



· LIGHTING DESIGN · ELECTRICAL · SMART CITIES ·
ENERGY REDUCTION · LIGHTING IMPACT

120 RHOSNESNI LANE, WREXHAM

LIGHTING STRATEGY

DFL-UK

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1. INTRODUCTION

1.1. Executive Summary

- 1.1.1. This Lighting Strategy has been written by DFL (Designs for Lighting Ltd¹), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.
- 1.1.2. The lighting has been designed to meet the conditions specified in two planning permission consents; WRA P/2022/1082 and WRA P/2022/0181.

“WRA P/2022/1082

2 Within 12 weeks of the date of this decision, an external Lighting scheme shall have been submitted for the written approval of the Local Planning Authority.

4 No use of the development shall be made before 0830 hours or after 1730 Monday to Saturday. No part of the development shall be used on a Sunday or Bank Holiday.

9 The outside of the building shall not be illuminated outside of the opening hours referred to in condition 4.

WRA P/2022/0181

3 No external illumination within the site shall take place before a Lighting scheme has been submitted to and agreed in writing by the Local Planning Authority. The lighting scheme shall be installed and operated in accordance with the approved details. No other lighting shall be used on any external part of the development.

17 The building shall not be illuminated outside of the opening hours referred to in condition 12.”

- 1.1.3. All proposed lighting will be controlled by Passive Infra-Red Sensors (PIRS) with a time clock set to operate within the designated opening hours of 0830 to 1730 hours Monday to Saturday (excluding Bank Holidays).
- 1.1.4. The Lighting Strategy proposes good practice and outlines a suitable approach for the proposed lighting at 120 Rhosnesni Lane, Wrexham, for the purpose of safety, security and wayfinding . The lighting strategy is intended to set out a minimally obtrusive approach to the lighting, whilst ensuring it is necessary and considers the sensitivity of nearby human, environmental and ecological receptors.

¹ <https://www.dfl-uk.com/about/>

- 1.1.5. Lighting associated with the Proposed Development will comply with relevant British Standards and Institution of Lighting Professionals (ILP) guidance to ensure obtrusive light is minimised in accordance with best practice.
- 1.1.6. 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; and
 - Details as to how lighting will be implemented for the 120 Rhosnesni Lane, Wrexham
- 1.1.7. It has been identified that the Application Site is set within a suburban location (E3).
- 1.1.8. Through careful design and mitigation, this Lighting Strategy ensures the lighting installation at the proposed development will be in accordance with British Standards, Guidance and Local Policy.

2. LEGISLATIVE FRAMEWORKS AND NATIONAL POLICIES

2.1. Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

- 2.1.1. Since 2005, artificial light has been incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the Clean Neighbourhoods and Environment Act 2005 states:

"Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a 'Statutory 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 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"

2.2. The Planning Policy Wales (PPW),

- 2.2.1. Edition 12 adopted in February 2024, states the following regarding lighting and the provision of lighting requirements for sites applying for planning permission.

"Lighting

6.8.1 There is a need to balance the provision of lighting to enhance safety and security to help in the prevention of crime and to allow activities like sport and recreation to take place with the need to:

- protect the natural and historic environment including wildlife and features of the natural environment such as tranquillity;*
- retain dark skies where appropriate;*
- prevent glare and respect the amenity of neighbouring land uses; and*
- reduce the carbon emissions associated with lighting.*

6.8.2 Dark sky reserves exist in various parts of Wales, including Snowdonia, Brecon Beacons and the Elan Valley. Dark sky reserves can contribute positively to an area in economic and environmental terms and their characteristics should be taken into account when preparing development plan strategies and policies and when considering individual development proposals

6.8.3 Lighting to provide security can be particularly important in rural areas or for specific purposes such as defence or to create calming environments. Where this is the case, planning authorities should adopt policies for lighting, including the control of light pollution, in their development plans.

6.8.4 Planning authorities can attach conditions to planning permissions for new developments that include the design and operation of lighting systems, for example, requiring energy-efficient design and to prevent light pollution."

