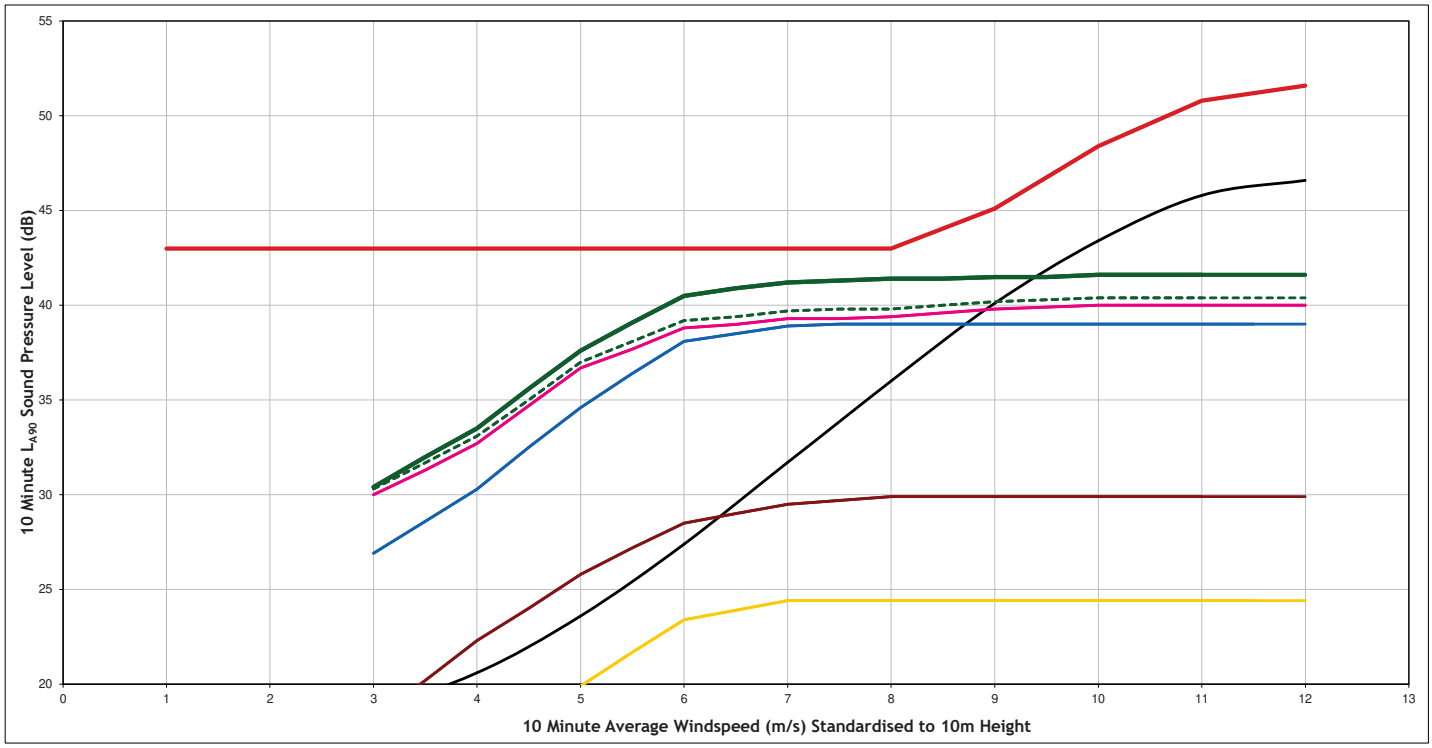
Daytime - NAL6



Night Time - NAL6



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL6
Figure Number	Figure A1.3f
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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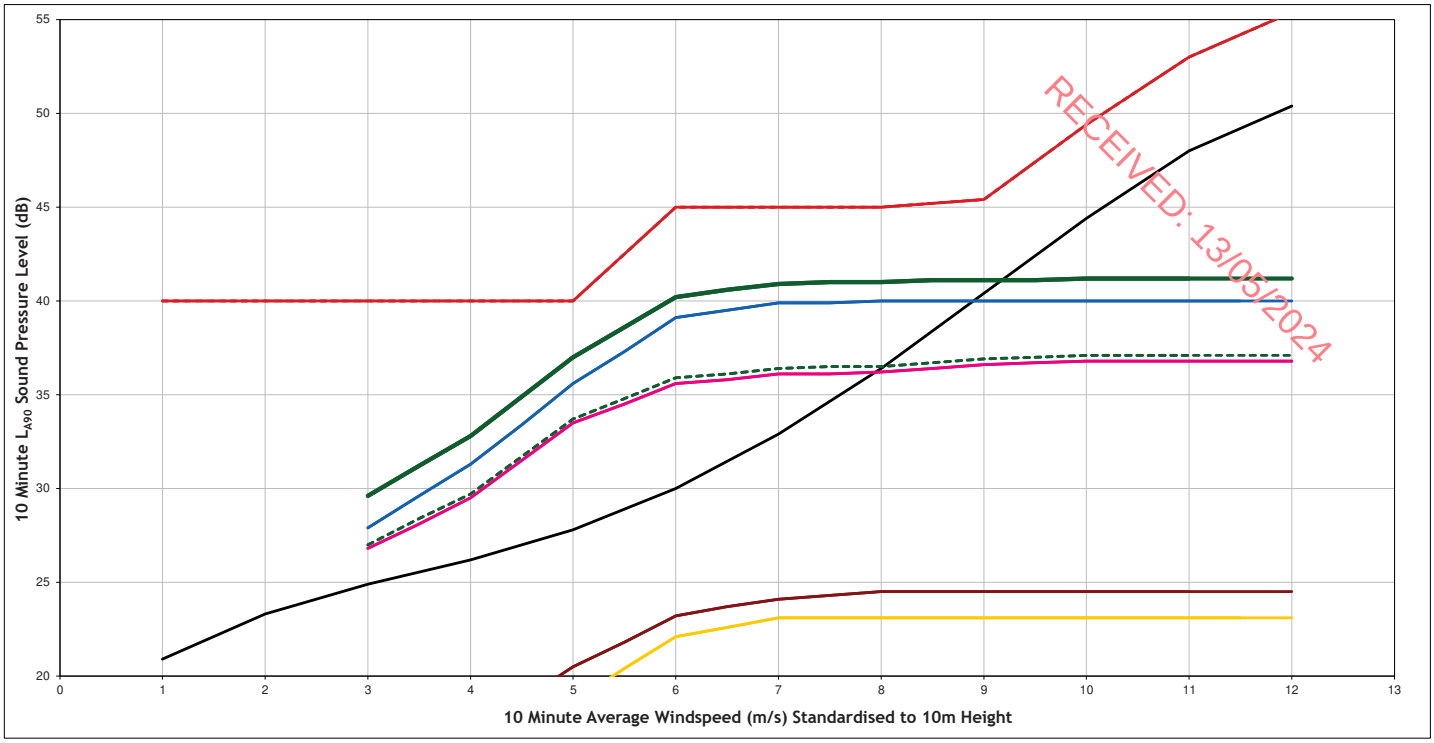
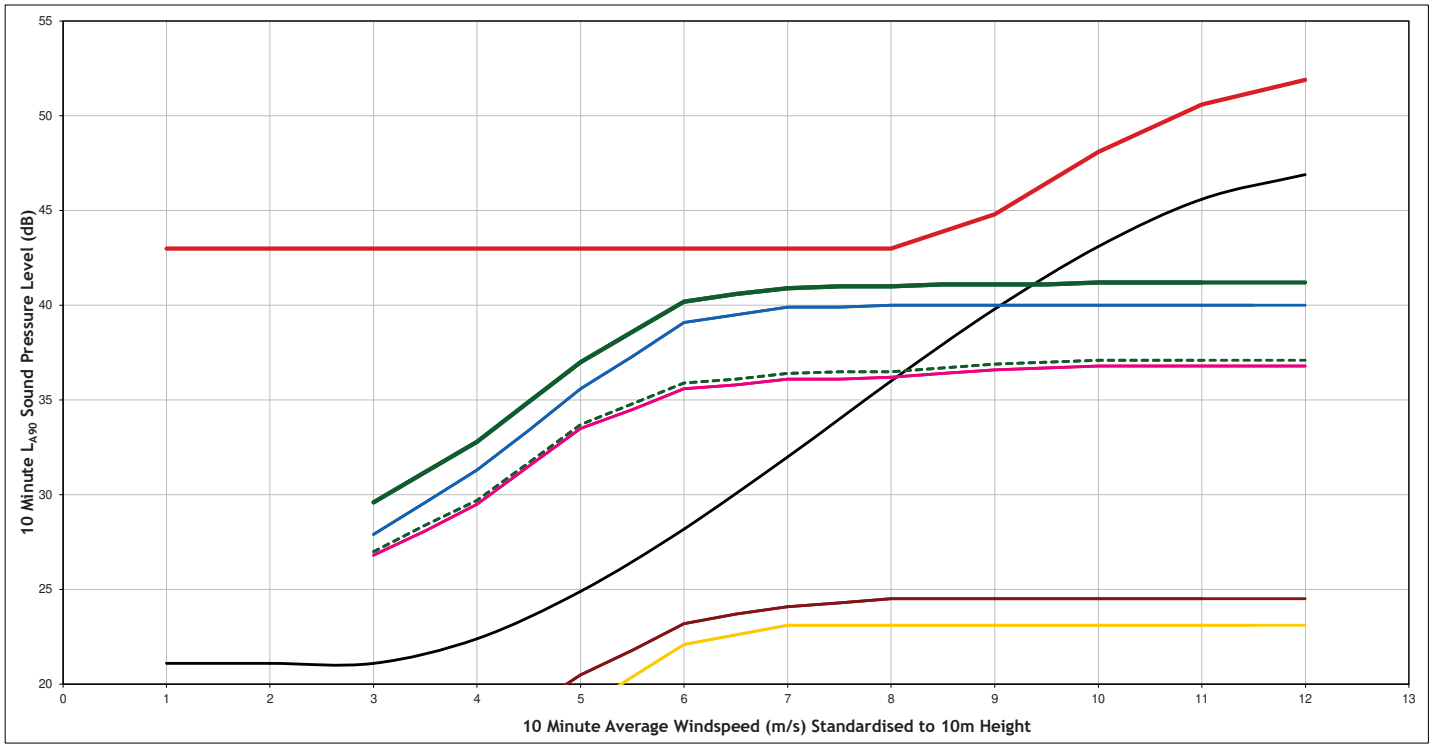
Daytime - NAL7



Night Time - NAL7



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL7
Figure Number	Figure A1.3g
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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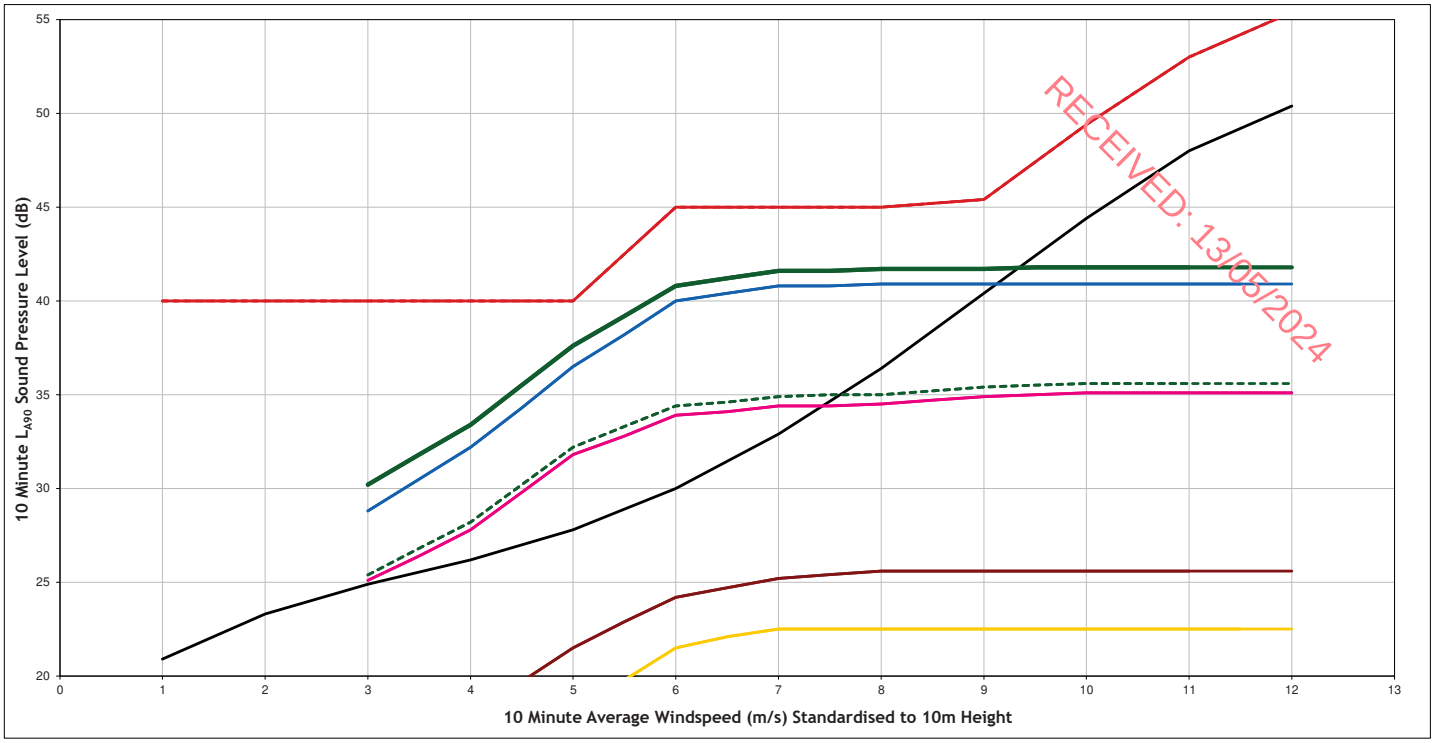
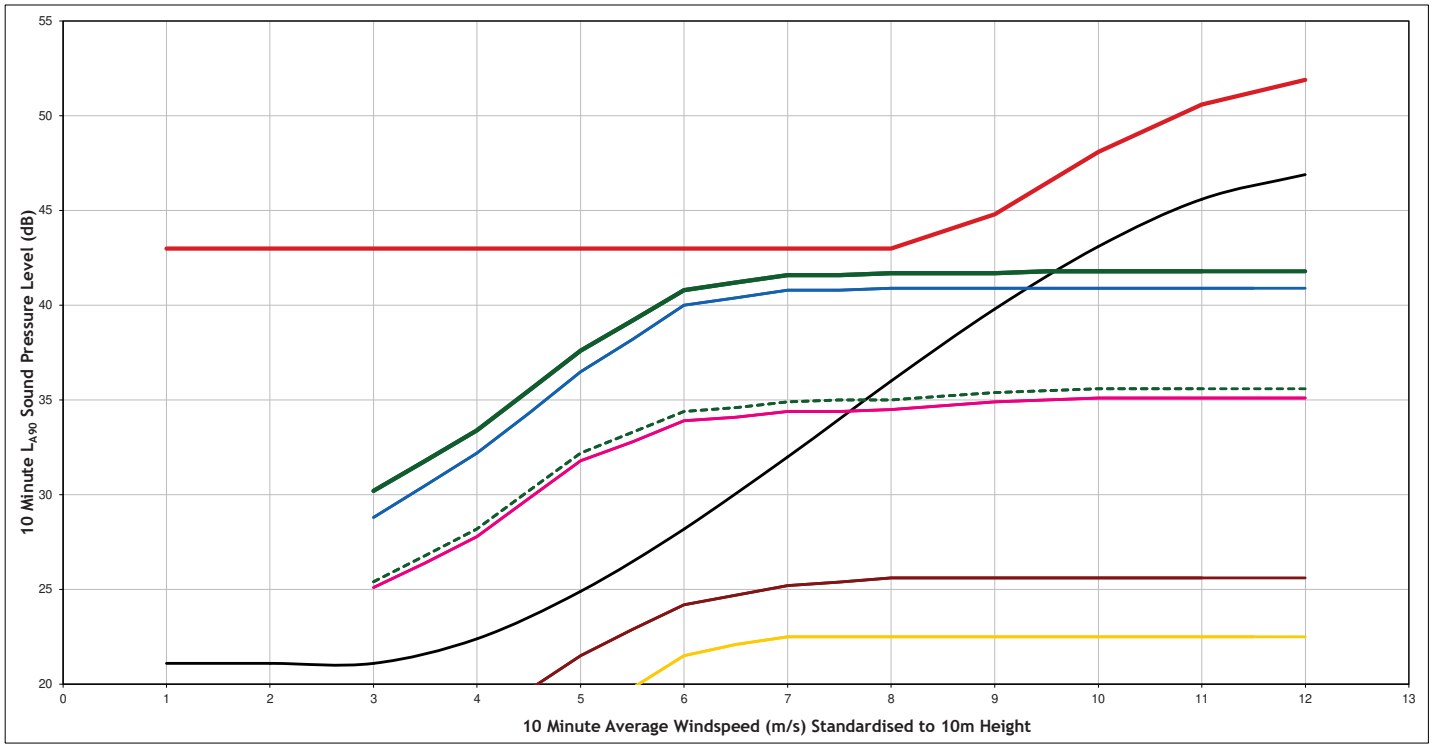
Daytime - NAL8



Night Time - NAL8



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL8
Figure Number	Figure A1.3h
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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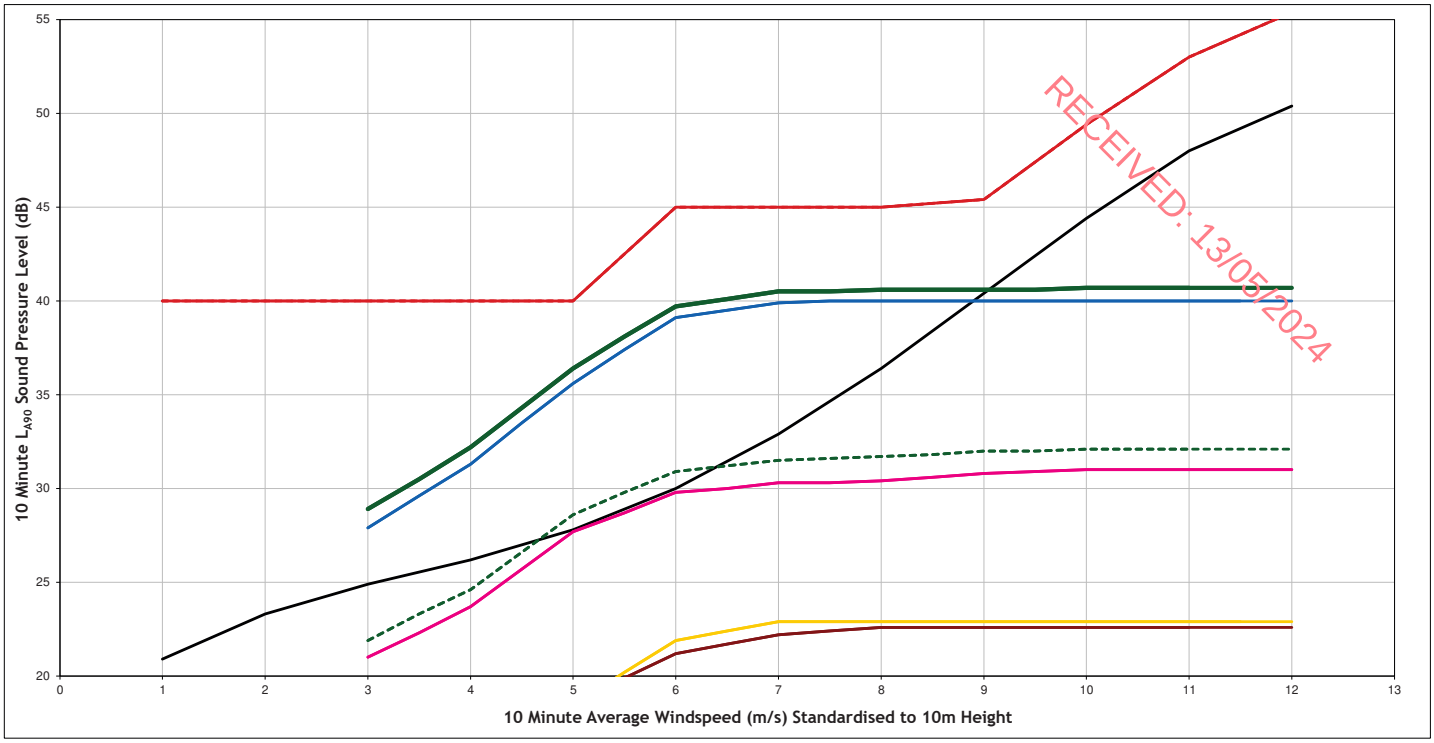
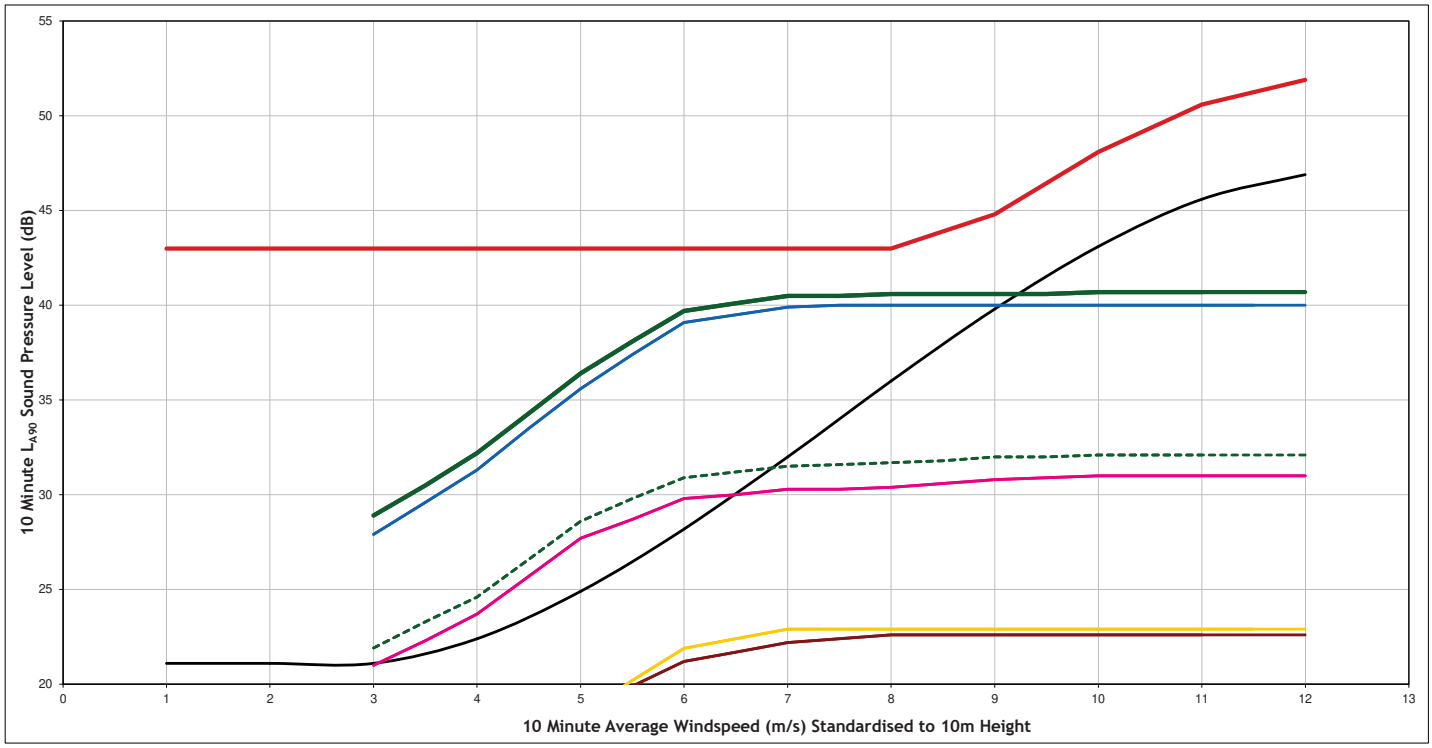
Daytime - NAL9



Night Time - NAL9



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL9
Figure Number	Figure A1.3i
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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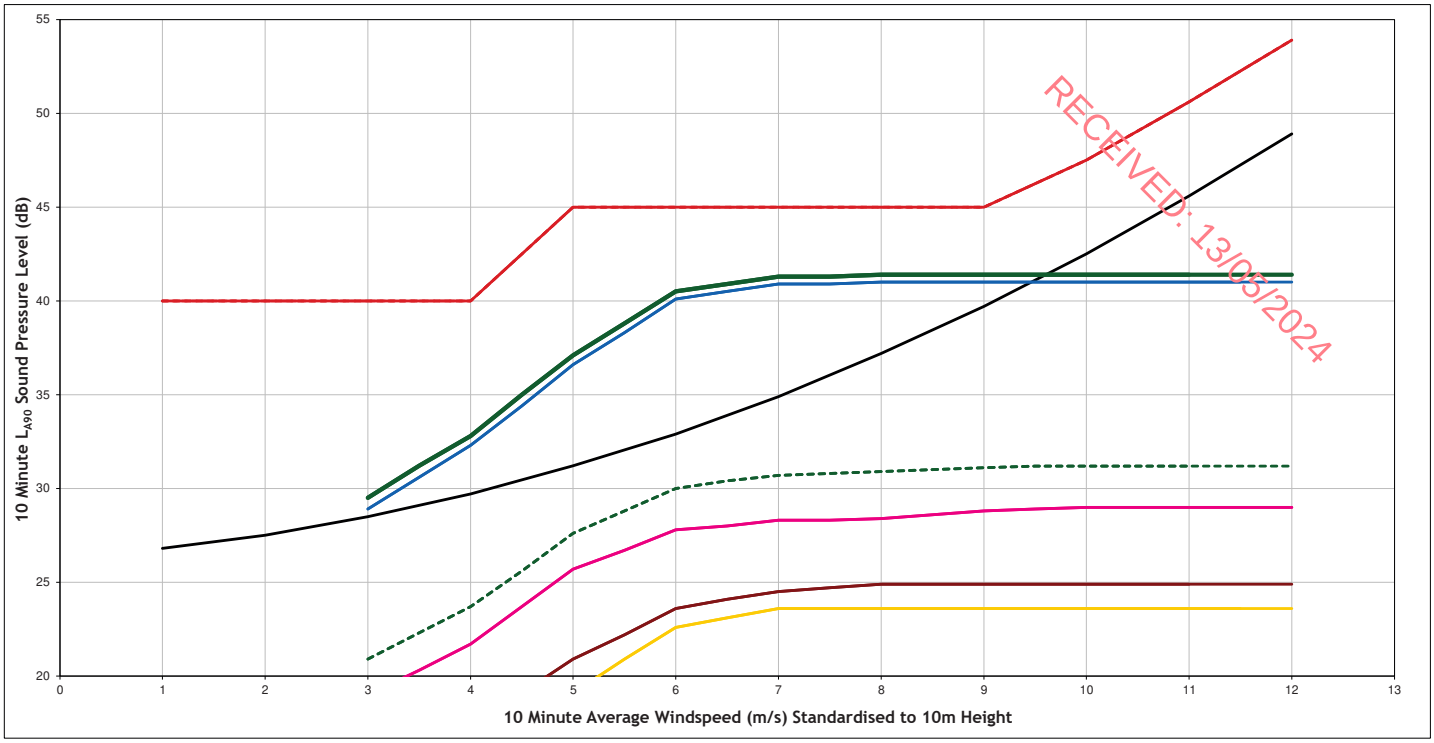
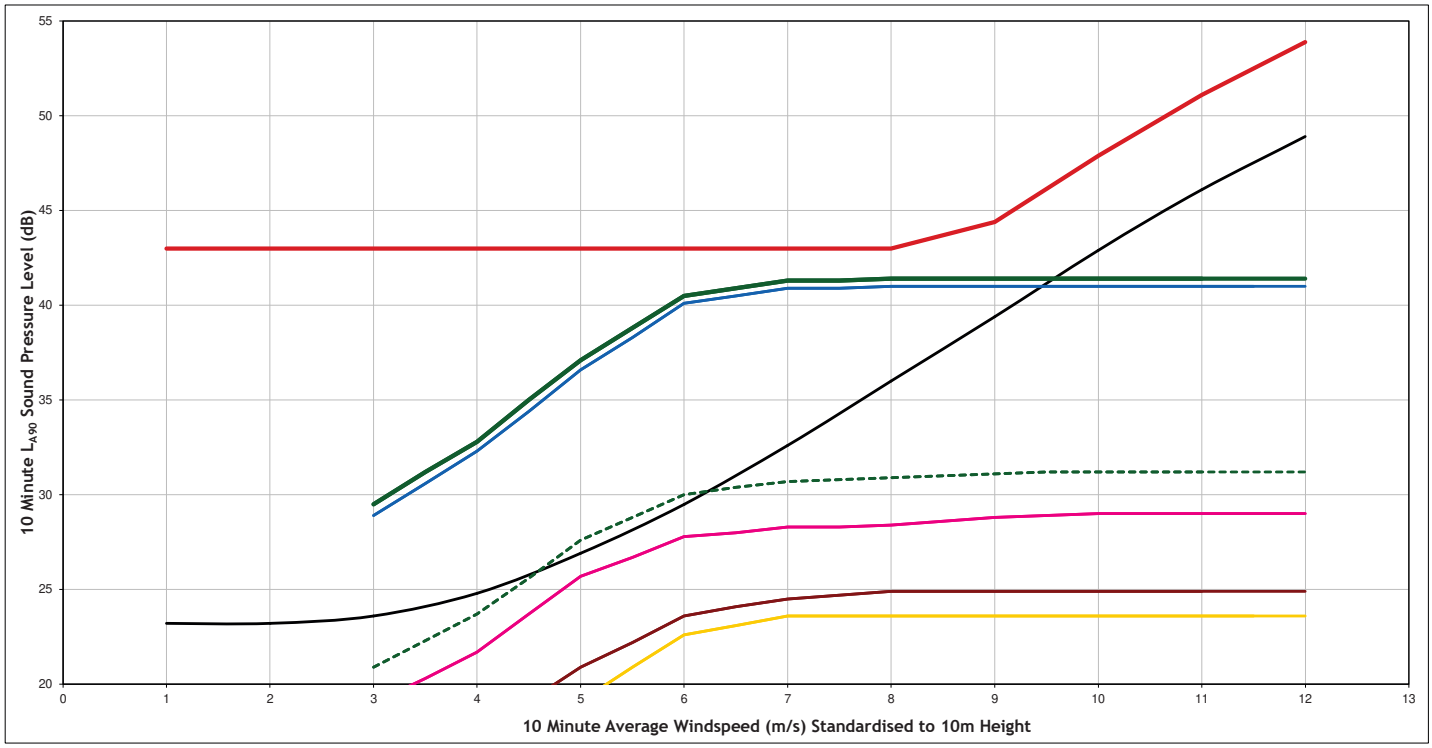
Daytime - NAL10



Night Time - NAL10



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL10
Figure Number	Figure A1.3j
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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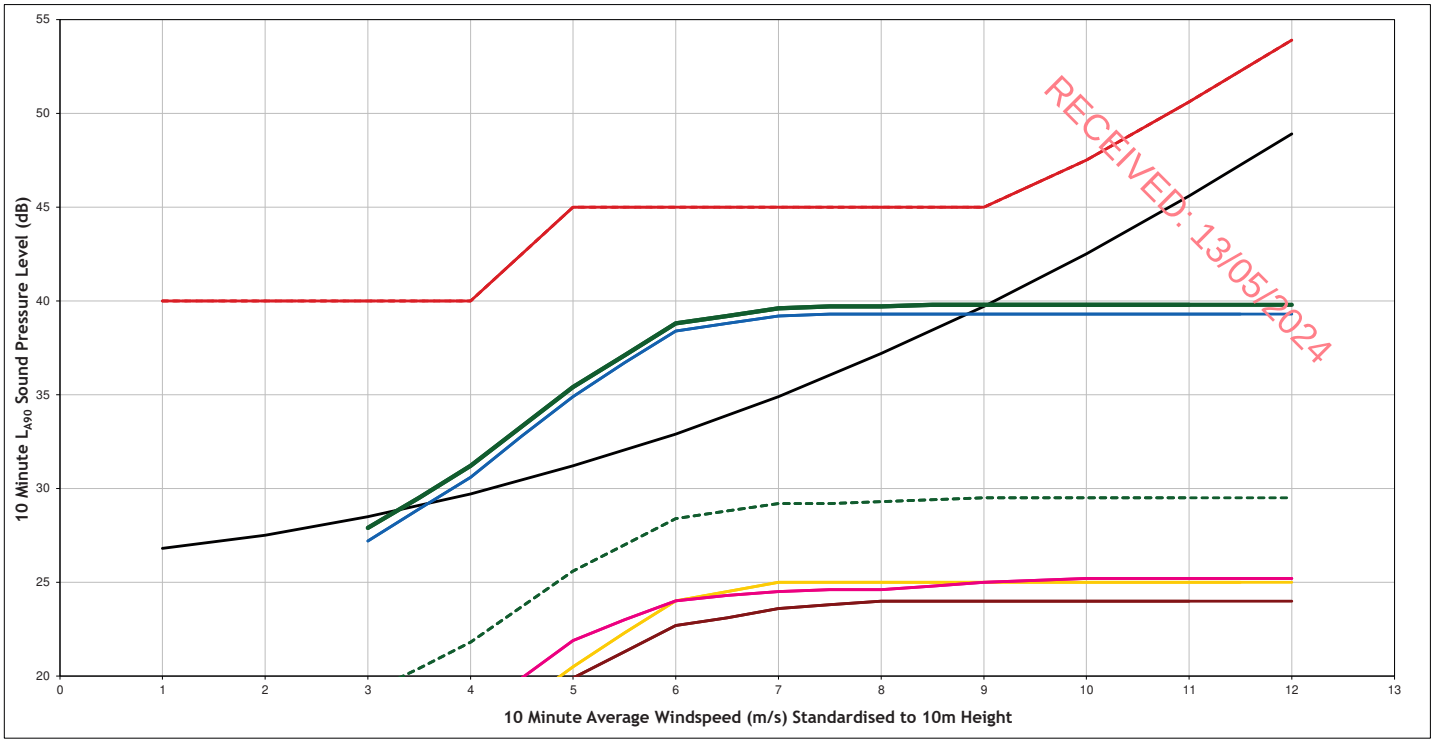
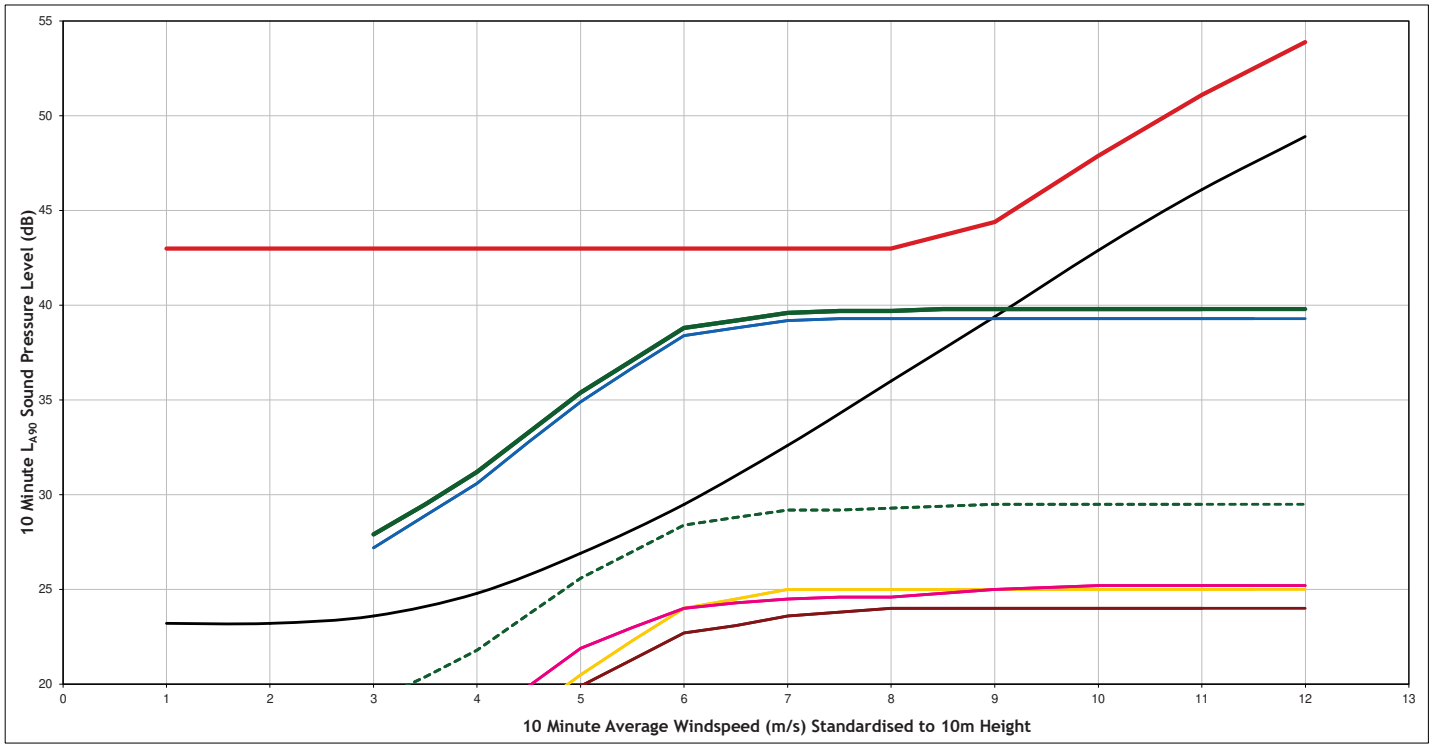
Daytime - NAL11



Night Time - NAL11



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL11
Figure Number	Figure A1.3k
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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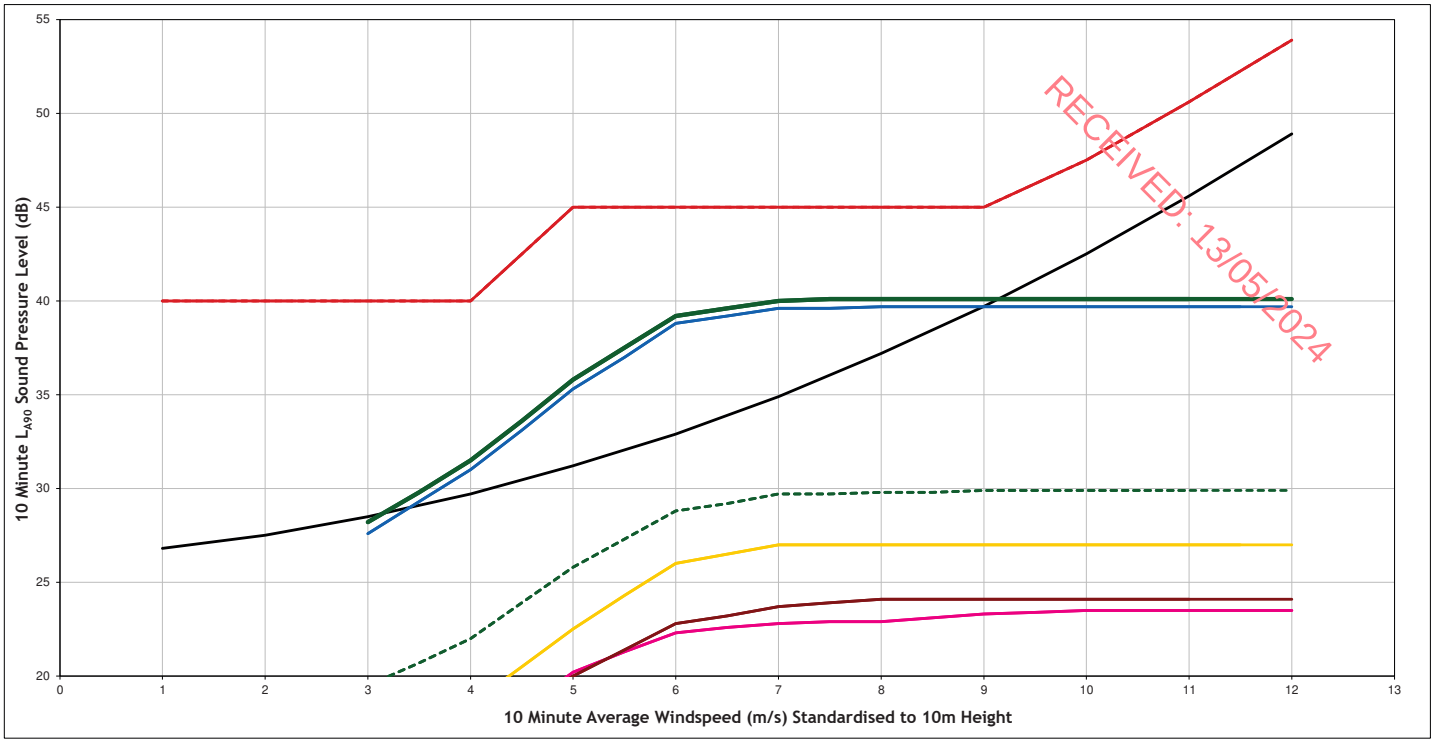
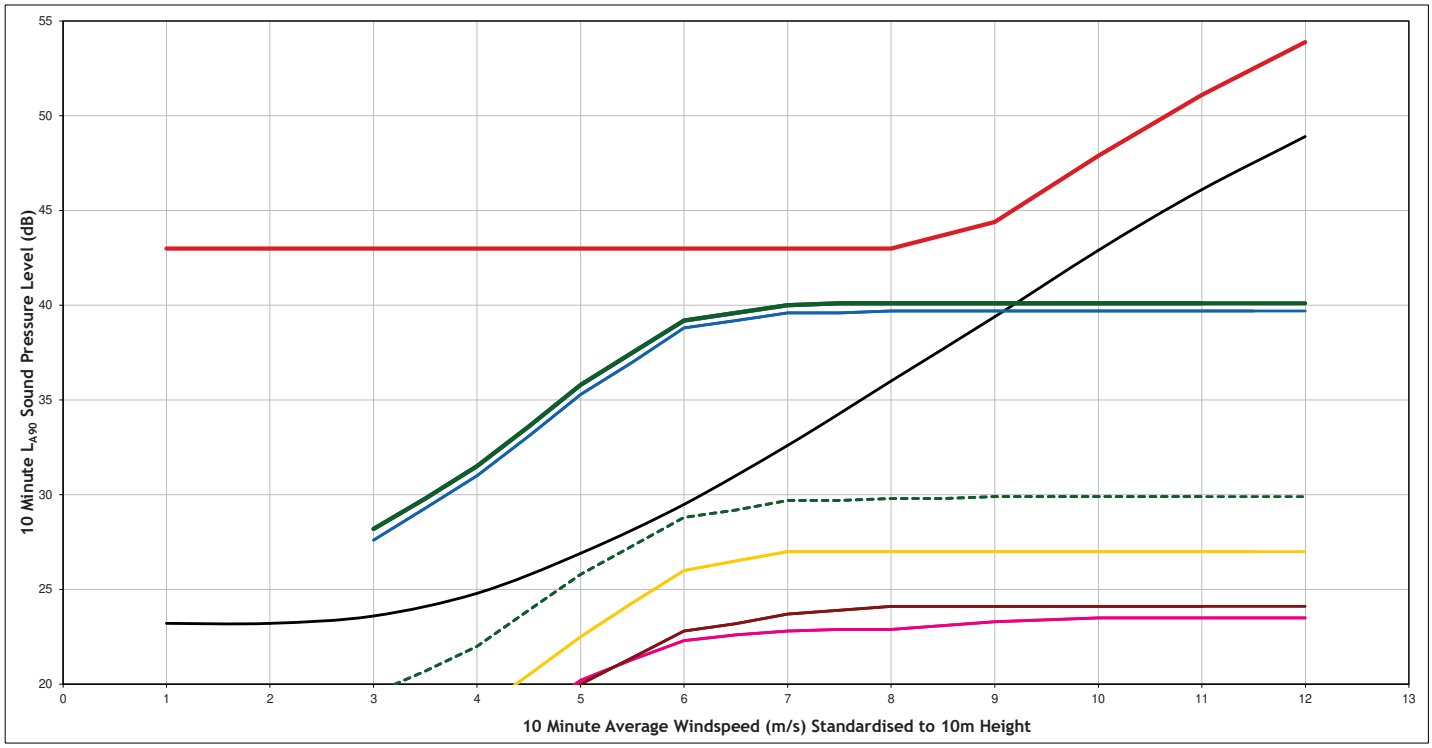
Daytime - NAL12



Night Time - NAL12



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL12
Figure Number	Figure A1.3l
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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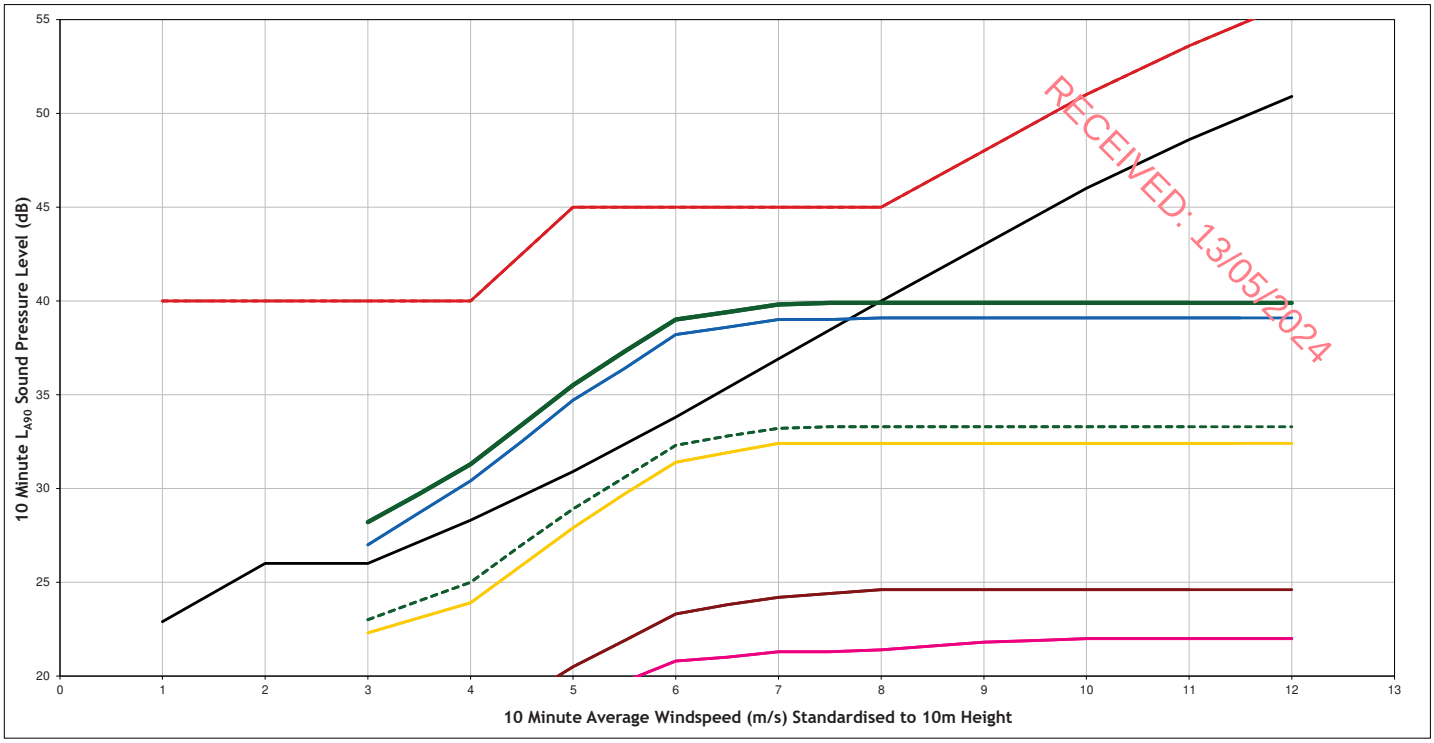
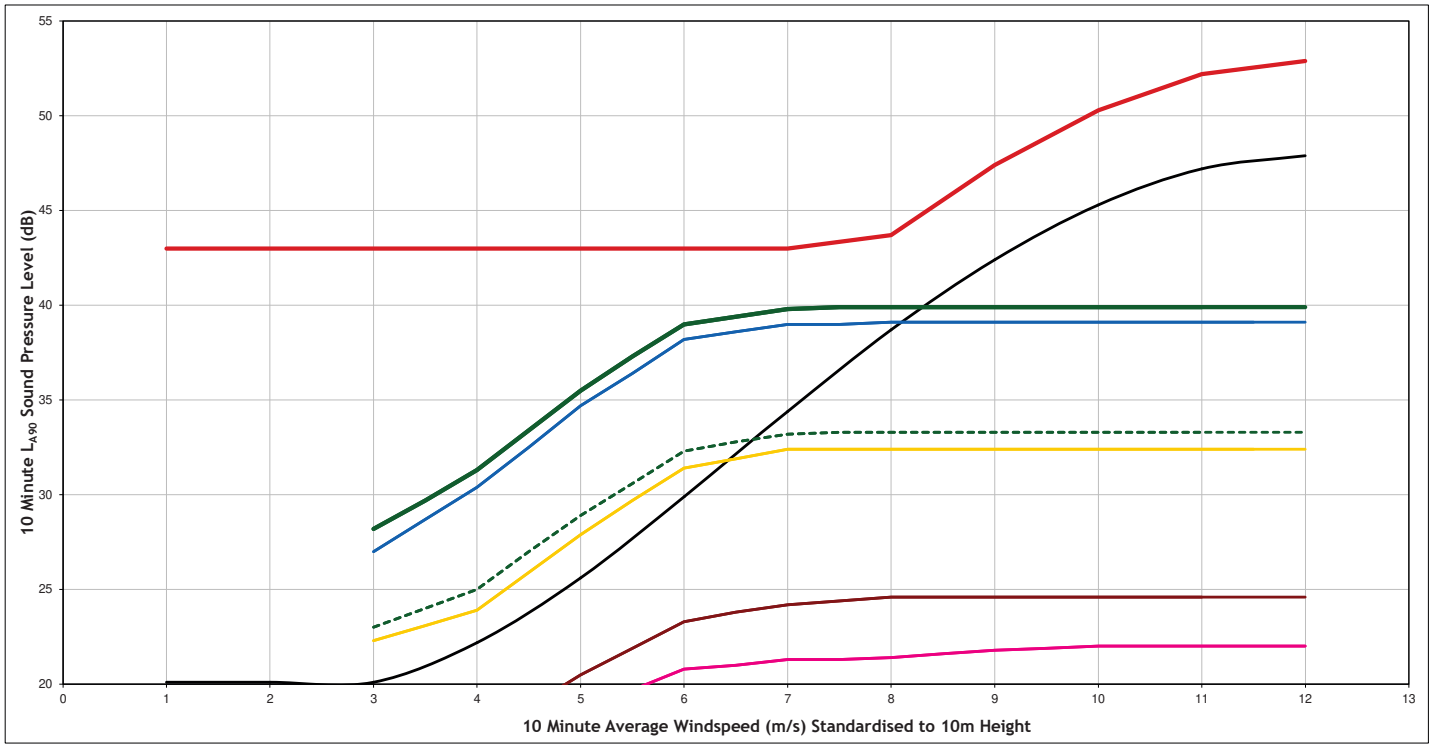
Daytime - NAL13



Night Time - NAL13

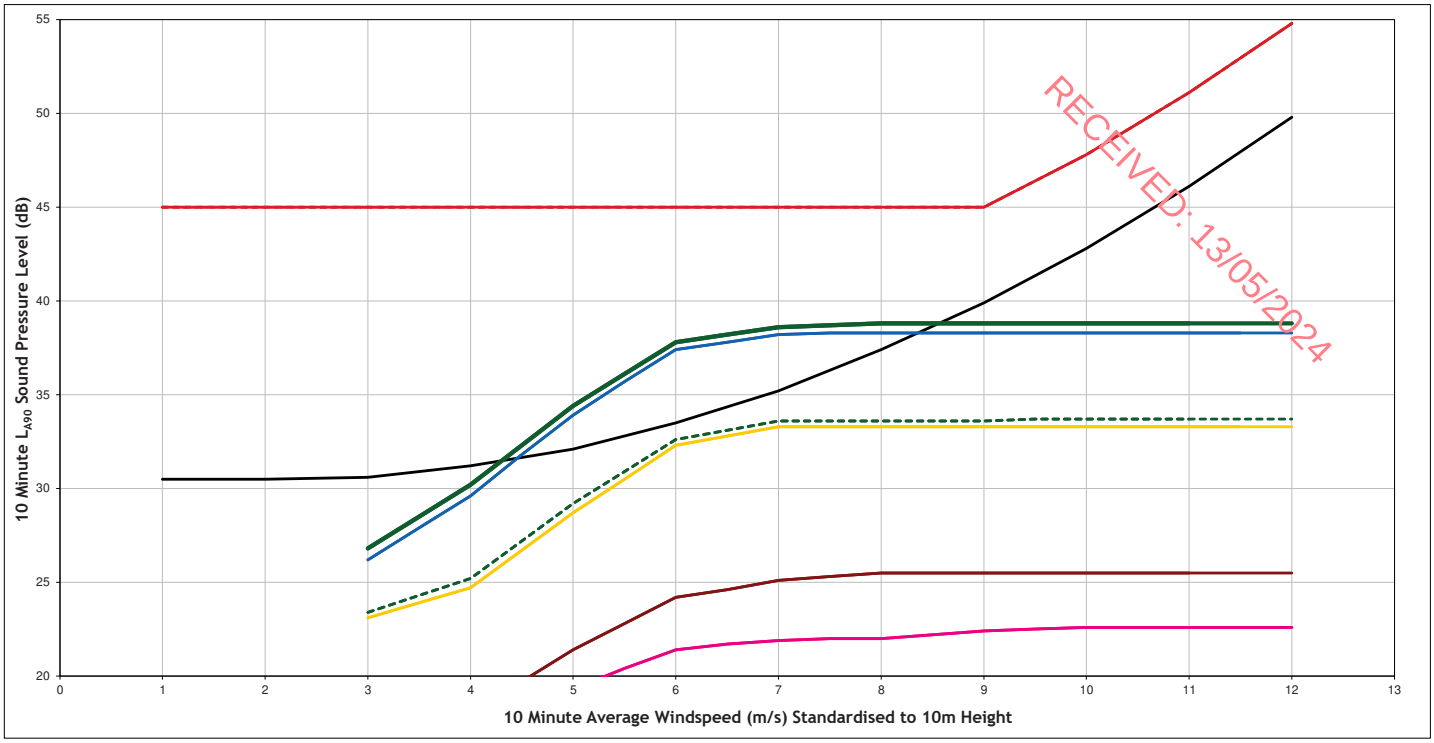


Legend:

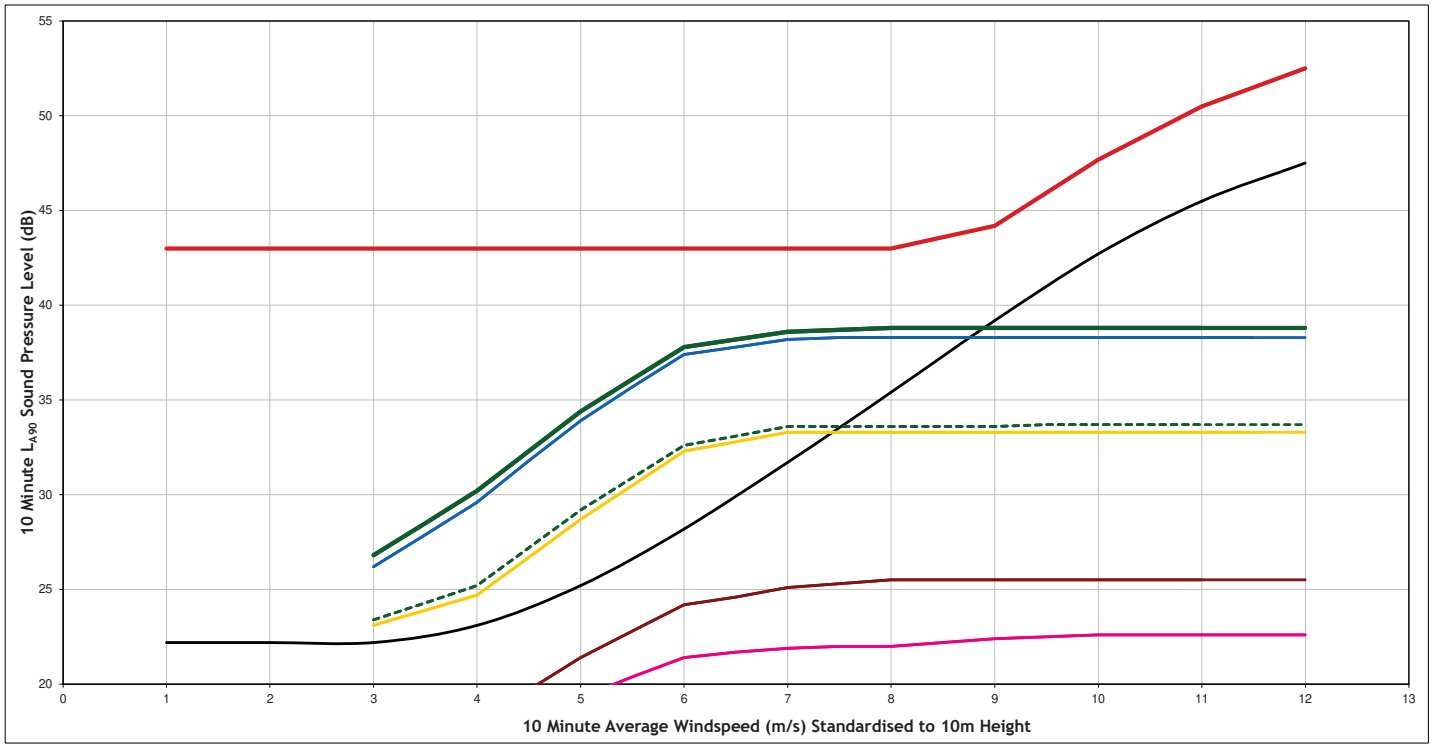
- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL13
Figure Number	Figure A1.3m
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Daytime - NAL14



