Severn Road, Avonmouth - Single Unit Additional Car Park
Environmental Lighting Impact Assessment

Loveday Lighting Report Ref: LL1351-002

Date: 09/08/2021

Report Prepared By:


..... Aimie Loveday

CONTENTS

1.0 INTRODUCTION

1.0 This external lighting environmental impact assessment is a desk top exercise to establish the baseline conditions and the likely impact to the surrounding environment of the proposed lighting at Severn Road, Avonmouth development.

1.2 The lighting design of this site should be carried out by a competent person governed by the Institution of Lighting Professionals.

1.3 The report has been prepared by Loveday Lighting Limited to the best of our knowledge using information provided by Tungsten Properties.

1.4 Loveday Lighting Limited accepts no responsibility or liability for:

a) The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;

b) The issue of this document to any third party with whom approval for use has not been agreed.

2.0 LEGAL REQUIREMENTS

2.1 This section summarises government policy on the environment with respect to external lighting.

3.0 STATUTORY DOCUMENTS

Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

3.1 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), states: "artificial light emitted from premises so as to be prejudicial to health or nuisance."

National Planning Policy Framework

3.2 The National Planning Policy Framework (NPPF), published in February 2019, sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans. 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:

- Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Relevant British Standards

3.3 The most applicable British Standards for lighting that relates to the proposed development are:

- BS5489-1:2020 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas
- BS EN 13201 2015 – Road Lighting. Performance Lighting
- BS 12464-2:2014 – Light and Lighting. Lighting of Work Places. Outdoor Lighting.

Institution of Lighting Professionals, Bat Conservation Trust Lighting Guidance (August 2018)

3.4 The Bat Conservation Trust and the ILP produced a paper in 2018, "Bats and Lighting in the UK", discussing the appropriate lighting levels, types of lamps, colour temperatures etc. which are suitable for lighting areas adjacent to bat houses.

Bat Conservation Trust 2014 Interim Guidance

3.5 The Bat Conservation Trust 2014 interim guidance provides recommendation to help minimise the impact of artificial lighting.

Guidance Notes for the Reduction of Obtrusive Light; 2021 Institution of Lighting Professionals (ILP)

3.6 Guidance notes produced by the Institution of Lighting Professionals are among the most commonly referenced guidance notes for good practice within the lighting design industry.

3.7 Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users. The assessment has been carried out in accordance with the published guidance documents from the ILP.

3.8 Light intrusion refers to the spilling of light beyond the boundary of the area to be lit. This includes the intrusion of light into bedroom windows.

3.9 Sky glow refers to the brightening of the sky above towns cause by direct or reflected upward light.

3.10 Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. **Figure 1** illustrates the different types of obtrusive light.

