

# **Environmental Report ('ER') – Volume 2 Appendices**

**Proposed 110kV Substation and  
Underground Grid Connection  
at  
Killoran, Co. Tipperary**

**On behalf of  
Soleiricity Lisheen Ltd**



**Environmental Report ('ER') – Volume 2  
Proposed 110kV Substation and Underground Grid Connection  
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## APPENDIX 8

# APPENDIX 8-1

## Glossary of Acoustic Terminology

### Abbreviation / Description Descriptor

A Weighted	A time weighting given to noise values to amend the values to suit the human ear response to the various frequency components of the sound.
Acoustic environment	Sound from all sound sources as modified by the environment (BS ISO 12913-1:2013).
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.  <i>Note: The ambient sound comprises the residual sound and the specific sound when present.</i>
Ambient sound level, $L_a = L_{Aeq, T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.  <i>Note: the ambient sound level is a measure of the residual sound and the specific sound when present.</i>
Background sound level, $L_{A90, T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
dB (decibel)	A relative unit of measurements, based on a logarithmic scale to describe the ratio between the measured level and a reference or threshold level of 0dB. Unless otherwise stated 0dB within this report is $2 \times 10^{-5}$ pascals (Pa).
Day	A 24 hour period from midnight to midnight.
Daytime	A 12 hour period between 07:00 – 19:00 hours, as per NG4
Evening-Time	A 4 hour period between 19:00 – 23:00 hours, as per NG4
Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T=t_2-t_1$ , has the same mean-squared sound pressure as a sound that varies with time, and is given the following equation:  $L_{Aeq,T} = 10 \lg_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2 / p_0^2] dt \right\}$ <p>where:  <math>p_0</math> is the reference sound pressure (20 <math>\mu</math>Pa); and  <math>p_A(t)</math> is the instantaneous A-weighted sound pressure (Pa) at time t</p> <i>Note: The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.</i>
$L_{AN, T}$	The Fast interval, A-Weighted noise level in the for the 'N' percentile of the sampling interval 'T'.
$L_{A10, T}$	The A-Weighted noise level for the 10%ile of the sampling interval 'T', typically utilised to represent peak noise events such as intermittent passing traffic.
$L_{A90, T}$	The A-Weighted noise level in the lower 90 percentile of the sampling interval 'T', excludes intermittent features typical of traffic. See also background sound level.
$L_{A95, T}$	The A-Weighted noise level for the 95%ile of the sampling interval 'T'. Representative of steady noise events at a monitoring location.

L <sub>Aeq,T</sub>	The equivalent continuous sound level, used to describe the fluctuating noise in terms of a single noise level over the same sampling time period (T). Also see ambient sound.
L <sub>den</sub>	Day-evening-night equivalent level, calculated as: $L_{den} = 10 \log \frac{1}{24} \left( 12 * 10^{\frac{L_{day}}{10}} + 4 * 10^{\frac{L_{evening} + 5}{10}} + 8 * 10^{\frac{L_{night} + 10}{10}} \right)$ <p>Where the L<sub>day</sub>, L<sub>evening</sub> and L<sub>night</sub> are as defined in ISO1996-2:1987, and for the duration of 12 hours, 4 hours and 8 hours respectively, are A-weighted long term Leq sound level.</p>
L <sub>day</sub>	Day equivalent level. A-weighted Leq sound level measured over the 12 hour period from 07:00 hours to 19:00 hours.
L <sub>evening</sub>	Evening equivalent level. A-weighted Leq sound level measured during the evening period of 19:00 hours to 23:00 hours.
L <sub>Amax</sub>	The maximum RMS A-Weighted sound pressure level occurring within a specified time period.
L <sub>night</sub>	Night equivalent level. A-weighted Leq sound level measured during the night period of 23:00 hours to 07:00 hours.
Measurement time interval, T <sub>m</sub>	total time over which measurements are taken.  <i>Note: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.</i>
Rating level, L <sub>A,r, T<sub>r</sub></sub>	specific sound level plus any adjustment for the characteristic features of the sound.
Reference time interval, T <sub>r</sub>	specified interval over which the specific sound level is determined.  <i>Note: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h</i>
Residual sound	ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, L <sub>r</sub> = L <sub>Aeq,T</sub>	equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Specific sound level, L <sub>s</sub> = L <sub>Aeq,Tr</sub>	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T <sub>r</sub> .
Specific sound source	sound source being assessed.
Night-Time	An 8 hour period between 23:00 – 07:00 hours, as per NG4
Noise Ambient	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far. Also see ambient sound.
Noise Background	The steady existing noise level present without contribution from any intermittent sources, The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, 'T' (L <sub>AF90,T</sub> ). Also see background sound level, L <sub>A90, T</sub> .
Noise Specific	The sound arising from the source under investigation, disregarding all external and residual sources. Also see specific sound source.
NSR	Noise Sensitive Receptor - an identified dwelling, amenity area, recreational zone or other such place where a change in noise may result in a nuisance impact.
RMS	Root Mean Squared, mathematical method to account for swells and troughs within wave forms, such as sound.

