Ministry of Defence

Deep Space Advanced Radar Capability (DARC)

Environmental Statement Volume 3: Appendices

Draft for Pre-application Consultation
Planning Application: 22/1136/SO
February 2026

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ES Appendix 16.1: Sensitive Receptor Tables

Appendix 16.1: Sensitive Receptor Tables

Table 1: Identified Potentially Human Amenity Receptors (PHARs)

Receptor No.	Description	Sensitivity
PHAR 001	Newgale Lodge	Medium
PHAR 002	Hilcroft Escapes	Medium
PHAR 003	Residential dwellings south of Erw Lon (along A487)	Medium
PHAR 004	Dwelling along A487 south of application site	Medium
PHAR 005	Brawby Farm and surrounding Braby dwellings	Medium
PHAR 006	Dwelling northwest of application site	Medium
PHAR 007	Properties 1 -28 Erw Lon	Medium
PHAR 008	Dwellings in proximity of D & G James	Medium
PHAR 009	38 Erw Lon and residential dwellings to the immediate north	Medium
PHAR 010	Dill Cottage, Cwmheldeg, Highfield House, Llareggub	Medium
PHAR 011	Properties to the North Erw Lon	Medium
PHAR 012	Farmhouse dwelling and nearing dwellings to the northeast of the application site	Medium
PHAR 013	Bungalow to the northeast of the application site	Medium
PHAR 014	Cawdor Barracks	Low
PHAR 015	Park Hall Village	Low
PHAR 016	Maerdy Lodge	Medium
PHAR 017	Dwellings upon entrance to Cawdor Barracks	Medium
PHAR 018	Paran Chapel	Medium
PHAR 019	Curlew Rise	Medium
PHAR 020	1-8 Sunnyview	Medium
PHAR 021	Upper Vanley and immediate surrounding dwellings	Medium
PHAR 022	Dwellings at Trefgarn Owen	Medium
PHAR 023	Derche	Medium
PHAR 024	Hedre Cross Farm	Medium
PHAR 025	The Moat House	Medium
PHAR 026	Dwelling north of Mount House	Medium

Table 2: Identified Potentially Sensitive Ecology Receptors (PSERs)

Receptor No.	Description	Sensitivity
PSER 001	Treeline and hedges to the north of the application site	High
PSER 002	Treeline and hedges to the northeast of the application site	High
PSER 003	Treeline and hedges to the east of the application site	High
PSER 004	Treeline and hedges to the west of the application site	Medium

The human amenity receptors are based on the nearest most likely effected residence within a 2.5 km radius.

Where a PHAR does not have direct line of site and a PHAR has already been assessed as “Neutral/Negligible” (see ES Chapter for definitions), the receptor has not been assessed separately. An example of this is Newgate Farm, where receptors, PHAR 005, 010, 003, 007 and 009 have already been assessed, and therefore is considered representative of Newgate Farm (see Appendix 16.3).

PSERs are based on the nearest hedgerows with the potential for use by potentially light sensitive species.

The term PHAR (Potential Human Amenity Receptor) is an abbreviated term used by DFL to define a location where the presence of human, has the potential to be affected either positively or negatively by the impacts of artificial lighting.

The term PSER (Potentially Sensitive Ecological Receptor) is an abbreviated term used by DFL to define a location where the presence of light sensitive ecological receptors, has the potential to be affected or displaced by the impacts of artificial lighting. Where a PHAR is addressed as low sensitivity this is based on its likely proximity to existing high levels of artificial light.

Visual representation of the potential receptor locations listed in Tables 1 and 2 can be seen in Appendix 16.3.

Receptors PHAR 014 and PHAR 015 have been classified as low sensitivity due to the nature of the area in question. As PHAR 014 is the Barracks, an already highly illuminated environment with on going activity throughout the period of darkness, this has likely altered the adaptablitly of the occupants of this area. PHAR 015, while not highly illuminated, is occupied only temporarily. As such, occupants are expected to have a relatively high adaptability to any additional light, given that exposure will be brief and they will return to their usual environment thereafter.

The potentially sensitive ecological receptor (PSER 004) to the west of the application site has been reduced from a highly sensitive receptor to a medium sensitivity, this is based on the information provided by the project ecologist, which has stated that there is not high levels of bat activity in this direction, but as there is potential for the hedge line to be used as a foraging path a medium sensitivity has been selected to retain any potential for the area to be used by light sensitive ecology.

