Spiorad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 19.11: Cumulative Wind Turbine Noise Assessment, Volume 2c

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Contents

List of Tables

List of Plates

1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) presents the cumulative wind turbine generator (WTG) noise assessment results relevant to the assessment of offshore airborne noise for the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project'). This appendix accompanies **Chapter 19: Offshore Airborne Noise, Volume 2a** of the EIAR.

1.1.1.2 This appendix should be read in conjunction with the project description provided in **Chapter 3: Project Description, Volume 1a** and the relevant parts of the following chapters and appendices:

- **Chapter 19, Volume 2a**;
- **Appendix 19.1: Policy, Guidance and Legislative Context, Volume 2c**;
- **Appendix 19.2: Noise Modelling and Prediction, Volume 2c**;
- **Appendix 19.3: Baseline Noise Survey, Volume 2c**;
- **Appendix 19.4: Wind Shear Correction, Volume 2c**;
- **Appendix 19.5: Baseline Noise Conditions - All Wind Directions, Volume 2c**;
- **Appendix 19.6: Baseline Noise Analysis Comparison – Design Option 1 vs Design Option 2, Volume 2c**;
- **Appendix 19.7: Baseline Noise Conditions - Directional Split, Volume 2c**;
- **Appendix 19.8: Existing Wind Turbine Contribution Check, Volume 2c**;
- **Appendix 19.9: Modelled Receptor Noise Levels, Volume 2c**;
- **Appendix 19.10: Noise Limits, Volume 2c**;

1.1.2 PROJECT BACKGROUND

1.1.2.1 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom WTGs.

1.1.2.2 The Project will include both offshore and onshore infrastructure. This EIAR supports the application for the offshore components of the Project as outlined in **Chapter 1: Introduction, Volume 1a**. The offshore components of the Project (the Offshore Project) includes all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (**Figure 1.2: Offshore Project Location, Volume 1b**). Further detailed information is provided in **Chapter 3, Volume 1a**.

1.1.2.3 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 km offshore and is approximately 161 km^2 in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required),

and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Turbine Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km^2, within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 This appendix describes the cumulative WTG noise assessment results relevant to the assessment of offshore airborne noise for the Offshore Project.

2 BACKGROUND

2.1.1.1 **Plate 3-1** to **Plate 3-18** compare the predicted operational WTG noise levels for the Offshore Project against noise level limits. Predicted operational WTG noise levels are below noise limits for both WTG Layout Options, under all wind speeds and all wind direction conditions. Compliance with the applied limits, ensures that a cumulative noise impact would not arise.

2.1.1.2 In each case, the noise level limits have been determined accounting for other cumulative WTG developments.

2.1.1.3 For noise-sensitive receptors (NSR) NSR1 to NSR6 (details of the noise sensitive receptors is presented in **Chapter 19, Volume 2a,** Table 19-16), the total cumulative noise level limits have been applied to the Offshore Project because there are no cumulative developments with the potential to give rise to an acoustically relevant contribution.

2.1.1.4 For NSR7 and NSR8, the residual noise limits (sometimes termed the 'Residual', 'Remaining Available', or 'Noise Budget' limits) have been applied. These have been determined accounting for the operational noise levels potentially generated by the Baile an Truiseil (BaT) Wind Farm. This wind farm location is shown in **Appendix 19.8, Volume 2c,** Plate 1-1.

2.1.1.5 For NSR9 the residual noise limits have been applied. These have been determined accounting for the operational noise levels potentially generated by the Horshader Wind Farm. This wind farm location is shown in **Appendix 19.8, Volume 2c,** Plate 1-1.

2.1.1.6 Separate assessments are presented for the Offshore Project subject to downwind conditions (**Plate 3-1** to **Plate 3-9**), and upwind conditions (**Plate 3-10** to **Plate 3-18**). In each case, the noise level limits have been determined based on analysis of the baseline data obtained under those conditions. Predicted operational noise levels are presented for the stated condition (e.g. downwind or upwind), but also crosswind propagation conditions.

2.1.1.7 Downwind propagation occurs where the wind is blowing from WTGs towards the receptor. Based on 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) directivity correction for flat landscapes, Figure 6a, no reduction is applied.

2.1.1.8 Crosswind propagation occurs where the wind direction is perpendicular to the line between the WTGs and the receptor. Based on the IOA GPG directivity correction for flat landscapes, Figure 6a, a -2 dB reduction is applied.

2.1.1.9 Upwind propagation occurs where the wind is blowing from the receptor towards the WTGs. Based on the IOA GPG directivity correction for flat landscapes, Figure 6a, sound level reductions can reach up to -13 dB. However, recognising that it would not be possible for a receptor to be directly upwind of all WTG at the same time, a more conservative -6 dB reduction is applied.