Sound Power Level ( $L_W$ )	The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m <sup>2</sup> . Utilised to express the intensity at source of a noise emission.
Sound Pressure Level ( $L_P$ )	Fluctuations in air pressure caused by the passage of a sound wave. The measurement of sound/noise through the use of a sound level meter, is a representation of these fluctuations in air pressure as they pass the instrument microphone.
Time Weighting	One of the averaging time for noise monitoring instrumentation: F – Fast, instrument samples every 125 milliseconds; S – Slow, instrument samples every 1 second; I – Impulsive, instrument samples every 35 milliseconds.

**Note:**

Unless otherwise stated all broadband noise values are A-weighted with a fast response.

Where 0dB is referenced it refers to the threshold of hearing –  $2 \times 10^{-5}$ Pa.

All 1/3 octave values are unweighted/linear. (z-weighted on the Bruel and Kjaer software)

## APPENDIX 8-2

## Input - Sources and Receivers

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Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Point sources, for method Industrial noise - ISO 9613-2:2024

Name	Desc.	Height	Terrain L	HDef.	Type	DI	DI_Horz	DI_Vert	DI(0)
Trans1	Power Transformer 1	1.50	128.00	Relative	Normal point source	none	0	0	0.0

## Input - Sources and Receivers

---

Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Point sources, for method Industrial noise - ISO 9613-2:2024

Name	DI (10)	DI (20)	DI (30)	DI (40)	DI (50)	DI (60)	DI (70)	DI (80)	DI (90)	DI (100)	DI (110)	DI (120)
Trans1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## Input - Sources and Receivers

---

Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Point sources, for method Industrial noise - ISO 9613-2:2024

Name	DI (130)	DI (140)	DI (150)	DI (160)	DI (170)	DI (180)	Ca (D)	Ca (E)	Ca (N)	Weighting	No refl.
Trans1	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	A	No

## Input - Sources and Receivers

---

Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Point sources, for method Industrial noise - ISO 9613-2:2024

Name	No building	No ind.site	Lw 31	Lw 63	Lw 125	Lw 250	Lw 500	Lw 1k	Lw 2k	Lw 4k	Lw 8k
Trans1	No	No	--	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00

## Input - Sources and Receivers

---

Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Point sources, for method Industrial noise - ISO 9613-2:2024

Name	Red 31	Red 63	Red 125	Red 250	Red 500	Red 1k	Red 2k	Red 4k	Red 8k
Trans1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Input - Sources and Receivers

---

Model: Final Model  
version of Area - Area  
Group: (main group)  
Listing of: Receivers, for method Industrial noise - ISO 9613-2:2024

Name	Desc.	Terrain L	HDef.	Height A	Height B	Height C	Height D	Height E	Height F	Façade
NSR01	South	127.04	Relative	1.50	4.00	--	--	--	--	No
NSR02	West	128.00	Relative	1.50	4.00	--	--	--	--	No
NSR03	West	126.67	Relative	1.50	4.00	--	--	--	--	No
NSR04	South	128.00	Relative	1.50	4.00	--	--	--	--	No
NSR05	East	126.00	Relative	1.50	4.00	--	--	--	--	No
NSR06	Commercial	128.00	Relative	1.50	4.00	--	--	--	--	Yes

## APPENDIX 8-3

## Output - Results

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Report: Table of Results  
Model: Final Model  
LAeq: total results for receivers  
Group: (main group)  
Group Reduction: No

Name								
Receiver	Description	X	Y	Height	Day	Evening	Night	Lden
NSR01_A	South	621425.63	665942.83	1.50	17.8	17.8	17.8	24.2
NSR01_B	South	621425.63	665942.83	4.00	18.2	18.2	18.2	24.6
NSR02_A	West	621054.62	666428.16	1.50	21.1	21.1	21.1	27.5
NSR02_B	West	621054.62	666428.16	4.00	21.4	21.4	21.4	27.8
NSR03_A	West	620744.71	666523.51	1.50	16.6	16.6	16.6	23.0
NSR03_B	West	620744.71	666523.51	4.00	17.0	17.0	17.0	23.4
NSR04_A	South	621667.02	666476.07	1.50	29.4	29.4	29.4	35.8
NSR04_B	South	621667.02	666476.07	4.00	29.5	29.5	29.5	35.9
NSR05_A	East	622990.46	667237.20	1.50	9.6	9.6	9.6	16.0
NSR05_B	East	622990.46	667237.20	4.00	10.0	10.0	10.0	16.4
NSR06_A	Commercial	621409.99	666642.30	1.50	33.6	33.6	33.6	40.0
NSR06_B	Commercial	621409.99	666642.30	4.00	34.7	34.7	34.7	41.1

All shown dB values are A-weighted