

# LIGHTING STRATEGY

## PROJECT: BURSTON GARDEN RETIREMENT VILLAGE

PREPARED FOR: CASTLEOAK GROUP

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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 Designs for Lighting Ltd are instructed as an independent lighting consultant to Castleoak Group for the proposed development at Burston Garden Centre.
- 1.1.3 The lighting strategy proposes good practice and outlines a suitable approach to apply to the lighting design at the detailed design phase. 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 human and ecological receptors.
- 1.1.4 The lighting strategy details the lighting requirements of the following areas of the proposed development:
  - Development access and internal road:
  - Car parks and courtyards:
  - Footpaths: and
  - Communal gardens.
- 1.1.5 The Application Site is located at Burston Garden Centre, N Orbital Rd, St Albans AL2 2DS.



Figure 1: Google Satellite View of Application Site location approximate.

- 1.1.6 The application site lies within the district of St Albans, and the civil parish of St Stephen, under the jurisdiction of Hertfordshire County Council. It is situated South of St Albans.
- 1.1.7 The Proposed Development is for a retirement village by Castleoak Group.



Figure 2: Proposed Development plan ref AA6903\_SiteModel\_2018\_WS\_maryh-LandscapePlanBase40%-5175036

Кеу	
	Site Access Driveway
	Internal Site Road
(Descrip	tions are for the purpose of the lighting strategy)

## 2. Legislative Requirements and Guidance

#### 2.1 National Policies

- 2.1.1 The following national policy is relevant to the artificial lighting of the development:
  - National Planning Policy Framework: 2019.

#### 2.2 Local Policies

2.2.1 The Local Planning Authority is St Albans City and District Council, and there currently appears to be no specific lighting policies within their adopted or examination local plans.

In the absence of any lighting related policies, the lighting proposals will be informed by the appropriate British Standards and industry guidance.

#### 2.3 Relevant Standards

- 2.3.1 The most applicable British Standards for lighting that relate to the proposed development are:
  - **BS 5489-1:2020** *Lighting of roads and public amenity areas* This document outlines the requirements for road and public amenity area lighting, it also outlines the British Standard criteria for the design of car park lighting.
  - BS EN 13201-2:2015 Road lighting Part 2: Performance requirements This part of the European Standard defines performance requirements which are specified as lighting classes for road lighting aiming at the visual needs of road users, and it considers environmental aspects of road lighting.

#### 2.4 Guidance

#### Guidance Notes for the Reduction of Obtrusive Light (GN01:2020)

- 2.4.1 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 (published in January 2020) 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.
- 2.4.2 The environmental zone criteria detailed within **Table 1 and Table 2** will form the basis for the lighting strategy.

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 Tr (into Win E <sub>v</sub> (In	Building Luminance Average, Pre-curfew	
		Pre- Curfew	Post-Curfew	Average L (cd/m <sup>2</sup> )
EO	0	0	0	0
E1	0	2	0 (1*)	0
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

Notes:

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

2. Ev is Vertical Illuminance in Lux;

3. I is viewed Light source Intensity in Candelas;

4. L is Luminance in Candelas per square metre; and

5. Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00.

6. (\*) Permitted only from Public road lighting installations.

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

- 2.4.3 Guidance for artificial lighting and bats was updated in Autumn 2018, the guidance states the following:
- 2.4.4 "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).





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

- 2.4.5 The following must apply when choosing luminaires, unless otherwise specified in **Tables 3 - 11***:* 
  - All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
  - LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
  - A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
  - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
  - Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill. (See figure overleaf.)

- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered.
- However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and
- their use should only be as directed by the lighting professional.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used –See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed."

## 3. Lighting Strategy

#### 3.1 Brief

3.1.1 The proposed development will require lighting for safety and amenity at limited times during the hours of darkness. Lighting must be fit for purpose and sensitive to nearby sensitive human and ecological receptors. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits, is sensitive to the area and provides a recognised standard level of lighting for all areas requiring illumination.

#### 3.2 Key Areas Requiring Lighting

- 3.2.1 The following key areas will require lighting:
  - Development access and internal road:
  - Car parks and courtyards:
  - Footpaths: and
  - Feature lighting of benches
  - Porch lighting

#### 3.3 Development Access and Internal Road

- 3.3.1 The access road will be illuminated using illuminated bollards to reduce the need for columns and reduce the potential for light spill towards Burtson Manor.
- 3.3.2 Column mounted luminaires will be provided from the junction of the access road and the internal site road. Luminaires will be mounted at a height not exceeding 4.0m and will emit light of warm white colour temperature (maximum 3000K).
- 3.3.3 The lighting of internal roads within the development will be designed in accordance with **BS** 5489-1:2020 *Lighting of roads and public amenity areas*.

