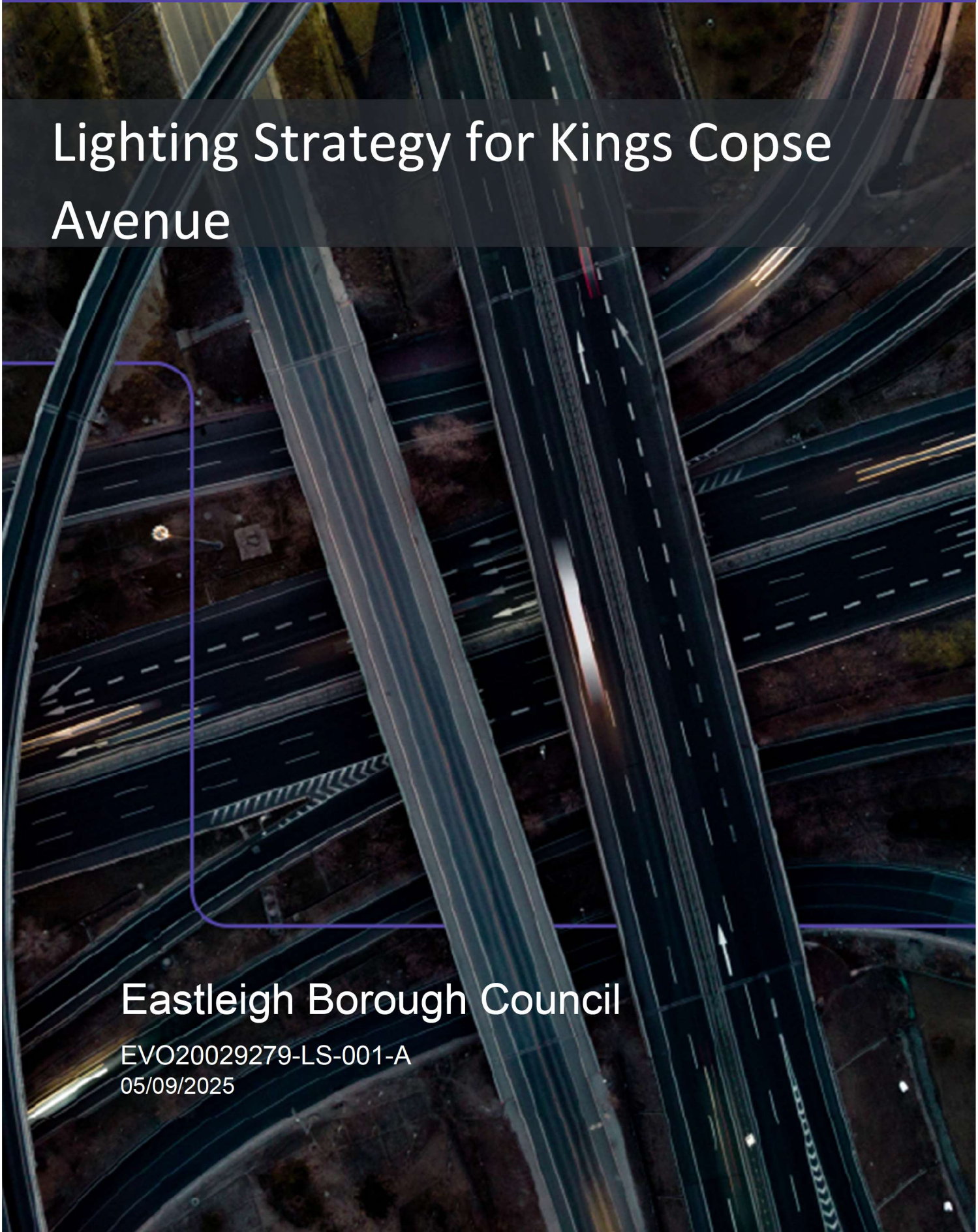




Lighting Strategy for Kings Copse Avenue

Eastleigh Borough Council

EVO20029279-LS-001-A

05/09/2025

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2 Version Control

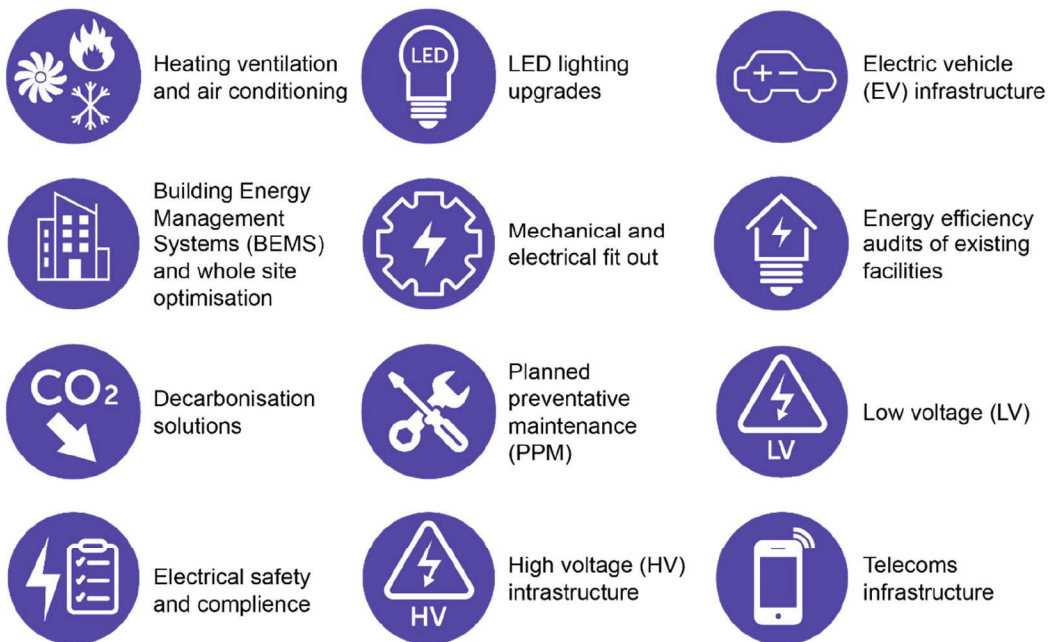
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3 About Enerveo Ltd

3.1 Enerveo

- 3.1.1 Enerveo is a multi-disciplinary contracting business, with the skills and expertise to deliver complex projects in complex environments across several different service lines.
- 3.1.2 From managing over 1 million streetlights, to rolling out EV charging points nationwide, we have an important role to play in connecting, sustaining, and renewing critical infrastructure in the UK and Ireland.
- 3.1.3 Our work is underpinned by strong commitment, not just to our customers and partners, but also to safety and we are proud to have one of the best safety records in the industry.
- 3.1.4 But we are more than just a contracting business. The world is changing, and we want to be a part of it; we have a responsibility to support society in accelerating towards Net Zero and will continue to provide innovative solutions to our clients to achieve this.
- 3.1.5 We are proud of our deep heritage. It drives us forward into the future. Into a better future. For all.