3 ASSESSMENT

3.1 DOWNWIND CONDITIONS

Plate 3-1: NSR1 (LT1) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

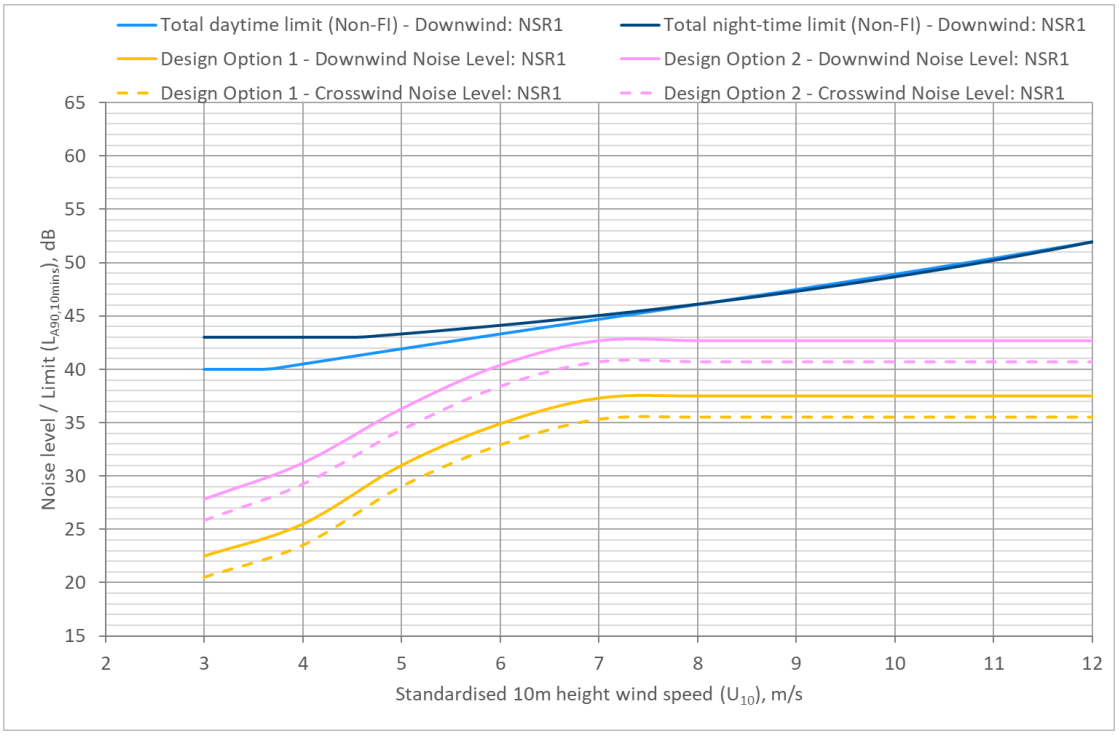


Plate 3-2: NSR2 (LT2) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

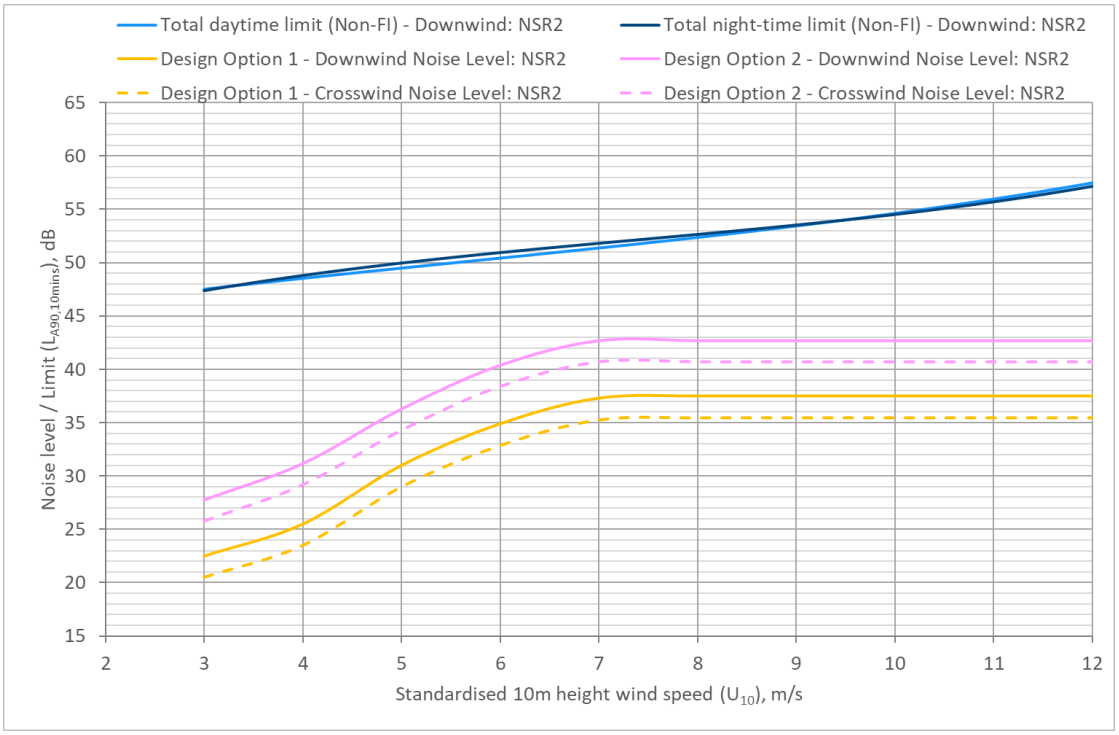


Plate 3-3: NSR3 (LT3) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

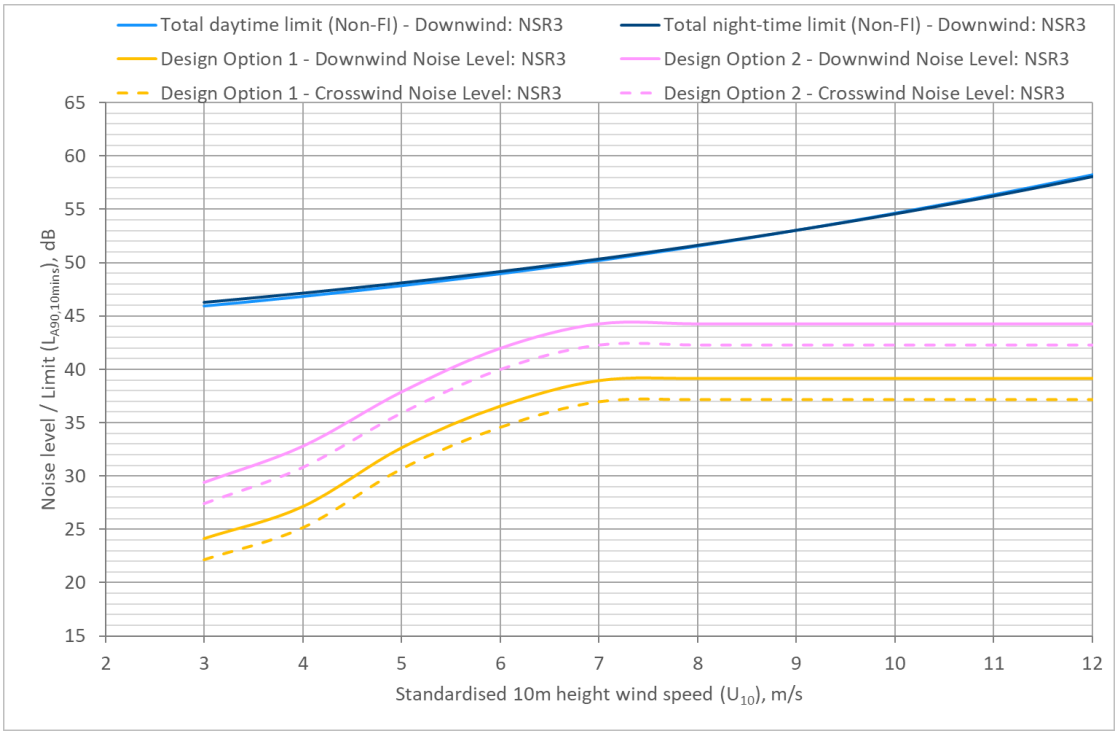


