Hilfield Solar Farm and Battery Storage Facility

Statement of Common Ground - Noise

LPA Reference: 21/0050/FULEI (Hertsmere Borough Council)
PINS Reference: APP/N1920/W/22/3295268

26th October 2022

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Version	1	2	3
Comments	First Draft	Rule 6 Party Comments	
Date	25th October 2022	26th October 2022	
Authored By	Antony Best BSc (Hons) MIOA	Antony Best BSc (Hons) MIOA	
Checked By	Neil Morgan MSc MIOA	Neil Morgan MSc MIOA	
Project Number	22-357	22-357	

1. INTRODUCTION

1.1 This Statement of Common Ground (SoCG) is agreed between Antony Best (for Elstree Green Limited; the Appellant) and David Watts (for the Combined Objectors Group; a Rule 6 Party) following the refusal of planning permission by the Local Planning Authority for the:

"Installation of renewable led energy generating station comprising ground-mounted photovoltaic solar arrays and battery-based electricity storage containers together with substation, inverter/transformer stations, site accesses, internal access tracks, security measures, access gates, other ancillary infrastructure, landscaping and biodiversity enhancements"

1.2 The purpose of this SoCG relates to noise, and is intended to identify the areas where the parties (the Appellant and the Rule 6 Party) are in agreement and to narrow down the issues that remain in dispute. This will allow the Public Inquiry to then focus on the most pertinent issues.

1.3 This SoCG sets out the agreed matters of fact and positions between the Appellant and the Rule 6 Party in relation to matters concerning noise. It covers:

- The impacts of noise arising from the Site when the Proposed Development is operational.

1.4 The SoCG dated 14th October 2022 provides the agreed position on the proposed wording of planning conditions related to operational noise from the proposals.

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2. AREAS OF AGREEMENT

2.1 The document *"Statement of Common Ground – Noise"* dated 14th October 2022 sets out the agreement reached on the proposed wording of planning conditions related to noise between The Appellant's and the Common Objectors Group's noise experts.

2.2 A document in the form of a memorandum from Inacoustic (Inacoustic reference 22-357, memo 01, dated 20th October 2022, Hilfield Solar Farm, Additional Information re: Noise) sets out further information in response to clarifications sought in the Proof of Evidence of Mr D L Watts and questions raised in the Public Inquiry.

2.3 For the avoidance of doubt, the memorandum is appended to this document. This memorandum includes the assessment of the impact of the Proposed Development on the mobile home residence to the rear of O'Malley's Haulage Yard.

2.4 We, Antony Best (on behalf of the Appellant) and David Watts (on behalf of the Rule 6 Party), are agreed that the environmental noise assessment provided by the Appellant to the inquiry including the additional information set out in the memorandum dated 20th October 2022, represents an appropriate assessment for the purposes of determining the Appeal.

3. MATTERS OF DISAGREEMENT

3.1 There are no substantive areas of disagreement.

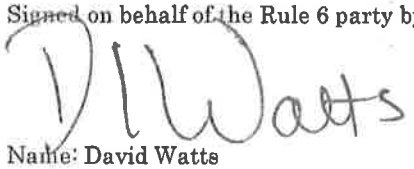
4. DECLARATION

This Statement has been certified as a Statement of Common Ground and is agreed by Antony Best, on behalf of Appellant, and David Watts, on behalf of the Rule 6 party.

Signed on behalf of the Appellant by:

Name: Antony Best
Position: Director – Inacoustic Ltd
Date: 26th October 2022

Signed on behalf of the Rule 6 party by:



Name: David Watts
Position: Technical Director
Date: 26 October 2022

20th October 2022

your reference	DLW/7441
our reference	22-357
memo reference	01

to: David Watts / AIRO
cc: Emily Benedek / UPP Planning
Paul Burrell / Pegasus Group
Rachel Gaffney / Pegasus Group
Paul G Tucker KC / Kings Chambers

Dear David,

RE: Hilfield Solar Farm. Additional Information re Noise.

Please find enclosed additional information regarding the noise impact assessment for the proposed Hilfield Solar Farm, as discussed on Friday 14th October 2022.

Noise Source Data

The octave band sound power level source data for the noise-generating elements of the proposed development are shown in Table 1, below.

