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ELGIN ENERGY ES CO LIMITED

SOLAR FARM, PENTRE BACH

BS4142 NOISE ASSESSMENT REPORT

JULY 2024

DATE ISSUED: JULY 2024
JOB NUMBER: CA11956
REPORT NUMBER: 0001
VERSION: V2.1
STATUS: FINAL

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JULY 2024

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EXECUTIVE SUMMARY

Wardell Armstrong LLP (WA) has carried out a noise assessment and prepared a report to accompany a planning application for a proposed solar farm on land at Pentre Bach, Cwmbran. An assessment has been carried out to consider the impact of the operational phase of the development.

The assessment indicates that the proposed development would have no more than a low impact on all receptors and no mitigation is required to reduce noise levels.

The assessment has been undertaken in accordance with all relevant noise policies and there are no planning or technical reasons why this application should be refused on noise grounds.

1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP (WA) has carried out a noise assessment and prepared a report to accompany a planning application for a proposed solar farm on land at Pentre Bach Farm, Cwmbran. The development will comprise photovoltaic modules, inverter substation, a substation compound and a Battery Energy Storage System (BESS) facility.
- 1.1.2 The site layout is shown on drawing number 9007 and is located to the northwest of Pentre Bach. The site is largely surrounded by farmland with a small number of existing residential receptors near the site, with the closest being approximately 10m to the south of the site boundary.
- 1.1.3 This noise report assesses the potential noise impact of the proposed development upon existing nearby noise sensitive receptors. The assessment has been informed by the site layout plan which has been provided by Stantec.

2 ASSESSMENT METHODOLOGY

2.1 Consultation and Scope of Works

2.1.1 Consultation has been undertaken with Torfaen County Borough Council and it has been agreed the proposed development does not require noise to be assessed as part of an Environmental Impact Assessment.

2.1.2 The scope of the assessment includes a consideration of the impact of operational noise of the development upon existing noise sensitive receptors.

2.2 Noise Survey

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out an unattended noise survey to assess the existing noise levels at the nearest noise sensitive receptors. Details of the noise survey are provided within Section 3 of this report.

2.3 Assessment Methodology

2.3.1 An assessment is required to consider the potential noise levels at the site. The potential impacts of the existing and proposed sources of noise on the existing and proposed residential areas have been assessed with reference to the following guidance, details of which are included within Appendix A;

- Planning Policy Wales, 2021
- Technical Advice Note 11: Noise (TAN 11)
- BS8233: 2014 - Guidance on sound insulation and noise reduction for buildings, (BS8233).
- BS4142: 2014 +A1 2019 – Methods for rating and assessing industrial and commercial sound (BS4142);

2.4 Noise Sensitive Receptors

2.4.1 The assessment will address the potential noise impact of the proposed development upon existing noise sensitive receptors. The noise sensitive receptors are described in Table 1 and shown on drawing no. CA11956-002.

Table 1: Sensitive Receptors			
Noise sensitive receptors	Grid reference		Proximity to site boundary
	Northing	Easting	
ESR1 – Property on Pentre Lane	328223	192026	10m
ESR2 – Chapel House	327393	192825	576m
ESR3 – Hollybush	328317	193475	503m

3 NOISE SURVEY

3.1.1 From 7th to the 12th of April 2021, Wardell Armstrong LLP carried out a noise survey at the nearest receptors to the proposed application site.

3.1.2 Noise measurements were carried out at three monitoring locations. The monitoring locations were chosen to be representative of existing noise at the nearest noise sensitive receptors.

3.1.3 The monitoring locations are detailed in Table 2 and are shown on drawing no. CA11956-001.

Table 2: Details of Noise Monitoring Locations				
Monitoring Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
1	Adjacent to the southern boundary on Pentre Lane	1000 hrs 07/04/21	0700hrs 08/04/21	Unattended
2	Approximately 530m west of the site on Maescoed Road	2000 hrs 08/04/21	1600 hrs 09/04/21	Unattended
3	Approximately 600m to the north of site near to Hollybush Housing Estate	1900 hrs 09/04/21	1000hrs 12/04/21	Unattended

3.1.4 The chosen locations are considered representative of the existing sensitive receptors (ESRs) as follows:

- ML1 – ESR1
- ML2 – ESR2
- ML3 – ESR3

3.1.5 The noise measurements were made using a Class 1, integrating sound level meter. In accordance with guidance, the meter was mounted vertically on a tripod 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces.

3.1.6 The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No significant drift in the calibration during the survey was noted.

3.1.7 Noise monitoring took place during dry and calm weather conditions.

- 3.1.8 A-weighted¹ L_{eq} ² and L_{90} ³ noise levels were measured to comply with the requirements of BS8233 and BS4142. Maximum sound pressure levels were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.
- 3.1.9 During the site visit, observations and detailed notes were made of the significant noise sources which contributed to each of the measured levels. The observations identified the following:

Traffic Noise: Noise levels were low at the monitoring locations. Occasional traffic noise was present on Pentre Lane. Traffic noise was dominant on Maescoed Road.

Other: Birdsong was audible throughout the survey.

¹ A' Weighting An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

² L_{eq} Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

³ L_{90} The noise level which is exceeded for 90% of the measurement period.

4 ASSUMPTIONS, LIMITATIONS AND UNCERTAINTY

4.1 Introduction

4.1.1 This assessment is affected by the following assumptions and limitations.

4.2 Assumptions

- The equipment associated with the proposed development will operate at 100% of its operating power simultaneously, during hours of sunlight i.e., worst case.
- The cooling fans on the inverters will operate at full speed during periods of peak operation and high temperatures.
- The inverters should include vibration dampeners to eliminate any critical frequencies and therefore any tonal characteristics.
- The noise specifications for the inverters are based on a typical model for this type of development. The typical model used for the assessment is an ABB Megawatt Station PVS800.
- The BESS Facility will be operating at full capacity throughout the daytime and night-time.
- The equipment installed will be serviced as instructed.

4.3 Limitations

4.3.1 The layout and equipment specification used for the assessment are indicative only. Therefore, the modelled results are indicative only.

4.4 Uncertainty

4.4.1 To reduce the uncertainty within this assessment, the following steps have been taken:

- In accordance with guidance, the microphone was mounted vertically on a tripod 1.5 m above the ground. MLs were more than 3.5 m from reflecting surfaces (excluding the ground);
- Distances have been measured using scale plans;
- The noise measurements were taken using a Class 1, integrating sound level meter; and
- The sound level meter and microphone were calibrated prior to and after the noise survey where, no significant drift was recorded.

5 NOISE IMPACT ASSESSMENT

5.1 Introduction

5.1.1 The noise sources associated with the proposed development have been assessed to determine the potential noise impact on existing receptors.

5.2.1 Noise Model Set-up

1.1.1 The assessment of sound propagation from the site and its potential noise impacts on ESRs, has been undertaken using SoundPLAN version 8.2 (SPv8.2)

1.1.2 SPv8.2 software uses geographical information to create a model of the study area on which to generate noise contours. This includes intervening objects such as buildings and topography, that affect the propagation path.

