BWB
A CAF GROUP COMPANY

PROPERTY

Hargreaves Land
Planning Application 1 at Lincolnshire Lakes (North)
Scunthorpe
Lighting Strategy

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1. INTRODUCTION

Instruction

1.1 BWB Consulting (BWB) was instructed by Hargreaves Land Limited (the Client) to carry out a Lighting Strategy at Lincolnshire Lakes, Scunthorpe ('the Site') for a Proposed Development within the administrative area of North Lincolnshire Council (NLC), described as:

"Hybrid Planning Application:

Full planning application for the construction of a new vehicular access off the M181/A1077(M) roundabout, a pedestrian and cycle link to Scotter Road, a foul pumping station, earthworks and 'off-plot' drainage, ecological and associated landscaping and infrastructure works.

Outline planning application, with all matters reserved, for the development of up to 550 residential dwellings (Use Class C3), a local centre (Use Class E) and associated 'on-plot' landscaping, drainage and other infrastructure works."

Scope of Works

1.2 This report details the relevant lighting policy and guidance that should be complied with during the future production of a detailed lighting design.

1.3 This report describes the main forms of light pollution. It sets out the maximum acceptable light pollution limits at the Site and explains how they can be mitigated against as much as possible.

1.4 This report defines the design parameters and criteria that shall be followed during the production of a future detailed lighting design. This includes details of luminaires, mounting heights, light direction and example luminaires. Performance criteria for average lux level and uniformity are defined for each type of area, task or activity throughout the Site.

1.5 The future proposed external lighting design must not exceed the recommended levels for obtrusive light. An adequate and safe level of lighting will be provided for Site tasks, amenity, and security, whilst maintaining a minimal impact on local light-sensitive receptors.

1.6 The Site Location Plan is included in **Appendix 1**.

2. RELEVANT POLICY AND GUIDANCE

2.1 The relevant international, national, and local policy documents plus relevant guidance are summarised in this section and have been considered in the production of this Lighting Strategy.

International Guidance

Commission Internationale De L'Eclairage (CIE 150)

2.2 The purpose of this guide is to help formulate guidelines for assessing the environmental effects of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. As the obtrusive effects of outdoor lighting are best controlled initially by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures which may be taken for existing installations. This guide refers to the potentially adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residents, sightseers, transport users to environmentalists and astronomers.

Guidelines for Minimising Sky Glow (CIE 126)

2.3 These guidelines prepared by Commission Internationale De L'Eclairage provide general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for lighting installations. These values must be regarded as limiting values. Lighting designers should seek to meet the lowest specifications for the design. Other uses of the open air areas at night will usually result in less stringent sky-glow requirements. Practical implementation of the general guidance is left to National Regulations.

National Guidance

Lighting in the Countryside: Towards Good Practice

2.4 The Office of the Deputy Prime Minister (ODPM – now Department for Communities and Local Government) in conjunction with the Countryside Commission published 'Lighting in the Countryside: Towards Good Practice' in July 1997, and a revised issue in 2001. The guidance was developed to 'provide practical advice on the prevention and control of lighting effects through appropriate action by all those involved with lighting in the countryside'. Its objective is 'to identify good practice in the planning and design of lighting in rural areas; and advise on how it can be achieved, using case study examples'. The guide aims to provide an overview and common understanding of all aspects of good lighting practice stating that close co-operation and participation is required for all those involved in planning, designing, and installing lighting schemes. The guidance provides valuable information on lighting best practice and the standard methodology outlined in this guidance document has been followed as part of this assessment.

National Planning Policy Framework

2.5 The National Planning Policy Framework (NPPF) provides guidance relating to planning and pollution control for new development in England. The purpose of the planning system is to contribute to achievement of sustainable development. In relation to lighting, Paragraph 198 states: "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."

National Planning Practice Guidance

2.6 Light Pollution Planning Practice Guidance (http://planningguidance.planningportal. Gov.uk/blog/ light-pollution) advises on how to consider light within the planning system. It recognises that artificial light provides valuable benefits to society, including extending opportunities for sport, recreation, and commerce, and can be essential to a new development. Equally, inappropriate artificial light has the potential to be obtrusive and to cause light pollution. It can be a source of annoyance, harm wildlife, and undermine enjoyment of the countryside and views of the night sky.

ILP Guidance Notes for the Reduction of Obtrusive Light (GN01/21)

2.7 The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that they are incorporated at the local plan level. The guidance defines various forms of light pollution and describes a series of environmental zones (similar to the CIE 150 environmental zones). The ILP guidance provides suitable criteria against which the effects of artificial lighting can be assessed and is used in this assessment.

2.8 This Guidance Note recommends that the immediate environment is classified into an environmental zone based on ambient lighting levels in the surrounding area. The environmental zones are detailed in **Table 1**. Zone E0 requires the strictest level of control and E4 the lowest.

Table 1. Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations

Zone	Surrounding	Lighting Environment	Examples
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

2.9 For each Environmental Zone, recommended obtrusive light limits for exterior lighting installations have also been determined. Limits apply for light spill (**Table 2**), sky glow (direct upward light) (**Table 3**) and glare (viewed source intensity) (**Table 4**).

Table 2. Light spill limits

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

Table 3. Sky glow limits

Light technical parameter	Application conditions	Environmental zones				
		E0	E1	E2	E3	E4
Upward light ratio (ULR) %	Pre/post-curfew	0	0	2.5	5	15

Table 4. Glare (source intensity) limits

Light technical parameter	Application conditions	Luminaire group (projected area Ap in m²)					
		0<Ap ≤0.002	0.002<Ap ≤0.01	0.01<Ap ≤0.03	0.03< Ap ≤0.13	0.13<Ap ≤0.50	Ap>0.5
Maximum luminous intensity emitted by luminaire (I in cd)	**E0**						
	Pre-curfew	0	0	0	0	0	0
	Post-curfew	0	0	0	0	0	0
	E1						
	Pre-curfew	0.29 d	0.3 d	1.3 d	2.5 d	5.1 d	2,500
	Post-curfew	0	0	0	0	0	0
	E2						
	Pre-curfew	0.57 d	1.3 d	2.5 d	5.0 d	10 d	7,500
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	500
	E3						
	Pre-curfew	0.86 d	1.9 d	3.8 d	7.5 d	15 d	10,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	1,000
	E4						
	Pre-curfew	1.4 d	3.1 d	6.3 d	13 d	26 d	25,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	2,500

ILP Guidance Note 08 for Bats and artificial lighting in the UK (GN08/23)

2.10 This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios.

ILP Professional Lighting Guide 23 Lighting for Cycling Infrastructure

2.11 This document describes an approach to assessing the need for and the provision of lighting to different cycling infrastructure facilities.

British Standards

BS EN 12464-2: Lighting of Workplaces, Outdoor Workplaces (2014)

2.12 This standard specifies requirements for lighting of tasks in most outdoor work places and their associated area in terms of quantity and quality of illumination. In addition, recommendations are given for good lighting practice. This standard includes important recommendations on how obtrusive light can be limited to keep night skies free of light pollution.

BS 5489: Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas (2021)

2.13 BS 5489-1 provides recommendations on the general principles, aesthetic and technical aspects of road lighting and advises on statutory provisions, operation and maintenance of lighting. The standard provides recommendations for the design of lighting for all types of highways and public thoroughfares, including those specifically for pedestrians and cyclists, and for pedestrian subways and bridges.

BS EN 13201 Part 2: Road Lighting Performance Requirements (2015)

2.14 This standard defines lighting classes for road lighting according to photometric requirements and aiming at the visual needs of road users. It also considers environmental aspects of road lighting.

Local Guidance

North Lincolnshire Core Strategy (Adopted June 2011)

2.15 This Core Strategy sets out the long-term spatial planning framework for the development of North Lincolnshire up to 2026 by providing strategic policies and guidance to deliver the vision for the area including the scale and distribution of development, the provision of infrastructure to support it and the protection of our natural and built environment.

2.16 **Spatial Objective 7: Efficient Use and Management of Resources**

"***To ensure the efficient use of resources, maximising recycling of minerals and waste products, minimising pollution, maintaining and improving air, soil and water quality, and employing sustainable building practices in new development.***

The Local Development Framework will achieve this by providing a policy framework that supports the reduction in the consumption of non-renewable resources. This includes fossil fuels, land, soil and minerals. As part of this it will be important to ensure that the use of suitable previously developed land is maximised, where possible. The framework will also support measures to minimise pollution and improve air, soil and water quality, and ensure that adequate infrastructure is available to serve new development. It will also promote the use of renewable energy and more energy efficient developments.

The Framework will identify mechanisms for reducing the level of waste produced and the amount of waste being sent to landfill in North Lincolnshire from all sources. Where appropriate sites for new waste facilities to meet the waste management targets and apportionments identified in the RSS will need to be identified. Detailed policies regarding waste matters will be included in a Minerals & Waste DPD."

2.17 **Spatial Objective 10: Creating A Quality Environment**

"***To transform North Lincolnshire's image by ensuring that all new development exhibits a high standard of design and architectural quality that respects and enhances the distinctive landscapes and townscapes of North Lincolnshire's towns and villages.***

The design of new development will contribute to the future image and perception change of North Lincolnshire. It should make the best of its surroundings, be accessible to all sections of the community, contribute to an enhanced feeling of safety and security, maximise resource efficiency, minimise pollution and waste. Poor quality design will not be acceptable."

North Lincolnshire Local Plan Saved Policies (2003)

2.18 **Policy DM12 Light Pollution** States:

"Planning applications which involve light generating development including floodlighting will only be permitted where it can be demonstrated that there would be no adverse impact on local amenities.

- Appropriate planning conditions may be attached to a planning permission which control and moderate the impact of light generating development including floodlighting and external illumination of advertisements."

Lincolnshire Lakes Area Action Plan (Adopted May 2016)

2.19 The AAP will direct development to ensure long term economic, social and environmental objectives are met. It will also ensure that landowners, developers, and statutory undertakers work towards these objectives in a coordinated way.

2.20 **Policy T8: Public Transport Provision** states:

*"[…] routes must be maintained and remain attractive to users, including management of vegetation in order that routes do not become overgrown and a perceived threat to safety. Where routes are not overlooked (which is the case for some short sections), then open views and **lighting** must be provided to reduce the perceived risk to personal safety and encourage use. […]*

2.21 **Policy D3: Strategic Design Code** states:

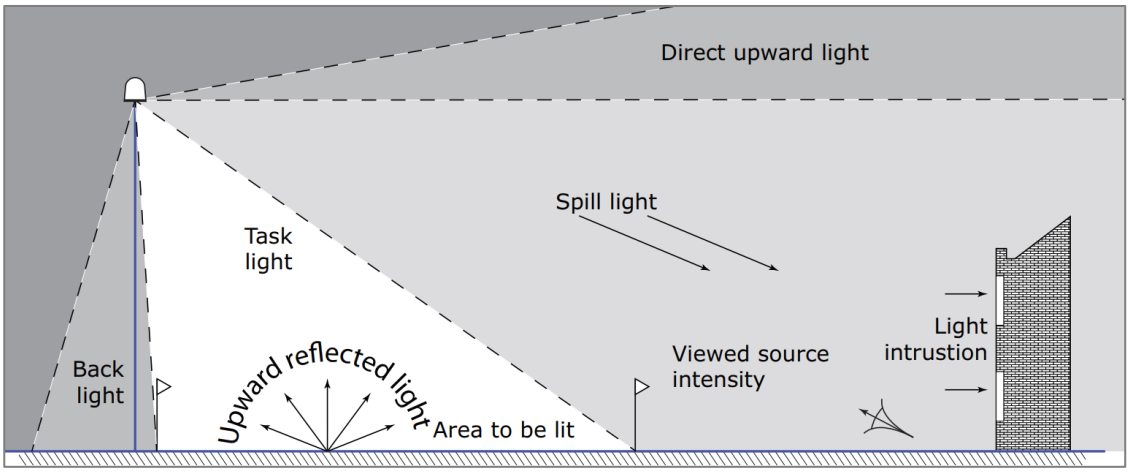
"The Strategic Design Code will include:

[…] Illustrative cross sections/plans to show how landscaping, access, footpaths, boundaries, frontages, seating, lighting, ecological enhancement and drainage will relate to the lake areas […]

3. LIGHT POLLUTION

3.1 Light pollution is a generic term for all the adverse impacts that artificial lighting can have after dark. The main types of light pollution are shown diagrammatically in **Figure 1**.

Figure 1. Types of Light Pollution



Source: ILP GN01/21

3.2 Contributing to these direct effects are three design aspects that should be considered alongside the purpose for a new lighting installation and the type of sensitive receptors found in the local area. These are described later in this report.

Types of Light Pollution

Light Spill (Light intrusion, back light)

3.3 Light spill is 'the spilling of light beyond the boundary of the Site on which a light source is located', such that it causes a noticeably adverse effect. More simply, light spill is often termed as the intrusion of light into homes. It can also have a negative effect on wildlife and ecological systems local to an installation.

3.4 As set out in the ILP Guidance Notes, the limits for light spill vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. Through careful design, it can readily be ensured that this impact is prevented and that the illumination falling within any residential property can be reduced to zero. This is incorporated into the Lighting Strategy contained within this report.

Sky Glow (Direct upward light)

3.5 Sky glow is the 'the brightening of the night sky' above illuminated areas. The brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water

droplets in the atmosphere – rain, fog / mist, and snow, for example, exacerbate the effect.

3.6 Mitigation is achieved by complying with the recommended limits in the ILP Guidance Notes for upward light emission. The limits vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. The Lighting Strategy will ensure that these limits can be met for the Proposed Development.

3.7 To mitigate sky glow as much as possible, lighting must be accurately targeted and kept to a minimum, and this design principle is incorporated into the Lighting Strategy.

3.8 The magnitude of the impact is a matter of judgement, taking into account the existing night-time view. The magnitude is lessened for those views where an observer is subject to direct illumination from, say, a nearby streetlight, or where light spill from a nearby light source illuminates the foreground, because the observer's vision is not fully dark adapted.

Glare (Viewed source intensity)

3.9 Glare occurs when an individual experiences visual discomfort or disability stemming from direct views of lamp sources, or high contrast of a lighting installation against a dark background. The placement of luminaires, their photometric characteristics, and the viewing context contribute to glare, which has been noted to result from uncontrolled private lighting installations, security lighting, street lighting mounted at high level near residences or habitat.

Design Aspects

Building Luminance

3.10 This considers the appropriateness and scale of brightness for the lighting / highlighting of built structures. Design criteria is included within ILP guidance notes as more of a main effect. While this is addressed independently, building luminance can also be considered as an indirect contributor to light spill, sky glow and glare.

Light Levels

3.11 Light levels, both as designed and installed, have the potential to create areas which have a noticeable difference in brightness. A new lighting installation in an area that has not been lit or is significantly brighter than the surrounding area may affect both adjacent receptors in the form of light spill or glare, and those over a larger area by contributing to sky glow through over-lighting.

Light Colour

3.12 Light colour has the potential to alter an individual's perception of their environment with respect to colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths. Various wildlife species may respond differently to spectral composition depending on how reliant they are on darkness;

many nocturnal animals continue their social habits and feeding behaviours with increased activity in the area while others may decrease their activity and possibly desert their habitat. This type of impact could affect pedestrians, vehicle operators and wildlife, and is likely to occur where new lighting is placed.

Example Lux Levels

3.13 To give context to the lux levels mentioned to within this report, **Table 5** provides examples of typical lux levels in various scenarios and applications.