3.2 Our services



4 Introduction

4.1 General

- 4.1.1 This report has been written by the Lighting Design department of Enerveo Ltd. The Lighting Design department has experience and knowledge in lighting impact assessments, obtrusive light mitigation, and detailed lighting design.
- 4.1.2 The purpose of this report is to provide an analysis of the predicted light spill of the proposed exterior lighting and to provide a mitigation strategy where necessary for the development southeast of Kings Copse Avenue, Hedge End, Hampshire (hereafter referred to as the Application Site) (Figure 1).
- 4.1.3 Eastleigh Borough Council seeks planning permission for the construction of Kings Copse Avenue, a residential development consisting of 102 houses and 90 flats, (here after referred to as the Proposed Development) (Figure 2).



Figure 1: Aerial view of the Application Site boundary (red line) with the surrounding area for context



Figure 2: Layout plan of the Proposed Development

- 4.1.4 The Application Site is situated on southeast side of Kings Copse Avenue (Classification: C, USRN: 13317041), and east of Tan House Lane (Classification: None, USRN: 13320003).
- 4.1.5 There is a Site of Special Scientific Interest (SSSI) to the south and east of the site (at its closest it is approximately 300 metres to the south, and over 1600m to the east), known as *Upper Hamble Estuary and Woods*.
- 4.1.6 There is a Ramsar Site to the south and east of the site (at its closest it is approximately 900 metres to the south, and over 1600m to the east), known as *Solent & Southampton Water*.
- 4.1.7 There is a Special Area of Conservation (SAC) to the south and east of the site (at its closest it is approximately 900 metres to the south, and over 1600m to the east), known as *Solent Maritime*.
- 4.1.8 There is a Special Protection Area (SPA) to the south and east of the site (at its closest it is approximately 900 metres to the south, and over 1600m to the east), known as *Solent & Southampton Water*.
- 4.1.9 There is a Local Nature Reserve (LNR) immediately adjacent of the site, known as *Manor Farm*.
- 4.1.10 There is a Site of Importance for Nature Conservation (SINC) immediately adjacent of the site, known as *Tanhouse Meadow*.
- 4.1.11 This report outlines the following:
- Relevant obtrusive light policies in direct relation to the Proposed Development.
 - Relevant national and local policies.
 - Why the Proposed Development requires artificial lighting?
 - Necessary mitigation to reduce the potential for spill light which may adversely affect the surrounding landscape and the identified sensitive receptors.

5 Legislative Policy, Frameworks, Standards & Guidance

5.1 Legislative Policy

- 5.1.1 The following national policies and legislative frameworks are likely to apply to the Proposed Development:

5.1.2 **Environmental Protection Act 1990 & Clean Neighbourhoods and Environment Act 2005: Part 9 Miscellaneous**

Since 2005 artificial light has been incorporated in law as a statutory nuisance. This is contained in the Clean Neighbourhoods and Environment Act 2005: Part 9 Miscellaneous within Section 102 and is an amendment to Section 79 of the Environmental Protection Act 1990:

“...the following matters constitute “statutory nuisances” for the purposes of this Part, that is to say— ... (fb)artificial light emitted from premises so as to be prejudicial to health or a nuisance ... and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 below ... and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint.”

5.1.3 **National Planning Policy Framework, 2023**

- 5.1.4 The National Planning Policy Framework sets out the Government’s planning policies for England and how these should be applied. The latest version was published in December 2023, and the final part of paragraph 191 pertains to light pollution and limiting its impact: *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”*

5.2 Local Policy

- 5.2.1 The local authorities for the Application Site are Eastleigh Borough Council.
- 5.2.2 *Eastleigh Borough Local Plan (2016-2036) Adopted April 2022* and guides all future development in the East Hampshire.
- 5.2.3 The most relevant policies to lighting outlined in the *Eastleigh Borough Local Plan (2016-2036) Adopted April 2022* are detailed below

5.2.4 Policy DM8, Pollution

1. *Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through:*
 - a. *air pollution (including odours or particulate emissions);*
 - b. *pollution of surface, underground, coastal waters or other watercourses;*
 - c. *noise or vibration;*
 - d. *light intrusion, both generally and with respect to the South Downs National Park's status as an International Dark Night Skies reserve; or*
 - e. *land contamination.*
2. *Development susceptible to particular forms of pollution will not be permitted:*
 - a. *where it will be adversely affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects; or*
 - b. *where it would inhibit existing economic or other activities giving rise to acceptable polluting effects.*
3. *Where a development site is known or suspected to be contaminated, before the site is developed the Borough Council will require the contamination to be remediated to a standard where as a minimum it cannot be defined as 'contaminated land' under Part IIA of the Environmental Protection Act 1990.*

- 5.2.5 Further details on lighting are outlined in Section 5.50, that is shown below

Light: Lighting can have a significant impact on people's perception of their environment and the South Downs to the north east of the Borough is specifically designated as a Dark Sky reserve due to its low levels of light pollution (the areas of the National Park closest to the Borough are designated as Dark Sky Zone E1(b) Transition Zone in the South Downs Local Plan dark night skies policy). At night, the main distinction between urban and rural areas is that the former are lit and the latter are not. Light spillage is a material consideration because it can cause discomfort and loss of privacy and obscure the night sky. However, well designed lighting can improve people's perception of public safety and the environment. Lighting to the sky, onto hedgerows and directly into waterways can cause impacts on bats, nocturnal species and migratory fish. The Council will seek to ensure that lighting from development does not cause unacceptable environmental or amenity impacts, whilst also providing appropriate illumination (for example in respect of highway and community safety or sporting facilities).

5.2.6 Policy DM14, Parking

1. *New residential development will be required to provide off-highway parking which is adequate in terms of highway safety/traffic management. Provision will take account of the adopted Eastleigh Borough Council's Residential Parking Standards SPD which sets out minimum requirements for parking provision. Over provision relative to car ownership levels or which would create an ineffective use of space will be avoided. Applications with parking levels which deviate away from the expected standard should be substantiated by robust evidence contained within the transport statement/assessment/travel plan.*
2. *For out-of-centre development proposals, parking needs will be assessed based on the impacts of the development on neighbouring town, district or local centre or a neighbourhood parade.*

3. Within town, district and local centres and in neighbourhood parades, parking needs will be assessed in relation to wider needs within the centre/parade. Where existing provision is inadequate, the provision of additional parking may be permitted subject to a financial contribution towards measures to assist on-street parking management, public transport, cycling and walking.

4. Proposals to provide new car parks, extend existing car parks or provide workplace park and ride facilities will be permitted if:

- a. it can be demonstrated that this is the only way the transport requirements driving the proposals for car parking provision can be met;
- b. the proposals form part of a strategy aimed at managing use of the private car, such as a workplace travel plan; and
- c. transport and other environmental assessments demonstrate that the benefits of the proposal (e.g. reduction of on-street parking pressures, reduction of traffic congestion) outweigh any adverse effects; and
- d. the design, layout, planting and landscaping and lighting provision addresses visual and landscape impacts, noise, lighting and impacts on residential amenity; and
- e. the developer pays for any off-site highway improvements necessary from traffic generated by the proposal, and any additional works necessitated by an inability to meet workplace travel plan targets; and
- f. for sites outside the urban edge and in accordance with other policies in the Plan, they are subject to a sequential approach prioritising sites within the urban edge. Proposals in settlement gaps will only be acceptable in exceptional cases (see strategic policy S6).