Plate 3-4: NSR4 (LT4) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

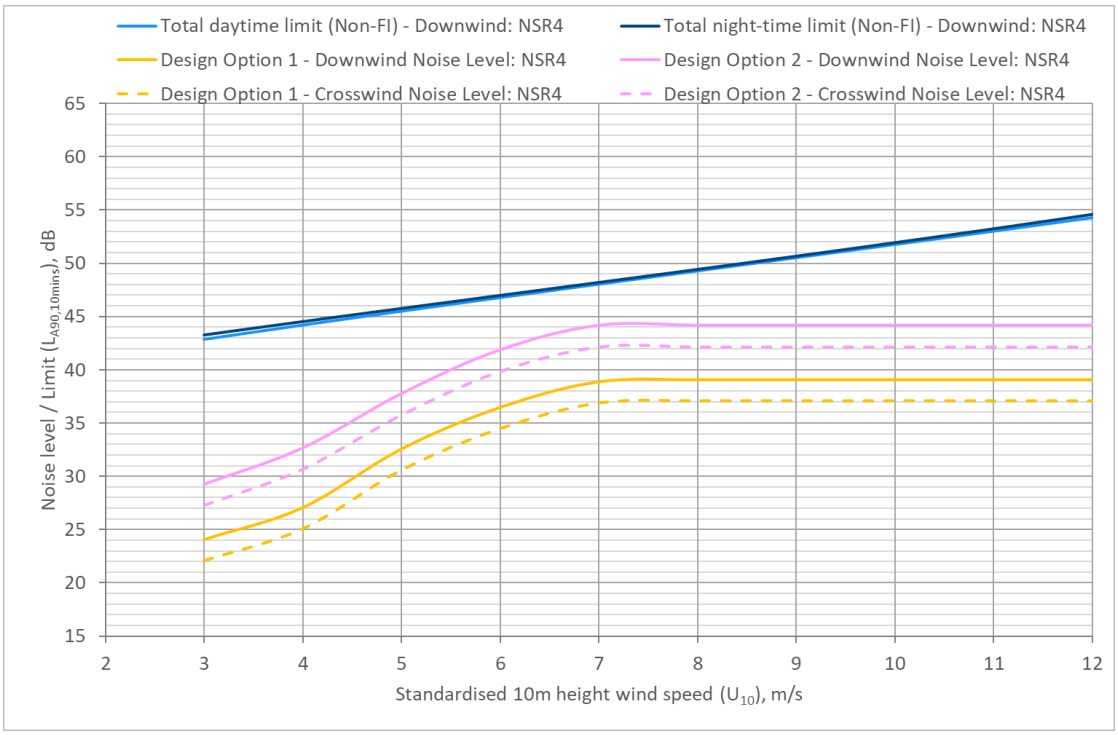


Plate 3-5: NSR5 (LT5) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

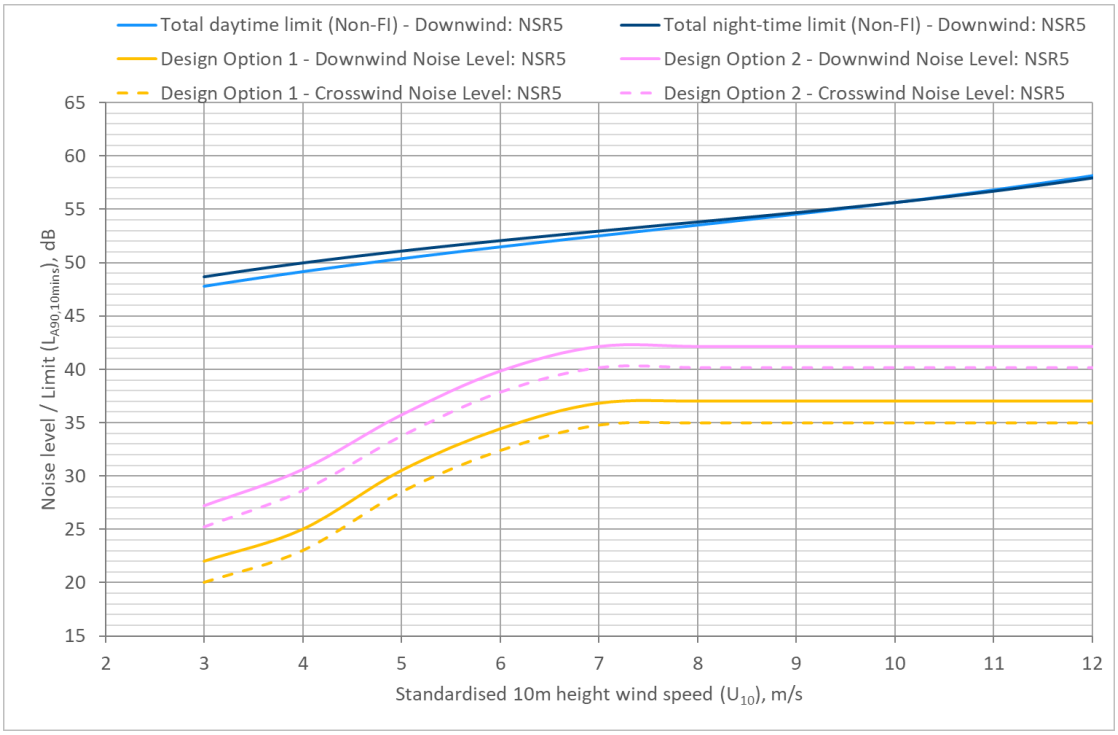


Plate 3-6: NSR6 (LT6) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

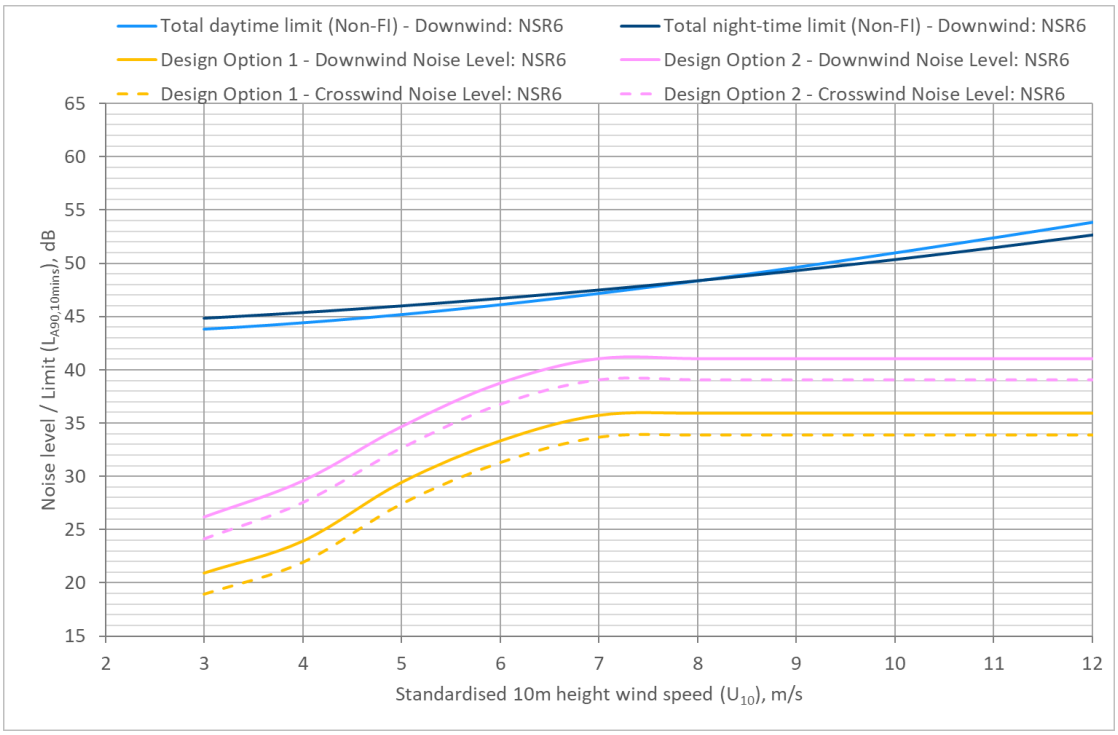


Plate 3-7: NSR7 (Residual Limit adopting LT6) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