2.3. Planning Practice Guidance

2.3.1. Guidance for assessing the effects of proposed artificial lighting is outlined in the planning practice guidance (PPG). 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.)"*

3. LOCAL POLICIES

3.1. Wrexham County Borough Council, Wrexham Local Development Plan 2013 – 2028 adopted 20th December 2023.

- 3.1.1. The relevant Local Planning Authority (LPA) for the Proposed Development is the Wrexham County Borough Council, with policies detailed within the Wrexham Local Development Plan 2013 – 2028 adopted 20th December 2023 applying to the lighting associated with the Proposed Development.

The applicable policies are:

"DM1: Development Management Considerations

Development proposals, where relevant, must:

- i. Accord with or enhance the character, local distinctiveness and appearance of the site, existing building(s) and surrounding landscape/ townscape in terms of their siting, layout, scale, height, design, density, use of materials and landscaping;
- ii. Not have an unacceptable effect on the amenity of the occupiers of nearby properties/land; and provide a satisfactory standard of amenity for the occupiers/users of the development itself;
- iii. Safeguard the environment from the adverse effects of pollution of water, land, noise, light or air, or land instability, arising from development;"

3.2. Wrexham County Borough Council, Wrexham Local Development Plan 2013 – 2028 adopted 20th December 2023.

- 3.2.1. The relevant Local Planning Authority (LPA) for the Proposed Development is the Wrexham County Borough Council, with policies detailed within the Wrexham Local Development Plan 2013 – 2028 adopted 20th December 2023 applying to the lighting associated with the Proposed Development.

The applicable policies are:

“SP14: Natural Environment

3.90 Protection, conservation and enhancement of the natural environment will allow for appropriate development in line with the principles of sustainability and wellbeing - to balance environmental, economic, cultural and social needs. Appropriate development will need to conserve and enhance valued countryside, landscapes, wildlife and significant geological sites, minimise harmful impacts on biodiversity and landscape character and identify and provide, where possible, mitigation and compensation for environmental losses.”

4. POTENTIAL ADDITIONAL STANDARDS

4.1. BS 5266-1:2016 – Emergency Lighting Part 1: Code of practice for the emergency lighting of premises.

- 4.1.1. This standard gives recommendations and guidance on the factors that need to be taken into account in the design, installation and wiring of electrical emergency lighting systems, in order to provide the lighting performance needed for safety of people in the building in the event of failure of the supply to the normal lighting.
- 4.1.2. We are proposing lighting for the purpose of safety, security and wayfinding to comply with the conditions of the planning permission, as such no British Standards will apply.

5. GUIDANCE

5.1. Guidance Notes for the Reduction of Obtrusive Light (Institution of Lighting Professionals GN01/2021)

5.1.1. The Lighting Strategy is informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, which is typically caused by poorly designed and installed exterior artificial lighting. The Lighting Strategy is informed by the most relevant sections of GN01/2021 that has recently been published to reduce the potential for obtrusive light from a wide range of exterior lighting applications.

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

Environmental Zones	Sky Glow ULR ² (Max %)	Light Trespass (Into Windows) E _v (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew ³	Average L (cd/m ²)
E0	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

² ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky.

³ 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. DESKTOP STUDY

6.1. Site Description and Context

- 6.1.1. The Application Site is a car park to the rear of 120 Rhosnesni Lane, Wrexham. The application site is currently a concreted open space used for parking vehicles. An indicative boundary of the site and proposed layout can be seen in **Figure 1** and **Figure 2**.
- 6.1.2. The Proposed Development comprises the demolition of an existing structure and the construction of 7 commercial units (B1). The Site Layout Plan is shown in **Figure 2**
- 6.1.3. A desktop assessment was completed to understand its position within the current lit environment.