TABLE 1: OCTAVE BAND SOUND POWER LEVEL SOURCE DATA

Source	Z-weighted Octave Band (Hz) Sound Power Level (dB)								A-weighted Broadband Sound Power Level (dB)
	63	125	250	500	1k	2k	4k	8k	
PV Inverters	80	86	81	88	81	77	69	68	87
Battery Storage (per Fan)	71	74	68	68	63	59	54	50	69

As noted in Section 3.2 of the noise assessment report, each battery storage container has 4 Nº externally mounted HVAC units, at high level. The HVAC units are located around 3.5 m above local ground level, and have been acoustically modelled as such.

The central inverter/transformer stations are modelled with cooling outlet louvres at a height of 2 m above local ground level, as the central inverter/transformer stations are typically 2.5 m in height.

There are numerous manufacturers and models of central inverter/transformer and battery storage container units, and the units are constantly developing and improving capacity and their noise emissions, which is why no one particular model is referenced in the report.

That said, we have access to source data from General Electric, SMA, Sungrow, Ingecon, Power Electronics, BYD, Pacific Green, CATL, and Tesla.

The manufacturers derive sound power source data in accordance with ISO 3744, ISO 3746 or ISO 9614. Sound power level data for the central inverter/transformer stations ranges from between L_{WA} 80 dB and L_{WA} 95 dB, depending on the electrical capacity of the units, how sophisticated their cooling package is, etc.

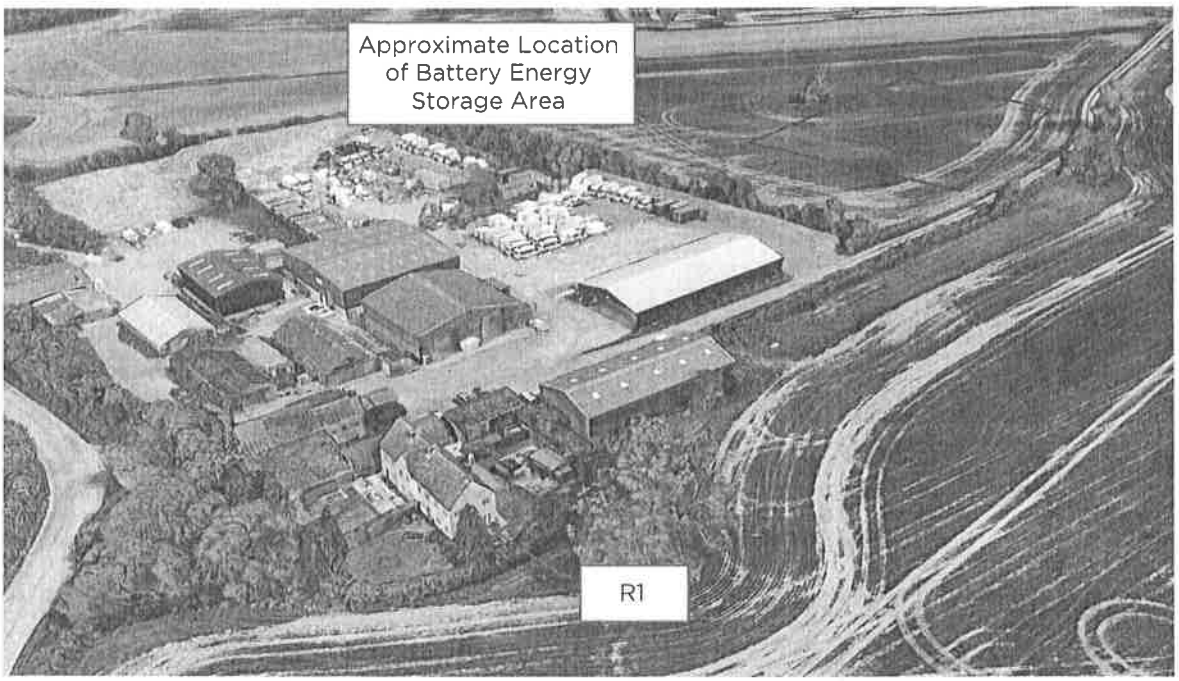
In addition to this, we have measured operational solar and battery energy storage sites to check and verify the validity of the stated performance figures, which have been confirmed.

The stated sound power level data from the manufacturers is typically at operating duties at or above 95%, which is at the top end of the operational profile of the units, when cooling demand is at its greatest. Indeed, for the majority of the time, the cooling is operating at much lower duties, where typically noise levels can reduce by between 8 dB to 13 dB, depending on the technological solution adopted.