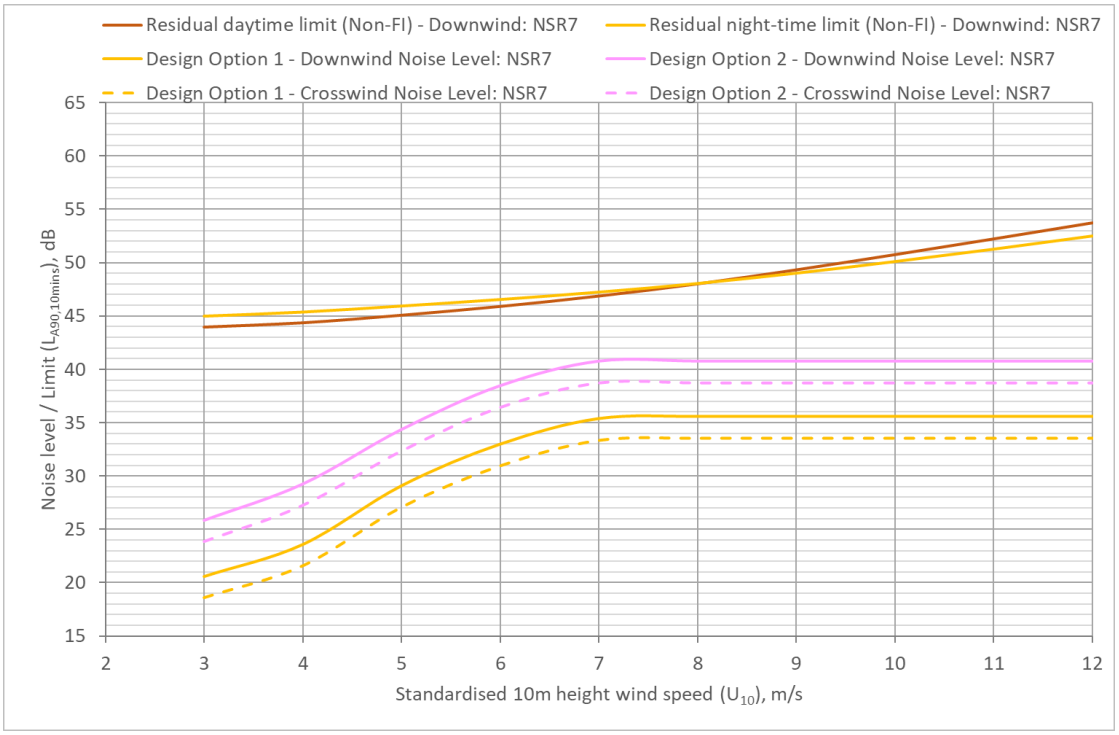


Plate 3-8: NSR8 (Residual Limit adopting LT6) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

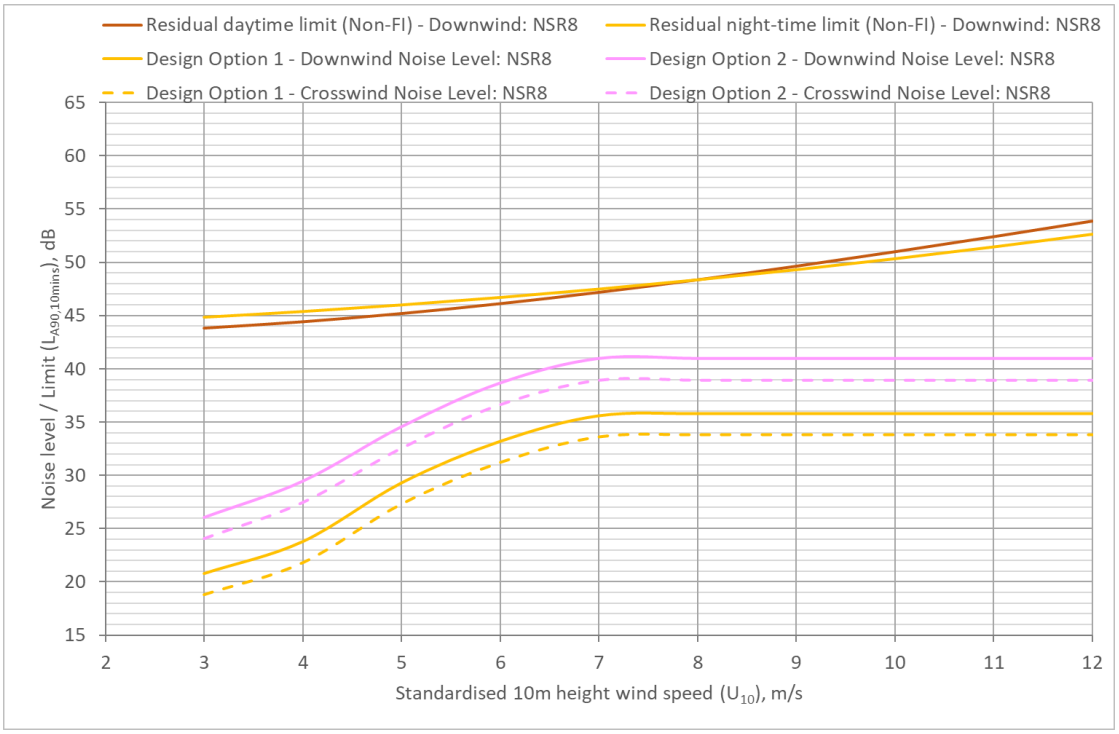
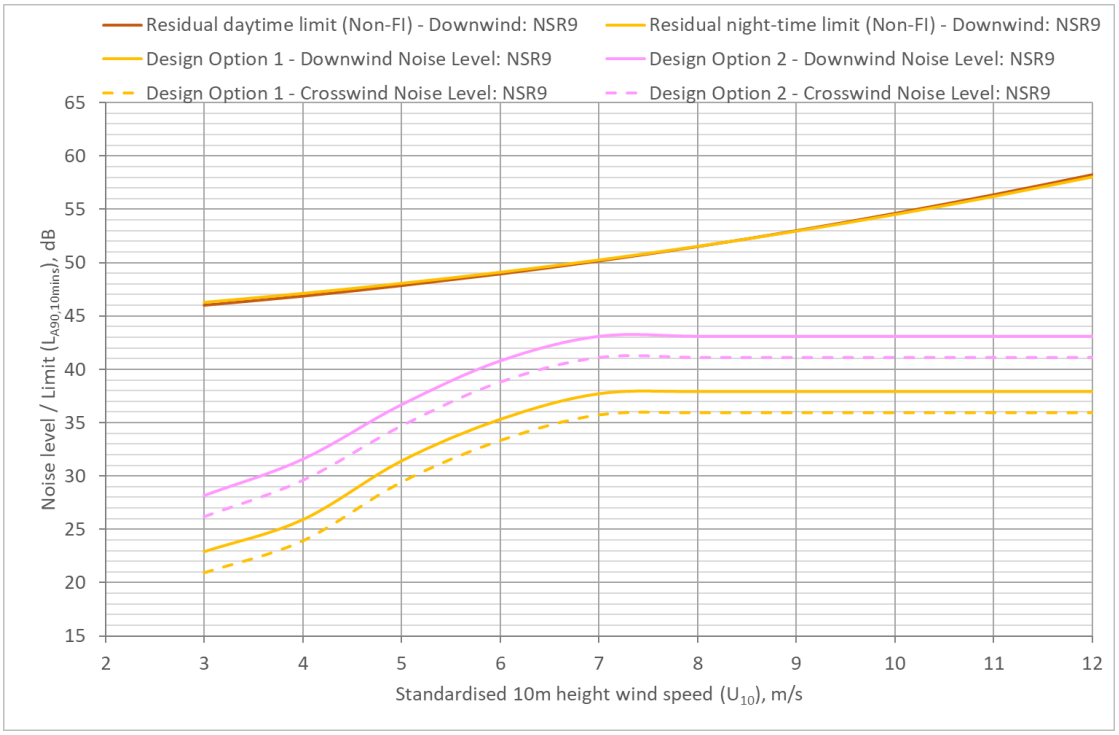