Figure 1: The Application Site location and boundary

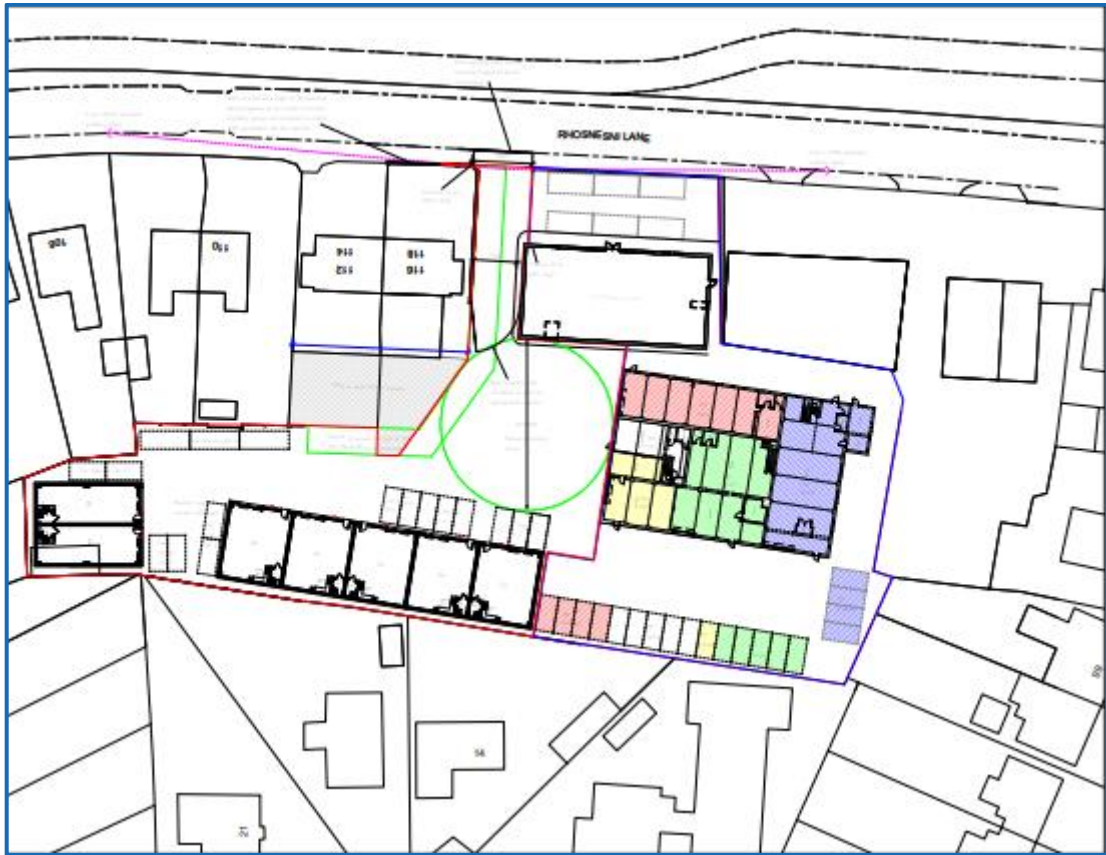


Figure 2: Proposed Development Site layout plan

6.1.4. The area is not within a designated SAC, SSSI or AONB.

6.2. Baseline lighting

6.2.1. The lighting on the B5100 Rhosnesni Lane from which the site is accessed, is comprised of approximately 6 metre post top mounted LED luminaires.

6.2.2. A site survey undertaken 9th of April 2024 assisted on the understanding of the baseline levels to the Application Site, these details can be found within the document 3401-DFL-ELG-XX-SU-EO-13001-S3.

6.3. CPRE Night Blight Mapping⁴

6.3.1. To inform our understanding of the nighttime environment, we look to use the CPRE Nightblight map to better appreciate the current baseline light levels. The CPRE Night Blight Mapping confirms the skyward radiance within the vicinity of the Application Site is between 8 - 16 Nano Watts/cm²/sr. As shown in **Figure 3**, the likely levels of skyglow within the vicinity of the Application Site are similar to those expected within an E3 zone.

⁴ NightBlight Map is a visual representation of light pollution as a view from above the earth's atmosphere and indicates upward light spill based on sky glow.