1.1.3 SPv8.2 models use the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors'. The contours show the noise levels emanating from the site as a function of distance.

1.1.4 The model has an assumed temperature of 10°C, 70% humidity and 1013.3 mbar air pressure. The dominant ground covering is soft therefore the ground absorption has been set to 0.8 (in which 0 = hard and 1 = completely absorbent).

5.2 BS4142 Assessment of the Solar Farm

5.2.1 The solar farm includes inverters which emit noise. There are 10 inverters included within the proposals, which are shown on drawing no. 9007. To the north-east of the development is a BESS Facility which has 10 battery units and a substation compound.

5.2.2 During summer months, when the sun can shine before 0700, the inverters could be operational during what is the night-time in planning terms. Therefore, a daytime and night-time assessment has been undertaken.

Identification of the Specific Noise

5.2.3 The specification of the inverters is not yet confirmed; however, a typical model has been proposed. The typical model used for the assessment is an ABB Megawatt Station PVS800. The sound power level of each inverter is 75dBA. To provide a robust assessment, it will be assumed that all inverters will be operational at any one time.

5.2.4 The proposed BESS facility to the northeast of site has been predicted using data provided by the client. Each BESS Unit has been modelled as two-point sources as each unit has a Power Conversion Unit attached. The sound power level of the BESS Unit is

91dBA and the Power Conversion Unit is 89dBA. To provide a robust assessment, the prediction assume that the BESS facility will be operating at full capacity.

5.2.5 SoundPLAN has been used to determine the noise level at each ESR when all inverters are operational. The noise model graphic is shown drawing no. CA11956-003. These figures will be used as the specific noise levels for the assessment. The noise levels at the ESRs are shown in Table 3 below.

Table 3: Specific Noise Levels (Figures in dBA)			
ESR	1	2	3
Specific Noise Level	33	27	28

Application of Acoustic Feature Penalties

5.2.6 BS4142 includes a section on identifying acoustic features which can increase the significance of impact over that expected from the basic comparison of the specific sound level and the background sound level.

5.2.7 The inverters should include vibration dampeners to eliminate any critical frequencies and therefore any tonal characteristics. Therefore, no penalty has been included for tonal features.

5.2.8 The inverters may be intermittent due to sunlight, however, due to the low noise levels at the receptors, it is considered that this would be imperceptible. Therefore, no penalty has been included for intermittency.

5.2.9 The inverters are not considered to be impulsive in nature and therefore no penalty has been included for this.

Identification of the Background Noise

5.2.10 Due to constant nature of the operation of the inverters and BESS Facility, it is considered suitable to use the average background noise level measured at each location. Daytime noise levels have been averaged from 0700hrs to 2200 hrs as these would be the extent of daylight hours. Night-time noise levels have been averaged from 0400hrs to 0700hrs as these would be the extent of daylight hours during the night-time. The selected background noise measurements for each ESR are shown in Table 4.

Table 4: Background Noise Levels (Figures in dBA L₉₀)			
ESR	1	2	3
Daytime	32	40	39
Night-time	32	34	34

5.2.11 In accordance with BS4142 the rating noise levels of the solar farm have been compared with the corresponding measured background noise levels, as shown in Tables 5 and 6.

Table 5: BS4142 Daytime Assessment of Solar Farm – (Figures in dBA)			
	ESRs		
	1	2	3
Specific Noise i.e., noise level of the operational activities	33	27	28
Acoustic Feature Correction	+0	+0	+0
Rating Level	33	27	28
Background Noise Level	32	40	39
Excess of rating over background level	+1	-13	-11

Table 6: BS4142 Night-time Assessment of Solar Farm – (Figures in dB(A))			
	ESRs		
	1	2	3
Specific Noise i.e., noise level of the operational activities	33	27	28
Acoustic Feature Correction	+0	+0	+0
Rating Level	33	27	28
Background Noise Level	32	34	34
Excess of rating over background level	+1	-7	-6

5.2.12 The results of the initial BS 4142 estimate show that noise from the proposed development will exceed the background sound level at ESR1 during the daytime and night-time by +1dB. However, the background sound level wont be exceeded at ESR2 and 3 during the daytime and night-time. This indicates that there will be no more than a “low” impact, depending on the context.

5.2.13 To understand the true significance of the potential noise impacts, consideration of the context has been undertaken below in accordance with BS 4142.

BS4142 Context Assessment

Absolute Level of Sound

5.2.14 The impact of a given difference between the rating level of the noise from the inverters and the background noise level will depend upon whether the residual sound level is low or high. The magnitude of the overall impact might be greater for an

acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

5.2.15 The residual level is low, and the rating level is low at all receptors, it is therefore likely that the noise from solar farm would have a lower impact on the receptors, than is suggested by Tables 5 and 6.

Character & Level of Residual Sound

5.2.16 The proposed development is in a rural area and dominated by light traffic. The solar farm noise is industrial in nature and could therefore alter the character of noise at the ESRs, however as the solar farm noise levels are so low, this is unlikely.

5.2.17 The existing residual sound level is relatively low as is the rating level. It is unlikely that the noise from the solar farm would alter the residual noise levels, which would suggest that the impact at the receptors could be lower than indicated in Tables 5 and 6.

Sensitivity of Receptor & Existing Acoustic Conditions

5.2.18 The ESRs are residential in nature with low background noise levels and therefore the sensitivity of the receptors is high. However, the noise levels from the solar farm will be low at the receptors and as such the impact will be low.

BS4142 Assessment Summary

5.2.19 A BS4142 assessment has been undertaken to assess the potential noise impact from solar farm at the existing sensitive receptors.

5.2.20 The assessment indicates that the noise associated with the solar farm will have a low impact on all nearby residential receptors and therefore no mitigation is required to reduce noise levels associated with the development.

6 CONCLUSIONS

- 6.1.1 Wardell Armstrong LLP (WA) has carried out a noise assessment and prepared a report to accompany a planning application for a proposed solar farm on land at Pentre Bach Farm, Cwmbran. An assessment has been carried out to consider the effect of noise from the operational phase of the development.
- 6.1.2 The results indicate that the solar farm would have no more than a low impact (the lowest category set out in the British Standard) on all nearby sensitive receptors and no mitigation would be required to reduce noise from the inverters associated with the proposed solar farm.
- 6.1.3 The assessment has been undertaken in accordance with all relevant noise policies and there are no planning or technical reasons why this application should be refused on noise grounds.

APPENDICES

Appendix A

Legislation, Policy and Guidance

Policy, Standards and Guidance

Appendix A

Planning Policy Wales

Planning Policy Wales (PPW) is the current planning policy guidance within Wales. The planning guidance defines the primary objective of the document in paragraph 1.2 as follows:

‘...to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales...’