Table 5. Example lux levels

Lighting Condition	Lux level
British summer sunshine	50,000
Overcast sky	5,000
Well-lit office	500
Minimum for easy reading	300
Passageway / outside working area	25
Main road lighting	5-20
Sunset	10
Typical side road lighting	5
Minimum security lighting	2
Twilight	1
Clear full moon	0.25 to <1
Typical moonlight / cloudy sky	0.1
Typical starlight	0.001
Poor starlight	0.0001

Source: IPCCTV specialists use-IP Ltd

4. BASELINE CONDITIONS

Introduction

4.1 The study area includes the Site, the surrounding areas and any sensitive receptors which may have a direct view towards external lighting proposals and / or which may be affected during the construction and operation of the proposed development. Assessment of designation, use, habitat and external lighting condition dictates the classification of Environmental Zone across the proposed Site Location and surrounding areas.

4.2 The following categories have been determined as potential sensitive receptors which could be impacted by any external lighting proposals at the Site:

- Ecology;
- Residential properties;
- Natural – direct sky glow; and
- Transport – highway and railway.

Existing Sources of Artificial Light

M181/A1077(M) – North-south motorway at the existing roundabout and from which vehicular access is proposed into the PA#1 Site to the west.

4.3 The existing roundabout and approaches appear to be provided with street lighting, in accordance with BS 5489-1 and BS EN 12301-2, via assumed 8m column mounted Urbis Ampera type luminaires.

Figure 2.View from A1077(M)/M181 (facing north)

Scotter Road – Running north-south to the east of the LL (North) site, on the edge of Scunthorpe settlement boundary

4.4 Street lighting appears to be provided in accordance with BS 5489-1 and BS EN 12301-2, via assumed 8m column mounted Urbis Ampera type luminaires.

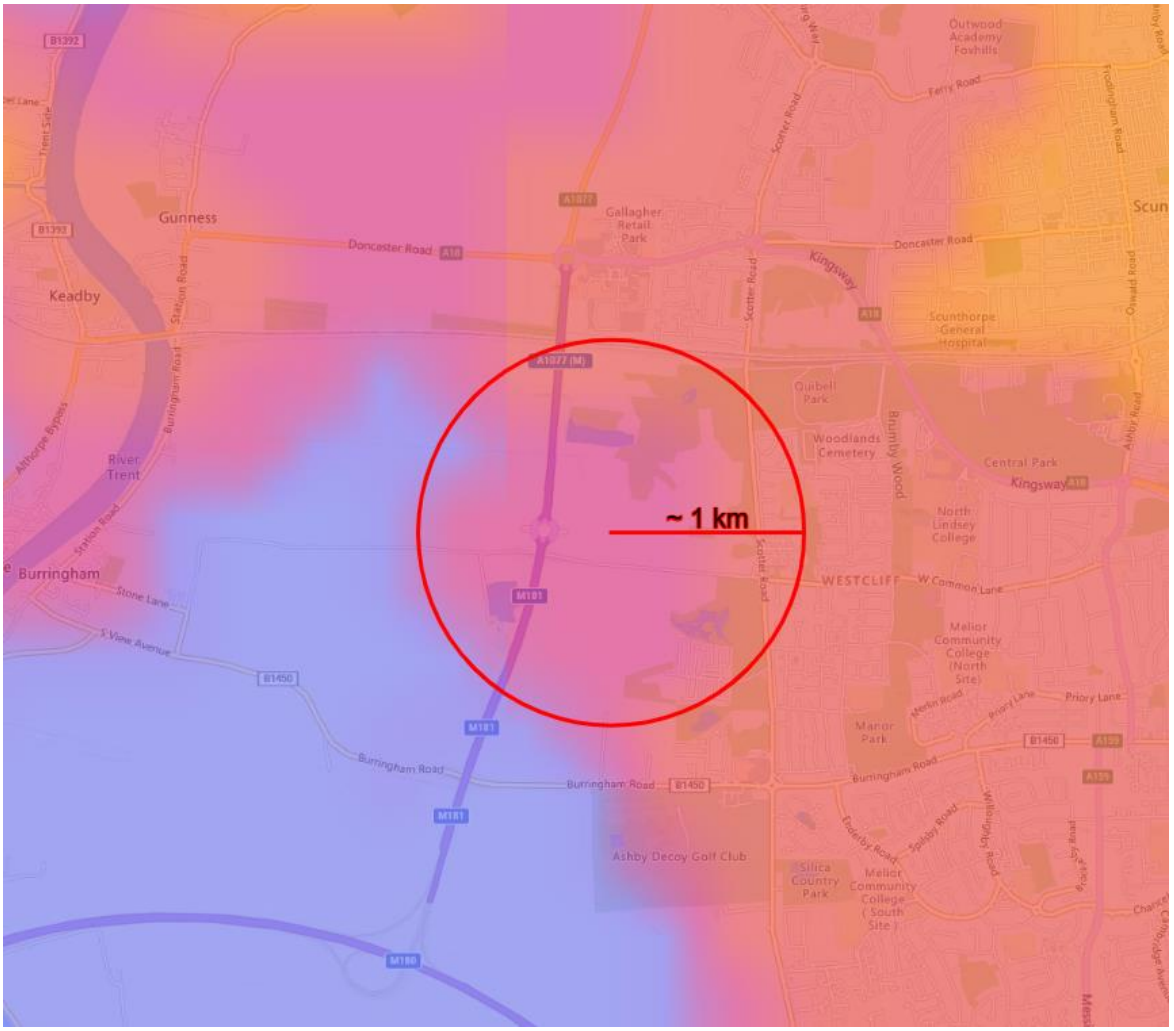
Figure 3. View from Scotter Road (facing north)

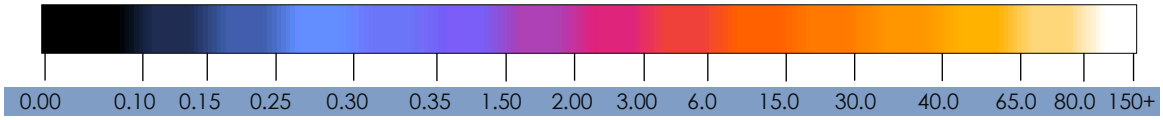
Local Radiance

4.5 The Visible Infrared Imaging Radiometer Suite (VIIRS) is a satellite instrument which orbits earth to collect and record radiance data (light emissions). The latest data was recorded in 2023 and is available in visual format. An extract at the Site location is included in **Figure 4**.

4.6 It is important to state that recognised organisations, such as the ILP or CIE, have not calibrated VIIRS radiance data with the Environmental Zones established in **Table 1**. It is also important to note the data should not accurately be relied upon and should be viewed conservatively. The data should be used as one tool to help understand the context of existing light emissions local to the Site.

Figure 4. Local radiance (nW/cm2/sr)





Mean Radiance, calculated about a 1km radius from the Site	**4.35 nW/cm2/sr**

Ref: Visible Infrared Imaging Radiometer Suite (VIIRS) Imagery (2023)

Environmental Zone

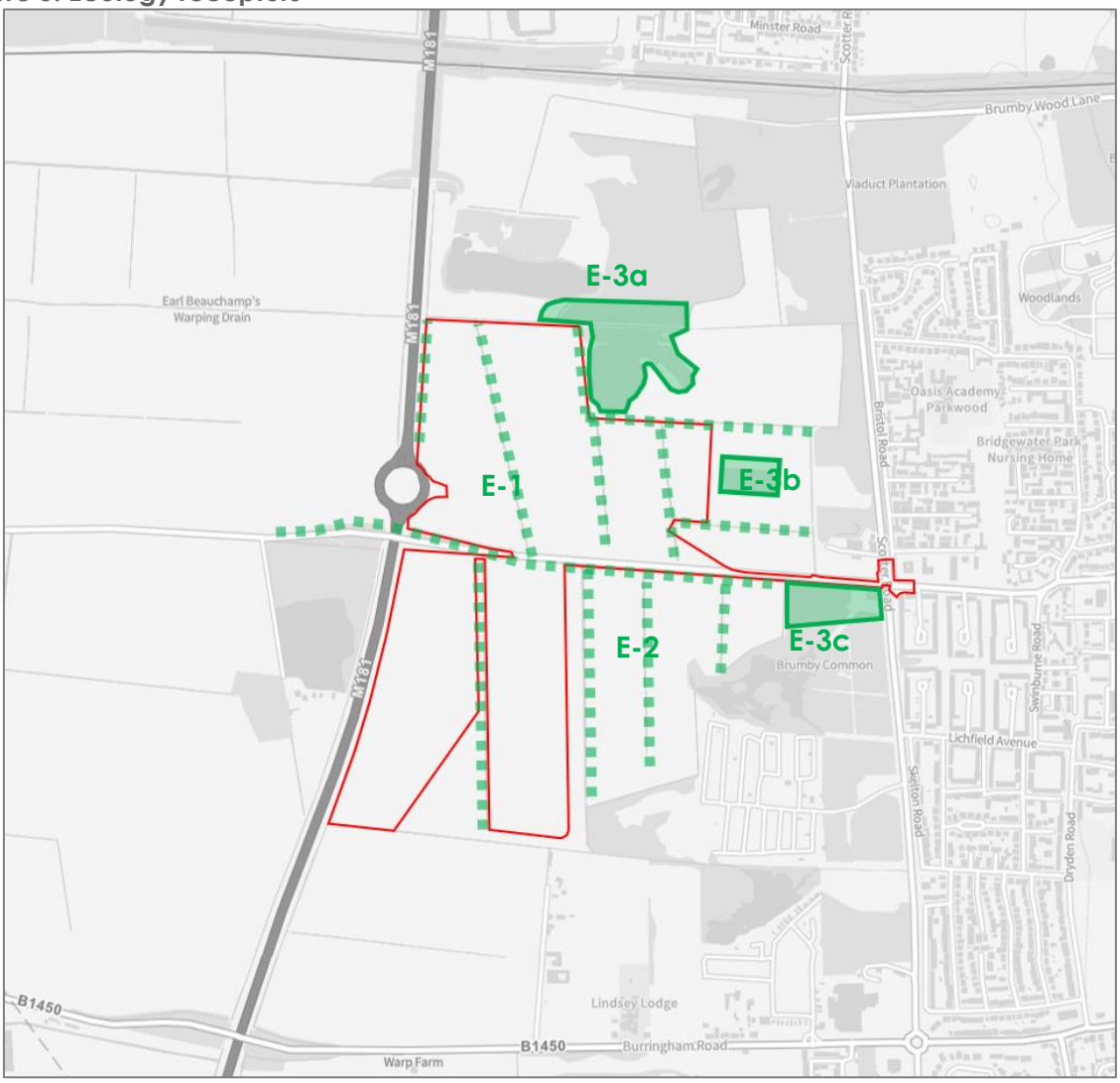
4.7 With reference to **Table 1** and with consideration of the Site context and nature of identified potentially sensitive receptors it is deemed that the Site falls into **Environmental Zone E2**, defined as rural, low district brightness e.g. village or relatively dark outer suburban locations.

Ecology Receptors

4.8 The appointed Ecologist has been consulted as part of the Lighting Strategy in order to establish all potentially light-sensitive ecology receptors in proximity to the Site.

4.9 Potentially sensitive ecology receptors surrounding the Site have been identified as illustrated in **Figure 5**. Mitigation measures are discussed later in the lighting strategy.

Figure 5. Ecology receptors



- **E-1** Existing trees and hedgerows in and adjacent to HA1 HA2 and HA3. Any retained featured are potentially valuable to local ecology and should be maintained as dark as practicable, identified as high sensitivity;
- **E-2** Existing trees and hedgerows in and adjacent to HA6 HA7 and Cycle Link. Any retained featured are potentially valuable to local ecology and should be maintained as dark as practicable, identified as high sensitivity; and
- **E-3(a-c)** Mature woodland and trees classified as medium distinctiveness habitat. Should be maintained as dark as practicable, identified as high sensitivity.

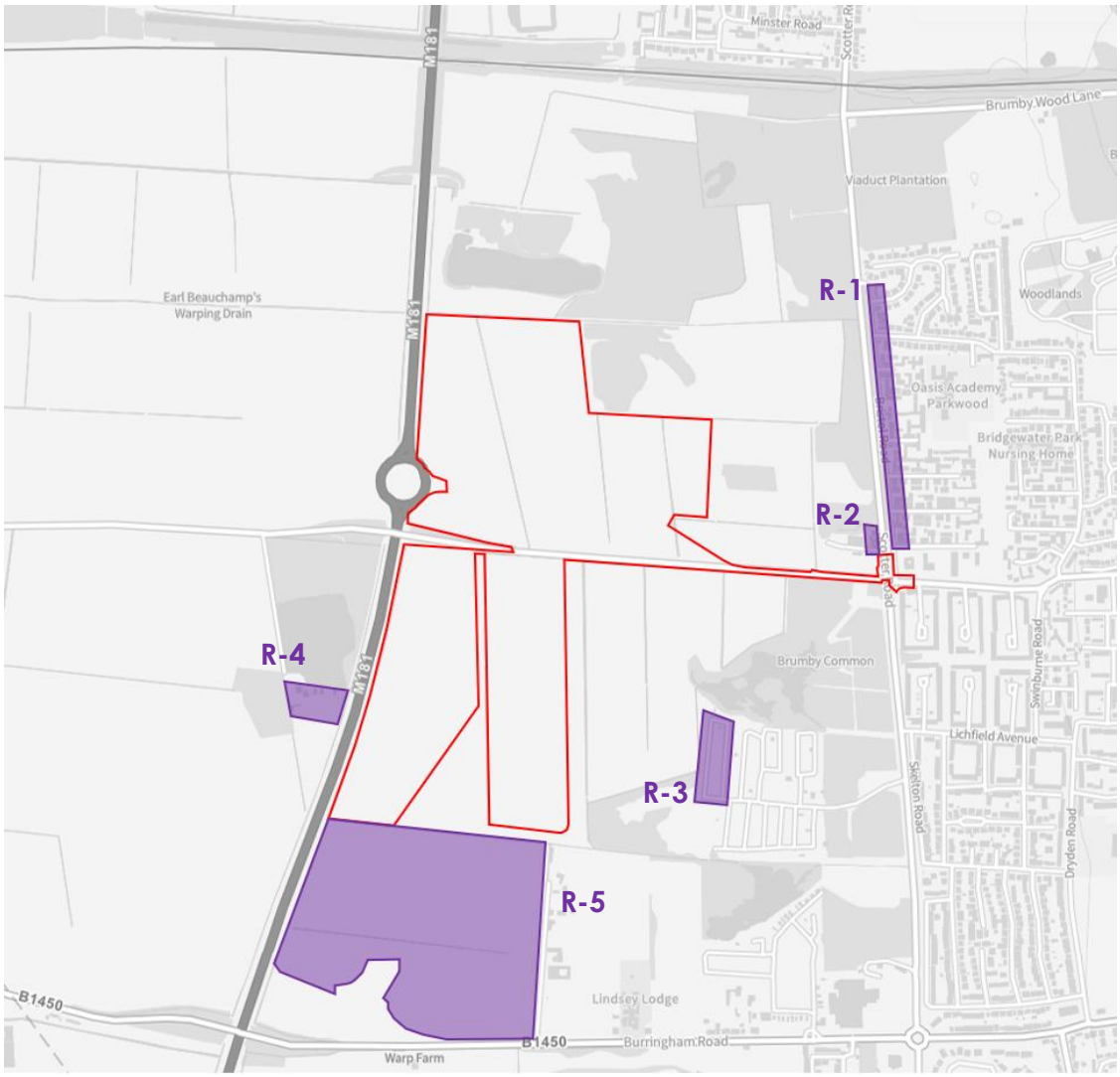
Residential Receptors

4.10 The residential receptors surrounding the Site have been identified based on a desktop study using MAGIC mapping data in conjunction with Google Earth satellite and street view imagery.