Plate 3-9: NSR9 (Residual Limit adopting LT3) Downwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment



3.2 UPWIND CONDITIONS

Plate 3-10: NSR1 (LT1) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

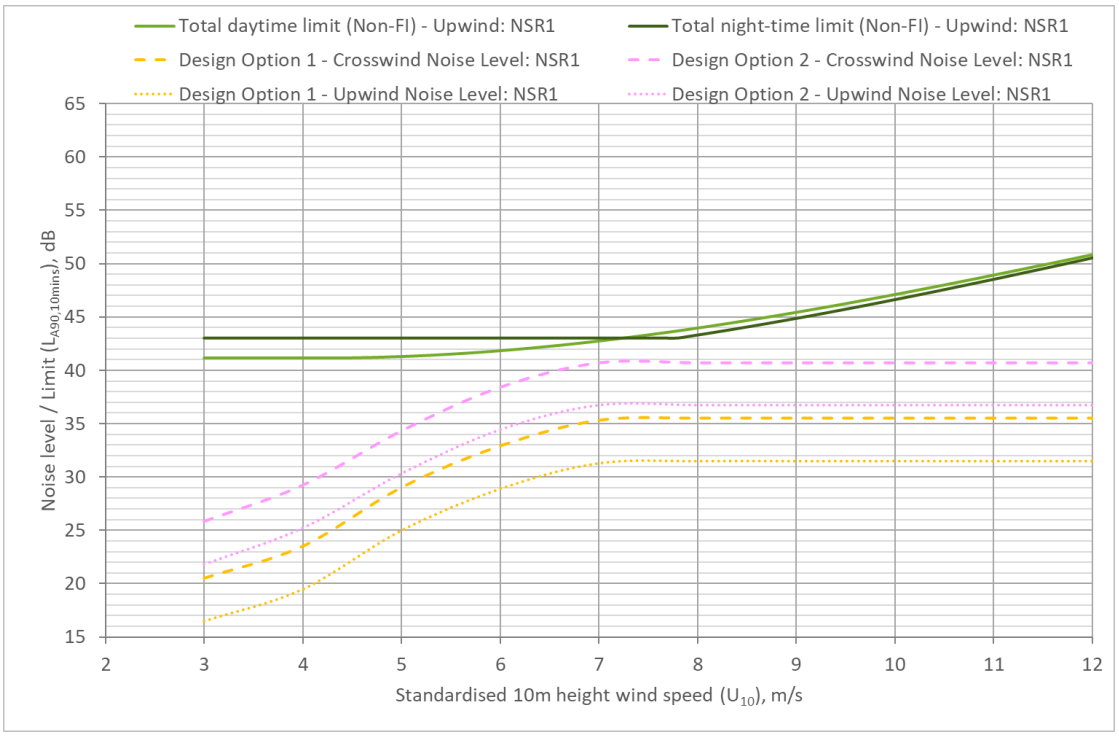


Plate 3-11: NSR2 (LT2) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

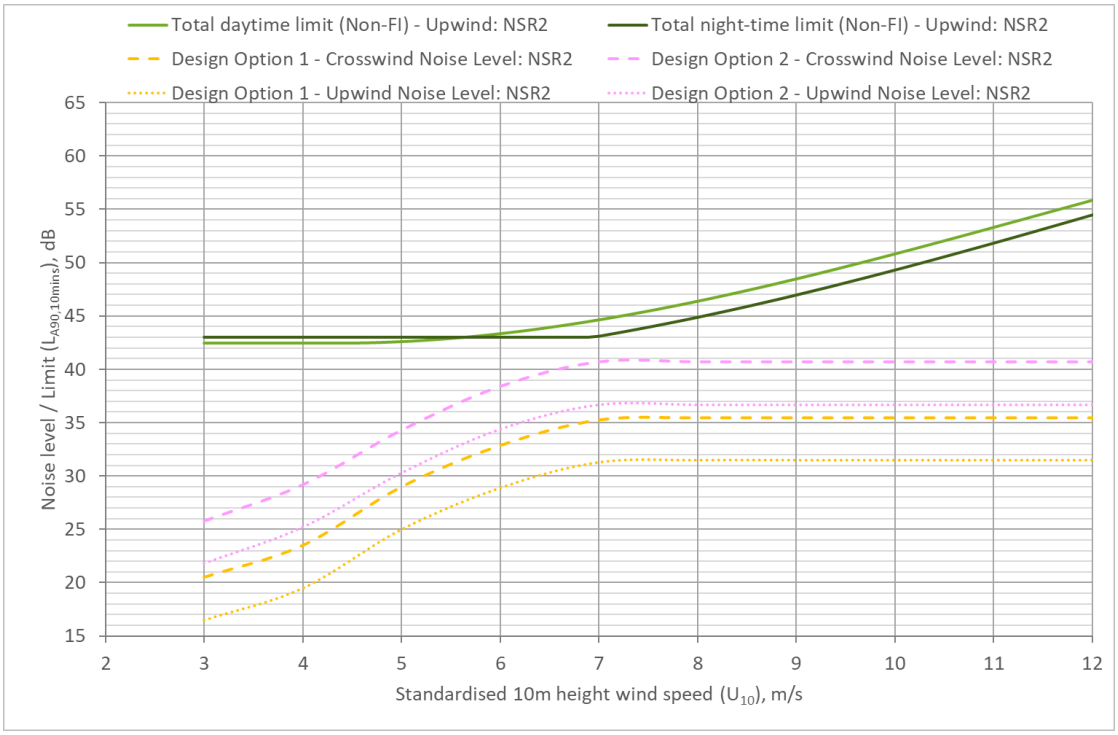