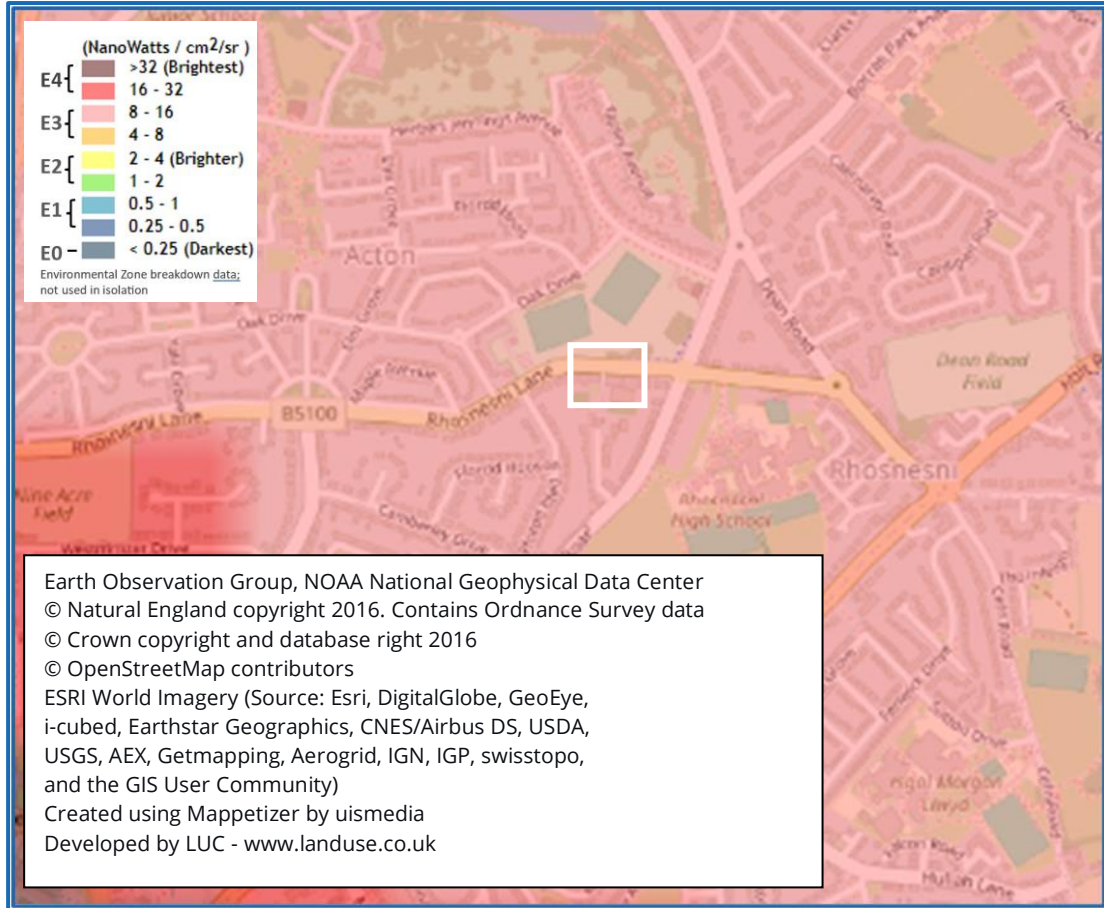


Figure 3: Surrounding areas/roads

6.4. Environmental Zone Classification

6.4.1. The Environmental Zone criteria detailed within **Table 1** and **Table 2** informs the basis of the Lighting Strategy. The Application Site is considered to be located within an E3 Environmental Zone, because it is a well inhabited urban settlement with medium district brightness.

Zone	Surrounding	Examples	Limitations		Sky Glow ULR (Max)
			Pre-curfew	Post-curfew	
E3	Suburban	Well inhabited rural and urban settlements, small town centres or suburban locations.	10	2	5%

Table 3: Limitations of identified environmental zone.

7. IDENTIFIED RECEPTORS

7.1. Human Amenity

- 7.1.1. To the south, east and west of the Application Site, Potential Human Amenity Receptors (PHAR) have been identified as shown in **Appendix 3**. Therefore, this lighting strategy has been written in accordance with GN01/2021, **Table 2** - Obtrusive Light Criteria.