Traffic fl	0W	Lighting class				
	E1 to E4 <sup>A)</sup>	E1 to E4 <sup>A)</sup> E1 to E2 <sup>A)</sup> E3 to E4 <sup>A)</sup>				
	Pedestrian and cy	clists Speed limit	$v \le 30 \text{ mph}$ Speed limit $v \le 30 \text{ mph}$			
	only					
Busy <sup>B)</sup>	P5	P4	P3			
Normal <sup>cj</sup>	P5	P5	P4			
Quiet <sup>D)</sup>	P6	P5	P4			

Table 3: BS EN 5489-1:2020 [Table A.5 Lighting classes for subsidiary roads with a typical speed of main user v <30 mph].

- 3.3.4 The traffic flow / usage has been determined as 'quiet' in accordance with the following descriptor: 'Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road and mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.'
- 3.3.5 Ambient lighting levels within the area are described as 'low' with the location situated within an E2 Environmental Zone.
- 3.3.6 Taking the above traffic flow and ambient luminance into consideration, the appropriate lighting classification for the internal road is 'P5'. Associated illuminance levels for the appropriate lighting class are presented in **Table 4.** Illuminance levels associated with 'P6' lighting classifications are also applicable to the scheme as these classifications can be applied later into the evening.

Additional requirement if facial recognition is necessary	
E <sub>sc,min</sub> [maintained] lx	
5,0	
2,0	
1,5	
1,0	
0,6	
0,2	
anc	

Table 4: Extract from BS EN 13201-2:2015 (Table 3)

#### 3.4 Car Parks / Courtyards

- 3.4.1 Luminaires mounted at a height of 3.0m will be used to provide light in car parks and within 'courtyard' style areas with private parking arrangements.
- 3.4.2 Luminaires with a maximum colour temperature of 3000K will be used in the car parking areas, to achieve lighting levels in accordance with BS 5489-1:2020 (Table 5).

		Values in lux
Type of area and usage	$\overline{E}$	U <sub>o</sub>
Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of major shopping centres, major sports and multipurpose sports and building complexes	20	0.25
Table 5: Extract from BS5489-1:2020 (table 4)		

3.4.3 Maintaining a base lighting level will assist residents by providing an enhanced perception of safety rather than switching lighting off entirely. The base lighting state will also assist any movements required during the hours of darkness.

#### 3.5 Pedestrian Footpaths and Communal Areas

- 3.5.1 Illuminated bollards not exceeding 1 metre in height will be used to light the footpaths and communal areas in order to introduce low level light for amenity and wayfinding during hours of darkness.
- 3.5.2 The light output from illuminated bollards will be warm white in colour temperature (maximum of 3000K). This is to ensure the impact of light on potentially sensitive ecology is minimised.

#### 3.6 Feature Lighting of Benches

- 3.6.1 Feature lighting will be installed to the underside of benches in the sensory garden to accentuate the area and provide a low level of subtle illumination during the hours of darkness.
- 3.6.2 Lighting will be of warm white colour temperature and will be concealed beneath individual benches to create a warm glow.
- 3.6.3 Where white light is used for the under-bench lighting, the colour temperature will not exceed 3000K.

#### 3.7 Porch Lighting

- 3.7.1 Porch lighting will be installed for safety, security, and amenity.
- 3.7.2 Lighting will be of warm white in colour temperature (maximum of 3000K) and will emit downwards light only to reduce potential for sky glow. This also ensures the impact of light on potentially sensitive ecology is minimised.
- 3.7.3 Porch lighting will be sensor controlled to ensure luminaires do not operate when they are not required.

#### 3.8 General Lighting Performance Parameters

- 3.8.1 Column mounted luminaires will be installed at a height not exceeding 4 metres; this will limit the potential levels of obtrusive light contributed towards sensitive receptors of the proposed development.
- 3.8.2 All Luminaires will be installed with a zero-degree tilt angle
- 3.8.3 The correlated colour temperature (CCT) of the lighting will not exceed 3000 Kelvin to ensure the lighting equipment is appropriate for potentially sensitive flora and fauna. Additionally, the lit effect of the Proposed Development at night will be more sympathetic in the landscape.