5.2.7 Policy BO3, Land east of Kings Copse Avenue and east of Tanhouse Lane

1. An area of approximately 6.96 ha of land on the eastern side of Kings Copse Avenue and Tanhouse Lane, as defined by the policies map, is allocated for development to include approximately 120 dwellings. Planning permission will be granted provided that the detailed proposals comply with the development plan, and with an approved masterplan for the whole site which addresses the following specific requirements:

- a. a range of housing types, sizes and tenure;
- b. the provision of on-site public open space and play areas, to serve the development;
- c. the provision of vehicular access from Kings Copse Avenue;
- d. the provision of contributions to, or delivery of, off-site highway improvements considered necessary to serve the development;
- e. the provision of pedestrian and cycle links both within the site and to connect the site with the surrounding area, including the adjacent Roadway Pavilion and Football Ground;
- f. the maintenance and improvement of the Public Rights of Way to the west of the site;
- g. 20m buffers off Tanhouse Meadow Sites of Importance for Nature Conservation/Manor Farm Local Nature Reserve to protect the designated sites and the Hedge End stream to the north. All mature hedgerows should be retained and buffered by 5m either side;
- h. ensure avoidance or mitigation of direct and indirect adverse impacts on habitats or species protected by legislation or identified as of principal importance within the NERC Act 2006 S41 lists and that there is a net gain in biodiversity;
- i. avoiding development on areas of the site at risk of flooding;
- j. to preserve water quality and flows into the Hedge End Stream details of Sustainable Urban Drainage shall be provided in accordance with policy DM6 as part of any application for outline or full planning permission;
- k. the provision of a landscape setting for the development, including buffer planting on Kings Copse Avenue frontage, and maintaining, reinforcing and buffering existing boundary hedgerows, tree belts and woodland;
- l. the provision of good quality landscape setting for the development (including buffer planting on Kings Copse Avenue frontage), and maintaining and reinforcing existing boundary hedgerows, tree belts and woodland;
- m. a thorough examination of the potential for the relocation of the overhead power line which crosses the site, in order to maximise the site's development potential;

- n. preservation of the pipeline infrastructure which cross the site;*
- o. ensuring an acceptable noise environment for new homes through appropriate siting of development and the provision of suitable noise and air mitigation measures, in light of the increased road traffic noise impact from Kings Copse Avenue, due to the opening of Pylands bypass/Link Road and Botley bypass; and*
- p. occupation of the development is phased to align with the delivery of any necessary wastewater network reinforcement, in liaison with the service provider.*

5.2.8 Eastleigh Borough Local Plan (2016-2036) Adopted April 2022 Policies Map

- 5.2.9 The Application site is identified on the Policies map as BO3, which the key shows as an area of Proposed Housing & Residential-Led Mixed Use Development Allocation.

5.2.10 Hampshire County Council Technical Guidance Note TG13 – Street Lighting

- 5.2.11 The latest edition of Technical Guide 13 (TG13) was published in January 2025 and is revision 5.
- 5.2.12 TG13 outlines that HCC street lighting is maintained on a PFI contract running from 2010-2035.
- 5.2.13 TG13 summarises the Development Standard and ensures compliance with the Accrual Required Standards. This includes but is not limited to column, luminaire and electrical specifications etc.
- 5.2.14 TG13 requires that luminaires use warm white (3,000K) LEDs for residential roads, however the presence of bats at the site means that 2,700K warm white LEDs will be used, as per GN08/23.
- 5.2.15 TG13 requires that luminaires should be fitted with 0° tilt in E3 environmental zones.
- 5.2.16 This site is not proposed for adoption however the document TG13 offers an excellent starting point for street lighting and for ease of ongoing maintenance its principles and equipment requirements are to be followed. This will allow for quicker and simpler maintenance as local streetlighting contractors will all hold stock of this equipment.

5.2.17 Street Lighting Maintenance Management Plan (SLMMP) v1.6

- 5.2.18 The latest version of the SLMMP is version 1.6, published in 2023.
- 5.2.19 The most relevant policies to this site outlined in SLMMP are detailed below:

5.2.20 Policy Number SL1 – Lighting Provision (General Requirements)

“Zone E3 Areas of Medium District Brightness (Low Crime Suburban Locations)

Roads in Zone E3 areas shall be lit to the levels originally provided at the time of adoption.”

5.2.21 Policy Number SL3 – New Infrastructure

Where the proposed works lie within areas designated to be lit then the Highway Lighting Authority’s Street lighting and illuminated sign requirements shall form part of any Agreement and/or Contract. Such general requirements are laid down in the “Model Section 38 Agreement” and the Directorate’s standard drawings and material specifications.

All equipment proposed for adoption by the Highway Lighting Authority shall be maintained by the developer to ensure its safe working condition and ensure the equipment is fit for purpose up to the date of adoption. Such maintenance shall be in accordance with relevant UK legislation and the UK Roads Liaison Group document “Well Managed Highway Infrastructure”

5.3 Standards

- 5.3.1 The following British Standards and European Standards will apply to adoptable highway lighting at the Proposed Development as they are required by the Highway Authority, Hampshire County Council (HCC).
- 5.3.2 Additionally, the following British Standards and European Standards will apply to private road lighting at the Proposed Development.

5.3.3 BS EN 5489-1: 2020

- 5.3.4 Lighting in accordance with BS 5489-1:2020 is required by the adopting highway authority, HCC).
- 5.3.5 The standard gives recommendations for the general principles of road lighting as well as providing guidance on minimising energy consumption and limiting the impact of lighting on the environment and adjacent property.
- 5.3.6 The standard gives recommendations for the design of all types of highways including subsidiary roads like those in the proposed development. The performance requirements are set out in Table A.5

Table A.5 — *Lighting classes for subsidiary roads*

Traffic flow	Lighting class		
	E1 to E4 ^{A)}	E1 to E2 ^{A)}	E3 to E4 ^{A)}
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy ^{B)}	P5	P4	P3
Normal ^{C)}	P5	P5	P4
Quiet ^{D)}	P6	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in [A.3.3.2](#).

NOTE 2 An EV lighting class using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_o , needs to be as high as reasonably practicable (see [7.2.6](#)).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N2].

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

^{A)} Environmental zone, as given in ILP GN01 [N2].

^{B)} Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

^{C)} Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

^{D)} Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road, and is mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.

Figure 3: BS EN 5489-1:2020 - Table A.5 - Lighting classes for subsidiary roads (appropriate pre-risk assessment classes highlighted)

- 5.3.7 A lighting class of P4 has been reduced to P5 for the interior roads and for the Proposed Development, due to the presence of bats, adjacent nature reserve, and the perimeter roads reduced further to P6 due to the buffer zones outlined in BO3.

- 5.3.8 This lighting class P5 and P6 is the lower advised lighting level for residential streets where there is mixed vehicular and pedestrian usage, for the E3 environmental zone that the Application Site will become once developed. However, due to the reasons outlined above a P4 lighting class would be too bright. Reducing to P5 lighting class across the majority of site will help to reduce light pollution. And for sections of lit carriageways that are adjacent to the site boundaries the lighting level will be reduced further to P6, to minimise spill light towards the site boundary as per GN08/23.