In particular reference to noise Paragraph 6.7.3 of the PPW states:

‘Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Noise action plans drawn up by public bodies aim to prevent and reduce noise levels where necessary and preserve soundscape quality where it is good. Noise levels used to identify priority areas contained in noise actions plans are usually set quite high in order to focus resources on the most polluted areas and noise must meet a number of tests before it qualifies as a statutory nuisance. Lower levels of noise however, can still be annoying or disruptive and impact on amenity and as such should be protected through the planning process wherever necessary.’

Technical Advice Note 11: Noise (TAN 11)

TAN 11 is used to categorise noise levels for proposed residential developments. TAN 11 presents four noise exposure categories (NECs), ranging from A to D, where A represents the lowest noise levels, and D is for sites with higher noise levels. A breakdown of the NECs, and subsequent advice is provided below in Table 1 and 2.

Time	Noise Exposure Category			
	A	B	C	D
0700-2300	<55	55 - 63	63 - 72	>72
2300-0700 ⁽²⁾	<45	45 - 57	57 - 66	>66

Footnote

⁽¹⁾ **Noise levels:** the noise level(s) ($L_{Aeq,T}$) used when deciding the NEC of a site should be representative of typical conditions.

⁽²⁾ **Night-time noise levels (2300-0700):** sites where individual noise events regularly exceed $82dB_{LAmax}$ (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8H}$ (except where the $L_{Aeq,8H}$ already puts the site in NEC D).

Table 2: Advice relating to noise exposure category		
NEC	Significance	Advice
A	Negligible	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Minor	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Moderate	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Major	Planning permission should normally be refused.

TAN 11 also states that:

“This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.”

British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings

British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;

- 35 dB L_{Aeq} (16 hour) during the day time in noise sensitive rooms
- 30 dB L_{Aeq} (8 hour) during the night time in bedrooms
- 45 dB $L_{Amax,F}$ during the night time in bedrooms
- 50 dB L_{Aeq} (16 hour) desirable external noise levels for amenity space such as gardens and patios
- 55 dB L_{Aeq} (16 hour) upper guideline value which would be acceptable in noisier environments.

In addition, for internal noise levels it states;

“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

Furthermore, with regard to external noise, the Standard states;

“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas,

such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound (BS4142):

BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

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

The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:
 - 1) Investigating complaints;
 - 2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
 - 3) Assessing sound at proposed new dwellings or premises used for residential purposes.

The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

BS4142 refers to noise from the industrial source as the ‘specific noise’ and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with industrial noise. The ‘specific noise’ sources, of the existing industrial premises that have been observed are detailed in Section 3 of this report.

BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 of this report provides details of the background noise survey undertaken.

Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Appendix B

Noise monitoring Results

Appendix B
Noise Monitoring Results

Monitoring Location 1 – Adjacent to the southern site boundary on Pentre Lane						
Time	L_{Aeq} (dB)	L_{A min} (dB)	L_{A max} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
07/04/2021 – Daytime						
1000-1100	49.1	28.9	75.1	30.7	41.0	Low noise level. Occasional traffic on Pentre Lane. Birdsong
1100-1200	50.0	28.6	78.1	29.8	41.5	
1200-1300	46.5	28.6	75.5	29.9	39.8	
1300-1400	48.9	29.0	74.5	30.5	47.2	
1400-1500	45.4	28.8	76.1	30.5	40.9	
1500-1600	49.9	28.9	77.8	30.4	41.8	
1600-1700	48.7	29.6	73.8	31.7	49.7	
1700-1800	49.0	29.5	77.5	31.2	45.6	
1800-1900	48.9	29.4	76.4	31.8	46.4	
1900-2000	52.8	29.1	74.1	31.3	48.3	
2000-2100	45.3	28.4	72.3	29.3	40.3	
2100-2200	44.0	28.5	75.3	29.0	35.4	
2200-2300	30.9	28.2	45.5	29.0	32.2	
07-08/04/2021 – Night-time						
2300-2315	29.8	28.0	38.0	28.3	31.1	Low noise level. Occasional traffic on Pentre Lane. Birdsong
2315-2330	29.9	28.0	40.8	28.5	31.1	
2330-2345	29.5	27.9	38.7	28.3	30.5	
2345-0000	29.3	27.8	41.3	28.3	30.0	
0000-0015	29.6	28.1	37.0	28.3	30.9	
0015-0030	29.2	28.0	37.0	28.4	29.9	
0030-0045	29.3	27.9	42.5	28.3	29.5	
0045-0100	30.9	28.0	46.5	28.4	31.7	
0100-0115	29.4	27.9	38.2	28.3	30.2	
0115-0130	29.6	27.9	42.4	28.2	30.2	
0130-0145	29.2	28.0	41.5	28.3	29.3	
0145-0200	29.0	27.8	34.1	28.4	29.5	
0200-0215	29.6	28.5	34.5	28.8	30.1	
0215-0230	29.1	28.5	32.8	28.7	29.4	
0230-0245	29.4	28.4	33.1	28.8	29.7	
0245-0300	32.4	28.6	48.9	29.0	33.4	
0300-0315	30.0	28.6	37.6	28.9	30.9	
0315-0330	29.2	28.4	33.1	28.7	29.4	
0330-0345	29.2	28.2	37.0	28.6	29.4	
0345-0400	29.4	28.6	32.2	28.9	29.7	
0400-0415	29.5	28.5	32.4	28.9	29.9	
0415-0430	29.8	28.8	32.8	29.2	30.3	
0430-0445	30.2	29.2	35.3	29.4	30.8	
0445-0500	29.8	28.8	33.0	29.2	30.2	
0500-0515	30.6	28.6	38.4	29.2	31.9	
0515-0530	30.2	29.1	34.3	29.5	30.7	
0530-0545	31.0	29.4	38.6	29.8	32.0	
0545-0600	53.3	29.7	68.9	30.8	57.8	
0600-0615	48.9	34.9	65.6	41.3	52.1	
0615-0630	48.2	33.8	63.1	36.6	51.3	
0630-0645	41.8	33.7	55.8	35.3	44.6	
0645-0700	41.6	33.7	57.6	35.3	42.9	
08/04/2021 – Daytime						
0700-0800	48.3	34.1	77.4	36.6	44.5	