Night Time - NAL14

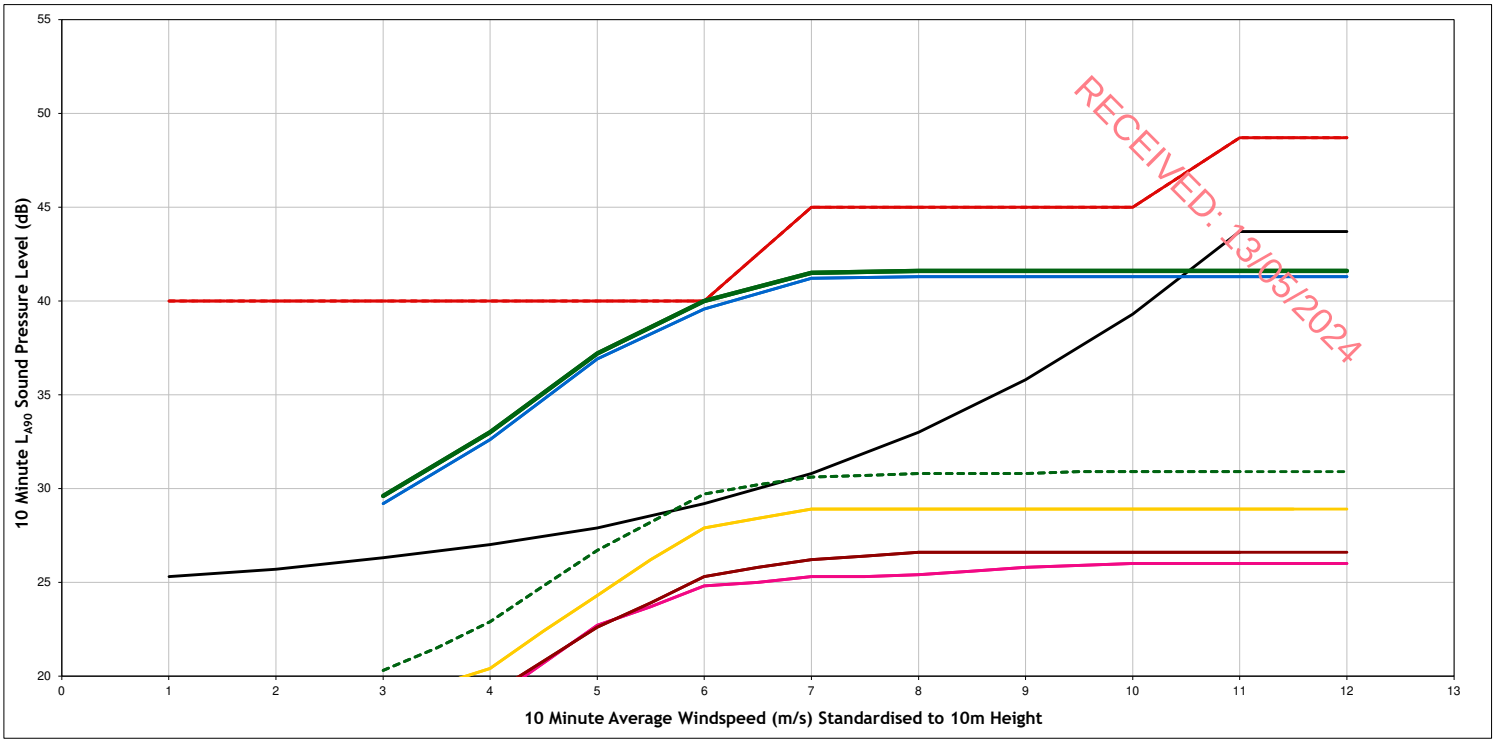


Legend:

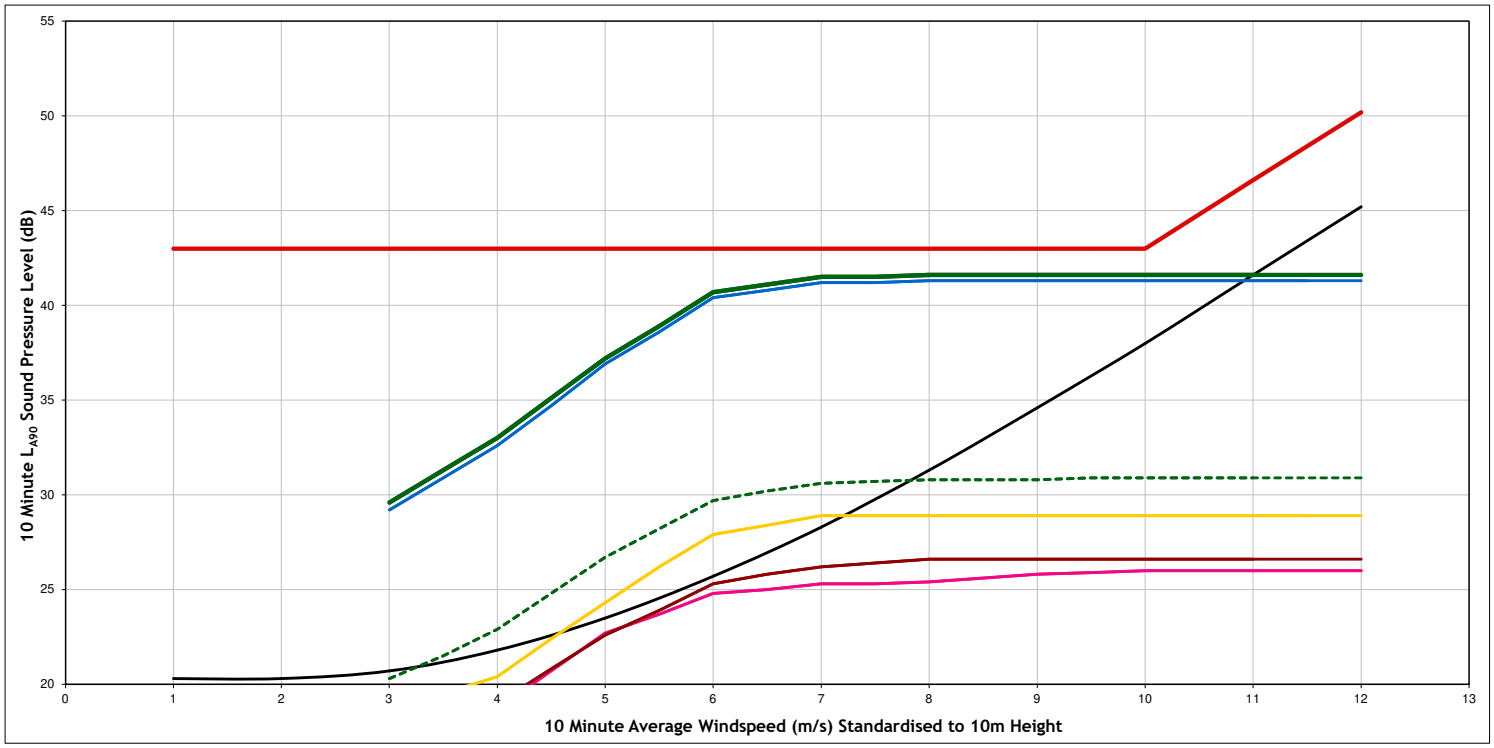
- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL14
Figure Number	Figure A1.3n
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Daytime - NAL15



Night Time - NAL15



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hills, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL15
Figure Number	Figure A1.3o
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

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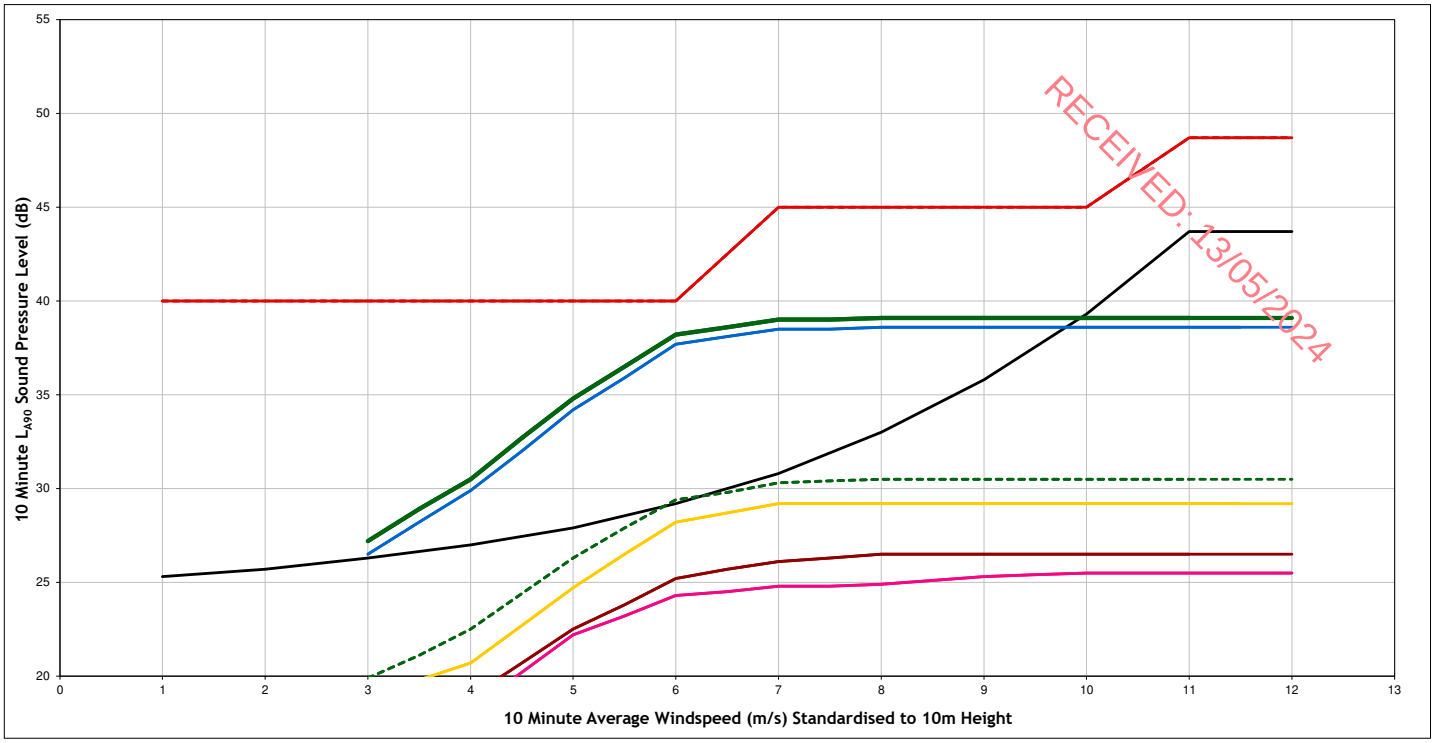
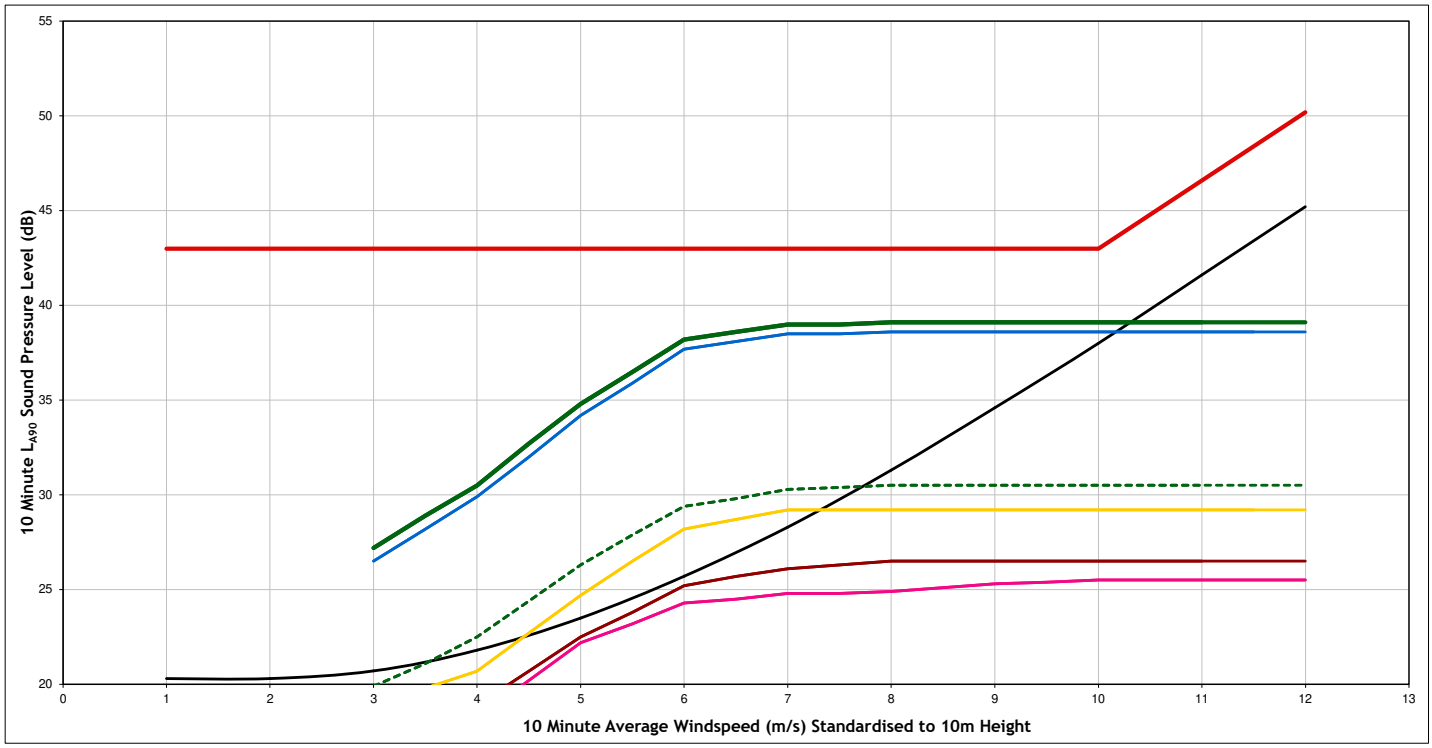
Daytime - NAL16



Night Time - NAL16



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL16
Figure Number	Figure A1.3p
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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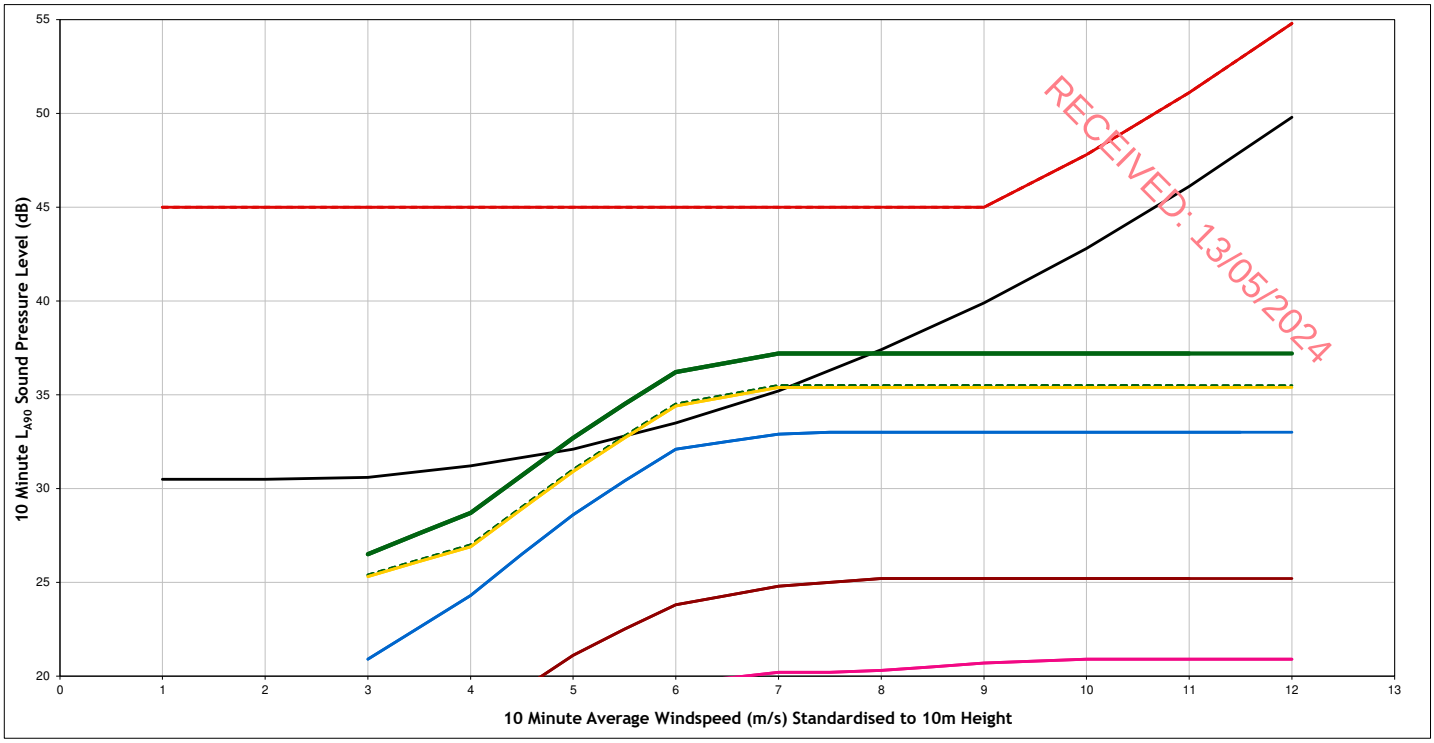
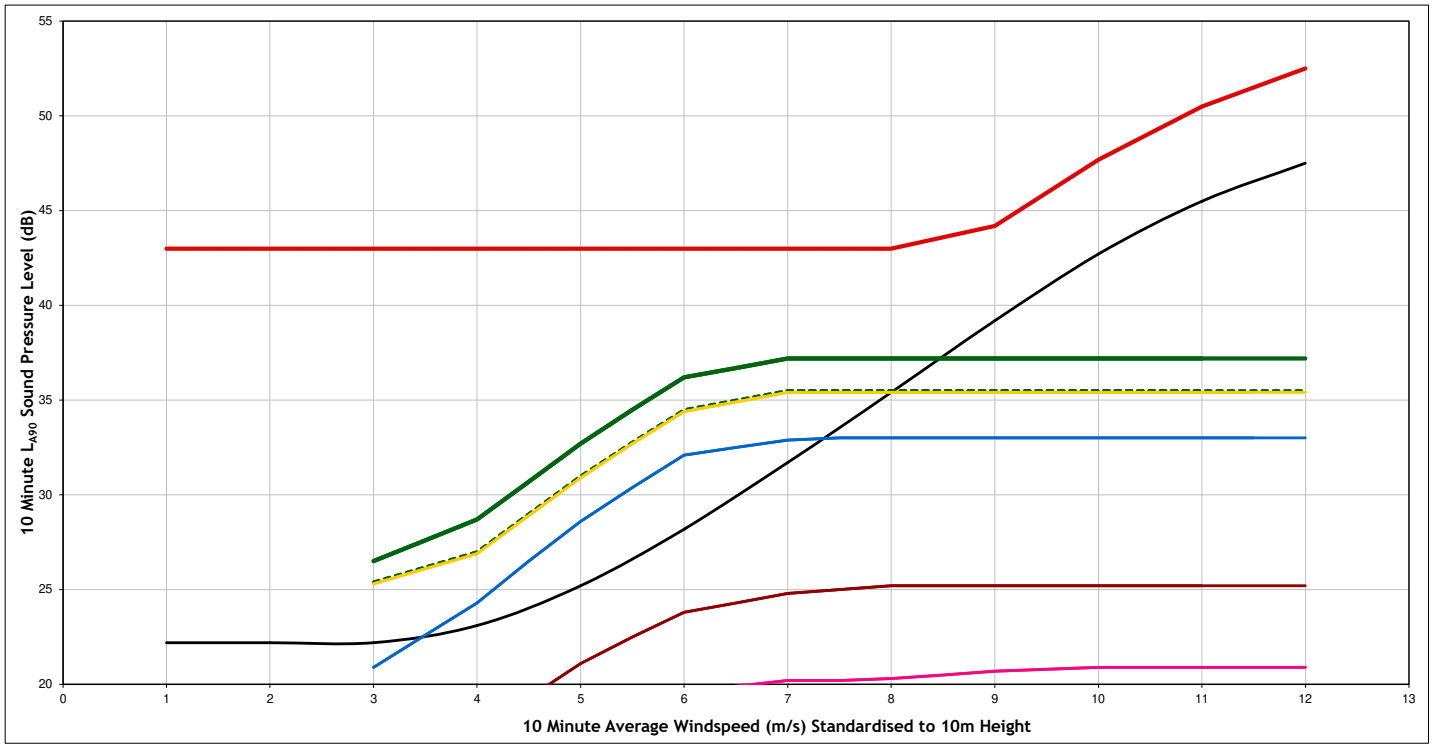
Daytime - NAL17



Night Time - NAL17



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL17
Figure Number	Figure A1.3q
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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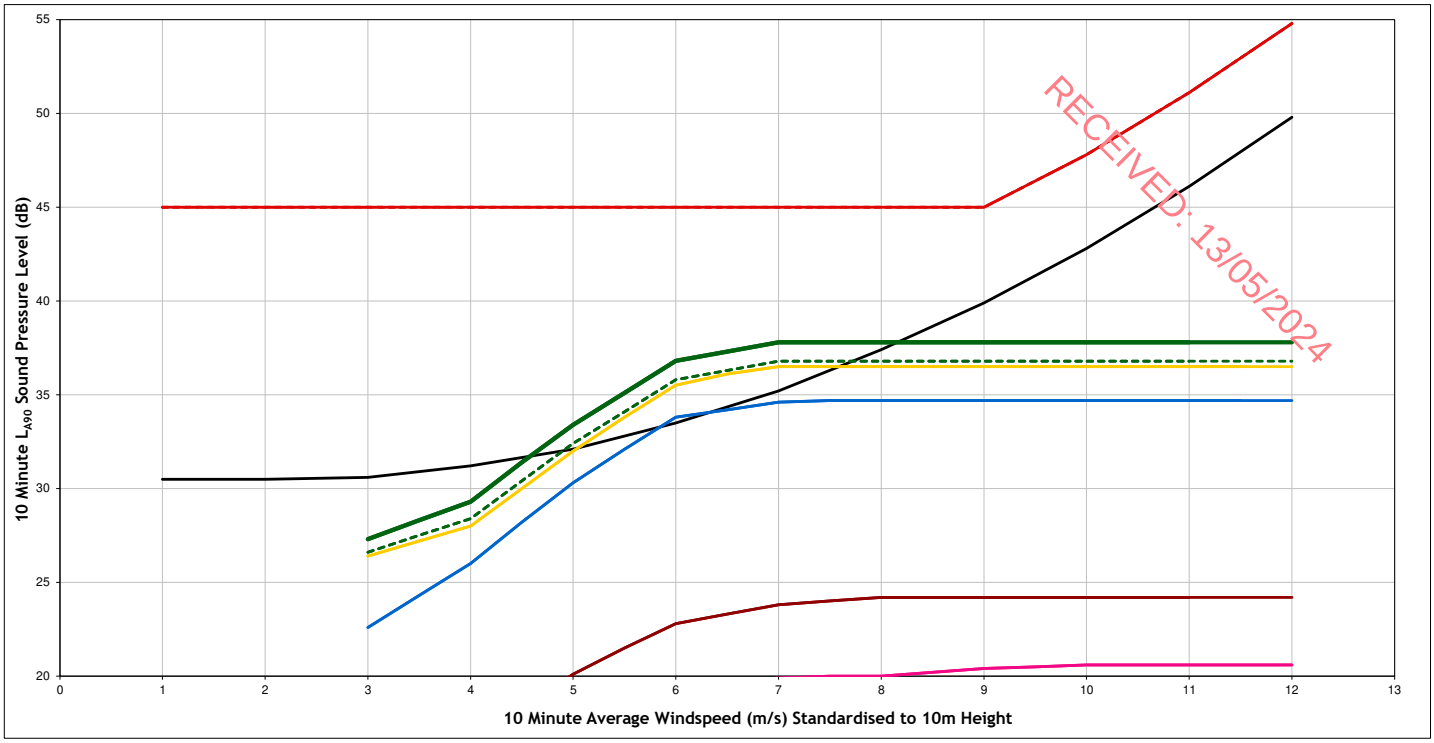
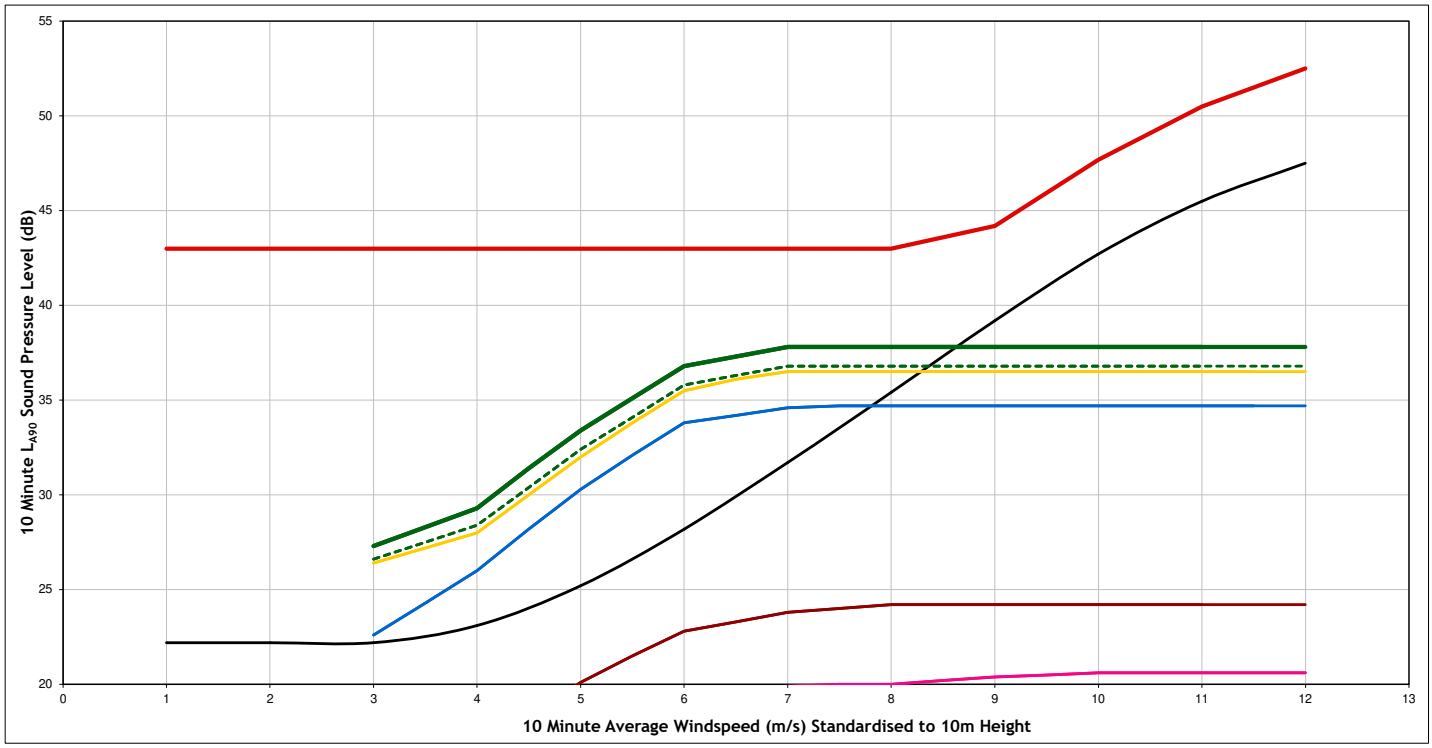
Daytime - NAL18



Night Time - NAL18



Legend:

- Background Noise Trendline (Indicative)
- Total WEDG Noise Limit
- Cumulative,including the Proposed Development with 7 x V150 6.0 MW PO6000
- Cumulative,excluding the Proposed Development
- Proposed Development,with 7 x V150 6.0MW PO6000
- White Hill, with 6 x V162 6.2MW
- Bilboa, with 5 x V117 4.2MW SO2
- Gortahile, with 8 x Nordex N90/2500 HS

Project	Seskin Wind Farm
Client	EDF Renewables Ireland
Title	Noise Assessment - Cumulative NAL18
Figure Number	Figure A1.3r
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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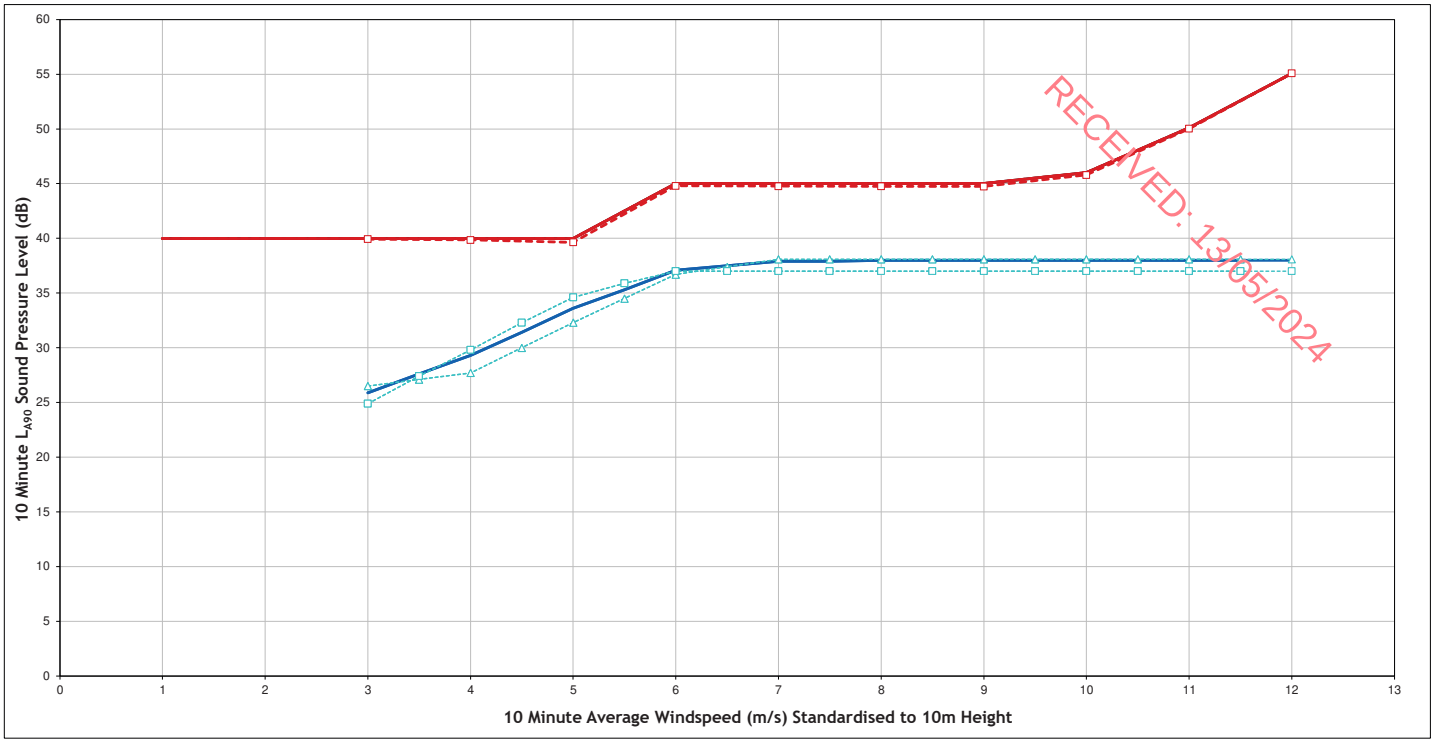
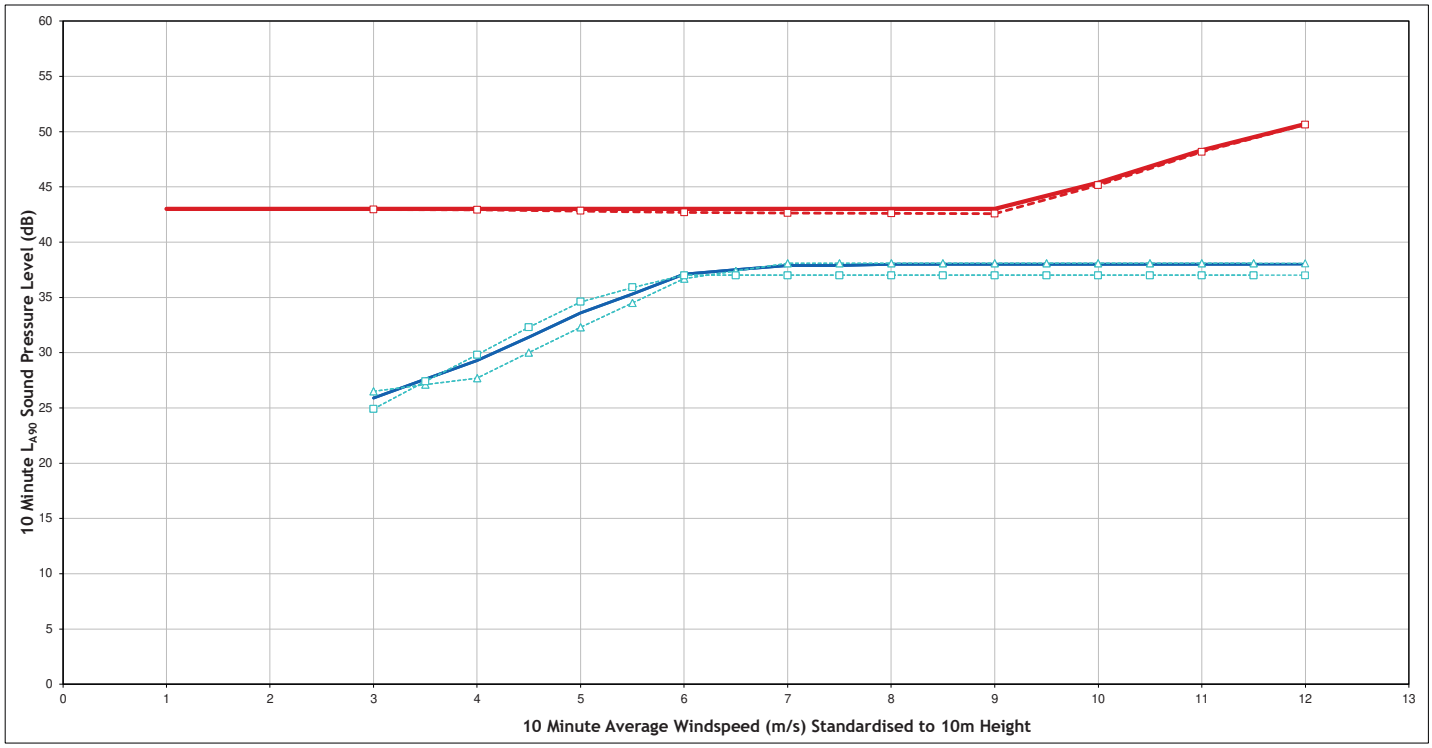
Daytime - NAL1



Night Time - NAL1



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4a
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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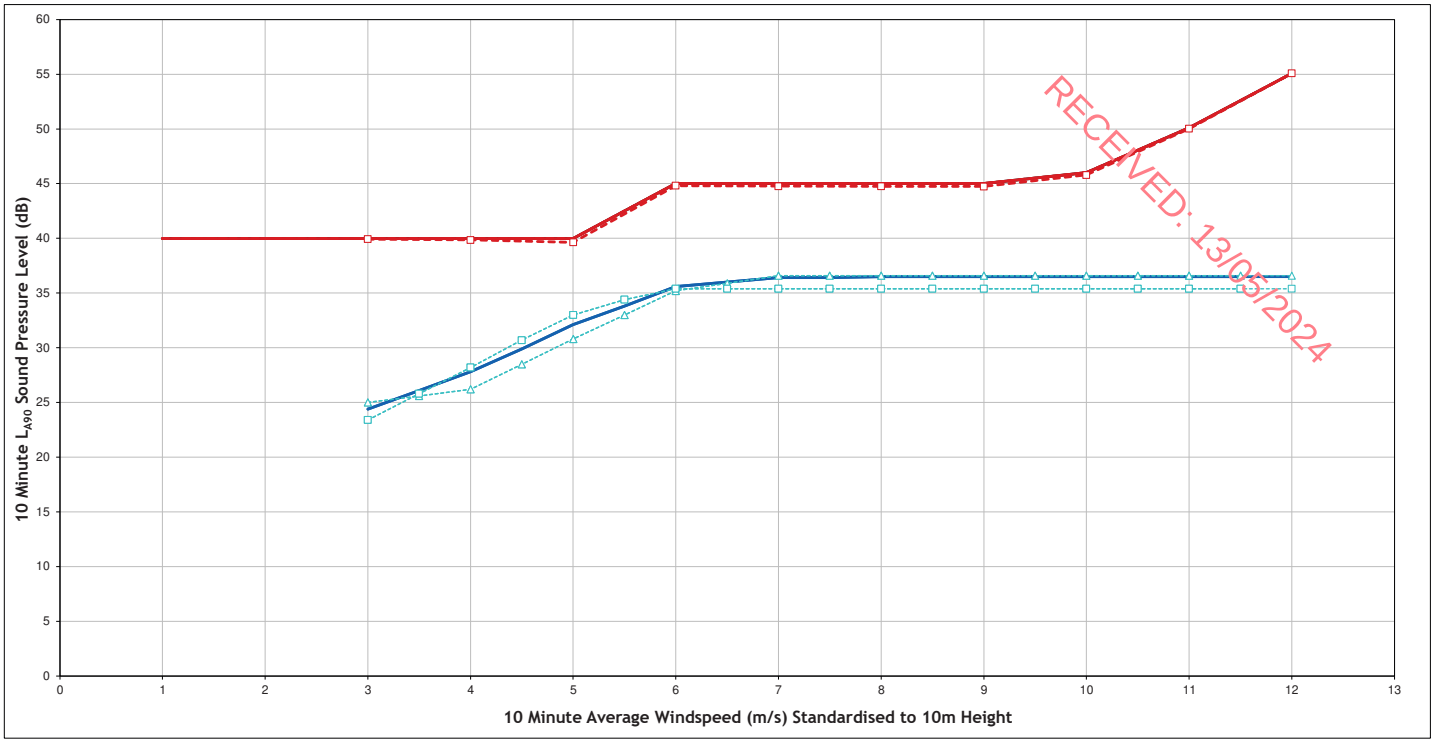
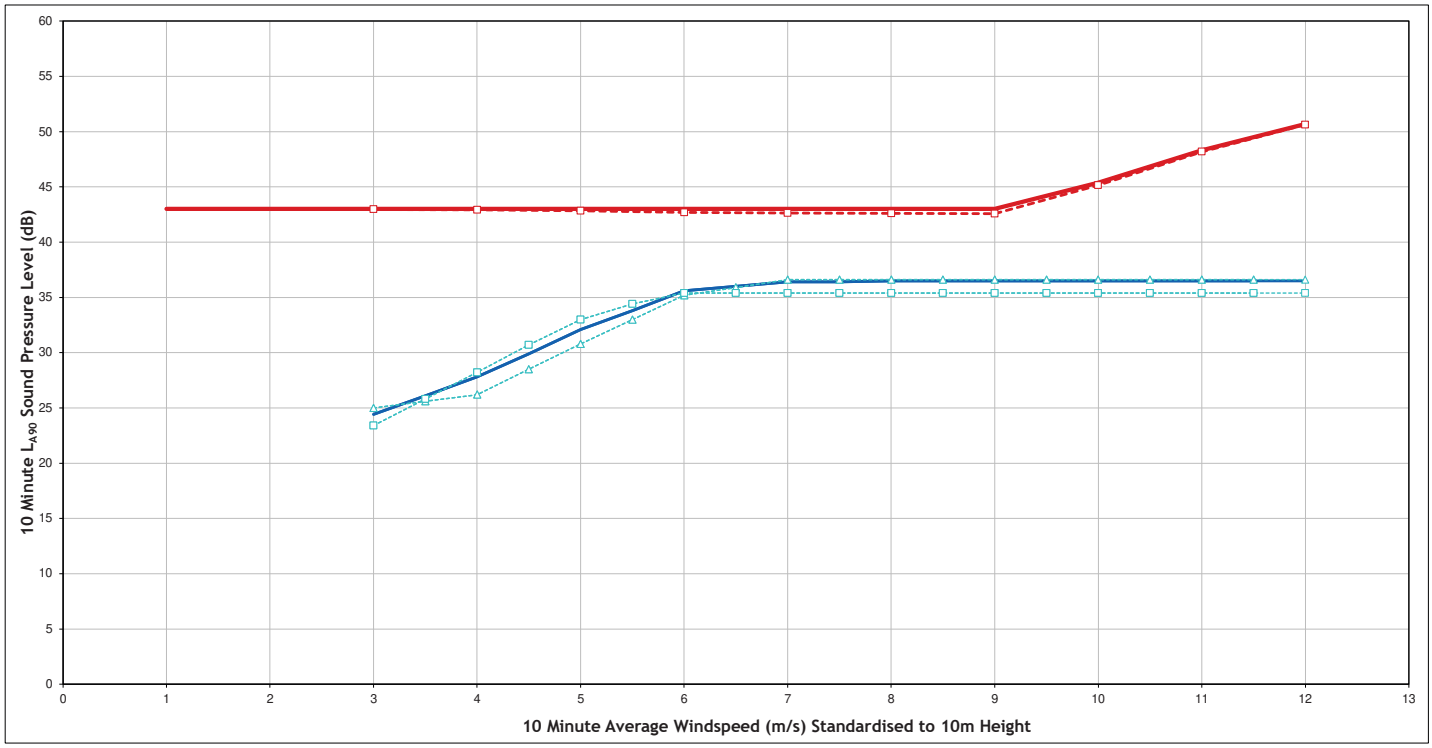
Daytime - NAL2



Night Time - NAL2



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4b
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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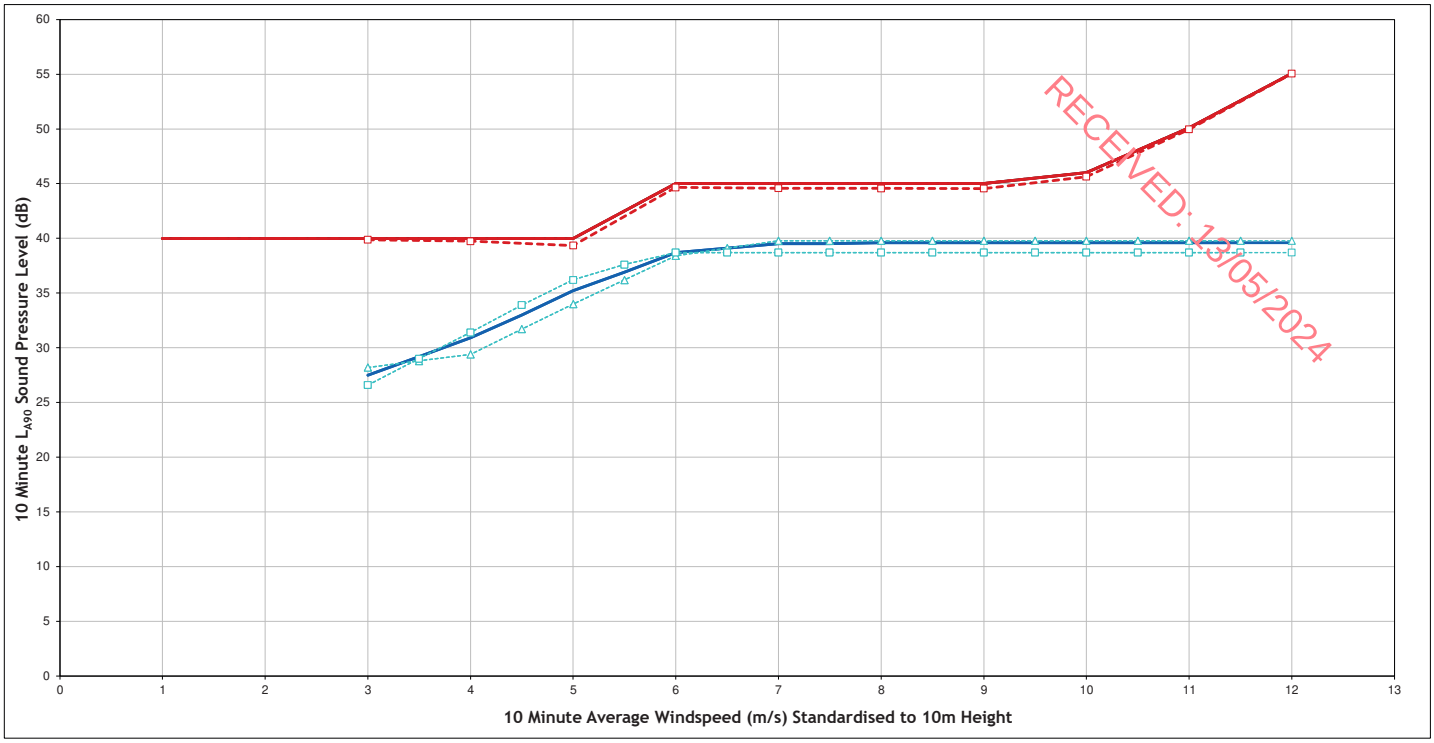
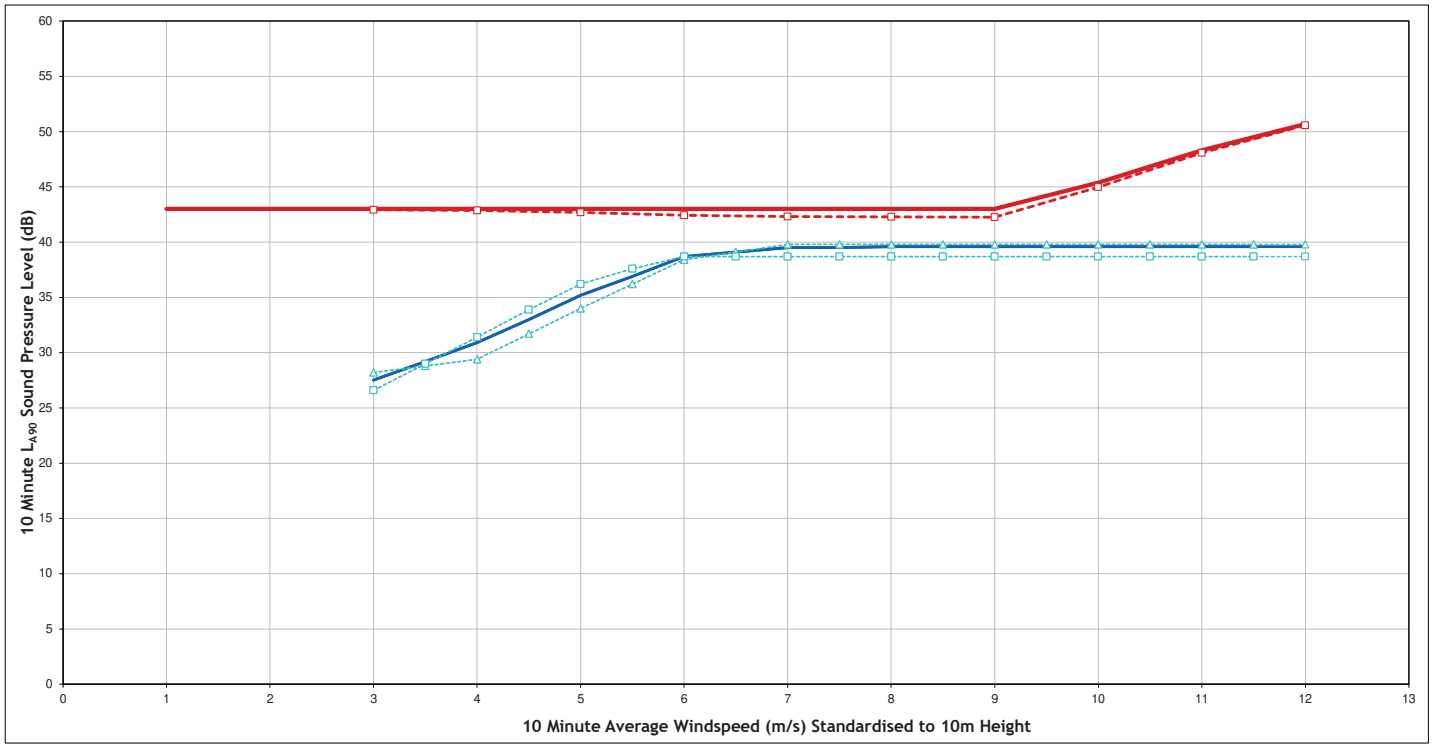
Daytime - NAL3



Night Time - NAL3



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4c
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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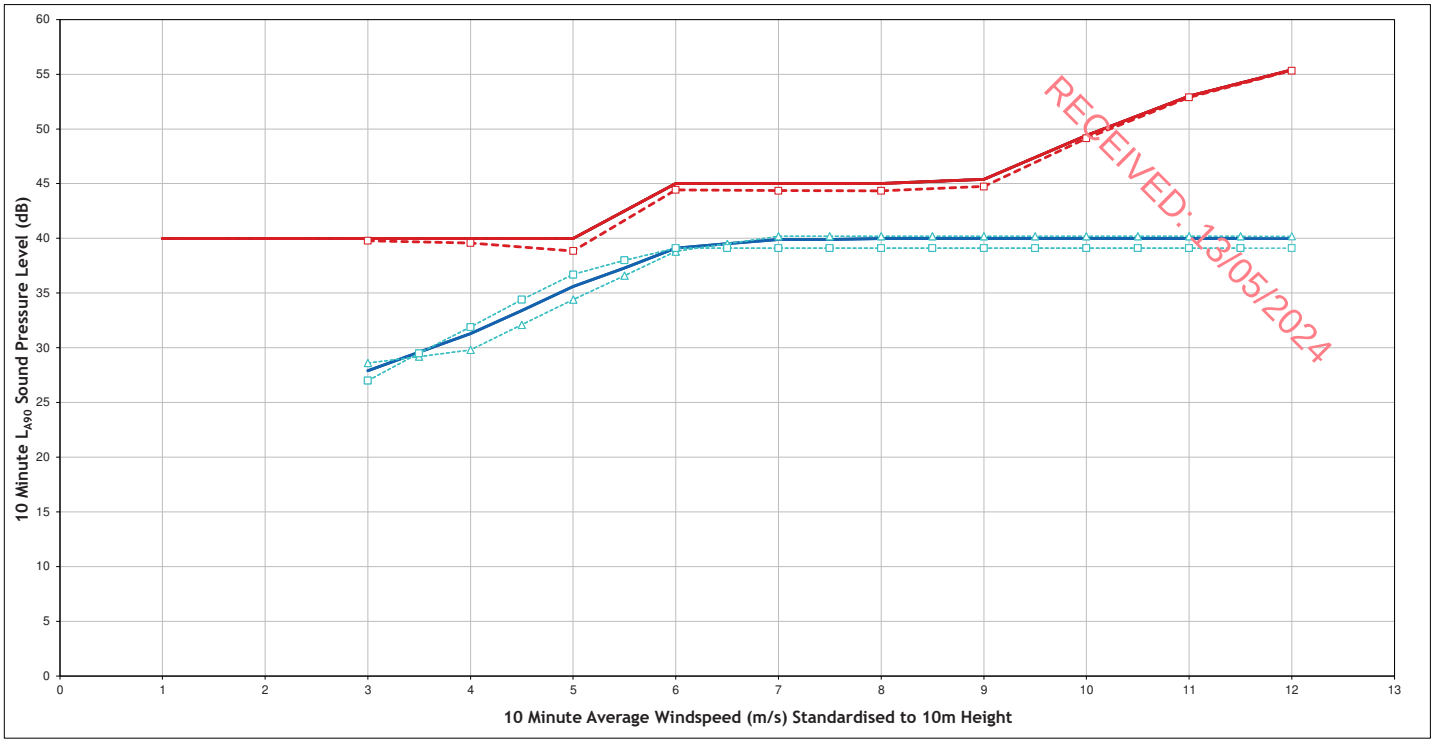
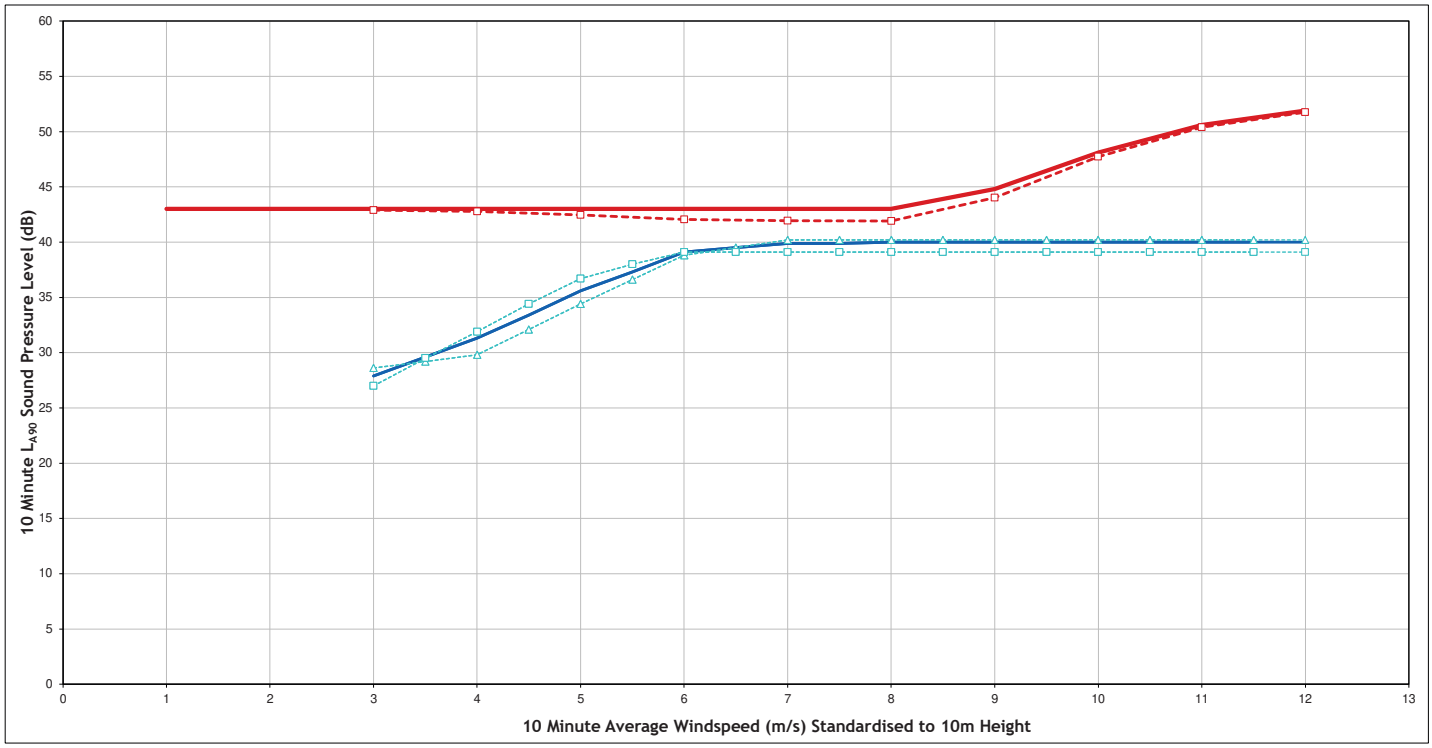
Daytime - NAL7