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ES Appendix 16.2: Site Survey Information

Appendix 16.2 Site Survey Information

1 Introduction

1.1.1. This report is to outline the findings of the baseline survey undertaken by DFL, a lighting design consultancy specialising in lighting impact assessments, obtrusive light mitigation, and detailed lighting design.

1.1.2. The report outlines the finding of a site survey to establish the baseline lighting conditions, which have been undertaken by suitably qualified and competent lighting professionals.

1.1.3. The results below show the baseline lighting survey lead by Peter Burrows on the 26th of February 2024. This will aid in the conclusion of the accompanying ES chapter.

1.1.4. Astronomical twilight at the time of the survey was between 18:50 to 19:30, the survey was started at 19:00. Further information on the application site and surrounding area at the time of the survey can be seen in Annex 1.

2 Methodolgy

Relevant Guidance

2.1.1. This baseline survey has been undertaken in accordance with the ILP Professional Lighting Guide (PLG04); and with consideration of the limits on obtrusive light set out within the ILP “Guidance Notes for the Reduction of Obtrusive Light” (GN01:2021).

2.1.2. The baseline survey has been carried out by suitably qualified and competent lighting professionals.

Illuminance Readings

2.1.3. Illuminance measurements were taken in the horizontal plane with the illuminance meter being placed on the ground above the measurement point, and in the vertical plane at approximately 1.5 metres in height facing relative north, east, south, and west, based on a common reference point.

2.1.4. Measurement positions taken during the baseline survey are presented in Annex 1.

2.1.5. Measurements were taken using a Konica Minolta T-10A illuminance meter (serial number: 36621008) which has a current calibration certificate (certificate no: STD_145652) and is widely regarded as the standard instrument for providing a consistent level of accuracy at the low illuminance levels associated with site measurements in locations with typically low ambient luminance. A copy of the calibration certificate can be found in Annex 3.

2.2. Survey Area

2.2.1. The area surveyed is shown by the orange line in Appendix 16.3

2.2.2. Photographs for visual references were taken in the locations outlined in Appendix 16.3.

2.2.3. The survey was conducted in accordance with PLG04. Details of the conditions of the baseline survey can be found in Annex 1.

2.2.4. Multiple Locations used for photographic locations. However, only a few locations were significant to the assessment, these locations are shown below and within Appendix 16.3

2.3. Overview of findings

2.3.1. The highest reading on the application site was recorded along the horizontal plane at point 30 with a reading of 142.6 Lux.

2.3.2. The results of the illuminance measurements are presented in Annex 1.

Annex 1: Site Illuminance Measurements

Survey Information

Survey Information	
Site Address	Cawdor Barracks, Haverfordwest, SA62 6BL
Survey Start	19:00
Survey Finish	22:30
Astronomical Twilight	19:30
Weather	Clear sky
Moon Phase	Waning Gibbous

Source: / https://moonphases.co.uk

Survey Results

Location	Reading Number	Horizontal	Vertical			
			North	East	South	West
1	1	88.00	1.11	19.90	29.20	0.90
2	2	0.74	0.24	1.27	0.41	0.28
3	3	0.20	0.60	0.10	0.07	0.43
4	4	3.37	0.61	3.22	5.39	0.23
5	5	13.86	16.82	8.37	0.31	3.36
6	6	10.63	6.08	19.21	0.60	0.45
7	7	9.54	12.43	9.75	3.26	3.69
8	8	0.00	0.08	0.00	0.00	0.09
9	9	0.00	0.03	0.00	0.00	0.02
10	10	0.00	0.00	0.00	0.00	0.00
11	11	0.00	0.00	0.00	0.00	0.00
12	12	0.00	0.17	0.00	0.00	0.14
13	13	0.00	0.03	0.00	0.00	0.04
14	14	0.00	0.05	0.00	0.02	0.07
15	15	0.00	0.04	0.00	0.02	0.06
16	16	0.16	0.00	0.04	0.00	0.05
17	17	0.00	0.01	0.00	0.00	0.02
18	18	0.00	0.00	0.00	0.00	0.00
19	19	0.00	0.00	0.00	0.01	0.02
20	20	0.00	0.00	0.00	0.03	0.04
21	21	0.01	0.00	0.00	0.07	0.05
22	22	0.03	0.00	0.07	0.19	0.17
23	23	11.43	0.13	0.19	2.09	18.69
24	24	72.20	1.13	76.00	66.90	1.00
25	25	31.50	0.73	36.40	50.90	0.89
26	26	15.15	1.58	25.07	21.32	4.53
27	27	10.92	0.73	6.99	18.42	2.84
28	28	51.50	1.20	9.07	49.20	20.81
29	29	96.20	1.76	16.34	96.40	15.05
30	30	142.60	3.58	0.99	33.50	124.30
31	31	94.30	2.84	1.88	29.70	97.40