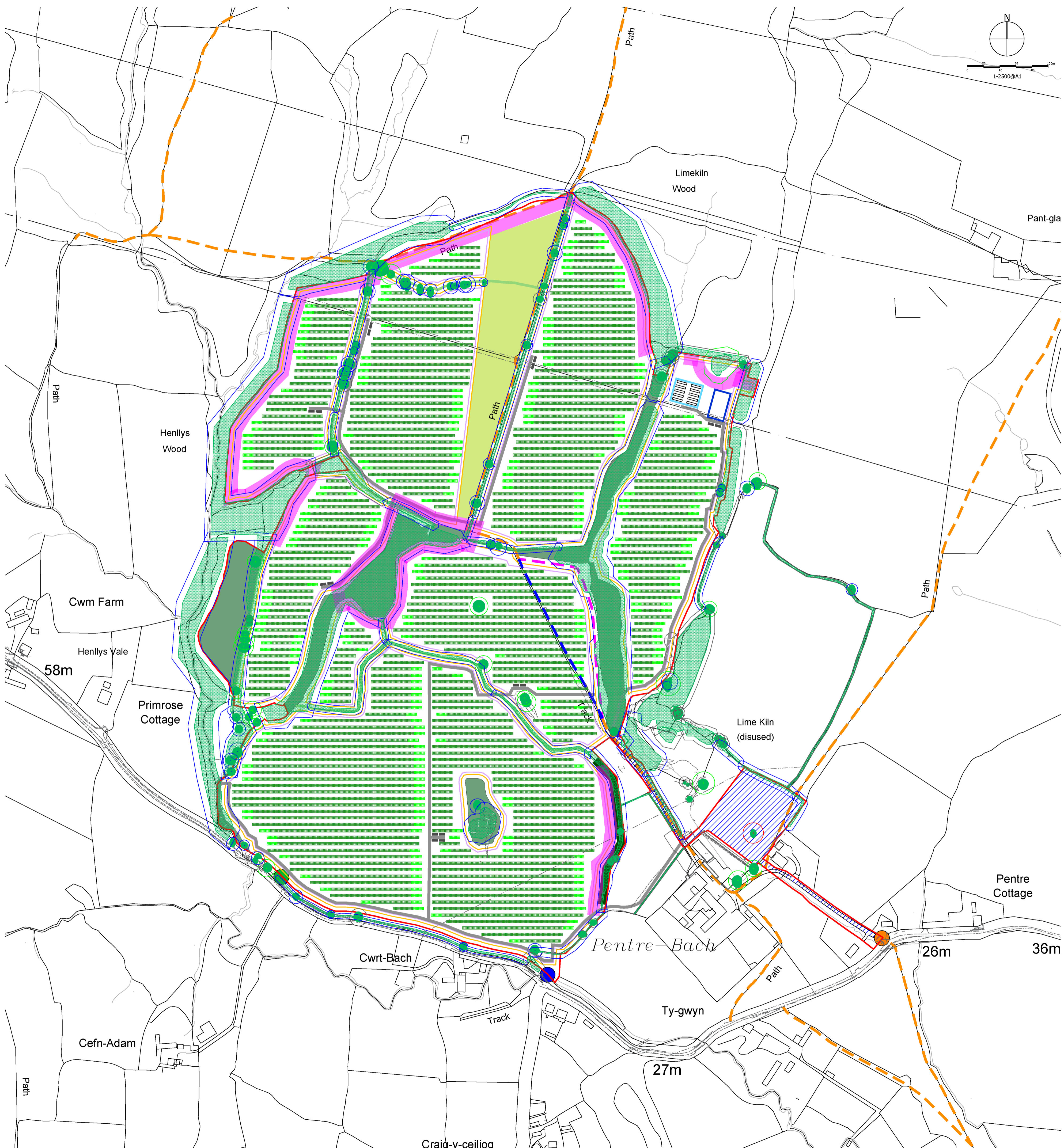
0800-0900	48.4	32.2	76.3	34.8	46.7	Low noise level. Occasional traffic on Pentre Lane. Birdsong
0900-1000	55.3	32.3	76.1	35.0	51.3	
Monitoring Location 2 – Approximately 530m west of the site on Mescoed Road						
Time	LAeq (dB)	LA min (dB)	LA max (dB)	LA90 (dB)	LA10 (dB)	Comments
08/04/2021 - Daytime						
2000-2100	65.5	28.0	85.7	32.4	63.2	Traffic on Mescoed Road dominant noise source. Birdsong
2100-2200	64.4	26.8	91.4	28.5	58.9	
2200-2300	61.7	24.9	85.8	26.8	54.4	
08-09/04/2021 – Night-time						
2300-2315	63.8	26.0	86.4	27.0	58.0	Traffic on Mescoed Road dominant noise source. Birdsong
2315-2330	56.3	25.3	82.1	26.2	32.8	
2330-2345	57.7	26.3	81.1	27.7	42.5	
2345-0000	56.3	26.8	78.7	28.2	40.0	
0000-0015	61.3	26.8	83.7	29.8	42.4	
0015-0030	58.5	26.5	83.3	28.4	41.2	
0030-0045	30.9	25.6	44.1	26.6	33.2	
0045-0100	53.6	25.7	79.1	27.5	37.9	
0100-0115	53.6	26.4	78.6	29.5	46.9	
0115-0130	52.6	31.8	77.5	35.3	51.9	
0130-0145	52.3	30.3	77.4	34.5	47.4	
0145-0200	38.5	26.1	52.8	27.6	42.0	
0200-0215	51.5	23.7	79.8	25.6	33.4	
0215-0230	53.5	24.5	80.2	25.8	33.0	
0230-0245	54.6	24.4	78.7	26.2	38.0	
0245-0300	29.2	23.3	51.9	24.3	30.1	
0300-0315	55.5	23.1	82.0	23.7	29.0	
0315-0330	50.5	23.0	77.4	23.6	31.2	
0330-0345	55.1	22.9	80.3	23.4	30.7	
0345-0400	29.7	23.2	42.1	23.9	33.5	
0400-0415	51.4	23.4	78.6	24.0	31.4	
0415-0430	57.0	23.3	82.9	23.9	35.5	
0430-0445	57.9	23.6	81.8	24.6	39.0	
0445-0500	53.7	23.8	81.7	24.9	35.7	
0500-0515	64.2	26.2	85.0	28.6	56.4	
0515-0530	68.0	27.1	94.5	34.4	52.2	
0530-0545	68.3	32.0	88.2	35.8	63.0	
0545-0600	63.7	38.3	82.6	47.4	63.4	
0600-0615	65.1	35.7	85.4	41.2	64.5	
0615-0630	69.1	34.6	87.8	39.5	63.8	
0630-0645	70.1	35.5	85.5	40.8	69.4	
0645-0700	68.8	36.1	85.8	40.3	67.1	
09/04/2021 – Daytime						
0700-0800	71.1	33.9	87.6	41.1	75.2	Traffic on Mescoed Road dominant noise source. Birdsong
0800-0900	70.3	35.8	87.9	44.0	74.8	
0900-1000	67.9	38.9	85.0	45.5	69.4	
1000-1100	68.2	35.6	84.1	41.5	72.3	
1100-1200	67.2	33.2	84.2	39.6	71.0	
1200-1300	67.4	33.6	84.2	41.2	71.6	
1300-1400	71.6	33.7	87.0	42.0	76.3	
1400-1500	69.4	32.9	85.7	40.5	74.3	
1500-1600	69.3	34.6	84.3	42.0	74.5	

