



**East Pye Solar
Environmental Statement
Volume 3: Appendix 7.11 - Lighting Strategy**

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1 Lighting Strategy

1.1 Introduction

- 1.1.1 This Lighting Strategy has been prepared for East Pye Solar (hereafter referred to as the 'Scheme') in relation to the Development Consent Order (DCO) application (the 'DCO Application').
- 1.1.2 The key aims and objectives of this Lighting Strategy are to:
- Identify national and local planning policy, guidance and standards as relevant to artificial lighting for the Scheme;
 - Determine the existing lighting conditions within the Order Limits and surrounding area;
 - Establish the ecological, human, landscape and visual receptors likely to be affected by new artificial lighting introduced by the Scheme; and
 - Establish principles within the lighting mitigation strategy for the Scheme to minimise obtrusive light from construction, operation and decommissioning phases of the Scheme with due regard to illuminance levels established by industry guidance.
- 1.1.3 The Lighting Strategy aims to ensure that external lighting for the Scheme is designed to provide a safe working environment while avoiding unnecessary light pollution and reducing potential effects on the key receptors. The objective is to minimise adverse effects as far as practicable, while meeting essential safety and security requirements of the Scheme.
- 1.1.4 This Lighting Strategy sets out requirements for Construction and Decommissioning Phases to ensure safety and compliance during works. It also addresses operational lighting for components of the Scheme expected to have lighting requirements for security and maintenance, which are: the National Grid Substation, 132kV and 400kV Project Substations and the Battery Energy Storage System (BESS). All other components of the Scheme are anticipated to remain unlit under normal operation and therefore not considered further in this Lighting Strategy.
- 1.1.5 Within this Lighting Strategy, all reference to external lighting relate to security and maintenance lighting. No other external lighting requirements is anticipated.

- 1.1.6 The Applicant has provided this strategy to outline the approach to the use of artificial lighting during the construction, operation and decommissioning of the Scheme. Lighting will be managed through the following management plans:
- **Outline Construction Environmental Management Plan** (Outline CEMP) [EN0110014/APP/7.1];
 - **Outline Operational Environmental Management Plan** (Outline OEMP) [EN0110014/APP/7.2]; and
 - **Outline Decommissioning Environmental Management Plan** (Outline DEMP) [EN0110014/APP/7.3].
- 1.1.7 A detailed lighting design will be developed at the detailed design stage, setting out the precise locations of all proposed luminaires to be in compliance with the relevant lighting criteria.

1.2 Scheme Overview

- 1.2.1 The Scheme comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating station with a total capacity exceeding 100 megawatts (MW) and associated development including a BESS, up to three 132kV Project Substations and up to three 400kV Project Substations, Grid Connection Infrastructure and a new National Grid Substation. A description of the Scheme can be found in **ES Volume 1, Chapter 4 – The Scheme** [EN0110014/APP/6.1.4].
- 1.2.2 The Scheme would be located within the Order Limits (shown on the **Location Plan** [EN0110014/APP/2.1] and **Works Plan** [EN0110014/APP/2.3] submitted as part of the DCO Application and secured by Article 3 of the **draft DCO** [EN0110014/APP/3.1]). The Order Limits contain all elements of the Scheme comprising the Solar PV Arrays, 132kV and 400kV Project Substations, the National Grid Substation, the BESS, Grid Connection Infrastructure, Mitigation and Enhancement Areas and Highway Works. A description of the Order Limits is provided in **ES Volume 1, Chapter 3: The Order Limits** [EN0110014/APP/6.1.3].

2 Legislation, Policy and Guidance

Introduction

- 2.1.1 Legislation, policy and guidance set out in this section is considered relevant to this Lighting Strategy and is not a complete guide to all legislation, policy and guidance on lighting.

Legislation

- 2.1.2 The Clean Neighbourhoods and Environment Act 2005 (CNEA) (Ref 1) amended Section 79 of the Environmental Protection Act 1990 (Ref 2) by extending the statutory nuisance regime to include light nuisance, by stating in paragraph 1(fb) the following:

'... artificial light emitted from premises so as to be prejudicial to health or a nuisance...'