Plate 3-12: NSR3 (LT3) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

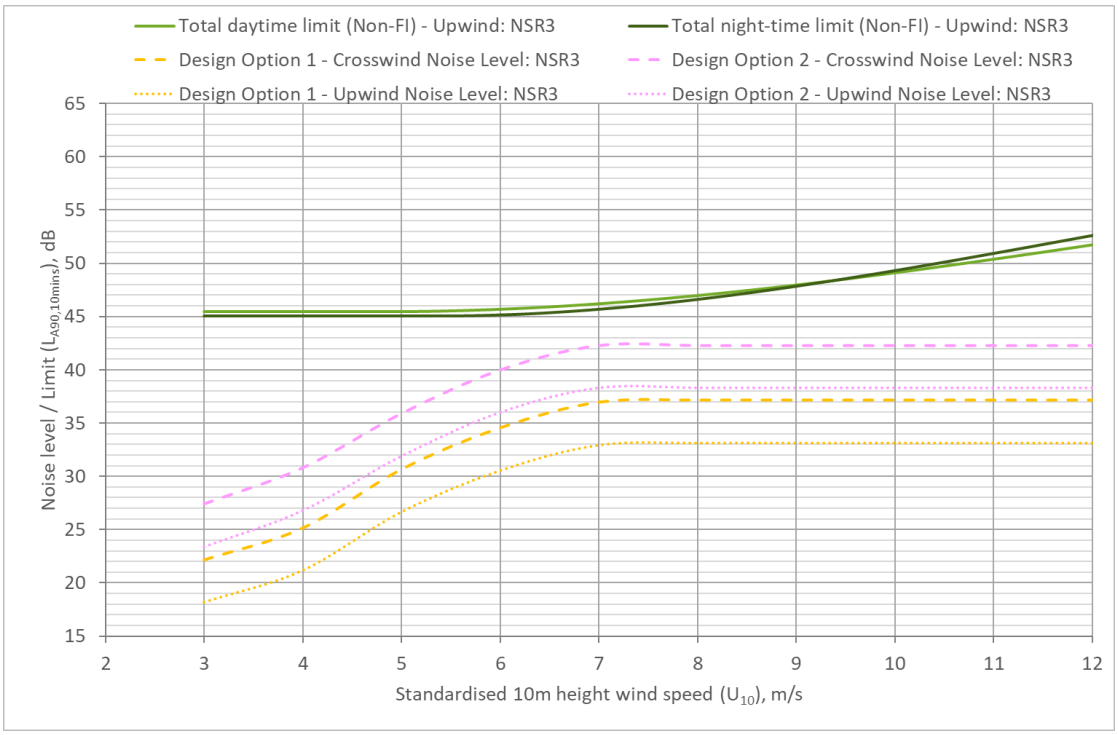


Plate 3-13: NSR4 (LT4) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

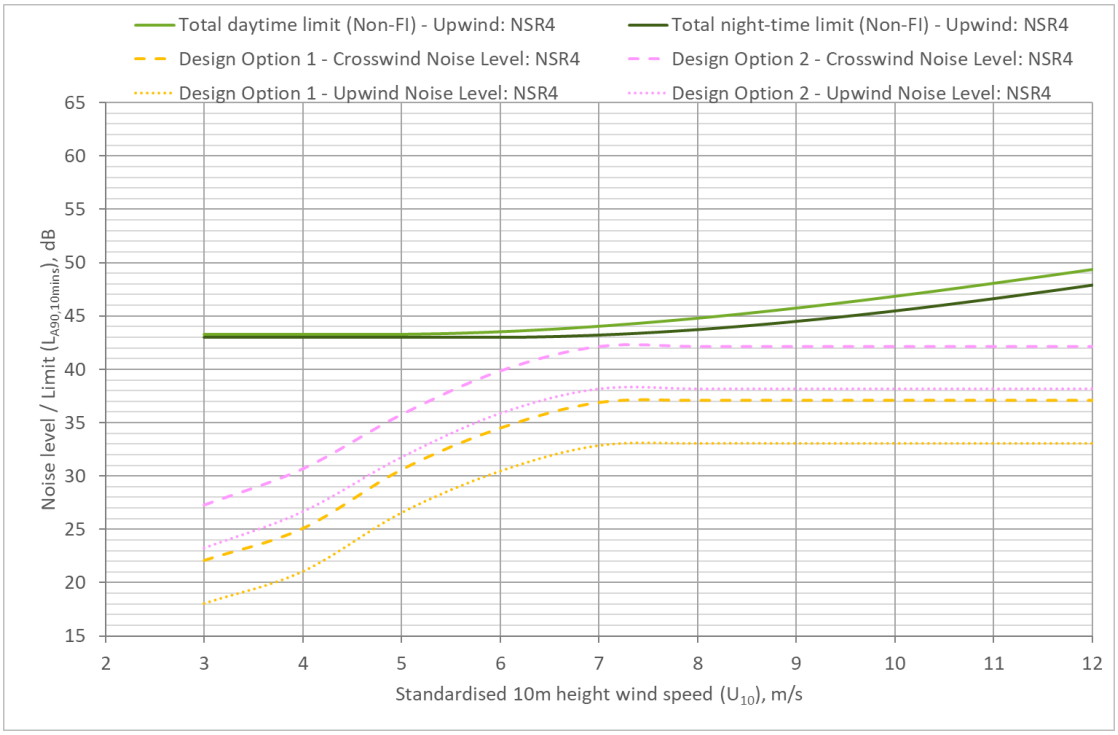


Plate 3-14: NSR5 (LT5) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

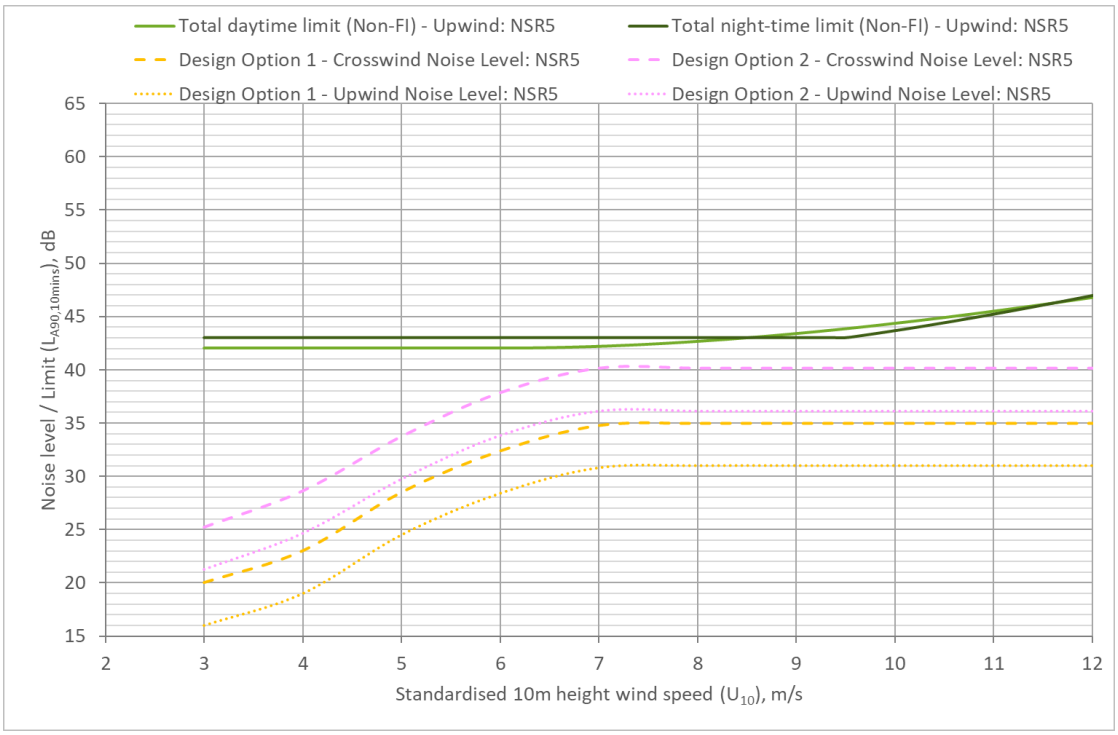