4.11 Residential properties within 500m of the Site, with a direct view, are considered potentially sensitive.

4.12 Potentially sensitive residential receptors surrounding the Site have been identified as illustrated in **Figure 6**. Mitigation measures are discussed later in the lighting strategy.

Figure 6. Residential receptors



- **R-1** Dwellings off Bristol Road, situated to the east. These dwellings have largely obstructed views of the Site. Unlikely to be impacted by lighting. High sensitivity;
- **R-2** Dwellings off Scotter Road, situated to the east. These dwellings have largely obstructed views of the Site. Unlikely to be impacted by lighting. High sensitivity;

- **R-3** Parklands Mobile Homes, situated to the southeast. This development has largely obstructed views of the Site. Unlikely to be impacted by lighting. High sensitivity; and
- **R-4** Nuddock Wood Lakes, situated to the west. This development has largely obstructed views of the Site. Unlikely to be impacted by lighting. High sensitivity.
- ***R-5*** *The* Keepmoat Planning Application*, situated to the south.* At the time of writing this note the application was still pending consideration. *High sensitivity*.

4.13 The limits for light intrusion (Illuminance in the vertical plane, in this case intrusion through windows) for Environmental Zone E2 are provided in **Table 6**.

Table 6. Maximum values of vertical illuminance on residential properties

Light Technical Parameter	Application Conditions	Environmental Zones				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx	1 lx	2 lx	5 lx

4.14 The limits for source intensity (as viewed from nearby residential properties) for Environmental Zone E1 are provided in **Table 7**.

Table 7. Glare (source intensity) limits as viewed from residential properties

Light technical parameter	Application conditions	Luminaire group (projected area Ap in m²)					
		0<Ap ≤0.002	0.002<Ap ≤0.01	0.01<Ap ≤0.03	0.03< Ap ≤0.13	0.13<Ap ≤0.50	Ap>0.5
Maximum luminous intensity emitted by luminaire (I in cd)	**E0**						
	Pre-curfew	0	0	0	0	0	0
	Post-curfew	0	0	0	0	0	0
	E1						
	Pre-curfew	0.29 d	0.3 d	1.3 d	2.5 d	5.1 d	2,500
	Post-curfew	0	0	0	0	0	0
	E2						
	Pre-curfew	0.57 d	1.3 d	2.5 d	5.0 d	10 d	7,500
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	500
	E3						
	Pre-curfew	0.86 d	1.9 d	3.8 d	7.5 d	15 d	10,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	1,000
	E4						
	Pre-curfew	1.4 d	3.1 d	6.3 d	13 d	26 d	25,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	2,500

4.15 Curfew is defined as the time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the local authority. Unless otherwise stated this 23:00 – 07:00 is suggested.

Natural – Sky Glow Receptors

4.16 The ILP GN01/21 guidance provides limitations for maximum allowable sky glow percentage for each Environmental Zone as shown in **Table 8**.

4.17 Sky glow is measured as ULR (Upward Light Ratio), the percentage of luminaire flux of a luminaire or a lighting installation that is emitted above the horizontal. Sky glow limitations depend on the Environmental Zone of the lighting installation as set out in the ILP guidance notes. The Environmental Zone categories are previously defined in this report in **Table 1**.

Table 8. Maximum values of upward light ratio (ULR) of luminaires

Light Technical Parameter	Environmental Zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) %	0	0	2.5	5	15

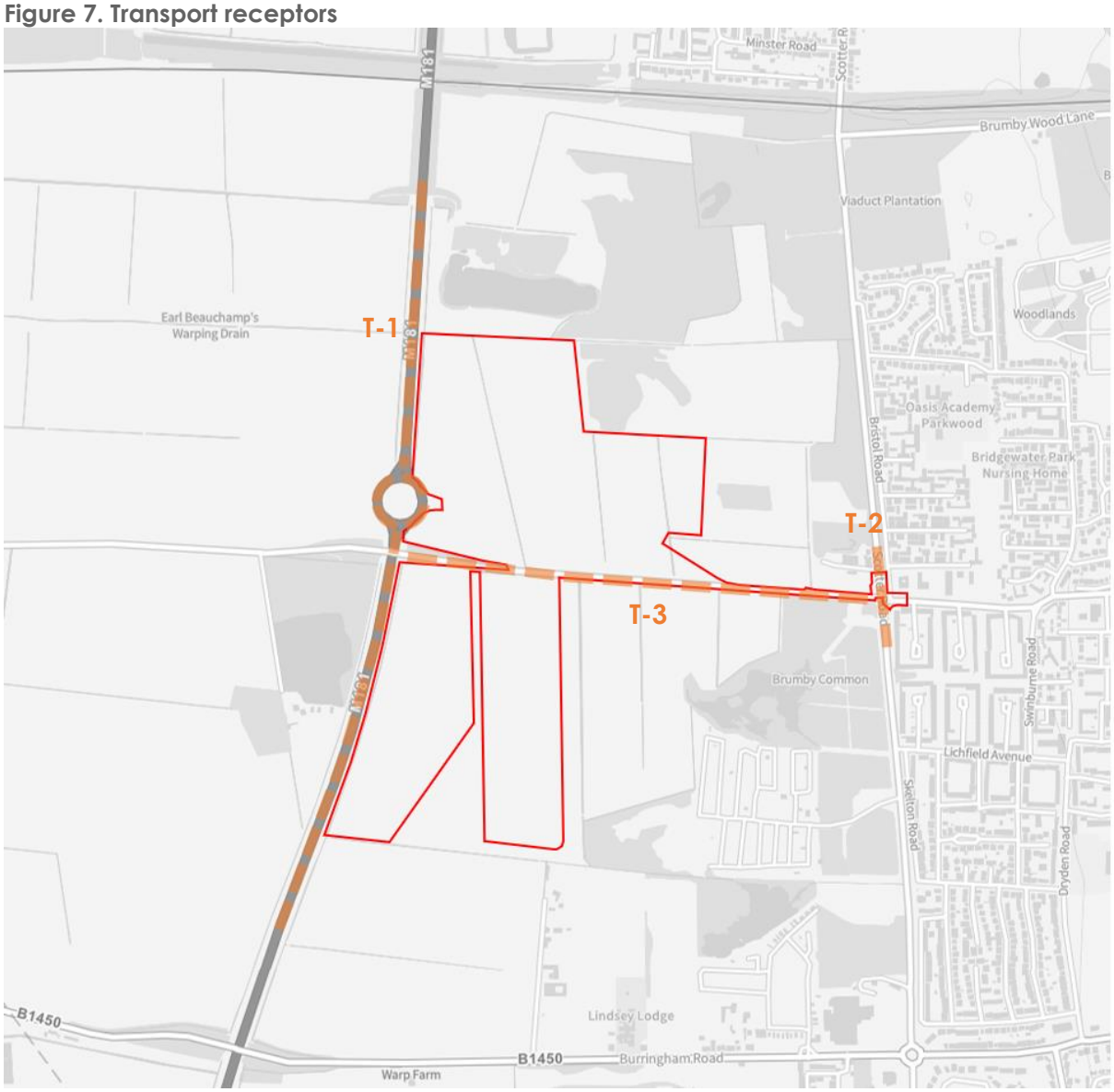
Transport Receptors

4.18 The transport receptors surrounding the Site have been determined based on a desktop study using MAGIC mapping data in conjunction with Google Earth satellite and street view imagery.

4.19 Highways or railway lines within 500m of the Site, with a direct view, are considered potentially sensitive.

4.20 Potentially sensitive transport receptors surrounding the Site have been identified as illustrated in **Figure 7**. Mitigation measures are discussed later in the lighting strategy.

Figure 7. Transport receptors



- **T-1** M181/A1077(M) – North-south motorway at the existing roundabout and from which vehicular access is proposed into the PA#1 site to the west. (NLC are proposing to de-trunk this motorway however timescales are unknown). High sensitivity;
- **T-2** Scotter Road – Running north-south to the east of the LL (North) site, on the edge of Scunthorpe settlement boundary. High sensitivity; and
- **T-3** Brumby Common Lane – Running east-west through the PA#1 site, linking Scotter Road and running over the M181/A1077(M) via a bridge. High sensitivity.

Highway

4.21 The ILP GN01/21 guidance provides limitations for the maximum threshold increment (TI) and veiling luminance (LV) for each road classification type, as shown in **Table 9**.

Table 9. Obtrusive light limitations for exterior lighting installations – road users

Road Classification	Threshold Increment (Ti)	Veiling Luminance (L_v)
No road lighting	15% based on adaptation luminance of 0.1cd/m^2	0.04
ME6 / ME5	15% based on adaptation luminance of 1cd/m^2	0.25
ME4 / ME3	15% based on adaptation luminance of 2cd/m^2	0.40
ME2 / ME1	15% based on adaptation luminance of 5cd/m^2	0.84

Where Threshold Increment (TI) is a measure of the loss of visibility caused by the disability glare from the obtrusive light installation and Veiling Luminance (LV) is a measure of the adaptation luminance caused by the disability glare from the obtrusive light installation.

- Road Classifications – as given in BS EN 13201-2:2015 Road lighting performance requirements. Limits apply where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and for viewing directions in the path of travel.

Railway

4.22 The closest railway line is the South Humberside Main Line, situated approximately 600m north of the Site. This railway line is sufficiently remote from the Site, not considered potentially sensitive to any lighting proposals at the Site.

5. LIGHTING STRATEGY

Introduction

5.1 This section sets out the design principles and overall outline strategy external lighting for the Site. The measures set out must be reflected in the final lighting design which shall be produced at the detailed design stage.

5.2 Lighting elements associated with the full planning application comprise a new vehicular access off the M181/A1077(M) roundabout and a pedestrian and cycle link to Scotter Road.

5.3 Lighting elements associated with the outline planning application comprise residential roads connecting up to 550 residential dwellings (Use Class C3) and a local centre (Use Class E).

5.4 The Lighting Strategy supports relevant policy and guidance.

5.5 A modern external lighting installation is vitally important to the Proposed Development for many reasons including, but not limited to, the following:

- To provide safety for pedestrians and cyclists from moving vehicles;
- To provide ease of wayfinding and navigation for residents, staff, *and* visitors;
- To provide security and deter antisocial behaviour;
- To set the architectural scene and urban landscape;
- To enable sports and other activities to be undertaken safely during hours of darkness;
- To control directional signage and their relationship with other illuminated material;
- To protect installations from accidental or deliberate damage; and
- To allow safe access and maintenance.

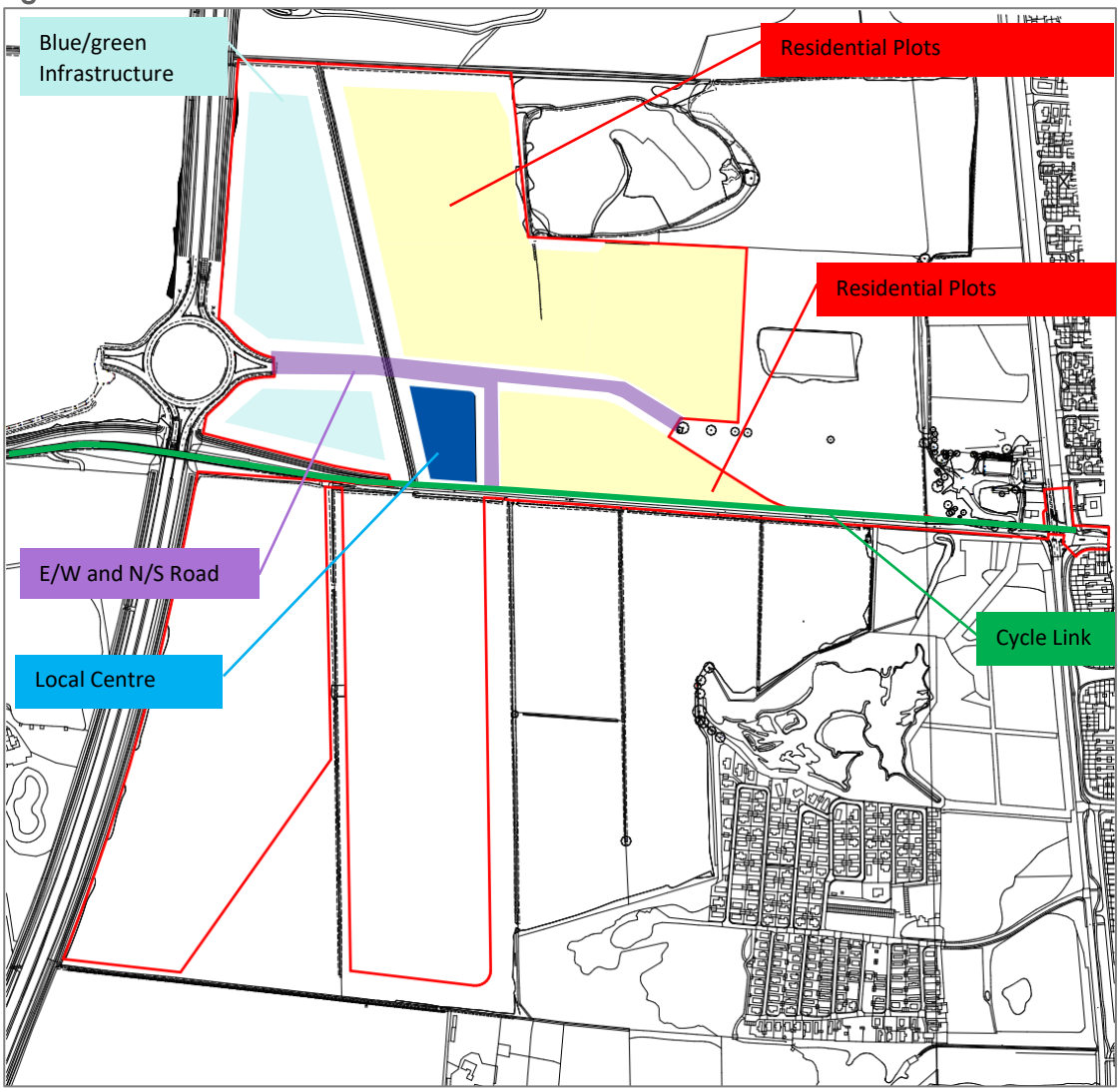
5.6 It is important that the lighting applications provide both an aesthetic quality and also the appropriate levels of illumination required for the space they inhabit.

5.7 This section focuses primarily on the operational phase lighting strategy. A sub-section specific to construction phase lighting strategy is included at the end of this section.

5.8 All external lighting shall be provided in accordance the relevant policies and guidance. It will be designed to minimise obtrusive light and optimise energy use. Lighting will comply with recommendations for Environmental Zone E2 given in the ILP GN01/21 guidance.

5.9 For the reasons set out above it is recommended that an external lighting installation is provided to the areas which have been identified in **Figure 8**.

Figure 8. Extract from Lincolnshire Lakes Parameter Plan – Land Use



Site Access (E/W and S/W Road)

5.10 A modern LED type street lighting installation is required to promote safe navigation and to reduce fear of crime while minimising obtrusive light.

5.11 Extract from 'BS 5489-1:2020 - Design of road lighting - Section 7.5 Lighting Traffic Routes':

"The lighting requirements for traffic routes are strongly dependent on traffic density and mix. Typically for traffic routes, the aim of the lighting scheme is to create a bright background against which an object is seen in silhouette or negative contrast. This works best on relatively straight roads where the motorist's viewing distance is greater than 60 m."