'Subsection (1) (fb) does not apply to artificial light emitted from - (a) an airport; (b) harbour premises; (c) railway premises, not being relevant separate railway premises; (d) tramway premises; (e) a bus station and any associated facilities; (f) a public service vehicle operating centre; (g) a goods vehicle operating centre; (h) a lighthouse; (i) a prison.'

National Planning Policy

Overarching National Policy Statement for Energy (EN-1) (2025)

- 2.1.3 The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 3) includes references to the potential for artificial lighting to have a detrimental impact on local amenity.
- 2.1.4 Paragraph 5.7.1 of NPS EN-1 (Ref 3) states that *'During the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990'*.

National Policy Statement for Renewable Energy Infrastructure (EN-3) (2025)

- 2.1.5 The NPS for Renewable Energy Infrastructure (EN-3) (Ref 4) includes references to lighting within its assessment principles. Paragraph 2.10.38 of NPS EN-3 (Ref 4) acknowledges security is a key consideration, including lighting, whilst also seeking to minimise security lighting (paragraph 2.10.125).
- 2.1.6 Paragraph 2.10.39 of NPS EN-3 (Ref 4) seeks that *'Applicants should assess the visual impact of these security measures, as well as the impacts on local*

residents, including for example issues relating to intrusion from CCTV and light pollution in the vicinity of the site’.

2.1.7 In paragraph 2.10.40 of NPS EN-3 (Ref 4), it states that consideration should be given to the need to minimise the impact on the landscape and the visual impact of security measures. NPS EN-3 (Ref 4) continues in paragraph 2.10.125 to state *‘Any lighting should utilise a passive infra-red (PIR) technology and should be designed and installed in a manner which minimises impact’.*

2.1.8 Paragraph 2.10.74 of NPS EN-3 (Ref 4) notes that the impact on local ecology from lighting installations should be considered and *‘if lighting is necessary, it should be minimised and directed away from areas of likely habitat’.*

National Policy Statement for Electricity Networks Infrastructure (EN-5) (2025)

2.1.9 The NPS for Electricity Networks Infrastructure (EN-5) (Ref 5) does not include a specific policy for lighting, although paragraph 2.10.6 of NPS EN-5 refers to the use of screening to reduce landscape and visual impacts from elements of the scheme, which would include lighting.

National Planning Policy Framework

2.1.10 The National Planning Policy Framework (NPPF) (Ref 6) was adopted in February 2025. The adopted NPPF introduced explicit references in paragraph 198c to the need to consider the effects of artificial lighting in planning decisions. A draft NPPF was published in December 2025 (Ref 7) for consultation, which retains this emphasis but does not propose any additional changes relating to artificial lighting.

Local Planning Policy

Greater Norwich Local Plan

2.1.11 The Greater Norwich Local Plan (GNLP) (Ref 8) does not explicitly reference light pollution, although it requires developments to minimise pollution and safeguard general amenity and the natural environment.

Norfolk County Council Environmental Lighting Zone Policy

2.1.12 Norfolk County Council (NCC) Environmental Lighting Zones (ELZ) policy, introduced in 2003 (Ref 9), aims to protect the county’s rural dark landscapes from unnecessary light pollution. The policy supports dark-sky objectives by guiding external lighting design, ensuring lighting is only used where necessary and designed to minimise obtrusive light.

Guidance

Planning Practice Guidance

- 2.1.13 The Planning Practice Guidance (PPG), published in November 2016 and updated in February 2024 has a chapter dedicated to Light Pollution (Ref 10). The chapter provides advice to local planning authorities on how to assess and control the impact of artificial lighting in planning decisions, including considerations for amenity, safety and environmental protection.

The Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (2021) (ILP GN01-21)

- 2.1.14 This ILP guidance (Ref 11) provides advice on lighting including the recommendation to local planning authorities to specify Environmental Zones for exterior lighting based on the existing external ambient lighting levels in the area. The guidance also provides design guidance including maximum obtrusive lighting (lighting pollution) level limits for each Environmental Zone – focusing on reflected light and glare in particular. The ILP publication is based on the International Commission on Illumination (CIE) Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition: 2017 (CIE150:2017) (Ref 12).

ILP GP12: Towards Understanding Skyglow (2007)

- 2.1.15 This Towards Understanding Skyglow guidance (Ref 13) provides information on the mechanics of skyglow, levels of skyglow resulting from different luminaires and design considerations to reduce skyglow caused by artificial lighting.

ILP GN08: Guidance Note on Bats and Artificial Lighting in the UK (2023)

- 2.1.16 The Guidance Note on Bats and Artificial Lighting in the UK (Ref 14) provides guidance on general principles of lighting to mitigate adverse effects on areas where bats are known to be present and / or commuting to feeding areas. The guidance sets out advice for bat workers and lighting professionals to ensure that both parties work together to achieve the most effective solution in delivering an appropriate artificial lighting solution whilst reducing the adverse effects on bats. This is a joint publication with the Bat Conservation Trust (BCT).

Chartered Institute of Building Service Engineers / Society of Light & Lighting Guidance

- 2.1.17 Chartered Institute of Building Service Engineers / Society of Light & Lighting (CIBSE / SLL) Lighting Guide 06: The Exterior Environment (2016) (Ref 15) provides general and specific lighting design criteria for the outdoor environment. The guide covers many technical aspects which are likely to be of interest to designers. It presents lighting solutions to basic visual problems and individual characteristics of outdoor lighting applications.

Standards and Design Guides

British Standards

- 2.1.18 BS EN 12464-2:2024 Light and lighting – Lighting of work places Part 2: Outdoor Work (Ref 16) defines the lighting requirements for outdoor work places, which meet the needs for visual comfort and performance.

National Grid Standards

- 2.1.19 The National Grid Generic Electricity Substation Design Manual (Ref 17) provides comprehensive guidance on the design, construction, and operational requirements for electricity substations, covering technical standards, safety considerations, and best practices to ensure compliance with National Grid specifications and reliable system performance. Specifically, Section 04: Site Lighting of the Design Manual (Ref 17) provides detailed guidance on the design, specification, and implementation of lighting systems for electricity transmission sites, ensuring adequate illumination for safety, security and operational requirements while minimising environmental impact and light pollution.

3 Baseline Conditions

- 3.1.1 This section has been informed by a desk-based study of the Order Limits and surrounds, using publicly available information such as Google Street View / Earth and Ordnance Survey mapping, together with baseline information presented in the Environmental Statement.

Order Limits

- 3.1.2 The land within the Order Limits comprises predominantly agricultural (arable) fields crossed by farm tracks, roads (including rural lanes), hedgerows, tree belts, scattered trees, watercourses and Public Rights of Way (PRoW), including the Boudicca Way and Via Beata recreational routes. An existing 400kV overhead line and associated transmission pylons pass through Site 1.
- 3.1.3 Streetlighting is present on the A and B roads within the Order Limits, including the A140, though these are concentrated around the junctions or roundabouts. The minor roads or rural lanes are generally unlit, although they may receive some indirect illumination from lighting on adjacent properties.
- 3.1.4 The remaining areas within the Order Limits are expected to have no existing lighting infrastructure and therefore unlit.

Immediate Surrounds of the Order Limits

- 3.1.5 The majority of roads within the surrounding area of the Order Limits are rural or single lane routes that do not feature any form of street lighting (the extent of the transport and access study area relating to the Scheme is explained in the **Outline Construction Traffic Management Plan [EN0110014/APP/7.6]** and shown on Figure 1 within that document). Streetlighting is present near or adjacent to major junctions and/or roundabouts. These typically range between 10-15m in height.
- 3.1.6 Lighting is present within the surrounding villages. These typically feature common sources of illumination such as streetlights, shopfront lighting, and domestic lighting from residential properties. Individual domestic dwellings and farms are located close to the Order Limits. These are expected to feature some form of domestic lighting, such as wall/façade mounted luminaires or floodlighting.