Night Time - NAL7



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4d
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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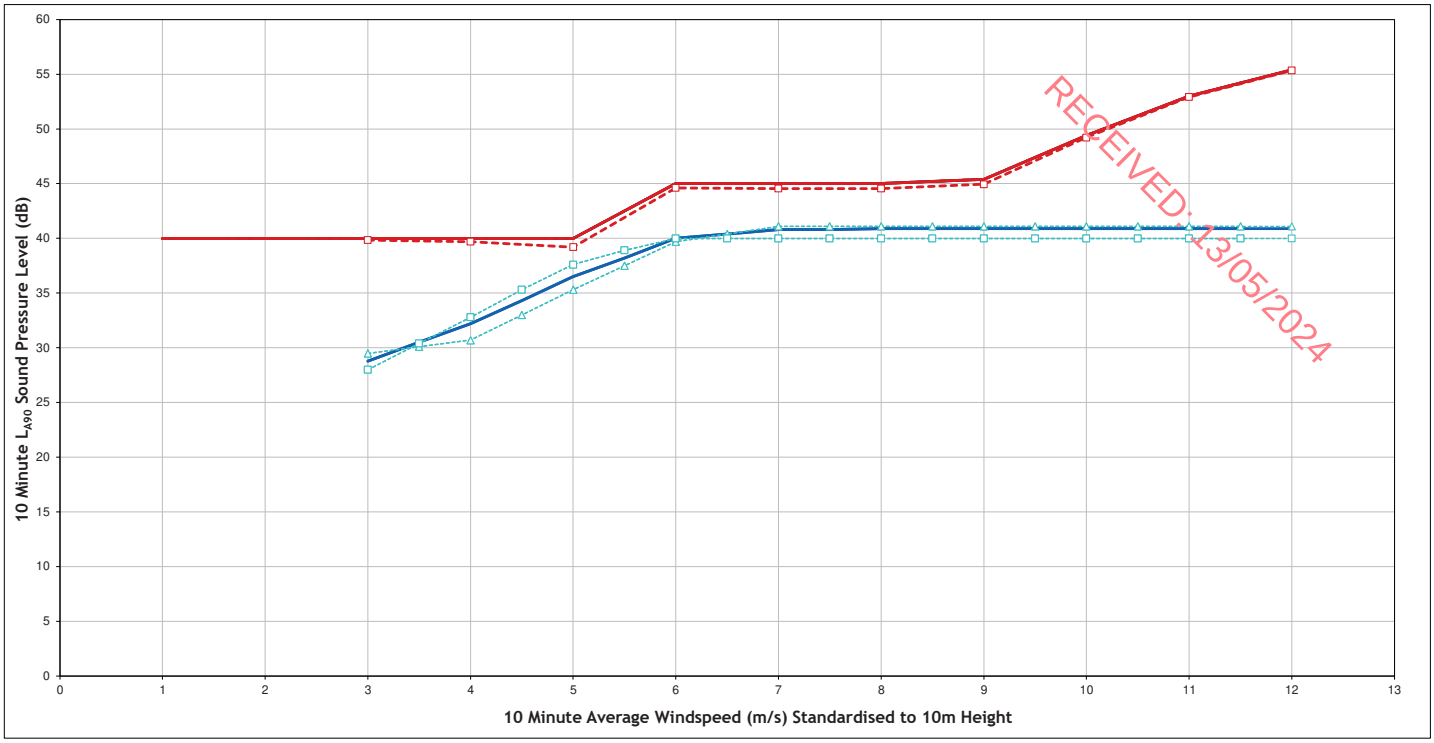
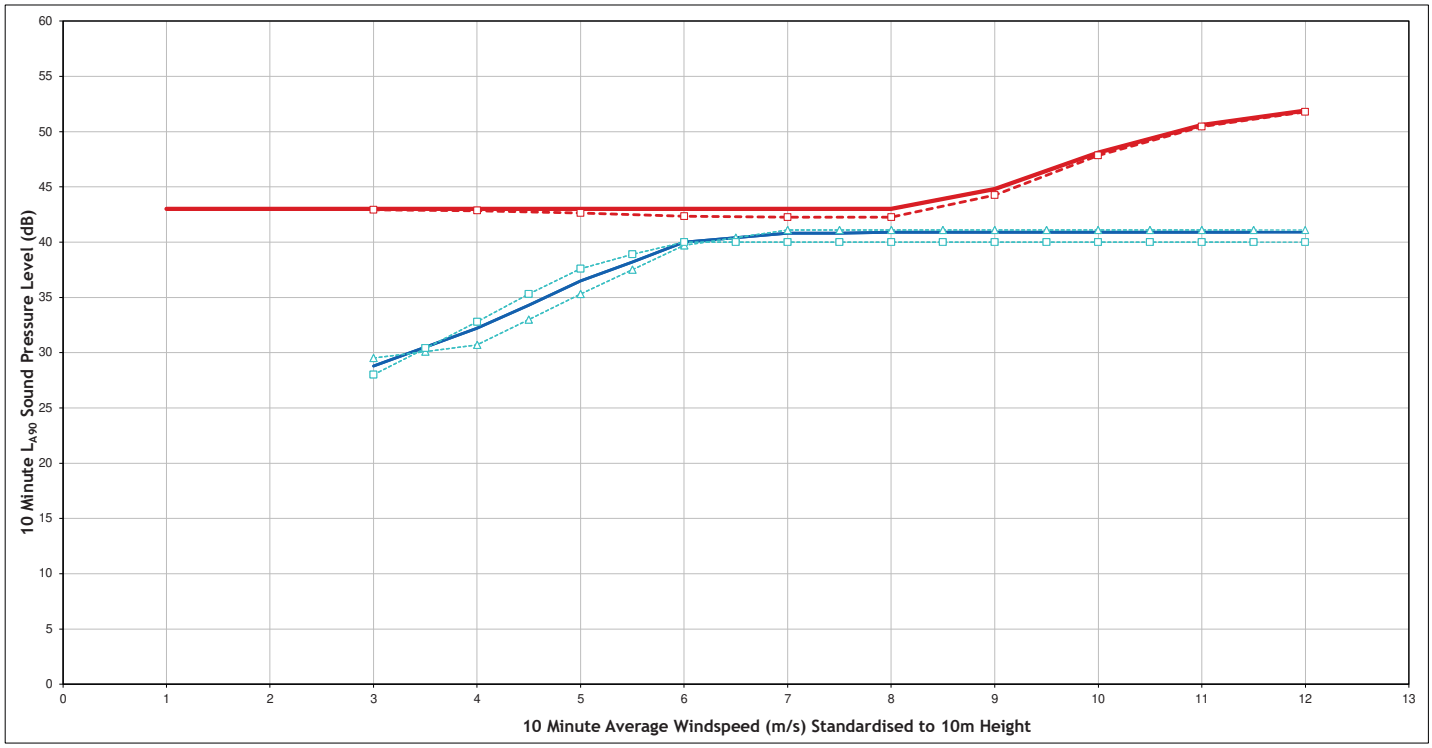
Daytime - NAL8



Night Time - NAL8



Legend:

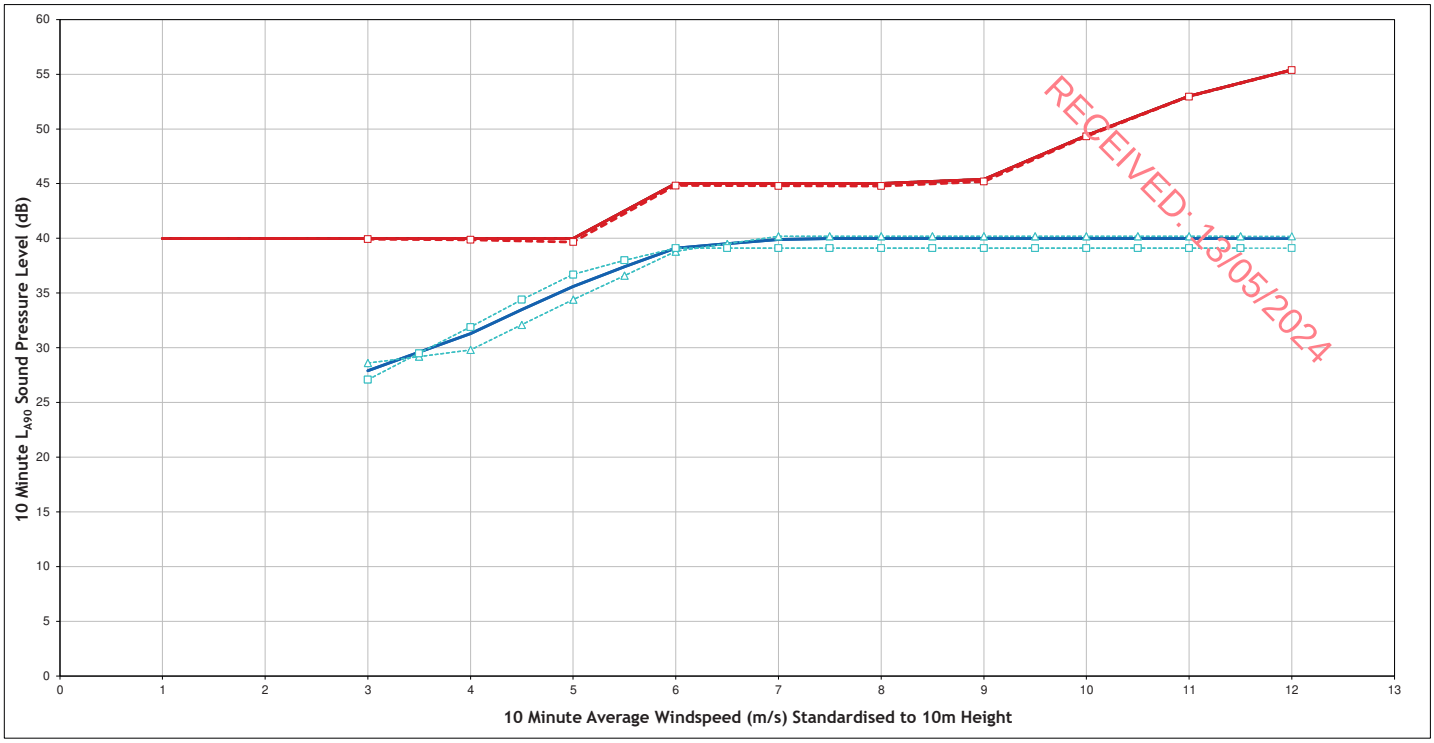
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4e
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

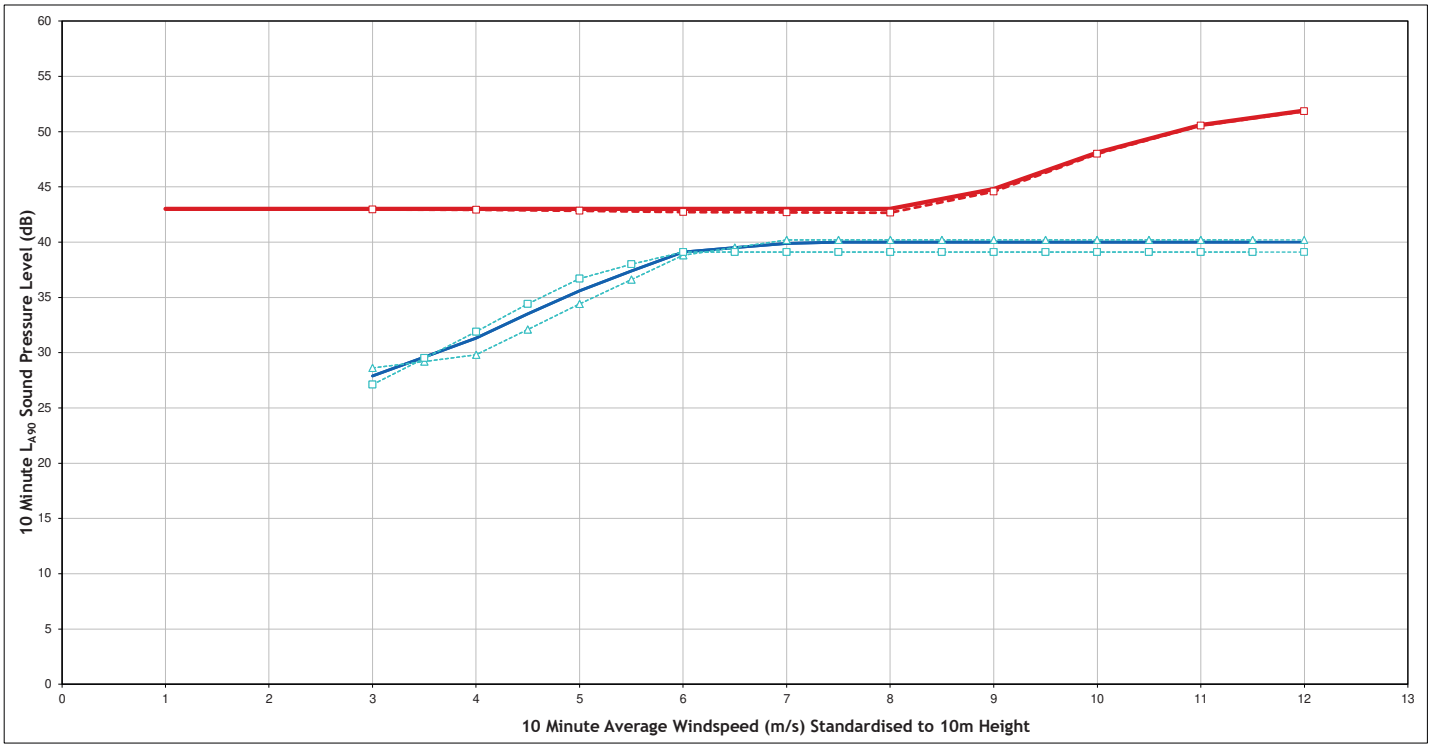
EDF renewables

tnei

Daytime - NAL9



Night Time - NAL9



Legend:

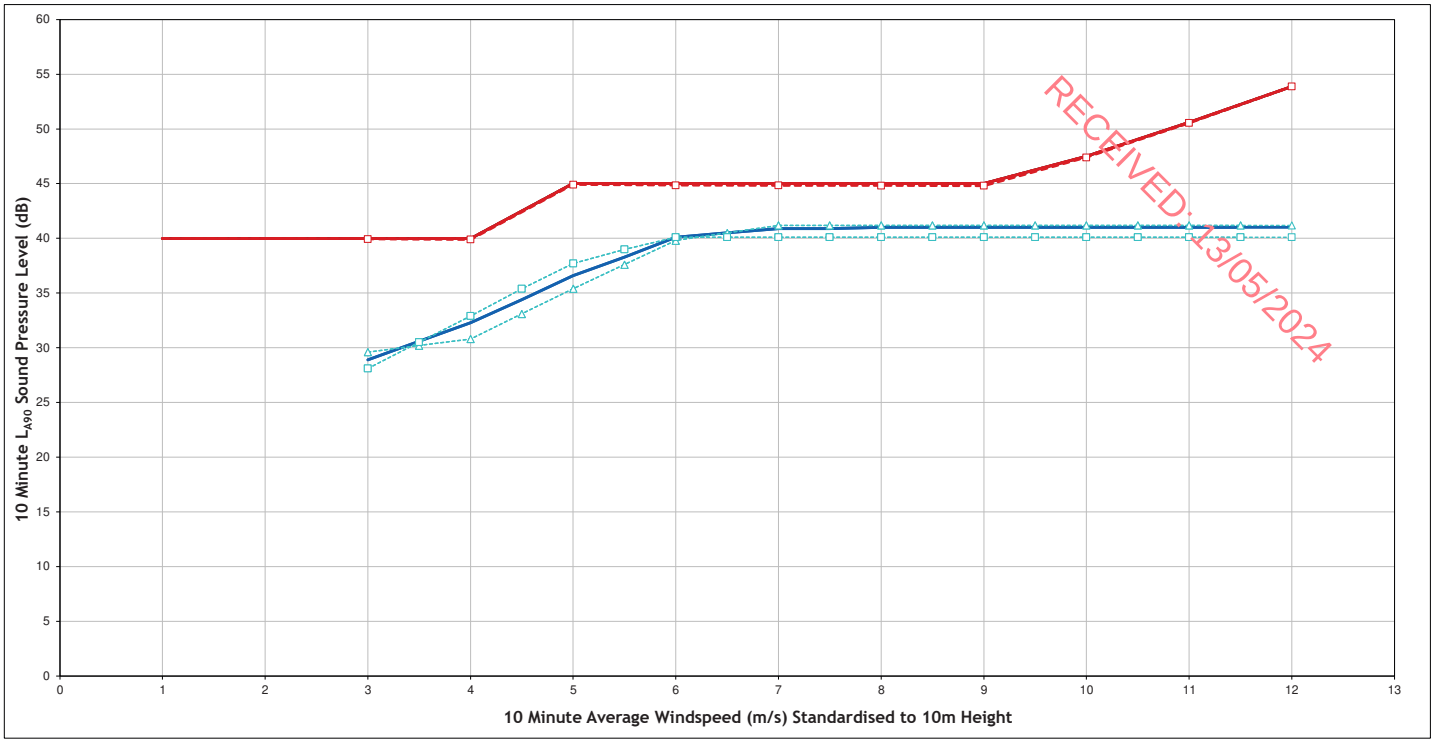
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4f
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

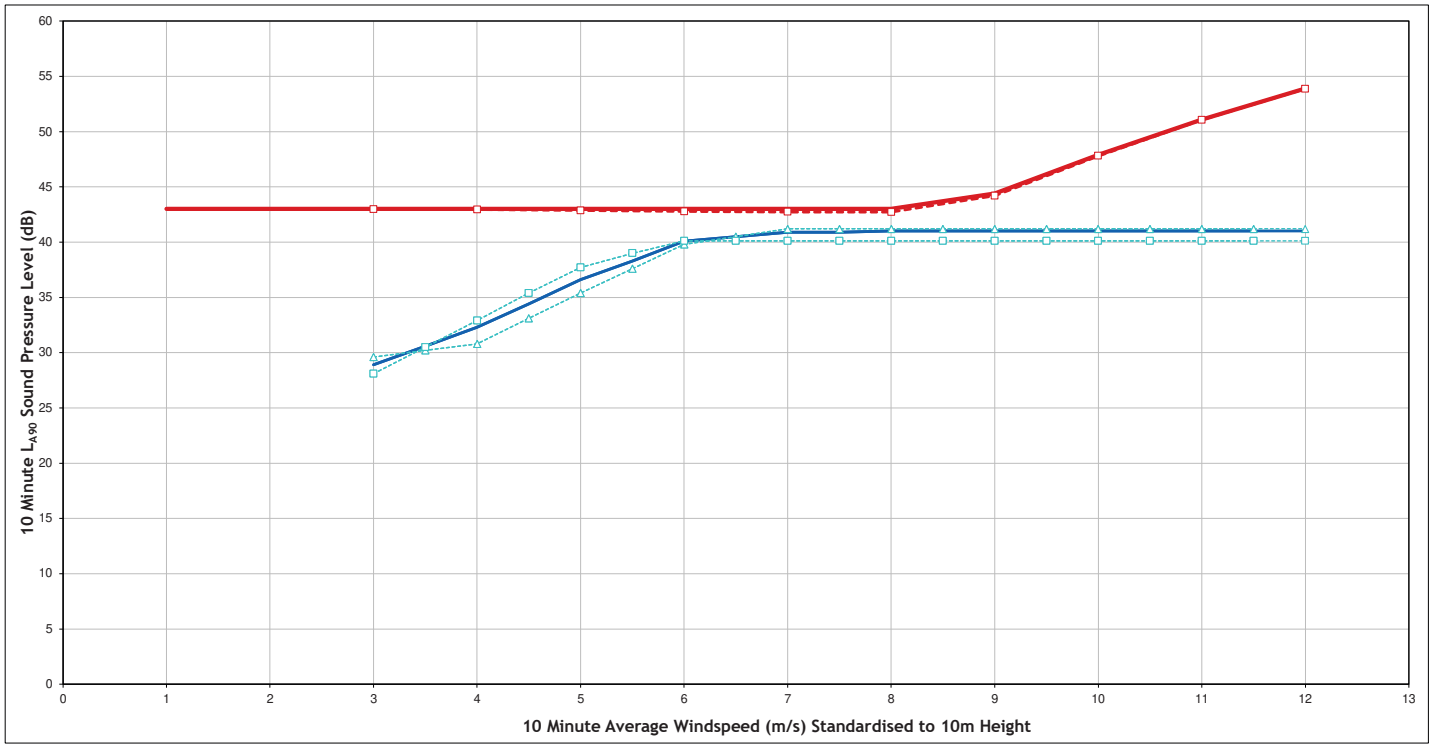
EDF renewables

tnei

Daytime - NAL10



Night Time - NAL10



Legend:

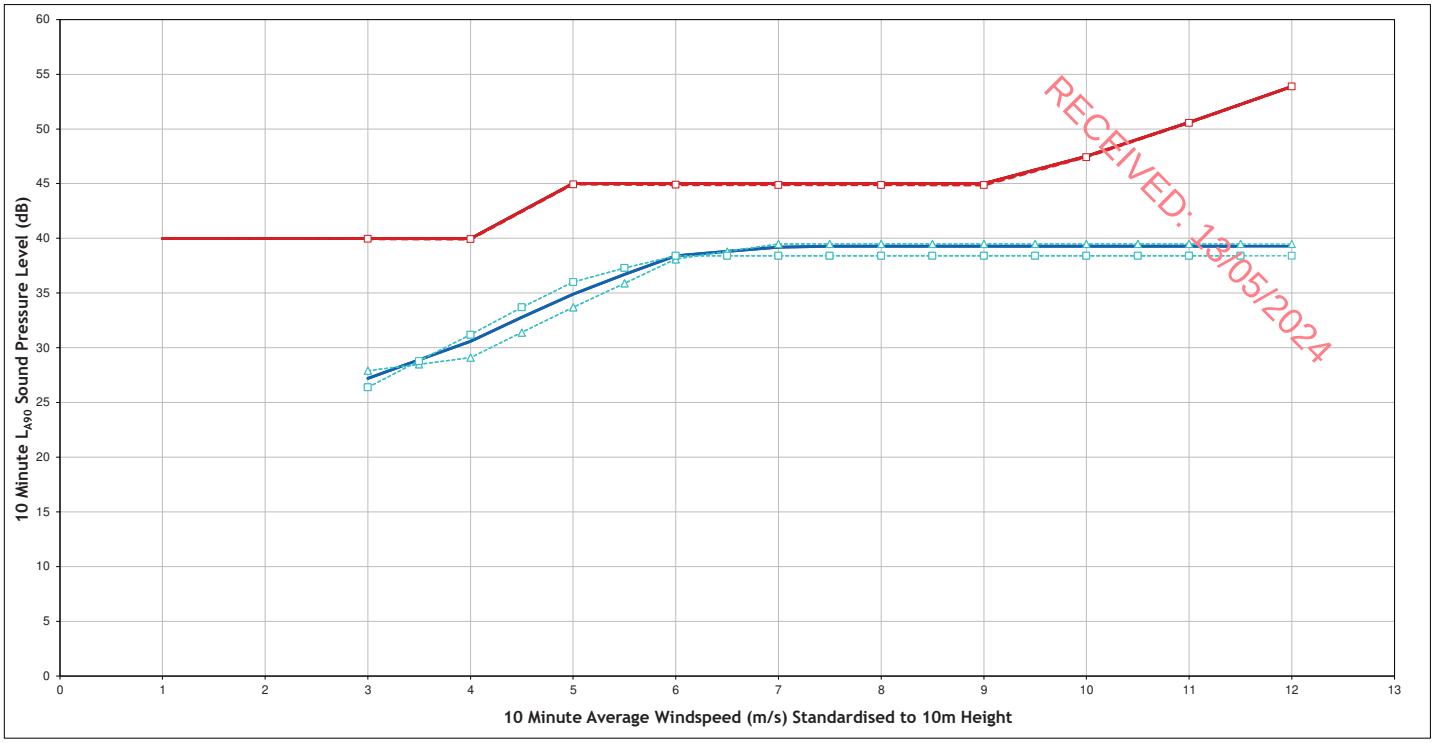
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4g
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

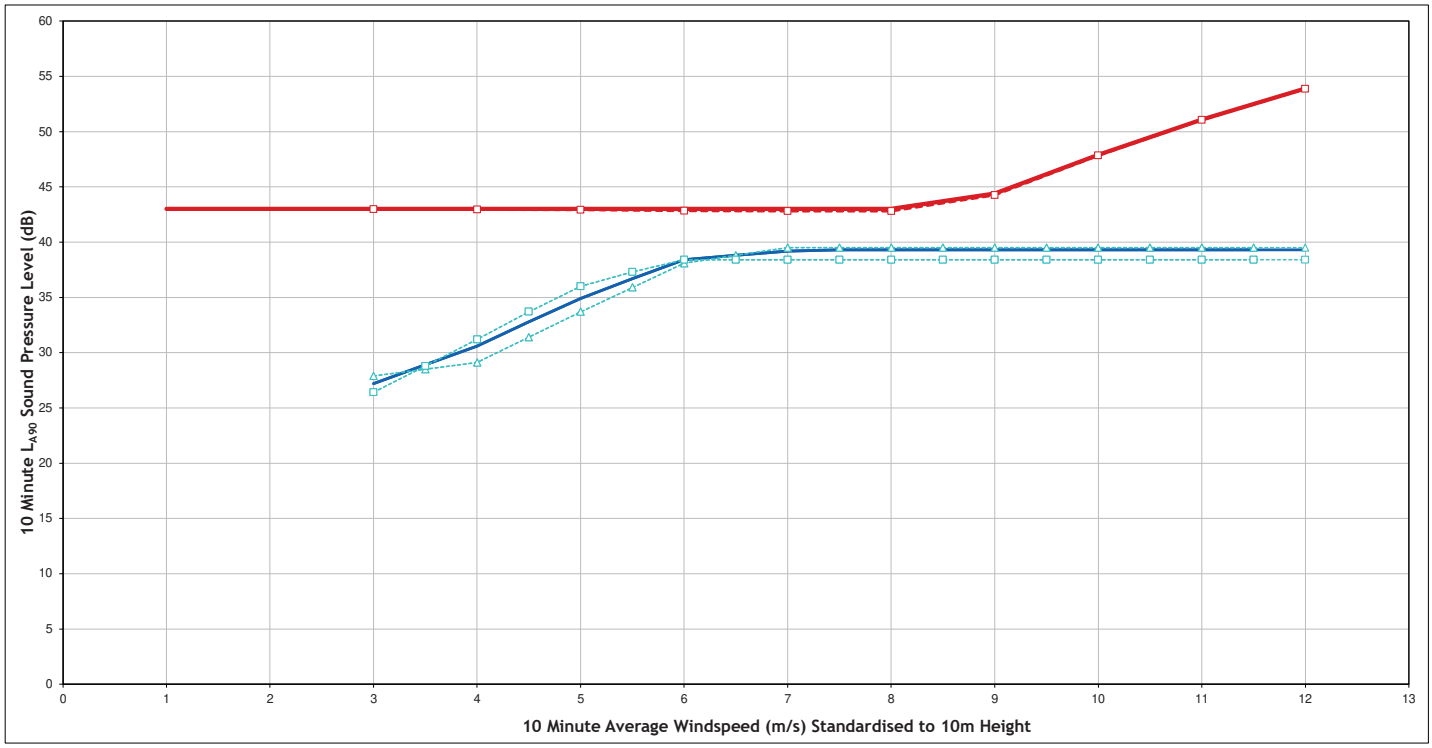
EDF renewables

tnei

Daytime - NAL11



Night Time - NAL11



Legend:

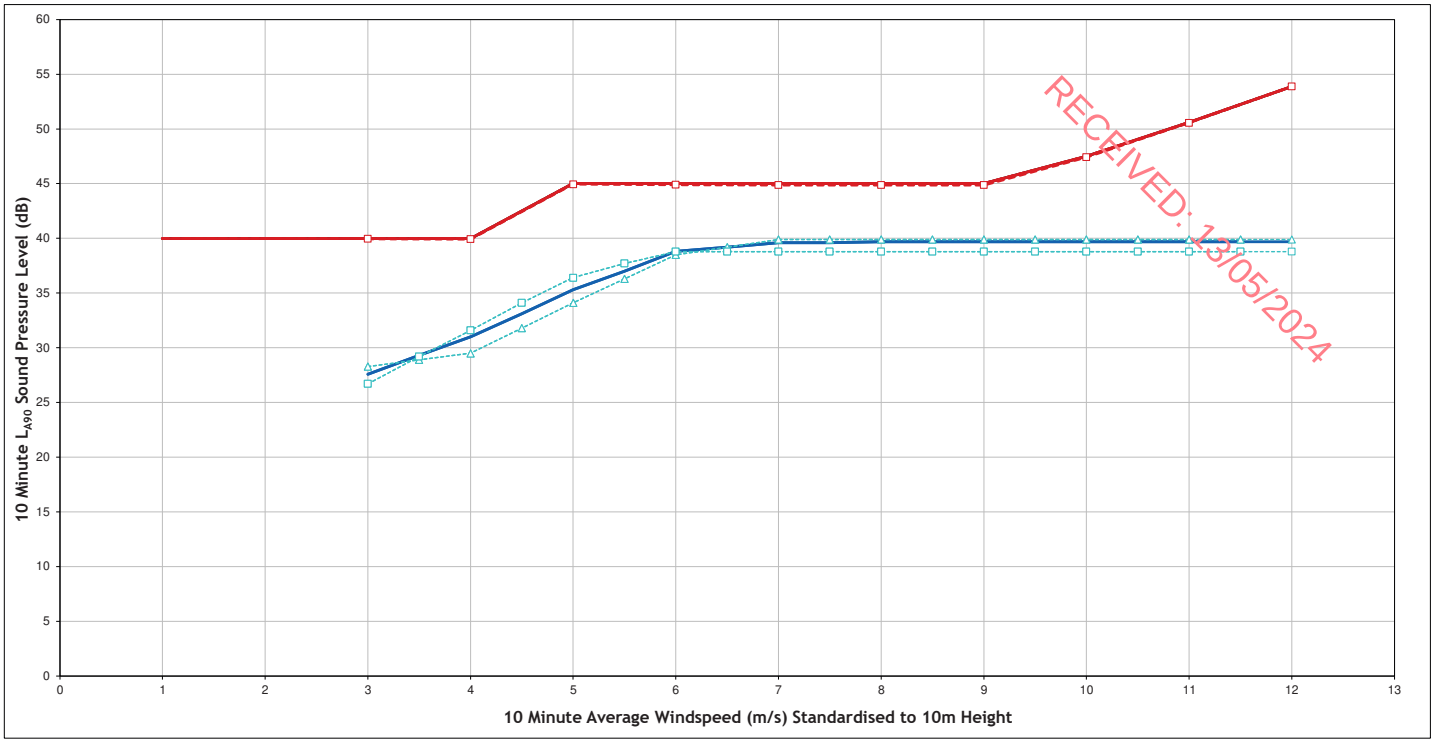
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4h
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

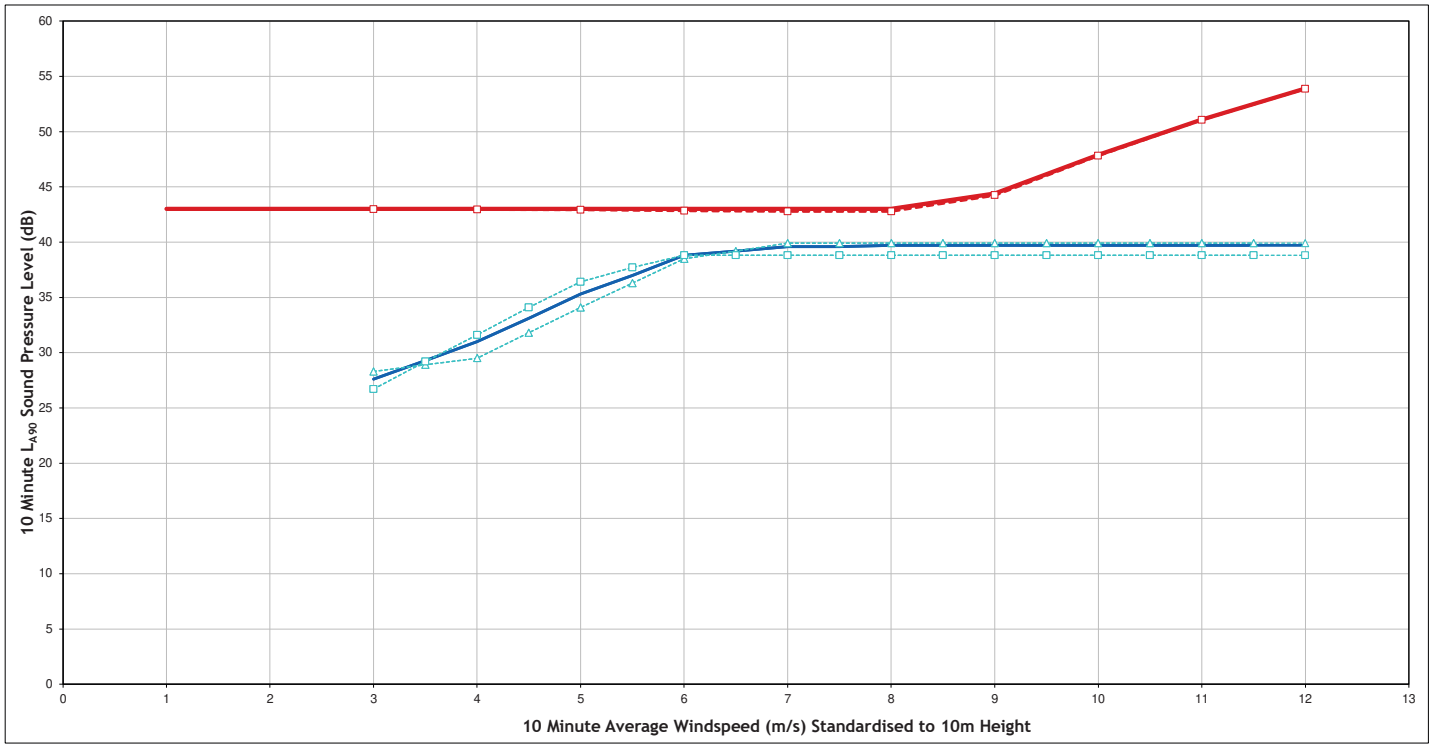
EDF renewables

tnei

Daytime - NAL12



Night Time - NAL12



Legend:

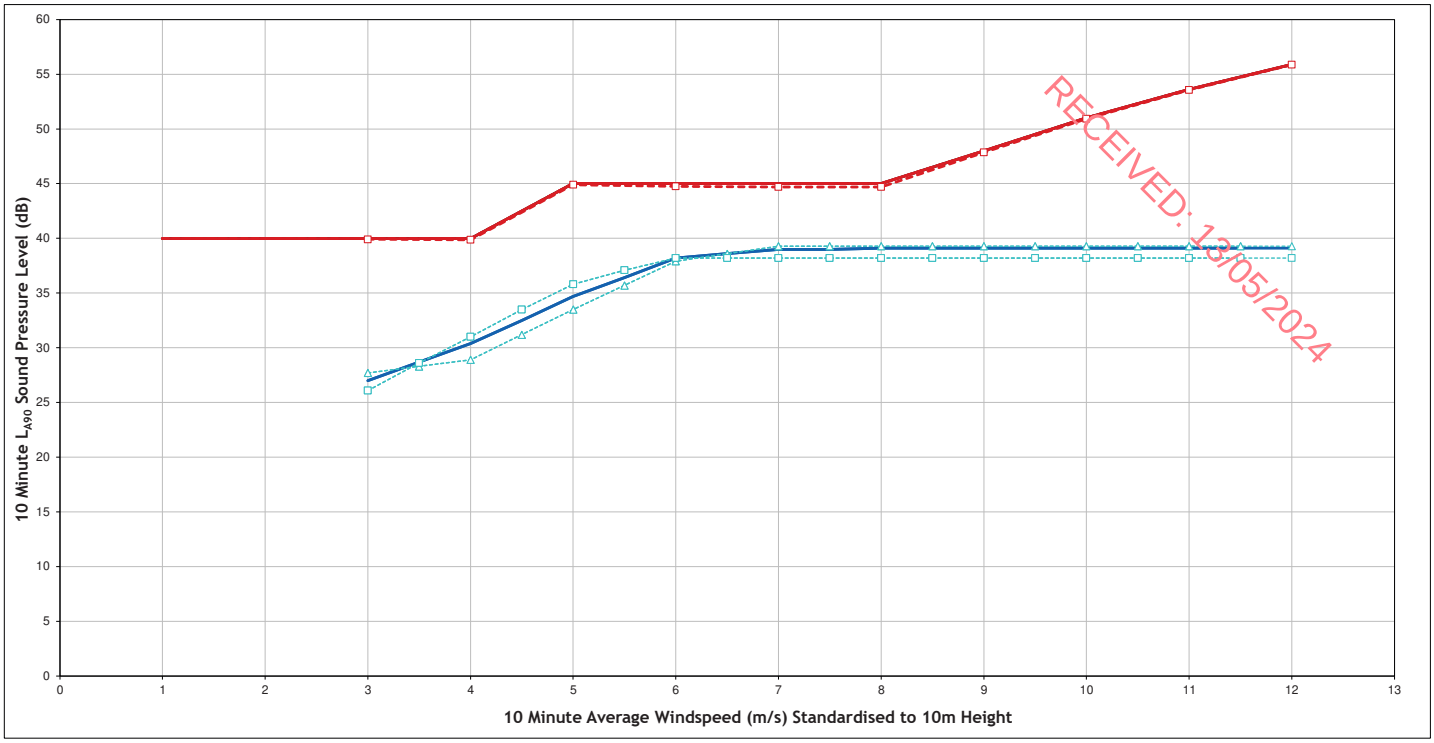
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4i
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

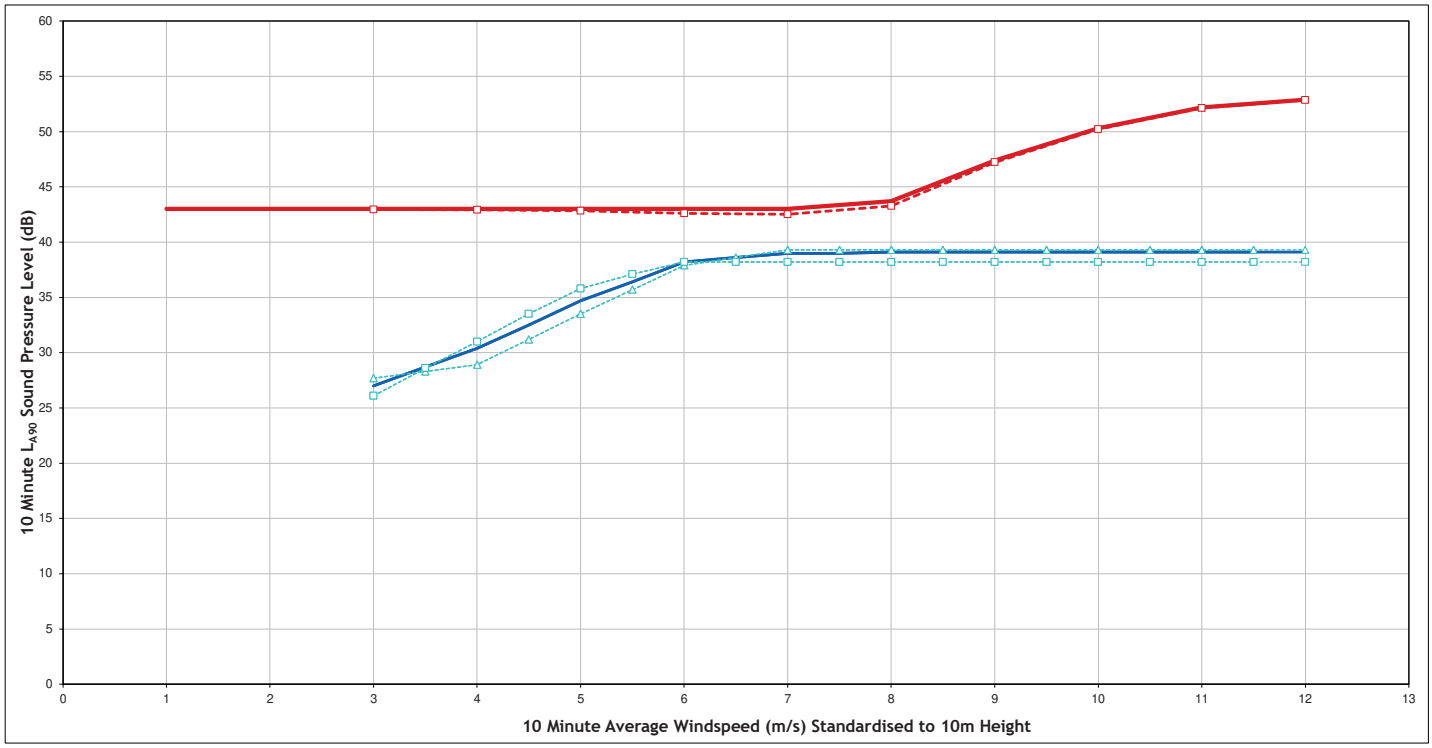
EDF renewables

tnei

Daytime - NAL13



Night Time - NAL13



Legend:

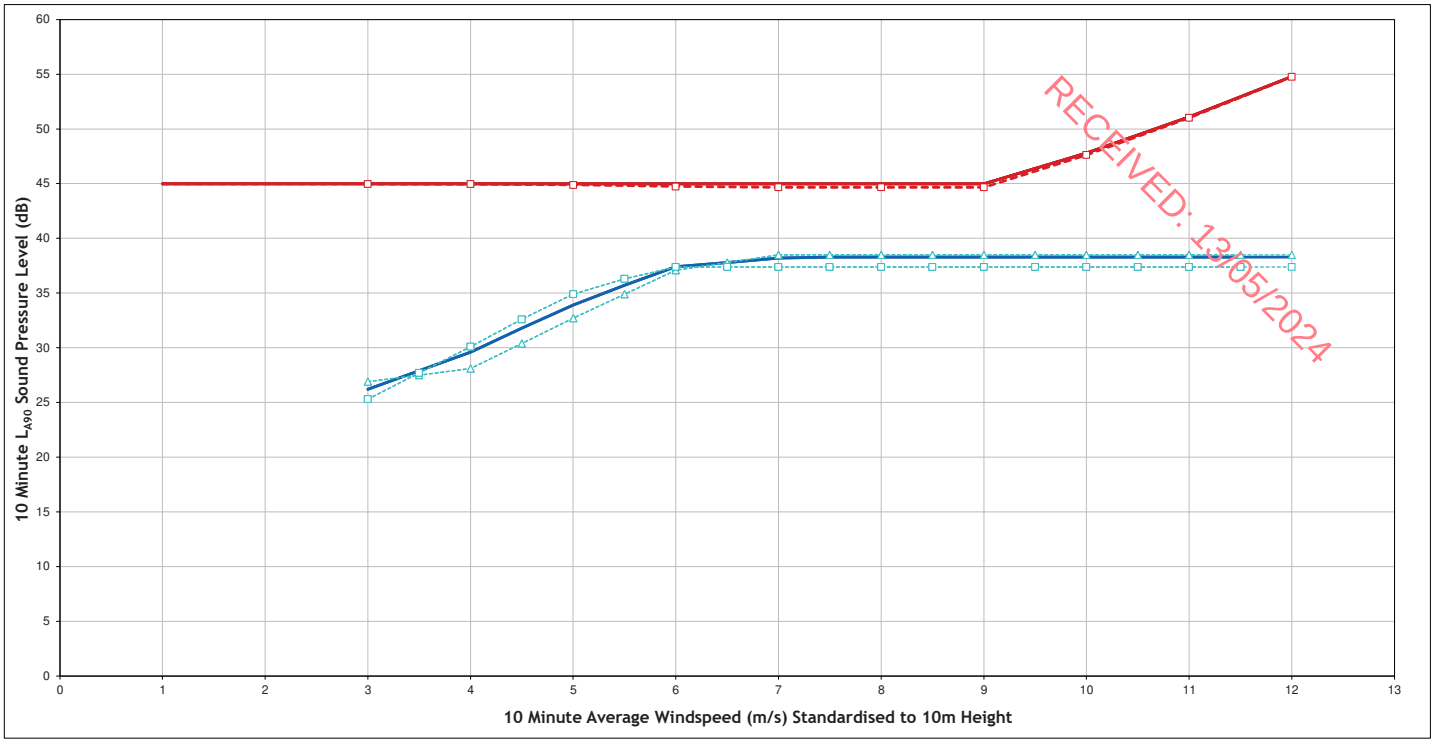
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4j
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

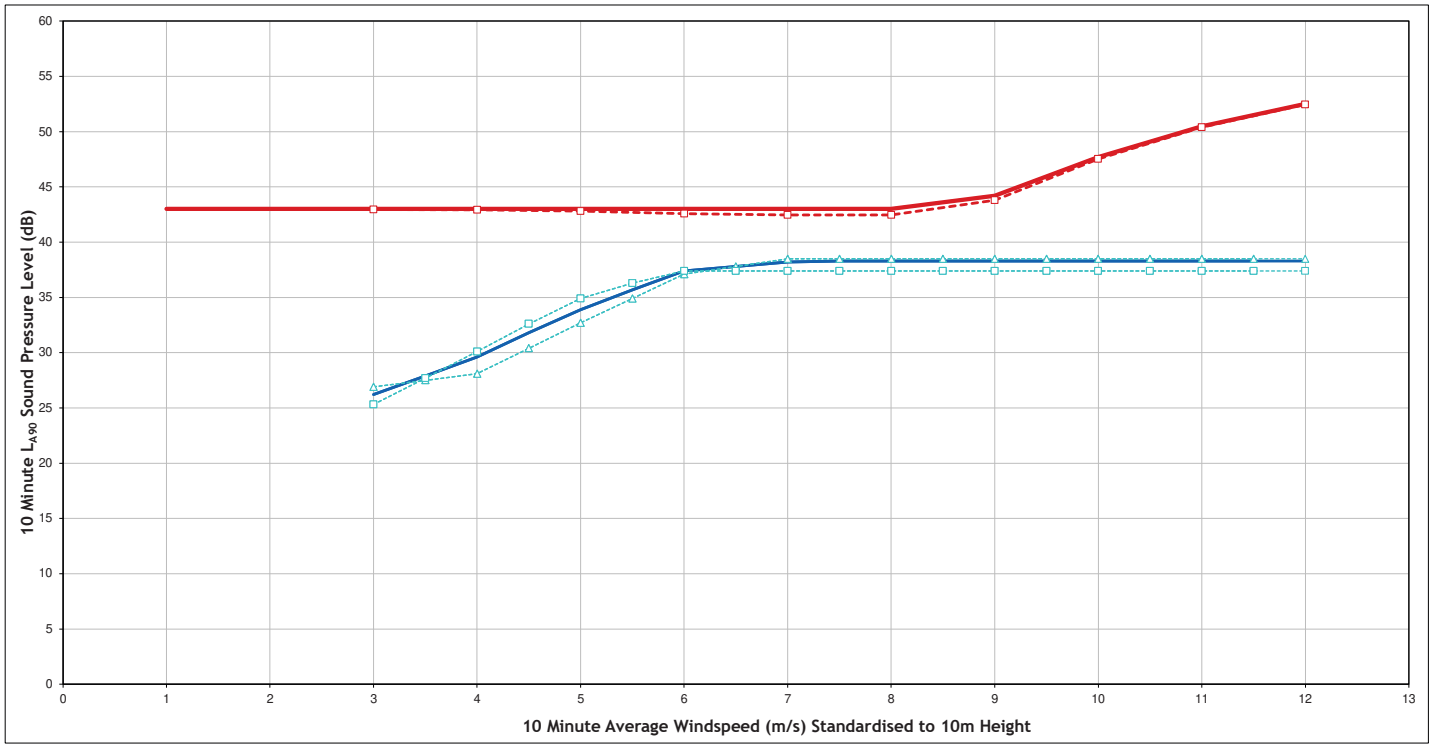
EDF renewables

tnei

Daytime - NAL14



Night Time - NAL14



Legend:

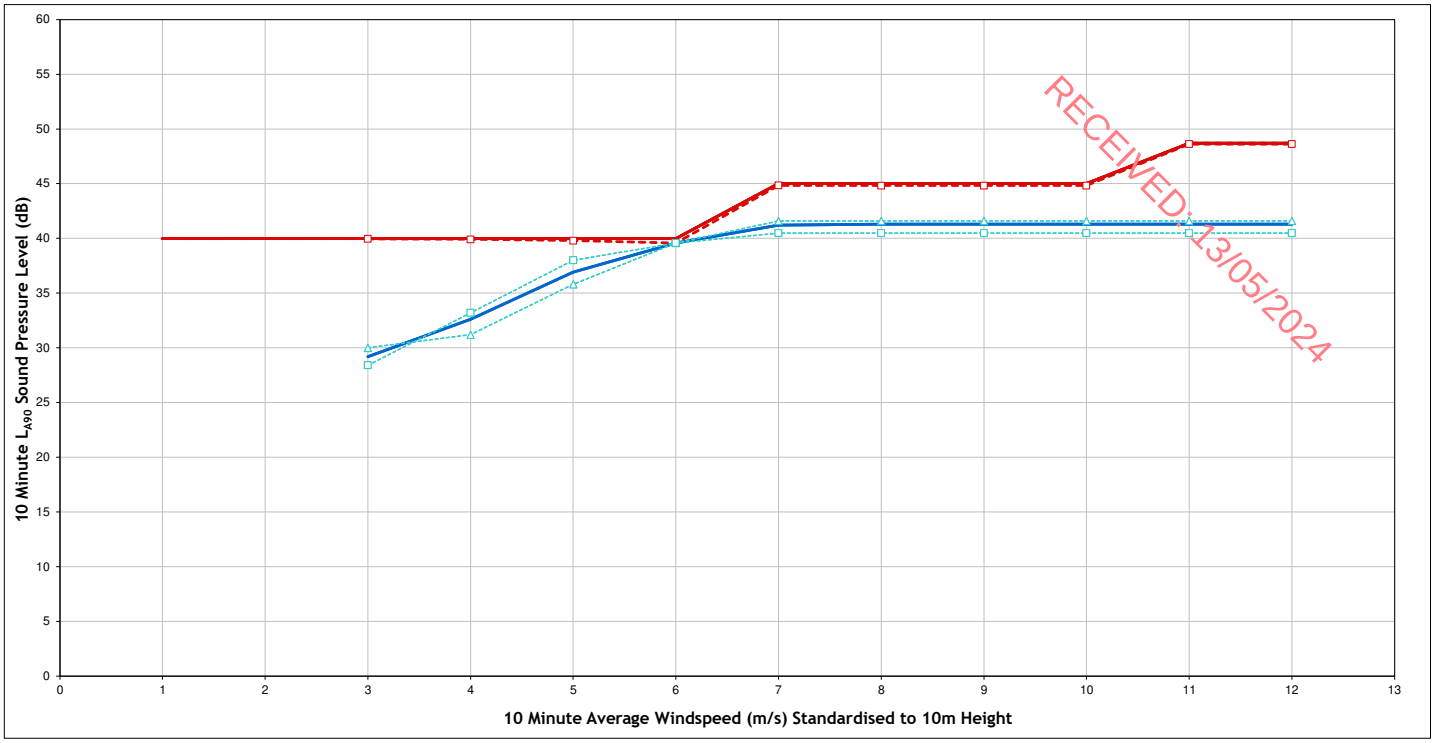
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4k
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

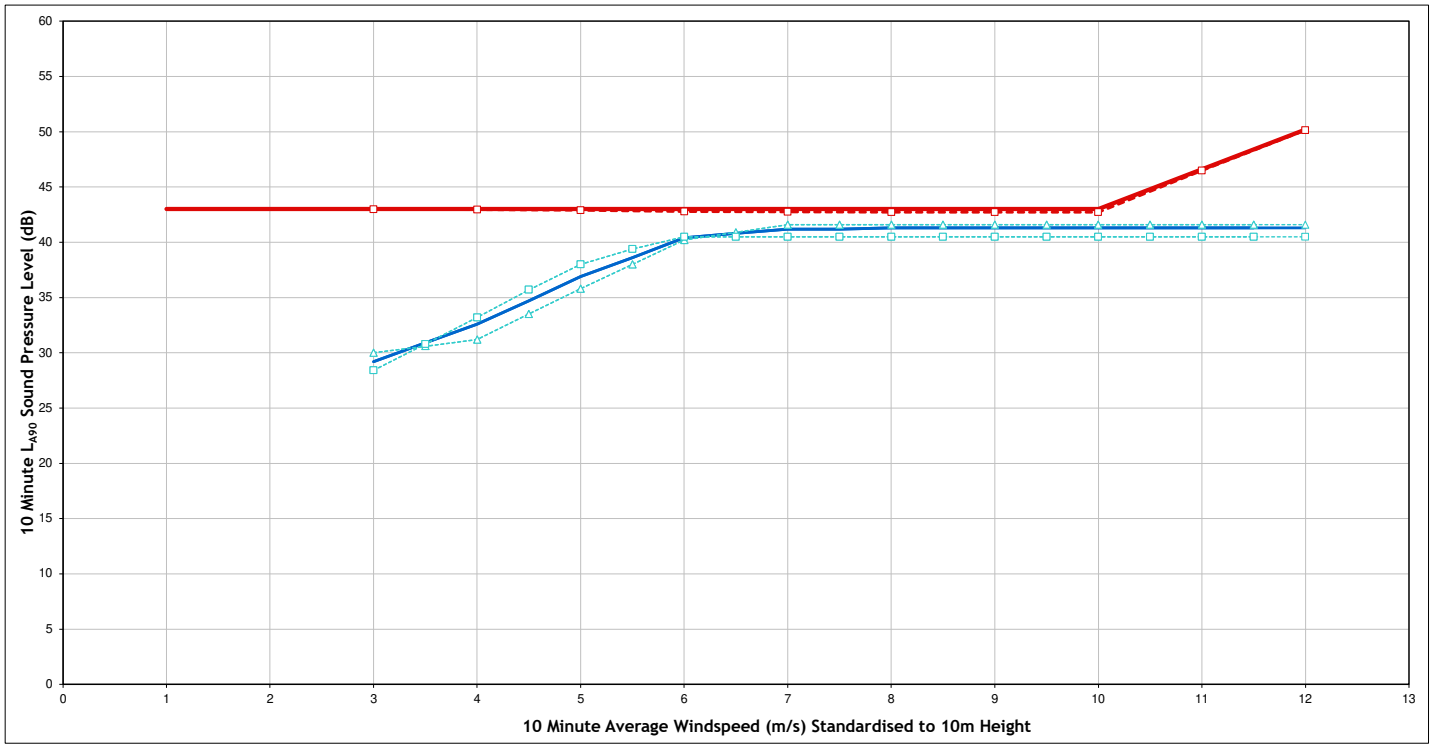
EDF renewables

tnei

Daytime - NAL15



Night Time - NAL15

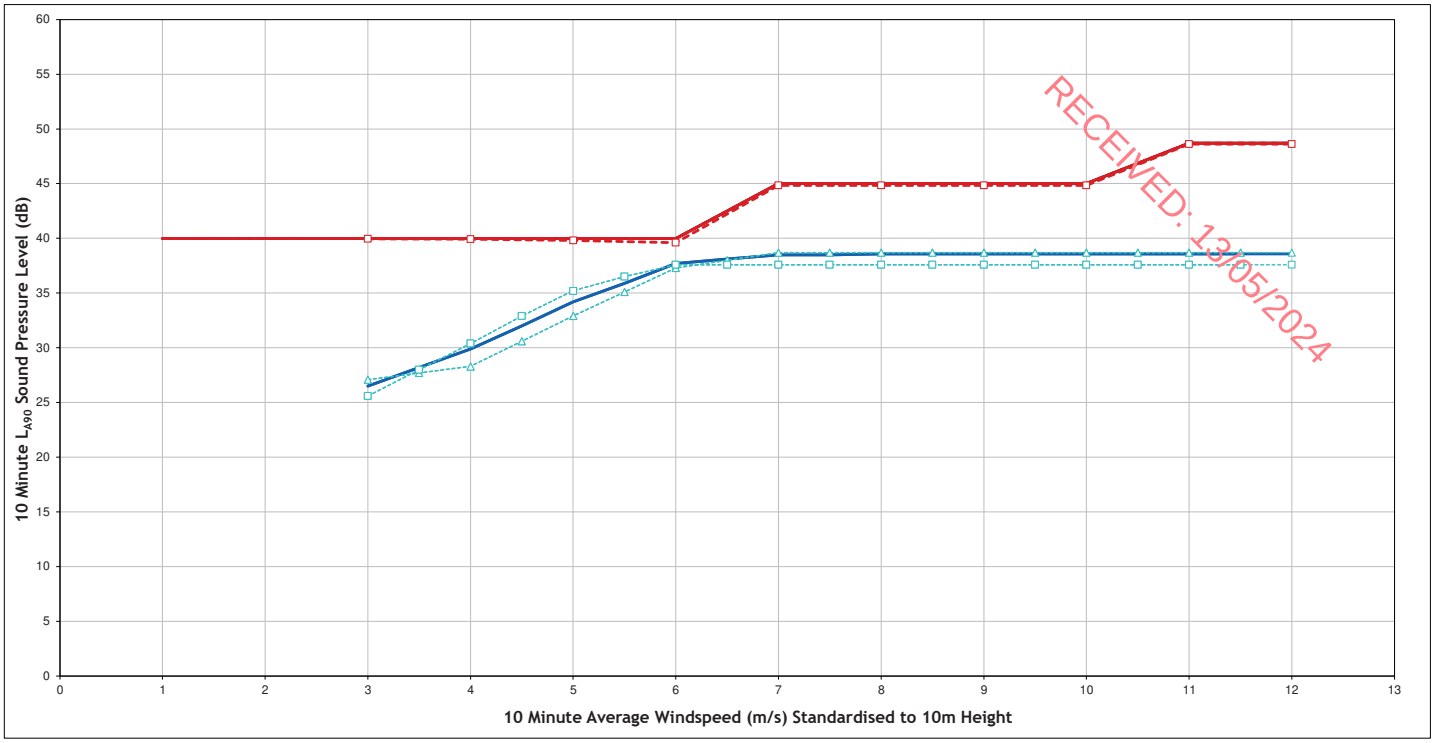


Legend:

