

LIGHTING STRATEGY

PROJECT: BUTTS BATCH, WRINGTON

PREPARED FOR: STRONGVOX HOMES

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1. Introduction

1.1 General

- 1.1.1 This lighting strategy is provided by Designs for Lighting Ltd, a specialist lighting design consultancy with experience and knowledge in lighting impact assessments, mitigation and lighting design.
- 1.1.2 The lighting strategy proposes good practice and outlines a suitable approach to apply to the installation of the proposed lighting to support the residential development. The aim of the strategy is to outline a minimally obtrusive approach to lighting, which is functional to ensure safety and sensitivity to both the environment and nearby ecological receptors (for example; bats).
- 1.1.3 The Application Site is situated on Butts Batch, Wroughton. The site is currently undeveloped and is bounded by open fields to the West, South, and partially to the East. The Northern boundary and the remainder of the Eastern Boundary are adjacent to existing residential properties and roadways – with areas of woodland beyond the site boundary to the South and West.

2. Standards and Policies

2.1 Relevant National Policies

- Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005;
- National Planning Policy Framework 2019; and
- Planning Practice Guidance

2.2 Relevant British Standards

2.2.1 The most applicable British Standards for lighting that relate to the Proposed Development are:

- **BS 5489-1: 2020 – Code of practice for the design of road lighting.** – This contains lighting design guidance for roads and public amenity spaces.

2.3 Relevant Guidance

Guidance Notes for the Reduction of Obtrusive Light (GN01/20)

- 2.3.1 The lighting strategy shall be informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, caused by poorly designed and installed exterior artificial lighting. The lighting strategy is informed by the most relevant sections of GN01/20 that has recently been published to reduce the potential for obtrusive light from a wide range of exterior lighting applications. Notably, the updated guidance has been specifically aimed at systems of flood lighting, as such some sections relating to luminaire source intensity are not applicable to this lighting strategy.
- 2.3.2 The environmental zone descriptions and criteria outlined in **Tables 1 and 2** will form the basis of the lighting strategy.
- 2.3.3 The environmental zone is classed as E2 given the rural location of the application site. There is a presence of lighting within the area and it is assumed that the background levels of luminance would be described as low.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5 +)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty 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 or suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 1 Environmental Zone Descriptions

Notes:

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid-2019 but not retrospective.

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.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

Environmental Zones	Sky Glow ULR (Max %)	Light Trespass (into Windows) E_v (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew	Average L (cd/m ²)
E0	0	0	0	< 0.1
E1	0	2	< 0.1 (1*)	< 0.1
E2	2.5	5	1	5
E3	5	10	2	10
E4	15	25	5	25

Table 2 Obtrusive light criteria relating to each Environmental Zone

Note:

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

GN08/18 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professional's.

- 2.3.4 Guidance for artificial lighting and bats was updated in Autumn 2018, the guidance states the following:

“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 averse behaviour (Stone, 2012).”

“Dark buffers, illuminance limits and zonation dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. Buffer zones rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in- to zones of increasing illuminance limits radiating away from the feature” (see Figure 1).

Example of illuminance limit zonation

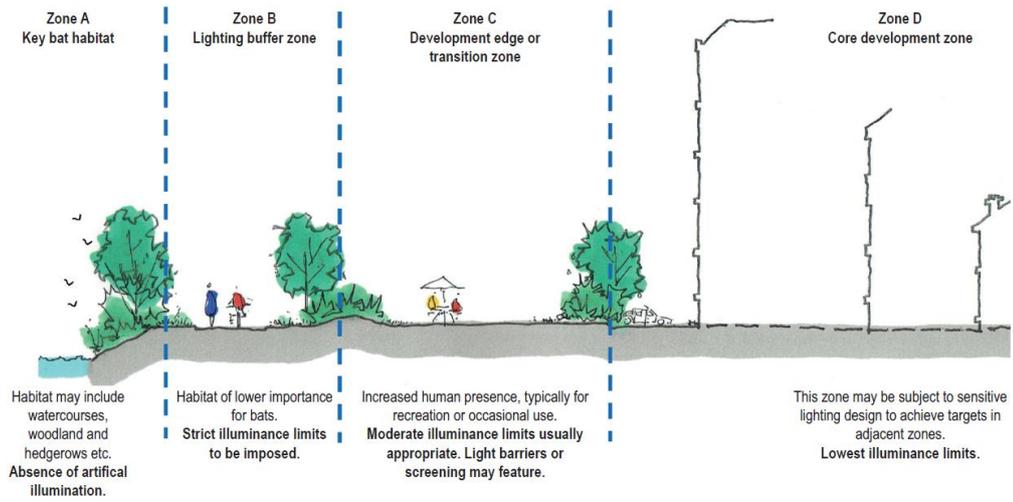


Figure 1 - Example of lighting zonation near sensitive boundaries and known ecological habitats

2.4 Relevant local policies

2.4.1 The most applicable policies for the development relating specifically to well-designed or thoroughly considered lighting are:

- **North Somerset Council: Core Strategy – (January 2017) – Policy CS3 – Living within environmental limits**

2.4.2 **Policy CS3** states:

“Development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation.”