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Human Amenity	PHAR 001	Residential properties on western boundary of site	Low
Human Amenity	PHAR 002	Residential properties on southern boundary of site	Low
Human Amenity	PHAR 003	Residential properties on eastern boundary of site.	Low

Table 4: Potential Human Amenity Receptors (PHAR)

8. LIGHTING STRATEGY

8.1. Summary

- 8.1.1. The Proposed Development will require lighting for safety and amenity at limited times during the hours of darkness. Lighting will be fit for purpose and sensitive to nearby human and ecological receptors.
- 8.1.2. Lighting will be of an appropriate specification and designed in accordance with British Standards.
- 8.1.3. Amenity lighting for the Proposed Development will be applied sensitively to account for the receptors identified bounding the Application Site and within the Proposed Development.
- 8.1.4. Luminaires will be used with integral LEDs and only where the luminaire photometry is available from the manufacturer. This is to ensure the photometric footprint of the luminaires can be modelled to ensure the potential effects of light spill are minimised or mitigated.
- 8.1.5. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Application Site is located, is sensitive to the area, and provides a recognised standard level of lighting for all adoptable areas requiring illumination. Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.
- 8.1.6. All lighting unless otherwise stated is to emit a warm white colour temperature light (3000 Kelvin or less) to reduce the potential for adverse effects onto potentially sensitive receptors.
- 8.1.7. Lighting in unadopted areas will be required in the following task areas:
 - > Car park

8.2. Car Park

- 8.2.1. The car park to the rear of 120 Rhosnesni Lane, Wrexham will be illuminated in accordance with Wrexham Borough County Council planning policy and planning consents WRA P/2022/1082 and WRA P/20220181 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy to ensure a satisfactory standard of appearance of the development in the interests of the visual and residential amenities of the area in accordance with Policy DM1 of the Wrexham Local Development Plan.
- 8.2.2. The Car Park will be illuminated for wayfinding purposes only.
- 8.2.3. Luminaire performance requirements are outlined in **Appendix 4**.

9. SUMMARY OF RESULTS

9.1. Overview

- 9.1.1. The Light Spill Diagram shown in **Appendix 1 & 2** demonstrates that the Light Spill Levels associated with the proposed lighting would comply with the obtrusive light guidance set out in ILP GN01/2021, at sensitive receptors.
- 9.1.2. To ensure the worst-case scenario has been modelled, the highest potential light levels have been modelled / presented in the light spill diagram, with the project maintenance factors set at MF = 1.0⁵. This demonstrates the light levels at their highest (initial light levels at the start of luminaire life).

9.2. Summary of Results

- 9.2.1. The proposed lighting within the task area(s) is compliant to the relevant policies, standards and guidance.
- 9.2.2. Where human receptors are potentially sensitive to vertical light spill, a vertical illumination grid has been modelled, as shown in **Appendix 2**. The light levels based on the modelling do not exceed 2 Lux, keeping the light levels within the guidance given within GN01/2021 for an area identified as an E3 environment.

Receptor No	GN01/2021 requirements		Maximum vertical Illuminance (Lux)	Pass/fail
	Pre-curfew	Post Curfew		
PHAR 001	10 Lux	2 Lux	0.19	Pass
			0.80	Pass
PHAR 002	10 Lux	2 Lux	1.09	Pass
			0.39	Pass
			0.11	Pass
			0.15	Pass
PHAR 003	10 Lux	2 Lux	1.17	Pass
			0.11	Pass
			0.19	Pass

Table 5: PHAR results table, maximum illuminance

⁵ <https://www.dfl-uk.com/knowledge-hub/faqs/>

9.3. Mitigation

- 9.3.1. Careful design ensures the lighting has been minimised onto sensitive receptors in accordance with standards and guidance.
- 9.3.2. Where applicable, shields are proposed in particularly sensitive areas to further minimise spill.
- 9.3.3. Through the use of the control methods detailed in **Appendix 4**, it limits the amount of light in the affected Application Area to the minimum amount of time for amenity and safety purposes.
- 9.3.4. The detailed design is to be completed by a competent person or persons in accordance with the details within this Lighting strategy.