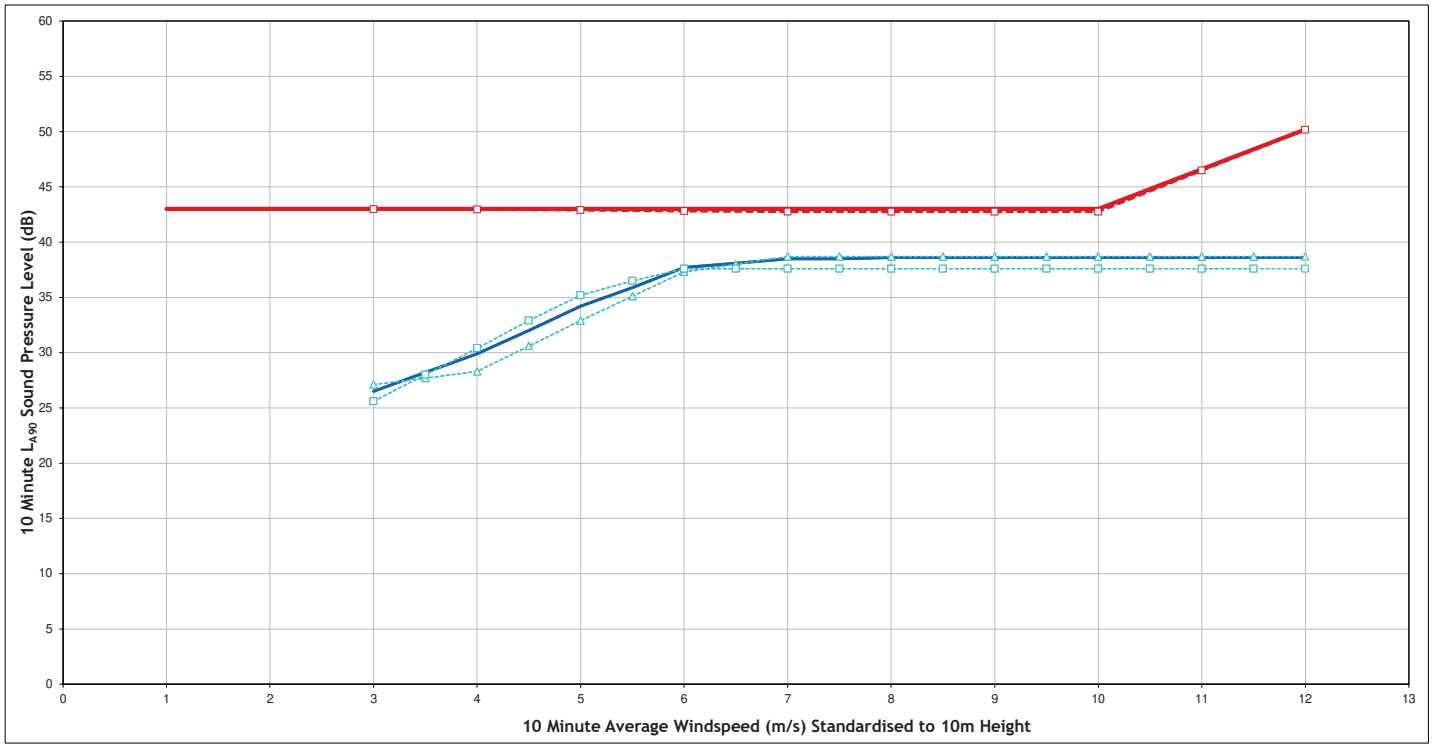
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4l
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Daytime - NAL16



Night Time - NAL16



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4m
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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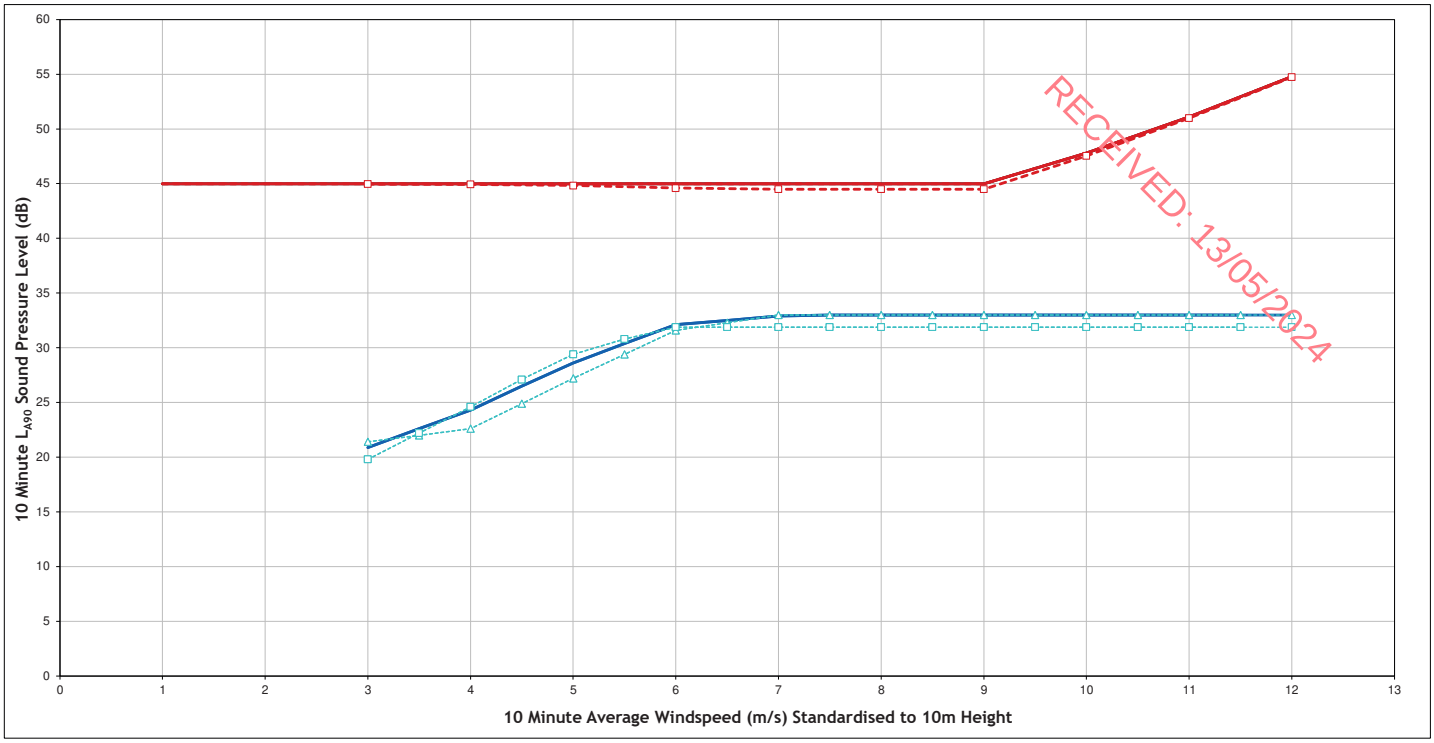
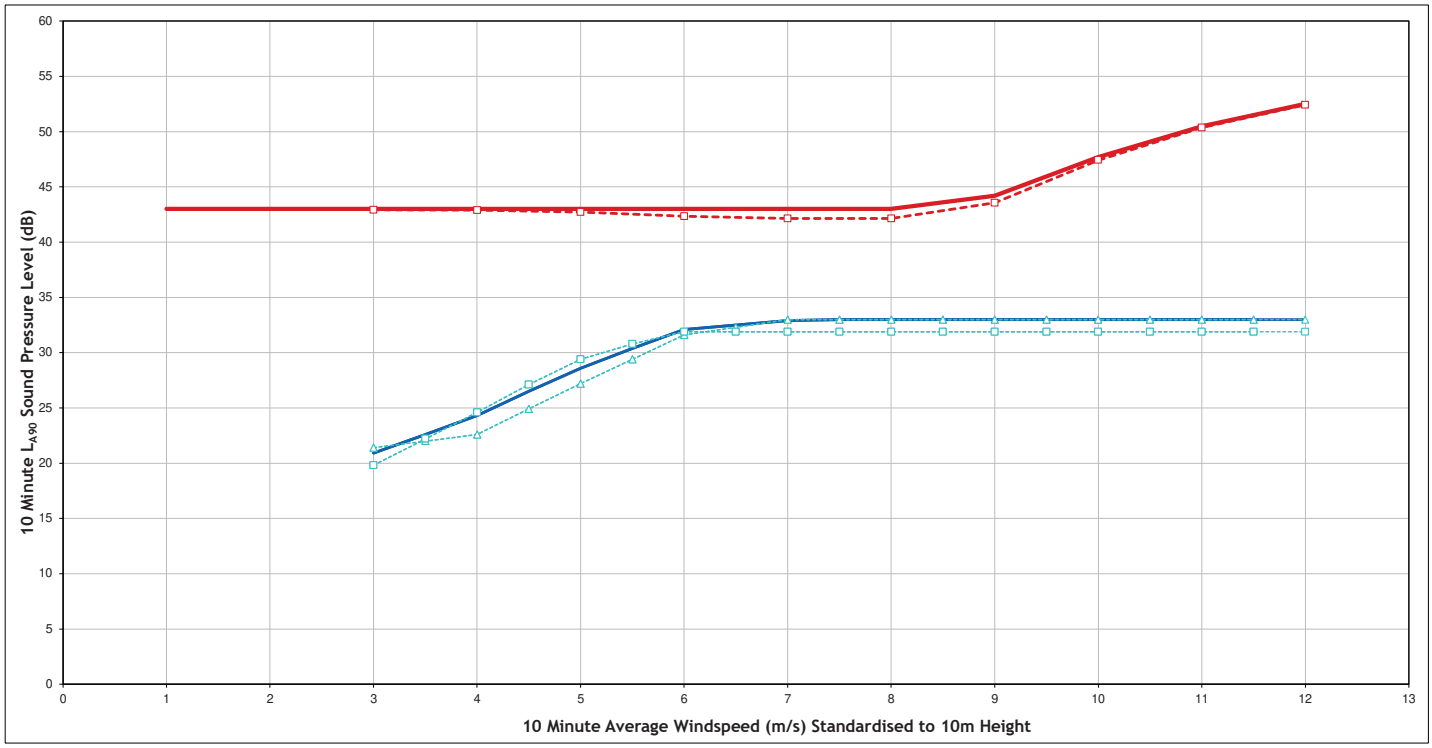
Daytime - NAL17



Night Time - NAL17



Legend:

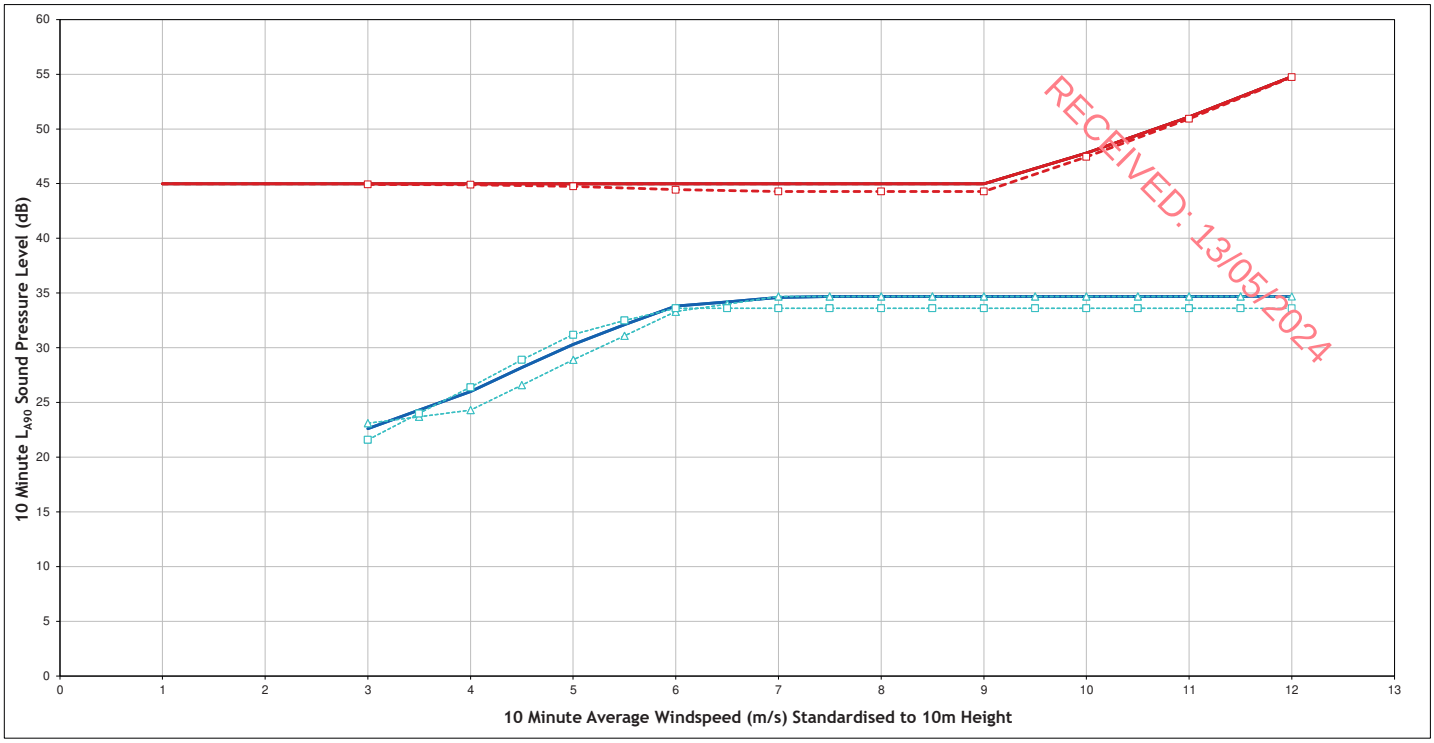
- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4n
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

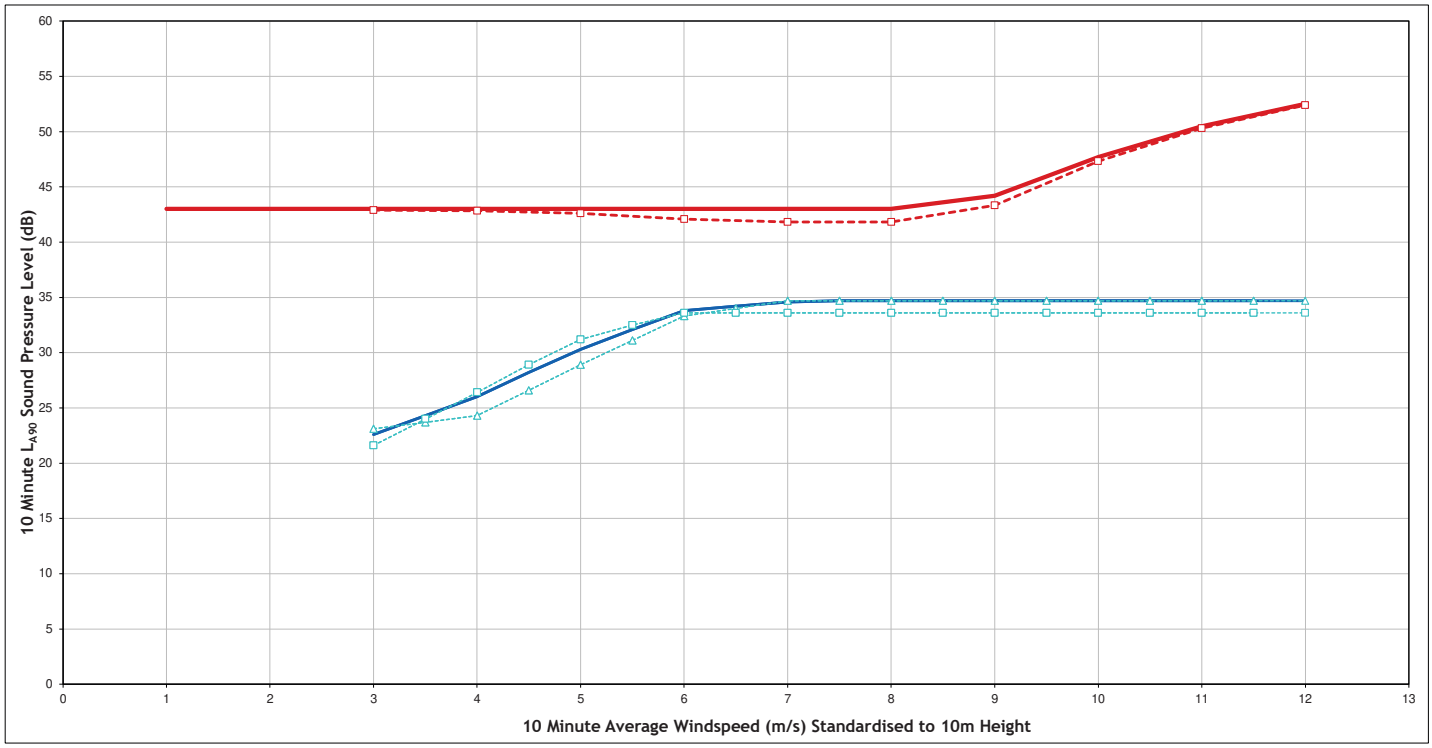
EDF renewables

tnei

Daytime - NAL18



Night Time - NAL18



Legend:

- Total WEDG Noise Limit
- Site Specific Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A1.4o
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

EDF renewables

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Annex 2 – Field Data Sheets / Installation Reports for Noise Monitoring Equipment

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 01
Description	The noise monitoring equipment was installed at a location to the south of the property. The location was chosen due to its proximity to the north of the proposed development. The kit was positioned in what was considered to be a representative of the amenity area to the front of the property.
Comments	Measurements were undertaken in January (2023) until April (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	664333, 670281
Survey Period	26/01/23 – 05/04/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits included noise from adjacent trees, birdsong and distant car traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 019	NL31	00593595	23/07/2022
Pre Amplifier	Rion	NH-21	30357	23/07/2022
Microphone	Rion	UC-53a	313300	23/07/2022
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0101	13:20 26/01/23	12:20 03/03/23	94.0	94.2	0.2	<u>26/01:</u> Birdsong Cars passing Wind induced noise from surrounding trees
0102	12:40 03/03/23	11:40 05/04/23	94.0	94.3	0.3	<u>03/03:</u> Cows lowing from adjacent farm Birdsong Cars passing <u>05/04:</u> Trees adjacent moving in wind (loud) Birdsong constant Windy Distant car traffic (slightly audible but constant)

PHOTOGRAPHS

North 	**South** 
East 	**West** 

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 02
Description	The noise monitoring equipment was installed at a location to the north of the property in an area just outwith the garden, due to guard dogs being present in the amenity area to the south of the property. The location was chosen due to its proximity to the north-east of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until March (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	664721, 669755
Survey Period	26/01/23 – 30/03/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits included wind induced noise, dogs barking loudly and cattle lowing.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 009	NL32	00972337	08/06/2021
Pre Amplifier	Rion	NH-21	25122	08/06/2021
Microphone	Rion	UC-55a	316005	08/06/2021
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0201	13:50 26/01/23	11:50 03/03/23	94.0	94.2	0.2	26/01: In field to keep away from German Shepards in the back garden Farm has no animals Windy Cattle lowing in distance
0202	12:00 03/03/23	12:10 05/04/23	94.0	94.3	0.3	03/03: Dogs barking constantly Kit now moved inside to the back garden and away from dogs as cattle being moved into field in coming days 05/04 Dogs very loud upon arrival again Birdsong constant

PHOTOGRAPHS

North 	**South** 
East 	**West** 

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 03
Description	The noise monitoring equipment was installed at a location to the north east of the property. The location was chosen due to its proximity to the east of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until March (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	665105, 668234
Survey Period	26/01/23 – 05/04/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits included noise from trees and vegetation, birdsong, do barking and distant traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 054	NL52	00410235	12/08/2021
Pre Amplifier	Rion	NH-25	10677	12/08/2021
Microphone	Rion	UC-59	19117	12/08/2021
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0301	14:30 26/01/23	12:30 03/03/23	94.0	94.2	0.2	26/01 Rain Gauge installed here Away from the play area Quiet Field adjacent seems to have no animals Trees surrounding property
0302	12:50 03/03/23	12:30 05/04/23	94.0	94.3	0.3	03/03 Birdsong Trees and vegetation noise Quiet 05/04 Dog barking Distant traffic slightly audible Birdsong constant

PHOTOGRAPHS

North	South
	
East	**West**
	

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 04
Description	The noise monitoring equipment was installed at a location to the north east of the property. The location was chosen due to its proximity to the south of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until March (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	663548, 667162
Survey Period	26/01/23 – 05/04/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits were wind induced noise from trees, bushes and vegetation, birdsong, dogs barking and distant traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 018	NL31	01283554	04/08/2021
Pre Amplifier	Rion	NH-21	29311	04/08/2021
Microphone	Rion	UC-53a	315581	04/08/2021
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0401	11:30 26/01/23	10:20 03/03/23	94.0	93.8	-0.2	26/01 Tall bushes surrounding the outer edges of garden. Garden includes trees and shrubs Loud bang noise in distance (intermittent) Very quiet Dogs barking
0402	10:40 03/03/23	10:50 05/04/23	94.0	94.3	0.3	03/03 Dogs barking Bushes, trees and vegetation noise Tractor and quad bike in action adjacent to back garden (kit location) 05/04 Constant dog barking (5 dogs) Birdsong constant Cars passing

PHOTOGRAPHS

North	South
	
East	**West**
	

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 05
Description	The noise monitoring equipment was installed at a location to the south east of the property. The location was chosen due to its proximity to the south west of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until March (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	662658, 668128
Survey Period	26/01/23 – 05/04/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits were wind induced noise from farm machinery, birdsong, dogs barking and distant traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 025	NL32	00703296	15/11/2021
Pre Amplifier	Rion	NH-21	33387	15/11/2021
Microphone	Rion	UC-53a	617048	15/11/2021
Calibrator	Cal 003	NC-74	35173441	09/03/2021
Calibrator	Cal 003	NC-74	34762316	09/03/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0501	10:50 26/01/23	11:10 03/03/23	94.0	93.9	0.1	26/01 Garden is next to relatively active road Dogs barking Birdsong Quiet Rain Gauge installed
0502	11:30 03/03/23	10:50 05/04/23	94.0	94.4	0.4	03/03 Horses neighing in adjacent field Cars passing Very quiet 05/04 Humming machinery noise from barn (intermittent) Birdsong (constant) Rattle noise from neighbouring house (could be from rain)

PHOTOGRAPHS

North	South
	
East	**West**
	

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 06
Description	The noise monitoring equipment was installed at a location to the north of the property, away from a flue. The location was chosen due to its proximity to the west of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until March (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	662547, 669183
Survey Period	26/01/23 – 13/03/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits were wind induced noise from farm birdsong, crowing and distant traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 014	NL32	01273102	04/08/2021
Pre Amplifier	Rion	NH-21	26021	04/08/2021
Microphone	Rion	UC-53a	313359	04/08/2021
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0601	12:10 26/01/23	11:10 03/03/23	94.0	93.8	0.2	26/01 Residents keep foster dogs in back garden Boiler and flue on eastern side so kit installed away from this area Very quiet Quarry vehicles pass by intermittently
0602	11:30 03/03/23	11:30 13/03/23	94.0	94.2	0.2	03/03 Crowing constant Quiet Dog van being cleaned 13/03 *Kit uninstalled as requested by resident Very windy and rainy Distant traffic noise from motorway Birdsong

PHOTOGRAPHS

North 	**South** 
East 	**West** 

Noise Monitoring Field Data Sheet

MONITORING LOCATION

Location Name	NML 07
Description	The noise monitoring equipment was installed at a location to the west of the property, away from a flue north of the property. The location was chosen due to its proximity to the north-west of the proposed development. The kit was positioned in what was considered to be a representative area of the property garden.
Comments	Measurements were undertaken in January (2023) until April (2023) to quantify the baseline noise measurements at this location. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.
Approximate National Grid Reference	662653, 670357
Survey Period	26/01/23 – 05/04/23
Noise sources noted during installation, weekly inspection and removal	The predominant sounds heard during site visits were wind induced noise from birdsong, dogs barking and distant traffic.

NOISE MONITORING EQUIPMENT DETAILS

Survey	Kit Number	Model	Serial Number	Last Calibrated/ Conformance Checked
Sound Level Meter	SLM 006	NL32	00482652	06/01/2022
Pre Amplifier	Rion	NH-21	27756	06/01/2022
Microphone	Rion	UC-53a	314027	06/01/2022
Calibrator	Cal 003	NC-74	35173441	01/04/2022

NOISE MONITORING EQUIPMENT SETTINGS

	Network (A,B,Z)	Index and Time	Time Weighting (Slow, Fast)	Range (dB)	Audio
Parameters Recorded	A	$L_{A9010min}$, $L_{Aeq10min}$	Fast	20-110	No

DATA

File Name	Start Time	End Time	Cal. at Start	Cal. at End	Drift	Observations
0701	13:00 26/01/23	11:40 03/03/23	94.0	93.9	0.1	26/01 Dogs barking Birdsong constant Flue north of property, installed kit away from this noise contamination Cars passing and quite loud due to road
0702	12:00 03/03/23	11:40 05/04/23	94.0	94.4	0.4	03/03 Birdsong constant New owners in house Cars passing every so often and loud 05/04 Distant motorway audible Dogs barking Birdsong

PHOTOGRAPHS

North West 	**South East** 
North East 	**South West** 

Seskin Wind Farm, Co. Carlow - Noise Survey - Installed Noise Monitoring Locations

Present during the course of the installation:

- Colum Breslin, TNEI Ireland Ltd

Unless specified, all noise meters were installed at least 3.5 m from any hard-reflecting surface except the ground and away from obvious noise sources, such as boiler flues.

Detailed information and pictures for each of the installed locations are provided below. The original full-size pictures are available on request.

Noise Monitoring Location (NML) - Latitude/ Longitudes

NML	Lat Long	ITM (X , Y)
NML01	52.779723"N, -7.046425"W	664333, 670281
NML02	52.774945”N, -7.040775”W	664721, 669755
NML03	52.761235”N, -7.035386”W	665105, 668234
NML04	52.751782”N, -7.058658”W	663548, 667162
NML05	52.760566”N, -7.071658”W	662658, 668128
NML06	52.770066”N, -7.073095”W	662547, 669183
NML07	52.780603”N, -7.071313”W	662653, 670357

NML01

North	South
	
East	**West**
	

Description
The noise monitoring equipment was installed to the south of the property. The location was chosen due to its proximity to the north east of the proposed development. The kit was positioned in what was considered to be a representative residential amenity area, in the front garden. The location was seen to be representative of the other properties in the area to the north and north-east. The predominant sounds that were audible during the installation were from road traffic, birdsong and wind induced noise from the nearby vegetation and trees. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.

NML02

North	South
	
East	**West**
	

Description
The noise monitoring equipment could not be installed in the amenity area as there were a number of guard dogs (German Shepherds) and they would damage the kit. The installation took place in a representative location in the adjacent field less than 15 m from the property. The location was chosen due to its proximity to the east of the proposed development, and was seen to be representative of other properties in the surrounding area. The predominant sounds that were audible during the installation were from birdsong and wind induced noise from the vegetation and trees. Secondary noises were cattle lowing far away in the distance. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.

NML03

North	South
	
East	**West**
	

Description
The noise monitoring equipment was installed in the amenity area which is located to the north east of the property. Away from the children play area. The location was chosen due to its proximity to the south-east of the proposed development. The predominant sounds that were audible during the installation were from wind induced noise from the vegetation and trees south and east of the property. There is a farm adjacent, however, during installation, there were no animals present. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground. A rain gauge was installed at this location.

NML04

North

South

East

West

Description
The noise monitoring equipment was installed to the north east of the property at the request of the occupier, and away from the household flue. The surrounding environment has many dogs that constantly barked during installation. The location was chosen due to its proximity to the south of the proposed development. The predominant sounds that were audible during the installation were from barking, wind induced noise from vegetation, tall bushes and trees. Secondary noise was the birdsong. The noise meter was located on a grass patch area adjacent to the property, greater than 3.5m from any hard reflecting surface except the ground.

NML05

North	South
	
East	**West**
	

Description
The noise monitoring equipment was installed to the east of the property. The kit was installed away from the children play area and away from reflective surfaces. The location was chosen due to its proximity to the west of the proposed development, and was also seen to be representative of the other properties in the surrounding area. The predominant sounds that were audible during the installation were from birdsong, cars passing from adjacent road, wind induced noise form the vegetation and trees and cattle lowing from nearby field. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground. A rain gauge was installed at this location.

NML06

North

South

East

West

Description
The noise monitoring equipment was installed to the north of the property. It was located in this corner of the garden to be as far away from a flue on the other side of the garden. The location was chosen due to its proximity to the west of the proposed development. The predominant sounds that were audible during the installation were from birdsong, rustling from surround vegetation and the passing of quarry trucks. There were no dogs present but the owner did highlight that they foster dogs. The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.

NML07

North West	South East
	
North East	**South West**
	

Description
The noise monitoring equipment was installed to the west of the property in a location considered to provide representative data. The kit could not be installed in the amenity area to the east of the property as there were two guard dogs (German Shepherds) occupying the back garden. As well, the kit was installed far away from the household flue. The location was chosen due to its proximity to the north-west of the proposed development and was also seen to be representative of the other properties in the surrounding area. The predominant sounds that were audible during the installation were from birdsong, wind induced noise from the vegetation and trees, dogs barking. Secondary noise were from the cars passing (seldom). The noise meter was located in a free field position, greater than 3.5m from any hard reflecting surface except the ground.

Annex 3 – Calibration/ Conformance Certificates for Sound Level Meters and Calibrator

NSAI
National Metrology Laboratory

Certificate of Calibration

Issued to
TNEI Ireland Limited
Unit S12 Synergy Centre
Technological University Campus
Tallaght
Dublin 24

Attention of Ewan Watson

Certificate Number	221332
Item Calibrated	RION NC-74 Sound Level Calibrator
Serial Number	35173441
ID Number	None
Order Number	6
Date Received	24 Mar 2022
NML Procedure Number	AP-NM-13
Method	The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity. The calibrator's operating frequency was also measured.
Calibration Standards	Norsonic 1504A Calibration System incorporating: Agilent 34401A Digital Multimeter, File No. 0736 [Cal Due: 10 Jun 2022] B & K 4134 Measuring Microphone, File No. 0744 [Cal Due: 03 Jun 2023] B & K 4228 Pistonphone, File No. 0740 [Cal Due: 04 Jun 2023]

Calibrated by David Fleming

Approved by Paul Hetherington

Date of Calibration 01 Apr 2022

Date of Issue 01 Apr 2022

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

NSAI
National Metrology Laboratory

RECEIVED: 13/05/2024

Certificate of Calibration

Issued to	TNEI Ireland Limited Unit S12 Synergy Centre Technological University Dublin Campus Tallaght Dublin D24 A386
Attention of	Ewan Watson

Certificate Number	**215238**
Item Calibrated	Rion NL-32 Sound Level Meter, complete with Rion UC53A Microphone
Serial Numbers	00482652 (Sound Level Meter) and 314027 (Microphone)
ID Number	SLM006
Order Number	4
Date Received	14 Dec 2021
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters.* This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 10 Jun 2022] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 10 Jun 2022] B&K 4134 Measuring Microphone, No. 0744 [Cal Due Date: 03 Jun 2023] B&K 4228 Pistonphone, No. 0740 [Cal Due Date: 04 Jun 2023] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 07 Oct 2022]

Calibrated by	David Fleming	**Approved by**	Paul Hetherington
Date of Calibration	06 Jan 2022	**Date of Issue**	06 Jan 2022

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

IAC Ltd
Emerald House
11 Fitzwilliam Terrace
Strand Road, Bray
Co Wicklow A98R8X9

Sysmex Nederland B.V.
Ecustraat 1-1
4870 AG Etten Leur

CALIBRATION CERTIFICATE

Certificate number: 311465401983

Applicant: TENI
2nd Floor Bainbridge House 86-90 London Road
MANCHESTER M1 2PW
England

Instrument:	Make	Type	Serial number
Sound level meter :	Rion	NL-32	00972337
Microphone :	Rion	UC-55A	316005
Preamplifier :	Rion	NH-21	25122

Calibration date: 08 Jun. 2021

Calibration method: The sound level meter with microphone and microphone preamplifier has been verified against the requirements as specified in the IEC 61672 standards (method AC10 and AC20) for the applicable class of accuracy (class 1 or class 2).
Before and after the tests the sound level meter is calibrated with an acoustic calibrator (nominal sound level 94.0 dB; frequency 1 kHz) and adjusted if necessary.

Results: The results of the verification are stated on page 2 of this certificate. The ambient temperature during the measurements was 23,0 °C ± 3 °C.

Traceability: The measurements have been executed using standards for which the traceability to (inter)national standards has been demonstrated towards the Raad voor Accreditatie.

Executed

Etten Leur, 08 Jun. 2021

Valère van Unen

V. van Unen
Product Application Specialist Calibration

NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to	TNEI Group Floor 7 West One Forth Banks Newcastle Upon Tyne England
Attention of	Ewan Watson

Certificate Number	**212990**
Item Calibrated	Rion NL-31 Sound Level Meter, complete with Rion UC53A Microphone
Serial Numbers	01273102 (Sound Level Meter) and 313359 (Microphone)
ID Number	SLM014
Order Number	1696
Date Received	20 Jul 2021
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 10 Jun 2022] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 10 Jun 2022] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 27 May 2022] B&K 4228 Pistonphone, No. 0741 [Cal Due Date: 26 May 2022] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 02 Sep 2021]

Calibrated by	David Fleming	**Approved by**	Paul Hetherington
Date of Calibration	04 Aug 2021	**Date of Issue**	04 Aug 2021

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org).

NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to	TNEI Group Floor 7 West One Forth Banks Newcastle Upon Tyne England
Attention of	Ewan Watson

Certificate Number	212989
Item Calibrated	Rion NL-31 Sound Level Meter, complete with Rion UC53A Microphone
Serial Numbers	01283554 (Sound Level Meter) and 315581 (Microphone)
ID Number	SLM018
Order Number	1696
Date Received	20 Jul 2021
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 10 Jun 2022] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 10 Jun 2022] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 27 May 2022] B&K 4228 Pistonphone, No. 0741 [Cal Due Date: 26 May 2022] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 02 Sep 2021]

Calibrated by	David Fleming	**Approved by**	Paul Hetherington
Date of Calibration	04 Aug 2021	**Date of Issue**	04 Aug 2021

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org).

NSAI
National Metrology Laboratory

RECEIVED: 13/05/2024

Certificate of Calibration

Issued to

TNEI Group
Synergy Centre
TU Dublin
Tallaght
Dublin 24

Certificate Number	223016
Item Calibrated	Rion NL-31 Sound Level Meter, complete with Rion UC53A Microphone
Serial Numbers	00593595 (Sound Level Meter) and 313300 (Microphone)
ID Number	SLM019
Order Number	8
Date Received	11 Jul 2022
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters.* This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 05 Aug 2022] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 05 Aug 2022] B&K 4134 Measuring Microphone, No. 0744 [Cal Due Date: 03 Jun 2023] B&K 4228 Pistonphone, No. 0740 [Cal Due Date: 04 Jun 2023] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 07 Oct 2022]

Calibrated by	David Fleming	Approved by	Paul Hetherington
Date of Calibration	23 Jul 2022	Date of Issue	23 Jul 2022

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

NSAI
National Metrology Laboratory

RECEIVED: 13/05/2024

Certificate of Calibration

Issued to	TNEI Ireland Limited Unit S12 Synergy Centre Technological University Dublin Campus Tallaght Dublin D24 A386
Attention of	Ewan Watson

Certificate Number	**214283**
Item Calibrated	Rion NL-32 Sound Level Meter, complete with Rion UC53A Microphone
Serial Numbers	00703296 (Sound Level Meter) and 617048 (Microphone)
ID Number	SLM025
Order Number	3
Date Received	18 Oct 2021
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters.* This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 10 Jun 2022] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 10 Jun 2022] B&K 4134 Measuring Microphone, No. 0744 [Cal Due Date: 03 Jun 2023] B&K 4228 Pistonphone, No. 0740 [Cal Due Date: 04 Jun 2023] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 07 Oct 2022]

Calibrated by	David Fleming	**Approved by**	Paul Hetherington
Date of Calibration	15 Nov 2021	**Date of Issue**	15 Nov 2021

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

MEASUREMENT SYSTEMS

CERTIFICATE OF CONFORMANCE

Date of Issue	**12 August 2021**
Customer	**TNEI Services Ltd**
Certificate Number	**CONF082104**

	Manufacturer	**Type**	**Serial Number**
Sound Level Meter	Rion	NL-52	00410235
Preamplifier	Rion	NH-25	10677
Microphone	Rion	UC-59	19117

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 61672-1:2013 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

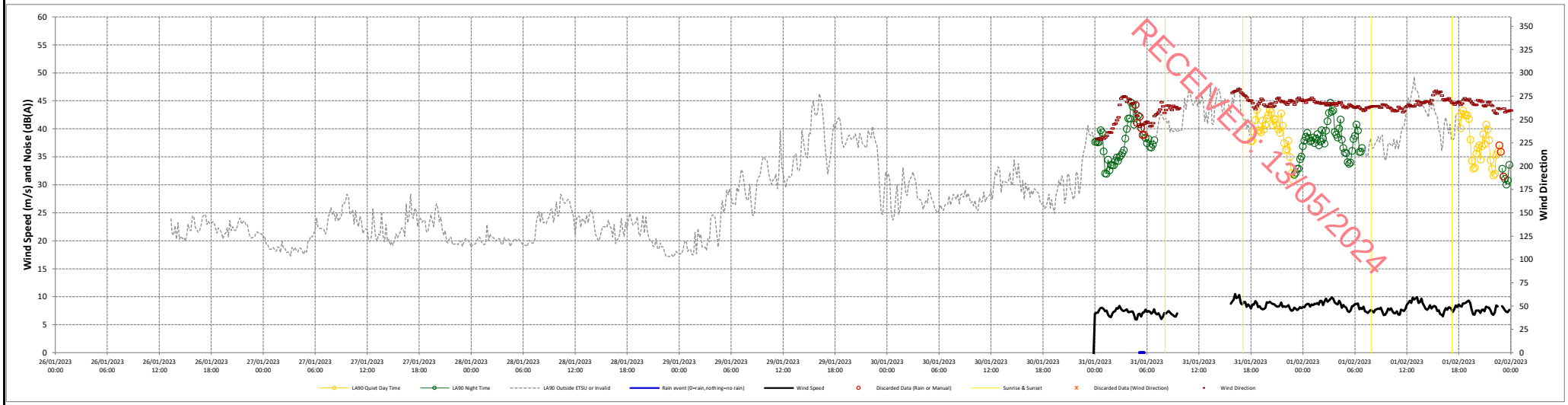
Signed..... Position. Calibration Technician Date. 12 August 2021

B. Bogdan

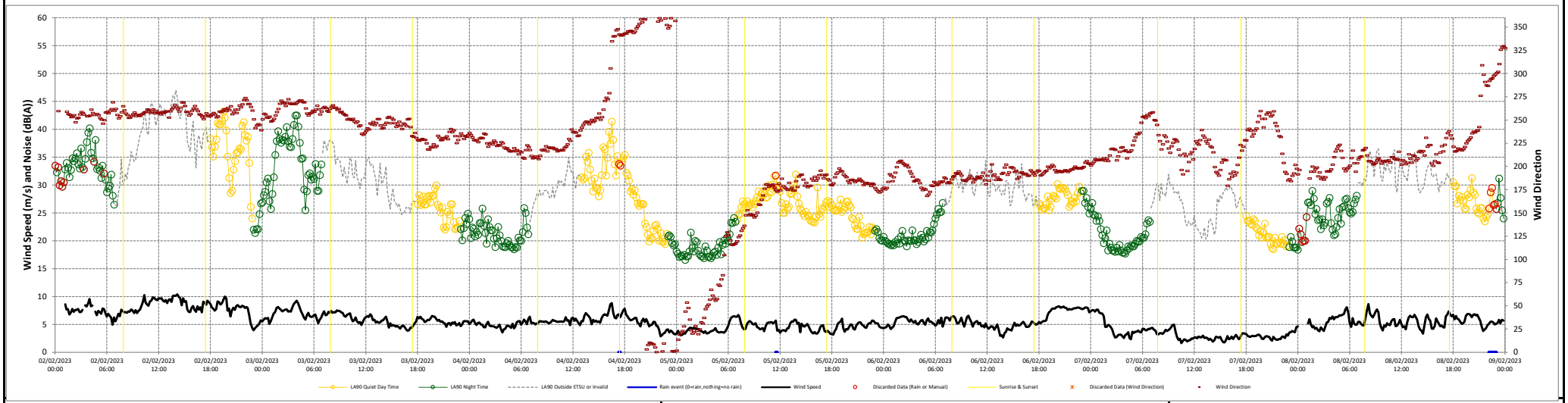
BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL
☎ 01908 642846 🖷 01908 642814
✉ info@noise-and-vibration.co.uk 💻 www.noise-and-vibration.co.uk

Annex 4 – Time Series Graphs

26/01/2023 to 02/02/2023

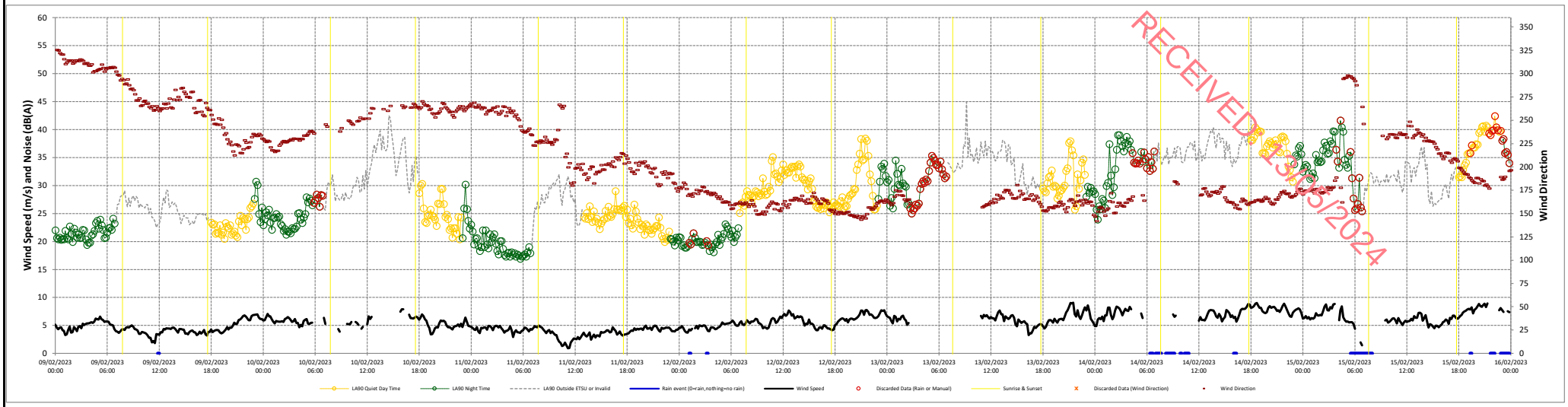


02/02/2023 to 09/02/2023

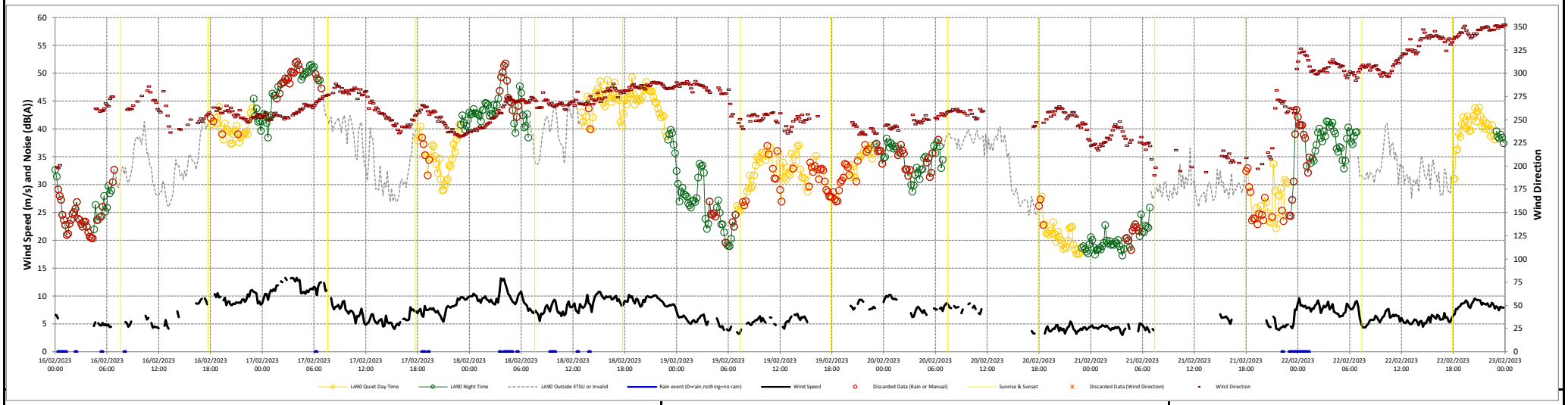


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML1 Page 1 of 5
Date	08/03/2024

09/02/2023 to 16/02/2023

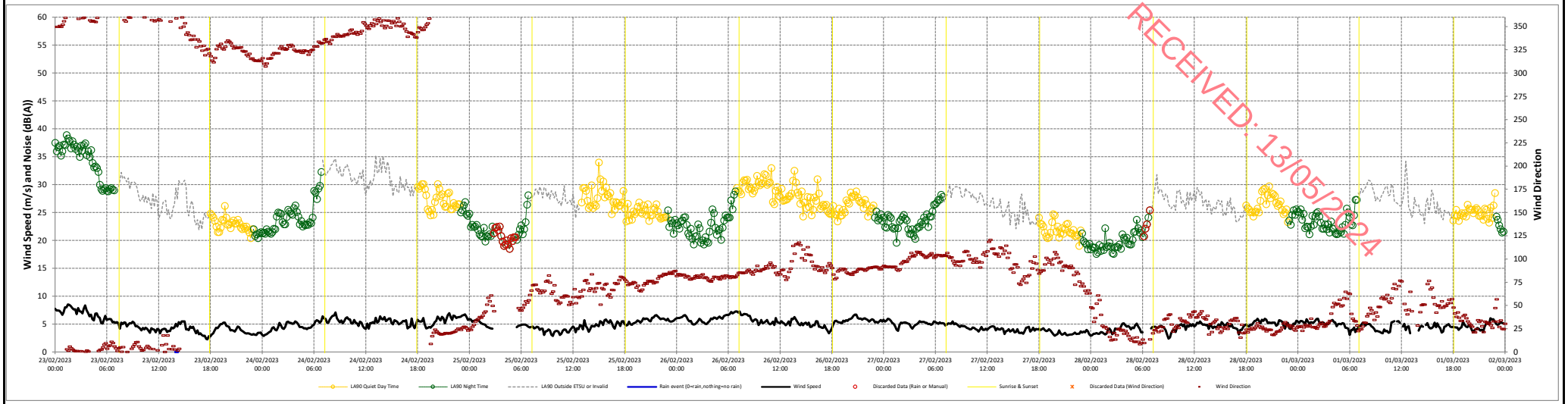


16/02/2023 to 23/02/2023

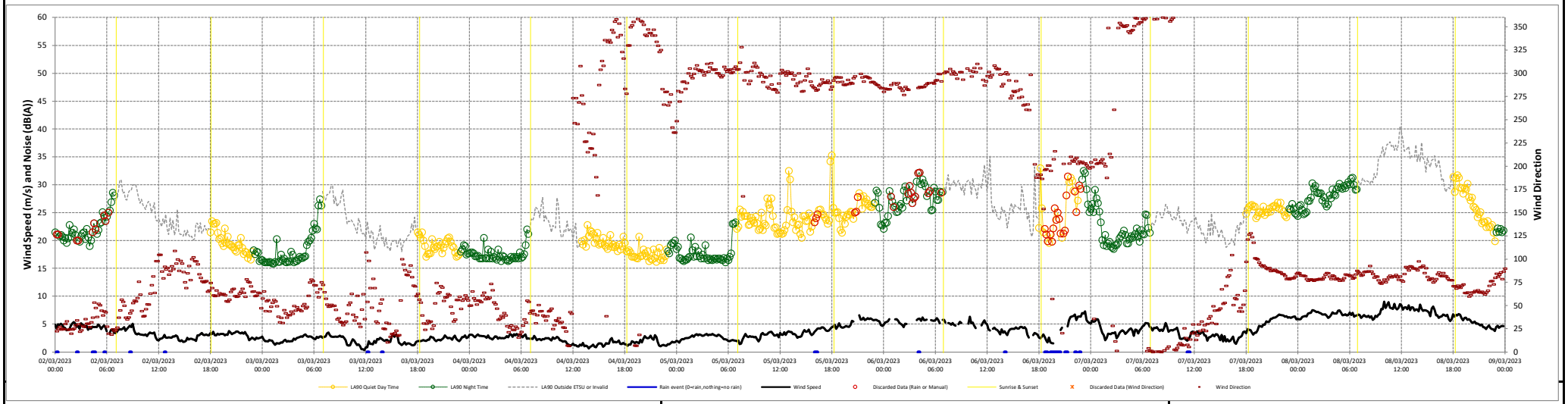


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML1 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023

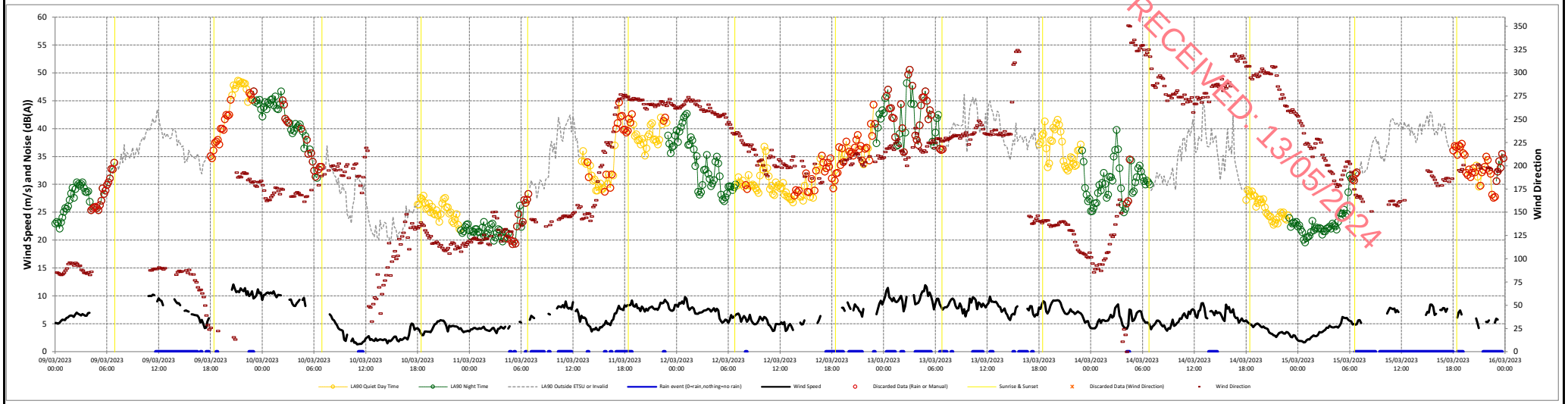


02/03/2023 to 09/03/2023

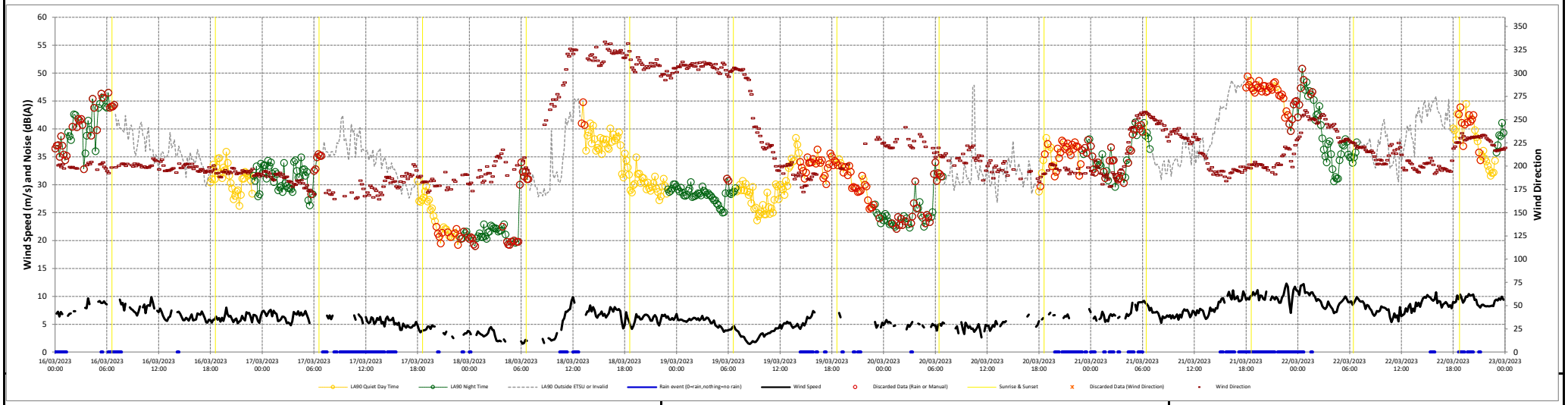


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML1 Page 3 of 5
Date	08/03/2024

09/03/2023 to 16/03/2023

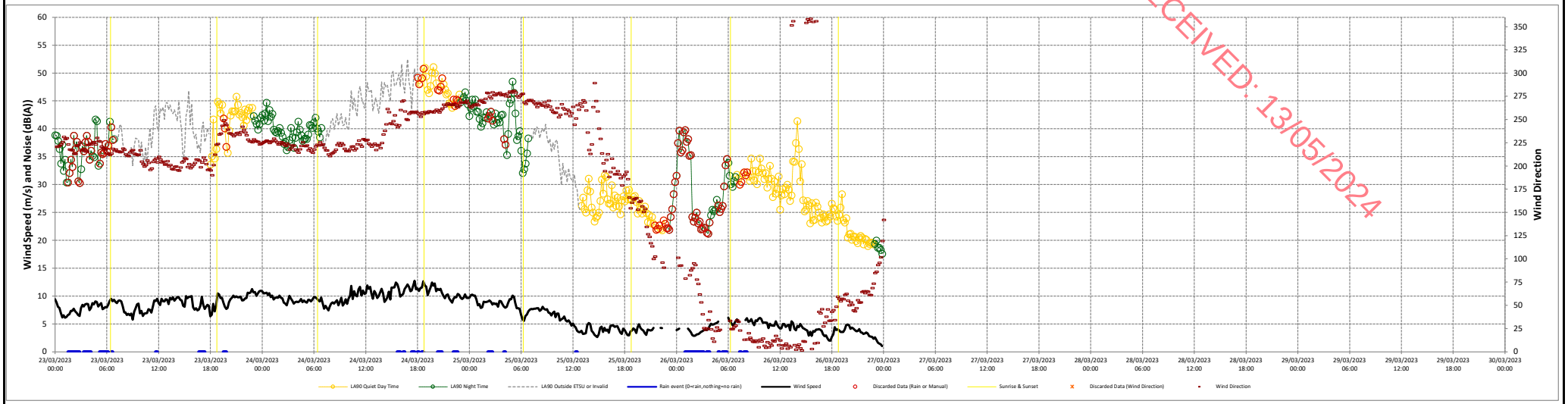


16/03/2023 to 23/03/2023



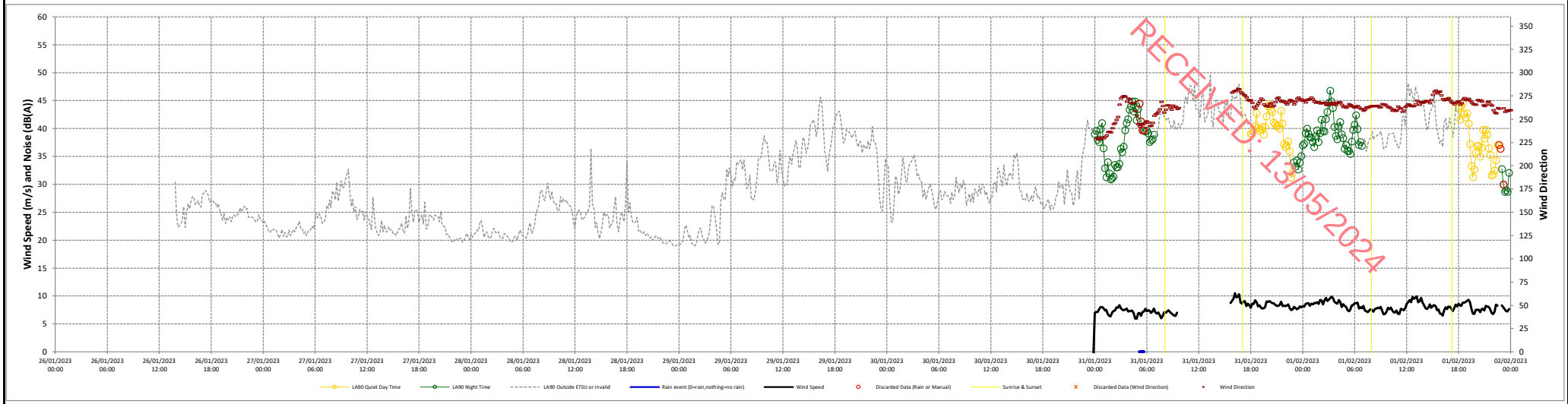
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML1 Page 4 of 5
Date	08/03/2024