Monitoring Location 3 – Approximately 600m north of site near to Hollybush Housing Estate						
Time	L_{Aeq} (dB)	L_{A min} (dB)	L_{A max} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
09/04/2021 – Daytime						
1900-2000	42.7	33.5	55.4	37.1	45.2	Low noise level. Distant traffic noise. Birdsong
2000-2100	46.3	32.7	67.8	37.3	45.8	
2100-2200	38.3	32.7	47.1	35.4	40.2	
2200-2300	38.2	31.2	56.4	33.8	40.1	
09-10/04/2021 – Night-time						
2300-2315	36.8	31.5	49.6	33.2	38.7	Low noise level. Distant traffic noise. Birdsong
2315-2330	36.3	31.8	47.7	33.1	38.2	
2330-2345	35.1	29.5	44.9	31.6	37.7	
2345-0000	34.3	28.8	46.5	30.6	36.6	
0000-0015	34.7	27.6	51.1	29.7	36.3	
0015-0030	31.8	26.9	41.6	28.6	34.0	
0030-0045	34.0	28.1	41.4	30.4	36.2	
0045-0100	34.6	27.7	43.6	30.4	37.4	
0100-0115	33.0	27.9	45.1	29.9	35.0	
0115-0130	31.9	26.8	39.9	28.2	34.0	
0130-0145	31.5	26.3	42.0	27.7	34.3	
0145-0200	32.6	27.2	40.1	29.2	34.7	
0200-0215	30.7	26.6	36.9	27.9	32.9	
0215-0230	34.0	27.9	49.0	29.1	36.1	
0230-0245	31.0	25.6	41.7	27.2	33.1	
0245-0300	30.6	26.3	42.4	27.7	32.3	
0300-0315	31.0	26.8	41.0	27.9	33.1	
0315-0330	33.0	27.3	46.2	28.8	35.4	
0330-0345	31.0	26.7	38.8	28.4	32.8	
0345-0400	31.0	27.1	39.9	28.3	33.0	
0400-0415	32.4	26.3	44.3	27.8	35.0	
0415-0430	31.5	27.0	41.5	28.6	33.4	
0430-0445	32.9	28.0	45.8	29.3	34.9	
0445-0500	33.9	27.3	48.2	28.5	36.0	
0500-0515	33.5	28.1	41.5	30.1	35.8	
0515-0530	33.8	28.7	44.3	30.2	36.0	
0530-0545	46.3	30.9	59.4	34.3	50.2	
0545-0600	51.0	36.7	65.3	42.4	54.1	
0600-0615	46.4	34.7	62.0	39.1	48.2	
0615-0630	43.1	35.1	56.3	37.5	46.3	
0630-0645	44.7	35.9	61.6	38.1	46.6	
0645-0700	43.4	36.0	54.8	38.6	46.0	
10/03/2021 – Daytime						
0700-0800	42.9	36.4	61.4	39.1	44.6	Low noise level. Distant traffic noise. Birdsong
0800-0900	45.2	37.3	63.8	39.8	45.5	
0900-1000	47.8	38.2	67.9	41.0	47.3	
1000-1100	50.7	38.9	78.6	40.7	47.6	
1100-1200	48.1	38.7	71.4	40.4	48.0	
1200-1300	48.7	36.7	68.3	39.2	49.7	
1300-1400	48.5	37.2	71.5	40.4	49.6	
1400-1500	48.7	36.6	73.1	39.8	49.6	
1500-1600	47.4	36.4	64.7	39.8	49.1	
1600-1700	45.3	38.3	60.8	41.1	47.5	
1700-1800	46.4	40.1	58.7	42.5	48.9	
1800-1900	45.8	38.5	65.4	40.9	47.3	
1900-2000	48.6	36.8	77.5	39.0	44.5	
2000-2100	42.4	34.6	64.1	36.6	43.3	

2100-2200	38.5	32.1	56.6	34.6	39.6	
2200-2300	36.7	30.5	48.1	33.7	38.7	
10-11/04/2021 – Night-time						
2300-2315	35.8	31.3	42.8	32.8	37.7	Low noise level. Distant traffic noise. Birdsong
2315-2330	35.1	30.3	47.5	31.8	36.9	
2330-2345	33.5	29.0	41.1	30.9	35.3	
2345-0000	36.5	28.8	56.6	31.3	37.3	
0000-0015	35.4	29.9	45.3	31.9	37.8	
0015-0030	34.3	27.9	43.6	30.1	37.1	
0030-0045	33.2	26.6	47.4	28.5	35.5	
0045-0100	31.9	26.9	42.1	28.5	33.9	
0100-0115	34.8	27.3	45.4	29.4	37.7	
0115-0130	32.8	25.3	50.5	26.8	34.9	
0130-0145	33.6	26.2	44.8	28.5	35.9	
0145-0200	37.9	24.4	56.5	27.0	39.8	
0200-0215	30.0	24.2	40.5	25.8	32.7	
0215-0230	29.8	23.5	42.2	24.9	32.7	
0230-0245	30.9	24.5	42.2	26.1	33.7	
0245-0300	29.5	23.5	37.8	25.2	32.4	
0300-0315	30.9	24.3	41.5	25.1	34.4	
0315-0330	33.0	24.8	47.6	26.6	36.1	
0330-0345	30.8	25.2	44.8	26.6	33.4	
0345-0400	29.5	24.9	37.6	26.4	31.4	
0400-0415	28.1	23.7	38.4	25.2	30.0	
0415-0430	29.3	24.7	38.9	25.6	31.9	
0430-0445	32.5	24.0	45.8	25.6	35.4	
0445-0500	32.0	26.2	45.5	27.3	34.7	
0500-0515	32.2	25.6	45.1	27.7	35.2	
0515-0530	33.0	24.9	44.0	27.7	36.1	
0530-0545	42.7	28.0	54.2	32.5	46.7	
0545-0600	52.1	36.3	64.5	41.1	56.5	
0600-0615	46.0	33.1	67.7	37.3	48.7	
0615-0630	46.1	32.9	58.1	36.3	49.5	
0630-0645	46.2	34.1	62.9	36.7	48.4	
0645-0700	43.2	32.7	64.2	35.4	43.3	
11/04/2021 – Daytime						
0700-0800	44.3	31.0	60.8	35.7	46.6	Low noise level. Distant traffic noise. Birdsong
0800-0900	45.3	31.2	62.7	35.2	47.1	
0900-1000	45.4	32.8	66.5	36.1	46.6	
1000-1100	45.1	34.2	63.1	36.6	45.4	
1100-1200	49.3	33.4	74.3	36.8	49.5	
1200-1300	55.8	34.3	85.3	37.5	47.7	
1300-1400	47.7	34.5	68.3	38.0	49.6	
1400-1500	45.7	32.0	66.4	36.5	48.3	
1500-1600	46.5	31.4	59.4	38.5	49.4	
1600-1700	47.3	34.1	67.7	39.3	47.8	
1700-1800	44.5	35.4	62.6	38.6	46.0	
1800-1900	45.2	34.8	62.8	38.9	46.3	
1900-2000	44.3	36.6	63.4	39.4	46.7	
2000-2100	42.5	34.5	56.3	37.2	45.2	
2100-2200	40.1	30.8	51.7	35.2	42.9	
2200-2300	38.9	27.3	53.1	32.2	41.6	
11-12/04/2021 – Night-time						
2300-2315	37.5	29.2	50.8	31.4	40.2	Low noise level. Distant traffic noise. Birdsong
2315-2330	39.0	29.1	55.0	32.0	41.5	
2330-2345	36.4	27.5	54.8	29.5	38.2	