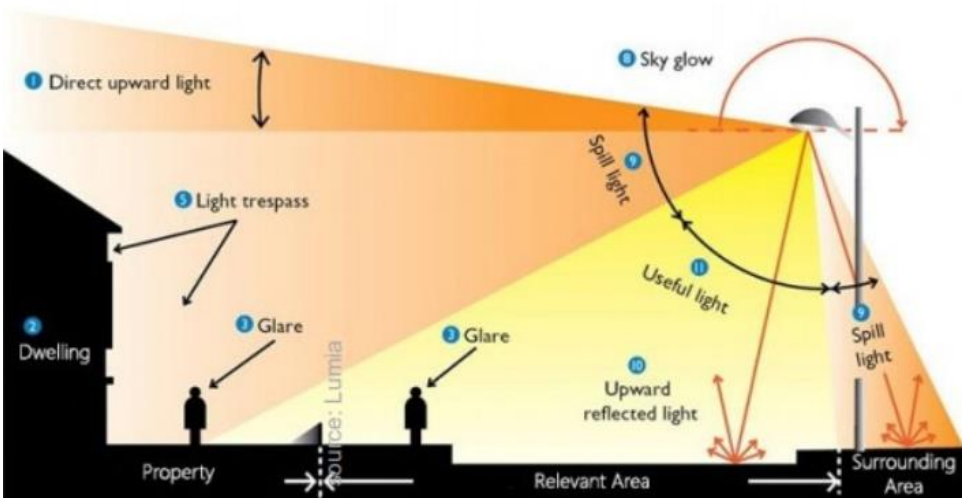
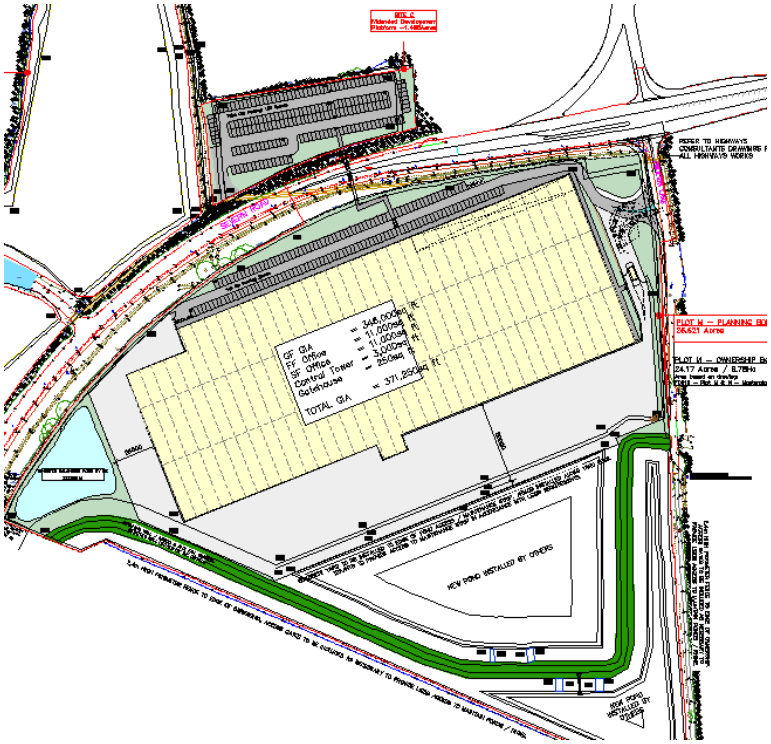


Figure 1: Light Obtrusion characteristics

4.0 SITE LOCATION

4.1 The proposed site layout for the Single Unit with the additional car park Severn Road development in Avonmouth:



5.0 BASELINE CONDITIONS

5.1 The following describes the site in relation to existing sources of lighting. A review of areas and features of the landscape are also described.

5.2 The surrounding area to the proposed development is built up and mainly consists of residential dwellings and rural areas.

5.3 All the surrounding streets are currently lit by systems of street lighting which are owned and maintained by the local council.

5.4 Sensitive receptors to light are surrounding residential properties and local wildlife.

5.5 The Institution of Lighting Professionals published a reference document GN01/21 – Guidance notes for the reduction of obtrusive light, which provides definitions of environmental zones and levels of permissible light trespass.

5.6 Using table 12.1 below, it would indicate that the area would be classified as E3 Medium District Brightness Areas.

Table 2: Environmental Zones			
Environmental Zones	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	Astronomical Observable dark skies, UNESCO starlight reserves, International Dark Sky Association (IDA) dark sky places
E1	Natural	Dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low District Brightness	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

Table 3: Maximum values of vertical illuminance on properties						
Light Technical Parameter	Application Conditions	Environmental Zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (Ev)	Pre-curfew	n/a	2 lux	5 lux	10 lux	25 lux
	Post-curfew	n/a	0.1 lux	1 lux	2 lux	5 lux

Table 6: 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

6.0 LIGHTING DESIGN SELECTION PROCESS

6.1 It has been assessed that the lighting levels shall be as per the British Standard BS5489-1:2020 and BS EN 13201-2:2015 recommendations:

Severn Road, Avonmouth: - Lighting Class to Access Road: P3

Minimum maintained illuminance (Eav) = 7.50 – 11.25 Lux
Minimum illuminance (Emin) = 1.50 Lux

Severn Road, Avonmouth: - Lighting Class to Car Park:

Minimum maintained illuminance (Eave) = 10 Lux
Uniformity (Uo) = 0.25

Severn Road, Avonmouth: - Lighting Class to HGV area:

Minimum maintained illuminance (Eave) = 20 Lux
Uniformity (Uo) = 0.25

6.2 The above has been made on the assumption that the proposed street lighting installation will be a 'Medium Traffic Flow' area. The 'Environmental Zone' has been selected as an 'E3' denoting a 'Medium District Brightness' area and the 'Crime Rate' for this area is currently unknown so it has been selected as a 'Moderate' area. This has been extrapolated from Table 5.9 & 5.7 of BS EN 12464-2:2014 the Maintained Lighting Levels for Outdoor Car Parks.