23/03/2023 to 30/03/2023

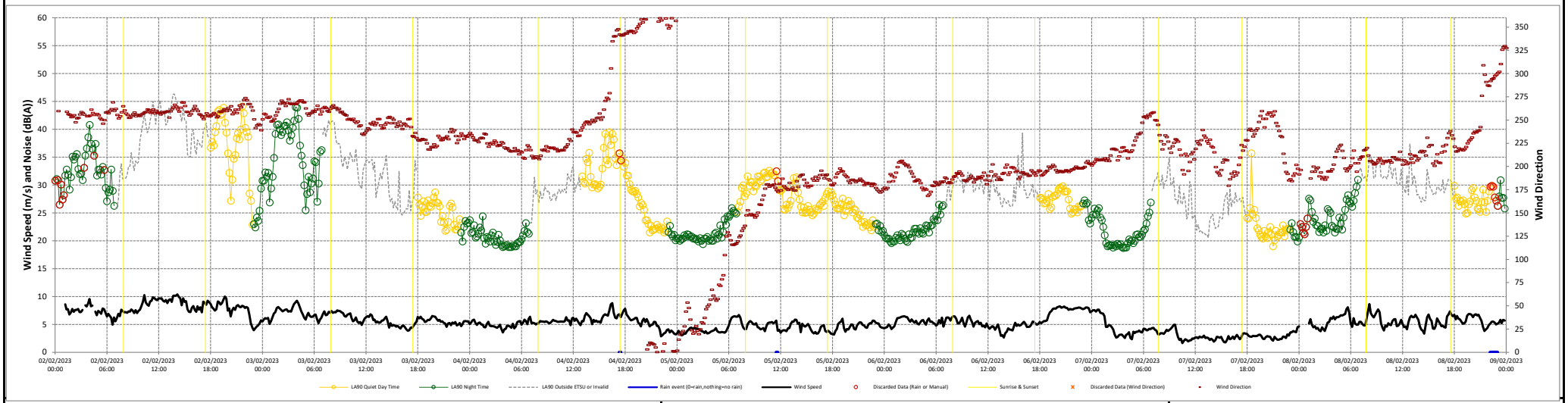


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML1 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023



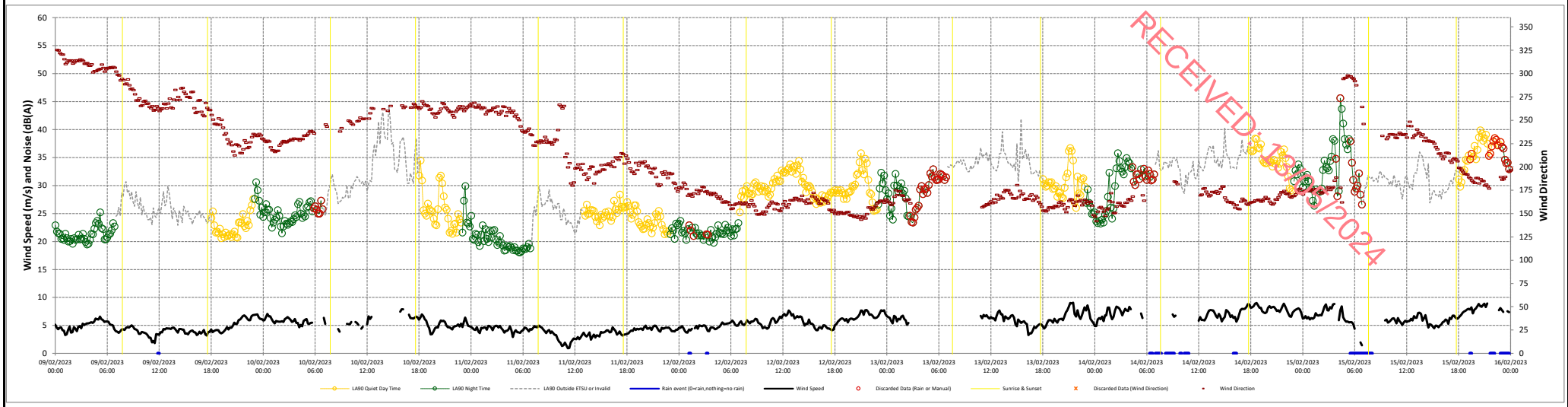
02/02/2023 to 09/02/2023



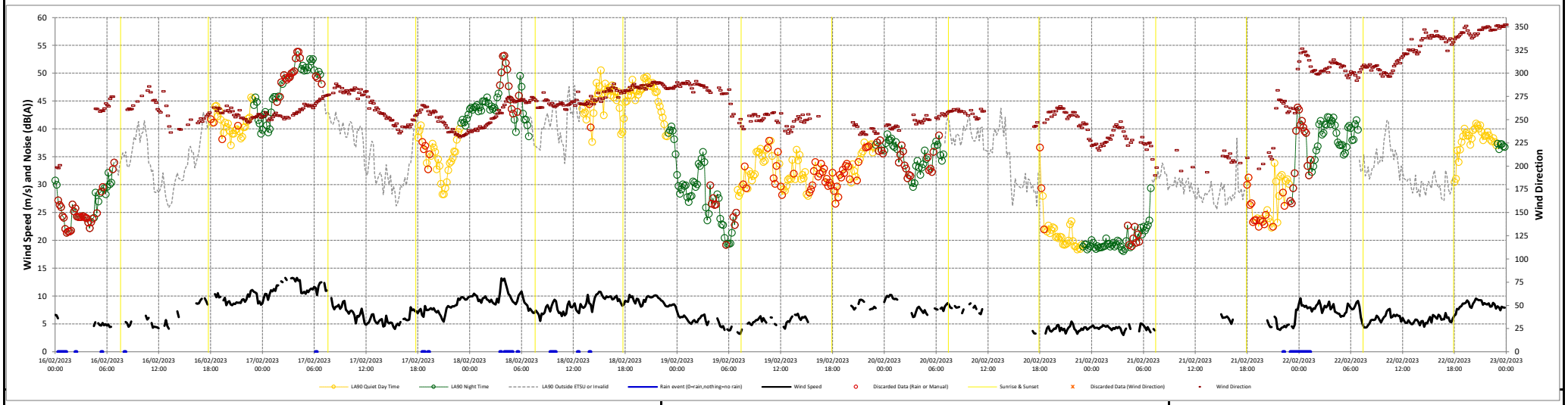
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML2 Page 1 of 5
Date	08/03/2024

tnei

09/02/2023 to 16/02/2023

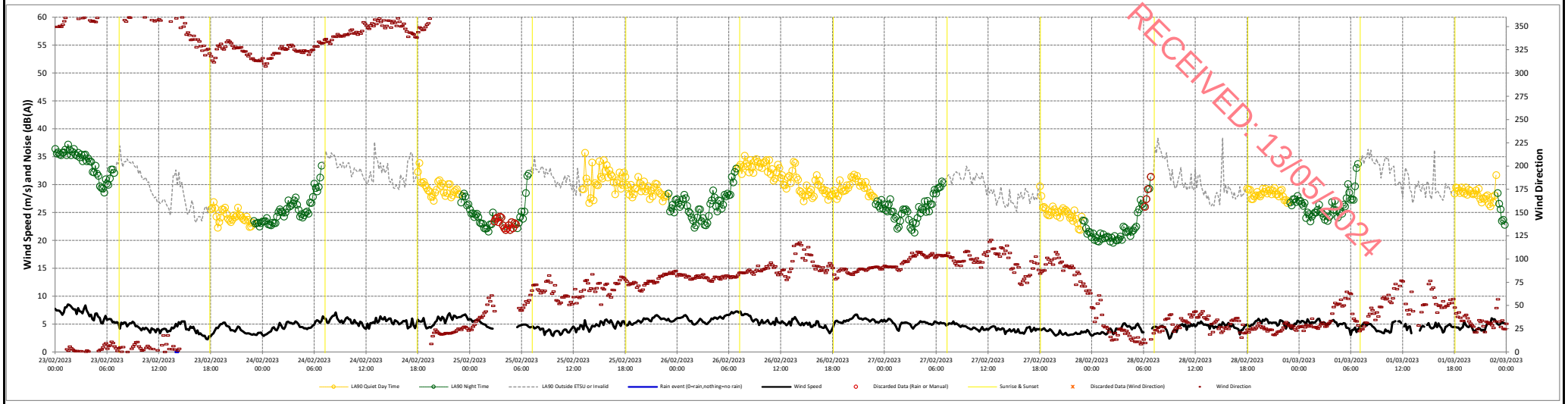


16/02/2023 to 23/02/2023

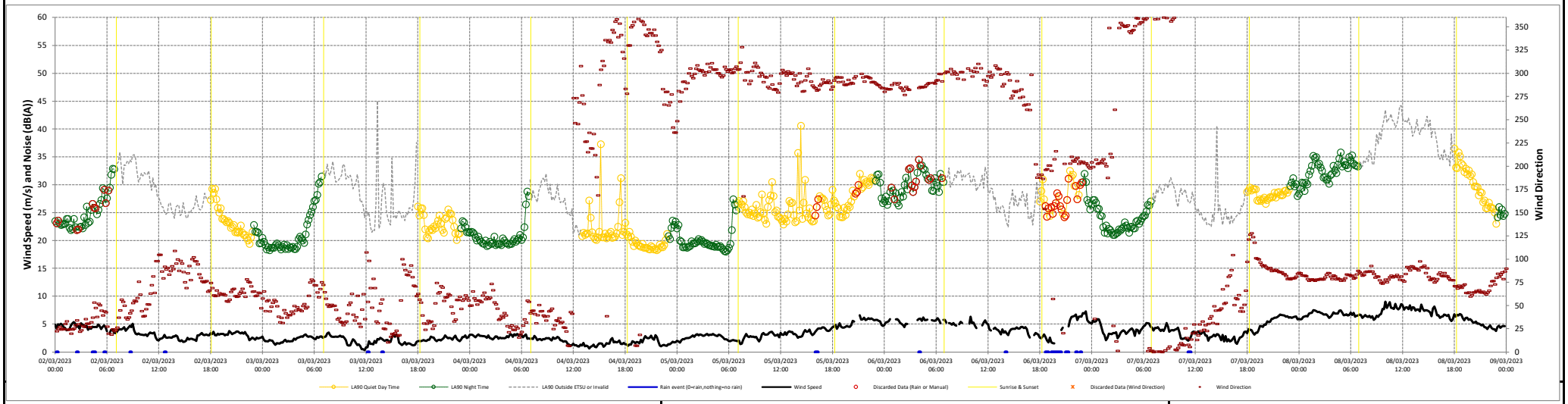


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML2 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023

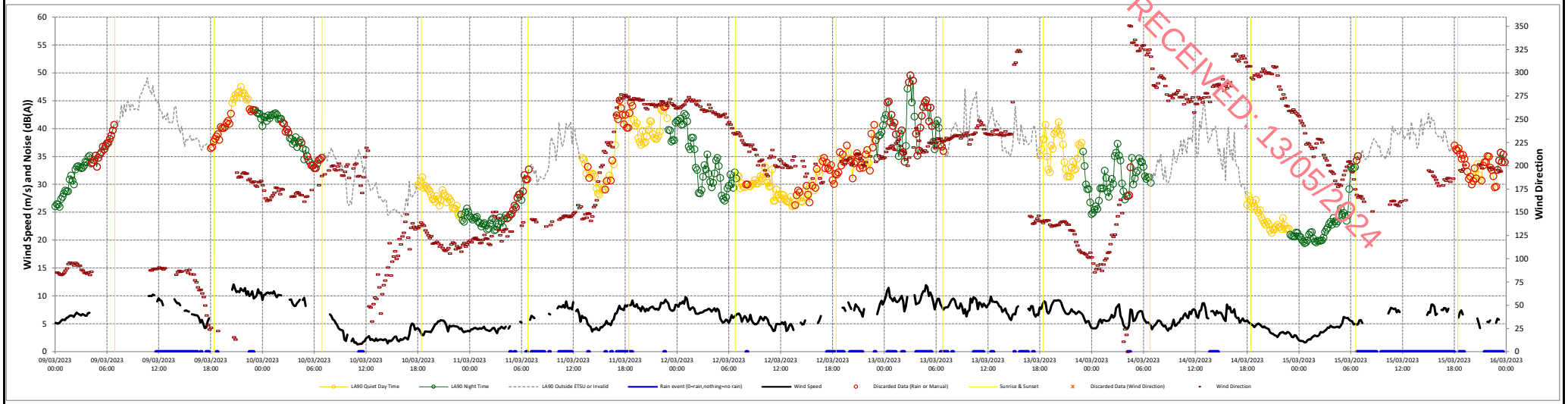


02/03/2023 to 09/03/2023

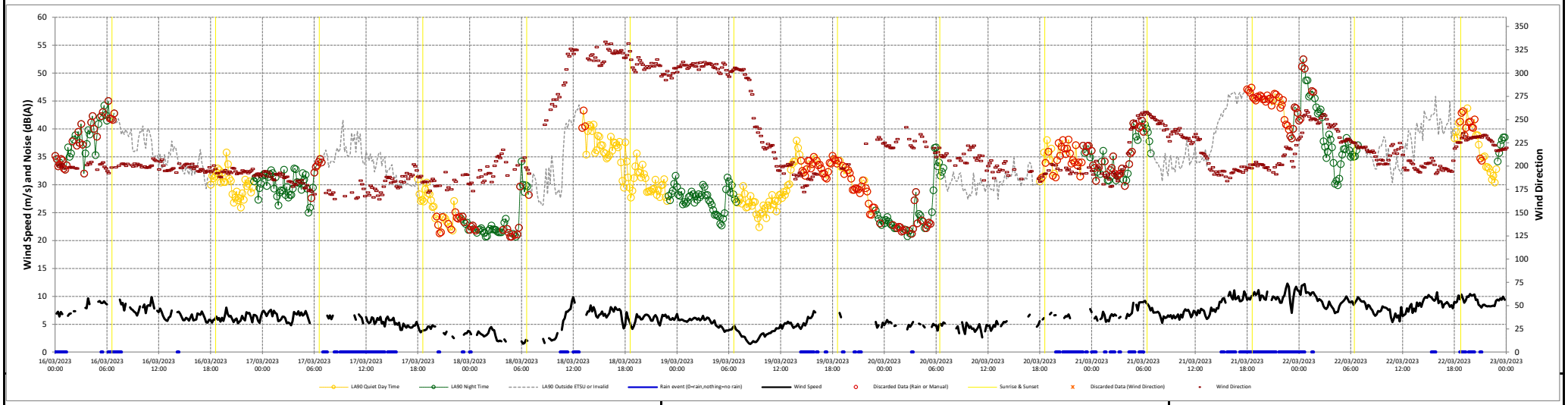


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML2 Page 3 of 5
Date	08/03/2024

09/03/2023 to 16/03/2023



16/03/2023 to 23/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML2 Page 4 of 5
Date	08/03/2024

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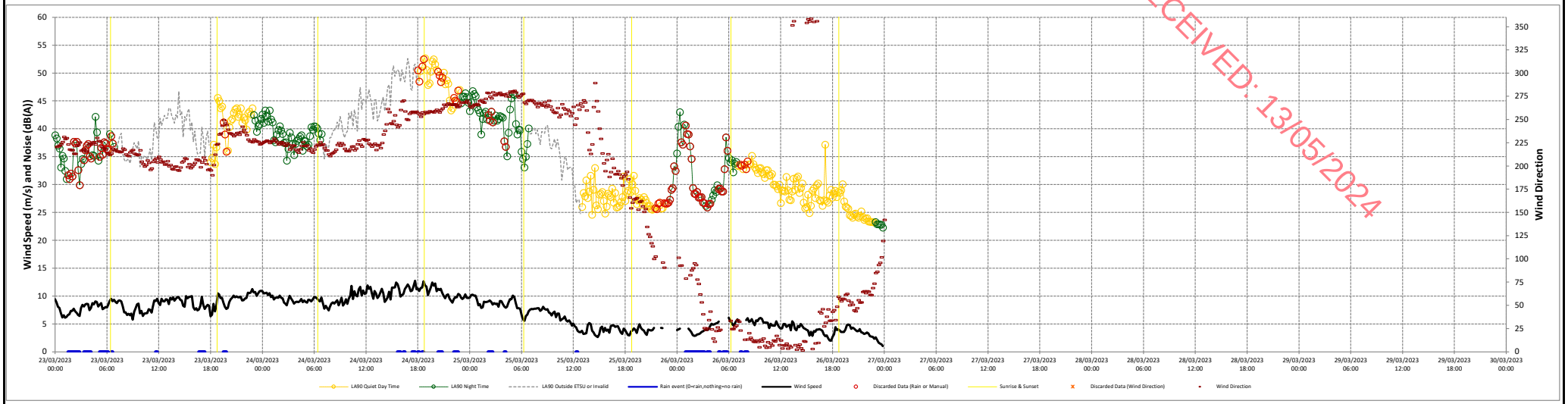
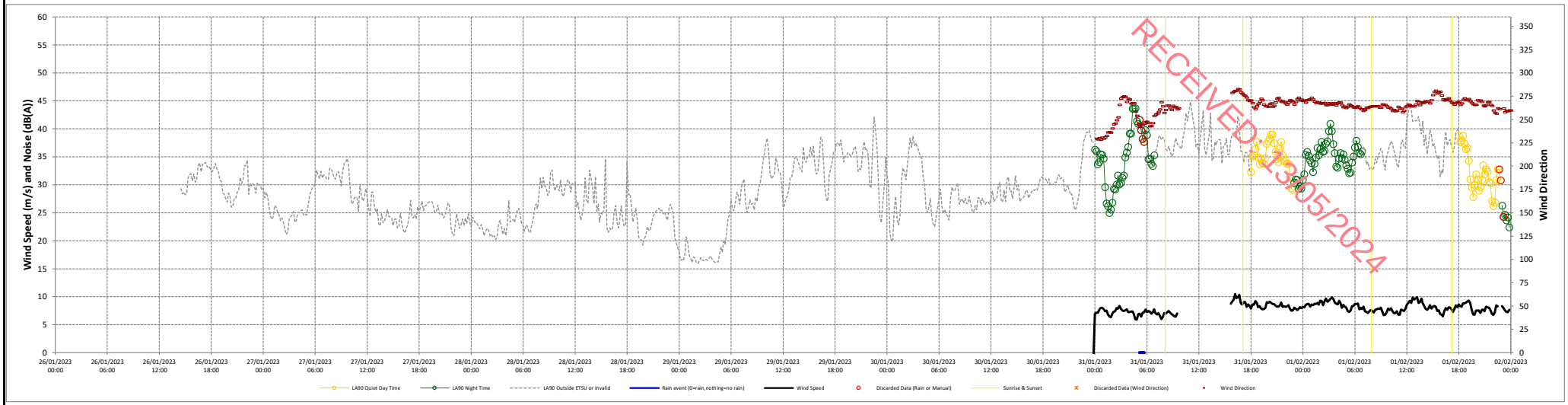
23/03/2023 to 30/03/2023

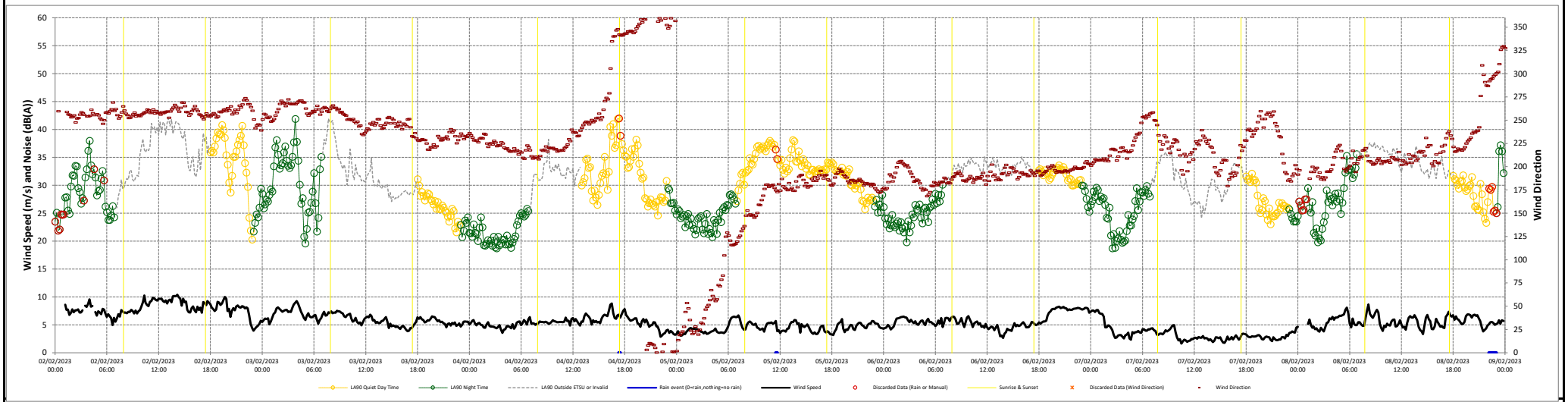


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML2 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023

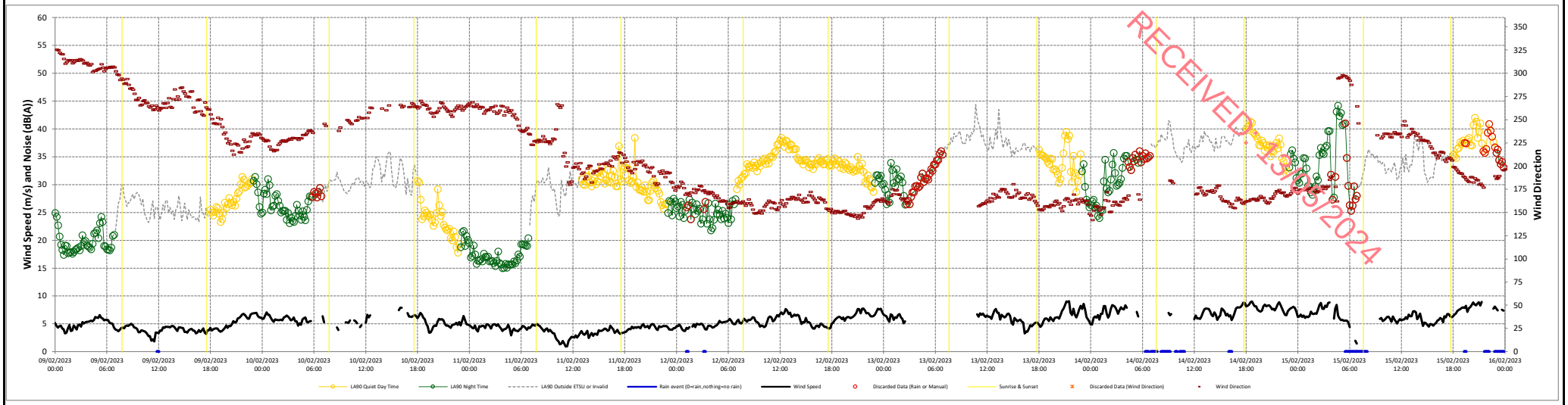


02/02/2023 to 09/02/2023

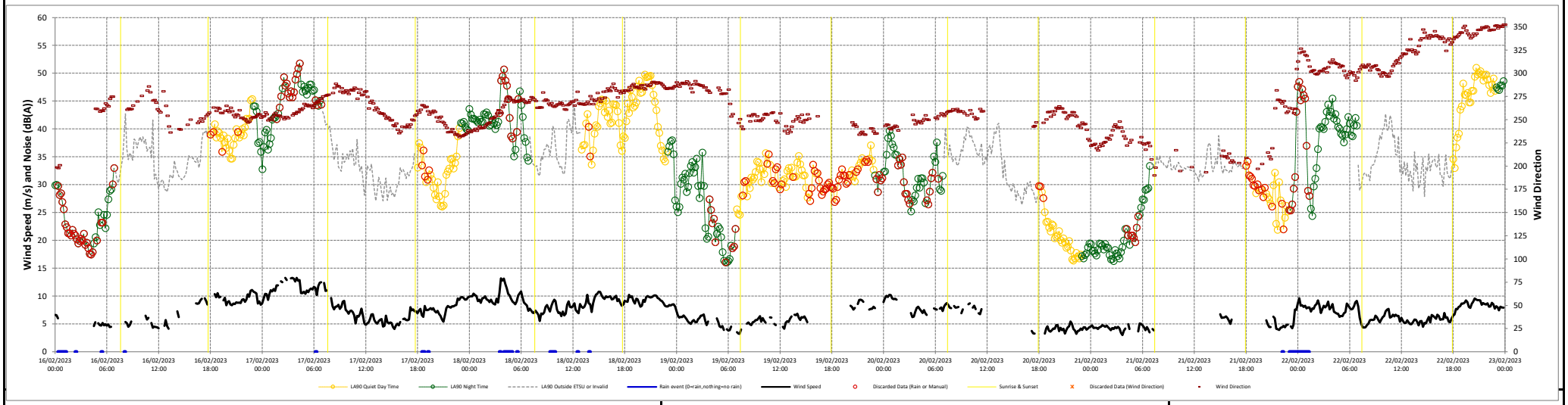


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML3 Page 1 of 5
Date	08/03/2024

09/02/2023 to 16/02/2023

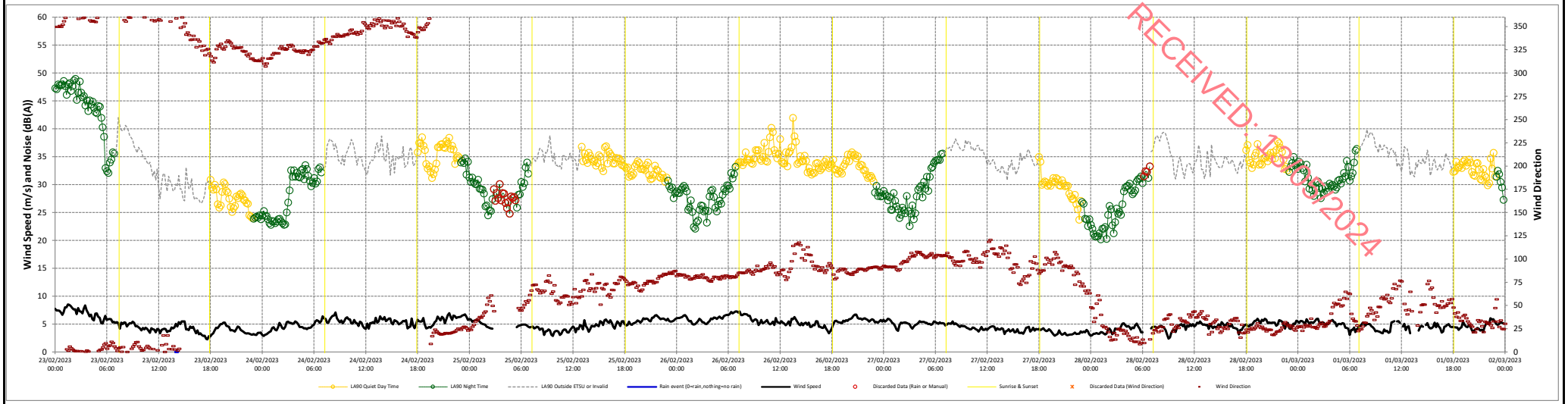


16/02/2023 to 23/02/2023

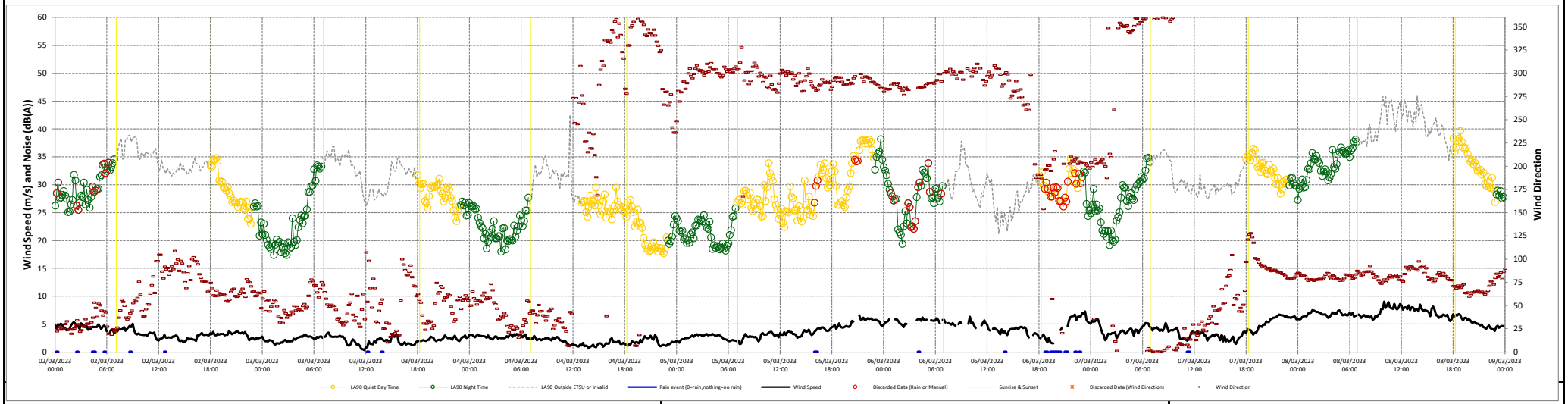


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML3 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023

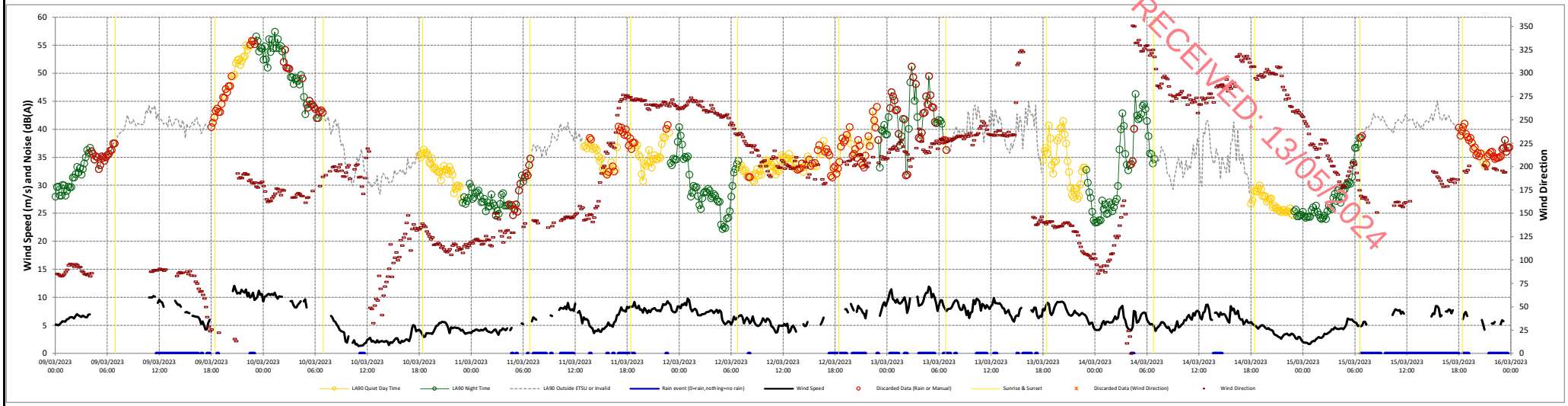


02/03/2023 to 09/03/2023

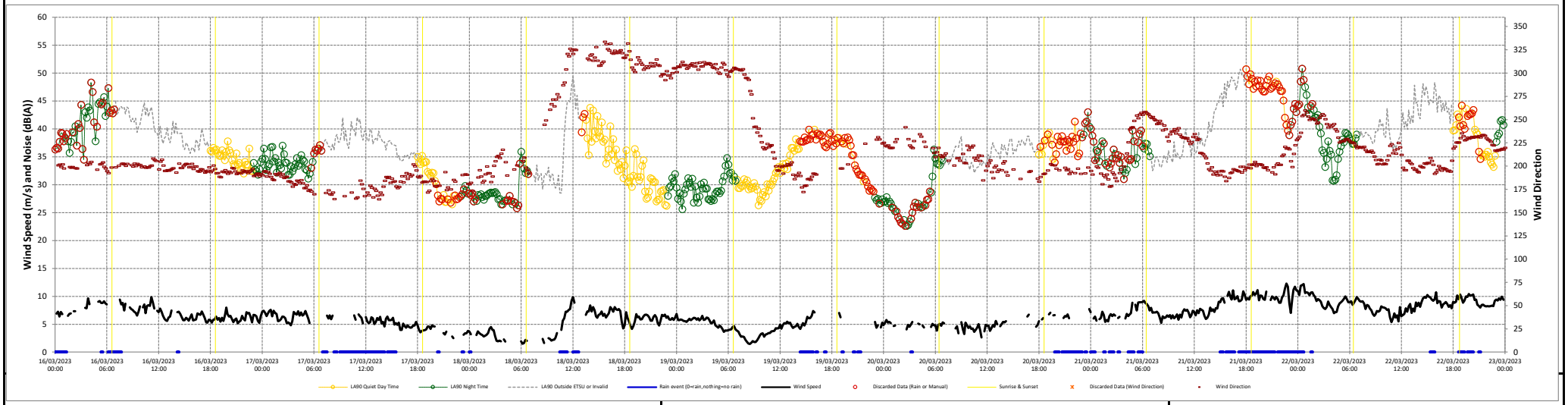


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML3 Page 3 of 5
Date	08/03/2024

09/03/2023 to 16/03/2023



16/03/2023 to 23/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML3 Page 4 of 5
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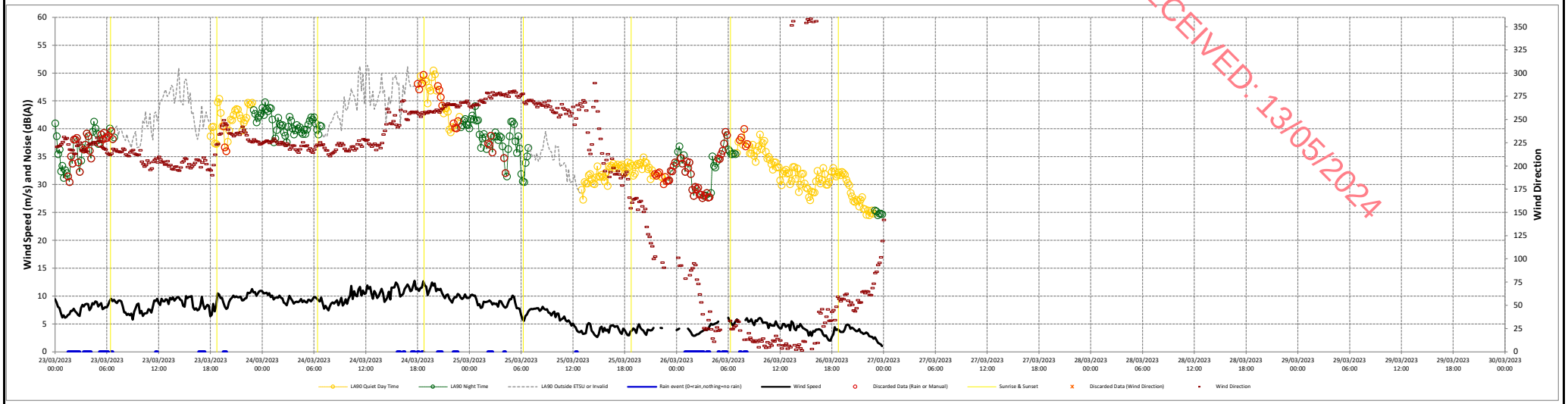
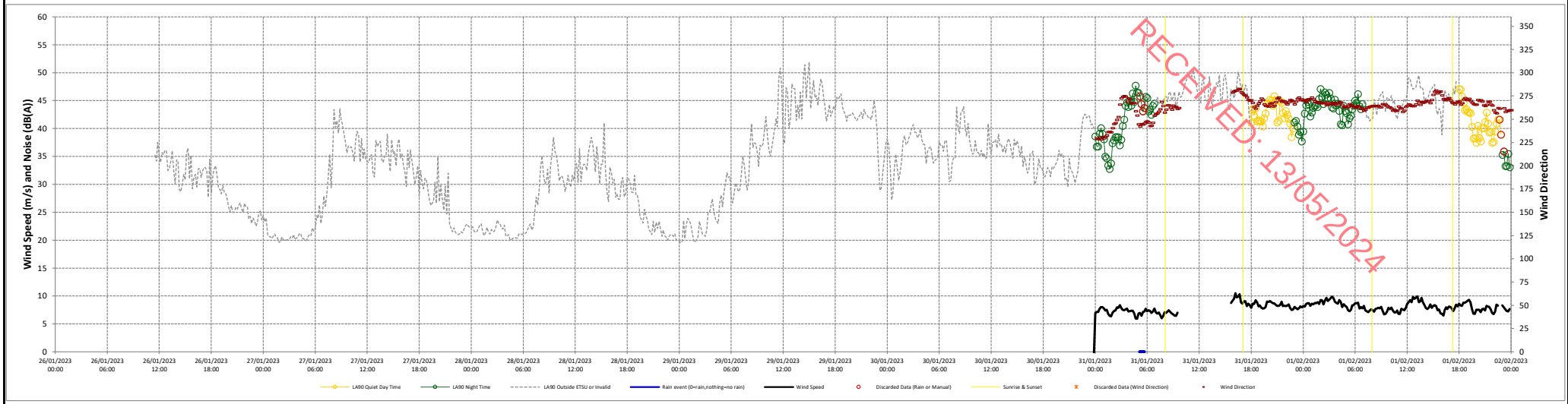
23/03/2023 to 30/03/2023

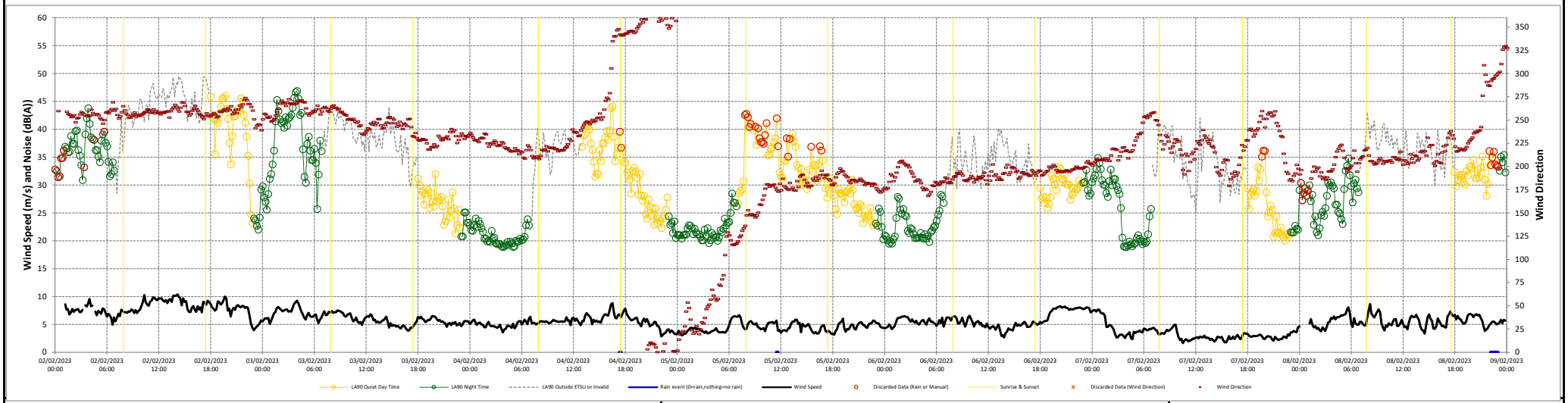


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML3 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023



02/02/2023 to 09/02/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML4 Page 1 of 5
Date	08/03/2024

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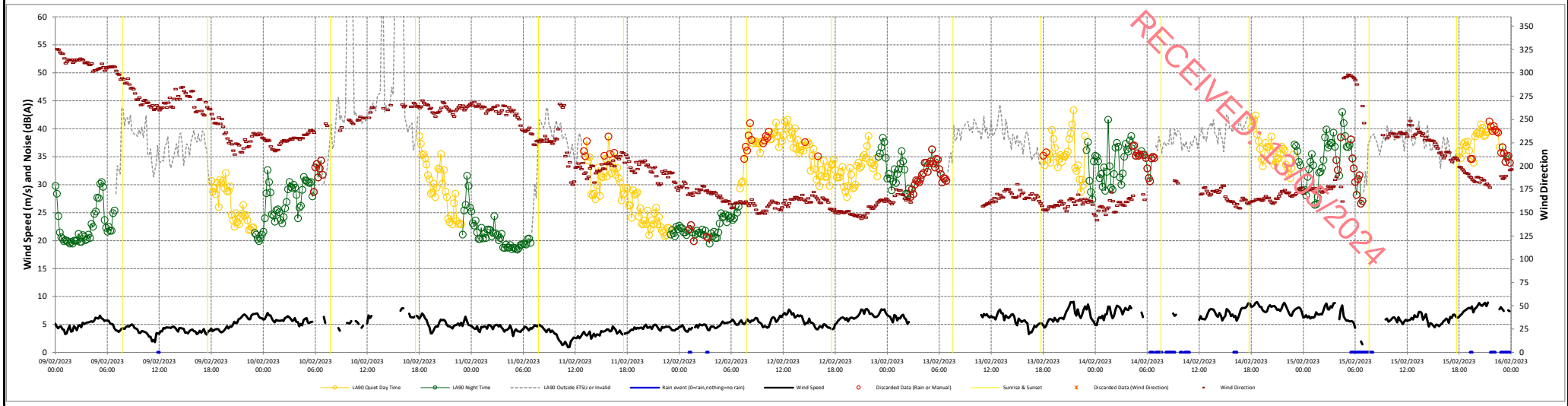
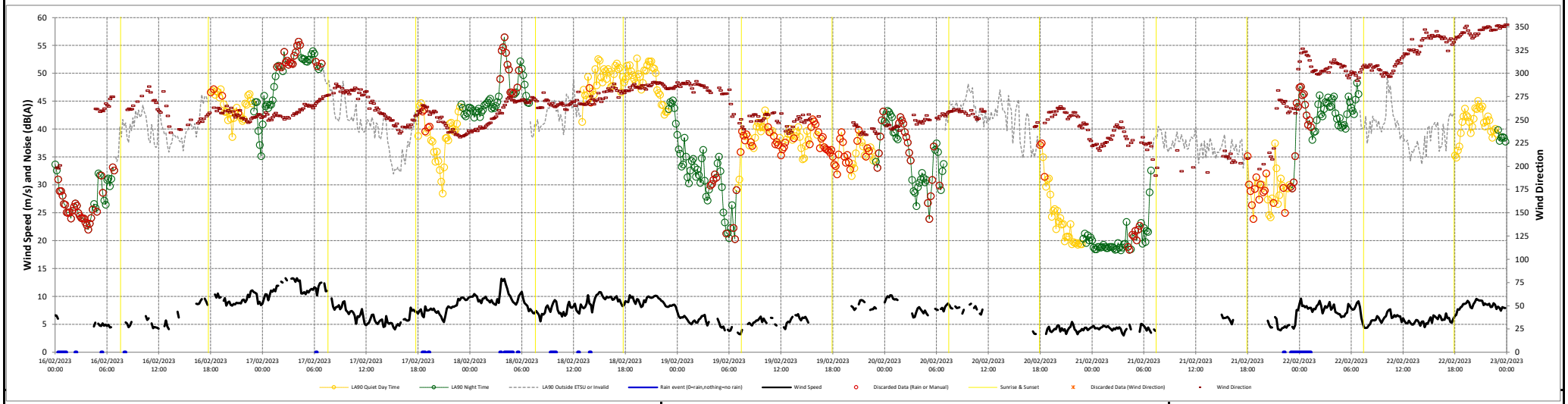
09/02/2023 to 16/02/2023

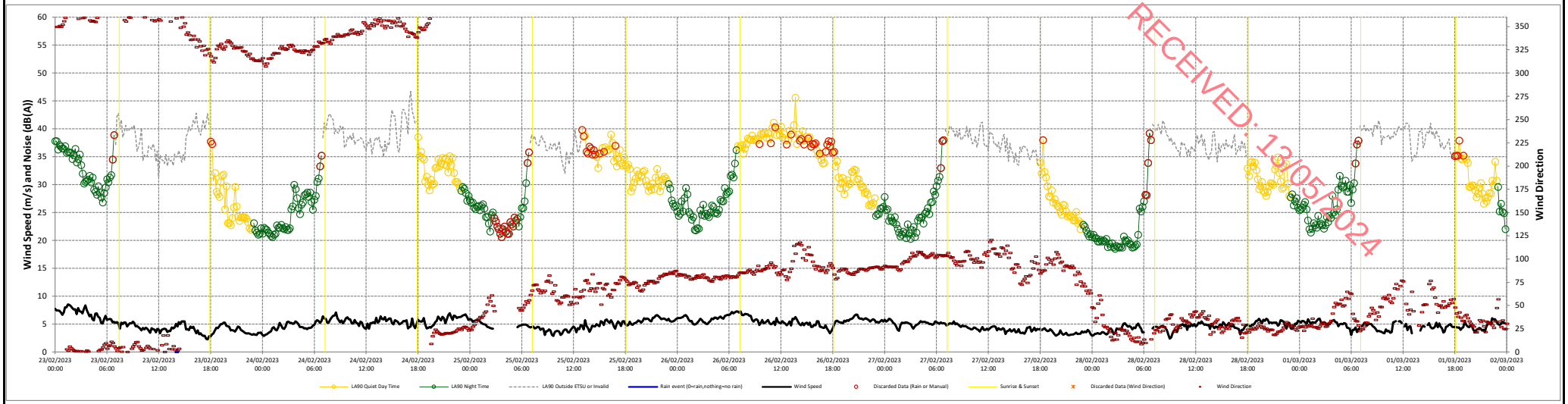


16/02/2023 to 23/02/2023

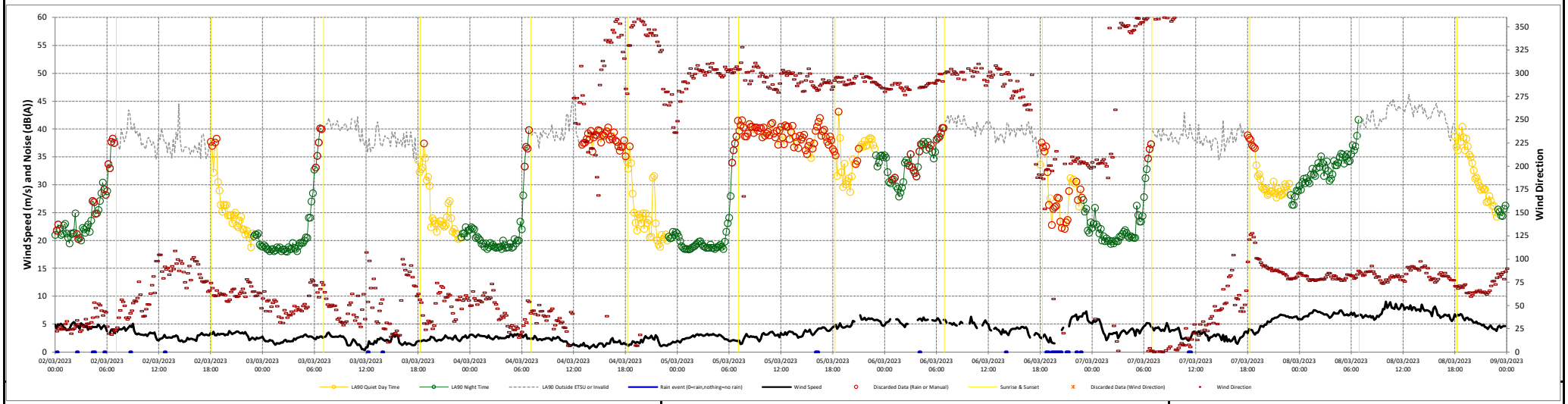


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML4 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023



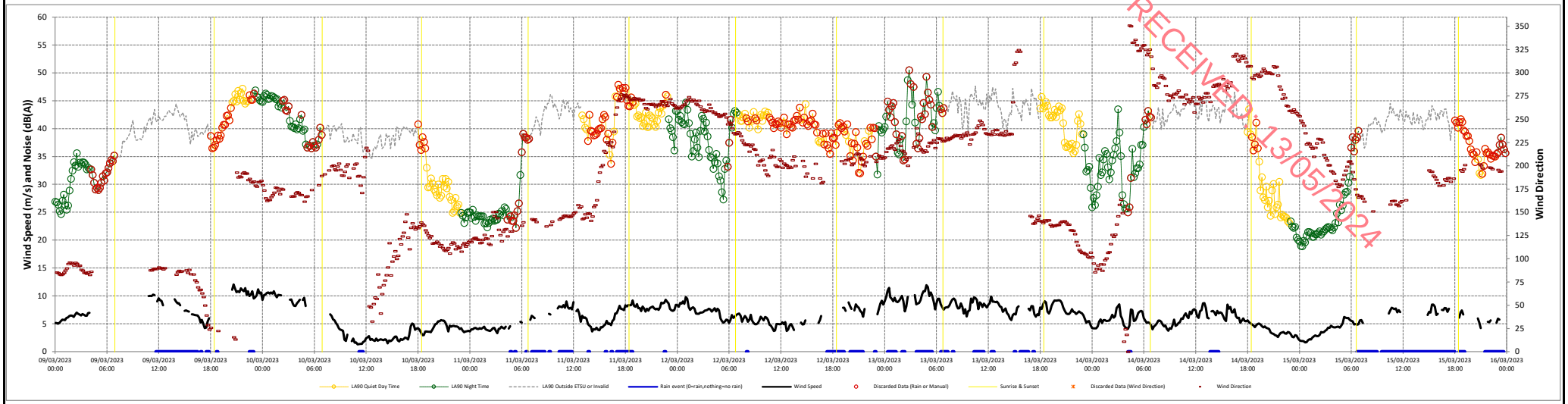
02/03/2023 to 09/03/2023



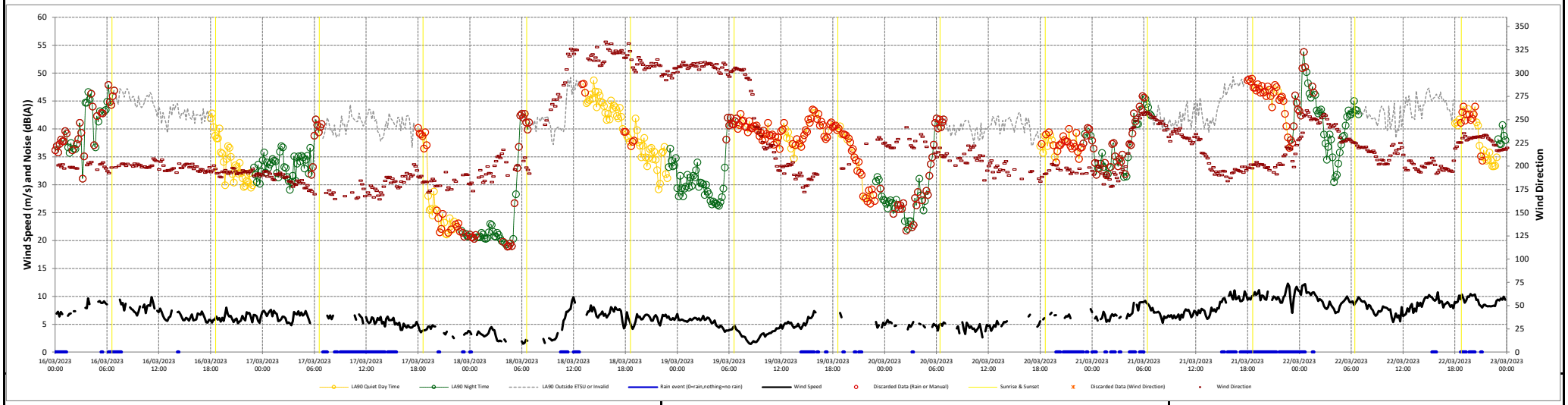
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML4 Page 3 of 5
Date	08/03/2024

tnei

09/03/2023 to 16/03/2023

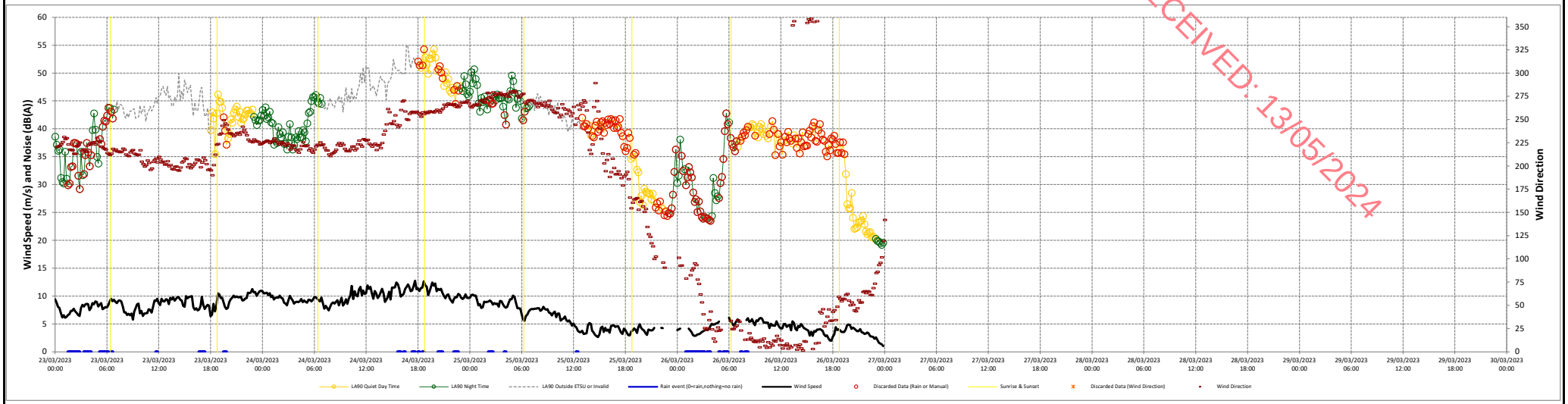


16/03/2023 to 23/03/2023



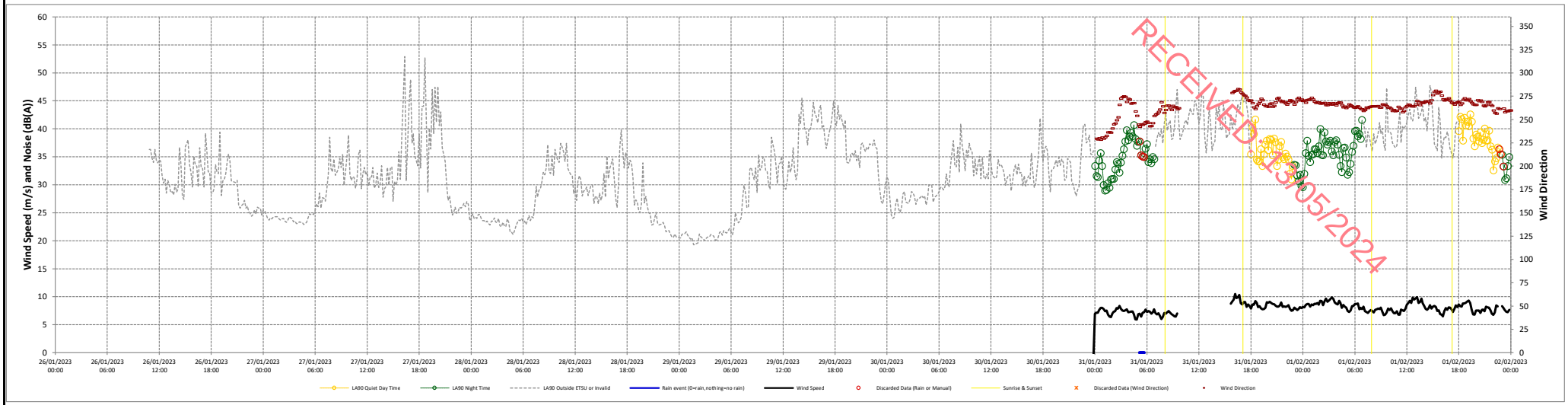
Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML4 Page 4 of 5
Date	08/03/2024

23/03/2023 to 30/03/2023

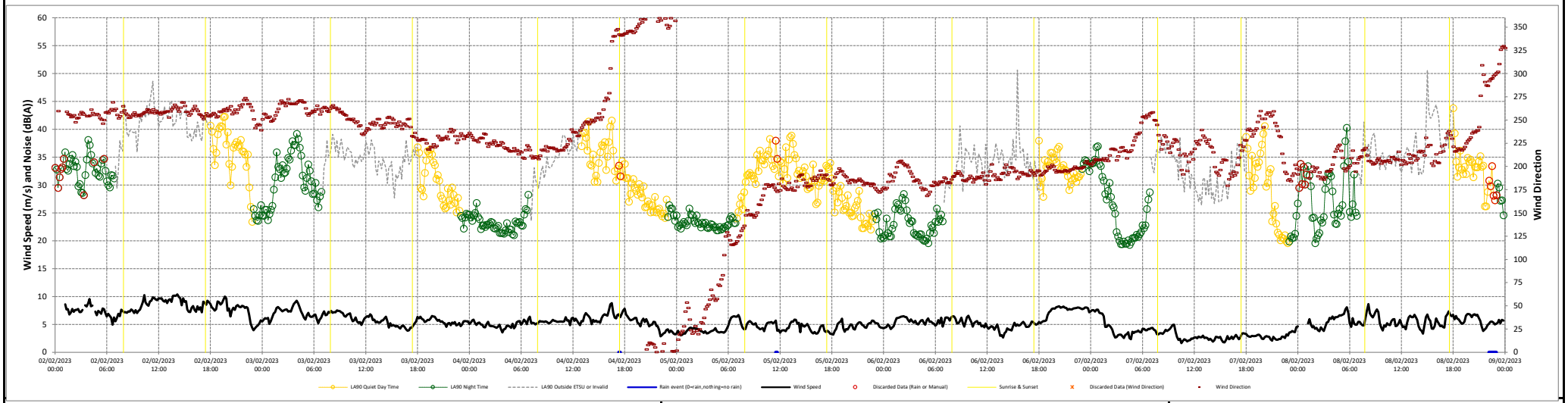


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML4 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023

