



# SUNNICA ENERGY FARM

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Volume 6

Environmental Statement

6.2 Appendix 11D: Construction Noise Modelling

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and  
Procedure) Regulations 2009



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Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
Procedure) Regulations 2009**

**Sunnica Energy Farm**

**Environmental Statement  
Appendix 11D: Construction Noise Modelling**

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# 1 Construction Noise Modelling

## 1.1 Modelling Notes

- 1.1.1 Construction noise predictions have been undertaken using the computer modelling software CadnaA® (v2019).
- 1.1.2 Calculations of sound propagation from plant has followed the methodologies from BS 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites.
- 1.1.3 Calculations of sound propagation from road traffic has followed the methodologies from Department of Transport/Welsh Office (1988) Calculation of Road Traffic Noise.
- 1.1.4 All construction plant items have been modelled as point sources with sound propagating uniformly in all directions, at a standard height of 1m above local ground level.
- 1.1.5 Due to the extent of the working areas it has been assumed that one of each construction plant item will be in operation at the closest approach to each of the identified sensitive receptors, continuously throughout a working day. This is considered a reasonable worst-case scenario.
- 1.1.6 Surrounding ground conditions have been modelled as soft ( $G=0.8$ ).
- 1.1.7 Air temperature was assumed to be 10 degrees and humidity 70%.
- 1.1.8 Two orders of reflection were modelled to take into account reflections from ground surfaces and buildings.
- 1.1.9 Land topography has been incorporated into the noise modelling.
- 1.1.10 All receptor points have been set at a standard height of 1.5m above local ground levels.
- 1.1.11 Building massing in the surrounding area outside of the DCO Site boundary has been sourced from Ordnance Survey Open Map [REDACTED] and modelled with a standard height of 6m.

## 1.2 Construction Plant Schedules and Sound Levels

- 1.2.1 Plant schedules and source data for sound pressure/power levels used in the noise model are summarised below.

**Table 1-1 Construction plant and machinery numbers and type required for Site construction**

Plant	Total required for whole Site - Sunnica East Site A and B	Total required for whole Site - Sunnica West Site A and B	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Compact excavator	21	21	C3.20	68	96	1	50%	-5	88
Mobile crane	7	5	C4.55	70	98	1	50%	-5	90
Crawled Dozer	6	3	C2.13	78	106	1	50%	-5	98
Excavator	13	11	C2.17	70	98	1	50%	-5	90
Mini Excavator	5	4	C3.20	68	96	1	50%	-5	88
Push press piling rig	12	12	AECOM library data	66	94	1	50%	-5	86
Power generator	6	4	C4.76	61	89	1	50%	-5	81
Telehandler	18	17	C4.55	70	98	1	50%	-5	90
Truck	18	15	C4.5	63	91	1	50%	-5	83
Vibrating roller	5	2	C2.40	73	101	1	50%	-5	93
Wheeled Excavator	5	4	C2.8	68	96	1	50%	-5	88

Plant	Total required for whole Site - Sunnica East Site A and B	Total required for whole Site - Sunnica West Site A and B	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Auger piling (battery storage areas only)	1 on site at a time		C3.21	79	107	1	50%	-5	99

**Table 1-2 Construction plant and machinery numbers and type required for the cable route construction**

Plant	Total required for whole Site	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Groundhog Portable Welfare Unit	3	C4.76	61	89	1	50%	-5	81
Fuel Bowser	2	C6.36 *	79	107	1	50%	-5	99
HGV Materials Delivery Vehicle	3	C2.32	74	102	1	50%	-5	94
HGV Beavertail	2	C2.35	71	99	1	50%	-5	91
HDD Rig	1	C2.44	77	105	1	50%	-5	97

Plant	Total required for whole Site	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Forklift / Telehandler	1	C2.35	71	99	1	50%	-5	91
HGV Water Tanker	2	C4.15 *	66	94	1	50%	-5	86
HGV Low Loader	2	C2.26	79	107	1	50%	-5	99
Tracked Excavator	2	C2.13	78	106	1	50%	-5	98
Mini Excavator	2	C3.20	68	96	1	50%	-5	88
Dumper	2	C4.3 *	66	94	1	50%	-5	86
Truck, 7.5 – 18 Tonne	2	C4.1 *	71	99	1	50%	-5	91
Rigid HGV HIAB (Grab)	6	C2.35	71	99	1	50%	-5	91
Truck Mounted Hot Box - 18 Tonne	1	C5.31	77	105	1	50%	-5	97
Cable Winch	1	C4.61	68	96	1	50%	-5	88
Cable Transport Vehicle	2	C4.53	77	105	1	50%	-5	97