5.12 The Vehicular Access should be provided with lighting in accordance with the requirements of Lighting Traffic Routes.

5.13 **Table 10** is an outline risk assessment, designed to indicate the Lighting Class. **Table 11** confirms the recommended lighting parameters. Note that the final Lighting Class is subject to approval by the Local Authority.

Table 10. Outline risk assessment – Vehicular Access (M Class)

Parameter	Option	Weighting
Design Speed	Moderate	-1
Traffic Volume	Moderate	0
Traffic Composition	Mixed	1
Seperation of Carriageway	No	1
Junction Density	High	1
Parked Vehicles	No	0
Ambient Luminance	Low	-1
Navigational Task	Moderate	1
	Total	**2**
Ref: CEN TR 13201-1	[6 – Total = Lighting Class]	**M4**

Table 11. Recommended lighting parameters for Vehicular Access

Parameter	Luminance of the road surface of the carriageway for the dry road surface condition	
	Minimum maintained Cd/m²	Uo (minimum)
Lighting Class M4	0.75	0.40
Ref: BS EN 12301-2		

5.14 The Vehicular Access Road is anticipated to be adopted by NLC. All street lighting equipment shall be provided by a manufacturer and product which is approved by NLC for adoption. An example product is the Urbis Axia.

Table 12. Example luminaire for Vehicular Access

Specification	Description
Mounting Height	6m – 8m
Light source	LED
Example Luminaire	Urbis Ampera
Notes	Internal spill shield should be installed on luminaires adjacent the Site boundary or ecology features
Example Luminaire Image	

Residential Plots (Internal Access Roads)

5.15 A modern LED type street lighting installation is required to promote safe navigation and to reduce fear of crime while minimising obtrusive light.

5.16 Extract from 'BS 5489-1:2020 - Design of road lighting - Section 7.2 Lighting Residential and Minor Roads':

The main purpose of lighting for subsidiary roads and areas associated with those roads is to enable pedestrians and cyclists to orientate themselves and detect vehicular and other hazards. It can allow pedestrians to recognize other pedestrians and feel more secure. It also has a wider social role, with the potential of helping to reduce fear of crime and to discourage crime against people and property.

5.17 Whilst the residential plots are yet to be designed, they are currently anticipated to include roads consistent with Residential and Minor Roads.

5.18 **Table 13** is an outline risk assessment, designed to indicate the Lighting Class. **Table 14** confirms the recommended lighting parameters. Note that the final Lighting Class is subject to approval by the Local Authority.

Table 13. Outline risk assessment - Internal Access Roads (P Class)

Parameter	Option	Weighting
Speed	Low	1
Use Intensity	Quiet	-1
Traffic Composition	Mixed	2
Parked Vehicles	Yes	1
Ambient Luminance	Low	-1
	Total	**2**
Ref: CEN TR 13201-1	[6 – Total = Lighting Class]	**P4**

Table 14. Recommended lighting parameters for internal access roads

Parameter	Lux average	Minimum
Lighting Class P4	5.0	1.0
Ref: BS EN 12301-2		

5.19 While the extent of proposed adoptable infrastructure has not yet been established, it is recommended that street lighting equipment is provided by a manufacturer and product which is approved by NLC for adoption. An example product is the Urbis Axia.

Table 15. Example luminaire for Internal Access Roads

Specification	Description
Mounting Height	5m - 6m
Light source	LED
Example Luminaire	Urbis Axia
Notes	Internal spill shield should be installed on luminaires adjacent the Site boundary or ecology features
Example Luminaire Image	

Dwelling Lighting

5.20 Dwelling lighting is recommended adjacent front and rear doors promote safe navigation and to reduce fear of crime while minimising obtrusive light. Dwelling lighting should be narrow beam, designed to light the immediate vicinity without unnecessary light spill.

Table 16. Example luminaire for Dwelling Lighting

Specification	Description
Mounting Height	2m - 3m
Light source	LED
Example Luminaire	Litecraft Fibo Wall Light
Notes	
Example Luminaire Image	

Brumby Common Lane Pedestrian and Cycle Link

5.21 A modern LED type street lighting installation is required to promote safe navigation and to reduce fear of crime while minimising obtrusive light.

5.22 The pedestrian and cycle link is anticipated to be classified as a P Class route.

5.23 **Table 17** is an outline risk assessment, designed to indicate the Lighting Class. **Table 18** confirms the recommended lighting parameters. Note that the final Lighting Class is subject to approval by the Local Authority.

Table 17. Outline risk assessment - Cycle Link (P Class)

Parameter	Option	Weighting
Speed	Low	1
Use Intensity	Quiet	-1
Traffic Composition	Pedestrians, cyclists and motorised traffic	2
Parked Vehicles	No	0
Ambient Luminance	Low	-1
	Total	**1**
Ref: CEN TR 13201-1	[6 – Total = Lighting Class]	**P5**

Table 18. Recommended lighting parameters for the Cycle Link

Parameter	Lux average	Minimum
Lighting Class P5	3.0	0.60
Ref: BS EN 12301-2		

5.24 Whilst the Cycle Link not currently anticipated to be adopted by NLC, it is recommended that all lighting equipment is be provided by a manufacturer and product which is approved by NLC. An example product is the Urbis Axia.

Table 19. Example luminaire for the Cycle Link

Specification	Description
Mounting Height	3m - 5m
Light source	LED
Example Luminaire	Urbis Axia

Specification	Description
Notes	Internal spill shield should be installed on luminaires adjacent the Site boundary or ecology features
Example Luminaire Image	

Local Centre

5.25 It is recommended that the Local Centre is provided with a modern LED type lighting installation to promote safe navigation and to reduce fear of crime while minimising obtrusive light.

5.26 In accordance with the recommendations of the Pre-Application Response received from the NLC Environmental Protection Department, prior to any installation of the Local Centre a light impact assessment shall be undertaken in accordance with the following:

- Identification of sensitive receptors likely to be impacted upon by light nuisance, with a determination of the proposed scheme's compliance with the design guidance in the Institution of Lighting Professionals Document: Guidance Notes for the Reduction of Obtrusive Light. https://www.theilp.org.uk/documents/obtrusive-light/
- A lighting scheme which proposes methods of mitigation against potential light nuisance, including potential glare and light spill, on sensitive receptors.

5.27 Lighting shall be provided in accordance with BS EN 12464-2 designed to achieve the performance requirements set out below.

Pedestrian walkways Table 5.1.1: 5 lux average and 0.25 uniformity

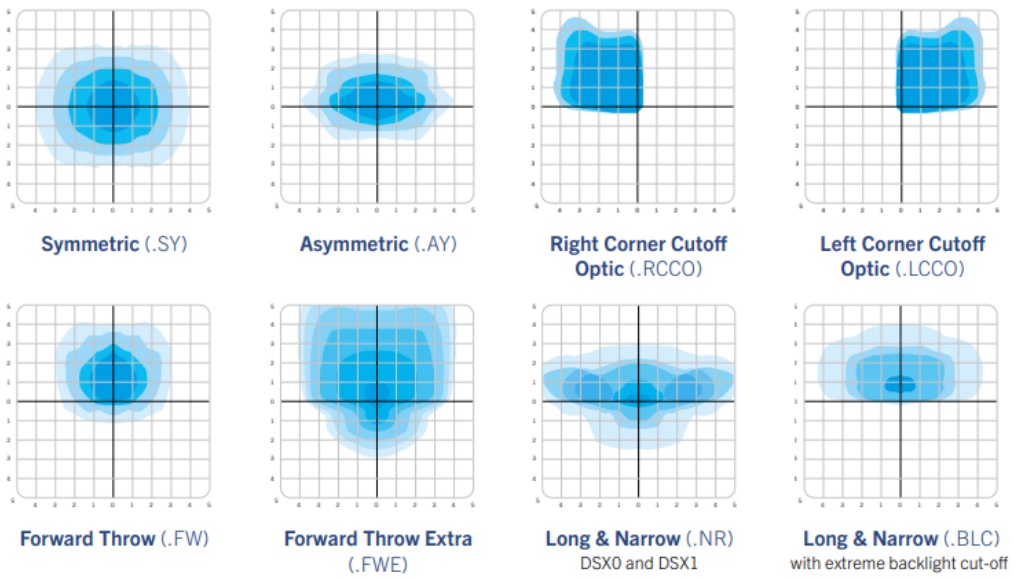
Traffic areas (max. 10km/h) Table 5.1.2: 10 lux average and 0.40 uniformity

Traffic areas (max. 40km/h) Table 5.1.3: 20 lux average and 0.40 uniformity

Vehicle turning, loading and unloading Table 5.1.4: 50 lux average and 0.40 uniformity

Car parks (medium traffic) Table 5.9.2: 10 lux average and 0.25 uniformity

5.28 Lighting shall be provided from a high-quality manufacturer which offers a wide range of optics to provide light where needed while minimising off Site light spill.



Example luminaire optics (Holophane D-Series)

5.29 Area lighting shall be provided to areas such as car parks via column mounted installations with mounting heights anticipated to range 5m – 8m depending on area size. The minimum practicable column height shall be selected at maximum spacing, ensuring all luminaires are installed with zero tilt angle applied.

5.30 Shielding shall be introduced to any luminaires proposed adjacent a Site boundary or any areas identified by the Ecologist as sensitive.

Luminaires without back shield

Luminaires with internal back shield

5.31 Building perimeters shall be illuminated via low glare directional wall lighting mounted at circa 2m – 4m to suit the architecture of the building.

Poor high glare wall light

Well-designed directional wall light

Table 20. Example luminaire for the Local Centre (column mounted)

Specification	Description
Mounting Height	5m – 8m
Light source	LED
Example Luminaire	Holophane D-Series
Notes	Internal spill shield should be installed on luminaires adjacent the Site boundary or ecology features
Example Luminaire Image	

Table 21. Example luminaire for the Local Centre (wall mounted)

Specification	Description
Mounting Height	3m – 4m
Light source	LED
Example Luminaire	Holophane Denver iD

Specification	Description
Notes	
Example Luminaire Image	

Blue / Green Infrastructure

5.32 These areas are anticipated to remain generally dark.

5.33 Consideration should be given to illuminating internal access routes for safety and security. Lighting should be restricted to high quality, low level, low intensity, bollard type lighting.

5.34 In keeping with the type of area the lowest practicable design levels should be implemented. Currently recommended as 0.4 lux minimum and 2.0 lux average.

Table 22. Example luminaire for Blue / Green Infrastructure internal access routes

Specification	Description
Mounting Height	Up to 1.1m
Light source	LED
Example Luminaire	TRT Via Bollard
Notes	Bollards be downward directional i.e. <5% upward light
Example Luminaire Image	

Lighting Controls

5.36 Lighting controls systems help to reduce energy consumption and ensure efficient operation of the lighting installation.

Astronomical Timeclock

5.37 The astronomical timeclock is an automatic time-switch control that controls lighting based on the time of day and astronomical events such as sunset and sunrise, accounting for geographic location and calendar date.

5.38 Timers with both astronomic and Daylight-Saving Time (DST) functionality automatically adjust to the seasonal day-to-night-time changes throughout the year. An electronic timer with astronomic functionality determines each day's sunrise and sunset times based on geographic location, while the automatic DST functionality resets the clock by one hour in the spring and fall.

5.39 It is recommended that all external lighting at the Site is controlled via an astronomical time clock as a minimum standard.

Central Management System (CMS)

5.40 Subject to consultation with NLC, it may be preferable to manage and control adoptable street and cycle link lighting via a Central Management System (CMS). This would enable monitoring of faults and energy consumption, adjust light levels and collect data.

Dimming

5.41 Subject to a risk assessment and consultation between all relevant stakeholders, dimming should be considered as a means to reduce energy consumption and overall lighting impact.

Part night dimming

In some areas on the Site, it may be appropriate to apply a part-night dimming profile. This would involve reducing the luminaire output at set times to achieve reduced average illuminance across the intended area. For example, a road may see less traffic during post-curfew hours and according to BS EN 13201.

Dynamic dimming

5.42 In some areas on the Site, it may be appropriate to apply dynamic dimming during post-curfew hours. This would involve reduced (or no) illuminance at an area of the Site, until motion is detected, at which point illuminance rises to the design levels for a set duration before returning to its dormant state.

Proposed Mitigation

5.43 **Optimising column heights:** Column heights shall be carefully considered at the time of design. The minimum practicable column height shall be selected at maximum spacing, ensuring all luminaires are installed with zero tilt angle applied. Lower column heights shall be used where practicable. High mast lighting shall be avoided.

5.44 **Avoiding over lighting:** All illumination levels will be set as low as practicable while complying with safety and security recommendations. Lighting designs shall be produced to a tight tolerance of the minimum requirements as set out above for each particular task or area.

5.45 **Spill control:** At the outer edges of the Site luminaires shall, as far as practicable, be positioned so that they are out of view of sensitive receptors. Luminaires at the outer edges of the Site shall be complete with back light shields, internal shields or optics with sharp cut-off to minimise impact on sensitive receptors.

5.46 **Latest generation optics:** Luminaires must utilise optimum optical distribution to direct exactly where needed while allowing maximum spacing between luminaries and minimise the required number of columns.

5.47 **No direct upward light:** Luminaires shall be of the directional type that emit all their light below the horizontal plane. Direct upward light shall be removed by ensure all luminaires are installed at zero tilt.

5.48 **Lighting controls:** A lighting controls strategy shall be implemented to ensure light is only provided when required.

5.49 **Colour temperature:** Colour temperature shall be considered in collaboration with a qualified Ecologist especially in areas close to biodiversity sensitive areas.

Climate Change

5.50 The external lighting installation must incorporate highly efficient LED light sources to minimise the required energy while providing the required lighting levels. Typically LED light sources use between 25%-80% less energy than traditional incandescent light sources, reducing the cumulative kilowatt-hours and carbon footprint of the installation. LED technology can last between 3-15 times longer than traditional light sources which also reduces the required manufacture, distribution and installation works needed to routinely replace and dispose of failed luminaires.

5.51 The external lighting installation must utilise luminaires with flat glass components, emitting directional light in order to minimise light pollution and therefore minimise energy lost due to “waste” light.

5.52 A lighting controls strategy shall be implemented to ensure light is only provided when required.

Construction Phase Lighting

5.53 While construction phase lighting is expected to be short term and reversible it is important to define the parameters to minimise light pollution.

5.54 To reduce the effects of lighting during the construction phase on sensitive receptors, a Construction Environmental Management Plan (CEMP) shall be produced which will contain best practice recommendations given by CIE, ILP, CIRIA, Health and Safety Executive (HSE) and the NLC Environmental Protection Team:

No stage of the development hereby permitted shall commence until a Construction Environmental Management Plan (CEMP) has been submitted to and approved in writing by the Local Planning Authority. The CEMP shall include the following:-

a) Specified locations for contractors' compounds and materials storage areas,

b) Areas where lighting will be required for health and safety purposes,

c) Location of potential temporary floodlights,

d) Identification of sensitive receptors likely to be impacted upon by light nuisance,

e) Proposed methods of mitigation against potential light nuisance, including potential glare and light spill, on sensitive receptors.