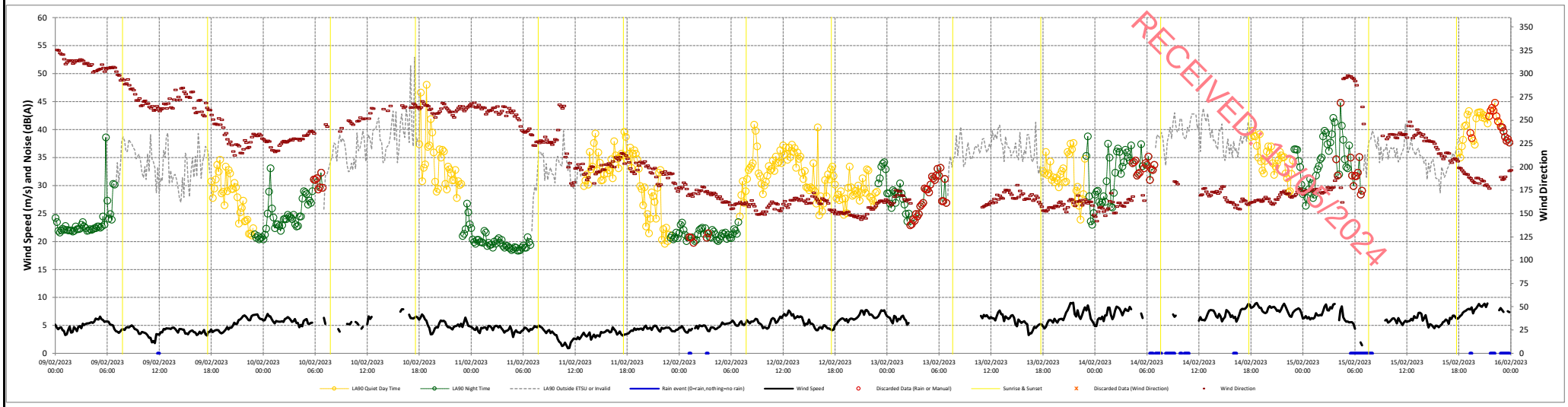


02/02/2023 to 09/02/2023

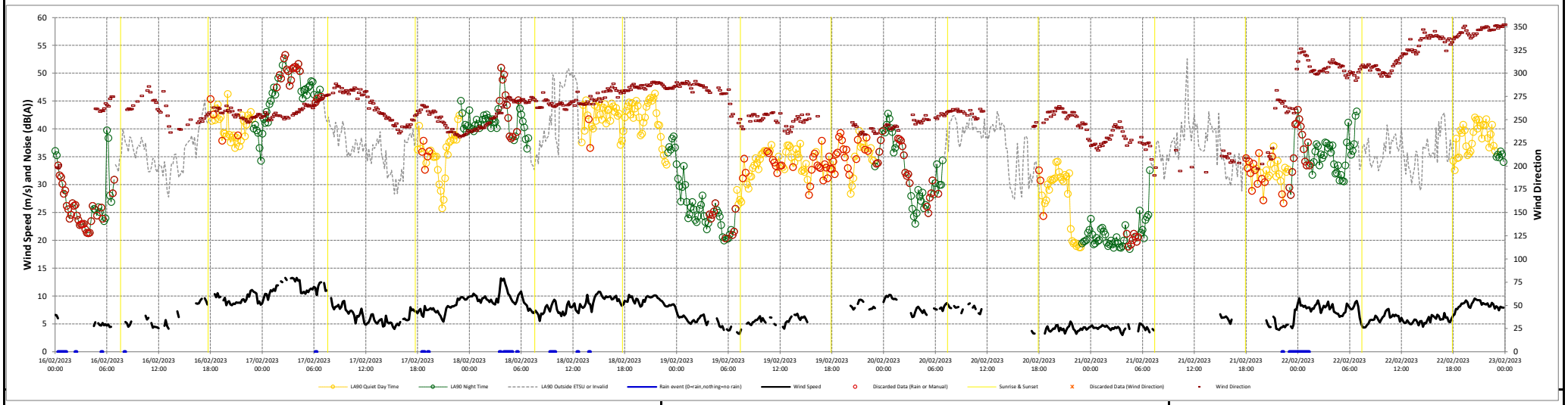


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML5 Page 1 of 5
Date	08/03/2024

09/02/2023 to 16/02/2023

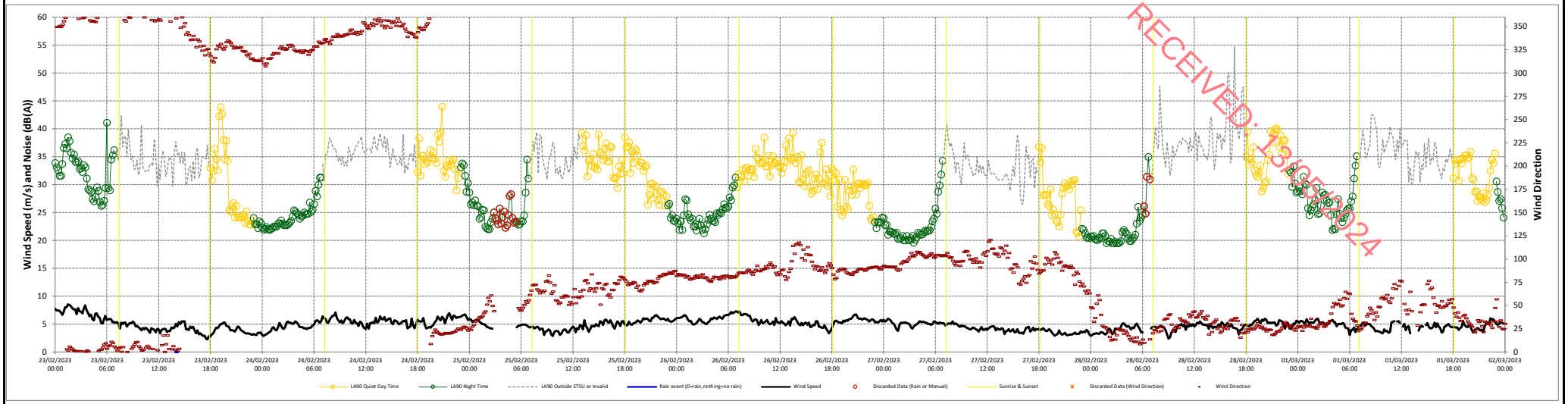


16/02/2023 to 23/02/2023

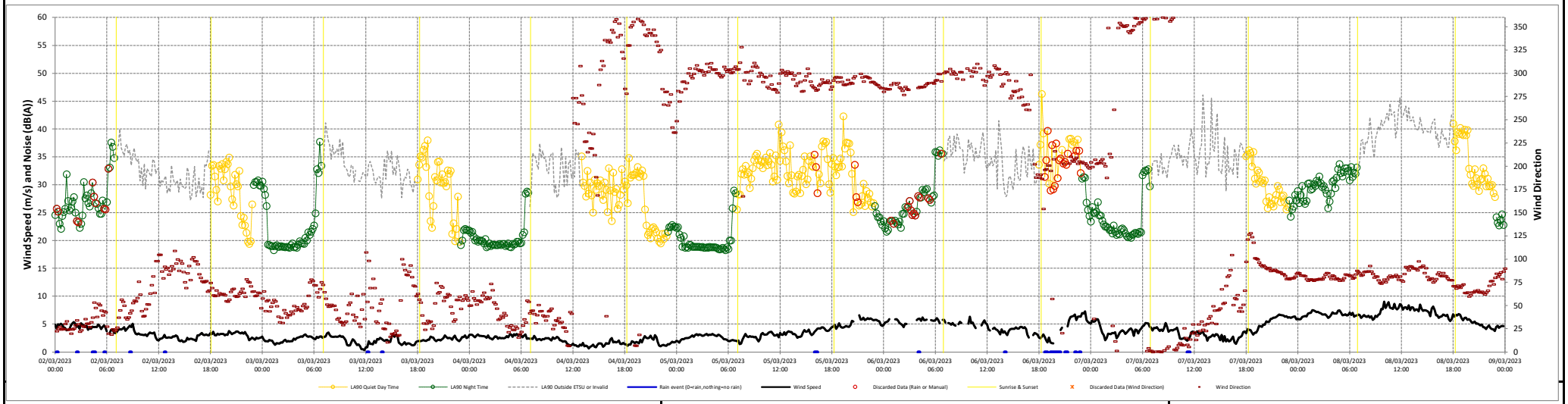


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML5 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023

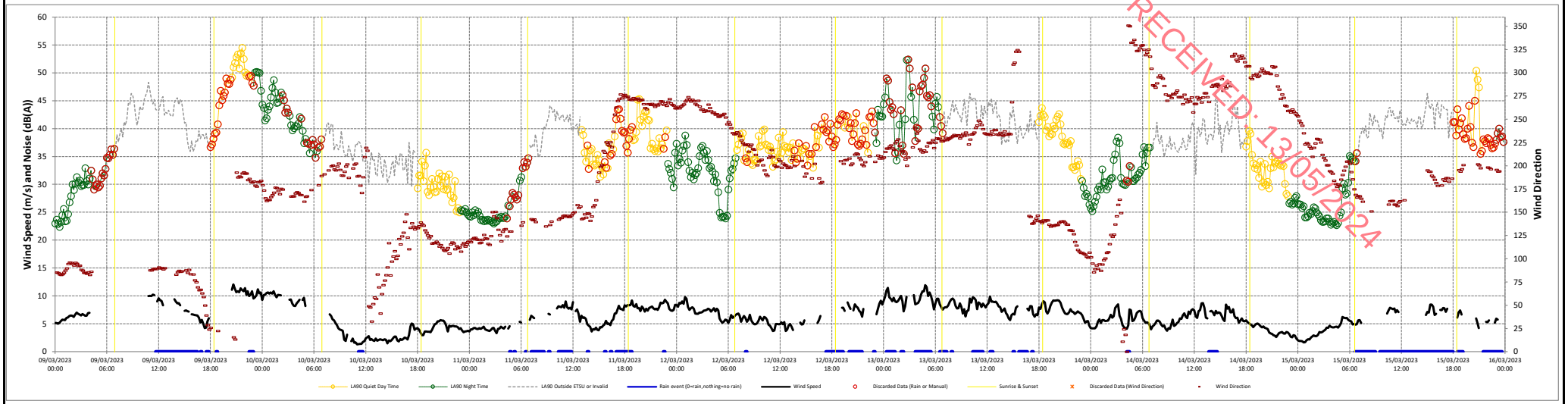


02/03/2023 to 09/03/2023

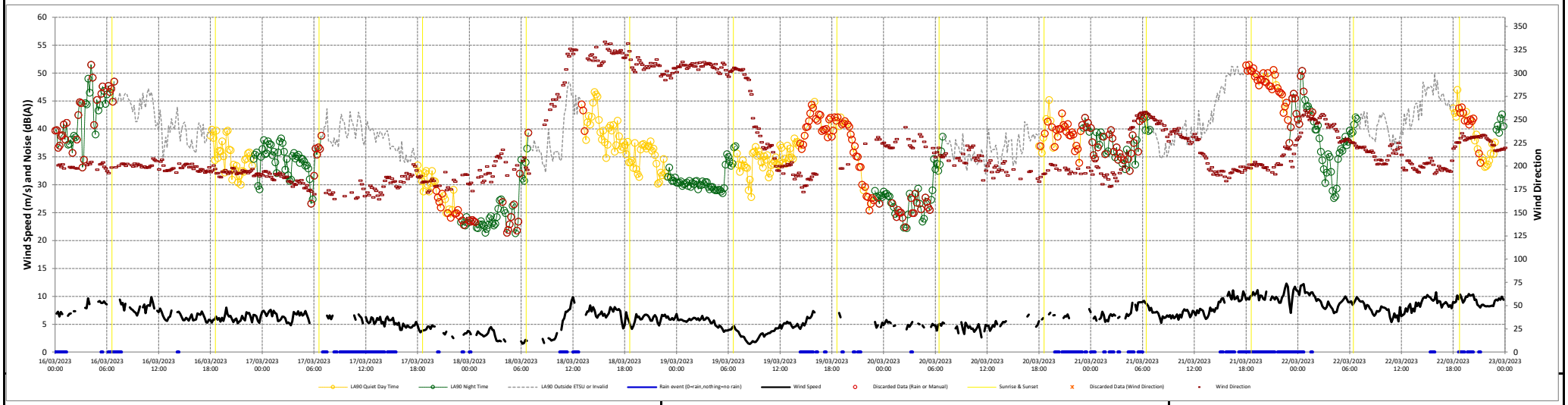


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML5 Page 3 of 5
Date	08/03/2024

09/03/2023 to 16/03/2023



16/03/2023 to 23/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML5 Page 4 of 5
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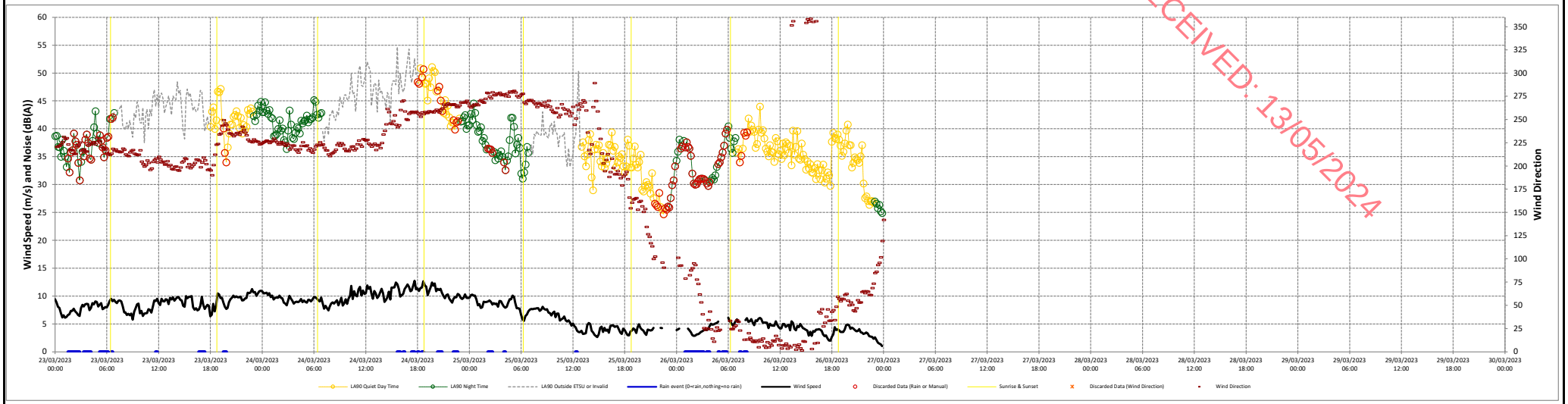
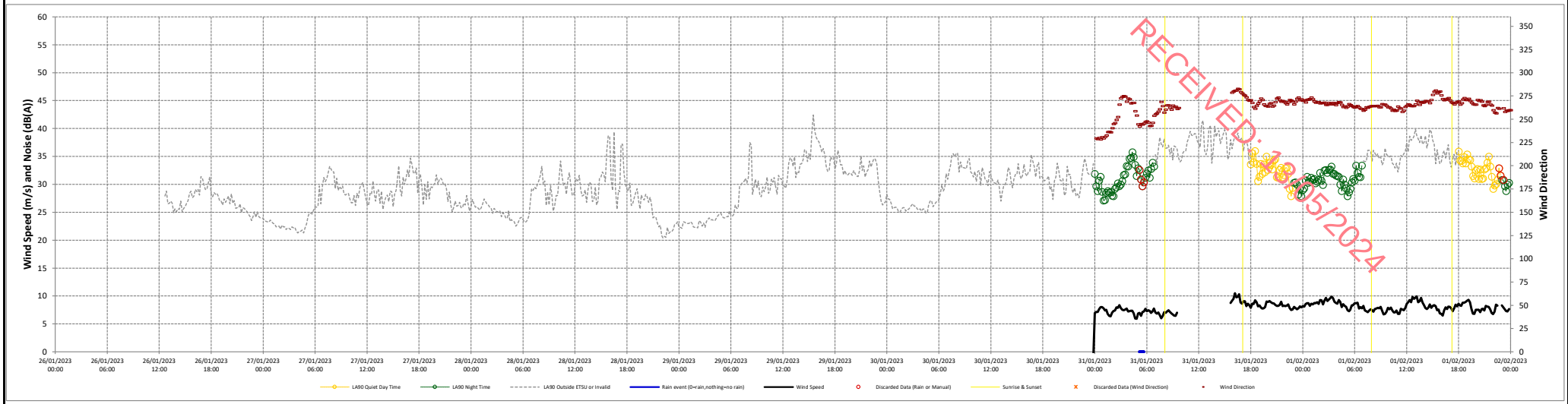
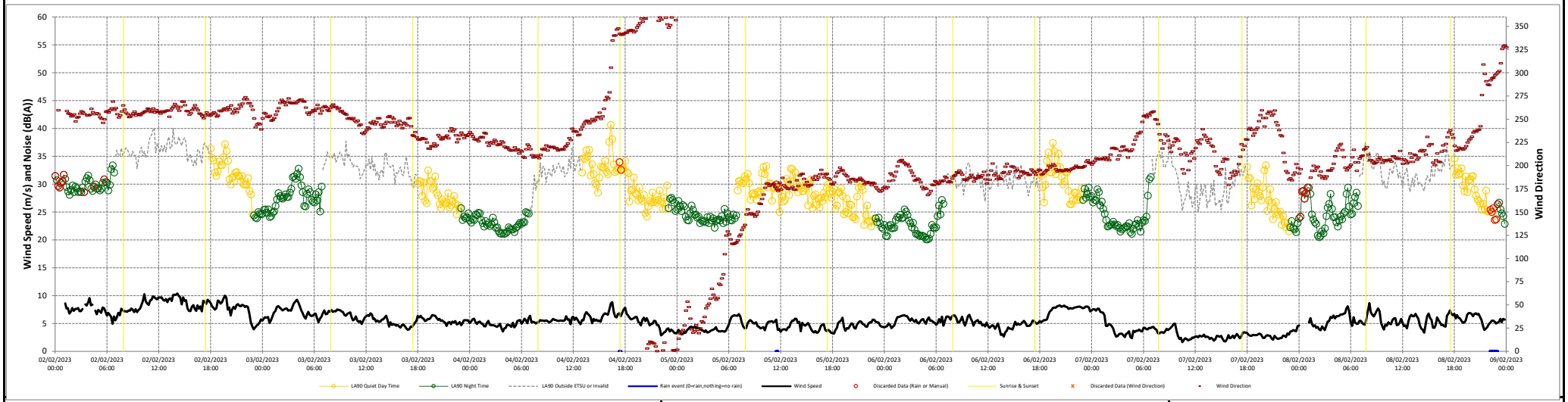


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML5 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023

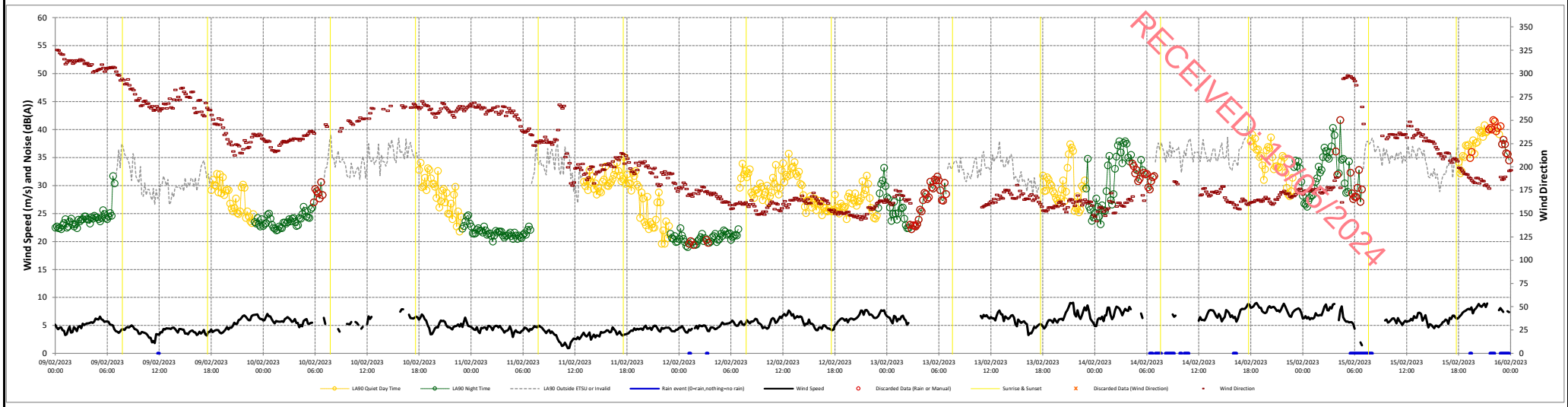


02/02/2023 to 09/02/2023

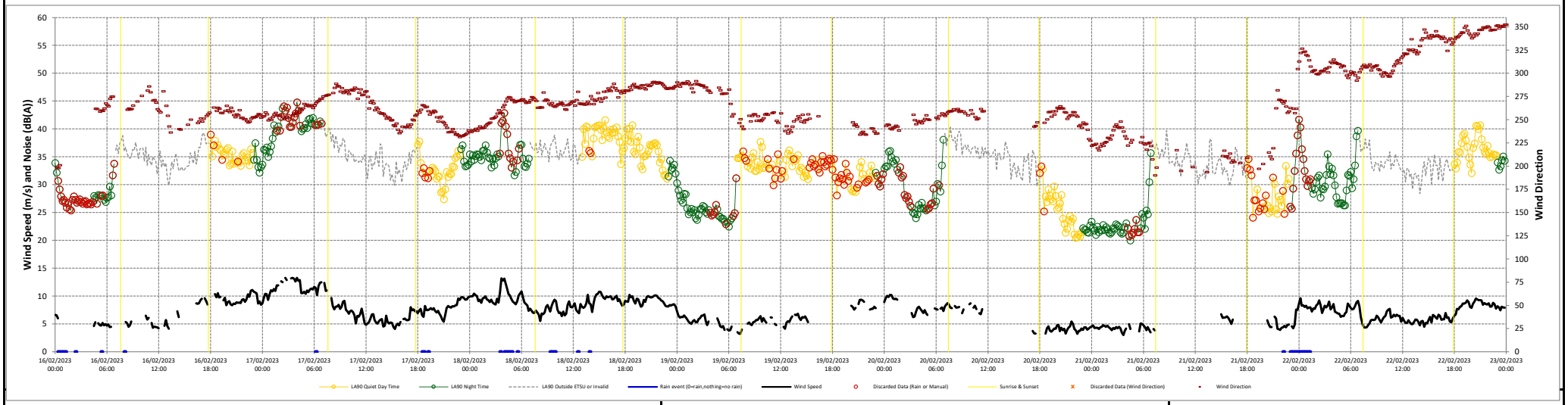


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML6 Page 1 of 5
Date	08/03/2024

09/02/2023 to 16/02/2023

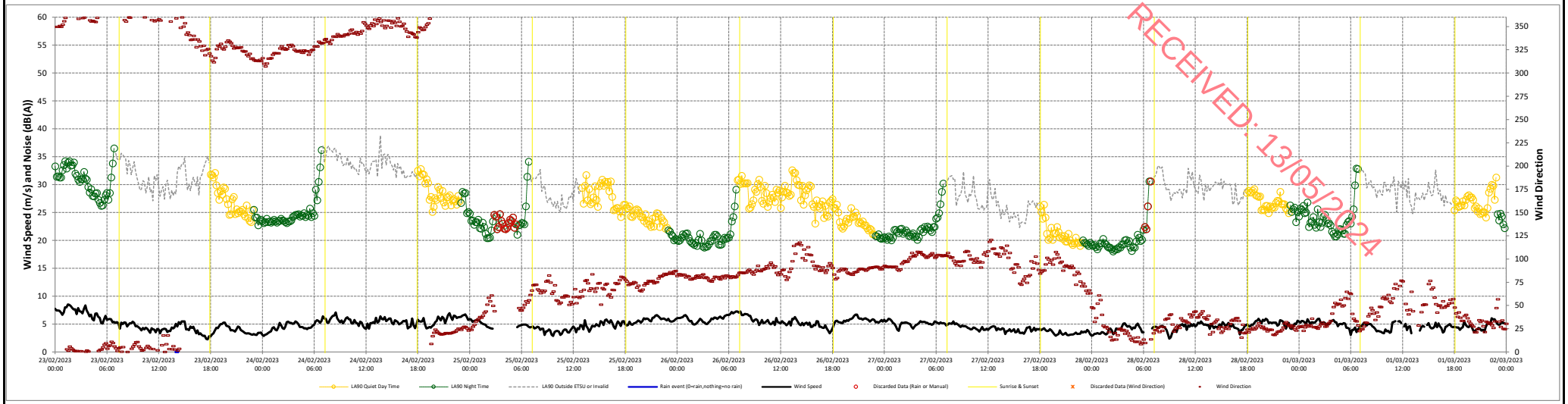


16/02/2023 to 23/02/2023

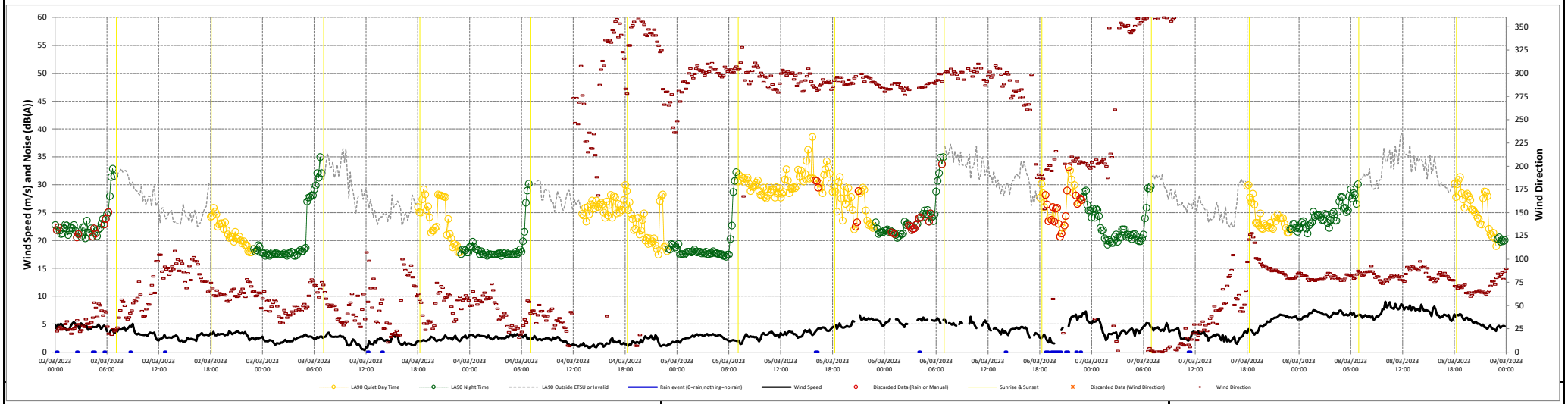


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML6 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023

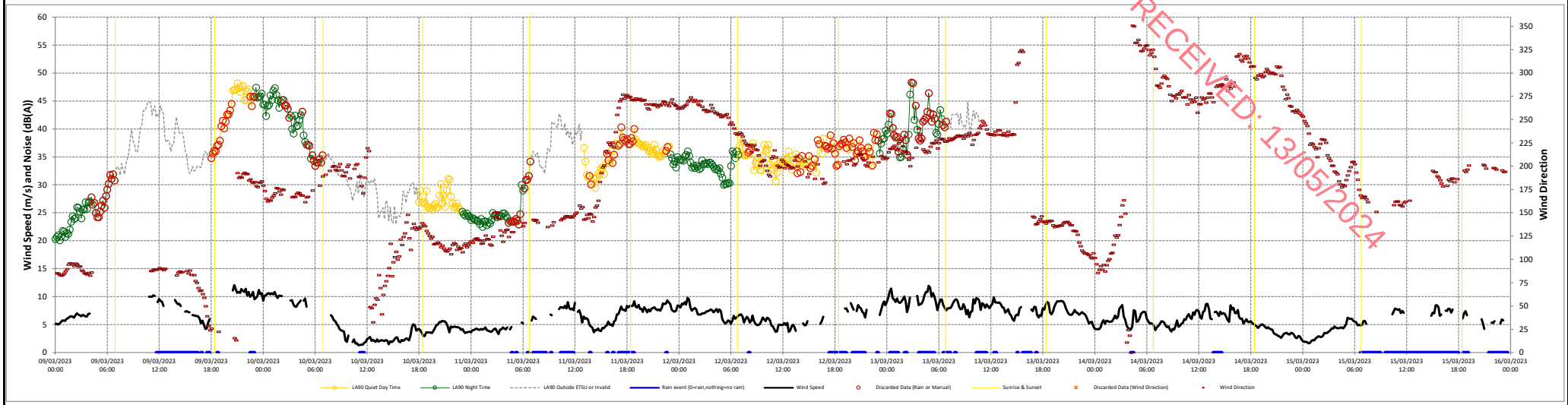


02/03/2023 to 09/03/2023

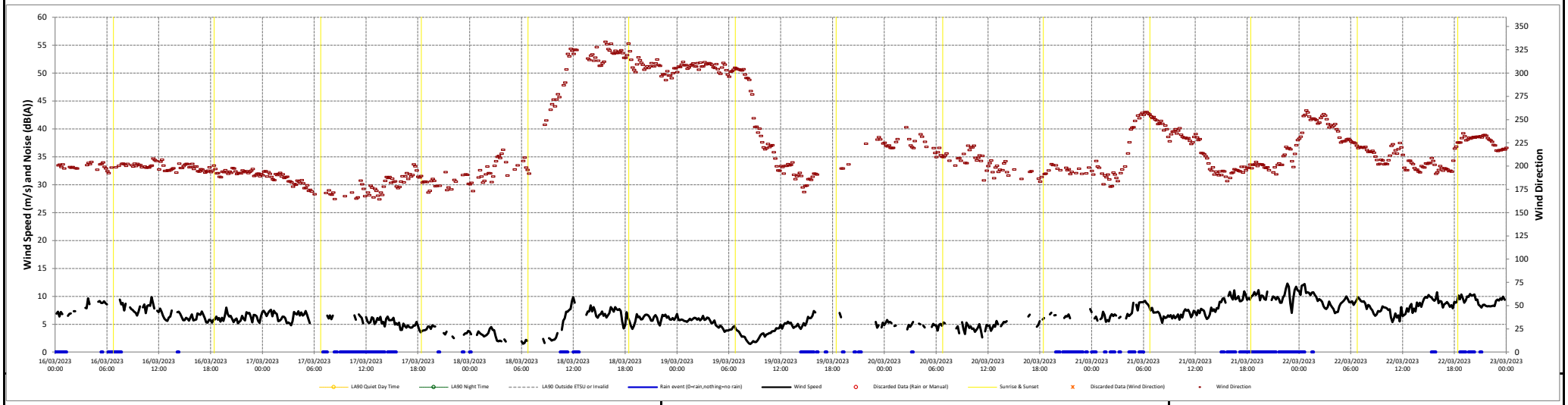


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML6 Page 3 of 5
Date	08/03/2024

09/03/2023 to 16/03/2023



16/03/2023 to 23/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML6 Page 4 of 5
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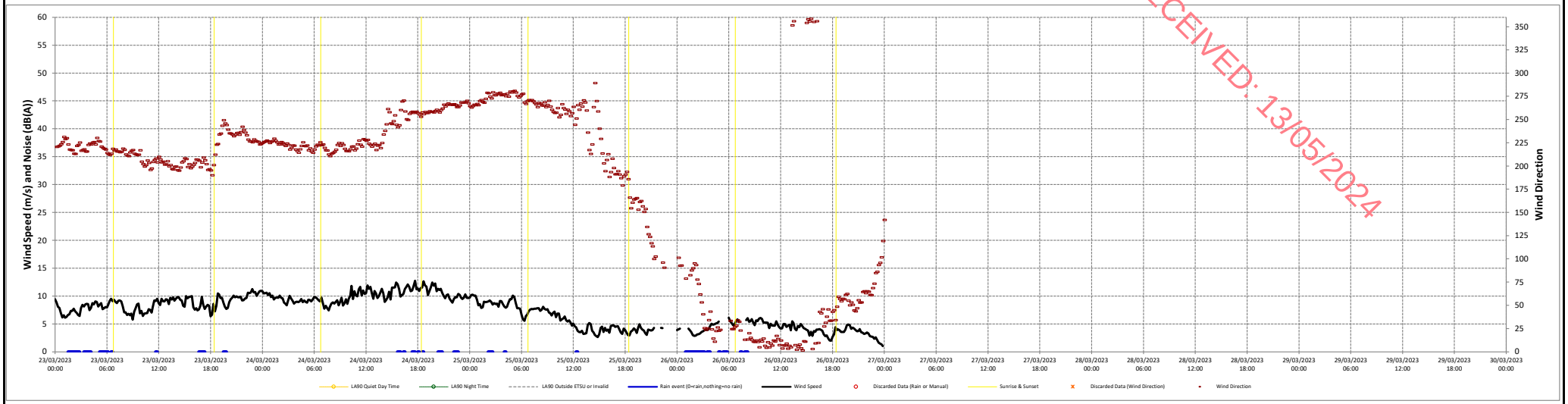
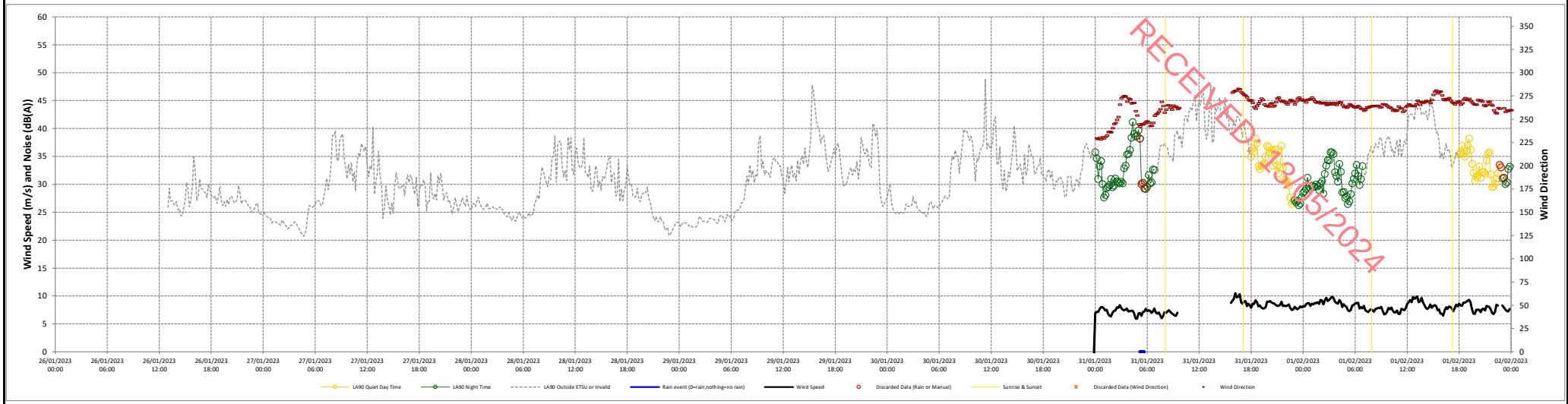
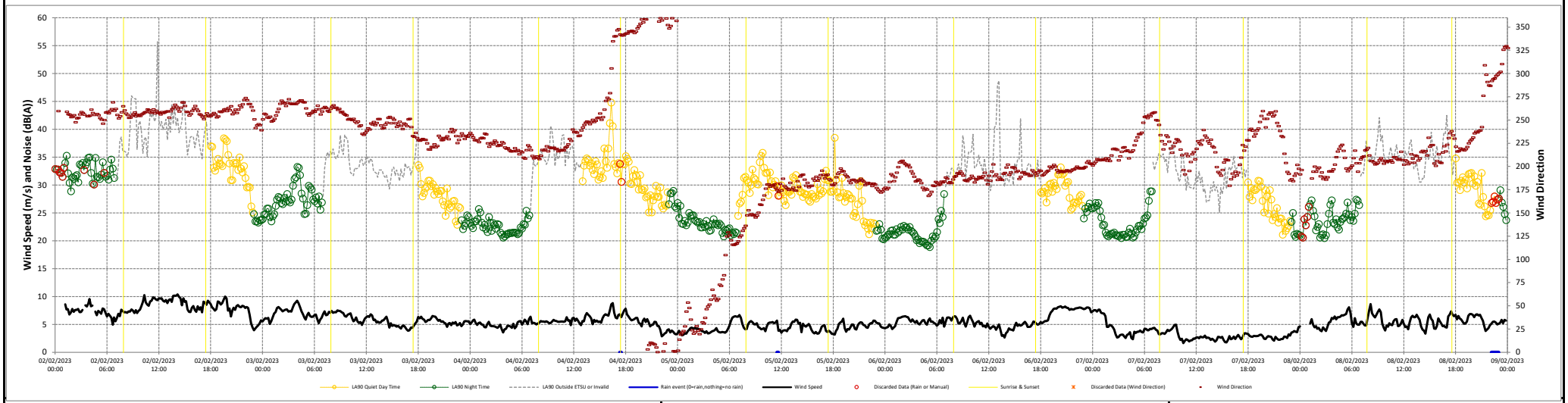


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML6 Page 5 of 5
Date	08/03/2024

26/01/2023 to 02/02/2023

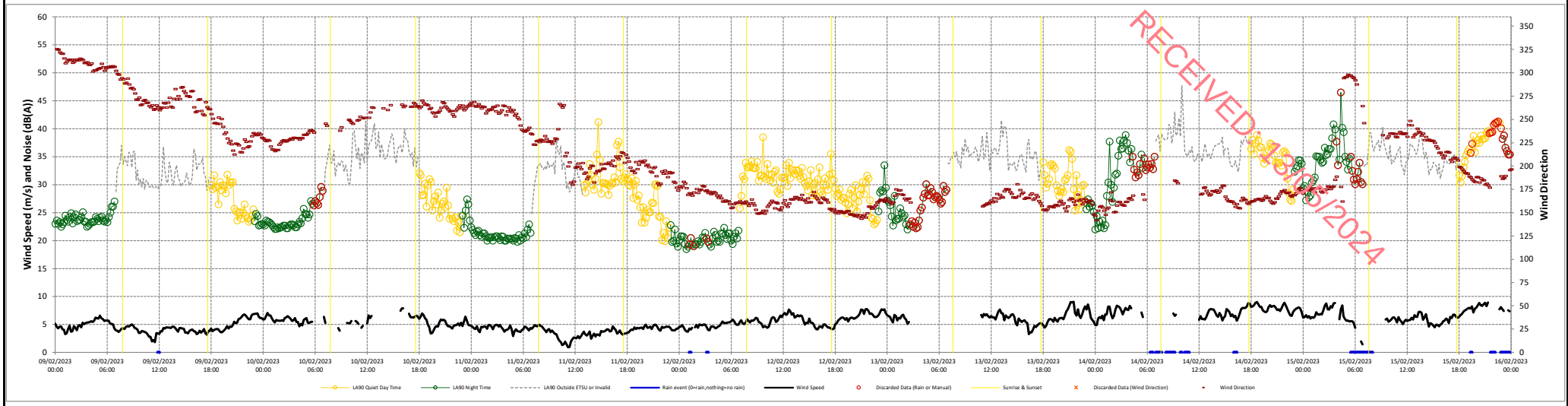


02/02/2023 to 09/02/2023

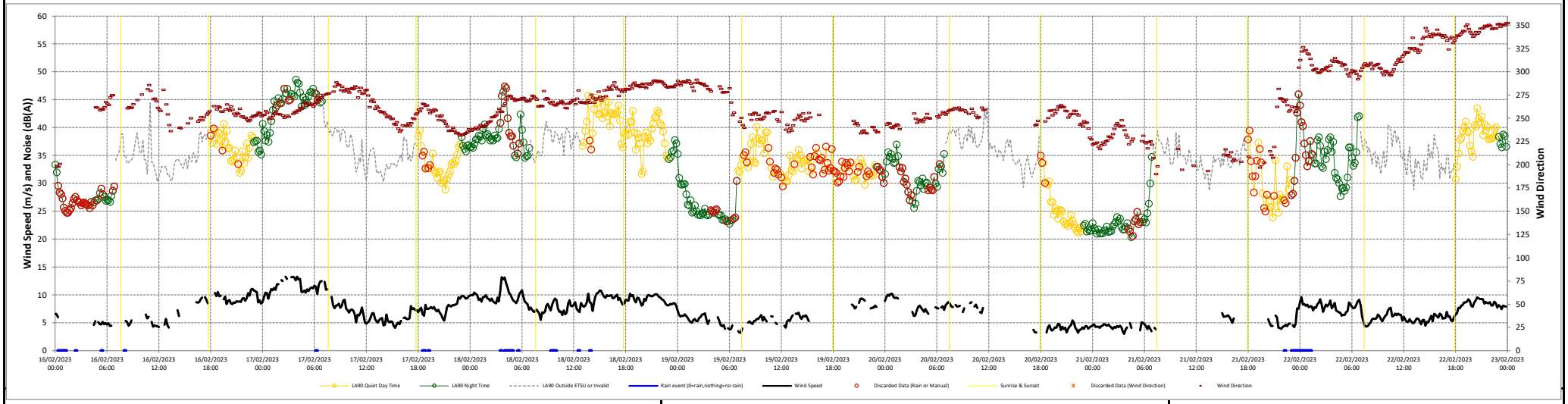


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML7 Page 1 of 5
Date	08/03/2024

09/02/2023 to 16/02/2023

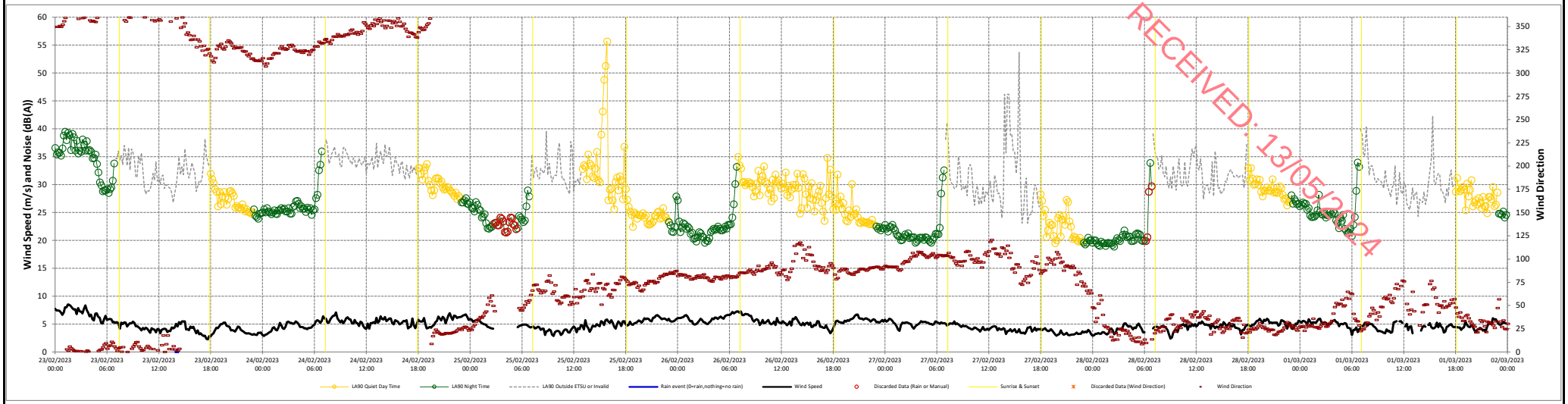


16/02/2023 to 23/02/2023

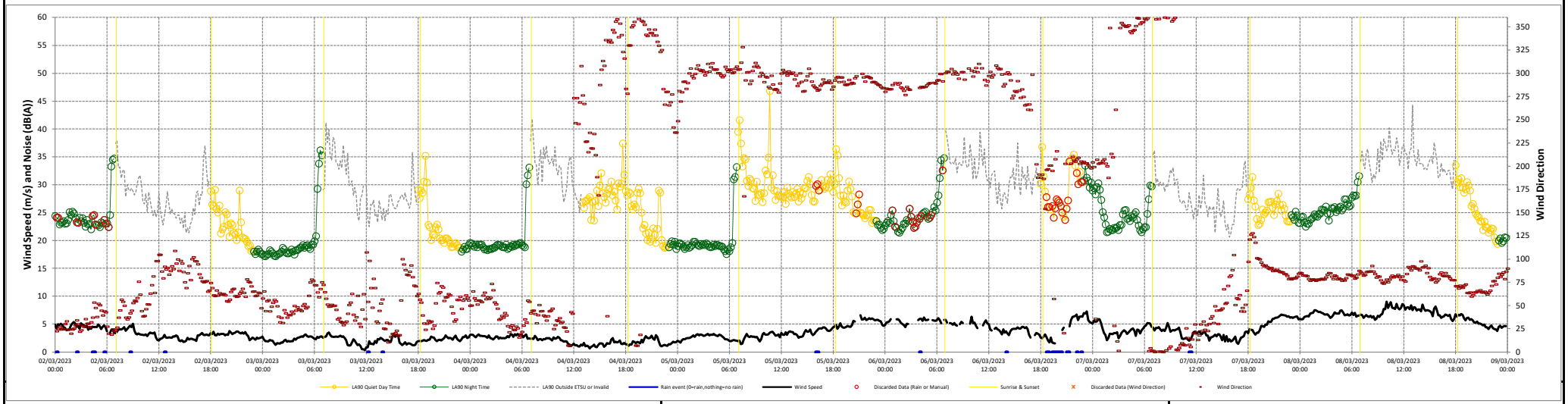


Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML7 Page 2 of 5
Date	08/03/2024

23/02/2023 to 02/03/2023



02/03/2023 to 09/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML7 Page 3 of 5
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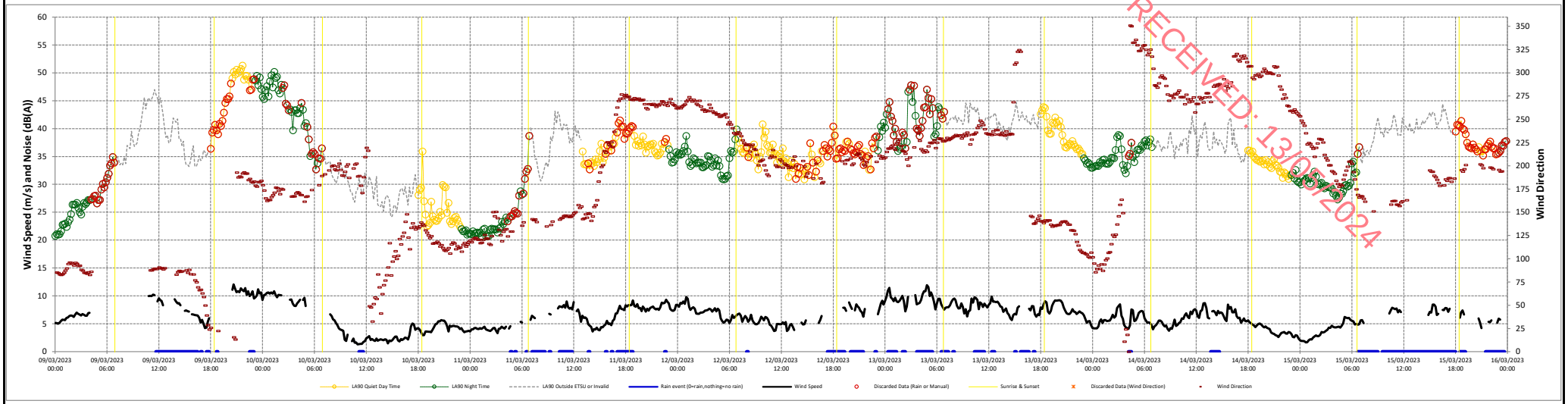
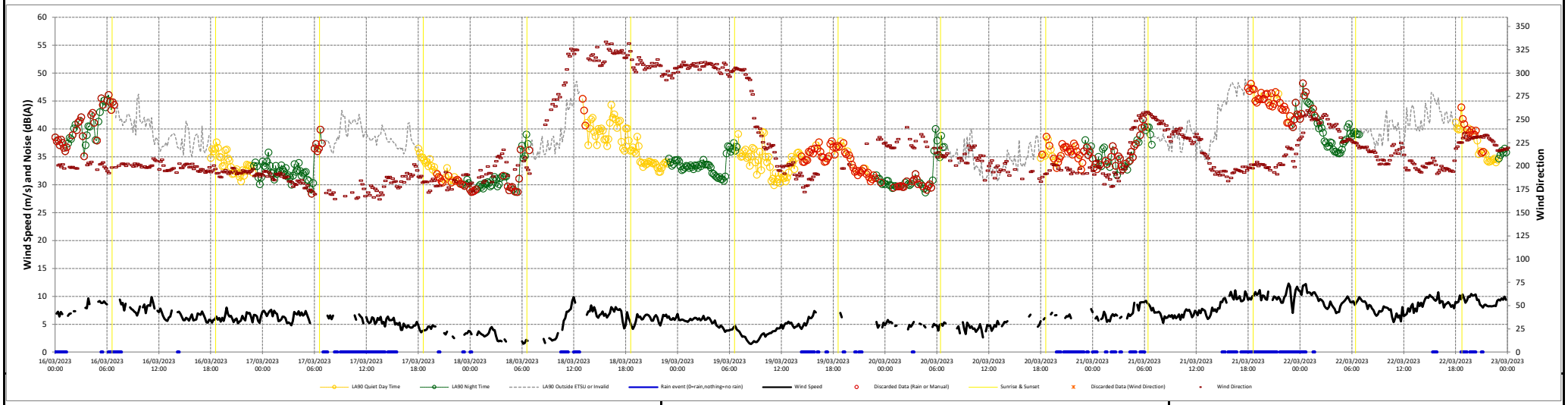
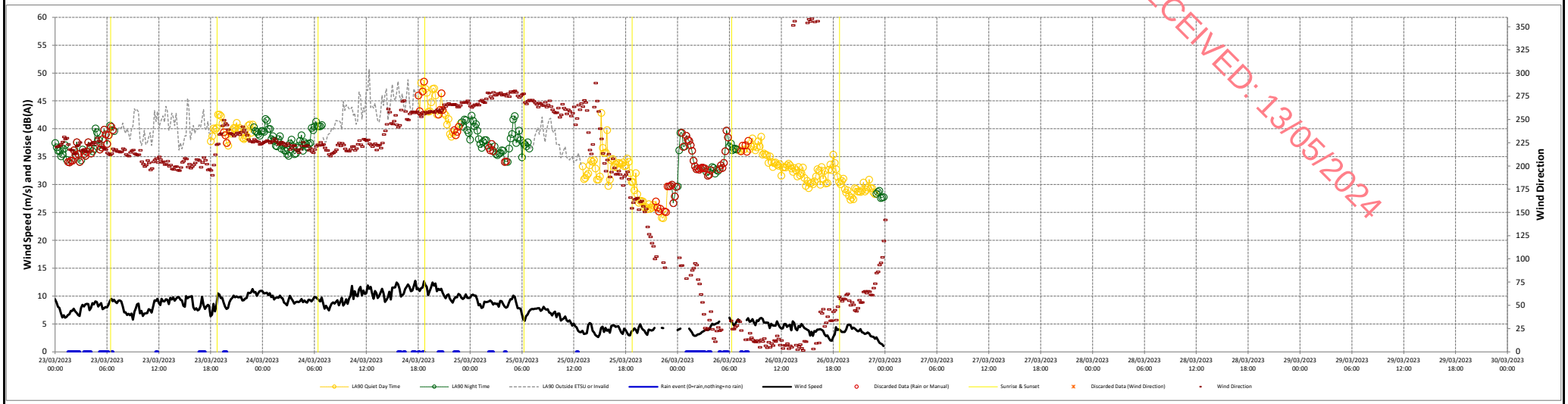


16/03/2023 to 23/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML7 Page 4 of 5
Date	08/03/2024

23/03/2023 to 30/03/2023



Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Time Series for NML7 Page 5 of 5
Date	08/03/2024

Annex 5 – NSR Coordinates and Prediction Modelling Results

Table A5.1 Total WEDG Noise Limits Compliance Table at NSRs – Daytime

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H6(NAL08)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Wind Turbine Noise L_{A90} dB	30.1	33.2	37.5	40.6	41.4	41.5	41.5	41.6	41.6	41.6
	Exceedance Level	-9.9	-6.8	-2.5	-4.4	-3.6	-3.5	-3.9	-7.8	-11.4	-13.8
H7(NAL09)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Wind Turbine Noise L_{A90} dB	28.8	32.1	36.3	39.7	40.4	40.5	40.6	40.6	40.6	40.6
	Exceedance Level	-11.2	-7.9	-3.7	-5.3	-4.6	-4.5	-4.8	-8.8	-12.4	-14.8
H8(NAL12)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	28.2	31.5	35.7	39.2	40.0	40.1	40.1	40.1	40.1	40.1
	Exceedance Level	-11.8	-8.5	-9.3	-5.8	-5.0	-4.9	-4.9	-7.4	-10.5	-13.8
H9(NAL10)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	29.2	32.6	36.8	40.2	41.0	41.1	41.1	41.1	41.1	41.1
	Exceedance Level	-10.8	-7.4	-8.2	-4.8	-4.0	-3.9	-3.9	-6.4	-9.5	-12.8
H10(NAL05)	Total WEDG Noise Limit L_{A90} dB	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
	Predicted Wind Turbine Noise L_{A90} dB	31.2	34.3	38.4	41.2	41.8	42.0	42.1	42.2	42.2	42.2
	Exceedance Level	-8.8	-10.7	-6.6	-3.8	-3.2	-3.0	-3.6	-7.4	-10.4	-11.6
H11(NAL04)	Total WEDG Noise Limit L_{A90} dB	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
	Predicted Wind Turbine Noise L_{A90} dB	30.4	33.5	37.7	40.6	41.4	41.5	41.6	41.6	41.6	41.6
	Exceedance Level	-9.6	-11.5	-7.3	-4.4	-3.6	-3.5	-4.1	-8.0	-11.0	-12.2
H12(NAL03)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	28.7	32.0	36.1	39.3	40.0	40.2	40.2	40.3	40.3	40.3
	Exceedance Level	-11.3	-8.0	-3.9	-5.7	-5.0	-4.8	-4.8	-5.7	-9.8	-14.8
H13(NAL15)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	29.3	32.7	37.0	40.4	41.2	41.3	41.3	41.3	41.3	41.3
	Exceedance Level	-10.7	-7.3	-3.0	0.4	-3.8	-3.7	-3.7	-3.7	-7.2	-12.3
H14(NAL11)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.7	31.0	35.3	38.8	39.6	39.7	39.7	39.7	39.7	39.7
	Exceedance Level	-12.3	-9.0	-9.7	-6.2	-5.4	-5.3	-5.3	-7.8	-10.9	-14.2
H15(NAL13)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	27.7	30.8	35.0	38.4	39.3	39.4	39.4	39.4	39.4	39.4
	Exceedance Level	-12.3	-9.2	-10.0	-6.6	-5.7	-5.6	-8.6	-11.6	-14.2	-16.5
H16(NAL07)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Wind Turbine Noise L_{A90} dB	30.1	33.2	37.3	40.3	41.0	41.1	41.2	41.3	41.3	41.3
	Exceedance Level	-9.9	-6.8	-2.7	-4.7	-4.0	-3.9	-4.2	-8.1	-11.7	-14.1
H17(NAL06)	Total WEDG Noise Limit L_{A90} dB	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
	Predicted Wind Turbine Noise L_{A90} dB	31.2	34.2	38.3	41.0	41.7	41.8	42.0	42.1	42.1	42.1
	Exceedance Level	-8.8	-10.8	-6.7	-4.0	-3.3	-3.2	-3.7	-7.5	-10.5	-11.7
H18	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	28.6	31.9	36.2	39.6	40.3	40.4	40.5	40.5	40.5	40.5
	Exceedance Level	-11.4	-8.1	-8.8	-5.4	-4.7	-4.6	-4.5	-7.0	-10.1	-13.4
H19	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	28.2	31.5	35.6	38.8	39.5	39.7	39.7	39.8	39.8	39.8
	Exceedance Level	-11.8	-8.5	-4.4	-6.2	-5.5	-5.3	-5.3	-6.2	-10.3	-15.3
H20	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.6	38.7	38.7	38.7
	Exceedance Level	-13.2	-10.0	-10.7	-7.3	-6.5	-6.4	-6.4	-8.8	-11.9	-15.2
H21	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	27.1	30.0	34.2	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-12.9	-10.0	-10.8	-7.3	-6.5	-6.4	-9.4	-12.4	-15.0	-17.3
H22	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Wind Turbine Noise L_{A90} dB	30.2	33.2	37.3	40.1	40.8	40.9	41.1	41.2	41.2	41.2
	Exceedance Level	-9.8	-6.8	-2.7	-4.9	-4.2	-4.1	-4.3	-8.2	-11.8	-14.2
H23	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.4	49.4	53.0	55.4
	Predicted Wind Turbine Noise L_{A90} dB	29.8	32.8	37.0	39.9	40.6	40.7	40.8	40.9	40.9	40.9
	Exceedance Level	-10.2	-7.2	-3.0	-5.1	-4.4	-4.3	-4.6	-8.5	-12.1	-14.5
H24	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.9	29.9	34.1	37.6	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-13.1	-10.1	-10.9	-7.4	-6.6	-6.5	-9.5	-12.5	-15.1	-17.4
H25(NAL01)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	27.1	30.5	34.7	37.9	38.7	38.9	38.9	38.9	38.9	38.9
	Exceedance Level	-12.9	-9.5	-5.3	-7.1	-6.3	-6.1	-6.1	-7.1	-11.2	-16.2
H26	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.2	34.4	37.8	38.7	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-12.8	-9.8	-10.6	-7.2	-6.3	-6.3	-9.2	-12.2	-14.8	-17.1
H27	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.9	29.9	34.1	37.5	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-13.1	-10.1	-10.9	-7.5	-6.6	-6.5	-9.5	-12.5	-15.1	-17.4
H29	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.5	30.8	35.0	38.4	39.2	39.3	39.3	39.3	39.3	39.3
	Exceedance Level	-12.5	-9.2	-10.0	-6.6	-5.8	-5.7	-5.7	-8.2	-11.3	-14.6
H30	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.1	34.3	37.7	38.6	38.7	38.7	38.7	38.7	38.7
	Exceedance Level	-18.2	-14.9	-10.7	-7.3	-6.4	-6.3	-6.3	-9.1	-12.4	-16.1