Plant	Total required for whole Site	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Van (e.g. Transit / Sprinter)	10	AECOM library data	51	79	1	50%	-5	71
Auger piling	1 on site at a time	C3.21	79	107	1	50%	-5	99

\* BS5228 provides maximum  $L_{Amax}$  noise levels for these plant items. These have been adjusted by -10dB to an average  $L_{Aeq}$  noise level.



**Table 1-3 Construction plant and machinery numbers and type required for the Burwell Substation Extension**

Plant	Total required for whole Site	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
80 Tonne Mobile Crane	2	C5.37	76	104	1	50%	-5	96
400 Tonne Mobile Crane	1	C4.38	78	106	1	50%	-5	98
1000 Tonne Mobile Crane	1	C4.50	71	99	1	50%	-5	91
Telehandler	5	C4.55	70	98	1	50%	-5	90
Generator	5	C4.76	61	89	1	50%	-5	81
Skip Loader, 18 Tonne	2	C2.26	79	107	1	50%	-5	99
Tanker (Water)	2	C4.15 *	66	94	1	50%	-5	86
Tanker (Fuel)	2	C4.15 *	66	94	1	50%	-5	86
Tracked Excavator	5	C2.13	78	106	1	50%	-5	98
Mini Excavator	5	C3.20	68	96	1	50%	-5	88
Vibrating Roller	5	C5.20	75	103	1	50%	-5	95

Plant	Total required for whole Site	BS5228-1 ref.	Sound pressure level at 10m, LpA	Sound power level, LwA	# of plant in model (at site boundary near to receptor)	Operational time (% of working day)	Partial screening (mobile screens, intervening structures, land features)	Resultant Sound power level, LwA
Ready Mix Concrete Wagon, 6M / 32 Tonne	16	C4.22	76	104	1	50%	-5	96
HGV Low Loader / Sliding Body	20	C2.26	79	107	1	50%	-5	99
Rigid HGV / HIAB	25	C2.35	71	99	1	50%	-5	91
Truck, 7.5 – 20 Tonne	35	C4.1 *	71	99	1	50%	-5	91
Van (e.g. Transit / Sprinter)	35	AECOM library data	51	79	1	50%	-5	71

\* BS5228 provides maximum L<sub>Amax</sub> noise levels for these plant items. These have been adjusted by -10dB to an average L<sub>Aeq</sub> noise level.

## 1.3 Construction Traffic – Main Access Points and within Scheme Boundary

1.3.1 Construction traffic vehicle data for average and worst-case flows during the construction programme is presented below.

**Table 1-4 Construction traffic vehicle data**

### HGVs

Sunnica East and Sunnica West Main Construction	AVG	MAX	
HGV East Total (Main Construction)	26	43	Max in month 2
HGV West Total (Main Construction)	21	51	Max in month 7
HGV Total (Main Construction)	45	79	Max in month 2

Substations	AVG	MAX	
HGV West A (Substation)	2	8	Max in month 3
HGV East A (Substation)	2	8	Max in month 3
HGV East B (Substation)	2	8	Max in month 4
HGV Burwell (Substation)	2	9	Max in months 3-5
HGV East Total (Substation)	4	15	Max in months 3-4
HGV West Total (Substation)	2	8	Max in month 3
HGV Total (Substation)	7	31	Max in month 3

Cable Routes	AVG	MAX	
Burwell Substation to Sunnica West A (Cable Route)	6	23	Max in months 3-5
Sunnica West A to Sunnica East A (Cable Route)	6	23	Max in month 4
HGV Total (Cable Route)	11	45	Max in month 4

Main Construction + Substations + Cable Routes	AVG	MAX	
HGV East Total (Main Construction + Substations)	29	57	Max in month 2
HGV West Total (Main Construction + Substations)	23	52	Max in month 7
HGV Burwell (Substation)	2	9	Max in months 3-5
HGV Total (Main Construction + Substations)	52	108	Max in month 3
HGV Total (Cable Route)	11	45	Max in month 4
HGV Total (Main Construction + Substations + Cable Routes)	63	152	Max in month 3