2.4.3 **Policy CS3** is further clarified to specifically include light within *“The Core Strategy approach”* clause 3.38:

“The first part of the policy applies where any of the following problems exists or a risk of it occurring is identified, whether or not it arises as a consequence of a development proposal:

- a) Coastal/riverbank erosion.
- b) Contamination (including risk from migrating contaminants).
- c) Electromagnetic fields.
- d) Explosion.
- e) Fire.
- f) Flooding.
- g) Ground instability.
- h) Harmful emissions (including dust and wind-blown litter).
- i) Heat.
- j) Interference with radio transmission.
- k) Light.
- l) Noise.
- m) Radiation.
- n) Smell.
- o) Vibration.
- p) Visual distraction from moving machinery (including shadow flicker from wind turbines).”

3. Sensitive Ecological Species

3.1 Recommendations

- 3.1.1 To reduce the potential for lighting to affect sensitive ecology receptors, measures as outlined in ILP GN08 / 18, including minimising light onto boundary hedgerows providing dark corridors for light sensitive species have been incorporated into the lighting strategy.
- 3.1.2 The aim of the lighting strategy will be to ensure appropriate and un-obtrusive lighting design is applied to the Proposed Development. Additionally, the site has been architecturally designed to position aspects and apertures such that light spill onto boundary hedges will be minimised.

4. Application Site & Potentially Sensitive Receptors

4.1 Overview

- 4.1.1 The application site is currently agricultural land at the South Western corner of Wrington. There is currently no established artificial light within the area covered by the proposed development, and limited lighting from adjacent properties. There is currently not widespread road lighting in close proximity to the application site.

4.2 Potentially Sensitive Receptors

- 4.2.1 Potentially sensitive receptors to the Proposed Development are shown in **Appendix 2**, and summarised below:
- Receptor 1 – Residential Properties, *The Wiltons Properties*. 20m North of the Application Site. Partially screened by established foliage and topography.
 - Receptor 2 – Residential Properties, *Kings Rd Properties*. Adjacent to the Application Site to the East. Very limited screening from hedges and gardens.
 - Receptor 3 – Residential Properties, *10 to 18 Butts Batch*. Approximately 100m East / 30m North of the Application Site, bordered to the West and South. Limited screening from established trees and foliage. Separated from the Application Site by open field.
 - Receptor 4 – Residential Properties, *Half Yard Properties (North)*. East of the Application Site, separated by Half Yard (Road). Extensively screened by established trees, foliage, and topography.
 - Receptor 5 – Residential Properties, *Half Yard Properties (South)*. East of the Application Site, separated by Half Yard (Road). Moderate screening from established trees, foliage, and topography.
 - Receptor 6 – Environmental Receptor, *Woodland*. Expanse of woodland to the South & West of the Application Site. Separated from the Application Site by open fields. Significant distance between the Application Site and the woodland (up to 300m to main concentration of trees).

5. Lighting Strategy

5.1 Brief

- 5.1.1 The Proposed Development will require lighting for safety, amenity and security during the hours of darkness, whilst ensuring that potential light spill onto the boundaries of the site is limited.
- 5.1.2 This lighting strategy considers the relevant local planning policies as outlined in **Section 2**, thus aiming to provide minimal lighting levels where required, whilst remaining un-obtrusive to nearby potentially sensitive receptors.
- 5.1.3 Lighting design approaches outlined in the lighting strategy are informed by North Somerset Council Highways departments Highway Development Design Guide, & Highways Electrical Design Guide (2015). The luminaires & lighting classes used for indicative light spill modelling have been chosen to match North Somerset Council Highways departments adoptable specification.

5.2 Key Areas Requiring Lighting

- Adoptable Roadway; and
- Property frontages / rears;

5.3 Road Lighting Strategy

Lighting Type	Installation Requirements
Correlated Colour Temperature (K)	4000 K (As required by North Somerset Council)
Luminaire Manufacturer	Schreder
Luminaire Model	Urbis Axia 2.1
Lighting Class	P5
Typical Luminaire Image	
Light Source	LED
Mounting Height	6.0m (max)
Mounting Type	Column Mounted
Luminaire Tilt	0°
Luminous Intensity class	G2
Controls	35/18 Part Night Photocell fitted on a 7-pin NEMA base. Part Night Operations shall be Midnight to 6am GMT. (As per North Somerset Adoptable Specification).

Table 3 Performance and Installation Requirements

5.3.1 The Application Site is intended to be adopted, and as such all indicative light spill modelling has been designed in accordance with **BS 5489-1: 2020 – Code of practice for the design of road lighting**, and indicative light spill is based upon an installation compliant to class P5.