Existing Receptors

- 3.1.7 The following receptors have been considered as part of this strategy, and have been summarised in **Table 3.1**

Table 3.1: Summary of Existing Receptors

Receptor	Location	Description
Residential	<p>There are several settlements either adjacent to or within 2km of the Order Limits. These include, but are not limited to, the following:</p> <ul style="list-style-type: none"> • Long Stratton • Hempnall • Tasburgh • Tharston • Brooke • Woodton • Great Moulton 	<p>Many of the properties will have some form of domestic lighting, such as wall mounted lighting or floodlights.</p> <p>The residents within these settlements may be susceptible to light spill, glare, and/or sky glow from the external lighting of the Scheme during the construction and operation phases, if lighting is not properly managed.</p>
Residential	<p>There are numerous individual dwellings (e.g. farms) either adjacent to or within 2km of the Order Limits.</p>	<p>Many of the properties will have some form of domestic lighting, such as wall mounted lighting or floodlights.</p> <p>The occupants of these dwellings may be susceptible to light spill, glare, and/or sky glow from the external lighting of the Scheme during the construction and operation phases, if lighting is not properly managed.</p>
Transport	<p>There are numerous roads inside, adjacent to, or with 2km of the Order Limits.</p>	<p>Many of the roads in this area are unlit, although there is some streetlighting present within the settlements and near road junctions.</p> <p>Drivers using these roads are susceptible to glare from the lighting from the Scheme, if not managed, and from any temporary lighting associated with traffic management.</p>
Airfield	<p>Tibbenham Airfield is located within 5km of the Order Limits.</p>	<p>The airfield is currently used by the Norfolk Gliding Club. Activities are likely to take place predominantly during daylight hours; however, there is potential for the airfield to facilitate nighttime flying. Therefore, pilots approaching the airfield may be susceptible to glare from light from both the construction and operation lighting if it is not properly managed.</p>
<p>Seething Airfield is also located within 5km of the Order Limits. However, the airfield is in operation during daylight hours and</p>		

Receptor	Location	Description
		no nighttime flights are expected. Therefore, this airfield is not considered a receptor.
Ecological Designated Sites		<p>Several Sites of Specific Scientific Interest (SSSI), Ancient Woodlands, County Wildlife Sites and other designated ecological sites are located adjacent to or within 2km of the Order Limits. There is one Country Wildlife Site (CWS) within the Order Limits and several CWS adjacent to the Order Limits. These locations are expected to have no artificial light sources and therefore are unlikely to contribute to light pollution.</p> <p>The CWS partially within the Cable Route Corridor of the Order Limits and will be subject to trenchless crossing (see Outline Cable Route Construction Statement [EN0110014/APP/7.21]). Much of the preparation for trenchless crossings will be undertaken within normal working hours, however, continuous working (typically 1-2 days) may be required for drilling as Horizontal Directional Drilling requires continuous works to complete the operation.</p> <p>Construction works would occur near to some of these ecological designated sites and therefore will be susceptible to impacts from construction lighting.</p>
Conservation Areas		Several Conservation Areas are located adjacent to or within 2km of the Order Limits. The Conservation Areas encompasses nearby settlements and therefore will include lighting associated with residential properties and street illumination.
Ecology		<p>Bats (roosting, commuting and foraging) are present within the Order Limits. They are also present in the trees, hedgerows and watercourses that are adjacent to or within 2km of the Order Limits.</p> <p>Nocturnal bird species, such as barn owls, are expected make use of the hedgerows, woodlands and watercourses for roosting, commuting and foraging.</p> <p>Badger setts and foraging areas are located within or adjacent to the Order Limits.</p>
Dark Environment	Sky	The Order Limits are not located within an International Dark Sky Nature reserve, but at the regional level the Order Limits are within a Rural Dark Landscape as defined in Norfolk County Council's Environmental Lighting Zones Policy (Ref 9).The CPRE England's Light Pollution and Dark Skies (see ES Volume 2, Figure 7.4 – CPRE England's Light Pollution and Dark Skies Plan [EN0110014/APP/6.2.7.4]) indicates that the skies classification varies from medium-level light pollution, relatively dim night skies, transitional zones between the darkest night skies and areas of relatively low light pollution and within a transitional zone between relatively dim night skies and areas of the darkest night sky. Some Sites fall within the darkest night sky.