2345-0000	35.6	26.2	51.8	28.3	39.1	
0000-0015	35.4	26.5	48.9	27.8	38.9	
0015-0030	34.8	25.4	49.8	27.1	37.5	
0030-0045	33.4	24.9	50.7	27.5	35.0	
0045-0100	34.2	25.2	55.5	26.7	35.4	
0100-0115	35.9	25.8	47.9	29.0	39.2	
0115-0130	35.2	27.7	48.3	30.2	37.8	
0130-0145	40.4	24.5	58.8	26.5	40.1	
0145-0200	33.6	22.7	49.7	23.8	33.7	
0200-0215	30.0	22.7	46.1	24.3	32.7	
0215-0230	38.1	24.4	49.4	26.8	42.5	
0230-0245	44.7	23.3	62.2	25.4	43.9	
0245-0300	32.0	22.5	51.9	23.4	32.0	
0300-0315	35.3	22.8	54.1	24.6	37.5	
0315-0330	35.6	22.3	52.7	23.8	35.5	
0330-0345	37.1	23.2	54.6	24.9	39.0	
0345-0400	29.4	23.7	47.8	24.4	29.2	
0400-0415	35.7	24.7	50.3	26.3	40.0	
0415-0430	33.3	24.2	47.7	25.7	35.8	
0430-0445	35.2	25.6	54.0	27.1	37.9	
0445-0500	38.8	28.5	53.5	32.0	42.1	
0500-0515	40.9	32.1	53.4	34.0	44.2	
0515-0530	40.7	31.2	52.9	34.1	43.7	
0530-0545	47.3	36.3	57.9	40.3	50.5	
0545-0600	47.1	38.2	53.6	41.7	49.8	
0600-0615	49.4	39.8	58.6	43.8	52.6	
0615-0630	48.8	40.8	58.2	44.3	51.7	
0630-0645	53.5	40.4	73.1	44.0	50.8	
0645-0700	47.2	38.5	55.7	43.2	49.7	
12/04/2021 – Daytime						
0700-0800	48.7	40.9	59.4	44.8	51	Low noise level.
0800-0900	49.1	42	68.4	44.1	50.3	Distant traffic noise.
0900-1000	50.9	39.6	78.3	42.6	51.4	Birdsong

DRAWINGS



The scaling of this drawing cannot be assured
 Revision I Date 19.05.22 Dm KT Ckd TE
 Layout updated in accordance with arboricultural survey

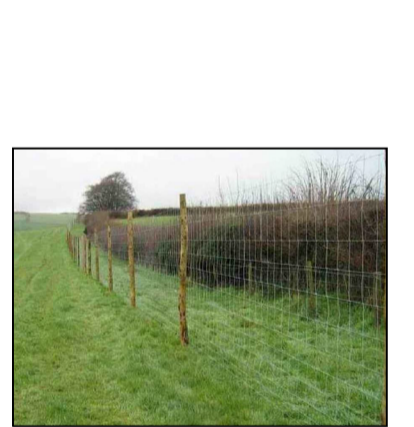
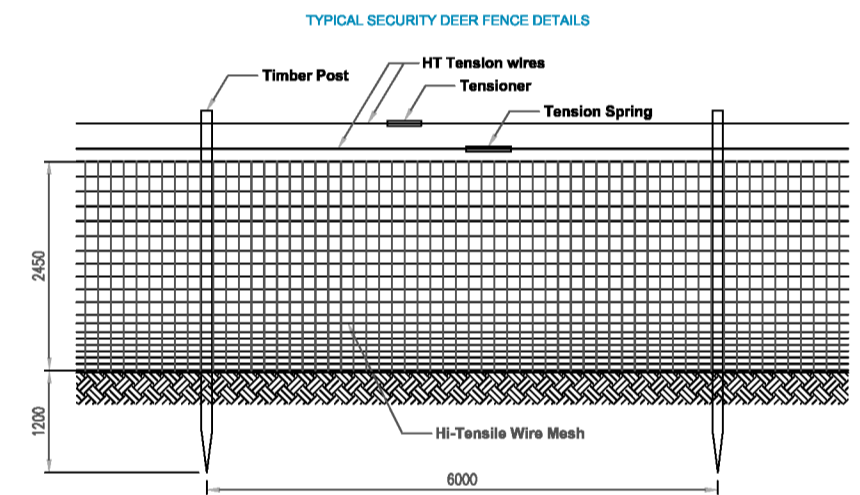
- Site Boundary
- Access Point A
- Access Point B
- Access Point C
- Energy Storage compound
- Substation
- 3.5m wide access track
- Inverter Substations
- Energy Storage Containers
- Public Right of Way
- Public Right of Way to be diverted
- Proposed new route for Public Right of Way
- Existing Hedgerow
- Fence (5m ecological buffer)
- 3m buffer from fence
- 2x12 Typical Module Panel
- 2x24 Typical Module Panel
- Existing Vegetation Retained
- Reinforce Existing Hedgerow - (To ensure no intervisibility between proposed panels and Pantre Bach Farmhouse)
- Construction Area
- 15m landscape buffer
- Extended buffer to mitigate views from PRoW and long distance views from wider landscape to the west



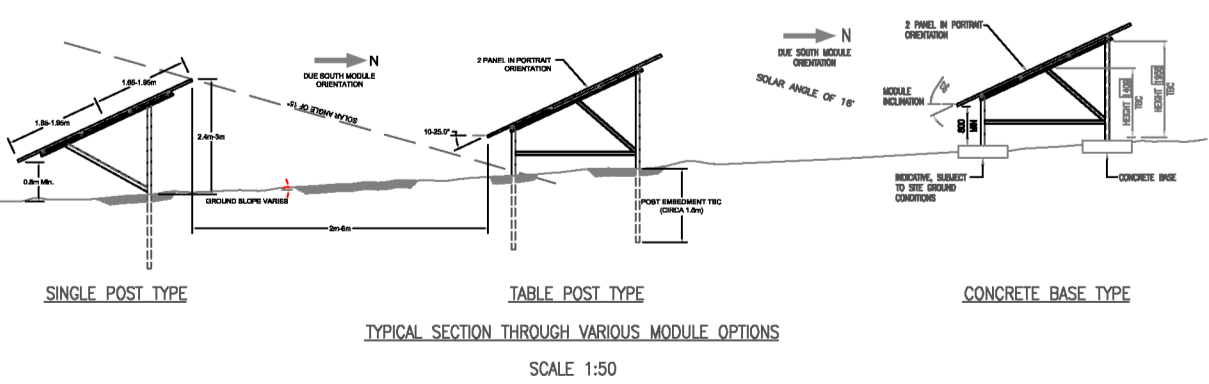
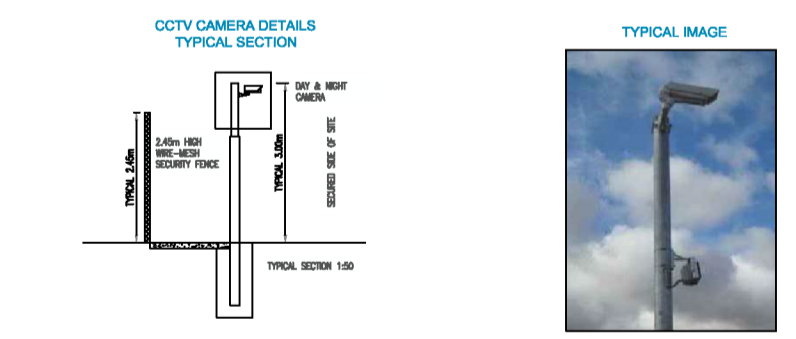
TYPICAL STORAGE UNIT
 TYPICAL DIMENSIONS 12.2m x 2.4m x 2.6m HIGH
 ALL SUBJECT TO FINAL DESIGN