5.3.9 BS EN 13201-2:2015

- 5.3.10 Lighting in accordance with BS EN 13201-2:2015 is required by the adopting highway authority, HCC).
- 5.3.11 The standard sets out the performance requirements for the lighting classes that are selected via BS EN 5489-1:2020. The classes are aimed at the visual needs of road users, and it considers environmental aspects of road lighting.

Table 3 — P lighting classes

Class	Horizontal illuminance		Additional requirement if facial recognition is necessary	
	$\bar{E}^a$ [minimum maintained] lx	E_{min} [maintained] lx	$E_{v,min}$ [maintained] lx	$E_{sc,min}$ [maintained] lx
P1	15,0	3,00	5,0	5,0
P2	10,0	2,00	3,0	2,0
P3	7,50	1,50	2,5	1,5
P4	5,00	1,00	1,5	1,0
P5	3,00	0,60	1,0	0,6
P6	2,00	0,40	0,6	0,2
P7	performance not determined	performance not determined		

^a To provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1,5 times the minimum $\bar{E}$ value indicated for the class.

Figure 4: BS EN 13201-2:2015 Table 3 – P lighting classes.

5.4 Guidance

- 5.4.1 The lighting at the Proposed Development should follow government & industry guidance and best practice. This will assist in minimising the effects of any artificial lighting at the Application Site and the surrounding area.

5.4.2 Planning Policy Guidance Light Pollution, 2019

- 5.4.3 Guidance for assessing the effects if the proposed artificial lighting is outlined in the Planning Policy Guidance (PPG), originally published in March 2014 with the latest updates taking place in November 2019. The guidance states:

- *“Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For example, this might be because:*
- *the artificial light has a significant effect on the locality; and/or*
- *users of the proposed development (e.g., a hospital) may be particularly sensitive to light intrusion from the existing light source.*
- *Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle. Additional guidance on applying this principle is set out in the planning practice guidance on noise.*
- *Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- *Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.*
- *Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?*
- *Would new lighting have any safety impacts, for example in creating a hazard for road users?*
- *Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.*
- *Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)”*

- 5.4.4 Guidance Notes for the Reduction of Obtrusive Light (GN 01/21), Institution of Lighting Professionals
- 5.4.5 The Institution of Lighting Professionals (ILP) Guidance Note 01 (GN01/21) gives advice on how to reduce the potential for obtrusive light, which can happen with poorly designed and installed artificial lighting. The latest version of GN01/21 was published in May 2021. This lighting strategy is informed by GN01/21 to reduce the potential for obtrusive light from the exterior lighting at the Application Site.
- 5.4.6 The environmental zone criteria are detailed within GN01/21 Tables 2 will inform the lighting strategy.

Table 1: ILP GN01/21, Table 2: Environmental zones

Zone	Surroundings	Lighting Environment	
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, 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

Note 1 Where an area to be lit lies close to the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone (see comment below)

Note 2 Rural zones under protected designations should use a higher standard of policy

Note 3 Zone E0 must always be surrounded by an E1 Zone

Note 4 Zoning should be agreed with the local planning authority. Due to local requirements a more stringent zone classification may be applied to protect special / specific areas

Note 5 SQM (Sky Quality Meter) is referenced by the International Dark Skies Association (IDA). SQM is an instrument used to measure the luminance of the night sky. It is typically used by astronomers to quantify skyglow, using units of magnitudes per square arcsecond. the scale is between 16:00 (a bright night sky) and 22:00 (the least light pollution). The criteria for zone E0 was revised in mid-2019, with the new requirements not being made retrospective

Note 6 Astronomical Observable Dark Skies will offer clearer views of the Milky Way and of other objects such as the Andromeda Galaxy and the Orion Nebula

Note 7 Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way

- 5.4.7 The maximum illuminance in the vertical plane e.g., onto property frontages is set out in GN01/21 Table 3 and will be used to inform this lighting strategy. The details that are applicable for the Application Site have been highlighted (Environmental zone E3). However, HCC use 2 lux vertical illuminance for all residential developments regardless environmental zone or being pre or post curfew, which is more stringent than the E2 pre curfew restriction within Condition 36 of the planning permission. And the post curfew restriction is ignored due to HCCs part night switch off policy.

Table 2: ILP GN01/21, Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on premises

Light technical parameter	Application conditions	Environmental Zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E _v)	Pre-curfew	n/a	2 lux	5 lux	10 lux	25 lux
	Post-curfew**	n/a	<0.1 lux*	1 lux	2 lux	5lux

* If the installation is for public (road) lighting then this may be up to 1 lux.

** Curfew refers to a time when the local authority has agreed that the lighting installation should be switched off.

5.4.8 The limitations on sky glow set out in GN01/21 Table 6 will be used to inform this lighting strategy. The details that are applicable for the Application Site have been highlighted (Environmental zone E3).

Table 3: ILP GN01/21, Table 6 (CIE 150 table 5): Maximum values of upward light ratio (ULR) of luminaires

Light technical parameter	Environmental Zone				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %*	0	0	2.5	5	15

* ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky;

5.4.9 Bats and Artificial Lighting in the UK, (GN08/23), Bat Conservation Trust and Institution of Lighting Professionals.

5.4.10 The Institution of Lighting Professionals (ILP) Guidance Note 08 (GN08/23) in conjunction with the Bat Conservation Trust published GN08/23 in the summer of 2023. GN08/23 is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios installed artificial lighting. This lighting strategy is informed by GN08/23 and will use the principles set out in it to mitigate the impact of artificial lighting, both from exteriors sources such as streetlights and porchlights and interior sources within homes.

5.4.11 The mitigation hierarchy (see Figure 5) applies to lighting design: impacts to biodiversity should be avoided in the first instance through design and where this has been clearly demonstrated not to be possible, appropriate mitigation needs to be put in place. Compensation is the least desirable option, so all other avenues should first be explored and ruled out. In parallel, opportunities to design lighting betterment for biodiversity should be sought wherever possible. Subsequently, planning authorities should seek sufficient information to provide confidence that the mitigation hierarchy has been appropriately applied.