Environmental Lighting Zone

- 3.1.8 ILP GN01 and ILP PLG04 (Ref 18) detail Environmental Lighting Zones (ELZ) based on CIE150 (see **Table 3.2**). The ELZ characterises the Order Limits and surrounding areas with classifications that determine the obtrusive light limitations at the Scheme and surrounding area.
- 3.1.9 The Order Limits are not located within an International Dark Sky Nature reserve, but at the regional level are within a Rural Dark Landscape as defined in NCC ELZ Policy (Ref 9).
- 3.1.10 For the purposes of this strategy, the Order Limits are deemed to fall within an **E2 ‘Rural’ ELZ** as defined in ILP GN01 (Ref 11) as the surrounding area is predominantly rural with low ambient light levels.

Table 3.2: Environmental Lighting Zones (ILP GN01, 2021)

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	Astronomical dark skies, starlight reserves, International Dark Sky Associations (IDA) dark sky places. Observable UNESCO reserves, International Dark Sky places.
E1	Natural	Intrinsically dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness	Sparsely inhabited rural area, village or relatively dark outer suburban locations.
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity.

4 Lighting Mitigation Strategy

4.1 Construction and Decommissioning Lighting

- 4.1.1 All lighting would seek to limit impact on sensitive receptors through the implementation of standard good practice measures and will be designed and positioned to ensure it does not create a nuisance under the Environmental Protection Act 1990.
- 4.1.2 Prior to the commencement of construction works, and throughout the construction period, the project team will liaise closely with the appointed Ecological Clerk of Works (ECoW). The ECoW will oversee activities on site to ensure that all ecological mitigation measures are implemented correctly and that works remain compliant with the agreed environmental requirements.
- 4.1.3 Lighting is required for safe undertaking of construction and decommissioning activities, alongside facilitating safe access for the works. Temporary fixed lighting is anticipated to be limited to the temporary construction compounds and construction laydown areas, which would include car parking, welfare offices and workshops, plant equipment and security infrastructure, including cameras, perimeter fencing and lighting. Lighting is also expected from construction or delivery vehicles as they approach, move around and leave the Order Limits.
- 4.1.4 The lighting will be suitably designed as far as reasonably practicable to not cause nuisance and will accord with good practice measures to minimise light spill and glare. Lighting will be required during construction to maintain a safe working environment, though its use will be largely confined to core working hours. Any need for illumination outside these hours will be addressed within a detailed Construction Environmental Management Plan (CEMP) to be delivered in accordance with Requirement 13 of the draft DCO.
- 4.1.5 However, some illumination may be required to support specific activities, such as Horizontal Directional Drilling (HDD) works and deliveries / movements of Abnormal Indivisible Loads (AILs).
- 4.1.6 The principles identified within **Table 4.1** will be applied during the construction and decommissioning phases.