TYPICAL INVERTOR SUBSTATION
 DIMENSIONS: 7m x 2.5m x 3m HIGH. ALL SUBJECT TO FINAL DESIGN



- TYPICAL SECURITY DEER FENCE DETAIL
- 2.45m HIGH PRESSURE TREATED TIMBER POSTS AT 6M CENTRES
 - HIGH TENSILE GALVANIZED WIRE TO BS EN 10223 AND BS EN 10244
 - 20 NO. HORIZONTAL LINES, 2.5MM WIRE SPACING WIRES BETWEEN 75MM AND 175MM
 - VERTICAL LINES, 2.5 WIRE AT 100MM CENTRES
 - HIGH TENSILE TENSION WIRE TO TOP TIED WITH TENSIONER AND TENSION SPRING



- Trees are indicated by symbols below, colour coded to indicate their 'Retention Categories'.
- Category U (defective, negligible or redundant trees)
 - Category A (high retention value)
 - Category B (moderate retention value)
 - Category C (low retention value)
 - APPROXIMATE crown spread of individual trees
- The nominal ROOT PROTECTION AREA (RPA) of each tree is indicated by a solid line using the colour coding above

- NOTES:**
- Final details all subject to final design. Arrangement of the panels shown is based on the following data:
- Typical panel size = 2.2 x 1.3 approx.
 - Panel typical inclination = 25 degrees and south facing.
 - Module length = Typical 15.6 run with 0.2m gaps supported on four post/frames.
 - The typical module section shows two panels in portrait orientation. Three Panels in portrait, four panels in landscape or six panels in landscape may also be required. Details are subject to final design.
 - For clear aisles distance between panels refer to section.
 - Panels at lowest point set at 0.8m above ground level increasing to 2.4m to 3m approximate.
 - Panels not located where land gradient exceeds 1 in 9.5 (6 degrees) due to excessive leg heights.
 - Minimum 5m ecology buffer allowed to all boundaries.
 - Access tracks to consist of clause 804 material where required i.e. areas of soft sport, final extent and design to be confirmed. Only permeable material to be used.
 - For extent and type of screening required refer to landscape and visual assessment report for proposals.
 - Number and location of inverter substations subject to final design.
 - Location of security fence subject to final design.
 - Where necessary, gaps approximately 10cm high will be created below the fencing for wildlife movement.
 - Existing hedgerow locations are indicative.
 - Existing hedgerows adjacent to the Site boundary are not shown but are assumed to lie within the Site boundary.
 - Footpath locations are indicative.
 - Diversion to be secured under a separate planning application under Section 257 of the Town and Country Planning 1990.

Project
Land at Pantre Farm Torfaen
 Drawing Title
Indicative Layout Plan

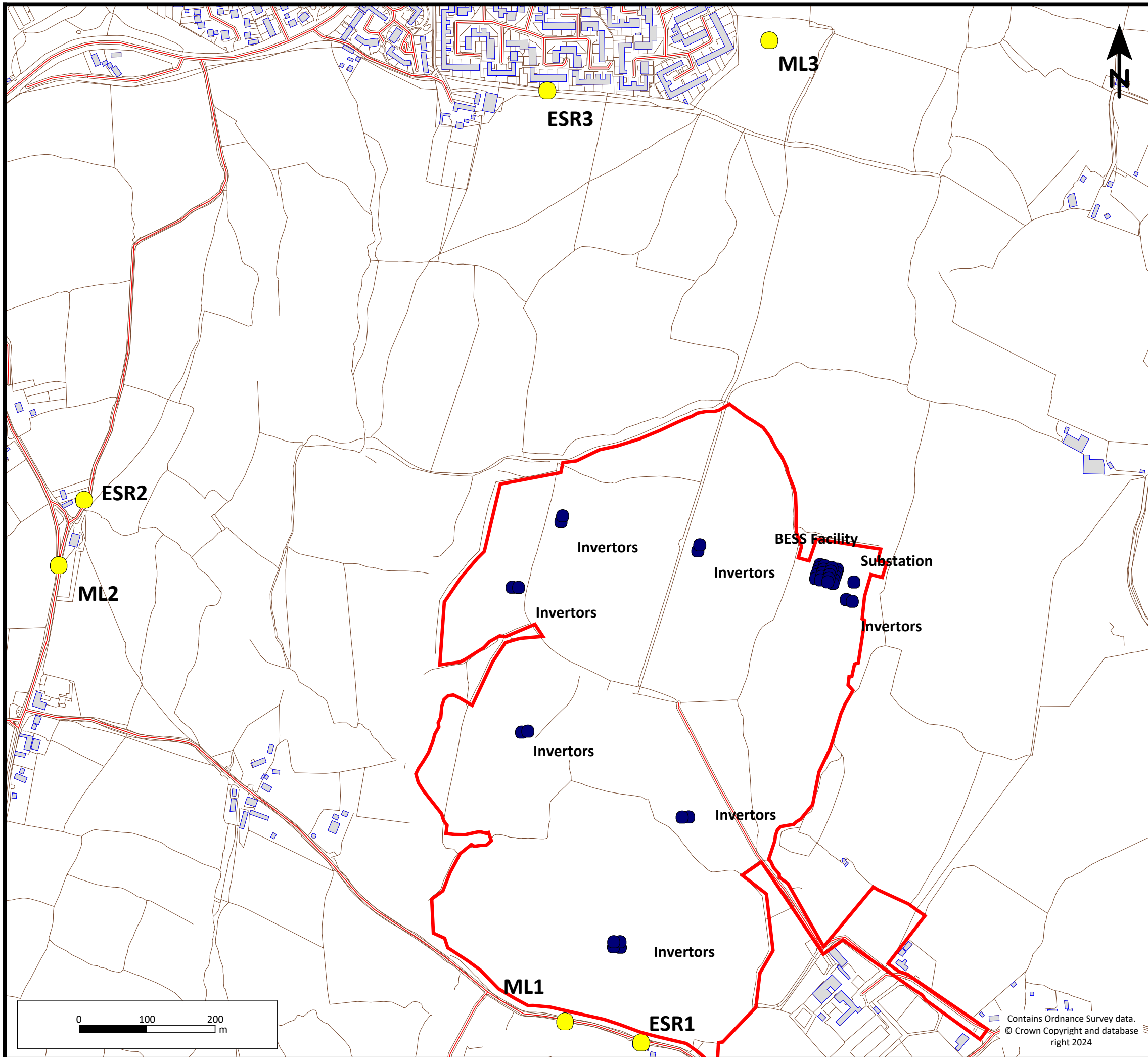
Date	Scale	Drawn by	Check by
30.07.21	Various	KT	TE
Project No	Drawing No	Revision	
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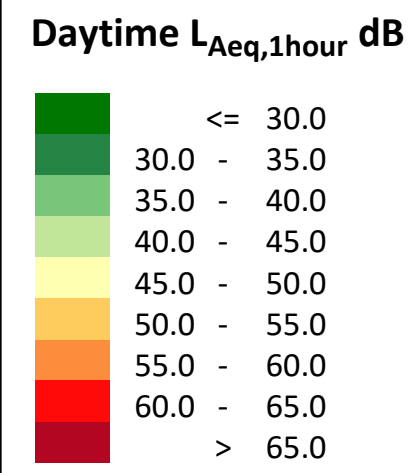
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Key