32	32	39.50	1.75	0.58	9.22	40.80

Annex 2: Photographs for Visual References

The key selection of photos selected have been indexed in the table below and locations can be seen in Appendix 16.3.

Photography Site Locations

Location	Image	Description
2	2.1	Northwest of the site looking towards the Barracks.
	2.2	East of the site looking away from the Barracks.
	2.3	North of the site looking away from the Barracks.
5	5.1	Northeast of the Site looking away from the Barracks.
	5.2	Northwest Looking towards the Barracks, view above the fencing.
19	19.1	Southwest view looking towards the Barracks.
	19.2	Northwest view looking towards the Barracks.
	19.3	South view looking towards the Barracks.
25	25	Southeastern view along the fence line.
30	30	Western view looking in towards the Barracks.
43	43	Southwest view looking in towards the Barracks from a distance.
48	48	Western view of the Barracks from a distance.

Image 2.1 Northwest

Image 2.2 East

Image 2.3 North

Image 5.1 Northeast

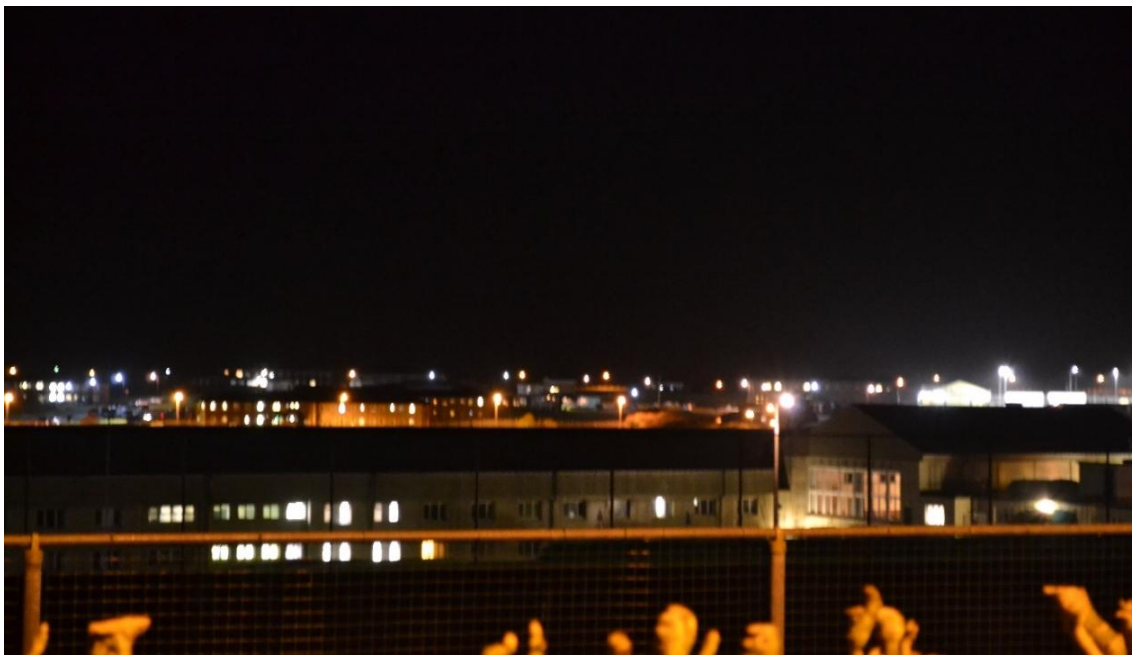

Image 5.2 Northwest

Image 19.1 southwest

Image 19.2 Northwest

Image 19.3 South

Image 25 Southeast

Image 30 West

Image 43 Southwest

Image 48 West

Annex 3: Calibration Certificate

Certificate of Calibration

Issued by: BSRIA Instrument Solutions - A division of BSRIA Limited

Date of issue: 18 August 2023

Certificate number
STD_145652

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BSRIA

Laboratory address:
Old Bracknell Lane West, Bracknell,
Berkshire RG12 7AH
T: +44 (0) 1344 459 314 | 0800 254 5566
E: instruments@bsria.co.uk
W: www.bsria.com/uk/instrument/

MATT NEWLAND
Approved signatory

Customer: Designs for Lighting UK Ltd
Fao Fran Goodyear 17 City Business Centre Hyde Street
Winchester Hampshire SO23 7TA

Date received: 02 August 2023

Instrument:

BSRIA I.D.:	129521
Description:	Light meter
Manufacturer:	Konica Minolta
Model:	T-10A
Serial number:	36621008
Procedure version:	BLT264V1

Laboratory conditions:

Temperature: 20 °C ± 4 °C Relative humidity: < 75 %rh
Mains voltage: 240 V ± 10 V Mains frequency: 50 Hz ± 1 Hz

Comments:

Instrument calibration conducted as found - no adjustments undertaken.
This certificate only relates to the range shown within.
At time of calibration the instrument was fitted with the measurement head serial number 55611050.

Calibration information:

The instrument was calibrated by comparison against laboratory reference equipment whose values are traceable to recognised National Standards. This is an electronic document that has been signed digitally.