Table 4.1: Principles of Construction Lighting

Principles of Construction Lighting
Management and Supervision
<p>Construction task lighting will be limited to agreed working hours for the Scheme. Night-time working avoided except in specific circumstances (see ES Volume 1, Chapter 4 – The Scheme [EN0110014/ APP/6.1.4]).</p> <p>A nominated person within each construction organisation to conduct reviews of proposals for construction lighting installations and verify consistency with the CEMP and minimisation of obtrusive light. Lighting details, such as locations, types and duration of use, will be agreed between the Applicant and Principal Contractor during detailed design stage.</p> <p>Inspection of the lighting installation should be undertaken on initiation of new lighting sources and at appropriate intervals thereafter.</p> <p>Appropriate records of temporary approval and inspection should be retained as part of the CEMP.</p> <p>Lighting will be operational only for the duration of each task and switched off when no longer required.</p>
Fixed Installations / Compounds, Offices and Welfare Buildings
<p>Luminaires on fixed / long term features to use with dark sky considerate luminaires, avoiding tilt angles that expose the light source or contribute to upward light. Mounting heights of luminaires to be kept as low as practicable.</p> <p>Visual screening, such as hoardings, applied to the perimeter of temporary construction compounds to contain light within those locations, as far as practicable. Where practical luminaires should be mounted below the upper height of the screening, so light sources are not visible externally to the temporary construction compound.</p> <p>Fittings to be oriented into the compounds and away from any woodland areas or sensitive receptors. If necessary, shielding to be used.</p> <p>Warmer colour temperature of 3000K to be used, where practicable.</p> <p>Where appropriate, either low-level lighting or infrared floodlighting should be used in conjunction with CCTV to minimise visible light while maintaining security.</p> <p>Minimise the external application of linear battens or bulkheads with clear, ribbed or opal polycarbonate diffusers. Whilst providing general illumination the wide distribution of these luminaires emits a significant percentage of their output as upward light, particularly when mounted on vertical surfaces. Use within structures or on underside of canopies/scaffolding may yield source visibility and some upward light but this is greatly reduced compared to their application along the side of paths or hoardings.</p> <p>Security and access lighting will be controlled through photocell and presence detection wherever practical.</p> <p>For vehicle circulation areas where pedestrian movement is not present consideration of unlit routes with passive (retroreflective) markers indicating routes in order to reduce the visibility of artificial light.</p>
Temporary Task Lighting

Principles of Construction Lighting

Lighting to only be operational for the duration of each task and switched off when no longer required.

Temporary shielding and screening applied between task areas and sensitive receptors, as far as practicable.

Portable or temporary task lighting to be appropriate scale, mounting height and distance from task, avoiding extreme tilt angles of luminaires. The use of a greater number of lower output luminaires correctly positioned is considered preferable to a smaller number of high output luminaires covering an expansive area.

LED lighting and cowls, hoods and other similar screens will be adopted

Lighting will be directed away from woodland / hedgerows.

Decommissioning and Laydown Areas

- 4.1.7 It is expected that work on these areas will occur during daytime hours. However, if any work is undertaken during the hours of darkness, then it shall be undertaken in alignment with the principles outlined in **Table 4.1**.

Operational Lighting

General Requirements

- 4.1.8 Components of the Scheme expected to have lighting requirements are: the National Grid Substation, 132kV and 400 kV Project Substations and the BESS.
- 4.1.9 Unless specified otherwise, the lighting will be controlled by motion sensors to support security, with a manual override function provided for maintenance.
- 4.1.10 A detailed lighting design will be developed at the detailed design stage. The operational lighting will be designed to meet the requirements of the standards and design guides set out in in Section 2 of this strategy.
- 4.1.11 The detailed lighting design will be developed with regard to **E2 ELZ**. Whilst the ELZ establishes maximum values for various criteria, the Scheme should seek to avoid and minimise light pollution at each opportunity.
- 4.1.12 Once the Scheme is operational, it is expected to operate unmanned and remain unlit under normal conditions, with all external lighting switched off. Lighting will only be activated during scheduled maintenance, in emergency situations or for security purposes.
- 4.1.13 All external lighting at the Project Substations and BESS will be motion sensitive. These will be positioned and angled to focus on human or vehicular movement – sensor sensitivity shall be adjusted to ignore minor heat signatures (i.e. wildlife) to prevent accidental activation of the light fittings. The

motion sensors will be linked to the security cameras and will activate upon detection of movement. Once movement ceases, the lights will remain on for a short, but appropriate period of time, to ensure personnel have sufficient time to move safely without the sudden loss of illumination. After this period has ended, the lights will switch off completely.