### Staff Vehicles

Sunnica East and Sunnica West Main Construction	AVG	MAX	
Staff East Total	341	502	Max in months 6-8
Staff West Total	280	522	Max in month 12
Staff Veh Total	621	937	Max in month 9

Substation	AVG	MAX
Staff Veh Burwell	8	37
Staff Veh West A	8	30
Staff Veh East A	8	30
Staff Veh East B	8	30
Staff Veh East Total	15	60
Staff Veh West Total	15	67
Staff Veh Total	31	127

Burwell staff go to Sunnica West A Max in months 5-7  
 Max in months 1-6  
 Max in months 1-6  
 Max in months 2-6  
 Max in months 2-6  
 Max in months 5-6  
 Max in months 5-6

Main Construction + Substation	AVG	MAX
Staff Veh East Total	356	562
Staff Veh West Total	295	522
Staff Veh Total	652	939

Max in month 6  
 Max in month 12  
 Max in month 9

Cable Route Staff	AVG	MAX
Staff Veh Burwell Substation to Sunnica West A (Cable Route)	1	3
Staff Veh Sunnica West A to Sunnica East A (Cable Route)	1	3
Staff Veh Total (Cable Route)	1	5

Cable route staff go to the cable route Max in months 2-6  
 Max in months 2-6  
 Max in months 2-6

1.3.2 Construction traffic vehicle data used in the noise modelling is summarised below.

**Table 1-5 Construction traffic vehicle data used in noise modelling**

Route	HGVs (Maximum)	Staff vehicles (Maximum)	Total vehicle per 10-hr day	Total per hour	% HGV
Sunnica East (Main construction + substations)	57	562	619	62	9%
Sunnica West (Main construction + substations)	52	522	574	57	9%
Burwell Substation	9	37	46	5	20%
Burwell Substation to Sunnica West A (Cable Route)	23	3	26	3	88%
Sunnica West A to Sunnica East A (Cable Route)	23	3	26	3	88%

## 1.4 Construction Traffic – Rural Roads

1.4.1 Construction traffic noise calculations for rural roads have followed guidance from BS 5228-1 Annex F.2.5 ‘ Method for mobile plant using a regular well-defined route (e.g. haul roads)’ using formula:

$$L_{Aeq, T} = L_{WA} - 33 + 10\log_{10}Q - 10\log_{10}V - 10\log_{10}d$$

where:

$L_{WA}$  is the sound power level of the vehicle, in decibels (dB);

$Q$  is the number of vehicles per hour;

$V$  is the average vehicle speed, in kilometres per hour (km/h);

$d$  is the distance of receiving position from the centre of haul road, in metres (m).

1.4.2 The calculations have been based on average traffic flows associated with the Sunnica East and Sunnica West Main Construction and Cable Route Construction phases, as these will most likely require various vehicle access along rural roads.

**Table 1-6 Construction traffic noise - Sunnica East Main Construction**

HGV		Other vehicles	
$L_{WA}$	110	$L_{WA}$	99
Daily average vehicles	26	Daily average vehicles	341
$Q$ (hourly)	3	$Q$ (hourly)	34
$V$	50	$V$	50
$D$	10	$D$	10
$L_{Aeq,1hr}$	54	$L_{Aeq,1hr}$	54
Total $L_{Aeq,1hr}$		57	

**Table 1-7 Construction traffic noise - Sunnica West Main Construction**

HGV		Other vehicles	
L <sub>WA</sub>	110	L <sub>WA</sub>	99
Daily average vehicles	21	Daily average vehicles	280
Q (hourly)	2	Q (hourly)	28
V	50	V	50
D	10	D	10
L <sub>Aeq,1hr</sub>	53	L <sub>Aeq,1hr</sub>	53
Total L <sub>Aeq,1hr</sub>		56	

**Table 1-8 Construction traffic noise - Cable Route Construction**

HGV		Other vehicles	
L <sub>WA</sub>	110	L <sub>WA</sub>	99
Daily average vehicles	6	Daily average vehicles	1
Q (hourly)	1	Q (hourly)	1
V	50	V	50
D	10	D	10
L <sub>Aeq,1hr</sub>	48	L <sub>Aeq,1hr</sub>	39
Total L <sub>Aeq,1hr</sub>		48	