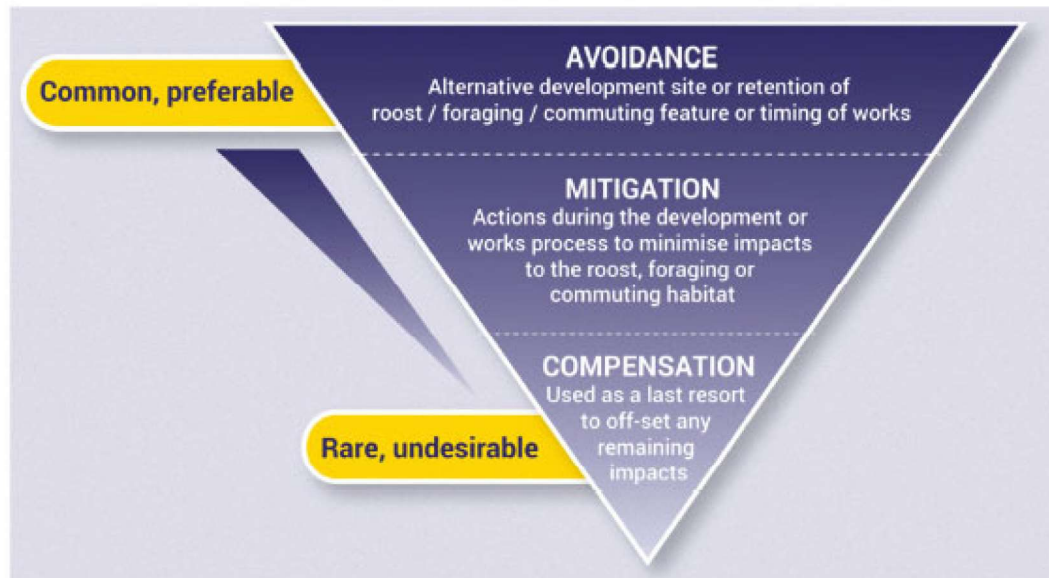
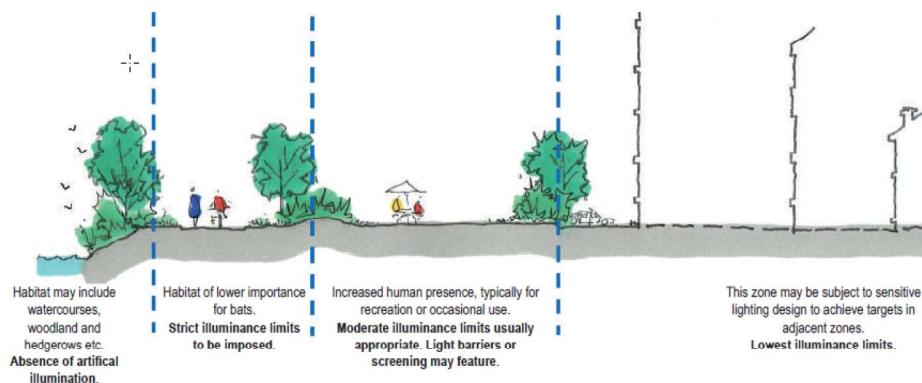
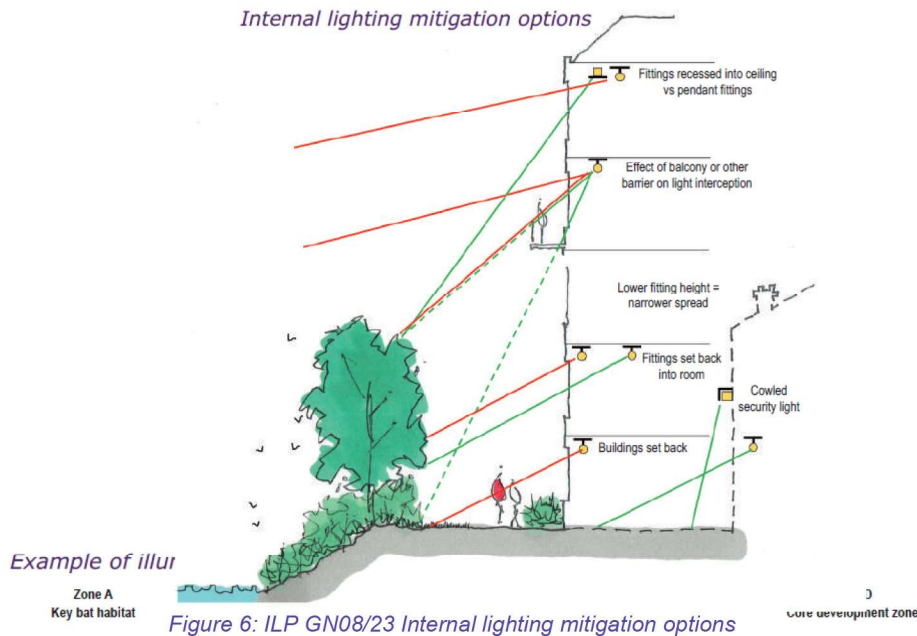


Figure 5: GN18/23 Figure 2. Mitigation hierarchy emphasising the importance of considering avoidance in the first instance (credit Bat Conservation Trust)

- 5.4.12 "It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation. It is therefore very difficult to demonstrate 'complete darkness' or a 'complete absence of illumination' on vertical planes where some form of lighting is proposed on site despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero. Consequently, where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane. These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light adverse behaviour (Stone, 2012).



6 Proposed Development

6.1 General

- 6.1.1 The Proposed Development is for the construction of 146 residential dwellings on the east of the town of Bordon, Hampshire.

7 Lighting Strategy

7.1 Brief

- 7.1.1 There is requirement for artificial lighting for residents' safety and amenity within the Proposed Development, which means that (without mitigation) there could be some potential for negative effects caused by parts of the required lighting including light spill (building mounted and post-top street lighting); direct source luminance or glare (onto receptor views); and sky glow or upward light without suitable mitigation measures.
- 7.1.2 The Application Site sits in a "moderate brightness" area, as seen in Figure 8 by the orange and pink colouration (2-4 NanoWatts / cm² / sr).
- 7.1.3 The Application Site will fall under the ILP designation "Well-inhabited rural and urban settlements", an environmental zone of E3 described in Section 5.4.4 has been selected to inform the lighting strategy of the Proposed Development.
- 7.1.4 The lighting strategy has been developed to ensure that any lighting associated with the Proposed Development is compliant with lighting industry guidance.
- 7.1.5 This lighting strategy outlines the most sensitive approaches to lighting whilst meeting intended lighting levels. It is not intended to supersede pre-existing local authority specifications, where these are applicable.