Plate 3-15: NSR6(LT6) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

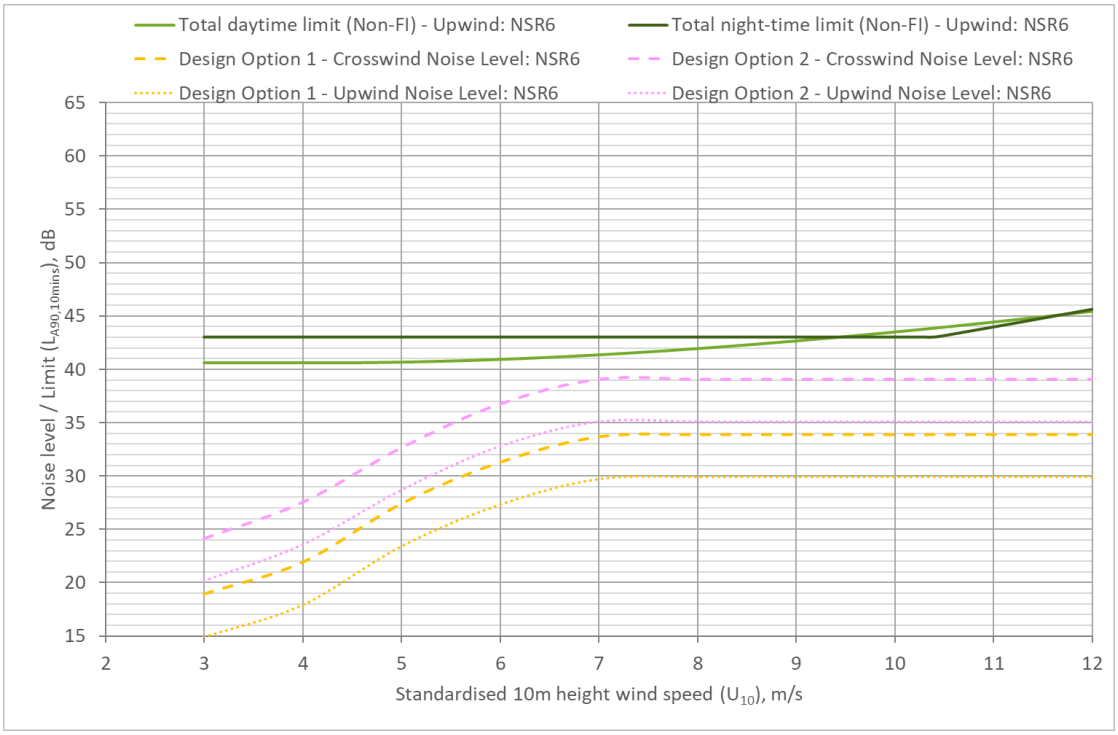


Plate 3-16: NSR7 (Residual Limit adopting LT6) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

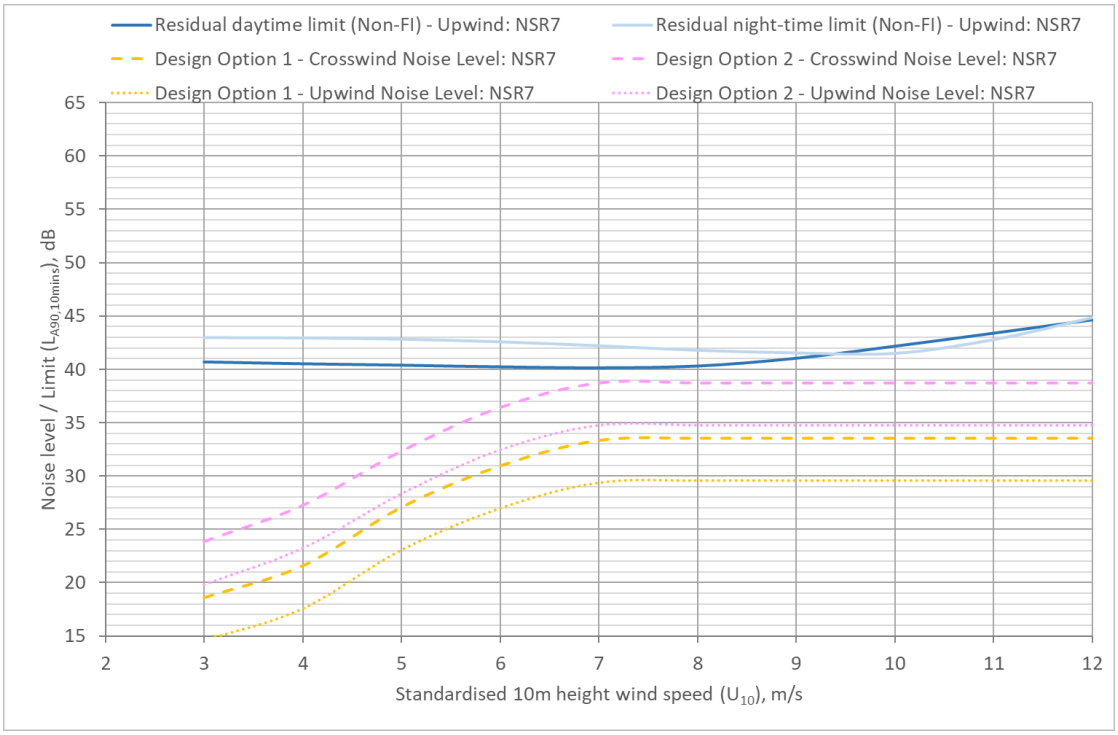


Plate 3-17: NSR8 (Residual Limit adopting LT6) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment

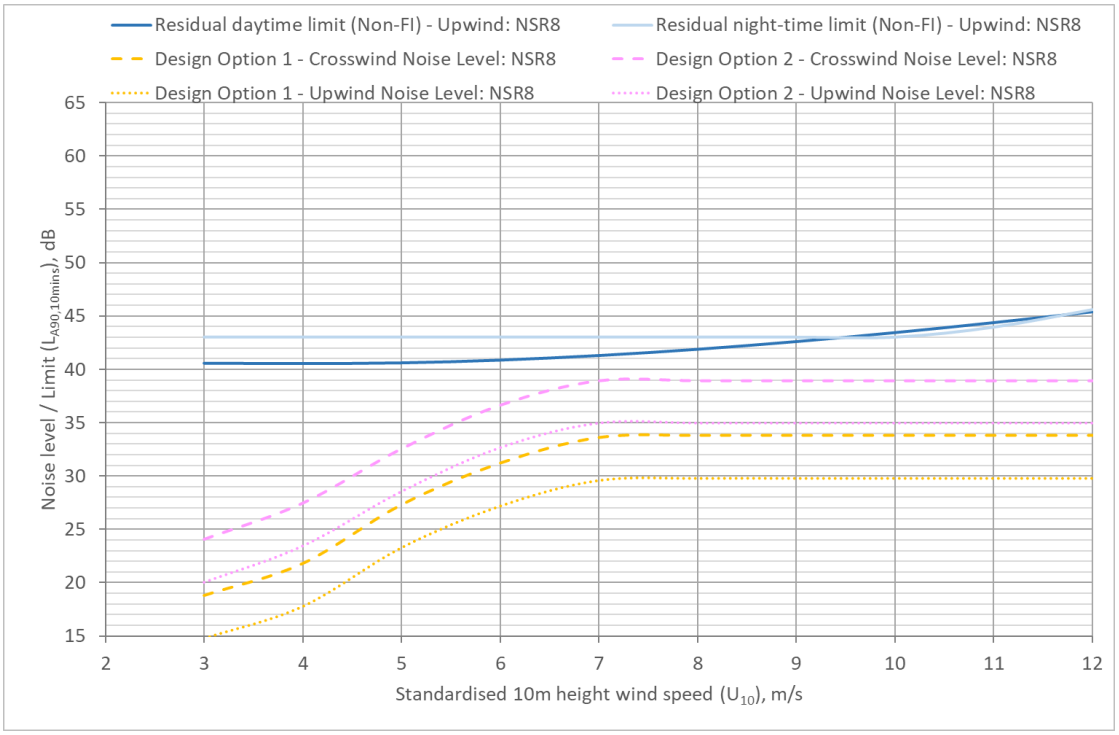
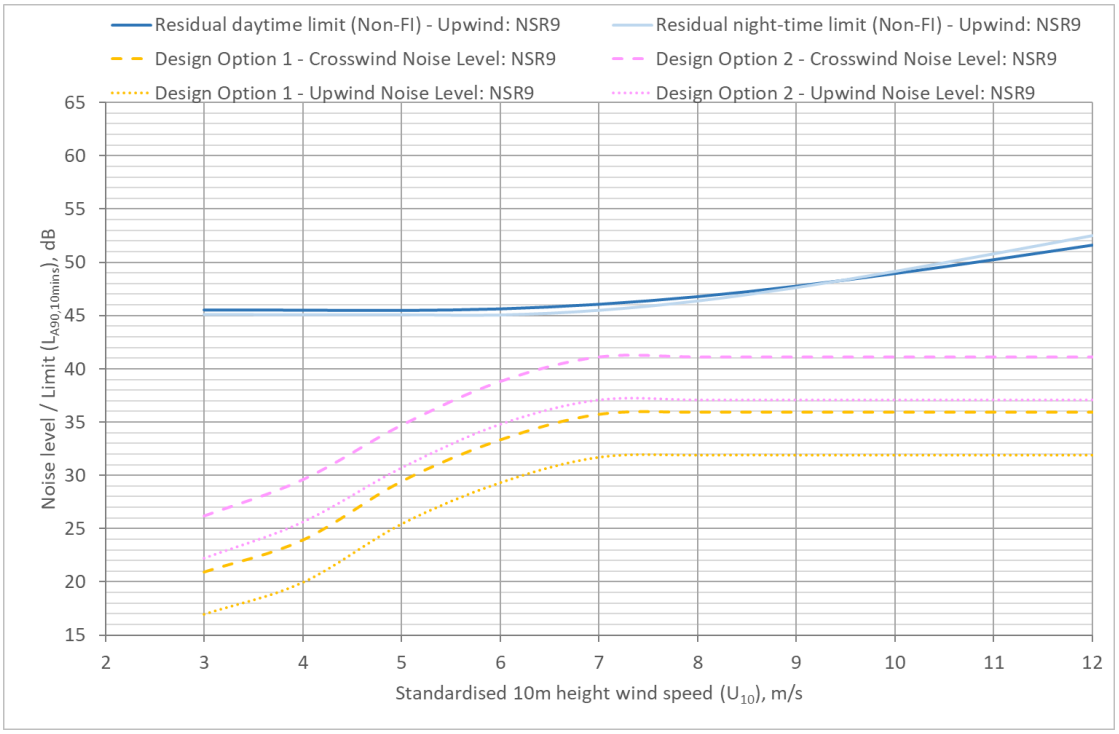


Plate 3-18: NSR9 (Residual Limit adopting LT3) Upwind – Daytime and Night-time Assessment limit, ($L_{A90,T}$, dB(A)) for the Cumulative WTG Noise Assessment



4 GLOSSARY OF TERMS AND ABBREVIATIONS

4.1.1.1 A list of key terms and acronyms used in this appendix are provided in **Table 4-1** and **Table 4-2**.

Table 4-1 Acronyms and abbreviations

Term	Definition
BaT	Baile an Truiseil (an existing wind farm)
dB	Decibel
dB(A)	A-weighted decibel
EIAR	Environmental Impact Assessment Report
IOA GPG	The Institute of Acoustics' guidance document: *A Good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise*
m	metres
m/s	metres per second
MHWS	Mean High Water Springs
NSR	Noise Sensitive Receptor
OCAS	Offshore Cable Area of Search
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
WTG	Wind Turbine Generator

Table 4-2 Glossary

Term	Meaning
A-weighting	Frequency weighted sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{A90,T}$	A statistical noise index defined as the level that is exceeded for 90% of the time over the measurement time period T. The 'A' denotes that the level is determined with 'A-weighting' applied.
U_{10}	Wind speed at standardised 10 m height

5 REFERENCES

Institute of Acoustics (IOA). (2013). *A Good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise*. St Albans, UK: Institute of Acoustics. Available at: https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf [Accessed 17 February 2026].