Details of Calculations at R1

As discussed in our telephone call, the receptor R1 is heavily screened by the built form of adjacent commercial buildings, as shown in Figure 1, below. The centre of the battery energy storage area is some 170 m from R1.

FIGURE 1: R1 AERIAL VIEW



Using iNoise, we have extracted the source to receiver attenuation factors, calculated in accordance with ISO 9613, to enable the verification of the calculations. The battery energy storage area was modelled as a single point source, with appropriate corrections made for the quantity of HVAC fans etc.

The breakdown of the calculated specific sound level from the battery energy storage area to R1 is presented in Table 2, below, as extracted from iNoise.

TABLE 2: ATTENUATION FACTORS AT R1 FROM BATTERY ENERGY STORAGE AREA

Element	Attenuation Factors (dB) per Octave Band (Hz)							
	63	125	250	500	1k	2k	4k	8k
L_{WA}	63.8	76.9	78.4	83.8	82.0	79.2	74.0	67.9
A_{gr}	-3.4	2.1	7.0	3.2	-0.2	-0.7	-0.7	-0.7
A_{bar}	9.9	8.0	5.8	12.2	18.3	21.7	24.6	24.8
A_{atm}	0.0	0.1	0.2	0.3	0.6	1.7	5.7	20.3
A_{div}	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9
C_{met}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_p	1.4	11.0	9.5	12.2	7.4	0.7	-11.5	-32.4

The specific sound level at R1, from the battery energy storage at a height of 1.5 m above ground level, is therefore 16.6 dB.

The net effect on the specific sound level at R1 of removing the built form of the commercial buildings, with respect to the acoustic screening afforded, has been calculated and broken down, as per the above table, in Table 2, according to the ISO 9613 standard, with regard to the battery energy storage area. The results are set out in Table 3, and ensure the suitability of the calculations and calculation software can be verified.

TABLE 3: ATTENUATION FACTORS AT R1 FROM BATTERY ENERGY STORAGE AREA WITHOUT SCREENING

Element	Attenuation Factors (dB) per Octave Band (Hz)							
	63	125	250	500	1k	2k	4k	8k
L_{WA}	63.8	76.9	78.4	83.8	82.0	79.2	74.0	67.9
A_{gr}	-3.4	2.1	7.0	3.2	-0.2	-0.7	-0.7	-0.7
A_{bar}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A_{atm}	0.0	0.1	0.2	0.3	0.6	1.7	5.7	20.3
A_{div}	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9
C_{met}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L_p	11.4	18.9	15.4	24.4	25.7	22.3	13.1	-7.6

The net effect of removing the screening from the calculations increases the predicted specific sound level at R1 from the battery energy storage area by some 13.2 dB.

It should be noted that, cumulatively from all noise sources associated with the proposed development, the specific sound level at 1.5 m is calculated to be 33 dB, and 35 dB at a height of 4.0 m, respectively when the buildings are removed from the noise model. As a result, the removal of the buildings from the calculation would not alter the conclusion of the noise assessment report in any way, with respect to complying with the requirements of BS4142:2014+A1:2019.

First-Floor Receptor Locations

Calculations have been undertaken, as per our conversation, at a height of 4.0 m above local ground level, to represent first-floor height at the residential receptors near to the proposed development.

As per our discussions, the receptor locations are 1 m from the façade of the residential receptors and have been calculated to present the potential noise impact during the 'night-time period', as defined by BS4142, when the solar inverters could operate during the early-morning periods in the peak of summer, when the sun can rise at around 04:30.

To that end, the predicted specific sound levels, at first floor height, are presented in Table 4, below.

TABLE 4: PREDICTED FIRST FLOOR SPECIFIC SOUND LEVELS

Receptor	Specific Sound Level (dB)
R1	27
R2	28
R3	32
R4	32
R5	32
R6	37
R7	26
R8	23
R9	26
R10	24
R11	24
R12	28
R13	26
R14	29
R15	30
R16	29
R17	29

Receptor	Specific Sound Level (dB)
R18	34
R19	28
R20	27
R21	30
R22	26
R23	24

When comparing the rating sound level, as calculated from the above specific sound levels at first-floor level, and adopting the same rating penalties etc as outlined in the report, against the background sound level, the resultant assessment summary during the daytime period can be seen below in Table 5.