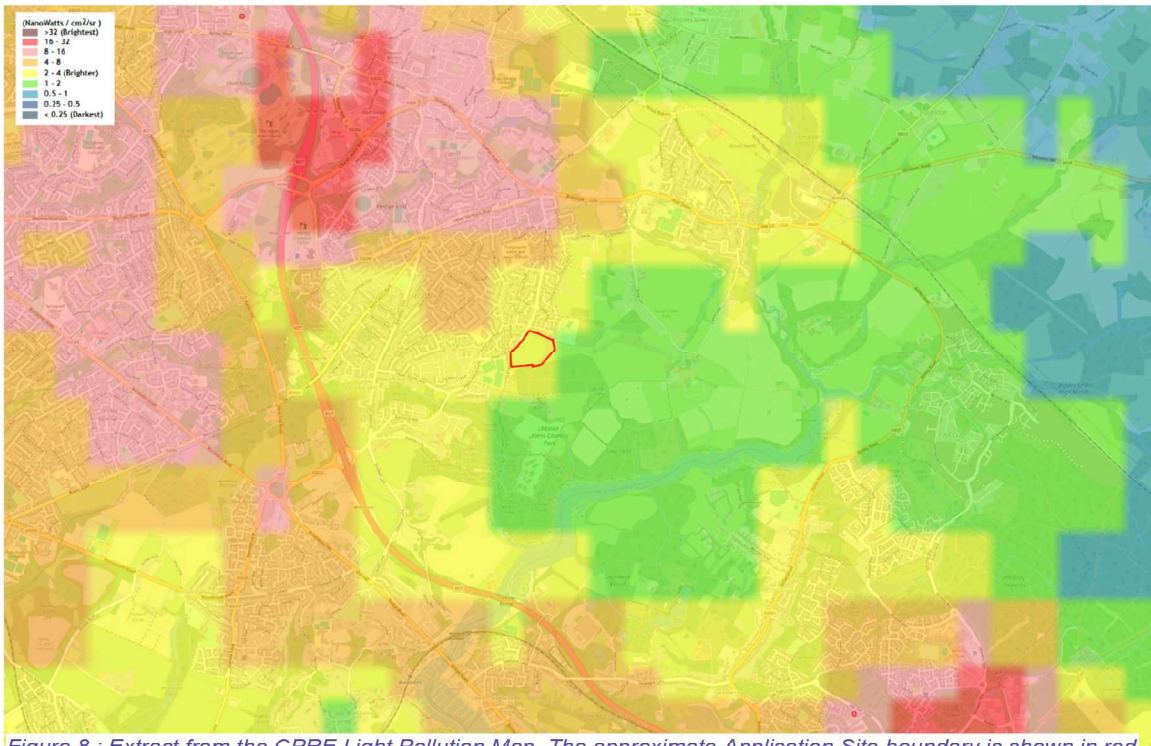


Figure 8 : Extract from the CPRE Light Pollution Map. The approximate Application Site boundary is shown in red

7.2 Bat Mitigation Strategy

- 7.2.1 ACD Environmental has been engaged as ecology consultants for this project.
- 7.2.2 Enerveo has consulted directly with ACD Environmental and agreed a working methodology for the application site.
- 7.2.3 This methodology includes the following *The Bat Conservation Trust recommends the following specifications for lighting on developments to prevent disturbance:*
- *lighting spectra: peak wavelength >550nm*
 - *colour temperature: <2700k (warm)*
 - *reduction in light intensity*
 - *minimal UV emitted*
 - *upward light ratio of 0% and good optical control.*
 - *Reduced light level on perimeter road P6 (2 lux ave, 0.4lux min), from standard road P5 (3 lux ave, 0.6lux min)*
 - *Louvred optics particularly Rear louvres to be used to reduce spill light.*
 - *0.4 lux maximum in the vertical plane at the sites boundary except along Kings Copse Avenue.*
- 7.2.4 No buffers around the site's boundaries have been suggested by ACD Environmental.

7.3 Key areas requiring lighting

- 7.3.1 Given the sensitive ecology, highway lighting should be minimal and in line with all relevant guidance.
- 7.3.2 Exterior lighting will be required for the safety of the residents and is to be limited to local lighting mounted to property entrances to allow for safe entrance and egress.
- 7.3.3 Adoptable roads and private roads should be lit to lighting levels defined by all relevant standards and guidance, and where dark corridors cross adoptable roads columns should be positioned in such a way as to minimise the light spill into the dark corridor.

8 Reducing Potential Light Spill

8.1 General

- 8.1.1 This lighting strategy seeks to ensure that lighting is applied carefully and sensitively, and that the potential for effects on sensitive ecology, and the surrounding area, are minimised or completely mitigated.
- 8.1.2 Mitigation measures for minimising the potential impact of external lighting on the night sky are also effective for minimising the potential for adverse impact on ecology. This is due to the principles applied, such as using “warm white” light sources only and ensuring luminaires demonstrate superior levels of optical control. That light is focused only where required, at low mounting heights and at a low light level to reduce the potential for vertical light spill and upward light
- 8.1.3 Light spill from onsite lighting can be successfully screened through soft landscaping and the installation of walls and fences.
- 8.1.4 Given the fact that planting may be removed, die back, or be inadequately replaced over time it should never be relied upon as the sole means of attenuating light spill.

8.2 Private Street Lighting

8.2.1 Columns

- 8.2.2 Column heights should be restricted to 6 metres, this is equal to the maximum column height of 6 metres that HCC permit, for residential streets.
- 8.2.3 Columns will be compliant with Hampshire County Council Adoptable Specification, to ease with future maintenance as these are readily available from Street Lighting Contractors.
- 8.2.4 The Columns will be finished in Black to differentiate them from the Mineral Green columns used by HCC as standard.

8.2.5 Luminaires

- 8.2.6 Luminaires must be installed with 0° of tilt to prevent upward light.
- 8.2.7 Luminaires must have 0% Upward Light Ratio (URL) when installed with 0° of tilt.
- 8.2.8 Luminaires will be compliant with Hampshire County Council Adoptable Specification
- 8.2.9 Luminaires will be used with integral LEDs and where the luminaire photometry is available from the manufacturer. If luminaires are to include louvers photometry is also to be available from the manufacturer. This is to ensure the photometric footprint of the luminaires can be modelled to show the potential effects of light spill, and upward light are unlikely to affect the area surrounding the Application Site.
- 8.2.10 Luminaires will have a maximum correlated colour temperature (CCT) of 2700K in line with GN08/23.

8.2.11 Applied Lighting Standards

- 8.2.12 Roadways throughout the Proposed Development will require lighting in accordance with BS EN 5489-1-2020, BS EN 13201-2-2015.

Table 4: Lighting Class Selection Details for adoptable roads

	Interior Roads	Perimeter Roads
Reference Table	A.5	A.5
Environmental Zone	E3, moderate ambient brightness	E3, moderate ambient brightness
Traffic flow	Normal	Quiet
Traffic composition	Mixed	Pedestrians
Road Speed	30 mph	30 mph
Other Considerations	Unrestricted parking, road geometry & short length dictates slow speeds, proximity to South Downs National Park, bats present	Unrestricted parking, road geometry & short length dictates slow speeds, proximity to South Downs National Park, bats present, site boundary
Lighting Class	P5	P6

Table 5: Performance requirements of chosen lighting classes for adoptable roads and footpaths

Lighting Class	Average Illuminance, Eave (Lux)	Average Illuminance Maximum, Eave (Lux)	Minimum Illuminance, Eave (Lux)
P5	3.00	4.50	0.60
P6	2.00	2.50	0.40

8.2.13 Lighting Controls

- 8.2.14 The Proposed Development's proposed adoptable street lighting will utilise photocells, and these will be 20/20 lux and have part night switching to match HCCs current 2025 part night policy.
- 8.2.15 Currently the curfew for adoptable part-night switching regime commences 0000 and runs through to 0500 (current as per September 2025).
- 8.2.16 The suggested photocells are to be Westire Acro NEMA 20/20 with part night switch off between 0000 and 0500.