6. CONCLUSION

6.1 A modern external lighting installation is vitally important to the Proposed Development for many reasons including, but not limited to, the following:

- To provide safety for pedestrians from moving vehicles;
- To provide ease of wayfinding and navigation for staff and visitors;
- To provide security and deter antisocial behaviour;
- To set the architectural scene and urban landscape;
- To enable sports and other activities to be undertaken safely during hours of darkness;
- To control directional signage and their relationship with other illuminated material;
- To protect installations from accidental or deliberate damage; and
- To allow safe access and maintenance.

6.2 The Lighting Strategy supports relevant policy and guidance including from the North Lincolnshire Core Strategy (Adopted June 2011), specifically:

- Spatial Objective 7: Efficient Use and Management of Resources
- Spatial Objective 10: Creating A Quality Environment

6.3 Through careful practise detailed lighting designs could be produced that minimises light pollution and complies all relevant policy and guidance as identified in this report while meeting the defined performance requirements.

6.4 Prior to commencement of construction of non-residential elements of the proposed development, a light impact assessment shall be undertaken in accordance with the following:

- Identification of sensitive receptors likely to be impacted upon by light nuisance, with a determination of the proposed scheme's compliance with the design guidance in the Institution of Lighting Professionals Document: Guidance Notes for the Reduction of Obtrusive Light. https://www.theilp.org.uk/documents/obtrusive-light/
- A lighting scheme which proposes methods of mitigation against potential light nuisance, including potential glare and light spill, on sensitive receptors.

6.5 The following key principles shall be carried forward into the next design stages:

- Ensuring that all areas within the development are lit adequately to the relevant policy and guidance, depending on the purpose, intended usage and to ensure safety;
- Aspire to meet relevant standards and local authority requirements, and where possible to emphasise the developments key spaces and views;
- Minimise crime and promote safety throughout the development;
- Minimise adverse lighting impact on local ecology, residents, transport systems, and the nighttime sky;

- Consideration of lighting controls to further reduce energy consumption and overall lighting impact; and
- Consider views from the surrounding countryside and avoid a line of lights, defining the edge of the settlement.

6.6 This report should be reviewed by all relevant parties prior to the production of a detailed lighting design. The designer should use this report to form the basis of their lighting design.

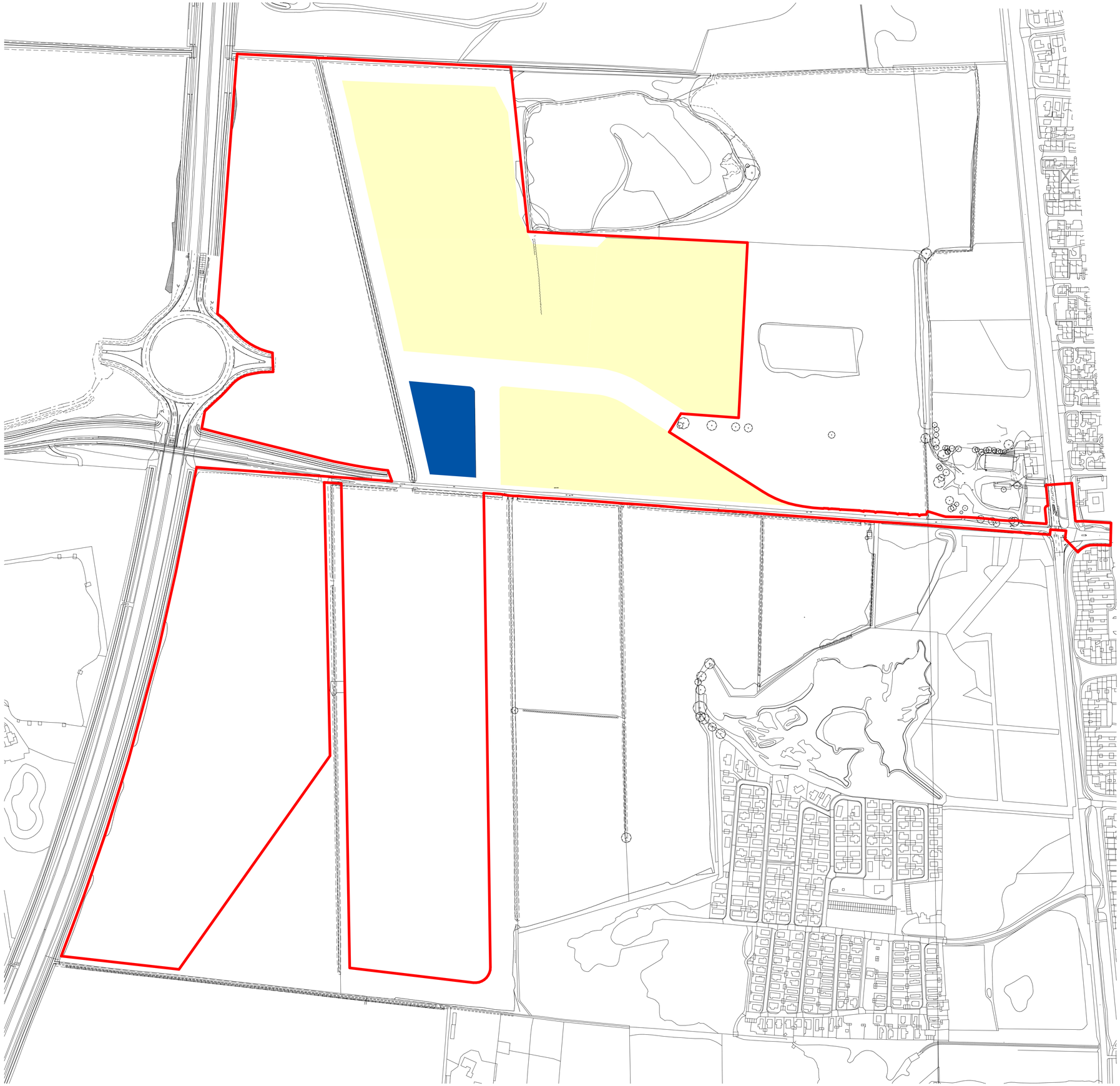
6.7 The lighting designer should work in collaboration with all relevant parties, including the local authority and a qualified Ecologist, to produce a lighting design that satisfies all requirements.

6.8 The detailed lighting design shall be produced using industry standard lighting calculation software. The design shall include:

- A lux plot that indicates light spill outside of the Site boundary;
- Calculations to demonstrate compliance with Environmental Zone E2;
- Horizontal and vertical calculations at local ecology receptors;
- A calculation of average maintained illuminance and illuminance uniformity at each type of area, task or activity across the Site;
- Specific details of the position and type of lighting units including tilt angle, if any; and
- A lighting control strategy.

APPENDICES

APPENDIX 1: Site Location Plan



KEY

- PA#1 RED LINE BOUNDARY
- RESIDENTIAL
- LOCAL CENTRE

N

20 0 20 40 60 80 100

SCALE 1:2500 m

Rev	Description	Date	Drn	Ckd
P1	FIRST ISSUE	15.01.24	TD	CG

Status

SKETCH - NOT FOR CONSTRUCTION

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Project

LINCOLNSHIRE LAKES

Client

Hargreaves Land

Drawing Title

LINCOLNSHIRE LAKES PARAMETER PLANS - LAND USE

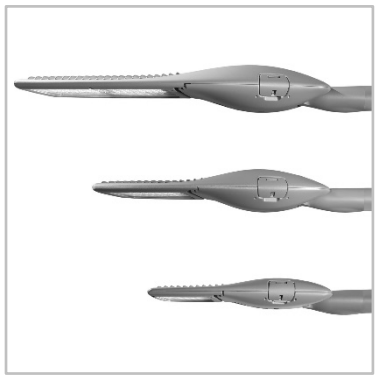
Proj Ref	Origin	Zone	Level	Type	Role	Num	Status	Rev
7730	SMR	00	ZZ	DR	A	2021	S3	P1

SMR Job Ref	Sheet	Scale	Drawn
7730-00-2021	A1	NOTED	HE

APPENDIX 2: Manufacturer's Literature

Ampera

Designer : Thomas Coulbeaut



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LENSO FLEX™ 2

LED solution for an optimised return on investment

Designing the most efficient and cost-effective LED range was the driving force behind the development of the Ampera family.

The Ampera range sets a new benchmark in LED lighting with performing and flexible solutions that lead to the shortest payback time. With its long lifespan and limited maintenance requirements, the Ampera range enables you to maximise your return on investment.

Available in 3 sizes - with a lumen package scalable up to over 35,000lm - and with numerous lighting distributions, the Ampera range can meet all your road and urban lighting needs.

This range is the perfect solution for replacing luminaires fitted with mercury vapour, high-pressure sodium, metal halide and other HID lamps.

The Ampera Mini is a strategic alternative to fittings with 70W traditional light sources while the Ampera Midi and the Ampera Maxi provide significant energy savings for replacing luminaires with 150W and 250W lamps.

IP 66

IK 09

RoHS

CE

005 certification

PLUS 02

URBAN & RESIDENTIAL STREETS

BRIDGES

BIKE & PEDESTRIAN PATHS

RAILWAY STATIONS & METROS

CAR PARKS

LARGE AREAS

SQUARES & PEDESTRIAN AREAS

ROADS & MOTORWAYS

Concept

The Ampera luminaire comes in two separate high-pressure die cast aluminium parts for an easy installation. Fixed on a pole with an universal mounting piece, the inclination angle - in the lower part - can be adjusted before installing the upper part which incorporates the gear and optical unit.

Both parts are connected by two tool free side latches. The electrical connection is automatically triggered on closing by a knife-type connector.

The Ampera range is available in 3 different sizes to offer maximum flexibility and aesthetic coherence for town and city centres. They incorporate LensoFlex®2 photometric engines protected by a tempered glass.

The complete range is available with three different universal fixation parts adapted for post-top and side-entry mountings on various spigot diameters (Ø32mm with adapter, Ø42-48mm, Ø60mm and Ø76mm). The inclination angle can be adjusted on-site by 15° for both post-top and side-entry configurations.

The Ampera is FutureProof. Both the LED engine and the electronic assembly can be replaced, without any tools, to take advantage of future technological developments.

ThermiX®: withstands high temperatures.

Mounting with two separated parts for easy installation.

TYPES OF APPLICATION

- URBAN & RESIDENTIAL STREETS
- BRIDGES
- BIKE & PEDESTRIAN PATHS
- RAILWAY STATIONS & METROS
- CAR PARKS
- LARGE AREAS
- SQUARES & PEDESTRIAN AREAS
- ROADS & MOTORWAYS

KEY ADVANTAGES

- Cost-effective and efficient lighting solution for a fast return on investment
- 3 sizes for flexibility
- IP 66 tightness level
- ThermiX®: withstands high temperatures (Ta 50°C)
- Mounting with two separated parts for easy installation and set-up (inclination angle)
- FutureProof: easy replacement of photometric engine and power supply on-site
- IoT ready: optional 7-pin NEMA socket

On-site adjustable tilting angle for an optimised result.

Easy access to internal components (tool free opening).

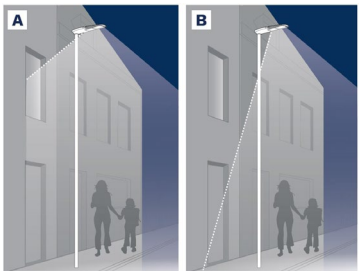
LensoFlex®2

LensoFlex®2 is based upon the addition principle of photometric distribution. Each LED is associated with a specific PMMA lens that generates the complete photometric distribution of the luminaire. The number of LEDs in combination with the driving current determines the intensity level of the light distribution.

Back Light control

As an option, the LensoFlex®2 and LensoFlex®4 modules can be equipped with a Back Light control system.

This additional feature minimises light spill from the back of the luminaire to avoid intrusive light towards buildings.

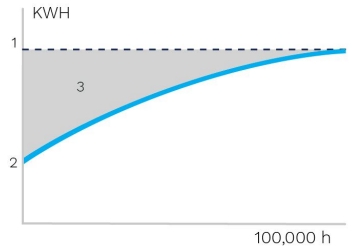


A. Without Back Light control | B. With Back Light control

Constant Light Output (CLO)

This system compensates for the depreciation of luminous flux to avoid excess lighting at the beginning of the installation's service life. Luminous depreciation over time must be taken into account to ensure a predefined lighting level during the luminaire's useful life.

Without a CLO feature, this simply means increasing the initial power upon installation in order to make up for luminous depreciation. By precisely controlling the luminous flux, the energy needed to reach the required level can be maintained throughout the luminaire's life.

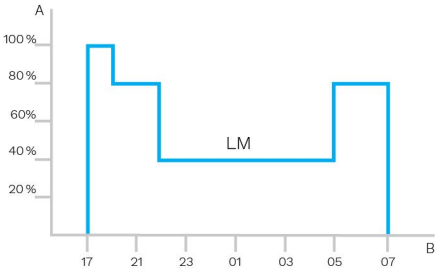


1. Standard lighting level | 2. LED lighting consumption with CLO | 3. Energy savings

Custom dimming profile

Intelligent luminaire drivers can be programmed with complex dimming profiles. Up to five combinations of time intervals and light levels are possible. This feature does not require any extra wiring.

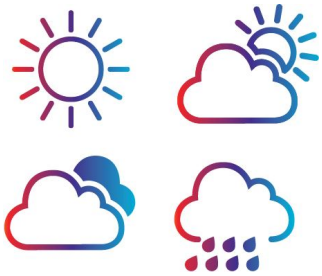
The period between switching on and switching off is used to activate the preset dimming profile. The customised dimming system generates maximum energy savings while respecting the required lighting levels and uniformity throughout the night.



A. Dimming level | B. Time

Daylight sensor / photocell

Photocell or daylight sensors switch the luminaire on as soon natural light falls to a certain level. It can be programmed to switch on during a storm, on a cloudy day (in critical areas) or only at nightfall so as to provide safety and comfort in public spaces.



PIR sensor: motion detection

In places with little nocturnal activity, lighting can be dimmed to a minimum most of the time. By using passive infrared (PIR) sensors, the level of light can be raised as soon as a pedestrian or a slow vehicle is detected in the area.

Each luminaire level can be configured individually with several parametres such as minimum and maximum light output, delay period and ON/OFF duration time. PIR sensors can be used in an autonomous or interoperable network.

Owlet IoT

Owlet IoT remotely controls luminaires in a lighting network, creating opportunities for improved efficiency, accurate real-time data and energy savings of up to 85%.

ALL-IN-ONE

The LUCO P7 CM controller includes the most advanced features for optimised asset management. It also provides an integrated photocell and operates with an astronomical clock for seasonal dimming profile adaptations.

EASY TO DEPLOY

Thanks to wireless communication, no cabling is needed. The network is not subject to physical constraints or limitations.

From a single control unit to an unlimited network, you can expand your lighting scheme at any time.

With real-time geolocation and automatic detection of luminaire features, commissioning is quick and easy.

USER-FRIENDLY

Once a controller is installed on a luminaire, the luminaire automatically appears with its GPS coordinates on a web-based map.

An easy-to-use dashboard enables each user to organise and customise screens, statistics and reports. Users can gain relevant, real-time insights.

The Owlet IoT web application can be accessed at all times from anywhere in the world with a device connected to the Internet. The application adapts to the device to offer an intuitive and user-friendly experience.

Real-time notifications can be pre-programmed to monitor the most important elements of the lighting scheme.

SECURE

The Owlet IoT system uses a local wireless mesh communication networks to control the on-site luminaires combined with a remote control system utilising the cloud to ensure smooth data transfers to and from the central management system.

The system uses encrypted IP V6 communication to protect data transmission in both directions. Using a secure APN, Owlet IoT ensures a high level of protection.

In the exceptional case of a communication failure, the built-in astronomical clock and photocell will take over to switch the luminaires on and off, thus avoiding a complete blackout at night.