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H31	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.5	34.8	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-12.8	-9.5	-10.2	-6.8	-6.0	-5.9	-5.9	-8.4	-11.5	-14.8
H32	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.2	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-13.8	-10.6	-11.4	-7.9	-7.1	-7.0	-10.0	-13.0	-15.6	-17.9
H33	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.7	33.9	37.3	38.1	38.2	38.2	38.3	38.3	38.3
	Exceedance Level	-13.3	-10.3	-11.1	-7.7	-6.9	-6.8	-9.8	-12.7	-15.3	-17.6
H34	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.6	33.8	37.2	38.1	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-13.4	-10.4	-11.2	-7.8	-6.9	-6.8	-9.8	-12.8	-15.4	-17.7
H35	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.7	38.7	38.7	38.7
	Exceedance Level	-13.2	-10.0	-10.7	-7.3	-6.5	-6.4	-6.3	-8.8	-11.9	-15.2
H36	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-13.2	-10.0	-10.7	-7.3	-6.5	-6.4	-6.4	-8.9	-12.0	-15.3
H37	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	27.5	30.8	34.9	38.0	38.7	38.9	39.0	39.0	39.0	39.0
	Exceedance Level	-12.5	-9.2	-5.1	-7.0	-6.3	-6.1	-6.0	-7.0	-11.1	-16.1
H38	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-13.5	-10.6	-11.4	-7.9	-7.1	-7.0	-10.0	-13.0	-15.6	-17.9
H39	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.0	29.1	33.4	36.8	37.6	37.7	37.7	37.7	37.7	37.7
	Exceedance Level	-14.0	-10.9	-11.6	-8.2	-7.4	-7.3	-10.3	-13.3	-15.9	-18.2
H40	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	27.3	30.6	34.7	37.8	38.6	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-12.7	-9.4	-5.3	-7.2	-6.4	-6.3	-6.2	-7.2	-11.3	-16.3
H41(NAL02)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.9	34.0	37.3	38.0	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-13.5	-10.1	-6.0	-7.7	-7.0	-6.8	-6.8	-7.8	-11.9	-16.9
H42	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.1	37.5	38.3	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-18.4	-15.1	-10.9	-7.5	-6.7	-6.5	-6.5	-9.3	-12.6	-16.3
H43	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.9	34.1	37.5	38.3	38.4	38.5	38.5	38.5	38.5
	Exceedance Level	-18.5	-15.1	-10.9	-7.5	-6.7	-6.6	-6.5	-9.3	-12.6	-16.3
H44(NAL14)	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.1	37.6	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-18.4	-15.1	-10.9	-7.4	-6.6	-6.5	-6.5	-9.3	-12.6	-16.3
H45	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.7	28.8	33.0	36.4	37.2	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-14.3	-11.2	-12.0	-8.6	-7.8	-7.7	-10.7	-13.7	-16.3	-18.6
H46	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.7	28.7	32.9	36.4	37.2	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-14.3	-11.3	-12.1	-8.6	-7.8	-7.7	-10.7	-13.7	-16.3	-18.6
H47	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.8	34.1	37.5	38.3	38.4	38.4	38.4	38.4	38.4
	Exceedance Level	-18.3	-15.2	-10.9	-7.5	-6.7	-6.6	-6.6	-9.4	-12.7	-16.4
H48	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.9	28.8	33.0	36.4	37.3	37.4	37.4	37.4	37.4	37.4
	Exceedance Level	-14.1	-11.2	-12.0	-8.6	-7.7	-7.6	-10.6	-13.6	-16.2	-18.5
H49	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.0	37.1	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-13.4	-10.1	-6.0	-7.9	-7.1	-6.9	-6.9	-7.8	-11.9	-16.9
H50	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.7	33.9	37.3	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-18.4	-15.3	-11.1	-7.7	-6.8	-6.7	-6.7	-9.5	-12.8	-16.5
H51	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.6	33.9	37.3	38.1	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-18.4	-15.4	-11.1	-7.7	-6.9	-6.8	-6.8	-9.6	-12.9	-16.6
H52	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	26.0	28.9	33.0	36.5	37.3	37.4	37.4	37.4	37.4	37.4
	Exceedance Level	-14.0	-11.1	-12.0	-8.5	-7.7	-7.6	-10.6	-13.6	-16.2	-18.5
H53(NAL16)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.5	34.8	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-12.8	-9.5	-5.2	-1.8	-6.0	-5.9	-5.9	-5.9	-9.4	-14.5
H54	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.6	30.0	34.0	37.2	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-13.4	-10.0	-6.0	-7.8	-7.1	-6.9	-6.9	-7.8	-11.9	-16.9
	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H55	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.5	32.7	36.1	37.0	37.1	37.1	37.1	37.1	37.1
	Exceedance Level	-14.5	-11.5	-12.3	-8.9	-8.0	-7.9	-7.9	-13.9	-16.5	-18.8
H56	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.8	37.6	37.7	37.8	37.8	37.8	37.8
	Exceedance Level	-13.9	-10.5	-6.4	-8.2	-7.4	-7.3	-7.2	-8.2	-12.3	-17.3
H57	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.8	37.6	37.7	37.8	37.8	37.8	37.8
	Exceedance Level	-13.9	-10.5	-6.4	-8.2	-7.4	-7.3	-7.2	-8.2	-12.3	-17.3
H58	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.4	33.6	36.9	37.7	37.8	37.8	37.9	37.9	37.9
	Exceedance Level	-13.9	-10.6	-11.4	-8.1	-7.3	-7.2	-7.2	-9.6	-12.7	-16.0
H59	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.7	32.9	36.3	37.1	37.2	37.3	37.3	37.3	37.3
	Exceedance Level	-14.6	-11.3	-12.1	-8.7	-7.9	-7.8	-7.7	-10.2	-13.3	-16.6
H60	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.4	32.6	36.0	36.8	36.9	37.0	37.0	37.0	37.0
	Exceedance Level	-14.6	-11.6	-12.4	-9.0	-8.2	-8.1	-11.0	-14.0	-16.6	-18.9
H61	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.9	36.9	36.9
	Exceedance Level	-14.7	-11.7	-12.5	-9.1	-8.3	-8.2	-11.2	-14.1	-16.7	-19.0
H62	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.7	30.0	34.1	37.1	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-13.3	-10.0	-5.9	-7.9	-7.1	-6.9	-6.9	-7.8	-11.9	-16.9
H63	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.6	32.8	36.2	37.0	37.1	37.1	37.2	37.2	37.2
	Exceedance Level	-14.7	-11.4	-12.2	-8.8	-8.0	-7.9	-7.9	-10.3	-13.4	-16.7
H64	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.4	29.5	33.7	37.1	38.0	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-18.6	-15.5	-11.3	-7.9	-7.0	-6.9	-6.9	-9.7	-13.0	-16.7
H65	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.4	29.5	33.7	37.2	38.0	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-18.6	-15.5	-11.3	-7.8	-7.0	-6.9	-6.9	-9.7	-13.0	-16.7
H66	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.4	33.5	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-13.9	-10.6	-6.5	-8.3	-7.5	-7.4	-7.3	-8.3	-12.4	-17.4
H67	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-14.7	-11.7	-12.5	-9.1	-8.3	-8.2	-11.2	-14.2	-16.8	-19.1
H68	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-13.9	-10.5	-6.4	-8.3	-7.5	-7.4	-7.3	-8.3	-12.4	-17.4
H69	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-13.9	-10.5	-6.4	-8.3	-7.5	-7.4	-7.3	-8.3	-12.4	-17.4
H70	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.3	32.5	36.0	36.8	36.9	36.9	36.9	36.9	36.9
	Exceedance Level	-15.0	-11.7	-12.5	-9.0	-8.2	-8.1	-8.1	-10.6	-13.7	-17.0
H71	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.3	32.5	35.9	36.8	36.9	36.9	36.9	36.9	36.9
	Exceedance Level	-14.5	-11.7	-12.5	-9.1	-8.2	-8.1	-11.1	-14.1	-16.7	-19.0
H72	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.3	33.6	37.0	37.8	37.9	37.9	37.9	37.9	37.9
	Exceedance Level	-18.7	-15.7	-11.4	-8.0	-7.2	-7.1	-7.1	-9.9	-13.2	-16.9
H73	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.0	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-18.7	-15.6	-11.4	-7.9	-7.1	-7.0	-7.0	-9.8	-13.1	-16.8
H74	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.2	32.4	35.8	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-14.6	-11.8	-12.6	-9.2	-8.3	-8.2	-11.2	-14.2	-16.8	-19.1
H75	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.0	32.2	35.6	36.4	36.5	36.6	36.6	36.6	36.6
	Exceedance Level	-15.0	-12.0	-12.8	-9.4	-8.6	-8.5	-11.4	-14.4	-17.0	-19.3
H76	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.1	28.1	32.2	35.7	36.5	36.6	36.6	36.6	36.6	36.6
	Exceedance Level	-14.9	-11.9	-12.8	-9.3	-8.5	-8.4	-11.4	-14.4	-17.0	-19.3
H77	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.9	34.1	37.5	38.3	38.4	38.5	38.5	38.5	38.5
	Exceedance Level	-13.3	-10.1	-5.9	-2.5	-6.7	-6.6	-6.5	-6.5	-10.0	-15.1
H78	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.7	33.9	37.4	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-13.5	-10.3	-6.1	-2.6	-6.8	-6.7	-6.7	-6.7	-10.2	-15.3
H79	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.6	29.0	33.1	36.2	37.0	37.1	37.2	37.2	37.2	37.2

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-14.4	-11.0	-6.9	-8.8	-8.0	-7.9	-7.8	-8.8	-12.9	-17.9
H80	Total WEDG Noise Limit L_{A90} dB	45.0	45.0	45.0	45.0	45.0	45.0	45.6	47.8	51.1	54.8
	Predicted Wind Turbine Noise L_{A90} dB	26.0	29.1	33.3	36.7	37.5	37.6	37.6	37.7	37.7	37.7
	Exceedance Level	-19.0	-15.9	-11.7	-8.3	-7.5	-7.4	-7.4	-10.1	-13.4	-17.1
H81	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.8	32.9	36.0	36.8	37.0	37.0	37.1	37.1	37.1
	Exceedance Level	-14.5	-11.2	-7.1	-9.0	-8.2	-8.0	-8.0	-8.9	-13.0	-18.0
H82	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	27.8	32.0	35.4	36.3	36.4	36.4	36.4	36.4	36.4
	Exceedance Level	-15.0	-12.2	-13.0	-9.6	-8.7	-8.6	-11.6	-14.6	-17.2	-19.5
H83	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.2	27.9	32.1	35.5	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-14.8	-12.1	-12.9	-9.5	-8.6	-8.5	-11.5	-14.5	-17.1	-19.4
H84	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	24.8	27.7	31.9	35.3	36.1	36.2	36.2	36.2	36.2	36.2
	Exceedance Level	-15.2	-12.3	-13.1	-9.7	-8.9	-8.8	-11.8	-14.8	-17.4	-19.7
H85	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	25.2	27.9	32.1	35.5	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-14.8	-12.1	-12.9	-9.5	-8.6	-8.5	-11.5	-14.5	-17.1	-19.4
H86	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.1	28.5	32.6	35.7	36.5	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-14.9	-11.5	-7.4	-9.3	-8.5	-8.3	-8.3	-9.3	-13.4	-18.4
H87	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	24.6	27.4	31.6	35.0	35.9	36.0	36.0	36.0	36.0	36.0
	Exceedance Level	-15.4	-12.6	-13.4	-10.0	-9.1	-9.0	-12.0	-15.0	-17.6	-19.9
H88	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	27.3	29.6	33.7	37.2	38.1	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-12.7	-10.4	-11.3	-7.8	-6.9	-6.9	-6.9	-6.9	-10.4	-15.5
H89	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	24.2	27.0	31.2	34.6	35.5	35.6	35.6	35.6	35.6	35.6
	Exceedance Level	-15.8	-13.0	-13.8	-10.4	-9.5	-9.4	-12.4	-15.4	-18.0	-20.3
H90(NAL18)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	27.5	29.5	33.5	37.0	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-12.5	-10.5	-11.5	-8.0	-7.1	-7.0	-7.0	-7.0	-10.5	-15.6
H91	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	24.7	28.0	32.1	35.4	36.2	36.3	36.4	36.4	36.4	36.4
	Exceedance Level	-15.3	-12.0	-7.9	-9.6	-8.8	-8.7	-8.6	-9.6	-13.7	-18.7
H92	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	24.0	26.9	31.1	34.5	35.3	35.4	35.4	35.4	35.4	35.4
	Exceedance Level	-16.0	-13.1	-13.9	-10.5	-9.7	-9.6	-12.6	-15.6	-18.2	-20.5
H93	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.6	32.8	36.2	37.0	37.1	37.1	37.2	37.2	37.2
	Exceedance Level	-14.5	-11.4	-7.2	-3.8	-8.0	-7.9	-7.9	-7.8	-11.3	-16.4
H94	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.5	32.8	36.2	37.0	37.1	37.1	37.1	37.1	37.1
	Exceedance Level	-14.5	-11.5	-7.2	-3.8	-8.0	-7.9	-7.9	-7.9	-11.4	-16.5
H95	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.7	30.9	34.1	34.9	35.0	35.0	35.1	35.1	35.1
	Exceedance Level	-16.5	-13.3	-14.1	-10.9	-10.1	-10.0	-10.0	-12.4	-15.5	-18.8
H96	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-14.7	-11.7	-7.5	-4.1	-8.3	-8.2	-8.2	-8.2	-11.7	-16.8
H97	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-14.7	-11.7	-7.5	-4.1	-8.3	-8.2	-8.2	-8.2	-11.7	-16.8
H98	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.2	32.4	35.8	36.6	36.7	36.8	36.8	36.8	36.8
	Exceedance Level	-14.8	-11.8	-7.6	-4.2	-8.4	-8.3	-8.2	-8.2	-11.7	-16.8
H99	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	23.4	26.2	30.4	33.8	34.7	34.8	34.8	34.8	34.8	34.8
	Exceedance Level	-16.6	-13.8	-14.6	-11.2	-10.3	-10.2	-13.2	-16.2	-18.8	-21.1
H100	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.9	27.9	32.1	35.5	36.4	36.4	36.4	36.5	36.5	36.5
	Exceedance Level	-15.1	-12.1	-7.9	-4.5	-8.6	-8.6	-8.6	-8.5	-12.0	-17.1
H101	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.2	32.4	35.8	36.6	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-14.8	-11.8	-7.6	-4.2	-8.4	-8.3	-8.3	-8.3	-11.8	-16.9
H102	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.8	26.0	30.2	33.4	34.2	34.3	34.3	34.4	34.4	34.4
	Exceedance Level	-17.2	-14.0	-14.8	-11.6	-10.8	-10.7	-10.7	-13.1	-16.2	-19.5
H103	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	28.2	29.9	33.9	37.4	38.4	38.4	38.4	38.4	38.4	38.4
	Exceedance Level	-11.8	-10.1	-11.1	-7.6	-6.6	-6.6	-6.6	-6.6	-10.1	-15.2

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H104	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.5	32.6	35.5	36.2	36.4	36.5	36.5	36.5	36.5
	Exceedance Level	-14.7	-11.5	-7.4	-9.5	-8.8	-8.6	-8.5	-9.5	-13.6	-18.6
H105	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.4	27.4	31.6	35.0	35.8	35.9	35.9	35.9	35.9	35.9
	Exceedance Level	-15.6	-12.6	-8.4	-5.0	-9.2	-9.1	-9.1	-9.1	-12.6	-17.7
H106	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.0	32.2	35.6	36.4	36.5	36.5	36.6	36.6	36.6
	Exceedance Level	-15.0	-12.0	-7.8	-4.4	-8.6	-8.5	-8.5	-8.4	-11.9	-17.0
H107	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.3	27.3	31.5	34.9	35.7	35.8	35.8	35.8	35.8	35.8
	Exceedance Level	-15.7	-12.7	-8.5	-5.1	-9.3	-9.2	-9.2	-9.2	-12.7	-17.8
H108	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	22.8	25.7	29.9	33.3	34.2	34.2	34.3	34.3	34.3	34.3
	Exceedance Level	-17.2	-14.3	-15.1	-11.7	-10.8	-10.8	-13.7	-16.7	-19.3	-21.6
H109	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	26.0	28.3	32.4	35.8	36.8	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-14.0	-11.7	-12.6	-9.2	-8.2	-8.2	-8.2	-8.2	-11.7	-16.8
H110	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.8	26.9	31.1	34.2	34.9	35.1	35.1	35.2	35.2	35.2
	Exceedance Level	-16.2	-13.1	-13.9	-10.8	-10.1	-9.9	-9.9	-12.3	-15.4	-18.7
H111	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.1	27.0	31.2	34.6	35.4	35.5	35.5	35.5	35.5	35.5
	Exceedance Level	-15.9	-13.0	-8.8	-5.4	-9.6	-9.5	-9.5	-9.5	-13.0	-18.1
H112	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.5	32.5	35.4	36.1	36.3	36.4	36.4	36.4	36.4
	Exceedance Level	-14.8	-11.5	-7.5	-9.6	-8.9	-8.7	-8.6	-9.6	-13.7	-18.7
H113	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.7	30.9	34.1	34.9	35.0	35.1	35.1	35.1	35.1
	Exceedance Level	-16.5	-13.3	-9.1	-10.9	-10.1	-10.0	-9.9	-10.9	-15.0	-20.0
H114	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.5	32.5	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-14.8	-11.5	-7.5	-9.6	-8.9	-8.7	-8.6	-9.5	-13.6	-18.6
H115	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.5	32.5	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-14.7	-11.5	-7.5	-9.6	-8.9	-8.7	-8.6	-9.5	-13.6	-18.6
H116	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.6	32.6	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-14.7	-11.4	-7.4	-9.6	-8.9	-8.7	-8.6	-9.5	-13.6	-18.6
H117	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.1	27.0	31.2	34.6	35.4	35.5	35.6	35.6	35.6	35.6
	Exceedance Level	-15.9	-13.0	-8.8	-5.4	-9.6	-9.5	-9.4	-9.4	-12.9	-18.0
H118	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.4	25.6	29.7	33.0	33.7	33.8	33.9	33.9	33.9	33.9
	Exceedance Level	-17.6	-14.4	-15.3	-12.0	-11.3	-11.2	-11.1	-13.6	-16.7	-20.0
H119	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	22.0	24.9	29.1	32.5	33.3	33.4	33.4	33.4	33.4	33.4
	Exceedance Level	-18.0	-15.1	-15.9	-12.5	-11.7	-11.6	-14.6	-17.6	-20.2	-22.5
H120	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.1	26.3	30.5	33.5	34.3	34.4	34.5	34.5	34.5	34.5
	Exceedance Level	-16.9	-13.7	-14.5	-11.5	-10.7	-10.6	-10.5	-13.0	-16.1	-19.4
H121	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.9	24.8	29.0	32.5	33.3	33.4	33.4	33.4	33.4	33.4
	Exceedance Level	-18.1	-15.2	-16.0	-12.5	-11.7	-11.6	-14.6	-17.6	-20.2	-22.5
H122	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	23.6	26.9	30.9	33.9	34.7	34.9	35.0	35.0	35.0	35.0
	Exceedance Level	-16.4	-13.1	-9.1	-11.1	-10.3	-10.1	-10.0	-11.0	-15.1	-20.1
H123	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	21.8	25.0	29.2	32.4	33.2	33.3	33.4	33.4	33.4	33.4
	Exceedance Level	-18.2	-15.0	-15.8	-12.6	-11.8	-11.7	-11.6	-14.1	-17.2	-20.5
H124	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.0	26.9	31.1	34.4	35.3	35.4	35.4	35.4	35.4	35.4
	Exceedance Level	-16.0	-13.1	-8.9	-5.6	-9.7	-9.6	-9.6	-9.6	-13.1	-18.2
H125	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	23.4	26.3	30.5	33.8	34.6	34.7	34.7	34.8	34.8	34.8
	Exceedance Level	-16.6	-13.7	-9.5	-11.2	-10.4	-10.3	-10.3	-11.2	-15.3	-20.3
H126(NAL17)	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	26.7	28.8	32.9	36.4	37.3	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-13.3	-11.2	-12.1	-8.6	-7.7	-7.7	-7.7	-7.7	-11.2	-16.3
H127	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	23.1	26.1	30.2	33.5	34.3	34.4	34.4	34.5	34.5	34.5
	Exceedance Level	-16.9	-13.9	-9.8	-11.5	-10.7	-10.6	-10.6	-11.5	-15.6	-20.6
	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H128	Predicted Wind Turbine Noise L_{A90} dB	23.2	26.5	30.5	33.6	34.4	34.5	34.6	34.6	34.6	34.6
	Exceedance Level	-16.8	-13.5	-9.5	-11.4	-10.6	-10.5	-10.4	-11.4	-15.5	-20.5
H129	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.6	30.7	33.8	34.5	34.6	34.7	34.8	34.8	34.8
	Exceedance Level	-16.5	-13.4	-14.3	-11.2	-10.5	-10.4	-10.3	-12.7	-15.8	-19.1
H130	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.9	24.1	28.4	31.7	32.5	32.7	32.7	32.7	32.7	32.7
	Exceedance Level	-19.1	-15.9	-16.6	-13.3	-12.5	-12.3	-12.3	-14.8	-17.9	-21.2
H131	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.6	24.5	28.7	32.1	33.0	33.0	33.1	33.1	33.1	33.1
	Exceedance Level	-18.4	-15.5	-16.3	-12.9	-12.0	-12.0	-14.9	-17.9	-20.5	-22.8
H132	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	22.9	25.9	30.0	33.3	34.1	34.2	34.2	34.3	34.3	34.3
	Exceedance Level	-17.1	-14.1	-10.0	-11.7	-10.9	-10.8	-10.8	-11.7	-15.8	-20.8
H133	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.8	24.1	28.3	31.6	32.4	32.5	32.6	32.6	32.6	32.6
	Exceedance Level	-19.2	-15.9	-16.7	-13.4	-12.6	-12.5	-12.4	-14.9	-18.0	-21.3
H134	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	22.8	26.2	30.2	33.3	34.1	34.2	34.3	34.3	34.3	34.3
	Exceedance Level	-17.2	-13.8	-9.8	-11.7	-10.9	-10.8	-10.7	-11.7	-15.8	-20.8
H135	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.5	24.3	28.5	31.9	32.8	32.9	32.9	32.9	32.9	32.9
	Exceedance Level	-18.5	-15.7	-16.5	-13.1	-12.2	-12.1	-15.1	-18.1	-20.7	-23.0
H136	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.1	25.2	29.4	32.5	33.3	33.4	33.5	33.5	33.5	33.5
	Exceedance Level	-17.9	-14.8	-15.6	-12.5	-11.7	-11.6	-11.5	-14.0	-17.1	-20.4
H137	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	29.6	31.3	35.3	38.8	39.8	39.8	39.8	39.8	39.8	39.8
	Exceedance Level	-10.4	-8.7	-9.7	-6.2	-5.2	-5.2	-5.2	-5.2	-8.7	-13.8
H138	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.2	24.1	28.3	31.7	32.5	32.6	32.6	32.6	32.6	32.6
	Exceedance Level	-18.8	-15.9	-16.7	-13.3	-12.5	-12.4	-15.4	-18.4	-21.0	-23.3
H139	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	21.1	24.2	28.4	31.6	32.4	32.5	32.6	32.6	32.6	32.6
	Exceedance Level	-18.9	-15.8	-16.6	-13.4	-12.6	-12.5	-12.4	-14.9	-18.0	-21.3
H140	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.3	24.1	28.2	31.7	32.5	32.6	32.6	32.6	32.6	32.6
	Exceedance Level	-18.7	-15.9	-16.8	-13.3	-12.5	-12.4	-15.4	-18.4	-21.0	-23.3
H141	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	22.5	25.9	29.9	33.0	33.8	33.9	34.0	34.0	34.0	34.0
	Exceedance Level	-17.5	-14.1	-10.1	-12.0	-11.2	-11.1	-11.0	-12.0	-16.1	-21.1
H142	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	20.8	23.9	28.1	31.5	32.3	32.4	32.4	32.4	32.4	32.4
	Exceedance Level	-19.2	-16.1	-16.9	-13.5	-12.7	-12.6	-15.6	-18.6	-21.2	-23.5
H143	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.5	24.2	28.3	31.8	32.6	32.7	32.7	32.7	32.7	32.7
	Exceedance Level	-18.5	-15.8	-16.7	-13.2	-12.4	-12.3	-15.3	-18.3	-20.9	-23.2
H144	Total WEDG Noise Limit L_{A90} dB	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
	Predicted Wind Turbine Noise L_{A90} dB	30.0	32.8	36.8	39.1	39.7	39.9	40.2	40.3	40.3	40.3
	Exceedance Level	-10.0	-12.2	-8.2	-5.9	-5.3	-5.1	-5.5	-9.3	-12.3	-13.5
H145	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	28.9	30.6	34.6	38.2	39.1	39.2	39.2	39.2	39.2	39.2
	Exceedance Level	-11.1	-9.4	-10.4	-6.8	-5.9	-5.8	-5.8	-5.8	-9.3	-14.4
H146	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.9	24.1	28.3	31.5	32.2	32.3	32.4	32.4	32.4	32.4
	Exceedance Level	-19.1	-15.9	-16.7	-13.5	-12.8	-12.7	-12.6	-15.1	-18.2	-21.5
H147	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	48.5	53.6
	Predicted Wind Turbine Noise L_{A90} dB	24.2	26.8	31.0	34.3	35.2	35.3	35.3	35.3	35.3	35.3
	Exceedance Level	-15.8	-13.2	-9.0	-5.7	-9.8	-9.7	-9.7	-9.7	-13.2	-18.3
H148	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.7	23.9	28.1	31.3	32.1	32.2	32.2	32.3	32.3	32.3
	Exceedance Level	-19.3	-16.1	-16.9	-13.7	-12.9	-12.8	-12.8	-15.2	-18.3	-21.6
H149	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.3	24.0	28.1	31.6	32.4	32.5	32.5	32.5	32.5	32.5
	Exceedance Level	-18.7	-16.0	-16.9	-13.4	-12.6	-12.5	-15.5	-18.5	-21.1	-23.4
H150	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.6	23.7	27.9	31.3	32.1	32.2	32.3	32.3	32.3	32.3
	Exceedance Level	-19.4	-16.3	-17.1	-13.7	-12.9	-12.8	-12.7	-15.2	-18.3	-21.6
H151	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	48.0	51.0	53.6	55.9
	Predicted Wind Turbine Noise L_{A90} dB	21.2	23.9	28.0	31.4	32.3	32.4	32.4	32.4	32.4	32.4
	Exceedance Level	-18.8	-16.1	-17.0	-13.6	-12.7	-12.6	-15.6	-18.6	-21.2	-23.5
H152	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	21.9	25.2	29.3	32.4	33.2	33.4	33.4	33.4	33.4	33.4

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-18.1	-14.8	-10.7	-12.6	-11.8	-11.6	-11.6	-12.6	-16.7	-21.7
H153	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	21.9	25.2	29.2	32.4	33.2	33.3	33.4	33.4	33.4	33.4
	Exceedance Level	-18.1	-14.8	-10.8	-12.6	-11.8	-11.7	-11.6	-12.6	-16.7	-21.7
H154	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	25.7	29.1	33.0	35.7	36.4	36.6	36.8	36.8	36.8	36.8
	Exceedance Level	-14.3	-10.9	-7.0	-9.3	-8.6	-8.4	-8.2	-9.2	-13.3	-18.3
H156	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	45.0	45.0	45.0	45.0	45.0	47.5	50.6	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.5	23.7	27.9	31.1	31.8	31.9	32.0	32.0	32.0	32.0
	Exceedance Level	-19.5	-16.3	-17.1	-13.9	-13.2	-13.1	-13.0	-15.5	-18.6	-21.9
H157	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	24.5	27.9	31.8	34.6	35.4	35.6	35.7	35.8	35.8	35.8
	Exceedance Level	-15.5	-12.1	-8.2	-10.4	-9.6	-9.4	-9.3	-10.2	-14.3	-19.3
H158	Total WEDG Noise Limit L_{A90} dB	40.0	40.0	40.0	45.0	45.0	45.0	45.0	46.0	50.1	55.1
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.6	33.5	36.1	36.9	37.1	37.2	37.3	37.3	37.3
	Exceedance Level	-13.7	-10.4	-6.5	-8.9	-8.1	-7.9	-7.8	-8.7	-12.8	-17.8

Table A5.2 Total WEDG Noise Limits Compliance Table at NSRs – Night-time

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H6(NAL08)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Wind Turbine Noise L_{A90} dB	30.1	33.2	37.5	40.6	41.4	41.5	41.5	41.6	41.6	41.6
	Exceedance Level	-12.9	-9.8	-5.5	-2.4	-1.6	-1.5	-3.3	-6.5	-9.0	-10.3
H7(NAL09)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Wind Turbine Noise L_{A90} dB	28.8	32.1	36.3	39.7	40.4	40.5	40.6	40.6	40.6	40.6
	Exceedance Level	-14.2	-10.9	-6.7	-3.3	-2.6	-2.5	-4.2	-7.5	-10.0	-11.3
H8(NAL12)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	28.2	31.5	35.7	39.2	40.0	40.1	40.1	40.1	40.1	40.1
	Exceedance Level	-14.8	-11.5	-7.3	-3.8	-3.0	-2.9	-4.3	-7.8	-11.0	-13.8
H9(NAL10)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	29.2	32.6	36.8	40.2	41.0	41.1	41.1	41.1	41.1	41.1
	Exceedance Level	-13.8	-10.4	-6.2	-2.8	-2.0	-1.9	-3.3	-6.8	-10.0	-12.8
H10(NAL05)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
	Predicted Wind Turbine Noise L_{A90} dB	31.2	34.3	38.4	41.2	41.8	42.0	42.1	42.2	42.2	42.2
	Exceedance Level	-11.8	-8.7	-4.6	-1.8	-1.2	-1.0	-3.0	-6.2	-8.6	-9.4
H11(NAL04)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
	Predicted Wind Turbine Noise L_{A90} dB	30.4	33.5	37.7	40.6	41.4	41.5	41.6	41.6	41.6	41.6
	Exceedance Level	-12.6	-9.5	-5.3	-2.4	-1.6	-1.5	-3.5	-6.8	-9.2	-10.0
H12(NAL03)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	28.7	32.0	36.1	39.3	40.0	40.2	40.2	40.3	40.3	40.3
	Exceedance Level	-14.3	-11.0	-6.9	-3.7	-3.0	-2.8	-2.8	-5.1	-8.0	-10.4
H13(NAL15)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	29.3	32.7	37.0	40.4	41.2	41.3	41.3	41.3	41.3	41.3
	Exceedance Level	-13.7	-10.3	-6.0	-2.6	-1.8	-1.7	-1.7	-1.7	-5.3	-8.9
H14(NAL11)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.7	31.0	35.3	38.8	39.6	39.7	39.7	39.7	39.7	39.7
	Exceedance Level	-15.3	-12.0	-7.7	-4.2	-3.4	-3.3	-4.7	-8.2	-11.4	-14.2
H15(NAL13)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	27.7	30.8	35.0	38.4	39.3	39.4	39.4	39.4	39.4	39.4
	Exceedance Level	-15.3	-12.2	-8.0	-4.6	-3.7	-4.3	-8.0	-10.9	-12.8	-13.5
H16(NAL07)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Wind Turbine Noise L_{A90} dB	30.1	33.2	37.3	40.3	41.0	41.1	41.2	41.3	41.3	41.3
	Exceedance Level	-12.9	-9.8	-5.7	-2.7	-2.0	-1.9	-3.6	-6.8	-9.3	-10.6
H17(NAL06)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
	Predicted Wind Turbine Noise L_{A90} dB	31.2	34.2	38.3	41.0	41.7	41.8	42.0	42.1	42.1	42.1
	Exceedance Level	-11.8	-8.8	-4.7	-2.0	-1.3	-1.2	-3.1	-6.3	-8.7	-9.5
H18	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	28.6	31.9	36.2	39.6	40.3	40.4	40.5	40.5	40.5	40.5
	Exceedance Level	-14.4	-11.1	-6.8	-3.4	-2.7	-2.6	-3.9	-7.4	-10.6	-13.4
H19	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	28.2	31.5	35.6	38.8	39.5	39.7	39.7	39.8	39.8	39.8
	Exceedance Level	-14.8	-11.5	-7.4	-4.2	-3.5	-3.3	-3.3	-5.6	-8.5	-10.9
H20	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.6	38.7	38.7	38.7
	Exceedance Level	-16.2	-13.0	-8.7	-5.3	-4.5	-4.4	-5.8	-9.2	-12.4	-15.2
H21	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	27.1	30.0	34.2	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-15.9	-13.0	-8.8	-5.3	-4.5	-5.1	-8.8	-11.7	-13.6	-14.3
H22	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Wind Turbine Noise L_{A90} dB	30.2	33.2	37.3	40.1	40.8	40.9	41.1	41.2	41.2	41.2
	Exceedance Level	-12.8	-9.8	-5.7	-2.9	-2.2	-2.1	-3.7	-6.9	-9.4	-10.7
H23	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.8	48.1	50.6	51.9
	Predicted Wind Turbine Noise L_{A90} dB	29.8	32.8	37.0	39.9	40.6	40.7	40.8	40.9	40.9	40.9
	Exceedance Level	-13.2	-10.2	-6.0	-3.1	-2.4	-2.3	-4.0	-7.2	-9.7	-11.0
H24	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.9	29.9	34.1	37.6	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-16.1	-13.1	-8.9	-5.4	-4.6	-5.2	-8.9	-11.8	-13.7	-14.4
H25(NAL01)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	27.1	30.5	34.7	37.9	38.7	38.9	38.9	38.9	38.9	38.9
	Exceedance Level	-15.9	-12.5	-8.3	-5.1	-4.3	-4.1	-4.1	-6.5	-9.4	-11.8
H26	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.2	34.4	37.8	38.7	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-15.8	-12.8	-8.6	-5.2	-4.3	-5.0	-8.6	-11.5	-13.4	-14.1
H27	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.9	29.9	34.1	37.5	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-16.1	-13.1	-8.9	-5.5	-4.6	-5.2	-8.9	-11.8	-13.7	-14.4
H29	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.5	30.8	35.0	38.4	39.2	39.3	39.3	39.3	39.3	39.3
	Exceedance Level	-15.5	-12.2	-8.0	-4.6	-3.8	-3.7	-5.1	-8.6	-11.8	-14.6
H30	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.1	34.3	37.7	38.6	38.7	38.7	38.7	38.7	38.7
	Exceedance Level	-16.2	-12.9	-8.7	-5.3	-4.4	-4.3	-5.5	-9.0	-11.8	-13.8
H31	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.5	34.8	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-15.8	-12.5	-8.2	-4.8	-4.0	-3.9	-5.3	-8.8	-12.0	-14.8

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H32	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.2	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-16.8	-13.6	-9.4	-5.9	-5.1	-5.7	-9.4	-12.3	-14.2	-14.9
H33	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.7	33.9	37.3	38.1	38.2	38.2	38.2	38.3	38.3
	Exceedance Level	-16.3	-13.3	-9.1	-5.7	-4.9	-5.5	-9.2	-12.0	-13.9	-14.6
H34	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.6	33.8	37.2	38.1	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-16.4	-13.4	-9.2	-5.8	-4.9	-5.5	-9.2	-12.1	-14.0	-14.7
H35	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.7	38.7	38.7	38.7
	Exceedance Level	-16.2	-13.0	-8.7	-5.3	-4.5	-4.4	-5.7	-9.2	-12.4	-15.2
H36	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.8	30.0	34.3	37.7	38.5	38.6	38.6	38.6	38.6	38.6
	Exceedance Level	-16.2	-13.0	-8.7	-5.3	-4.5	-4.4	-5.8	-9.3	-12.5	-15.3
H37	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	27.5	30.8	34.9	38.0	38.7	38.9	39.0	39.0	39.0	39.0
	Exceedance Level	-15.5	-12.2	-8.1	-5.0	-4.3	-4.1	-4.0	-6.4	-9.3	-11.7
H38	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-16.5	-13.6	-9.4	-5.9	-5.1	-5.7	-9.4	-12.3	-14.2	-14.9
H39	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.0	29.1	33.4	36.8	37.6	37.7	37.7	37.7	37.7	37.7
	Exceedance Level	-17.0	-13.9	-9.6	-6.2	-5.4	-6.0	-9.7	-12.6	-14.5	-15.2
H40	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	27.3	30.6	34.7	37.8	38.6	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-15.7	-12.4	-8.3	-5.2	-4.4	-4.3	-4.2	-6.6	-9.5	-11.9
H41(NAL02)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.9	34.0	37.3	38.0	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-16.5	-13.1	-9.0	-5.7	-5.0	-4.8	-4.8	-7.2	-10.1	-12.5
H42	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.1	37.5	38.3	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-16.4	-13.1	-8.9	-5.5	-4.7	-4.5	-5.7	-9.2	-12.0	-14.0
H43	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.9	34.1	37.5	38.3	38.4	38.5	38.5	38.5	38.5
	Exceedance Level	-16.5	-13.1	-8.9	-5.5	-4.7	-4.6	-5.7	-9.2	-12.0	-14.0
H44(NAL14)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.1	37.6	38.4	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-16.4	-13.1	-8.9	-5.4	-4.6	-4.5	-5.7	-9.2	-12.0	-14.0
H45	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.7	28.8	33.0	36.4	37.2	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-17.3	-14.2	-10.0	-6.6	-5.8	-6.4	-10.1	-13.0	-14.9	-15.6
H46	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.7	28.7	32.9	36.4	37.2	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-17.3	-14.3	-10.1	-6.6	-5.8	-6.4	-10.1	-13.0	-14.9	-15.6
H47	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.8	34.1	37.5	38.3	38.4	38.4	38.4	38.4	38.4
	Exceedance Level	-16.3	-13.2	-8.9	-5.5	-4.7	-4.6	-5.8	-9.3	-12.1	-14.1
H48	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.9	28.8	33.0	36.4	37.3	37.4	37.4	37.4	37.4	37.4
	Exceedance Level	-17.1	-14.2	-10.0	-6.6	-5.7	-6.3	-10.0	-12.9	-14.8	-15.5
H49	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.9	34.0	37.1	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-16.4	-13.1	-9.0	-5.9	-5.1	-4.9	-4.9	-7.2	-10.1	-12.5
H50	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.7	33.9	37.3	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-16.4	-13.3	-9.1	-5.7	-4.8	-4.7	-5.9	-9.4	-12.2	-14.2
H51	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.6	29.6	33.9	37.3	38.1	38.2	38.2	38.2	38.2	38.2
	Exceedance Level	-16.4	-13.4	-9.1	-5.7	-4.9	-4.8	-6.0	-9.5	-12.3	-14.3
H52	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	26.0	28.9	33.0	36.5	37.3	37.4	37.4	37.4	37.4	37.4
	Exceedance Level	-17.0	-14.1	-10.0	-6.5	-5.7	-6.3	-10.0	-12.9	-14.8	-15.5
H53(NAL16)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	27.2	30.5	34.8	38.2	39.0	39.1	39.1	39.1	39.1	39.1
	Exceedance Level	-15.8	-12.5	-8.2	-4.8	-4.0	-3.9	-3.9	-3.9	-7.5	-11.1
H54	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.6	30.0	34.0	37.2	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-16.4	-13.0	-9.0	-5.8	-5.1	-4.9	-4.9	-7.2	-10.1	-12.5
H55	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.5	32.7	36.1	37.0	37.1	37.1	37.1	37.1	37.1
	Exceedance Level	-17.5	-14.5	-10.3	-6.9	-6.0	-6.6	-10.3	-13.2	-15.1	-15.8
H56	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.8	37.6	37.7	37.8	37.8	37.8	37.8
	Exceedance Level	-16.9	-13.5	-9.4	-6.2	-5.4	-5.3	-5.2	-7.6	-10.5	-12.9
	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H57	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.8	37.6	37.7	37.8	37.8	37.8	37.8
	Exceedance Level	-16.9	-13.5	-9.4	-6.2	-5.4	-5.3	-5.2	-7.6	-10.5	-12.9
H58	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.4	33.6	36.9	37.7	37.8	37.8	37.9	37.9	37.9
	Exceedance Level	-16.9	-13.6	-9.4	-6.1	-5.3	-5.2	-6.6	-10.0	-13.2	-16.0
H59	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.7	32.9	36.3	37.1	37.2	37.3	37.3	37.3	37.3
	Exceedance Level	-17.6	-14.3	-10.1	-6.7	-5.9	-5.8	-7.1	-10.6	-13.8	-16.6
H60	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.4	32.6	36.0	36.8	36.9	37.0	37.0	37.0	37.0
	Exceedance Level	-17.6	-14.6	-10.4	-7.0	-6.2	-6.8	-10.4	-13.3	-15.2	-15.9
H61	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.9	36.9	36.9
	Exceedance Level	-17.7	-14.7	-10.5	-7.1	-6.3	-6.9	-10.6	-13.4	-15.3	-16.0
H62	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.7	30.0	34.1	37.1	37.9	38.1	38.1	38.2	38.2	38.2
	Exceedance Level	-16.3	-13.0	-8.9	-5.9	-5.1	-4.9	-4.9	-7.2	-10.1	-12.5
H63	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.6	32.8	36.2	37.0	37.1	37.1	37.2	37.2	37.2
	Exceedance Level	-17.7	-14.4	-10.2	-6.8	-6.0	-5.9	-7.3	-10.7	-13.9	-16.7
H64	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.4	29.5	33.7	37.1	38.0	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-16.6	-13.5	-9.3	-5.9	-5.0	-4.9	-6.1	-9.6	-12.4	-14.4
H65	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.4	29.5	33.7	37.2	38.0	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-16.6	-13.5	-9.3	-5.8	-5.0	-4.9	-6.1	-9.6	-12.4	-14.4
H66	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.4	33.5	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-16.9	-13.6	-9.5	-6.3	-5.5	-5.4	-5.3	-7.7	-10.6	-13.0
H67	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-17.7	-14.7	-10.5	-7.1	-6.3	-6.9	-10.6	-13.5	-15.4	-16.1
H68	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-16.9	-13.5	-9.4	-6.3	-5.5	-5.4	-5.3	-7.7	-10.6	-13.0
H69	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.1	29.5	33.6	36.7	37.5	37.6	37.7	37.7	37.7	37.7
	Exceedance Level	-16.9	-13.5	-9.4	-6.3	-5.5	-5.4	-5.3	-7.7	-10.6	-13.0

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H70	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.3	32.5	36.0	36.8	36.9	36.9	36.9	36.9	36.9
	Exceedance Level	-18.0	-14.7	-10.5	-7.0	-6.2	-6.1	-7.5	-11.0	-14.2	-17.0
H71	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.3	32.5	35.9	36.8	36.9	36.9	36.9	36.9	36.9
	Exceedance Level	-17.5	-14.7	-10.5	-7.1	-6.2	-6.8	-10.5	-13.4	-15.3	-16.0
H72	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.3	33.6	37.0	37.8	37.9	37.9	37.9	37.9	37.9
	Exceedance Level	-16.7	-13.7	-9.4	-6.0	-5.2	-5.1	-6.3	-9.8	-12.6	-14.6
H73	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.4	33.6	37.1	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-16.7	-13.6	-9.4	-5.9	-5.1	-5.0	-6.2	-9.7	-12.5	-14.5
H74	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.4	28.2	32.4	35.8	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-17.6	-14.8	-10.6	-7.2	-6.3	-6.9	-10.6	-13.5	-15.4	-16.1
H75	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.0	32.2	35.6	36.4	36.5	36.6	36.6	36.6	36.6
	Exceedance Level	-18.0	-15.0	-10.8	-7.4	-6.6	-7.2	-10.8	-13.7	-15.6	-16.3
H76	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.1	28.1	32.2	35.7	36.5	36.6	36.6	36.6	36.6	36.6
	Exceedance Level	-17.9	-14.9	-10.8	-7.3	-6.5	-7.1	-10.8	-13.7	-15.6	-16.3
H77	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	26.7	29.9	34.1	37.5	38.3	38.4	38.5	38.5	38.5	38.5
	Exceedance Level	-16.3	-13.1	-8.9	-5.5	-4.7	-4.6	-4.5	-4.5	-8.1	-11.7
H78	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	26.5	29.7	33.9	37.4	38.2	38.3	38.3	38.3	38.3	38.3
	Exceedance Level	-16.5	-13.3	-9.1	-5.6	-4.8	-4.7	-4.7	-4.7	-8.3	-11.9
H79	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.6	29.0	33.1	36.2	37.0	37.1	37.2	37.2	37.2	37.2
	Exceedance Level	-17.4	-14.0	-9.9	-6.8	-6.0	-5.9	-5.8	-8.2	-11.1	-13.5
H80	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.2	47.7	50.5	52.5
	Predicted Wind Turbine Noise L_{A90} dB	26.0	29.1	33.3	36.7	37.5	37.6	37.6	37.7	37.7	37.7
	Exceedance Level	-17.0	-13.9	-9.7	-6.3	-5.5	-5.4	-6.6	-10.0	-12.8	-14.8
H81	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.8	32.9	36.0	36.8	37.0	37.0	37.1	37.1	37.1
	Exceedance Level	-17.5	-14.2	-10.1	-7.0	-6.2	-6.0	-6.0	-8.3	-11.2	-13.6
H82	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.0	27.8	32.0	35.4	36.3	36.4	36.4	36.4	36.4	36.4
	Exceedance Level	-18.0	-15.2	-11.0	-7.6	-6.7	-7.3	-11.0	-13.9	-15.8	-16.5
H83	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.2	27.9	32.1	35.5	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-17.8	-15.1	-10.9	-7.5	-6.6	-7.2	-10.9	-13.8	-15.7	-16.4
H84	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	24.8	27.7	31.9	35.3	36.1	36.2	36.2	36.2	36.2	36.2
	Exceedance Level	-18.2	-15.3	-11.1	-7.7	-6.9	-7.5	-11.2	-14.1	-16.0	-16.7
H85	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	25.2	27.9	32.1	35.5	36.4	36.5	36.5	36.5	36.5	36.5
	Exceedance Level	-17.8	-15.1	-10.9	-7.5	-6.6	-7.2	-10.9	-13.8	-15.7	-16.4
H86	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.1	28.5	32.6	35.7	36.5	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-17.9	-14.5	-10.4	-7.3	-6.5	-6.3	-6.3	-8.7	-11.6	-14.0
H87	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	24.6	27.4	31.6	35.0	35.9	36.0	36.0	36.0	36.0	36.0
	Exceedance Level	-18.4	-15.6	-11.4	-8.0	-7.1	-7.7	-11.4	-14.3	-16.2	-16.9
H88	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	27.3	29.6	33.7	37.2	38.1	38.1	38.1	38.1	38.1	38.1
	Exceedance Level	-15.7	-13.4	-9.3	-5.8	-4.9	-4.9	-4.9	-4.9	-8.5	-12.1
H89	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	24.2	27.0	31.2	34.6	35.5	35.6	35.6	35.6	35.6	35.6
	Exceedance Level	-18.8	-16.0	-11.8	-8.4	-7.5	-8.1	-11.8	-14.7	-16.6	-17.3
H90(NAL18)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	27.5	29.5	33.5	37.0	37.9	38.0	38.0	38.0	38.0	38.0
	Exceedance Level	-15.5	-13.5	-9.5	-6.0	-5.1	-5.0	-5.0	-5.0	-8.6	-12.2

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H91	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	24.7	28.0	32.1	35.4	36.2	36.3	36.4	36.4	36.4	36.4
	Exceedance Level	-18.3	-15.0	-10.9	-7.6	-6.8	-6.7	-6.6	-9.0	-11.9	-14.3
H92	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	24.0	26.9	31.1	34.5	35.3	35.4	35.4	35.4	35.4	35.4
	Exceedance Level	-19.0	-16.1	-11.9	-8.5	-7.7	-8.3	-12.0	-14.9	-16.8	-17.5
H93	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.6	32.8	36.2	37.0	37.1	37.1	37.2	37.2	37.2
	Exceedance Level	-17.5	-14.4	-10.2	-6.8	-6.0	-5.9	-5.9	-5.8	-9.4	-13.0
H94	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.5	28.5	32.8	36.2	37.0	37.1	37.1	37.1	37.1	37.1
	Exceedance Level	-17.5	-14.5	-10.2	-6.8	-6.0	-5.9	-5.9	-5.9	-9.5	-13.1
H95	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.7	30.9	34.1	34.9	35.0	35.0	35.1	35.1	35.1
	Exceedance Level	-19.5	-16.3	-12.1	-8.9	-8.1	-8.0	-9.4	-12.8	-16.0	-18.8
H96	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-17.7	-14.7	-10.5	-7.1	-6.3	-6.2	-6.2	-6.2	-9.8	-13.4
H97	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.3	32.5	35.9	36.7	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-17.7	-14.7	-10.5	-7.1	-6.3	-6.2	-6.2	-6.2	-9.8	-13.4
H98	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.2	32.4	35.8	36.6	36.7	36.8	36.8	36.8	36.8
	Exceedance Level	-17.8	-14.8	-10.6	-7.2	-6.4	-6.3	-6.2	-6.2	-9.8	-13.4
H99	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	23.4	26.2	30.4	33.8	34.7	34.8	34.8	34.8	34.8	34.8
	Exceedance Level	-19.6	-16.8	-12.6	-9.2	-8.3	-8.9	-12.6	-15.5	-17.4	-18.1
H100	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.9	27.9	32.1	35.5	36.4	36.4	36.4	36.5	36.5	36.5
	Exceedance Level	-18.1	-15.1	-10.9	-7.5	-6.6	-6.6	-6.6	-6.5	-10.1	-13.7
H101	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.2	32.4	35.8	36.6	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-17.8	-14.8	-10.6	-7.2	-6.4	-6.3	-6.3	-6.3	-9.9	-13.5
H102	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.8	26.0	30.2	33.4	34.2	34.3	34.3	34.4	34.4	34.4
	Exceedance Level	-20.2	-17.0	-12.8	-9.6	-8.8	-8.7	-10.1	-13.5	-16.7	-19.5
H103	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	28.2	29.9	33.9	37.4	38.4	38.4	38.4	38.4	38.4	38.4
	Exceedance Level	-14.8	-13.1	-9.1	-5.6	-4.6	-4.6	-4.6	-4.6	-8.2	-11.8
H104	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.5	32.6	35.5	36.2	36.4	36.5	36.5	36.5	36.5
	Exceedance Level	-17.7	-14.5	-10.4	-7.5	-6.8	-6.6	-6.5	-8.9	-11.8	-14.2
H105	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.4	27.4	31.6	35.0	35.8	35.9	35.9	35.9	35.9	35.9
	Exceedance Level	-18.6	-15.6	-11.4	-8.0	-7.2	-7.1	-7.1	-7.1	-10.7	-14.3
H106	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	25.0	28.0	32.2	35.6	36.4	36.5	36.5	36.6	36.6	36.6
	Exceedance Level	-18.0	-15.0	-10.8	-7.4	-6.6	-6.5	-6.5	-6.4	-10.0	-13.6
H107	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.3	27.3	31.5	34.9	35.7	35.8	35.8	35.8	35.8	35.8
	Exceedance Level	-18.7	-15.7	-11.5	-8.1	-7.3	-7.2	-7.2	-7.2	-10.8	-14.4
H108	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	22.8	25.7	29.9	33.3	34.2	34.2	34.3	34.3	34.3	34.3
	Exceedance Level	-20.2	-17.3	-13.1	-9.7	-8.8	-9.5	-13.1	-16.0	-17.9	-18.6
H109	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	26.0	28.3	32.4	35.8	36.8	36.8	36.8	36.8	36.8	36.8
	Exceedance Level	-17.0	-14.7	-10.6	-7.2	-6.2	-6.2	-6.2	-6.2	-9.8	-13.4
H110	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.8	26.9	31.1	34.2	34.9	35.1	35.1	35.2	35.2	35.2
	Exceedance Level	-19.2	-16.1	-11.9	-8.8	-8.1	-7.9	-9.3	-12.7	-15.9	-18.7

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H111	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.1	27.0	31.2	34.6	35.4	35.5	35.5	35.5	35.5	35.5
	Exceedance Level	-18.9	-16.0	-11.8	-8.4	-7.6	-7.5	-7.5	-7.5	-11.1	-14.7
H112	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.5	32.5	35.4	36.1	36.3	36.4	36.4	36.4	36.4
	Exceedance Level	-17.8	-14.5	-10.5	-7.6	-6.9	-6.7	-6.6	-9.0	-11.9	-14.3
H113	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.7	30.9	34.1	34.9	35.0	35.1	35.1	35.1	35.1
	Exceedance Level	-19.5	-16.3	-12.1	-8.9	-8.1	-8.0	-7.9	-10.3	-13.2	-15.6
H114	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.2	28.5	32.5	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-17.8	-14.5	-10.5	-7.6	-6.9	-6.7	-6.6	-8.9	-11.8	-14.2
H115	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.5	32.5	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-17.7	-14.5	-10.5	-7.6	-6.9	-6.7	-6.6	-8.9	-11.8	-14.2
H116	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.3	28.6	32.6	35.4	36.1	36.3	36.4	36.5	36.5	36.5
	Exceedance Level	-17.7	-14.4	-10.4	-7.6	-6.9	-6.7	-6.6	-8.9	-11.8	-14.2
H117	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.1	27.0	31.2	34.6	35.4	35.5	35.6	35.6	35.6	35.6
	Exceedance Level	-18.9	-16.0	-11.8	-8.4	-7.6	-7.5	-7.4	-7.4	-11.0	-14.6
H118	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.4	25.6	29.7	33.0	33.7	33.8	33.9	33.9	33.9	33.9
	Exceedance Level	-20.6	-17.4	-13.3	-10.0	-9.3	-9.2	-10.5	-14.0	-17.2	-20.0
H119	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	22.0	24.9	29.1	32.5	33.3	33.4	33.4	33.4	33.4	33.4
	Exceedance Level	-21.0	-18.1	-13.9	-10.5	-9.7	-10.3	-14.0	-16.9	-18.8	-19.5
H120	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.1	26.3	30.5	33.5	34.3	34.4	34.5	34.5	34.5	34.5
	Exceedance Level	-19.9	-16.7	-12.5	-9.5	-8.7	-8.6	-9.9	-13.4	-16.6	-19.4
H121	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.9	24.8	29.0	32.5	33.3	33.4	33.4	33.4	33.4	33.4
	Exceedance Level	-21.1	-18.2	-14.0	-10.5	-9.7	-10.3	-14.0	-16.9	-18.8	-19.5
H122	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	23.6	26.9	30.9	33.9	34.7	34.9	35.0	35.0	35.0	35.0
	Exceedance Level	-19.4	-16.1	-12.1	-9.1	-8.3	-8.1	-8.0	-10.4	-13.3	-15.7
H123	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	21.8	25.0	29.2	32.4	33.2	33.3	33.4	33.4	33.4	33.4
	Exceedance Level	-21.2	-18.0	-13.8	-10.6	-9.8	-9.7	-11.0	-14.5	-17.7	-20.5
H124	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.0	26.9	31.1	34.4	35.3	35.4	35.4	35.4	35.4	35.4
	Exceedance Level	-19.0	-16.1	-11.9	-8.6	-7.7	-7.6	-7.6	-7.6	-11.2	-14.8
H125	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	23.4	26.3	30.5	33.8	34.6	34.7	34.7	34.8	34.8	34.8
	Exceedance Level	-19.6	-16.7	-12.5	-9.2	-8.4	-8.3	-8.3	-10.6	-13.5	-15.9
H126(NAL17)	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	26.7	28.8	32.9	36.4	37.3	37.3	37.3	37.3	37.3	37.3
	Exceedance Level	-16.3	-14.2	-10.1	-6.6	-5.7	-5.7	-5.7	-5.7	-9.3	-12.9
H127	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	23.1	26.1	30.2	33.5	34.3	34.4	34.4	34.5	34.5	34.5
	Exceedance Level	-19.9	-16.9	-12.8	-9.5	-8.7	-8.6	-8.6	-10.9	-13.8	-16.2
H128	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	23.2	26.5	30.5	33.6	34.4	34.5	34.6	34.6	34.6	34.6
	Exceedance Level	-19.8	-16.5	-12.5	-9.4	-8.6	-8.5	-8.4	-10.8	-13.7	-16.1
H129	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	23.5	26.6	30.7	33.8	34.5	34.6	34.7	34.8	34.8	34.8
	Exceedance Level	-19.5	-16.4	-12.3	-9.2	-8.5	-8.4	-9.7	-13.1	-16.3	-19.1
H130	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.9	24.1	28.4	31.7	32.5	32.7	32.7	32.7	32.7	32.7
	Exceedance Level	-22.1	-18.9	-14.6	-11.3	-10.5	-10.3	-11.7	-15.2	-18.4	-21.2
H131	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.6	24.5	28.7	32.1	33.0	33.0	33.1	33.1	33.1	33.1
	Exceedance Level	-21.4	-18.5	-14.3	-10.9	-10.0	-10.7	-14.3	-17.2	-19.1	-19.8