TABLE 5: DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY AT FIRST FLOOR

Receptor	Rating Sound Level (dB)	Uncertainty (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
R1	29	+1	51	-21
R2	30	+1	51	-20
R3	34	+1	51	-16
R4	34	+1	51	-17
R5	34	+1	51	-16
R6	39	+1	51	-11
R7	28	+1	58	-30
R8	25	+1	58	-32
R9	28	+1	58	-29
R10	26	+1	40	-13
R11	26	+1	40	-13
R12	30	+1	40	-9
R13	28	+1	40	-11
R14	31	+1	40	-9
R15	32	+1	40	-7
R16	31	+1	40	-8
R17	31	+1	42	-11
R18	36	+1	42	-5
R19	30	+1	42	-11
R20	29	+1	42	-12
R21	32	+1	39	-6

Receptor	Rating Sound Level (dB)	Uncertainty (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
R22	28	+1	39	-10
R23	26	+1	39	-12

The resultant assessment summary during the night time period can be seen below in Table 6.

TABLE 6: NIGHT TIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY AT FIRST FLOOR

Receptor	Rating Sound Level (dB)	Uncertainty (dB)	Night Time Background Sound Level (dB)	Excess of Rating over Night Time Background Sound Level (dB)
R1	29	+1	46	-16
R2	30	+1	46	-15
R3	34	+1	46	-11
R4	34	+1	46	-12
R5	34	+1	46	-11
R6	39	+1	46	-6
R7	28	+1	51	-23
R8	25	+1	51	-25
R9	28	+1	51	-22
R10	26	+1	33	-6
R11	26	+1	33	-6
R12	30	+1	33	-2
R13	28	+1	33	-4
R14	31	+1	33	-2
R15	32	+1	33	0
R16	31	+1	33	-1
R17	31	+1	36	-5
R18	36	+1	36	+1
R19	30	+1	33	-2
R20	29	+1	33	-3
R21	32	+1	32	+1
R22	28	+1	32	-3
R23	26	+1	32	-5

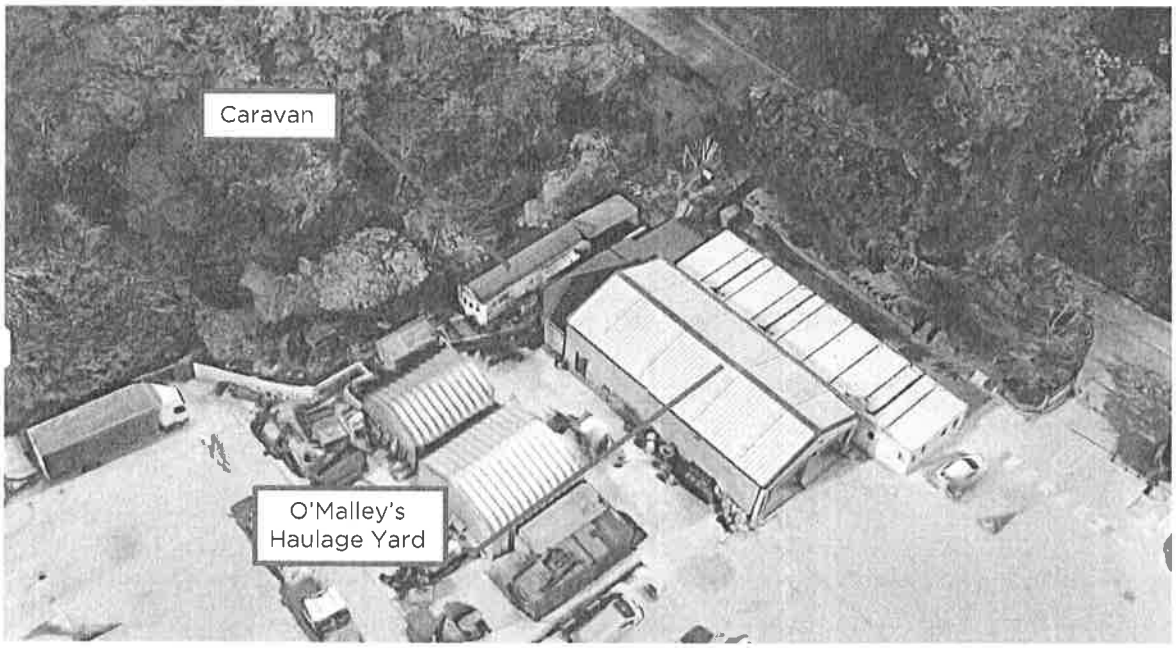
It should be noted that, as discussed, the site layout and plant selection was based on achieving the requirements of BS4142:2014+A1:2019, however, subsequent to the initial assessment, a planning condition has been agreed with respect to the noise impact from the proposed development at