EFFICIENT

Thanks to sensors and/or pre-programmed settings, lighting scenarios can be easily adapted to cope with live events, providing the right lighting levels at the right time and in the right place.

The integrated utility grade meter offers the highest accuracy available on the market today, enabling decisions based on real figures.

Accurate real-time feedback and clear reporting ensures that the network operates efficiently and maintenance is optimised.

When LED luminaires are switched on, the inrush current can create problems for the electricity grid. Owlet IoT incorporates an algorithm to preserve the grid at all times.

OPEN

The LUCO P7 CM controller can be plugged onto the standard 7 pin NEMA socket and operates through either a DALI or 1-10V interface to control the luminaire.

Owlet IoT is based on the IPv6 protocol. This method for addressing devices can generate an almost unlimited number of unique combinations to connect non-traditional components to the Internet or computer network.

Through open APIs, Owlet IoT can be integrated into existing or future global management systems.

GENERAL INFORMATION

Recommended installation height	4m to 12m | 13' to 39'
FutureProof	Easy replacement of the photometric engine and electronic assembly on-site
Driver included	Yes
CE Mark	Yes
ENEC+ certified	Yes
ROHS compliant	Yes
French law of December 27th 2018 - Compliant with application type(s)	a, b, c, d, e, f, g
BE 005 certified	Yes
Testing standard	LM 79-08 (all measurements in ISO17025 accredited laboratory)

HOUSING AND FINISH

Housing	Aluminium
Optic	PMMA Silicon
Protector	Tempered glass
Housing finish	Polyester powder coating
Standard colour(s)	AKZO grey 900 sanded
Tightness level	IP 66
Impact resistance	IK 09
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)
Access for maintenance	Tool-less access to gear compartment

· Any other RAL or AKZO colour upon request

OPERATING CONDITIONS

Operating temperature range (Ta)	-40 °C to +55 °C / -40 ° F to 131 °F

· Depending on the luminaire configuration. For more details, please contact us.

ELECTRICAL INFORMATION

Electrical class	Class I EU, Class II EU
Nominal voltage	220-240V – 50-60Hz
Power factor (at full load)	0.9
Surge protection options (kV)	10
Electromagnetic compatibility (EMC)	EN 55015 / EN 61000-3-2 / EN 61000-3-3 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 61000-4-6 / EN 61000-4-11 / EN 61547
Control protocol(s)	1-10V, DALI
Control options	AmpDim, Bi-power, Custom dimming profile, Photocell, Remote management
Socket	NEMA 7-pin (optional)
Associated control system(s)	Owlet Nightshift Owlet IoT
Sensor	PIR (optional)

OPTICAL INFORMATION

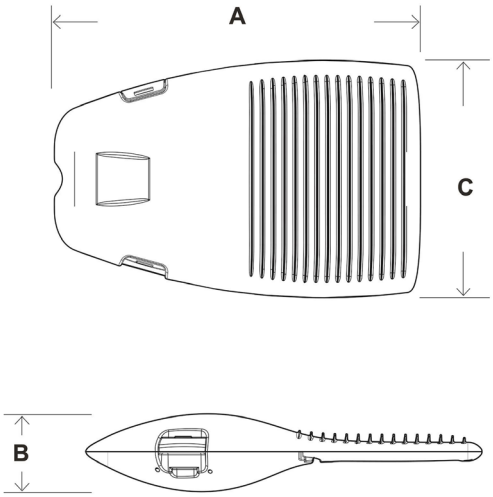
LED colour temperature	2700K (Warm White 727) 3000K (Warm White 730) 3000K (Warm White 830) 4000K (Neutral White 740)
Colour rendering index (CRI)	>70 (Warm White 727) >70 (Warm White 730) >80 (Warm White 830) >70 (Neutral White 740)
Upward Light Output Ratio (ULOR)	0%

LIFETIME OF THE LEDS @ TQ 25°C

All configurations	100,000h - L90

DIMENSIONS AND MOUNTING

AxBxC (mm | inch)	AMPERA MINI - 583x90x340 | 23.0x3.5x13.4 AMPERA MIDI - 674x132x436 | 26.5x5.2x17.2 AMPERA MAXI - 900x135x438 | 35.4x5.3x17.2
Weight (kg | lbs)	AMPERA MINI - 7.8 | 17.2 AMPERA MIDI - 11.5 | 25.3 AMPERA MAXI - 18.2 | 40.0
Aerodynamic resistance (CxS)	AMPERA MINI - 0.09 AMPERA MIDI - 0.12 AMPERA MAXI - 0.18
Mounting possibilities	Side-entry slip-over – Ø32mm Side-entry slip-over – Ø42mm Side-entry slip-over – Ø48mm Side-entry slip-over – Ø60mm Side-entry penetrating – Ø60mm Post-top slip-over – Ø32mm Post-top slip-over – Ø42mm Post-top slip-over – Ø48mm Post-top slip-over – Ø60mm Post-top slip-over – Ø76mm



Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 727		Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Warm White 830		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	Photometry
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Up to	
AMPERA MINI	8	350	800	1100	900	1100	800	1000	900	1200	10.3	10.3	117	LENSO FLEX°2
	8	400	1000	1200	1000	1300	900	1100	1100	1400	11.6	11.6	121	LENSO FLEX°2
	8	500	1200	1500	1200	1500	1100	1400	1300	1700	14.2	14.2	120	LENSO FLEX°2
	8	600	1400	1800	1400	1800	1300	1600	1600	2000	17	17	118	LENSO FLEX°2
	8	700	1600	2000	1700	2100	1500	1800	1800	2300	19.7	19.7	117	LENSO FLEX°2
	8	800	1800	2300	1900	2300	1600	2100	2000	2500	22.6	22.6	111	LENSO FLEX°2
	8	900	2000	2500	2000	2600	1800	2300	2200	2800	25.4	25.4	110	LENSO FLEX°2
	16	300	1400	1800	1500	1900	1300	1600	1600	2000	15.9	15.9	126	LENSO FLEX°2
	16	350	1700	2200	1800	2300	1600	2000	1900	2400	18.2	18.2	132	LENSO FLEX°2
	16	400	2000	2500	2000	2600	1800	2300	2200	2800	20.6	20.6	136	LENSO FLEX°2
	16	500	2400	3100	2500	3200	2200	2800	2700	3400	26.1	26.1	130	LENSO FLEX°2
	16	600	2900	3600	2900	3700	2600	3300	3200	4000	31	31	129	LENSO FLEX°2
	16	700	3200	4000	3300	4100	2900	3700	3600	4500	36.1	36.1	125	LENSO FLEX°2
	16	850	3500	4400	3600	4600	3200	4000	3900	4900	44	44	111	LENSO FLEX°2
	24	200	1600	2000	1600	2000	1400	1800	1700	2200	15.3	15.3	144	LENSO FLEX°2
	24	350	2600	3300	2700	3400	2400	3000	2900	3700	26	26	142	LENSO FLEX°2
	24	400	3000	3700	3100	3900	2700	3400	3300	4200	29.7	29.7	141	LENSO FLEX°2
	24	500	3600	4600	3800	4700	3300	4200	4100	5100	37.2	37.2	137	LENSO FLEX°2
	24	550	3900	5000	4100	5100	3600	4500	4400	5500	41	41	134	LENSO FLEX°2
	24	600	4300	5300	4400	5500	3900	4900	4800	6000	45.5	45.5	132	LENSO FLEX°2
	24	700	4800	6100	5000	6300	4400	5600	5400	6800	53	53	128	LENSO FLEX°2
	24	850	5700	7200	5900	7400	5200	6500	6400	8000	65	65	123	LENSO FLEX°2
	24	900	5900	7500	6100	7700	5400	6800	6600	8300	69	69	120	LENSO FLEX°2
	24	1000	6400	8100	6600	8300	5900	7400	7200	9000	77	77	117	LENSO FLEX°2

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 727		Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Warm White 830		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	Photometry
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Up to	
AMPERA MIDI	32	200	1900	2300	2000	2400	1700	2100	2100	2600	19.8	19.8	131	LENSO FLEX²2
	32	300	3100	3700	3200	3900	2800	3400	3400	4200	29.5	29.5	142	LENSO FLEX²2
	32	450	4600	5600	4800	5800	4200	5100	5200	6300	45.5	45.5	138	LENSO FLEX²2
	32	500	5100	6200	5200	6400	4600	5600	5700	6900	49.5	49.5	139	LENSO FLEX²2
	32	650	6300	7600	6500	7900	5700	7000	7000	8500	64.5	64.5	132	LENSO FLEX²2
	32	700	6600	8100	6900	8400	6100	7400	7400	9100	69.5	69.5	131	LENSO FLEX²2
	32	800	7200	8800	7400	9100	6600	8000	8100	9800	79	79	124	LENSO FLEX²2
	48	200	2900	3500	3000	3600	2600	3200	3200	3900	28.6	28.6	136	LENSO FLEX²2
	48	350	5500	6700	5600	6900	5000	6100	6100	7500	50	50	150	LENSO FLEX²2
	48	400	6200	7600	6400	7800	5700	6900	6900	8500	57	57	149	LENSO FLEX²2
	48	550	8300	10100	8500	10400	7600	9200	9200	11300	79	79	143	LENSO FLEX²2
	48	600	8900	10800	9100	11100	8100	9900	9900	12100	86	86	141	LENSO FLEX²2
	48	700	10000	12200	10300	12600	9100	11200	11200	13600	100	100	136	LENSO FLEX²2
	48	800	10800	13200	11200	13600	9900	12100	12100	14800	115	115	129	LENSO FLEX²2
	48	900	11600	14100	11900	14500	10600	12900	12900	15800	132	132	120	LENSO FLEX²2
	64	200	3900	4700	4000	4900	3500	4300	4300	5300	37.7	37.7	141	LENSO FLEX²2
	64	300	6200	7600	6400	7800	5700	6900	6900	8400	56.5	56.5	149	LENSO FLEX²2
	64	400	8300	10100	8500	10400	7600	9200	9300	11300	76	76	149	LENSO FLEX²2
	64	500	10000	12300	10400	12600	9200	11200	11200	13700	94	94	146	LENSO FLEX²2
	64	600	11800	14400	12200	14900	10800	13200	13200	16100	113	113	142	LENSO FLEX²2
	64	700	13400	16300	13800	16800	12200	14900	14900	18200	135	135	135	LENSO FLEX²2
	64	800	14500	17600	14900	18200	13200	16100	16200	19700	155	155	127	LENSO FLEX²2
	64	900	15400	18800	15900	19400	14100	17200	17200	21000	174	174	121	LENSO FLEX²2

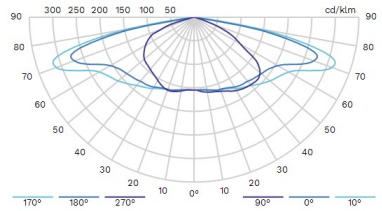
Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

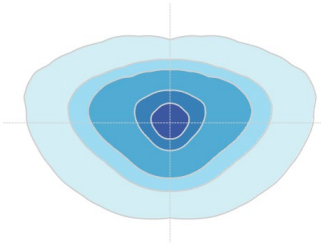
Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 727		Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Warm White 830		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	Photometry
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Up to	
AMPERA MAXI	80	350	9600	11500	9900	11800	8800	10500	10700	12800	81	81	158	LENSO FLEX°2
	80	400	10900	13000	11200	13400	9900	11900	12100	14500	93	93	156	LENSO FLEX°2
	80	500	13200	15800	13600	16200	12000	14400	14700	17600	117	117	150	LENSO FLEX°2
	80	600	15600	18700	16100	19300	14300	17100	17500	20900	141	141	148	LENSO FLEX°2
	80	700	17900	21400	18400	22100	16300	19600	20000	23900	165	165	145	LENSO FLEX°2
	96	200	6600	7900	6800	8200	6100	7300	7400	8900	56	56	159	LENSO FLEX°2
	96	350	11500	13800	11900	14200	10500	12600	12900	15400	97	97	159	LENSO FLEX°2
	96	400	13000	15600	13400	16100	11900	14300	14600	17500	111	111	158	LENSO FLEX°2
	96	500	16000	19200	16500	19800	14600	17500	17900	21400	140	140	153	LENSO FLEX°2
	96	600	18700	22400	19300	23100	17100	20500	20900	25000	169	169	148	LENSO FLEX°2
	96	700	21200	25400	21900	26200	19400	23200	23700	28300	200	200	142	LENSO FLEX°2
	96	800	23500	28200	24200	29000	21500	25700	26300	31500	230	230	137	LENSO FLEX°2
	112	200	7900	9500	8200	9800	7200	8700	8900	10600	66.5	66.5	159	LENSO FLEX°2
	112	350	13400	16100	13900	16600	12300	14700	15000	18000	115	115	157	LENSO FLEX°2
	112	450	16800	20200	17400	20800	15400	18400	18800	22500	154	154	146	LENSO FLEX°2
	112	500	18400	22100	19000	22800	16900	20200	20600	24700	166	166	149	LENSO FLEX°2
	112	680	23800	28500	24500	29400	21800	26100	26600	31800	226	226	141	LENSO FLEX°2
	112	700	24700	29200	25500	30100	22600	26700	27600	32600	236	236	138	LENSO FLEX°2
	112	800	27000	32300	27800	33300	24600	29500	30100	36100	272	272	133	LENSO FLEX°2
	128	200	9100	10900	9300	11200	8300	9900	10100	12100	75	75	161	LENSO FLEX°2
	128	350	15400	18400	15800	19000	14000	16800	17200	20600	132	132	156	LENSO FLEX°2
	128	420	18100	21700	18700	22400	16600	19800	20300	24300	158	158	154	LENSO FLEX°2
	128	500	21100	25200	21700	26000	19300	23100	23500	28200	188	188	150	LENSO FLEX°2
	128	600	24600	29500	25400	30400	22500	26900	27500	32900	226	226	146	LENSO FLEX°2
	128	700	27900	33400	28700	34400	25500	30500	31100	37300	270	270	138	LENSO FLEX°2
	128	800	30800	36900	31800	38000	28200	33700	34400	41200	310	310	133	LENSO FLEX°2

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

LENSO FLEX 2

5068





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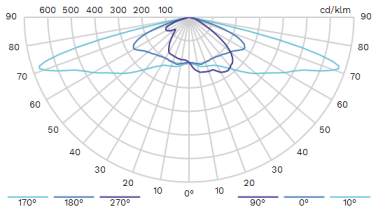

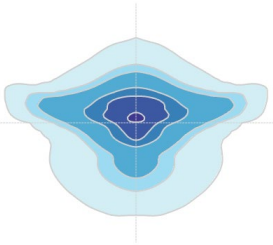

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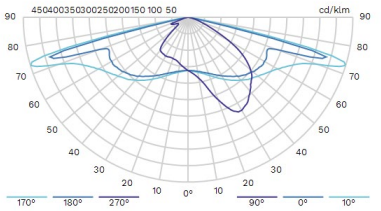
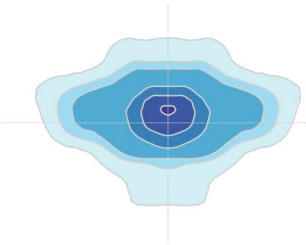
5098