5.4 Dwelling Frontage Amenity Lighting (Wall Mounted)

Lighting Type	Installation Requirements
Correlated Colour Temperature (K)	2700 K (max)
Luminaire Manufacturer	UNILAMP Bronco (Or equivalent)
Luminaire Style	Surface mounted (Down)
Typical Luminaire Image	
Light Source	LED
Mounting Height	1.8m (Recommended). 2.0m (Max)
Mounting Type	Wall mounted to dwelling frontage
Luminaire Tilt	Vertically Surface Mounted
Controls	PIR Sensor
Hours of Operation	≤15mins since activation

Table 4 Performance and Installation Requirements (Property frontages)

5.5 Dwelling Rear (Patio) Amenity Lighting

Lighting Type	Installation Requirements
Correlated Colour Temperature (K)	2700 K (max)
Luminaire Manufacturer	UNILAMP Bronco (Or equivalent)
Luminaire Style	Surface mounted (Down)
Typical Luminaire Image	
Light Source	LED
Mounting Height	1.8m (Recommended). 2.0m(Max)
Mounting Type	Wall mounted to dwelling rear
Luminaire Tilt	Vertically Surface Mounted
Controls	PIR Sensor
Hours of Operation	≤15mins since activation

Table 5 Performance and installation requirements (Property rears)

- 5.5.1 All lighting mounted to the property frontages and rears will have a maximum Correlated Colour Temperature (CCT) of 2700K to reduce the impact on ecological receptors, whilst providing a warmer ambience. The use of warm white light sources typically emits lower quantities of blue wavelength light, therefore minimising potential impacts on ecological receptors attracted by blue wavelength light. Additionally, the use of Light Emitting Diode (LED) sources emit negligible levels of Ultraviolet Light (UV) and infra-red light (IR) than traditional discharge or incandescent light sources.
- 5.5.2 All wall mounted luminaires are to be mounted at a maximum height not exceeding 2.0 metres; this will limit the levels of obtrusive light contributing towards sensitive receptors on the boundaries of the Application Site.
- 5.5.3 All luminaires mounted on the exterior façade of the Proposed Development must be installed with a 0° tilt angle to reduce the potential for light spill outside acceptable limits beyond the property boundaries.

5.6 Lighting Controls

- 5.6.1 Lighting to the dwelling frontages and rears will be controlled via a PIR and be internally switched to enable the lighting to be switched off when not in use.
- 5.6.2 This approach has been taken to ensure that the lighting within the Application Site minimises the level of spill light on the site boundaries during the hours of darkness.

6. Indicative Light Spill

- 6.1.1 The indicative light spill models included in **Appendix 1 - Indicative Light Spill** demonstrates the ability to provide lighting for the Proposed Development and to ensure that a sensitive lighting solution is installed.
- 6.1.2 The light spill diagram closely demonstrates the tight restrictions in light spill that are essential for protecting the immediate surrounds of the Application Site. As the model does not consider obstructions such as the buildings, the proposed fencing and landscape features or the topography, the Isolux contours presented in **Appendix 1** represent the adverse scenario. Blocking effects of the site features would further reduce the potential for light spill to affect the boundaries of the Application Site.
- 6.1.3 The light spill diagram further demonstrates that light spill has been controlled to avoid potentially sensitive receptors, with spill light at the site boundary falling below 0.2 Lux at most points.
- 6.1.4 This strategy complies with the requirements as set out in *GN08/18 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals*, with spill light at the site boundary below 0.2 lux.
- 6.1.5 The proposed lighting uses luminaires that focus the light down onto the ground, reducing the likelihood of upward light and light spill. The Isolux contours demonstrate the initial light output ultimately demonstrating the absolute adverse scenario.

7. Conclusion

- 7.1.1 The lighting strategy outlines the criteria for the lighting design of the Proposed Development. This lighting strategy aims to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the site boundaries.
- 7.1.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights of the luminaires, tilt angle and lumen output to those specified in **Section 4**.
- 7.1.3 The lighting to the front and rear of the properties are positioned at a maximum height of 2.0m, with PIR control to limit the hours of operation during darkness.
- 7.1.4 The light spill diagrams in **Appendix 1- Indicative Spill Lighting** outline the maximum adverse scenario, with all the lighting switched on at once, and at the start of life, when a luminaires output is at its highest.
- 7.1.5 In conclusion, the indicative light spill diagram presented in **Appendix 1- Indicative Spill Lighting**, show that implementing the strategy detailed in **Section 4** will ensure the lighting will be kept to the confines of the Proposed Development, with light levels typically less than 0.2 lux falling on the boundaries, where sensitive ecology may be present. The sensitive receptors presented in **Appendix 2 – Potentially Sensitive Receptors** fall outside of the site boundary, so the potential for significant levels of obtrusive light to fall upon them is **Negligible**.

Appendix 1 - Indicative Light Spill

See: 1731-DFL-LSD-001

Appendix 2 – Potentially Sensitive Receptors



Receptor No.	Marker Name	Marking Colour
Site Boundary	Butts Batch, Wrington	Outlined in Red
1	Residential Receptor (Amenity) – The Wiltons Properties	
2	Residential Receptor (Amenity) – Kings Rd Properties	
3	Residential Receptor (Amenity) – 10 to 18 Butts Batch	
4	Residential Receptor (Amenity) – Half Yard Properties (North)	
5	Residential Receptor (Amenity) – Half Yard Properties (South)	
6	Environmental Receptor - Woodland	