10. CONCLUSION

10.1. General

- 10.1.1. Lighting associated with the Proposed Development shall be designed in accordance with the Lighting Strategy for the Application Site outlined in **Section 8**.
- 10.1.2. This lighting strategy has been written in accordance with the relevant British Standards, industry guidance and local policies to ensure it is unlikely to give rise to obtrusive light with the potential to affect human, environmental and ecological receptors.
- 10.1.3. Through the application of this lighting strategy sensitive receptors will not be adversely affected by obtrusive light, as shown in **Appendix 1 & 2**.
- 10.1.4. The lighting scheme has been designed by an appropriately qualified professional to meet all the conditions of the planning consent. The lighting will be controlled by time clock to ensure it does not operate outside of the opening hours stipulated in the planning consent.
- 10.1.5. Through careful design and mitigation, this Lighting Strategy ensures the lighting installation at the proposed development will be in accordance with British Standards, Guidance and Local Policy.

APPENDIX 1 – LIGHT SPILL DIAGRAM

See accompanying document 3401-DFL-ELG-XX-LD-EO-13001-S3

APPENDIX 2 – VERTICAL LIGHT SPILL DIAGRAM

See accompanying document 3401-DFL-ELG-XX-LD-EO-13002-S3

APPENDIX 3 – SENSITIVE RECEPTORS



Figure 4: Sensitive receptors

APPENDIX 4 – EQUIPMENT SPECIFICATION

1.1. Luminaire and control specification

1.1.1. Performance requirements are outlined in **Table 1.1**

Equipment Specification	
Application Area	Car park
Correlated Colour Temperature (Kelvin)	≤ 3000 Kelvin
Luminaire Manufacturer	Kosnic
Luminaire Model	RHI20-W30
Light Source	LED ≤1900 lumens
Reference	Type B
Height	2M
Mounting Arrangement	Wall mounted
Luminaire Tilt	0 Degrees
Upward Light Output Ratio E3 < 5%	0
Example Luminaire Image	
Controls ⁶	Time clock off at 1730 - Remote PIRS on for 5 minutes

Table 1.1: Luminaire performance requirements

TECHNICAL DESCRIPTIONS, DEFINITIONS & ABBREVIATIONS

PHAR: is an abbreviation for a potential human amenity receptor, a location where an observer could have the potential to be affected by the proposed lighting to be installed *Abbreviation used by DFL LI&P.*

PSER: is an abbreviation for an area identified as or treated as a location that may host a potentially sensitive ecological receptor. This is generally used where light sensitive bats have the potential to live, forage or use as a flight path, other ecologically sensitive receptors such as (but not limited to) the Great Crested Newt may also be identified by this term. *Abbreviation used by DFL LI&P.*

PSR: is an abbreviation for an area where an individual maybe susceptible to light brightness (Light intensity) which may have the potential to cause a hazardous situation. *Abbreviation used by DFL LI&P.*

Obtrusive Light: refers to excessive or bothersome artificial light that goes where it shouldn't, causing discomfort and disruption. *Spill light which because of quantitative, directional or spectral attributes in a given context gives rise to annoyance, discomfort, distraction or reduction in the ability to see essential information.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Sky glow: When lights are directed upwards or light is scattered by particles in the air, like dust or water droplets, it creates a glow that makes it hard to see stars. *The increase in diffuse illuminance of the night sky above that produced by natural sources such as the moon and visible star.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Vertical Illuminance: is how much light lands on upright surfaces like walls. It's measured in lux or footcandles and matters for places where the view from a vertical angle is important. *Lighting of vertical surfaces such as walls, windows, statues, sculptures and people's faces.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Correlated colour temperature (CCT): the appearance of light emitted by a light source measured in Kelvin (K), Lower CCT values such as 2700K represent warmer, more yellowish light, *similar to the light from older incandescent lamps. (Tcp)The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions, measured in absolute temperature on the kelvin (K) scale.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lux: measures the brightness of light as perceived by the human eye at a specific point on a surface. *The SI derived unit of illuminance, measuring luminous flux per unit area (1 lux = 1 lumen/m²).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lumens: measure how bright a light appears to our eyes. *The SI derived unit of luminous flux; a measure of the total quantity of visible light emitted by a source or received by a surface (unit: lumen).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Glare: refers to an excess of bright light that makes you uncomfortable or hinders your vision. It happens when there's a big difference between a bright light and the rest of the surroundings. *Glare: condition of vision in which there is discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or by extreme contrasts.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.1.8

Luminous intensity: is light brightness or how intense the light source is. light intensity is how intense a light source is emitted or received in a particular direction, this is measured candelas and is termed as

luminous intensity I_v <of a source, in a given direction> quotient of the luminous flux, $d\Phi_v$, leaving the source and propagated in the element of solid angle $d\Omega$ containing the given direction, by the element of solid angle (unit: $\text{cd} = \text{lm} \cdot \text{sr}^{-1}$). BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.2.