The uncertainties quoted refer to the calibration only and are not intended to indicate any long-term instrument specification/performance. This certificate only relates to the items calibrated and was performed at the above laboratory address.

Calibrated by: D. M. Tovey **Date of calibration:** 18 August 2023

This certificate provides traceability of measurement to recognised National Standards, and to the units of measurement realised at the National Physical Laboratory or other recognised National Standards laboratories.

Certificate of Calibration

As Found Results

Certificate number STD_145652

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Reference equipment used in the calibration:

Instrument description	Serial number	Certificate number	Last cal. date	Cal. period
Light Bench (ZZMLB02)	18425/2 & 18426/1	ZZMLB02 - 2023	02/03/2023	12 Months
Light Bench (ZZMLB03)	18425/1 & 18427/1	ZZMLB03 - 2023	02/03/2023	12 Months
Distance Measuring System (ZZMLB04)	4816	ZZMLB04 - FEB 2023	08/02/2023	12 Months

Calibration uncertainties:

Illuminance : 0 to 2000 lux ±5 % of applied value or 0.1 lux whichever is greatest.
Measurement uncertainty equals the above plus the devices resolution as reported in the results section, added in quadrature.

Calibration procedure, Illuminance:

The instrument was calibrated against laboratory standards which are themselves traceable back to National Standards.

The illuminance measurements were conducted in accordance with the methodology contained in BS 667 using a tungsten filament lamp with a colour temperature of 2856 k. Illuminance levels were calculated using an inverse square law with respect to distance away from a tungsten filament lamp source.

The light meters reference plane was taken to be the front face of the diffuser.

The illuminance meter was zeroed prior to calibration.

Calibration results, Illuminance:

Range	Applied	Indicated	Correction	Specification	% of Spec.	Comment
Auto	0.00 lux	0.00 lux	0.00 lux	±0.01 lux	0.0 %	
	50.0 lux	50.6 lux	-0.6 lux	±1.1 lux	54.5 %	
	100.0 lux	100.6 lux	-0.6 lux	±2.1 lux	28.6 %	
	250.0 lux	248.8 lux	1.2 lux	±5.1 lux	23.5 %	
	500.0 lux	494 lux	6.0 lux	±11.0 lux	54.5 %	
	1000.0 lux	987 lux	13.0 lux	±21.0 lux	61.9 %	
	2000.0 lux	1966 lux	34.0 lux	±41.0 lux	82.9 %	

Any test points marked with a * do not comply with instrument specification.

End.

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ES Appendix 16.3: Site Information Map

Appendix 16.3 Site Information Map