## 3.9 Lighting Strategy Summary

	Area Requiring Lighting				
Lighting Type	Access driveway, off road footpaths & communal gardens	Car parks / courtyards	Internal Road	Porch Lighting	Feature lighting (beneath benches)
Lighting Class	Wayfinding only	Light traffic (BS 5489- 1:2020- Table 4)	P5 (BS EN 13201-2:2015 - Table 3)	Wayfinding only	N/A
Average Illuminance (lux)	N/A	5.0 lux	3.0 lux	N/A	N/A
Minimum Illuminance (lux)	N/A	N/A	0.60 lux	N/A	N/A
Minimum Uniformity (Uo)	N/A	0.25	Achieved average illuminance not to exceed 4.5 lux	N/A	N/A
Correlated Colour Temperature (K)	3000 K (max) Warm White				
Luminaire Intensity Class	N/A Light engine to be mounted in top side of luminaire, downward facing	G3 (minimum)	G3 (minimum)	N/A Light engine to be mounted in top side of luminaire, downward facing	N/A
		Inst	allation Requireme	ents	
Luminaire Manufacturer	D W WINDSOR (or similar approved)	D W WINDSOR (or similar approved)	D W WINDSOR (or similar approved)	Unilamp (or similar approved)	LED Linear or similar
Luminaire Model	KIRIUM BOLLARD (or similar approved)	KIRIUM PRO MINI (or similar approved)	KIRIUM PRO MINI (or similar approved)	Bronco (or similar approved)	
Light Source	LED				
Mounting Height	1.0m (max)	4.0m (max)	4.0m (max)	1.5m (max)	N/A
Luminaire Type	Illuminated Bollard	Column mounted	Column mounted	Wall Mounted	Linear strip
Luminaire Tilt	N/A	0° (max)	0° (max)	N/A	N/A
Luminaire Peak Beam	N/A	70° (max)	70° (max)	N/A	N/A
Controls	Refer to section 4				

Table 6: Performance and Installation Requirements.

## 4. Lighting Controls

#### 4.1 General

- 4.1.1 Implementation of a lighting control strategy would reduce the potential energy consumption of the proposed lighting, as well as controlling the visual appearance of the development at night.
- 4.1.2 As site security is of importance, the lighting would be managed through timed dimming, rather than switching on and off during periods of reduced activity on site, except for the main access.
- 4.1.3 Lighting of the access road to operate from dusk until 23:00pm. Microwave control from 23:00pm until dawn.
- 4.1.4 To reduce the potential energy consumption and usage of lighting where it is not required, luminaires lighting the internal road will be dimmed between 23:00pm and dusk to a P6 lighting classification as per the details in **Table 4**.
- 4.1.5 Lighting within the car parking areas, footpaths and communal garden areas will be dimmed by 50% of their output between the hours of 23:00pm and dusk. This ensures lighting levels are maintained during hours of darkness for security and perception of safety.
- 4.1.6 Wall mounted dwelling luminaires will be PIR sensor controlled between dusk and dawn, to ensure it does not operate when not required.
- 4.1.7 Feature lighting installed underneath benches will be controlled by astronomical timeclock from dusk until 23:00pm.

### 5. Indicative Light Spill

- 5.1.1 The indicative light spill model included in **Appendix 1 Indicative Light Spill** demonstrates the ability to provide functional and amenity lighting for the Proposed Development and to ensure that a sensitive lighting solution is installed.
- 5.1.2 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 landscaping 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 onto the boundaries of the Application Site.
- 5.1.3 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.
- 5.1.4 The indicative light spill model suggests that light spill onto the manor house is unlikely, given the performance parameters outlined in the lighting strategy.
- 5.1.5 The parameters within this report are limited to permanent exterior light sources. Interior lighting is not normally assessed using obtrusive light criteria as it is not relevant to interior lighting. Whilst interior lighting may be visible through the lit effect of windows, this is not something that is considered within the obtrusive light criteria as the light level associated with this is not measurable in obtrusive light terms due to the insignificance of the light levels from interior lighting associated with private residential usage.

### 6. Conclusion

- 6.1.1 The lighting strategy outlines the criteria for the lighting design of the Proposed Development, ensuring that the lighting is fit for purpose whilst maintaining sensitivity towards all boundaries.
- 6.1.2 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 3**.
- 6.1.3 The lighting to the front and rear of the properties are limited to a maximum height as outlined in **Section 3**), with sensor controls to limit the hours of operation during darkness.
- 6.1.4 The light spill diagram in **Appendix 1- Indicative Spill Lighting** outlines 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.
- 6.1.5 In conclusion, the indicative light spill drawing presented in **Appendix 1- Indicative Spill Lighting**, shows that implementing the strategy detailed in **Section 3** will ensure the lighting will be kept to the confines of the Proposed Development, with levels typically less than 0.5 lux falling on the boundaries. There is potential for a reduction in column density across the site to reduce the lighting levels further, as the column layout is based on the landscaping aspirations for the site. It is expected and encouraged that the lighting strategy is conditioned requiring detailed lighting designs to be submitted.

## Appendix 1 - Indicative Light Spill

See: 1178-DFL-LSD-003



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