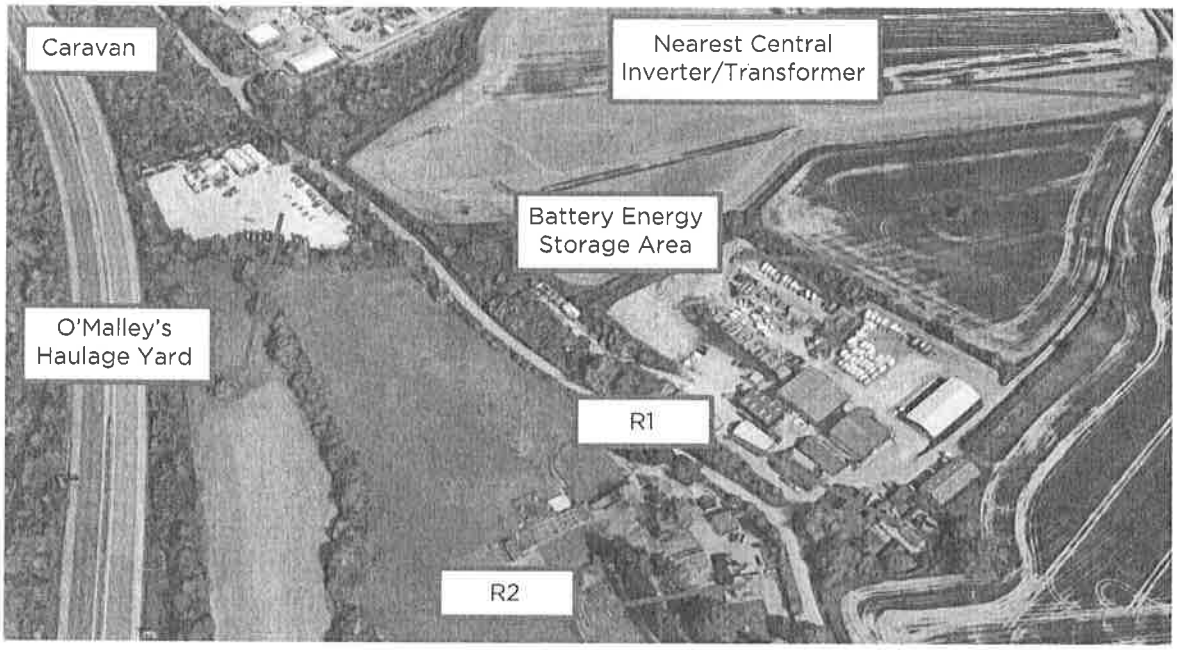
residential receptors and on public rights of way, which would necessitate the appropriate selection of equipment etc, which I understand we both agree is feasible.

Caravan near to O'Malley's Haulage Yard

I understand that the caravan located to the rear of O'Malley's Haulage Yard was raised on the first day of the Public Inquiry, and a query was raised as to why this was not included in the noise assessment. I have elaborated on this point in the following text.

Please find attached a 3D aerial view of the caravan in question, relative to the proposed noise generating elements of the proposed development (battery energy storage area and central inverter/transformer stations). I appreciate the solar panels do encroach much further towards the caravan, but do not inherently generate any noise.





The caravan is screened by the built form of O'Malley's Haulage Yard, and the highest calculated rating sound level at the caravan is 25dB at a height of 1.5 m (as it is single storey unit), some 33dB below the daytime background noise level, and 26dB below the night time noise level. The caravan is in very close proximity to the M1, so the measurement position MP6 has been used to represent the background sound level at this property.

The margin of compliance is same as that demonstrated at R8 in the noise assessment report, i.e. this would be one of the least potentially affected receptors in the entire vicinity of the proposed development, and is therefore not a constraint with respect to noise, hence why it was not considered in the initial noise assessment.

I trust the enclosed is clear and sufficient to overcome any concerns you may have had regarding the noise impact assessment, and I hope subsequent to your reading of this document that we are able to agree at Statement of Common Ground with respect to noise, but should you require any further information, then please do not hesitate to ask.

Yours sincerely,

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