Table 6: Proposed Private Street Lighting Specification

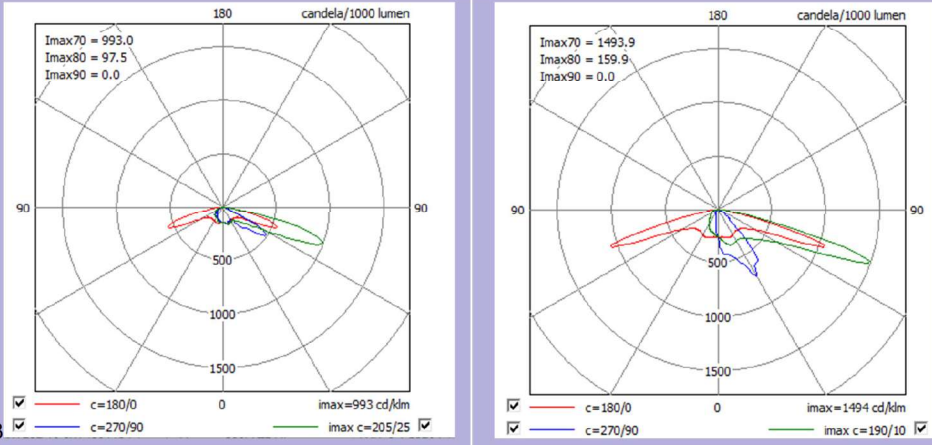
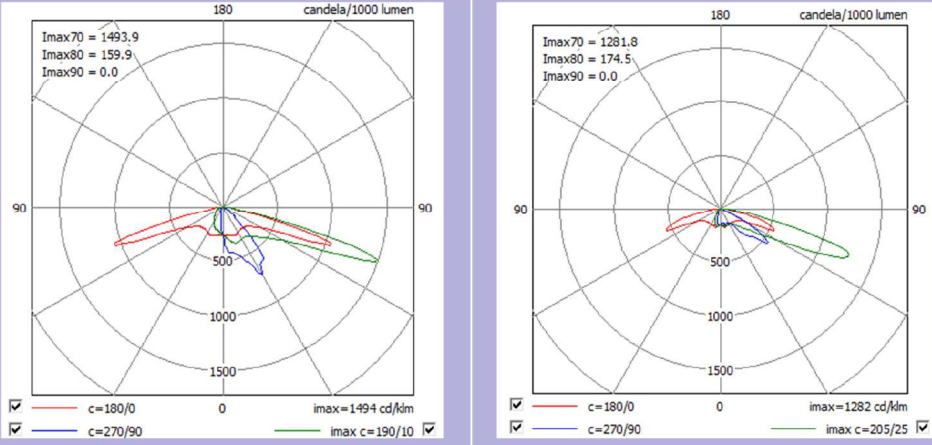
Equipment Specification	Description	
Light Source	Light Emitting Diode (LED)	
Luminaire Type	AXIA 3.1 5267 Integrated lenses 8 OSLO SQUARE GIANT LED@600mA Driver@600mA WW 727 230V 01-11-802 614432 or similar approved	AXIA 3.1 5266 Integrated lenses Front-Rear louvers 8 OSLO SQUARE GIANT LED@400mA Driver@400mA WW 727 230V 01-11-802 432032 or similar approved
CCT of Light Source (Kelvin)	2700K	
ULR%	0%	
Polar Diagram		
Luminaire Tilt	0° from horizontal	
Dimming and switching requirements	20/20 lux with part-night switch off between 0000 and 0500	
Mounting Arrangement	Post top	
Column Height	6 metres	
Luminaire Image		

Table 7: Proposed Private Street Lighting Specification

Equipment Specification	Description	
Light Source	Light Emitting Diode (LED)	
Luminaire Type	AXIA 3.1 5266 Integrated lenses Front-Rear louvers 8 OSLO SQUARE GIANT LED@300mA Driver@300mA WW 727 230V 01-11-802 432032 or similar approved	AXIA 3.1 5267 Integrated lenses Rear louvers 8 OSLO SQUARE GIANT LED@300mA Driver@300mA WW 727 230V 01-11-802 457672 or similar approved
CCT of Light Source (Kelvin)	2700K	
ULR%	0%	
Polar Diagram		
Luminaire Tilt	0° from horizontal	
Dimming and switching requirements	20/20 lux with part-night switch off between 0000 and 0500	
Mounting Arrangement	Post top	
Column Height	6 metres	
Luminaire Image		

8.3 Private Residential Exterior Lighting

- 8.3.1 The frontages of the private residences throughout the Proposed Development require exterior lighting for safety and amenity purposes. It is assumed that each property would have a single porch light next to the front door such as the Nordlux Tin Maxi c/w sensor.
- 8.3.2 Luminaires installed for the lighting of private property will have 0% upward light. This is to ensure upward light spill is maximally mitigated, and to ensure the impact on the local area from sky glow is negligible in its significance.
- 8.3.3 Private property exterior lighting will utilise PIR motion sensors with integrated photosensors to ensure lighting is only provided when needed during the hours of darkness. The timer for when the PIR motion sensor is activated should be kept to a minimum such as no more than 1 minute.
- 8.3.4 Private property exterior lighting should not exceed 500 lumens, the suggested lamp is the Nordlux GU10 PAR16 2700 Kelvin 345 Lumen.
- 8.3.5 Private property exterior lighting should have a maximum correlated colour temperature (CCT) of 2700K in line with GN08/23, will help to minimise the impact of the slightly higher than desirable colour temperature.
- 8.3.6 Private property exterior lighting should be installed at 0° tilt from the horizontal to minimise upwards light. All light emitting surface must be parallel with the ground.
- 8.3.7 Light trespass beyond the property boundaries will be minimal due to the low mounting height. Boundary fences will obscure most stray light.

Table 8: Proposed Private Exterior Light

Equipment Specification	Description
Light Source	Light Emitting Diode (LED) (GU10 2700K 36° 345lm)
Luminaire Type	Nordlux Tin Maxi c/w sensor (or similar approved)
CCT of Light Source (Kelvin)	2700K (maximum)
ULR%	0%
Luminaire Tilt	0° from horizontal
Dimming and switching requirements	PIR motion sensor with integrated motion sensor
Mounting Arrangement	Wall mounted
Mounting Height	Must not exceed 1.5 metres
Luminaire Colour	Black, Aluminium
Luminaire Image	

8.4 Private Residential Internal Lighting

- 8.4.1 The proposed dwellings will require interior lighting which will spill out of unshielded windows. Spill light can be reduced by careful selection of interior lighting equipment.
- 8.4.2 Light fittings should not be installed close to windows or doors and should be set back in the room.
- 8.4.3 Recessed fittings such as down-lighters are preferred over pendants as they reduce spill light, especially above ground floor levels.
- 8.4.4 Exterior glazing should be restricted or redesigned wherever the ecologists determine there is a likely significant effect upon key bat habitat and features.
- 8.4.5 Where windows and glass facades etc. cannot be avoided, low transmission glazing treatments may be a suitable option in achieving reduced illuminance targets. Glazing restrictions may not be required on all floors.

9 Technical Assessment

9.1 Introduction

- 9.1.1 Lighting within the Proposed Development is to comply with the implemented strategy as outlined in [Section 7](#) and utilise the light spill reduction methods and equipment in [Section 8](#).
- 9.1.2 The implementation of this strategy will enable lighting to be minimally obtrusive within the environment and to any nearby potentially sensitive receptors with views of the Application Site.

9.2 Proposed Lighting

- 9.2.1 Lighting is proposed for private dwellings within the Application Site, according to the lighting strategy and luminaire specifications set out in [Section 7 and 8](#).
- 9.2.2 Lighting is to be provided by well-controlled LED luminaires, mounted at 0° to the horizontal. All luminaires proposed are to have a 0% Upward Light Output Ratio (ULOR) when mounted at 0°.
- 9.2.3 Lighting is not to exceed colour temperatures of 2700K.
- 9.2.4 Lighting is to be energy efficient and applied only where needed.