6.3 The street lighting proposals for this development have been submitted using a total of:

- **Four** new Philips Luma Gen2 Mini BGP703 DW50 10.50klm 3000k LED luminaires. All luminaires to be post top mounted on 8m standard spec columns.
- **Twenty-one** new Philips Luma Gen2 Medium BGP704 DX51 16.00klm 3000k LED luminaires. All luminaires to be post top mounted on 8m standard spec columns.
- **Eight** new Philips Luma Gen2 Medium BGP704 DX51 16.00klm 3000k LED luminaires. All luminaires to be wall mounted 8m from ground level.
- **Ten** new Philips Clearflood BV651 DX50 60.00klm 3000k LED luminaires. All luminaires to be wall mounted 10m from ground level.

All luminaires are to have electronic control gear and be fitted with a Lucy Zodion ZCell 20 lux.

7.0 ECOLOGY

7.1 Loveday Lighting Limited has taken ecology into consideration for this development site and considers sensitive receptors to any proposed lighting to be extremely important. Maintaining flight paths, feeding patterns, nesting and mating areas should also be considered when proposing any street lighting to ensure that wildlife continues to flourish in this area.

7.2 Within the development it is proposed that LED lighting with a correlated colour temperature of 3000 kelvin is used. LED light sources contain low UV wavelengths and warmer colour temperatures reduce the light emitted beyond the 550 manometer wavelengths. These requirements are consistent with current research on the impact of artificial lighting on bats, as published by the Bat Conservation Trust (2018) and is a requirement of good practice of external lighting.

7.3 Light spill has the potential to affect both flora (plants etc) and fauna (from insects through to bats. Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat. The lighting strategy will seek to avoid and mitigate light spill where there are potential ecological receptors that could be adversely affected. This will be sought through guidance provided by the ILP for the reduction of obtrusive light.

7.4 In order to minimise the impact of light spill onto the site boundary and any sensitive areas, narrow optics/beams have been proposed to the southern end of the development. Please refer to Loveday Lighting drawing LL1351-002 to review the Iso Lux contours.

7.5 Due to the site being located within a sensitive ecology area, it is extremely important that the lighting impact can be minimised by using accepted methods of lighting control, essentially limiting illuminance and controlling light spill. Generally lighting shall be selected to provide safety and security without polluting the boundary site.

8.0 MITIGATION MEASURES

During Construction

8.1 Mitigation of the effects of the lighting installation during construction phase will include the following:

- Specifying working hours, use of lighting, location of temporary floodlights in the construction compound and agreeing these with the local council. Lighting to be switched off when not required specifically for construction activities or required health and safety or security.

- Adhere to best practice measures as recommended by the Institution of Lighting Professionals (ILP), Health & Safety Executive (HSE) and CIE (International Commission on Illumination) guidance. Lighting solutions will be selected to reduce light pollution.

- Specifically, designed luminaires will be selected to minimise upward spread of light. The optics in the lanterns will control the distribution of light to avoid overspill, sky glow and glare.

- Glare will be kept to a minimum by ensuring the main beam angle of all lights directed towards any potential observer is not more than 70°. Higher mounting heights allow lower main beam angles, which can assist in reducing glare.

- Restrict lighting to the task area using horizontal cut-off optics.

- Lighting would need to be provided in the form of column mounted lanterns. Where possible, lanterns would need to be pointed into the development and away from adjacent trees, hedgerows and woodland areas. Optics in the lanterns would need to be specified to control the distribution of light, avoiding overspill, sky glow and glare. Back shields shall be fitted to columns where appropriate.