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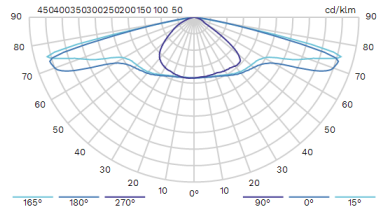
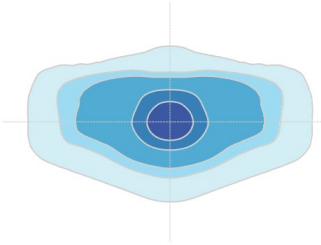
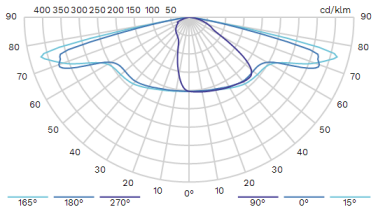
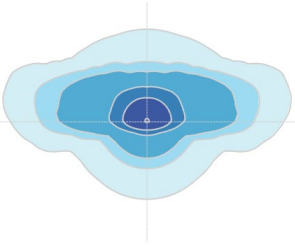




LENSO FLEX 2

5112 - BL





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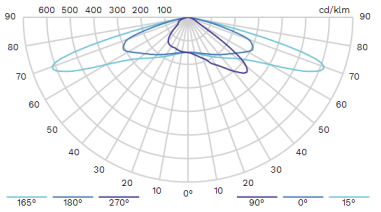
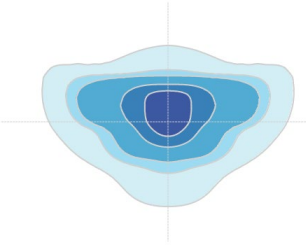
5117





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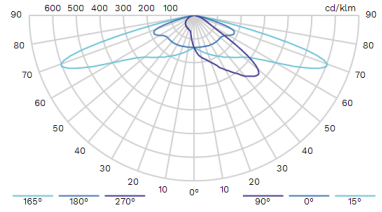
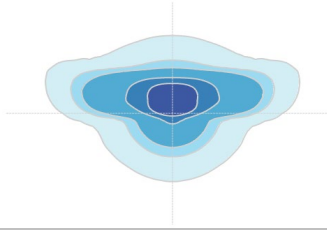
5117 - BL





LENSO FLEX 2

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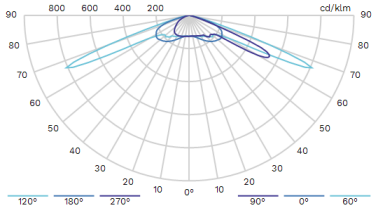
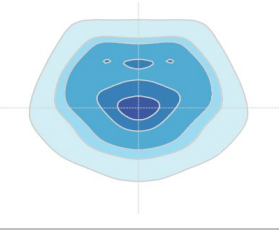
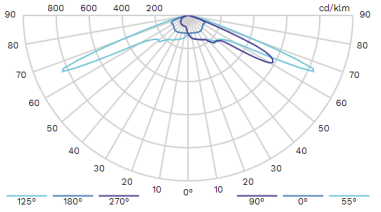
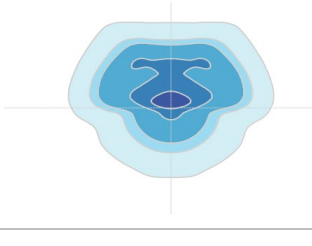




LENSO FLEX 2

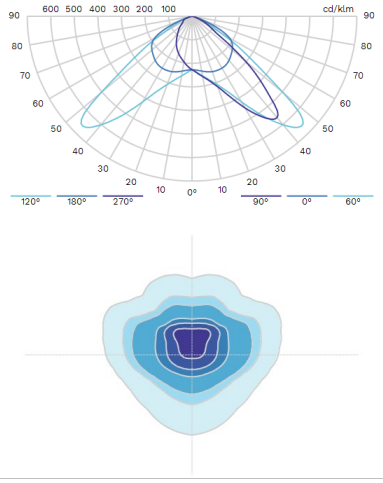
5119 - BL





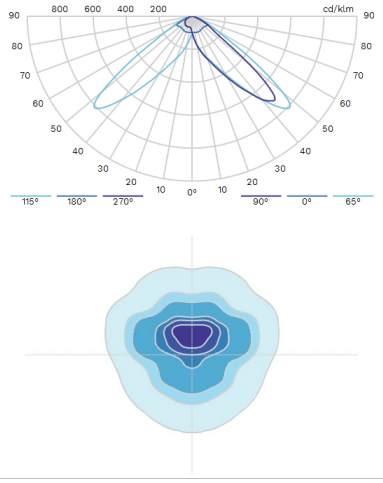
LENSO FLEX 2

5120



LENSO FLEX 2

5120 - BL



LENSO FLEX 2

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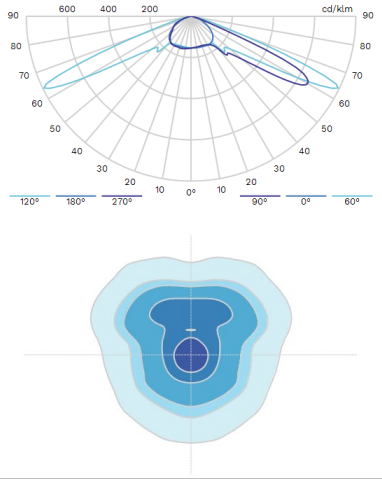
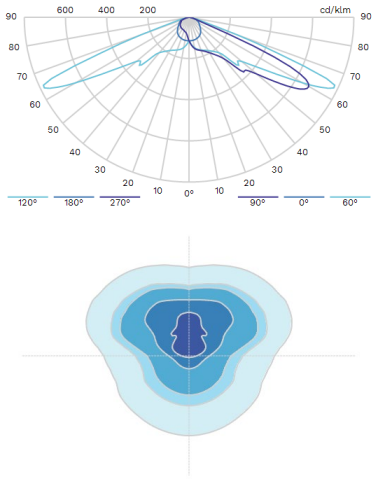


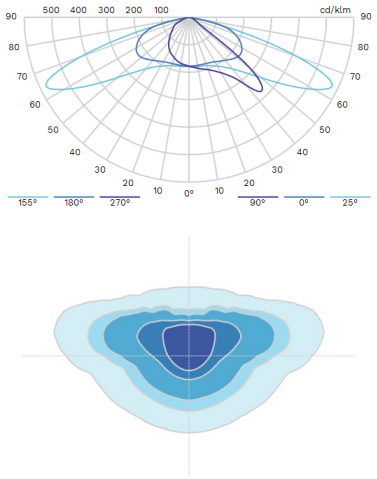
LENSO FLEX 2

5121 - BL



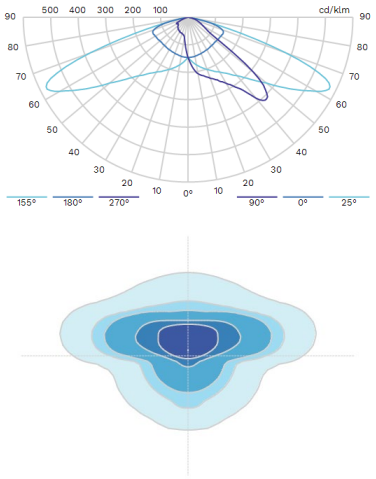
LENSO FLEX 2

5139



LENSO FLEX 2

5139 - BL



LENSO FLEX 2

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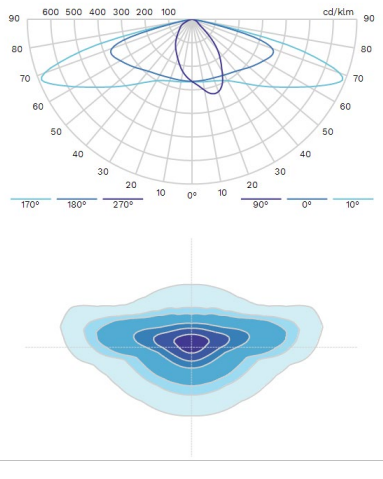

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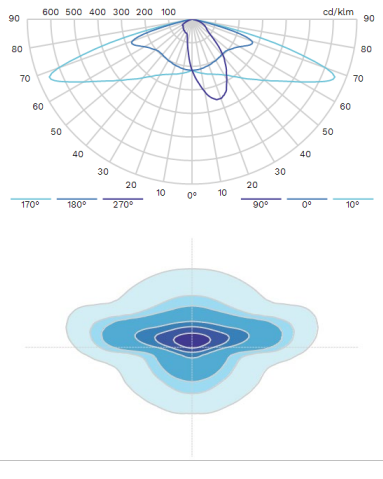

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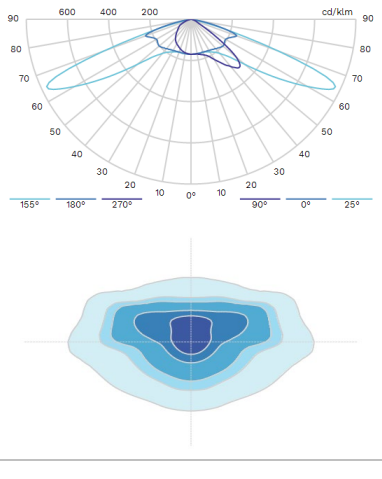

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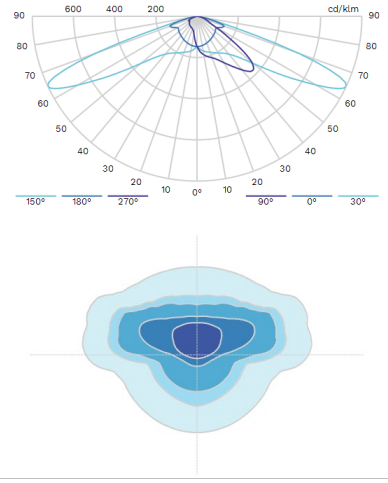
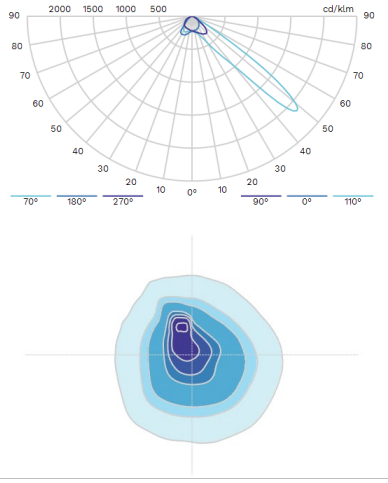


LENSO FLEX 2

5144 Zebra left



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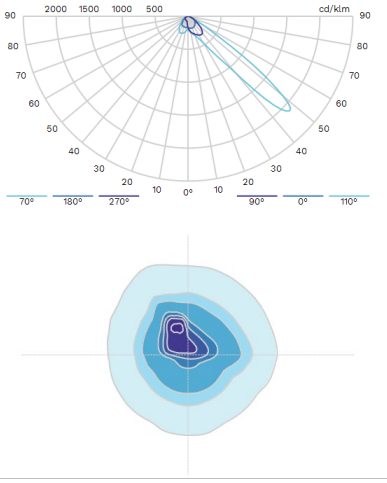
5144 Zebra left BL



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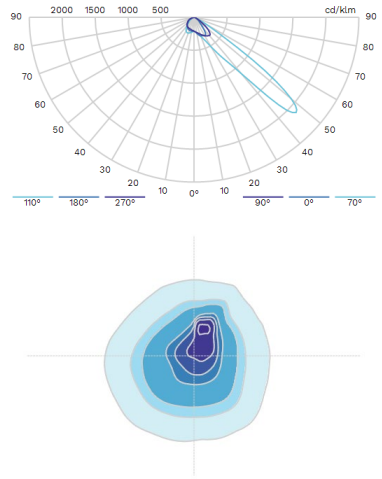
5145 Zebra right



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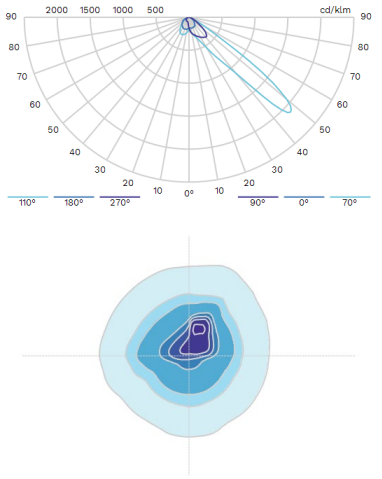
5145 Zebra right BL



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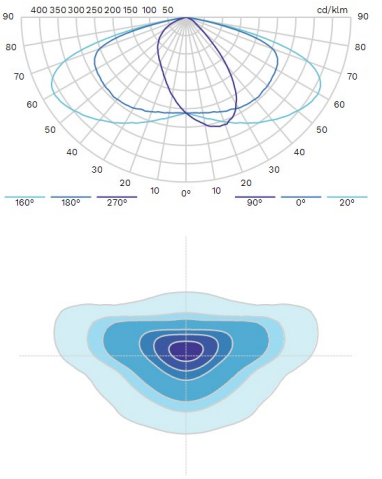
5147



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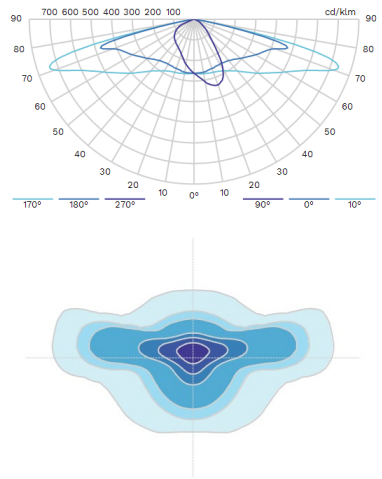

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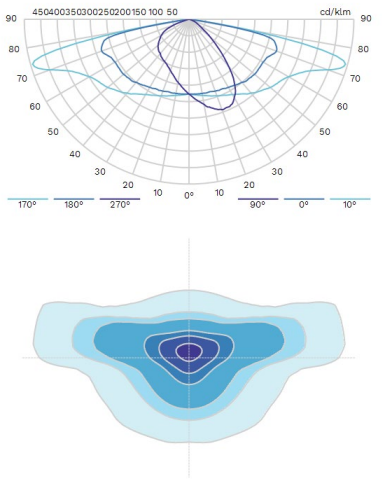

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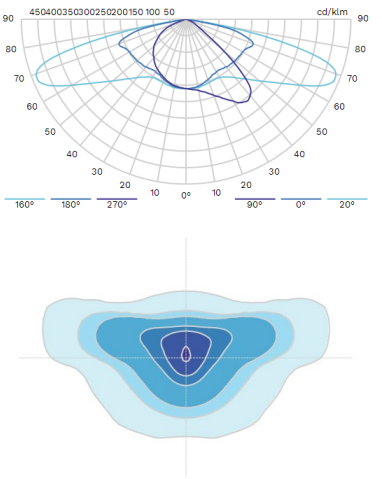

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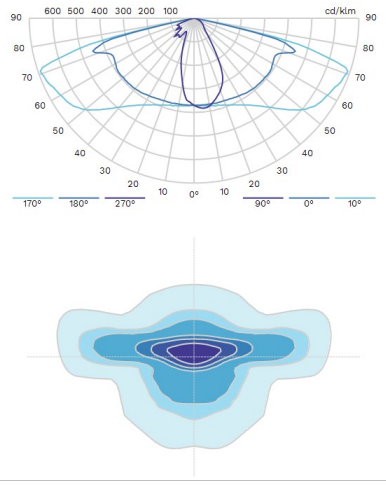