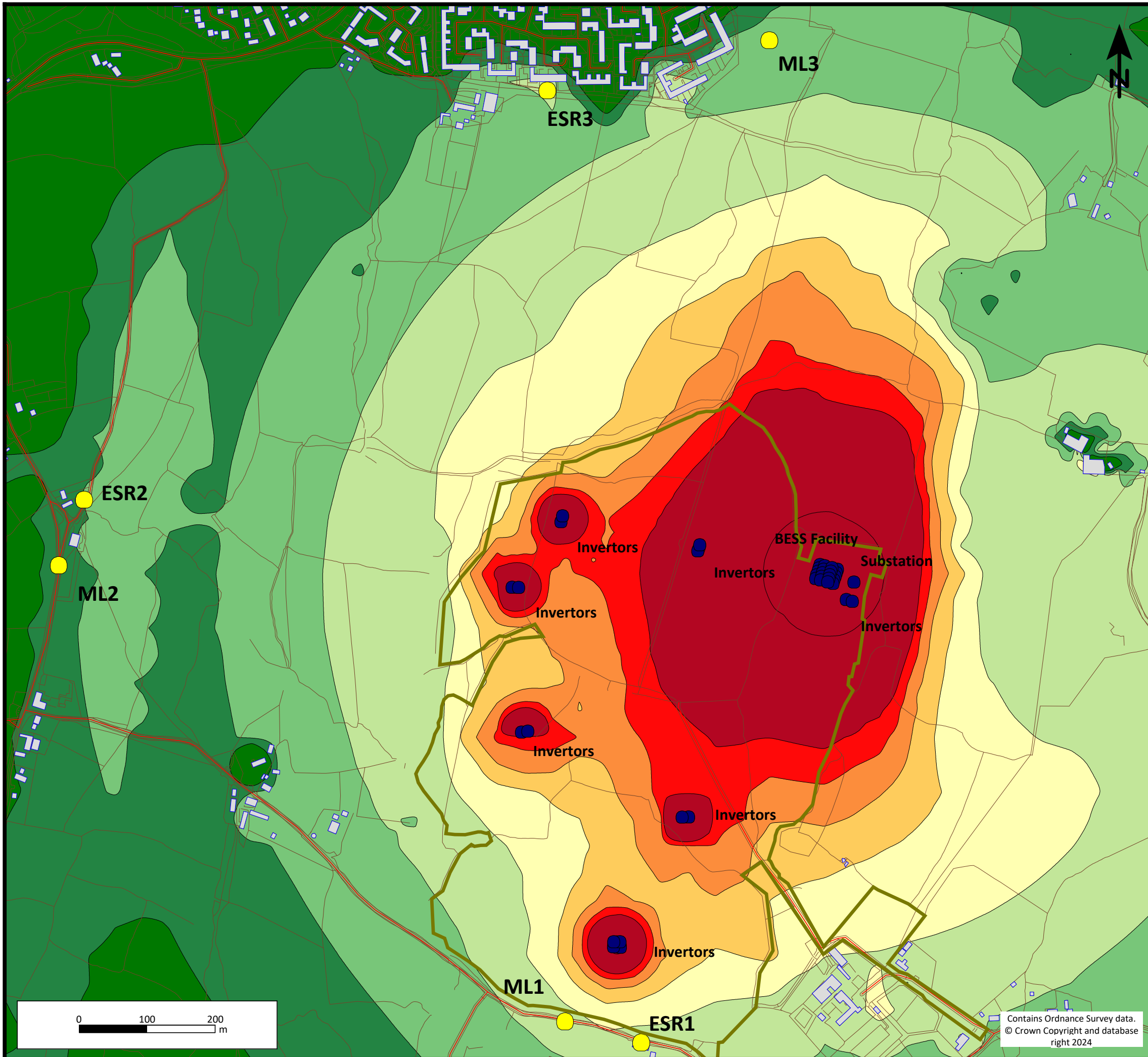
- Existing Buildings
- Road
- Site Boundary
- Invertors, Substation
- Receptors and Monitoring Locations








CLIENT: ELGIN ENERGY ES CO LIMITED		
PROJECT: Proposed Solar Farm, Pentre Bach		
TITLE: Figure 1 - Monitoring Location Plan		
DRG NO: CA11956/001	REV: A	
DRG SIZE: A3	SCALE: 1:5600	DATE: 30/07/2024
DRAWN BY: CG	CHECKED BY: PB	APPROVED BY: PB



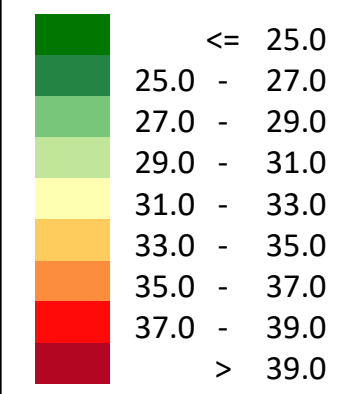
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Key

-  Existing Buildings
-  Road
-  Site Boundary
-  Invertors, Substation
-  Monitoring Locations

Daytime $L_{Aeq,1hour}$ dB



CLIENT:			ELGIN ENERGY ES CO LIMITED		
PROJECT:			Proposed Solar Farm, Pentre Bach		
TITLE:			Noise Contours		
DRG NO:		CA11956/002		REV: A	
DRG SIZE:	A3	SCALE:	1:5600	DATE:	30/07/2024
DRAWN BY:	CG	CHECKED BY:	PB	APPROVED BY:	PB

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