- 4.1.14 Any new external lighting will use low-intensity, warm spectrum lighting. A correlated colour temperature of 3000K or less would be used, where practicable. All external lighting will be mounted horizontally so that the light source is aimed directly downwards, with full cut-off optics, meaning the luminaire emits no direct upward light.
- 4.1.15 If there are large areas (such as car parking) which need to be illuminated, then this should be done using a luminaire with an asymmetrical optic. This will throw the light forward without the need of tilting the luminaire upwards and exposing its light source (and therefore causing light spill and glare onto nearby receptors). For the designated ecological sites, woodlands and/or tree belts and hedgerows, direct and indirect light should be avoided to prevent disturbance to protect the ecological integrity of these sites. If necessary, shielding and lighting controls should be used. These measures will be reviewed and approved by the appointed ECoW prior to the commencement of site operations.

National Grid Substation

- 4.1.16 The National Grid Substation will be positioned at least 10m from the nearby ecological features (such as hedgerows) and 15m from PRow. Further details of design offset distances are provided in **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**.
- 4.1.17 The lighting requirements for the National Grid Substation shall be designed to comply with the requirements of the National Grid Generic Electricity Substation Design Manual (Ref 17). The Relay and Control Rooms associated with the National Grid Substation will be inside a building and therefore will be lit internally. The National Grid Substation will feature external components, however these are not expected to require any dedicated external lighting. If lighting is required for any maintenance on these components, then temporary lighting shall be used.
- 4.1.18 As stated in Section 3.1 of the National Grid Generic Electricity Substation Design Manual (Ref 17), the external lighting shall be switchable either remotely via the substation control system or locally on site. The system shall be configured such that it cannot be left on inadvertently or automatically switch on at night.
- 4.1.19 Lighting above the entrances to the Control Rooms, Relays and offices will be designed to emit no upward light. Exposed light sources should be avoided to minimise glare and prevent unnecessary light spill and towards the adjacent hedgerows and trees.

4.1.20 The access road to the National Grid Substation will not be illuminated.

BESS

4.1.21 The boundary of the BESS will be positioned at least 10m from nearby ecological features and 200m from the nearest residential property. Further details of offset distances are provided in **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**.

4.1.22 The BESS Compound perimeter will be illuminated by column mounted luminaires, which will be mounted as low as practically possible. These will be orientated so that they are facing into the compound rather than away, and they be mounted horizontally so that the light source is aimed directly downwards. Furthermore, only luminaires with a negligible or zero ULR should be used. If further mitigation is required, shielding shall be used to control the direction of light and further minimise light spill from the column mounted luminaires.

4.1.23 The column mounted luminaires will be controlled by motion sensors for security purposes, with a manual override function for maintenance.

4.1.24 Once operational, the batteries are expected to remain closed and unlit. If maintenance is required, this can be provided via the compound perimeter lighting or, if required temporary portable lighting.

4.1.25 The access road to the BESS will not be illuminated.

Solar PV Arrays

4.1.26 The boundary of the Solar PV Arrays will be at least 10m from the nearby ecological features (such as hedgerows) and 30m from Ancient Woodland, SSSI and CWS. Further details of offset distances are provided in **Design Principles, Parameters and Commitments [EN0110014/ APP/7.18]**.

4.1.27 The Solar PV modules will require no lighting during operation.

4.1.28 It is expected that work on these areas will occur during daytime hours. However, if any work is undertaken during the hours of darkness, then it shall be undertaken in alignment with the principles outlined in **Table 4.1**.

4.1.29 The access roads to the Solar PV Arrays will not be illuminated.

132kV and 400 kV Project Substations

4.1.30 The boundary of the 132kV and 400kV Project Substations will be positioned at least 10m from nearby ecological features (such as hedgerows) and 30m from Ancient Woodland, SSSI and CWS. Further details of offset distances are provided in **Design Principles, Parameters and Commitments [EN0110014/ APP/7.18]**.