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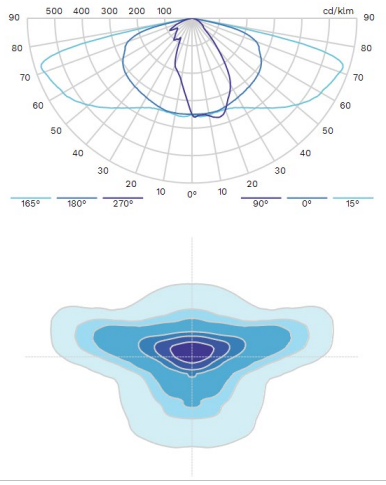

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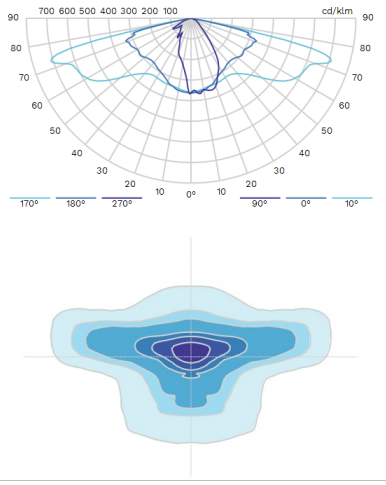

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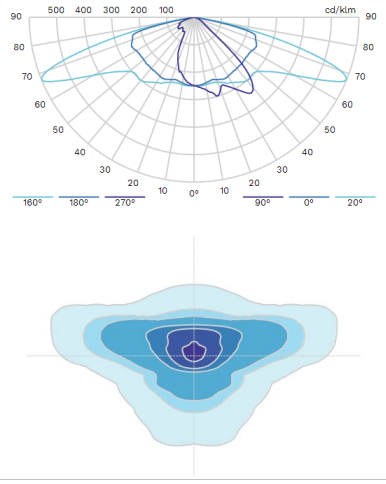

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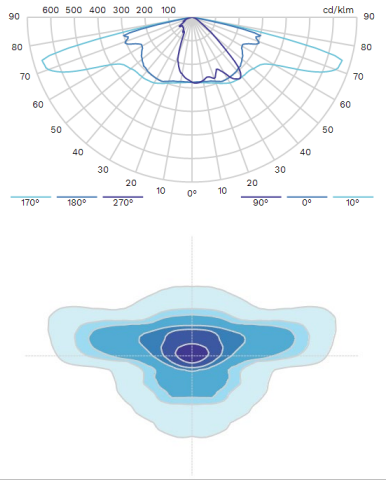

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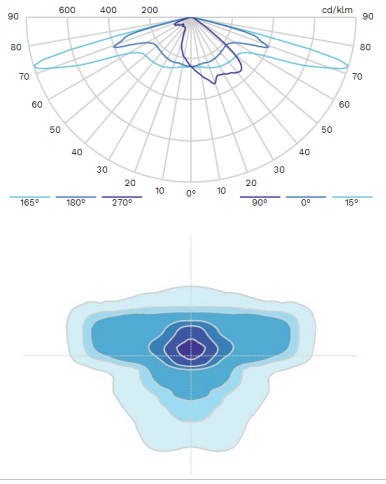

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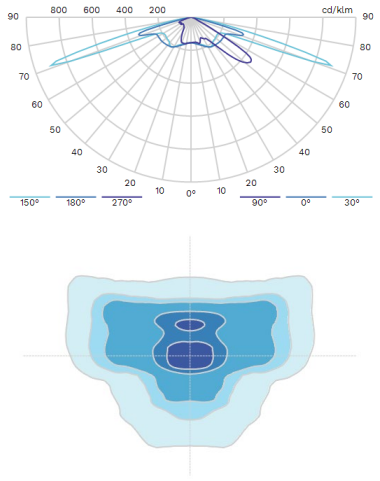

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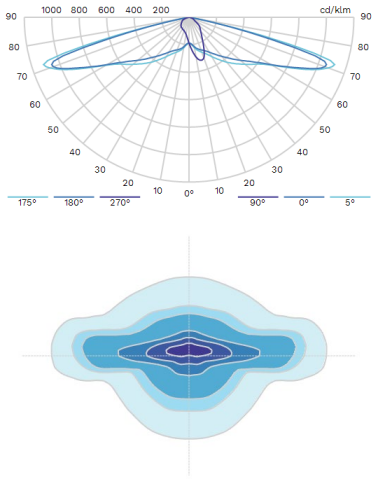
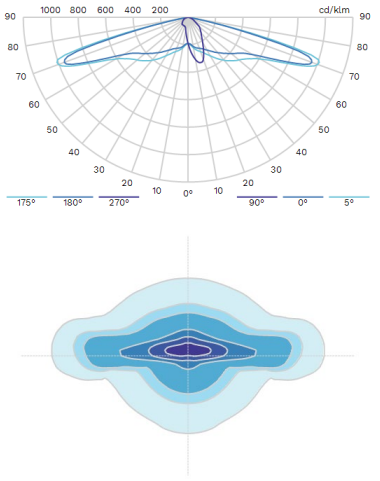


LENSO FLEX™2

5283 - BL



Schréder
Experts in lightability™

ROAD

AXIA 3

PRO FLEX™

Engineered for performance, designed for the customer experience

With customer feedback playing a critical part in our innovative design process, we developed AXIA 3. More than a luminaire, it is a platform delivering sustainability, cost-effectiveness and customer experience all while supporting smart city frameworks. Based on experience from the hundreds of thousands AXIA luminaires installed worldwide, this third generation luminaire pushes the boundaries with photometric innovation, ease and speed of installation and FutureProof connectivity.

Available in three sizes, AXIA 3 enables towns and cities to maximise efficiency when lighting numerous environments, from bike paths, squares and car parks to residential streets, carriageways, urban roads and large boulevards. This lightweight and compact luminaire combines quality of light with a minimal carbon footprint. It excels in easy installation and carefree maintenance, reducing operating costs.

IP 66 | IK 10

URBAN & RESIDENTIAL STREETS | BIKE & PEDESTRIAN PATHS | RAILWAY STATIONS & METROS | CAR PARKS | LARGE AREAS | SQUARES & PEDESTRIAN AREAS | ROADS & MOTORWAYS

Concept

AXIA 3 is a robust yet compact luminaire, designed with a focus on miniaturisation and superior efficiency. Composed of high-pressure die-cast aluminium, as well as composite materials, AXIA 3 is available in three sizes. Thanks to its reduced weight, this road luminaire is easy to handle during installation. The AXIA 3.1, which can be fitted with up to 16 LEDs, is perfectly suited to low-height applications, whereas AXIA 3.2 and 3.3, with up to 32 or 64 LEDs, are ideal for lighting urban and large roads, carriageways and avenues. The AXIA 3 range is equipped with ProFlex photometric engines, providing the highest efficiency thanks to their ability to maximise the lumen output and to provide very extensive light distributions.

AXIA 3 comes pre-cabled, hence there is no need to open the luminaire. The complete range is available with an integrated universal fixation part adapted for post-top and side-entry mounting on various spigots (Ø32mm with adapter, Ø42-48mm, Ø60mm and Ø76mm). The inclination angle can be adjusted on-site for both post-top (-5°/+15°) and side-entry (-10°/+10°) configurations to optimise lighting, reduce power consumption and control light pollution.

This highly efficient, cost-effective and connected-ready luminaire, offers towns and cities the ideal solution to improve lighting levels, increase safety, generate energy savings and reduce their ecological footprint. AXIA 3 is the ideal tool to provide another 25 years of efficiency, sustainability and safety.

The ProFlex photometric engine provides the highest efficiency.

The AXIA 3 range has a universal fixation part for spigots ranging from Ø32 to Ø76mm.

TYPES OF APPLICATION

- URBAN & RESIDENTIAL STREETS
- BIKE & PEDESTRIAN PATHS
- RAILWAY STATIONS & METROS
- CAR PARKS
- LARGE AREAS
- SQUARES & PEDESTRIAN AREAS
- ROADS & MOTORWAYS

KEY ADVANTAGES

- Maximised savings in energy and maintenance costs
- ProFlex photometric engines offering high efficiency lighting, comfort and safety
- 3 sizes to provide the most accurate solutions for numerous road and urban applications
- Easy installation: pre-cabled and equipped with universal fixation part adapted for side-entry and post-top mounting
- Adjustable inclination for optimised photometry and uniformity
- Connected-ready

The inclination is adjustable on-site for optimised photometry and further energy savings.

AXIA 3 is connected-ready and can operate with various sensors and control systems.

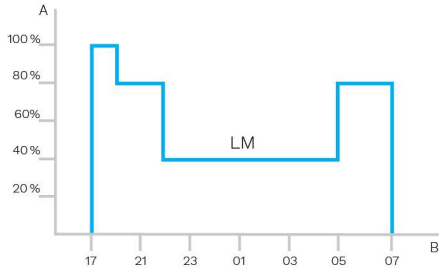
ProFlex™

The ProFlex photometric engine integrates the lenses into a polycarbonate protector. This integration increases the output and reduces the reflection inside the optical unit. The polycarbonate used for the ProFlex photometric engine offers essential characteristics such as high optical clarity for a superior light transmission, better impact resistance compared to glass and a long life span with UV-stabilisation treatment. The ProFlex concept enables a compact design with a thin optical compartment. It provides extensive light distributions so that the spacing between the luminaires can be increased.

Custom dimming profile

Intelligent luminaire drivers can be programmed with complex dimming profiles. Up to five combinations of time intervals and light levels are possible. This feature does not require any extra wiring.

The period between switching on and switching off is used to activate the preset dimming profile. The customised dimming system generates maximum energy savings while respecting the required lighting levels and uniformity throughout the night.



A. Dimming level | B. Time

Daylight sensor / photocell

Photocell or daylight sensors switch the luminaire on as soon natural light falls to a certain level. It can be programmed to switch on during a storm, on a cloudy day (in critical areas) or only at nightfall so as to provide safety and comfort in public spaces.

PIR sensor: motion detection

In places with little nocturnal activity, lighting can be dimmed to a minimum most of the time. By using passive infrared (PIR) sensors, the level of light can be raised as soon as a pedestrian or a slow vehicle is detected in the area.

Each luminaire level can be configured individually with several parametres such as minimum and maximum light output, delay period and ON/OFF duration time. PIR sensors can be used in an autonomous or interoperable network.

Schréder EXEDRA is the most advanced lighting management system on the market for controlling, monitoring and analysing streetlights in a user-friendly way.

Standardisation for interoperable ecosystems

Schréder plays a key role in driving standardisation with alliances and partners such as uCIFI, TALQ or Zhaga. Our joint commitment is to provide solutions designed for vertical and horizontal IoT integration. From the body (hardware) to the language (data model) and the intelligence (algorithms), the complete Schréder EXEDRA system relies on shared and open technologies. Schréder EXEDRA also relies on Microsoft Azure for cloud services, provided with the highest levels of trust, transparency, standards conformance and regulatory compliance.

Breaking the silos

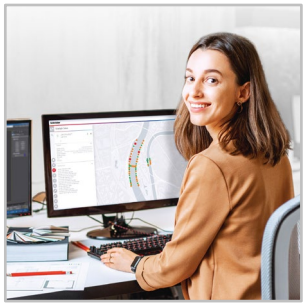
With EXEDRA, Schréder has taken a technology-agnostic approach: we rely on open standards and protocols to design an architecture able to interact seamlessly with third-party software and hardware solutions. Schréder EXEDRA is designed to unlock complete interoperability, as it offers the ability to:

- control devices (luminaires) from other brands
- manage controllers and to integrate sensors from other brands
- connect with third-party devices and platforms

A plug-and-play solution

As a gateway-less system using the cellular network, an intelligent automated commissioning process recognises, verifies and retrieves luminaire data into the user interface. The self-healing mesh between luminaire controllers enables real-time adaptive lighting to be configured directly via the user interface. OWLET IV luminaire controllers, optimised for Schréder EXEDRA, operate Schréder's luminaires and luminaires from third parties. They use both cellular and mesh radio networks, optimising geographical coverage and redundancy for continuous operation.

Tailored experience



Schréder EXEDRA includes all advanced features needed for smart device management, real-time and scheduled control, dynamic and automated lighting scenarios, maintenance and field operation planning, energy consumption management and third-party connected hardware integration. It is fully configurable and includes tools for user management and multi-tenant policy that enables contractors, utilities or big cities to segregate projects.

A powerful tool for efficiency, rationalisation and decision making

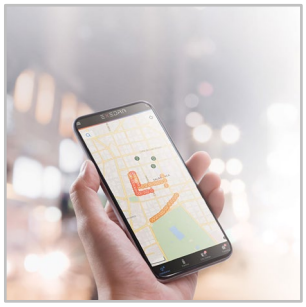
Data is gold. Schréder EXEDRA brings it with all the clarity managers need to drive decisions. The platform collects massive amounts of data from end devices and, aggregates, analyses and intuitively displays them to help end-users take the right actions.

Protected on every side

ISO 27001
BUREAU VERITAS
Certification

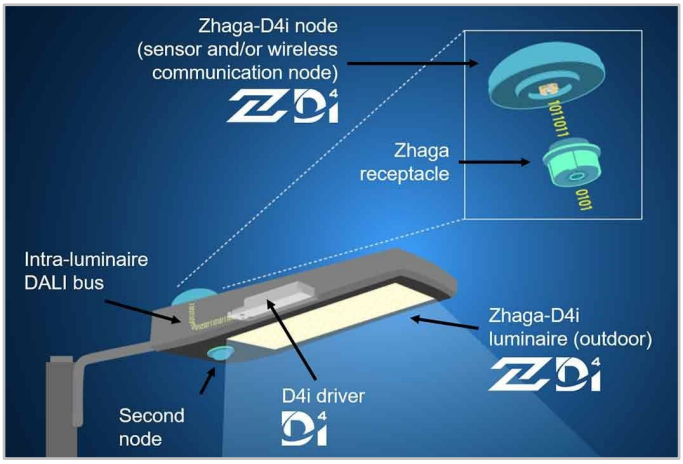
Schréder EXEDRA provides state-of-the-art data security with encryption, hashing, tokenisation, and key management practices that protect data across the whole system and its associated services. The whole platform is ISO 27001 certified. It demonstrates that Schréder EXEDRA meets the requirements for establishing, implementing, maintaining and continually improving security management.

Mobile App: any time, any place, connect to your street lighting



The Schréder EXEDRA mobile application offers the essential functionalities of the desktop platform, to accompany all types of operator on site in their daily effort to maximise the potential of connected lighting. It enables real-time control and settings, and contributes to effective maintenance.

The Zhaga consortium joined forces with the DiiA and produced a single Zhaga-D4i certification that combines the Zhaga Book 18 version 2 outdoor connectivity specifications with the DiiA's D4i specifications for intra-luminaire DALI.



Standardisation for interoperable ecosystems

Member of Zhaga

As a founding member of the Zhaga consortium, Schréder has participated in the creation of, and therefore supports, the Zhaga-D4i certification program and the initiative of this group to standardise an interoperable ecosystem. The D4i specifications take the best of the standard DALI2 protocol and adapt it to an intra-luminaire environment but it has certain limitations. Only luminaire mounted control devices can be combined with a Zhaga-D4i luminaire. According to the specification, control devices are limited respectively to 2W and 1W average power consumption.

Certification program

The Zhaga-D4i certification covers all the critical features including mechanical fit, digital communication, data reporting and power requirements within a single luminaire, ensuring plug-and-play interoperability of luminaires (drivers) and peripherals such as connectivity nodes.

Cost-effective solution

A Zhaga-D4i certified luminaire includes drivers offering features that had previously been in the control node, like energy metering, which has in turn simplified the control device therefore reducing the price of the control system.