9.3 Likely Impacts

- 9.3.1 Whilst the lighting level within the Application Site will increase, the use of well controlled LED luminaires will limit the potential for significant levels of obtrusive light leaving the site.
- 9.3.2 Lighting is to be applied where needed only. A comprehensive control system is to be implemented to limit the impact of the proposed lighting outside of the main hours of use.
- 9.3.3 The use of luminaires with a 0% ULOR, in accordance with GN01:2021, will significantly limit the potential for the Proposed Development to contribute to local levels of sky glow and limit the amount of light required.
- 9.3.4 The ULR of the Proposed Development's exterior lighting luminaires was calculated using the method outlined in CIE 150, with the resulting ULR being 0%.
- 9.3.5 Isolux contours showing the relatively low levels of spill light leaving the Application Site are presented in [Appendix 1](#). This is a worst-case scenario and assumes that all the private exterior lighting (1x light by each front door) is on at the same time along with the street lighting. This is highly unlikely to ever happen as each one would be on a PIR motion sensor with timer and photocell and would only be active when motion is detected.
- 9.3.6 Contours on [Appendix 1](#) are presented for horizontal illuminance at lux levels of 10.0 (blue), 5.0 (green), 1.0 (Red), 0.5 (Teal), and 0.2 (purple) lux demonstrating that levels of spill light affecting nearby residential amenity areas are significantly lower than the 5.0 lux post-curfew maximum permitted from lighting installations in an E3 environmental zone outlined in GN01:2021, and for adoptable areas.
- 9.3.7 Vertical illuminance calculations have been conducted along the Application Site boundaries to ascertain the impact the lighting of the Proposed Development. The results of these calculations can be seen in [Table 5](#), and this includes the private porch lighting. And the position of each grid is shown in [Appendix 2](#).
- 9.3.8 These levels are a worst-case scenario, and no maintenance factor has been applied. All the levels are below the 0.4 lux maximum levels which are considered complete darkness within GN08/23 (see section 4.4.10) and is well below the levels of moonlight.

Table 9: Vertical Illuminance results around the site Boundary from proposed exterior lighting including private exterior porch lighting

	Average illuminance, E_{ave} , lux	Maximum Illuminance, E_{max} , lux
West Boundary	0.09	0.36
Southwest Boundary	0.09	0.38
South Boundary	0.08	0.39
Southeast Boundary	0.01	0.02
East Boundary	0.01	0.02
Northeast Boundary	0.02	0.16
West Boundary	0.05	0.34

- 9.3.9 All proposed lighting equipment has a ULR of 0% and is therefore Dark Skies compliant and minimises light spill.
- 9.3.10 Light spill modelling presents the absolute worst adverse scenario and does not consider the blocking or shading effects of screening in the form of site topography or planting features; thus, the Isolux contours and calculation results presented are typical of the on-site scenario at the start of luminaire life.
- 9.3.11 On balance, the impact associated with lighting for the Proposed Development are likely to be of negligible significance, as lighting levels outside the Application Site are unlikely to increase, there will only be with the increase in lighting levels contained within the Application Site, and the proposed lighting is compliant with all relevant standards, guidance, and policies.
- 9.3.12 The proposed lighting falls in line with the methodology agreed with ACD Environmental as the boundaries of the site have been protected from light spill. And any calculated light spill is below the accepted levels of vertical illuminance that constitute darkness as outlined in GN08/23.

10 Conclusion

10.1 General

- 10.1.1 The Proposed Development requires artificial lighting for safety, security, amenity, and task lighting.

10.2 Lighting Strategy

- 10.2.1 This lighting strategy outlines the criteria for the lighting design of the Proposed Development to ensure that the lighting is fit for purpose, whilst maintaining sensitivity to humans and environmental receptors through compliance with relevant British Standards and relevant national and industry Guidance.
- 10.2.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights, tilt angle, colour temperature and lumen output of exterior light sources as specified in **Section 8**.
- 10.2.3 Compliance with the advice set out in this document will allow for the Proposed Development to be lit allowing for public safety whilst minimising the impact of any exterior lighting on the natural environment and the surrounding area.
- 10.2.4 Following the methods in **Sections 7 and 8** will ensure lighting is compliant with the guidance set out in GN01/21 to reduce obtrusive light.
- 10.2.5 Following the methods in **Sections 7 and 8** will ensure lighting of the Proposed development will have minimal impact on lighting levels beyond the Application Site. Any increases in lighting levels kept to a minimum and contained within the Application Site.
- 10.2.6 The specification of luminaires with a 0% ULR for street lighting, International Dark skies Association (IDA) approved, will enable minimal impact from the lighting at this site. As such, it follows that the impact on the surrounding area is also likely to be negligible
- 10.2.7 Through careful design on the behalf of the architects the impact of interior lighting through windows can be minimise too. This will be achieved by the type and positioning of interior lighting, and through the size, position and material used for exterior glazing.

10.3 Summary

- 10.3.1 Lighting at the Application Site will be applied carefully to ensure minimal impact and to ensure compliance with Eastleigh Borough Council planning requirements.
- 10.3.2 Overall spill lighting levels from this development are unlikely to exceed those outlined in the Institution of Lighting Professionals guidance document GN01/21, which is the paramount guide to minimising spill and obtrusive light from artificial exterior lighting.
- 10.3.3 Overall spill lighting levels from this development are unlikely to exceed those outlined in the Institution of Lighting Professionals and Bat Conservation Trust guidance document GN08/23, which is the paramount guide to mitigating the impact of Artificial Light At Night (ALAN).
- 10.3.4 The Proposed Development's lighting should be judged by required standards, policies and guidance outlined in this document.

11 References

11.1 National Government Publications

- 11.1.1 National Planning Policy Framework 2021, *UK Government*
- 11.1.2 Environmental Protection Act 1990, *UK Government*
- 11.1.3 Environment Act 2005: Part 9 Miscellaneous, *UK Government*
- 11.1.4 Planning practice guidance Light Pollution 2019, *UK Government*

11.2 Local Government Publications

- 11.2.1 Eastleigh Borough Local Plan (2016-2036) Adopted April 2022, *Eastleigh Borough Council*, 2022
- 11.2.2 Eastleigh Borough Local Plan (2016-2036) Adopted April 2022 Policies Map (South), *Eastleigh Borough Council*, 2022
- 11.2.3
- 11.2.4 Technical Guidance Note TG13 – Street Lighting Revision 5, *Hampshire County Council*, 2025
- 11.2.5 Street Lighting Maintenance Management Plan (SLMMP) v1.6, *Hampshire County Council*, 2023

11.3 Standards Publications

- 11.3.1 BS 5489-1:2020 Code of practice for the design of road lighting — Part 1: Lighting of roads and public amenity areas.
- 11.3.2 BS EN 13201-2:2015, Road lighting. Performance requirements.

11.4 Other Publications

- 11.4.1 Guidance Note 01/21 Guidance notes for the reduction of obtrusive light, *Institution of Light Professionals*, 2021
- 11.4.2 Guidance Note 08/23 Bats and Artificial Lighting at Night, *Institution of Light Professionals & Bat Conservation Trust*, 2023

12 Appendices

12.1 Appendix 1 – Isolux Plan for Private Exterior Lighting



12.2 Appendix 2 – Locations of Vertical Lighting Grids





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