- 4.1.31 Lighting for the entrances to the Control Rooms, offices and welfare facilities associated with the Project Substations will be designed to emit no upward light, and exposed light sources should be avoided to minimise glare and prevent unnecessary light spill beyond the intended area. Any components that are external will be illuminated either by the compound perimeter lighting or via temporary portable lights.
- 4.1.32 The access roads to the Project Substations will not be illuminated.

Maintenance

- 4.1.33 Maintenance of light fittings is expected to occur during daytime hours. If daytime maintenance is not feasible and the fitting must remain operational, temporary shielding will be employed to minimise light spill. Any work required will be completed as quickly and safely as possible to limit light exposure during maintenance work.

5 Conclusions

- 5.1.1 This Lighting Strategy is based upon an understanding of the baseline conditions within the Order Limits established through desk-based study. The Order Limits fall within an E2 'Rural' Environmental Lighting Zone.
- 5.1.2 Construction lighting will be suitably designed as far as reasonably practicable to not cause nuisance and would accord with good practice measures to minimise light spill. Construction lighting shall follow the principles set out in **Table 4.1**.
- 5.1.3 It is expected that operational lighting in the form of motion sensing lighting will be required for components of the Scheme, namely, the National Grid Substation, BESS and 132kV and 400kV Project Substations. Motion sensing lighting will be used only for maintenance and security purposes. Lighting is not expected to be required for the remainder of the Scheme, with the exception of temporary lighting for maintenance.
- 5.1.4 Lighting controls, lower colour temperatures and luminaire orientations set out in this Lighting Strategy will be considered as part of the detailed design to minimise and negate impacts as far as possible.

References

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Abbreviations

Abbreviation/Term	Definition
Institute of Lighting Professionals Guidance Note (ILP GN)	The UK's professional body for lighting engineers and practitioners. The guidance notes provide best-practice recommendations on specific lighting issues.
International Dark Sky Association (IDA)	A global non-profit organization dedicated to protecting the night sky from light pollution. It promotes responsible outdoor lighting, provides certification for Dark Sky Places, and develops guidelines and advocacy programs to preserve natural darkness for ecological, cultural, and scientific benefits.
British Standard European Norm (BS EN)	Standards published by the British Standards Institution (BSI) that adopt European Norms (EN) developed by the European Committee for Standardization. These documents set harmonised technical and safety requirements across the UK and Europe.
Environmental Lighting Zone (ELZ)	A classification system used to define areas based on their sensitivity to artificial lighting, guiding limits for light spill and brightness. Zones range from E0 (dark sky) to E4 (urban), with rural areas typically falling under E1 or E2.
Chartered Institute of Building Services Engineers (CIBSE)	The UK professional body for building services engineers, providing standards, guidance, and best practice for lighting, heating, ventilation, and other building systems.
Society of Light & Lighting (SLL)	A division of CIBSE dedicated to lighting professionals, offering technical guidance, standards, and publications on lighting design and performance.
Bat Conservation Trust (BCT)	UK charity providing guidance on bats and artificial lighting impacts.
Obtrusive Light	Unwanted or intrusive artificial light that causes nuisance, discomfort, or environmental harm beyond the area intended to be lit.
Light Spill	Light that falls outside the target area, often onto adjacent properties or sensitive receptors, contributing to visual intrusion or ecological impact.
Glare	Excessive brightness or contrast from a light source that causes visual discomfort or reduces visibility.
Sky Glow	Brightening of the night sky caused by upward light scatter from artificial sources, reducing the visibility of stars and affecting dark sky quality.

Abbreviation/Term	Definition
Correlated Colour Temperature (CCT)	The colour appearance of light (in Kelvin).
Upward Light Ratio (ULR)	The proportion of a luminaire's light output that is emitted directly upward into the sky. Expressed as a percentage.
Ambient Light	The general level of natural or artificial light present in an environment, excluding direct illumination from specific light sources. It represents the background lighting conditions that influence visibility and visual perception.
Passive Infrared Sensor (PIR)	A type of motion sensor that detects movement by measuring changes in infrared radiation (heat) emitted by objects within its field of view. Commonly used for security and lighting control systems to activate lights only when human presence is detected.