Candela: is a measurement for the brightness of a light source, taking into account the direction in which the light is emitted. Base unit of luminous intensity in the International System of Units (SI); the luminous power per unit solid angle emitted by a point light source in a particular direction. CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Uniformity (Uo): is an explanation for the even distribution of light across an area or surface. The overall uniformity shall be calculated as the ratio of the lowest luminance, occurring at any grid point in the field of calculation, to the average luminance. BS EN 13201-3-2015, Calculation of Performance Section 8.3.

Luminance: is how bright a surface appears to our eyes. It considers the light coming from or reflected by an object. L_v <in a given direction, at a given point of a real or imaginary surface> quantity defined by the formula (unit: $\text{cd} \cdot \text{m}^{-2} = \text{lm} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$) BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.3.

Illuminance is how much light lands on a surface per square meter. It's measured in lux. More lux means a brighter area. E_v (unit: $\text{lx} = \text{lm} \cdot \text{m}^{-2}$) 1. <at a point of a surface> quotient of the luminous flux $d\Phi_v$ incident on an element of the surface containing the point, by the area dA of that element 2. <at a point of a surface> equivalent definition: integral, taken over the hemisphere visible from the given point, of the expression. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.10.

Luminaire: a light fixture, this is also sometimes referred to as a lantern or a light fitting, is a product that produces artificial light. apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.3

ULOR: upward light output ratio or ULOR refers to the amount of light the light fixture will produce upwards as a percentage of its total light output. $RULO$ <of a luminaire> ratio of the upward luminous flux of the luminaire, measured under specified practical conditions with its own lamp(s) and equipment, to the sum of the individual luminous fluxes of the same lamp(s) when operated outside the luminaire with the same equipment, under specified conditions BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.12.

Maintenance factor (MF): is an allowance for how well the lights keep working overtime. It considers things like dirt on the light fittings and "wear and tear". **DEPRECATED:** light loss factor ratio of illuminance produced by the lighting installation after a certain period to the illuminance produced by the installation when new Note 1 to entry: The term depreciation factor has been formerly used to designate the reciprocal of the above ratio. Note 2 to entry: The maintenance factor takes into account light losses caused by dirt accumulation on luminaires and room surfaces (in interiors) or other relevant surfaces (in exteriors, where appropriate), and the decrease of the luminous flux of lamps. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.5.18.

Tilt: is how much the luminaire is lifted based on the fitting facing flat to the ground.

Outreach: how far away the fitting is from the column/wall its mounted on to the light source.

This isn't the end...

We don't just have the solution for what you need today. We also have the solutions you might need for the future. We have dedicated teams that deliver.

- **Lighting Impact and Planning** teams that focus on delivering the most effective and sensitive lighting solutions to support planning.
- **Residential** teams that cover all aspects of new development and redevelopment spanning private, section 38 and section 278 design packages.
- **Public Realm** teams that are experts in enhancing night-time public spaces to create inviting spaces and opportunity for local economies to thrive during the hours of darkness.
- **Electrical** teams – we don't just put a light in the ground, we can help you get power to it as well! Additionally, we also offer design services for EV charging. As this market rapidly expands, make sure you have the experts managing the load, otherwise your EV charging solutions might not live up to expectations.
- **Strategic Infrastructure** teams that offer Lighting and Electrical expertise for complex transport networks and interchanges.
- **Consultancy Services** teams that help when you know what you want but you need someone to help you turn the idea into a project.

Finally, as innovators, you might be facing something bespoke or niche. Don't worry – we might have the answer you need. Feel free to get in touch!

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