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H132	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	22.9	25.9	30.0	33.3	34.1	34.2	34.2	34.3	34.3	34.3
	Exceedance Level	-20.1	-17.1	-13.0	-9.7	-8.9	-8.8	-8.8	-11.1	-14.0	-16.4
H133	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.8	24.1	28.3	31.6	32.4	32.5	32.6	32.6	32.6	32.6
	Exceedance Level	-22.2	-18.9	-14.7	-11.4	-10.6	-10.5	-11.8	-15.3	-18.5	-21.3
H134	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	22.8	26.2	30.2	33.3	34.1	34.2	34.3	34.3	34.3	34.3
	Exceedance Level	-20.2	-16.8	-12.8	-9.7	-8.9	-8.8	-8.7	-11.1	-14.0	-16.4
H135	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.5	24.3	28.5	31.9	32.8	32.9	32.9	32.9	32.9	32.9
	Exceedance Level	-21.5	-18.7	-14.5	-11.1	-10.2	-10.8	-14.5	-17.4	-19.3	-20.0
H136	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	22.1	25.2	29.4	32.5	33.3	33.4	33.5	33.5	33.5	33.5
	Exceedance Level	-20.9	-17.8	-13.6	-10.5	-9.7	-9.6	-10.9	-14.4	-17.6	-20.4
H137	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	29.6	31.3	35.3	38.8	39.8	39.8	39.8	39.8	39.8	39.8
	Exceedance Level	-13.4	-11.7	-7.7	-4.2	-3.2	-3.2	-3.2	-3.2	-6.8	-10.4
H138	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.2	24.1	28.3	31.7	32.5	32.6	32.6	32.6	32.6	32.6
	Exceedance Level	-21.8	-18.9	-14.7	-11.3	-10.5	-11.1	-14.8	-17.7	-19.6	-20.3
H139	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	21.1	24.2	28.4	31.6	32.4	32.5	32.6	32.6	32.6	32.6
	Exceedance Level	-21.9	-18.8	-14.6	-11.4	-10.6	-10.5	-11.8	-15.3	-18.5	-21.3
H140	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.3	24.1	28.2	31.7	32.5	32.6	32.6	32.6	32.6	32.6
	Exceedance Level	-21.7	-18.9	-14.8	-11.3	-10.5	-11.1	-14.8	-17.7	-19.6	-20.3
H141	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	22.5	25.9	29.9	33.0	33.8	33.9	34.0	34.0	34.0	34.0
	Exceedance Level	-20.5	-17.1	-13.1	-10.0	-9.2	-9.1	-9.0	-11.4	-14.3	-16.7
H142	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	20.8	23.9	28.1	31.5	32.3	32.4	32.4	32.4	32.4	32.4
	Exceedance Level	-22.2	-19.1	-14.9	-11.5	-10.7	-11.3	-15.0	-17.9	-19.8	-20.5
H143	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.5	24.2	28.3	31.8	32.6	32.7	32.7	32.7	32.7	32.7
	Exceedance Level	-21.5	-18.8	-14.7	-11.2	-10.4	-11.0	-14.7	-17.6	-19.5	-20.2
H144	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
	Predicted Wind Turbine Noise L_{A90} dB	30.0	32.8	36.8	39.1	39.7	39.9	40.2	40.3	40.3	40.3
	Exceedance Level	-13.0	-10.2	-6.2	-3.9	-3.3	-3.1	-4.9	-8.1	-10.5	-11.3
H145	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	28.9	30.6	34.6	38.2	39.1	39.2	39.2	39.2	39.2	39.2
	Exceedance Level	-14.1	-12.4	-8.4	-4.8	-3.9	-3.8	-3.8	-3.8	-7.4	-11.0
H146	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.9	24.1	28.3	31.5	32.2	32.3	32.4	32.4	32.4	32.4
	Exceedance Level	-22.1	-18.9	-14.7	-11.5	-10.8	-10.7	-12.0	-15.5	-18.7	-21.5
H147	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.6	50.2
	Predicted Wind Turbine Noise L_{A90} dB	24.2	26.8	31.0	34.3	35.2	35.3	35.3	35.3	35.3	35.3
	Exceedance Level	-18.8	-16.2	-12.0	-8.7	-7.8	-7.7	-7.7	-7.7	-11.3	-14.9
H148	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.7	23.9	28.1	31.3	32.1	32.2	32.2	32.3	32.3	32.3
	Exceedance Level	-22.3	-19.1	-14.9	-11.7	-10.9	-10.8	-12.2	-15.6	-18.8	-21.6
H149	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.3	24.0	28.1	31.6	32.4	32.5	32.5	32.5	32.5	32.5
	Exceedance Level	-21.7	-19.0	-14.9	-11.4	-10.6	-11.2	-14.9	-17.8	-19.7	-20.4
H150	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.6	23.7	27.9	31.3	32.1	32.2	32.3	32.3	32.3	32.3
	Exceedance Level	-22.4	-19.3	-15.1	-11.7	-10.9	-10.8	-12.1	-15.6	-18.8	-21.6
H151	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.7	47.4	50.3	52.2	52.9
	Predicted Wind Turbine Noise L_{A90} dB	21.2	23.9	28.0	31.4	32.3	32.4	32.4	32.4	32.4	32.4
	Exceedance Level	-21.8	-19.1	-15.0	-11.6	-10.7	-11.3	-15.0	-17.9	-19.8	-20.5

Location		Wind Speed (ms^{-1}) as standardised to 10 m height									
		3	4	5	6	7	8	9	10	11	12
H152	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	21.9	25.2	29.3	32.4	33.2	33.4	33.4	33.4	33.4	33.4
	Exceedance Level	-21.1	-17.8	-13.7	-10.6	-9.8	-9.6	-9.6	-12.0	-14.9	-17.3
H153	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	21.9	25.2	29.2	32.4	33.2	33.3	33.4	33.4	33.4	33.4
	Exceedance Level	-21.1	-17.8	-13.8	-10.6	-9.8	-9.7	-9.6	-12.0	-14.9	-17.3
H154	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	25.7	29.1	33.0	35.7	36.4	36.6	36.8	36.8	36.8	36.8
	Exceedance Level	-17.3	-13.9	-10.0	-7.3	-6.6	-6.4	-6.2	-8.6	-11.5	-13.9
H156	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	44.4	47.9	51.1	53.9
	Predicted Wind Turbine Noise L_{A90} dB	20.5	23.7	27.9	31.1	31.8	31.9	32.0	32.0	32.0	32.0
	Exceedance Level	-22.5	-19.3	-15.1	-11.9	-11.2	-11.1	-12.4	-15.9	-19.1	-21.9
H157	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	24.5	27.9	31.8	34.6	35.4	35.6	35.7	35.8	35.8	35.8
	Exceedance Level	-18.5	-15.1	-11.2	-8.4	-7.6	-7.4	-7.3	-9.6	-12.5	-14.9
H158	Total WEDG Noise Limit L_{A90} dB	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.4	48.3	50.7
	Predicted Wind Turbine Noise L_{A90} dB	26.3	29.6	33.5	36.1	36.9	37.1	37.2	37.3	37.3	37.3
	Exceedance Level	-16.7	-13.4	-9.5	-6.9	-6.1	-5.9	-5.8	-8.1	-11.0	-13.4

Annex 6 – Topographical Corrections / Turbine Coordinates

Topographical (concave ground/ barrier) Adjustment Table and coordinates

Notes/Comments

Requirement to include a concave ground profile correction of +3dB has been calculated in accordance with section 4.3.9 of the IOA GPG (July 2011)

A barrier correction of -2dB is included where the landform completely obscures a turbine at the noise assessment location

Where analysis indicates that both are required the barrier correction take precedence and a correction of -2dB is applied

Wind Farm-Turbine	Hub	T ID	Noise Senstive Receptor																	X	Y	Candidate Considered
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
Seskin-T01	105	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663467	669637	Vestas V150 6.0 MW or Nordex N149 5.7MW or Siemens Gamesa SG 6.0-155 6.6MW. All full mode with serrated blade.
Seskin-T02	105	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663996	669653	
Seskin-T03	105	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	664205	669229	
Seskin-T04	105	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663569	669075	
Seskin-T05	105	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	664134	668661	
Seskin-T06	105	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663450	668611	
Seskin-T07	105	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663626	668143	
White Hills-T01	104	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661051	665506	Vestas V162 6.2MW serrated blades
White Hills-T02	104	12	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	661032	666188	
White Hills-T03	104	13	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	660870	666656	
White Hills-T04	104	14	0	0	3	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	660802	667111	
White Hills-T05	104	15	3	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	661462	667051	
White Hills-T06	104	16	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	661084	667601	
White Hills-T07	104	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661941	666817	
Bilboa-T01	78	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	665109	670609	Vestas V117 4.2 MW serrated blades mode SO2
Bilboa-T02	78	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	664865	670876	
Bilboa-T03	78	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	664641	671206	
Bilboa-T04	78	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	664333	670860	
Bilboa-T05	78	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	664109	671290	
Gortahile-T01	80	23	0	0	0	0	3	-2	-2	-2	-2	0	-2	0	3	3	0	0	0	3	663959	674961	Nordex N90/2500 HS 2.5MW (no serrated blades)
Gortahile-T02	80	24	0	0	0	0	3	-2	-2	-2	-2	0	-2	3	3	3	0	0	0	3	663459	674893	
Gortahile-T03	80	25	3	0	3	0	3	-2	-2	-2	-2	0	-2	3	3	3	0	0	0	3	663102	674652	
Gortahile-T04	80	26	3	3	3	3	3	-2	-2	-2	-2	0	3	3	3	3	3	0	3	3	663020	674261	
Gortahile-T05	80	27	3	3	3	3	3	3	-2	-2	-2	3	3	3	3	3	3	3	3	3	663120	673849	
Gortahile-T06	80	28	3	3	3	3	3	3	-2	-2	-2	3	3	3	3	3	3	3	3	3	663236	673487	
Gortahile-T07	80	29	3	3	3	3	3	3	-2	-2	-2	0	0	0	3	3	0	0	3	3	663608	672783	
Gortahile-T08	80	30	3	3	3	3	3	3	-2	3	-2	0	3	3	3	3	3	3	3	3	663432	673116	

Annex 7 – Summary of Wind Turbine Noise Source Data

Wind Turbine Noise Data assumptions

Table A7.1: Sound Power Level Data

Wind Farm	Turbine	Hub height of source data provided	Uncertainty added by TNEI on top of manufacturer data	Reference Wind Speed (ms^{-1}) Standardised to 10m Height									
				3	4	5	6	7	8	9	10	11	12
Seskin	Vestas V150 6.0 MW serrated blades	105	2	Restricted / NDA - data available on request									
Seskin	Nordex N149 5.7MW serrated blades	105	2	96	97.2	101.8	106.2	107.6	107.6	107.6	107.6	107.6	107.6
Seskin	Siemens Gamesa SG 6.0-155 6.6MW serrated blades	100	2	Restricted / NDA - data available on request									
White Hills	Vestas V162 6.2MW serrated blades	100	2	Restricted / NDA - data available on request									
Bilboa	Vestas V117 4.2 MW serrated blades mode SO2	78	2	Restricted / NDA - data available on request									
Gortahile	Nordex N90/2500 HS 2.5MW (no serrated blades)	80	2	95.8	99.9	103.4	106.2	107.1	107.5	107.5	107.5	107.5	107.5

Table A7.2: Octave Band Data

Wind Farm	Turbine	Reference Wind Speed (m/s)	Octave Band (Hz)								
			63	125	250	500	1000	2000	4000	8000	Overall
Seskin	Vestas V150 6.0 MW serrated blades	Restricted / NDA - data available on request									
Seskin	Nordex N149 5.7MW serrated blades	8	89.3	95.5	99.2	101.8	102.5	100	92.4	84.4	107.6
Seskin	Siemens Gamesa SG 6.0-155 6.6MW serrated blades	Restricted / NDA - data available on request									
White Hills	Vestas V162 6.2MW serrated blades	Restricted / NDA - data available on request									
Bilboa	Vestas V117 4.2 MW serrated blades mode SO2	Restricted / NDA - data available on request									
Gortahile	Nordex N90/2500 HS 2.5MW (no serrated blades)	10	92.7	96.8	101.2	101.6	100.1	99.0	95.0	87.4	107.5

Annex 8 – Assessment against Backstop Noise Limits at NALs 4-6

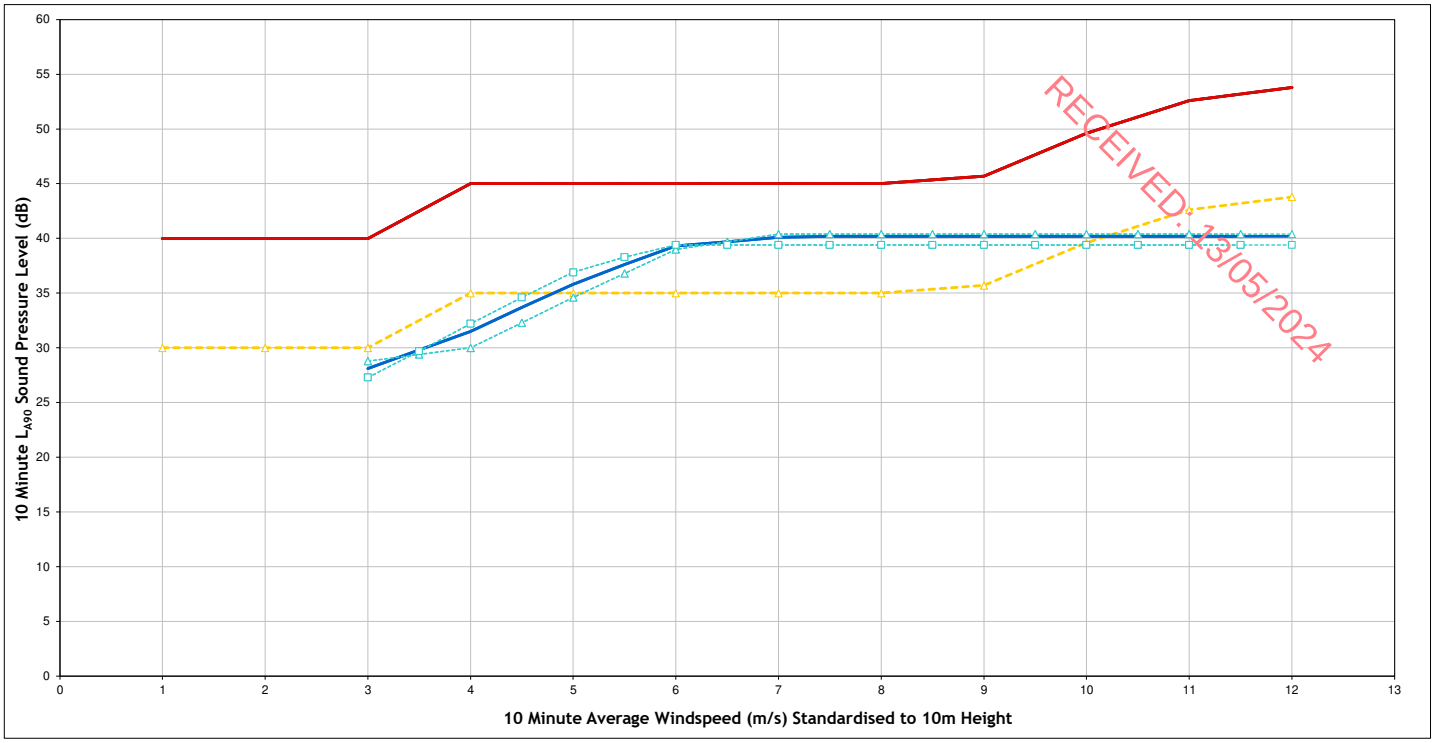
Table A8.1 Backstop Noise Limit Compliance Table – Daytime (based on V150)

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL4	Backstop Noise Limit, LA90	30	30	30	35	35	35	35	35	35.7	39.6	42.6	43.8
	Proposed Development Wind Turbine Noise L_{A90}	-	-	28.1	31.5	35.8	39.3	40.1	40.2	40.2	40.2	40.2	40.2
	Exceedance Level	-	-	-1.9	-3.5	0.8	4.3	5.1	5.2	4.5	0.6	-2.4	-3.6
NAL5	Backstop Noise Limit, LA90	30	30	30	35	35	35	35	35	35.7	39.6	42.6	43.8
	Proposed Development Wind Turbine Noise L_{A90}	-	-	27.1	30.5	34.8	38.3	39.1	39.2	39.2	39.2	39.2	39.2
	Exceedance Level	-	-	-2.9	-4.5	-0.2	3.3	4.1	4.2	3.5	-0.4	-3.4	-4.6
NAL6	Backstop Noise Limit, LA90	30	30	30	35	35	35	35	35	35.7	39.6	42.6	43.8
	Proposed Development Wind Turbine Noise L_{A90}	-	-	26.9	30.3	34.6	38.1	38.9	39	39	39	39	39
	Exceedance Level	-	-	-3.1	-4.7	-0.4	3.1	3.9	4	3.3	-0.6	-3.6	-4.8

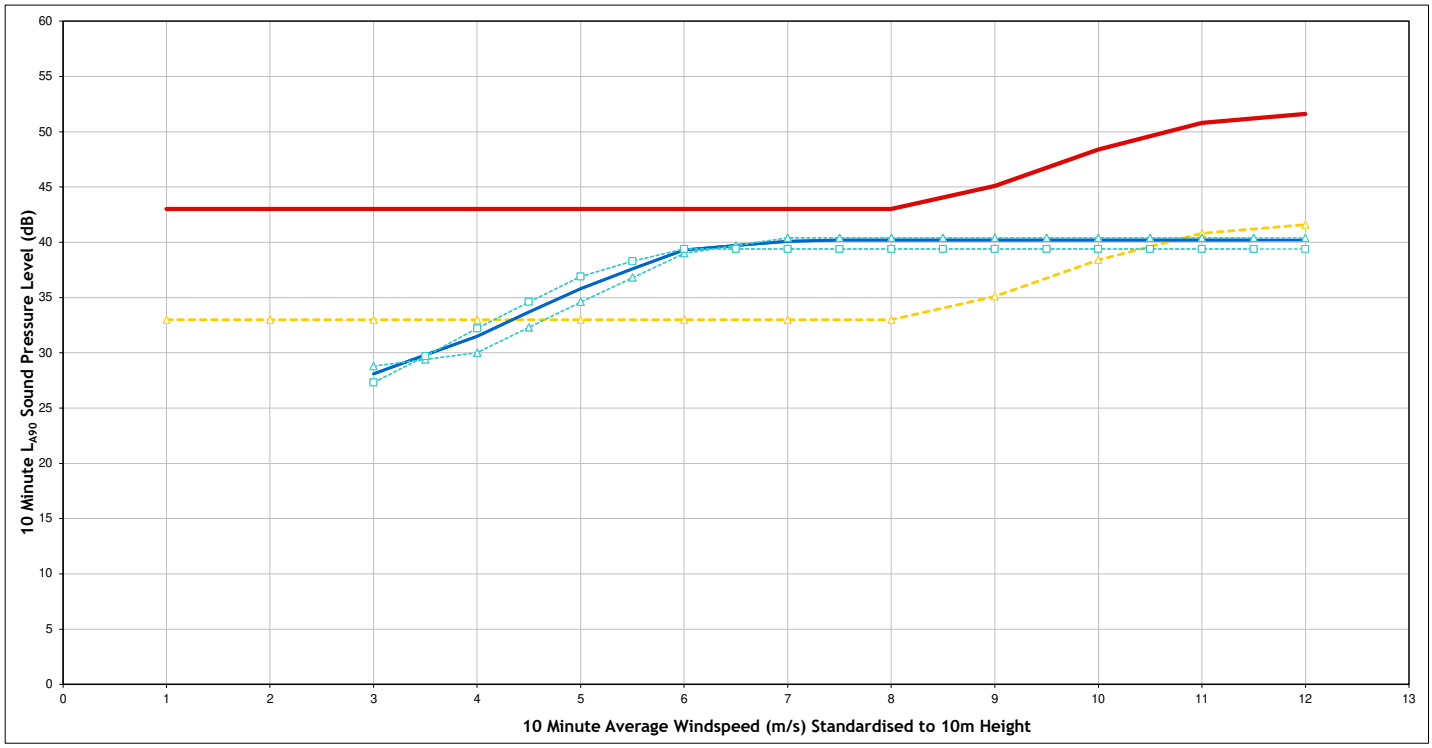
Table A8.2 Backstop Noise Limit Compliance Table – Night-time (based on V150)

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL4	Backstop Noise Limit, LA90	33	33	33	33	33	33	33	33	35.1	38.4	40.8	41.6
	Proposed Development Wind Turbine Noise L_{A90}	-	-	28.1	31.5	35.8	39.3	40.1	40.2	40.2	40.2	40.2	40.2
	Exceedance Level	-	-	-4.9	-1.5	2.8	6.3	7.1	7.2	5.1	1.8	-0.6	-1.4
NAL5	Backstop Noise Limit, LA90	33	33	33	33	33	33	33	33	35.1	38.4	40.8	41.6
	Proposed Development Wind Turbine Noise L_{A90}	-	-	27.1	30.5	34.8	38.3	39.1	39.2	39.2	39.2	39.2	39.2
	Exceedance Level	-	-	-5.9	-2.5	1.8	5.3	6.1	6.2	4.1	0.8	-1.6	-2.4
NAL6	Backstop Noise Limit, LA90	33	33	33	33	33	33	33	33	35.1	38.4	40.8	41.6
	Proposed Development Wind Turbine Noise L_{A90}	-	-	26.9	30.3	34.6	38.1	38.9	39	39	39	39	39
	Exceedance Level	-	-	-6.1	-2.7	1.6	5.1	5.9	6	3.9	0.6	-1.8	-2.6

Daytime - NAL4



Night Time - NAL4

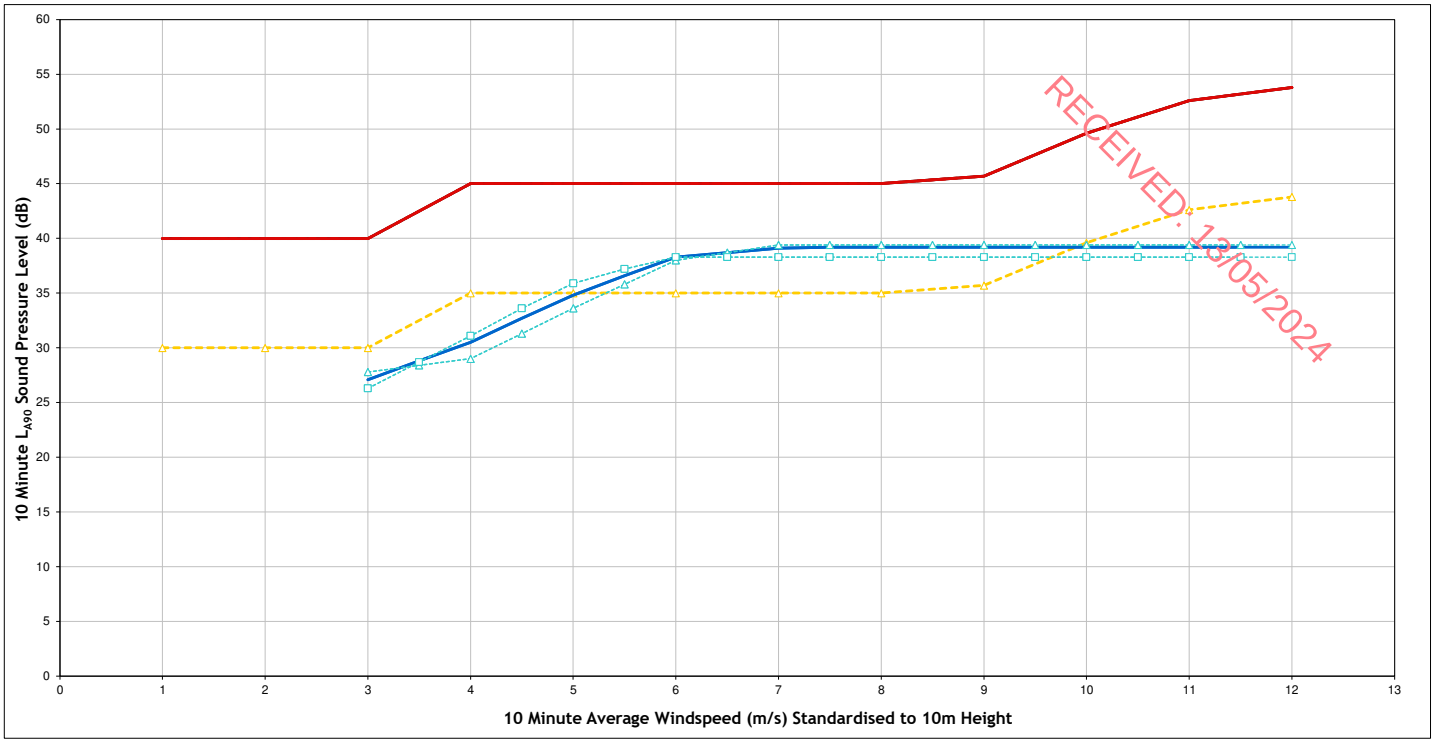


Legend:

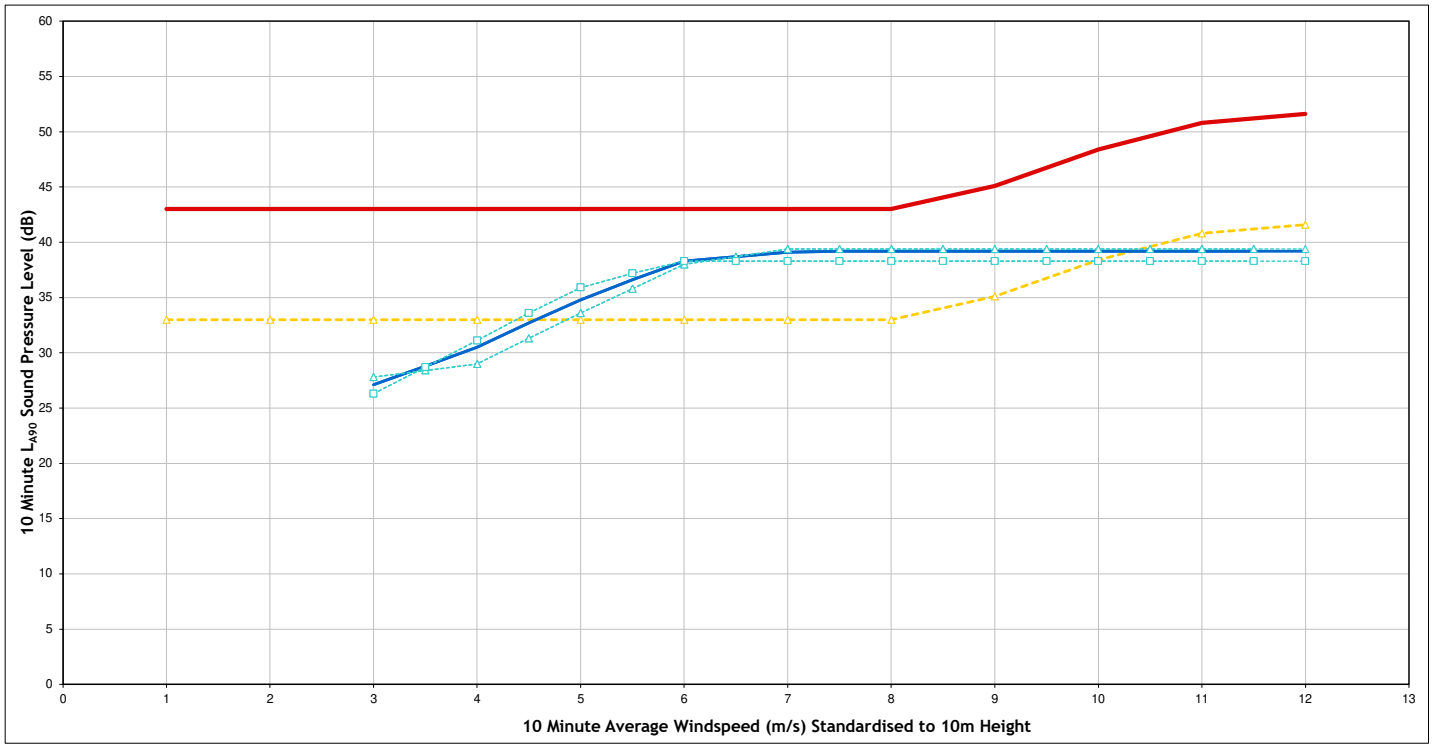
- Total WEDG Noise Limit
- Backstop Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A8.1a
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Daytime - NAL5



Night Time - NAL5

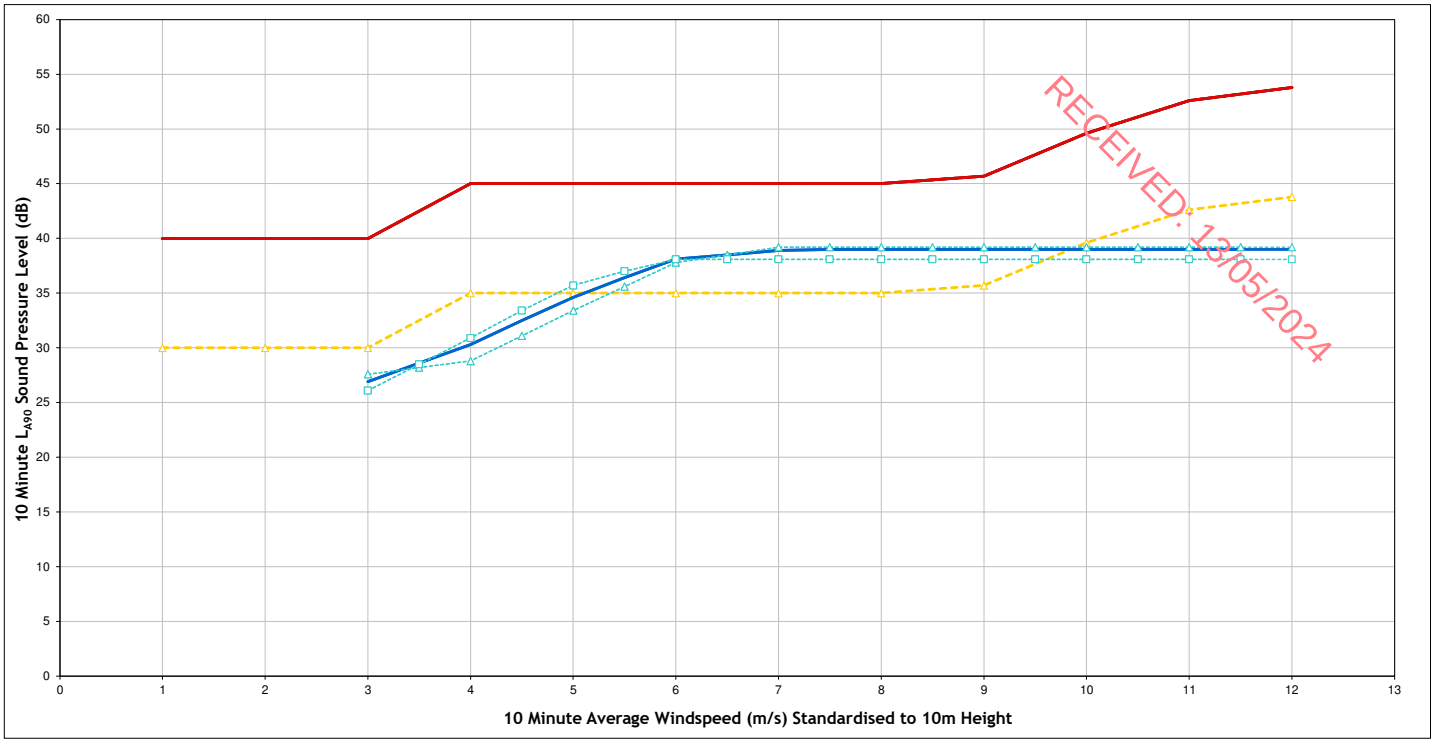


Legend:

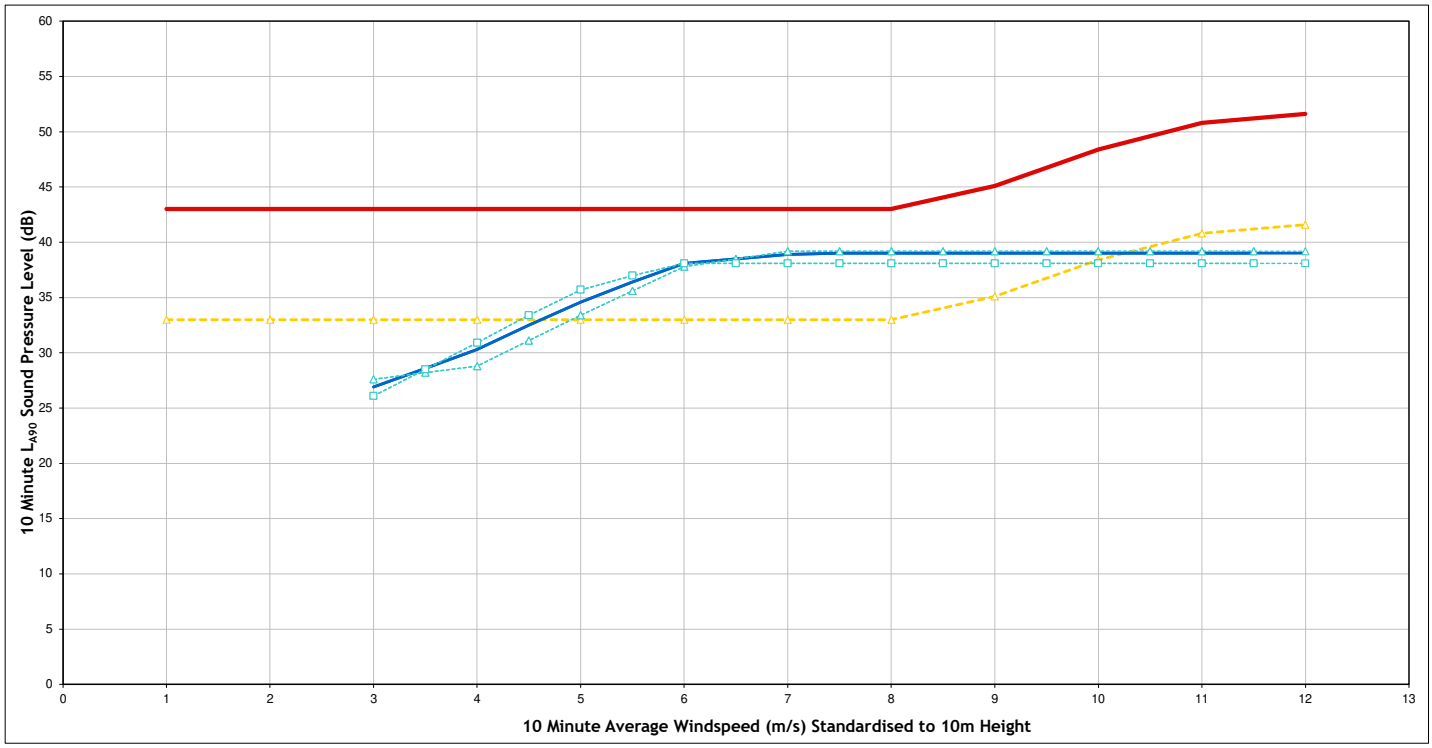
- Total WEDG Noise Limit
- Backstop Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A8.1b
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Daytime - NAL6



Night Time - NAL6



Legend:

- Total WEDG Noise Limit
- Backstop Noise Limit
- Proposed Development,with 7 x V150 6.0MW PO6000
- Proposed Development with 7 x N149 5.7MW Mode 0
- Proposed Development with 7 x SG 6.0-155 AM0

Project	Seskin Wind Farm, Co. Carlow
Client	EDF Renewables Ireland
Title	Noise Assessment - Site Specific
Figure Number	Figure A8.1c
Scale	NTS
Drawn	MC
Checked	GC
Date	08/03/2024
Document Reference	IE00102-noise models

Annex 9 – Flow Chart for noise complaint investigation and suggested Noise Condition

Suggested Noise Conditions with a backstop position:

1) The rating level of noise immission from the combined effects of the wind turbines hereby permitted (including the application of any tonal penalty), when determined in accordance with the attached Guidance Notes, shall not exceed the values for the relevant integer wind speeds set out in or derived from Tables 1 and 2 attached to these conditions.

   At the properties detailed in Tables 3 and 4 only, the rating level of noise immission from the combined effects of the wind turbines hereby permitted, operating in conjunction with the consented and operational turbines of Bilboa Wind Farm (application reference 22/340) (including the application of any tonal penalty), when determined in accordance with the attached Guidance Notes shall not exceed the values for the relevant integer wind speed set out in Tables 3 and 4 attached to these conditions. Following a complaint, in the event that the level of noise immission from the combined effects of the wind turbines hereby permitted, operating in conjunction with the consented and operational turbines of Bilboa Wind Farm (including the application of any tonal penalty) exceeds the values in Tables 3 and 4, the operator of Seskin Wind Farm shall undertake appropriate mitigation to reduced turbine noise immission such that the limits in Tables 3 and 4 are met, or such that noise from the wind turbines hereby permitted (including the application of any tonal penalty) does not exceed the levels set out in Tables 5 and 6 [See attached flowchart] and:

   A) Prior to the First Export Date, the wind farm operator shall submit to the Local Authority for written approval a list of proposed independent consultants who may undertake compliance measurements in accordance with this condition. Amendments to the list of approved consultants shall be made only with the prior written approval of the Local Authority.

   B) Within 21 days from receipt of a written request of the Local Authority, following a complaint to it alleging noise disturbance at a dwelling, the wind farm operator shall, at its expense, employ an independent consultant approved by the Local Authority to assess the level of noise immission from the wind farm at the complainant's property (or a suitable alternative location agreed in writing with the Local Authority) in accordance with the procedures described in the attached Guidance Notes. The written request from the Local Authority shall set out at least the date, time and location that the complaint relates to. Within 14 days of receipt of the written request of the Local Authority made under this paragraph (B), the wind farm operator shall provide the information relevant to the complaint logged in accordance with paragraph (H) to the Local Authority in the format set out in Guidance Note 1(e).

   C) Where there is more than one property at a location specified in Tables 1 and 2 attached to this condition, the noise limits set for that location shall apply to all dwellings at that location. Where a dwelling to which a complaint is related is not identified by name or location in the Tables attached to these conditions, the wind farm operator shall submit to the Local Authority for written approval proposed noise limits selected from those listed in the Tables to be adopted at the complainant's dwelling for compliance checking purposes. The proposed noise limits are to be those limits selected from the Tables specified for a listed location which the independent consultant considers as being likely to experience the most similar background noise environment to that experienced at the complainant's dwelling. The submission of the proposed noise limits to the Local Authority shall include a written justification of the choice of the representative background noise environment provided by the independent consultant. The rating level of noise immission resulting from the combined effects of the wind turbines when determined in accordance with the attached Guidance Notes shall not exceed the noise limits approved in writing by the Local Authority for the complainant's dwelling.

D) Prior to the commencement of any measurements by the independent consultant to be undertaken in accordance with these conditions, the wind farm operator shall submit to the Local Authority for written approval the proposed measurement location identified in accordance with the Guidance Notes where measurements for compliance checking purposes shall be undertaken. Where the proposed measurement location is close to the wind turbines, rather than at the complainants property (to improve the signal to noise ratio), then the operators submission shall include a method to calculate the noise level from the wind turbines at the complainants property based on the noise levels measured at the agreed location (the alternative method). Details of the alternative method together with any associated guidance notes deemed necessary, shall be submitted to and agreed in writing by the Local Authority prior to the commencement of any measurements. Measurements to assess compliance with the noise limits set out in the Tables attached to these conditions or approved by the Local Authority pursuant to paragraph (C) of this condition shall be undertaken at the measurement location approved in writing by the Local Authority.

E) Prior to the submission of the independent consultant's assessment of the rating level of noise immission pursuant to paragraph (F) of this condition, the wind farm operator shall submit to the Local Authority for written approval a proposed assessment protocol setting out the following:

i) the range of meteorological and operational conditions (the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immission.

ii) a reasoned assessment as to whether the noise giving rise to the complaint contains or is likely to contain a tonal component.

The proposed range of conditions shall be those which prevailed during times when the complainant alleges there was disturbance due to noise, having regard to the information provided in the written request of the Local Authority under paragraph (B), and such others as the independent consultant considers necessary to fully assess the noise at the complainant's property. The assessment of the rating level of noise immission shall be undertaken in accordance with the assessment protocol approved in writing by the Local Authority and the attached Guidance Notes.

F) The wind farm operator shall provide to the Local Authority the independent consultant's assessment of the rating level of noise immission undertaken in accordance with the Guidance Notes within 2 months of the date of the written request of the Local Authority made under paragraph (B) of this condition unless the time limit is extended in writing by the Local Authority. The assessment shall include all data collected for the purposes of undertaking the compliance measurements, such data to be provided in the format set out in Guidance Note 1(e). The instrumentation used to undertake the measurements shall be calibrated in accordance with Guidance Note 1(a) and certificates of calibration shall be submitted to the Local Authority with the independent consultant's assessment of the rating level of noise immission.

G) Where a further assessment of the rating level of noise immission from the wind farm is required pursuant to Guidance Note 4(c) of the attached Guidance Notes, the wind farm operator shall submit a copy of the further assessment within 21 days of submission of the independent consultant's assessment pursuant to paragraph (F) above unless the time limit for the submission of the further assessment has been extended in writing by the Local Authority.

H) The wind farm operator shall continuously log power production, wind speed and wind direction, all in accordance with Guidance Note 1(d) of the attached Guidance Notes. The data shall be retained for a period of not less than 24 months. The wind farm operator shall provide this information in the format set out in Guidance Note 1(e) of the attached Guidance Notes to the Local Authority on its request within 14 days of receipt in writing of such a request.

Note: For the purposes of this condition, a "dwelling" is a residential building which lawfully exists or had planning permission at the date of this permission.

Table 1 - Between 07:00 and 23:00 - Noise level dB $L_{A90,\ 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL1 (662730,670033)	39.9	39.9	39.9	39.9	39.6	44.8	44.8	44.7	44.7	45.8	50.0	55.1
NAL2 (662610,670156)	39.9	39.9	39.9	39.9	39.6	44.8	44.8	44.8	44.7	45.8	50.0	55.1
NAL3 (663257,670292)	39.9	39.9	39.9	39.7	39.3	44.6	44.6	44.6	44.5	45.6	50.0	55.1
NAL7 (664688,669900)	39.8	39.8	39.8	39.6	38.8	44.4	44.4	44.3	44.7	49.1	52.9	55.3
NAL8 (664705,669725)	39.8	39.8	39.8	39.7	39.2	44.6	44.6	44.5	44.9	49.2	52.9	55.4
NAL9 (664928,669208)	39.9	39.9	39.9	39.9	39.7	44.8	44.8	44.8	45.2	49.3	53.0	55.4
NAL10 (664824,668894)	39.9	39.9	39.9	39.9	44.9	44.9	44.8	44.8	44.8	47.4	50.5	53.9
NAL11 (664698,668149)	40.0	40.0	40.0	39.9	44.9	44.9	44.9	44.9	44.9	47.4	50.6	53.9
NAL12 (664248,667759)	40.0	40.0	40.0	39.9	44.9	44.9	44.9	44.9	44.9	47.4	50.6	53.9
NAL13 (663144,667630)	39.9	39.9	39.9	39.9	44.9	44.8	44.7	44.7	47.9	50.9	53.6	55.9
NAL14 (662682,668090)	45.0	45.0	45.0	45.0	44.9	44.7	44.7	44.7	44.7	47.6	51.0	54.8
NAL15 (662840,669042)	40.0	40.0	40.0	39.9	39.8	39.6	44.8	44.8	44.8	44.8	48.6	48.6
NAL16 (662555,669161)	40.0	40.0	40.0	39.9	39.8	39.6	44.9	44.8	44.8	44.8	48.6	48.6
NAL17 (661841,668376)	45.0	45.0	45.0	44.9	44.8	44.6	44.5	44.5	44.5	47.5	51.0	54.7
NAL18 (662611,667437)	44.9	44.9	44.9	44.9	44.8	44.4	44.3	44.3	44.3	47.4	50.9	54.7

Table 2 - Between 23:00 and 07:00 - Noise level dB $L_{A90,\ 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL1 (662730,670033)	43.0	43.0	43.0	42.9	42.8	42.7	42.6	42.6	42.6	45.2	48.2	50.6
NAL2 (662610,670156)	43.0	43.0	43.0	42.9	42.8	42.7	42.6	42.6	42.6	45.2	48.2	50.6
NAL3 (663257,670292)	42.9	42.9	42.9	42.9	42.7	42.4	42.3	42.3	42.3	45.0	48.1	50.6
NAL7 (664688,669900)	42.9	42.9	42.9	42.8	42.5	42.1	41.9	41.9	44.0	47.7	50.4	51.8
NAL8 (664705,669725)	42.9	42.9	42.9	42.9	42.6	42.4	42.3	42.3	44.3	47.8	50.5	51.8

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL9 (664928,669208)	43.0	43.0	43.0	42.9	42.8	42.7	42.7	42.7	44.6	48.0	50.5	51.9
NAL10 (664824,668894)	43.0	43.0	43.0	42.9	42.9	42.8	42.7	42.7	44.2	47.8	51.1	53.9
NAL11 (664698,668149)	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.8	44.3	47.8	51.1	53.9
NAL12 (664248,667759)	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.8	44.2	47.8	51.1	53.9
NAL13 (663144,667630)	43.0	43.0	43.0	42.9	42.8	42.6	42.5	43.3	47.2	50.2	52.1	52.9
NAL14 (662682,668090)	43.0	43.0	43.0	42.9	42.8	42.6	42.5	42.5	43.8	47.5	50.4	52.4
NAL15 (662840,669042)	43.0	43.0	43.0	43.0	42.9	42.8	42.7	42.7	42.7	42.7	46.5	50.1
NAL16 (662555,669161)	43.0	43.0	43.0	43.0	42.9	42.8	42.8	42.7	42.7	42.7	46.5	50.2
NAL17 (661841,668376)	42.9	42.9	42.9	42.9	42.7	42.3	42.1	42.1	43.6	47.4	50.4	52.4
NAL18 (662611,667437)	42.9	42.9	42.9	42.8	42.6	42.1	41.8	41.8	43.3	47.3	50.3	52.4

Table 3 - Between 07:00 and 23:00 - Noise level dB $L_{A90,\ 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL4 (663822,670342)	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
NAL5 (664335,670312)	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8
NAL6 (664468,670252)	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.7	49.6	52.6	53.8

Table 4 - Between 23:00 and 07:00 - Noise level dB $L_{A90,\ 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL4 (663822,670342)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
NAL5 (664335,670312)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6
NAL6 (664468,670252)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.1	48.4	50.8	51.6

Table 5 – Between 07:00 and 23:00 – Noise level dB $L_{A90, 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL4 (663822,670342)	30.0	30.0	30.0	35.0	35.0	35.0	35.0	35.0	35.7	39.6	42.6	43.8
NAL5 (664335,670312)	30.0	30.0	30.0	35.0	35.0	35.0	35.0	35.0	35.7	39.6	42.6	43.8
NAL6 (664468,670252)	30.0	30.0	30.0	35.0	35.0	35.0	35.0	35.0	35.7	39.6	42.6	43.8

Table 6 - Between 23:00 and 07:00 - Noise level dB $L_{A90, 10\text{-minute}}$

Location (easting, northing grid coordinates ITM)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
	L_{A90} Decibel Levels											
NAL4 (663822,670342)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	35.1	38.4	40.8	41.6
NAL5 (664335,670312)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	35.1	38.4	40.8	41.6
NAL6 (664468,670252)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	35.1	38.4	40.8	41.6

Note 1 to Tables 1-6: The geographical coordinates references set out in these tables are provided for the purpose of identifying the general location of dwellings to which a given set of noise limits applies. The standardised wind speed at 10 metres height within the site refers to wind speed at 10 metres height derived from those measured at hub height, calculated in accordance with the method given in the Guidance Notes.

Note 2 to Tables 1 - 6: ETSU-R-97 allows for the noise limits to be increased to 45 dB L_{A90}, or the relevant ETSU-R-97 derived “quiet daytime hours” or the “night hours” noise limit based on the measured background noise levels plus 5 dB, whichever is the greater, at any noise sensitive premises having a financial involvement with the wind farm. The noise limits detailed in this condition can be recalculated, if necessary to consider any differences in financial involvement, using the same methodology adopted in Chapter 12-Noise of the EIA Report submitted with the application for consent. Any update to the noise limits shall be submitted to and approved in writing by, the Planning Authority. The development shall operate in accordance with the limits contained in this Condition unless the Planning Authority gives it written consent to an updated set of noise limits.

Guidance Notes for Noise Condition

These notes are to be read with and form part of the noise condition. They further explain the condition and specify the methods to be employed in the assessment of complaints about noise immission from the wind farm. The rating level at each integer wind speed is the arithmetic sum of the wind farm noise level as determined from the best-fit curve described in Note 2 of these Guidance Notes and any tonal penalty applied in accordance with Note 3 with any necessary correction for residual background noise levels in accordance with Note 4. Reference to ETSU-R-97 refers to the publication entitled "The Assessment and Rating of Noise from Wind Farms" (1997) published by the Energy Technology Support Unit (ETSU) for the UK Department of Trade and Industry (DTI).

Note 1

(a) Values of the $L_{A90,10\text{-minute}}$ noise statistic should be measured at the complainant's property (or an approved alternative representative location as detailed in Note 1(b)), using a sound level meter of EN 60651/BS EN 60804 Type 1, or BS EN 61672 Class 1 quality (or the equivalent UK adopted standard in force at the time of the measurements) set to measure using the fast time weighted response as specified in BS EN 60651/BS EN 60804 or BS EN 61672-1 (or the equivalent UK adopted standard in force at the time of the measurements). This should be calibrated before and after each set of measurements, using a calibrator meeting BS EN 60945:2003 "Electroacoustics – sound calibrators" Class 1 with PTB Type Approval (or the equivalent UK adopted standard in force at the time of the measurements) and the results shall be recorded. Measurements shall be undertaken in such a manner to enable a tonal penalty to be calculated and applied in accordance with Guidance Note 3.

(b) The microphone shall be mounted at 1.2 - 1.5 metres above ground level, fitted with a two-layer windshield or suitable equivalent approved in writing by the Local Authority, and placed outside the complainant's dwelling. Measurements should be made in "free field" conditions. To achieve this, the microphone shall be placed at least 3.5 metres away from the building facade or any reflecting surface except the ground at the approved measurement location. In the event that the consent of the complainant for access to his or her property to undertake compliance measurements is withheld, the wind farm operator shall submit for the written approval of the Local Authority details of the proposed alternative representative measurement location prior to the commencement of measurements and the measurements shall be undertaken at the approved alternative representative measurement location.

(c) The $L_{A90,10\text{-minute}}$ measurements should be synchronised with measurements of the 10-minute arithmetic mean wind speed and wind direction data and with operational data logged in accordance with Guidance Note 1(d) and rain data logged in accordance with Note 1(f).

(d) To enable compliance with the conditions to be evaluated, the wind farm operator shall continuously log arithmetic mean wind speed in metres per second (m/s) and arithmetic mean wind direction in degrees from north in each successive 10-minutes period in a manner to be agreed in writing with the planning authority. Each 10 minute arithmetic average mean wind speed data as measured or calculated at turbine hub height shall be 'standardised' to a reference height of 10 metres as described in ETSU-R-97 at page 120 using a reference roughness length of 0.05 metres. It is this standardised 10 metre height wind speed data which is correlated with the noise measurements determined as valid in accordance with Note 2(b), such correlation to be undertaken in the manner described in Note 2(c). All 10-minute periods shall commence on the hour and in 10-minute increments thereafter synchronised with Greenwich Mean Time and adjusted to British Summer Time where necessary.

(e) Data provided to the Local Authority in accordance with paragraphs (E) (F) (G) and (H) of the noise condition shall be provided in comma separated values in electronic format with the exception of data collected to asses tonal noise (if required) which shall be provided in a format to be agreed in writing with the Local Authority.

(f) A data logging rain gauge shall be installed in the course of the independent consultant undertaking an assessment of the level of noise immission. The gauge shall record over successive 10-minute periods synchronised with the periods of data recorded in accordance with Note 1(d).

Note 2

(a) The noise measurements should be made so as to provide not less than 20 valid data points as defined in Note 2 paragraph (b).

(b) Valid data points are those measured during the conditions set out in the assessment protocol approved by the Local Authority under paragraph (E) of the noise condition but excluding any periods of rainfall measured in accordance with Note 1(f).

(c) Values of the $L_{A90,10\text{-minute}}$ noise measurements and corresponding values of the 10-minute standardised ten metre height wind speed for those data points considered valid in accordance with Note 2(b) shall be plotted on an XY chart with noise level on the Y-axis and wind speed on the X-axis. A least squares, "best fit" curve of an order deemed appropriate by the independent consultant (but which may not be higher than a fourth order) shall be fitted to the data points to define the wind farm noise level at each integer speed.

Note 3

(a) Where, in accordance with the approved assessment protocol under paragraph (E) of the noise condition, noise immission at the location or locations where compliance measurements are being undertaken contain or are likely to contain a tonal component, a tonal penalty shall be calculated and applied using the following rating procedure.

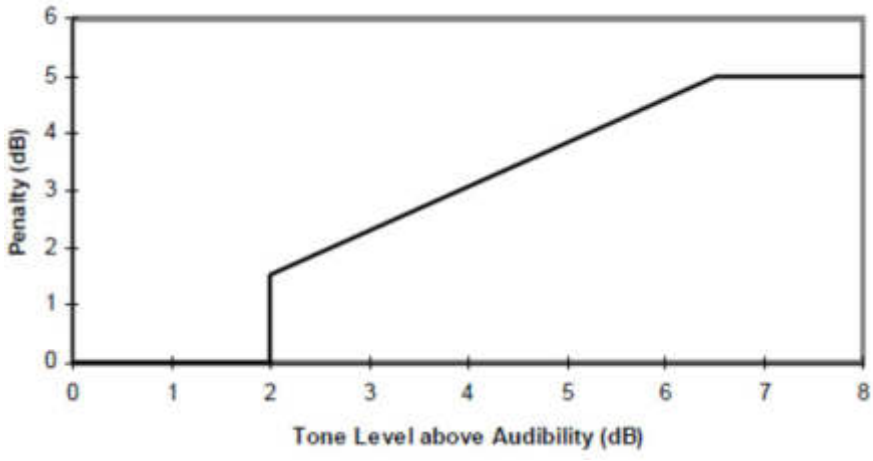
(b) For each 10-minute interval for which $L_{A90,10\text{-minute}}$ data have been determined as valid in accordance with Note 2, a tonal assessment shall be performed on noise immission during 2-minutes of each 10-minute period. The 2-minute periods should be spaced at 10-minute intervals provided that uninterrupted uncorrupted data are available ("the standard procedure"). Where uncorrupted data are not available, the first available uninterrupted clean 2-minute period out of the affected overall 10-minute period shall be selected. Any such deviations from the standard procedure shall be reported.

(c) For each of the 2-minute samples the tone level above audibility shall be calculated by comparison with the audibility criterion given in Section 2.1 on pages 104 -109 of ETSU-R-97.

(d) The tone level above audibility shall be plotted against wind speed for each of the 2-minute samples. Samples for which the tones were below the audibility criterion or no tone was identified, a value of zero audibility shall be substituted.

(e) A least squares "best fit" linear regression shall then be performed to establish the average tone level above audibility for each integer wind speed derived from the value of the "best fit" line fitted to values within ± 0.5m/s of each integer wind speed. If there is no apparent trend with wind speed then a simple arithmetic mean shall be used. This process shall be repeated for each integer wind speed for which there is an assessment of overall levels in Note 2.

(f) The tonal penalty is derived from the margin above audibility of the tone according to the figure below derived from the average tone level above audibility for each integer wind speed.



Note 4

(a) If a tonal penalty is to be applied in accordance with Note 3 the rating level of the turbine noise at each wind speed is the arithmetic sum of the measured noise level as determined from the best fit curve described in Note 2 and the penalty for tonal noise as derived in accordance with Note 3 at each integer wind speed within the range set out in the approved assessment protocol under paragraph (E) of the noise condition.

(b) If no tonal penalty is to be applied then the rating level of the turbine noise at each wind speed is equal to the measured noise level as determined from the best fit curve described in Note 2.

(c) If the rating level at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. In the event that the rating level is above the limit(s) set out in the Tables attached to the noise conditions or the noise limits for a complainant's dwelling approved in accordance with paragraph (C) of the noise condition, the independent consultant shall undertake a further assessment of the rating level to correct for background noise so that the rating level relates to wind turbine noise immission only.

(d) The wind farm operator shall ensure that all the wind turbines in the development are turned off for such period as the independent consultant requires to undertake the further assessment. The further assessment shall be undertaken in accordance with the following steps:

i. Repeating the steps in Note 2, with the wind farm switched off, and determining the background noise (L_3) at each integer wind speed within the range set out in the approved noise assessment protocol under paragraph (E) of this condition.

ii. The wind farm noise (L_1) at this speed shall then be calculated as follows where L_2 is the measured level with turbines running but without the addition of any tonal penalty:

$$L_1 = 10\log\left[10^{L_2/10} - 10^{L_3/10}\right]$$

iii. The rating level shall be re-calculated by adding the tonal penalty (if any is applied in accordance with Note 3) to the derived wind farm noise L_1 at that integer wind speed.

iv. If the rating level after adjustment for background noise contribution and adjustment for tonal penalty (if required in accordance with note (iii) above) at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. If the rating level at any integer wind speed exceeds the values set out in the Tables attached to the conditions or the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then the development fails to comply with the conditions.

Flow Chart to explain how complaints would be investigated for overall/tonal noise, for properties which are listed in Tables 3-4 where a backstop position is proposed.