- Operate curfew and minimise the duration of any lighting (switch off or part-night dimming). Dimming, preferably using a centralised management system (CMS), is one way of reducing unnecessary illumination. In the past, dimming was generally achieved by simply switching off a fraction of the lights. This saves energy, but the lack of uniformity within a group of lamps can be hazardous because dangers may not be seen in the dark regions. The dimming technologies now available for lights other than low-pressure sodium avoid this problem. Depending on the method employed, dimming can also reduce energy demand by 40% and maintenance costs by 50%.

Post Construction

8.2 The detailed lighting scheme is designed to use current best practice and technology. The impacts of external lighting will be minimised by the installation of lighting to the minimum specification required to provide a safe night-time environment for the public, therefore lighting will be designed to comply with the minimum illuminance levels given within the appropriate guidance.

8.3 Designing out and minimising the need for lighting to be installed is always the best method of reducing light pollution. However, where this is not possible, the careful choice of illuminance and luminance criteria is key to successfully limiting the impact that light may have on its surrounding environment.

8.4 Care should be taken to minimise glare from all luminaires installed, by ensuring the relevant luminaires are selected and installed correctly, in line with the recommendations within the ILP Guidance Notes for the Reduction of Obtrusive Light.

8.5 Lighting would need to be provided in the form of column & wall mounted lanterns. Where possible, lanterns would need to be pointed into the development and away from the adjacent sites. The optics in the lanterns would need to be specified to control the distribution of light avoiding overspill, sky glow and glare. Integrated rear shields are fitted to proposed luminaires.

9.0 CDM REGULATIONS

9.1 All street lighting installation works should be carried out whilst taking into account the current Health and Safety regulations and also where applicable the current CDM2015 regulations. Projects after the 6th April 2015 shall comply with CDM15 or be in the transitional process.

9.2 As the 'Designer' under the CDM 2015 Regulations, Loveday Lighting Limited expects the 'Client' to fully understand their duties and responsibilities under the current CDM 2015 Regulations; this statement is set out to make the client aware of “client duties” required under CDM. As a designer it is our responsibility to reduce and eliminate foreseeable health and safety risks to anyone effected by the project, take steps to reduce or control risks that cannot be eliminated and take account of any pre-construction information provided to us by the client or principal designer. On submission of this design to the client, the client must pass the full Loveday Lighting Limited design pack onto the Principal Designer (if involved) for inclusion in the pre-construction information and health and safety file.

9.3 Under CDM15 a project is notifiable if construction work lasts longer than 30 working days AND has more than 20 workers working simultaneously at any point or exceeds 500 person days. An F10 form must be submitted if the above applies and the form can be found online at www.hse.gov.uk.

9.4 This form must be submitted by the Client to the Health and Safety Executive. The only exception to this is where the project is for a domestic scheme, in this instance the responsibility automatically passes to the Contractor (or Principal Contractor). The Principle Designer can assume the responsibility for notification of a domestic project, but only where there is a written agreement between the domestic client and the Principal Designer that that they will carry out the client duties. Works that do not exceed the 30 day, 20 workers or 500 person days rule may still need to have the CDM2015 regulations applied but may not be notifiable. It is advised that the companies CDM2015 regulations trained personnel assess the project and make the necessary arrangements to meet the CDM2015 regulation requirements. If in doubt it is recommended that the company seeks professional advice.

10.0 CONCLUSION AND SUMMARY

10.1 In conclusion, subject to implementation of the above proposals, a lighting scheme can be designed and installed and an acceptably low impact on commercial properties, wildlife and on the wider landscape can be achieved.

10.2 The effects on sensitive receptors will be mitigated through the implementation of a stringent lighting design, which will include the use of low light pollution fittings which retain light spill within the development area, minimising the loss of light to the night sky and glare discomfort to on-site or neighbouring receptors.

10.3 In our considered opinion, if the measures detailed above are undertaken then we anticipate the proposed development will not have a negative impact on the immediate environment with respect to light pollution.

10.4 Loveday Lighting street lighting layout (LL1351-002) should be read in conjunction with this document.

10.5 This report has been prepared to the best of our knowledge; any lighting designs proposed shall be carried out by a competent lighting consultant in accordance with the local authority specification.