



Outdoor Lighting Assessment Report

Oak Lane, Newton with Scales housing development (Westchurch Homes)

SHD Lighting Consultancy Ltd

✉: info@shdlighting.co.uk

☎: 07834 490 192

🌐: shdlighting.co.uk

Document Status

Revision	Purpose of document	Compiled by	Reviewed by	Review date
R0	Planning	Steve Higham	Steve Higham	12/06/2021
R1	Planning	Steve Higham	Steve Higham	14/07/2021
R2	Planning	Steve Higham	Steve Higham	14/07/2021

Table of Contents

1. INTRODUCTION	1
1.1 General	1
2. BASELINE CONDITIONS	2
2.1 Site Overview.....	2
3. LEGISLATION, PLANNING AND POLICY GUIDANCE	4
3.1 Legislative Background.....	4
3.2 National Planning Policy Framework.....	4
3.3 British and European lighting standards.....	4
3.4 Relevant Lighting Standards.....	5
3.5 Obtrusive Light.....	7
4. ASSESSMENT METHODOLOGY	8
4.1 Environmental Zone Classification	8
4.2 Obtrusive lighting limitation for outdoor lighting installations.....	9
5. LIGHTING STRATEGY	10
5.1 Lighting Performance.....	10
5.2 Lighting Criteria.....	10
5.3 Lighting Calculations and Modelling	11
6. OUTDOOR LIGHTING REQUIREMENTS	12
6.1 Potential Effects	12
6.2 Street Lighting Design Mitigation	13
6.3 Street Lighting Upward Light and Glare	13
6.4 Housing Plot Design Mitigation.....	14
6.5 Housing Plot Upward Light and Glare	15
7. CONCLUSION	16
7.1 Street Lighting Design Conclusion	16
7.2 Housing Plot Design Conclusion	16
8. APPENDIX A	17
8.1 Luminaire details.....	17
9. APPENDIX B	19
9.1 Street Lighting Calculation Report.....	19
10. APPENDIX B	20
10.1 Housing Plot Calculation Report.....	20
11. APPENDIX C	21
11.1 Housing Lighting Renders	21

1. INTRODUCTION

1.1 General

- 1.1.1 This report has been prepared by SHD Lighting Consultancy Ltd on behalf of Westchurch Homes.
- 1.1.2 SHD Lighting Consultancy Ltd are an independent lighting design consultancy who specialise in outdoor lighting design and lighting assessments and have knowledge qualifications and experience in undertaking outdoor lighting impact assessments and mitigation.
- 1.1.3 The report assesses the potential effects of obtrusive light that could arise from artificial lighting of the adoptable highway lighting and outdoor lighting units mounted on the periphery of each housing plot.
- 1.1.4 The principal objective is to identify the effects of artificial lighting and any potential obtrusive lighting for the development and propose suitable mitigation measures.
- 1.1.5 Obtrusive light or light pollution is any light that strays to areas other than where it is intended and can include light intrusion (spill light) into neighbouring properties, upward light (which can create sky glow) and visual source intensity (glare).

It can also create effects upon ecological receptors in the area, particularly with respect to bat roosts and foraging corridors.
- 1.1.6 The lighting impact assessment considers the maximum adverse scenario in relation to the proposed artificial lighting, in order to assess the significance of the potential effects on identified receptors.
- 1.1.7 This lighting assessment should be carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.1.8 The report has been prepared by SHD Lighting Consultancy Ltd to the best of our knowledge using information provided by Westchurch Homes.

SHD Lighting Consultancy Ltd accept no responsibility or liability for:

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

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

2. BASELINE CONDITIONS

2.1 Site Overview

- 2.1.1 The site for the proposed housing development is located in a residential rural area near Newton with Scales, which is approximately five miles west of Preston city centre.
- 2.1.2 The entrance to the proposed development is located off Oak Lane, which is a residential road adopted by Lancashire County Council.
- 2.1.3 Information in this report will assess the impact on the introduction of artificial lighting which will be a street lighting system comprising of 5m lighting columns and LED luminaires and wall mounted light fittings located around the perimeter of each housing plot.

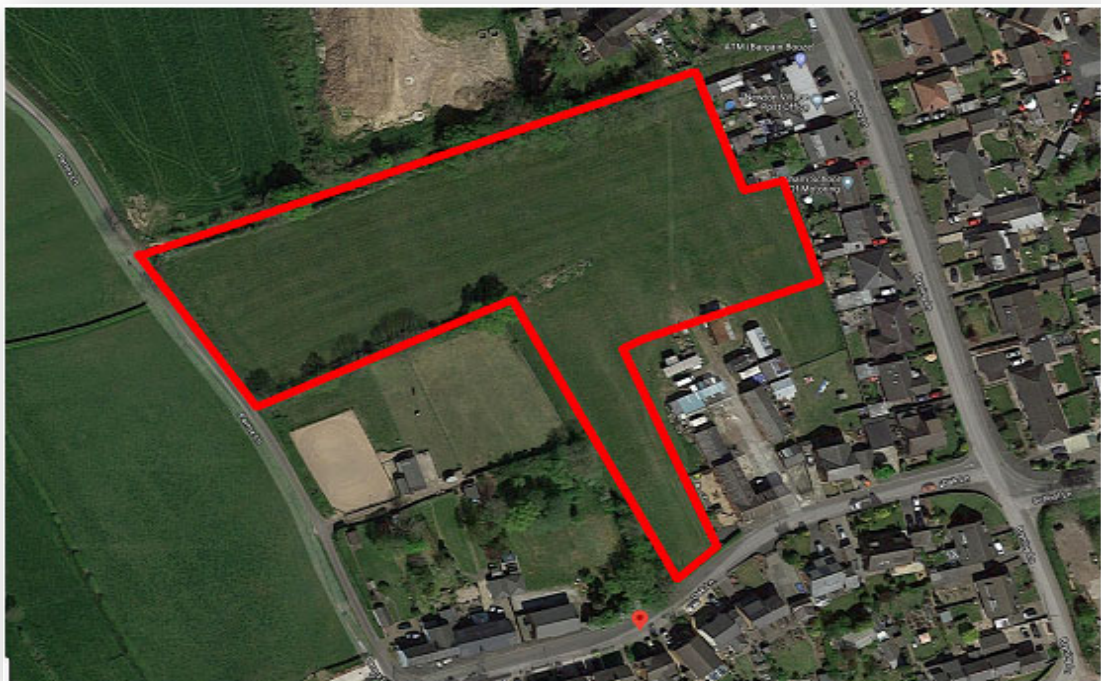


Figure 2.1 – Site view (Aerial)



Figure 2.2 - Site view (Location Plan)

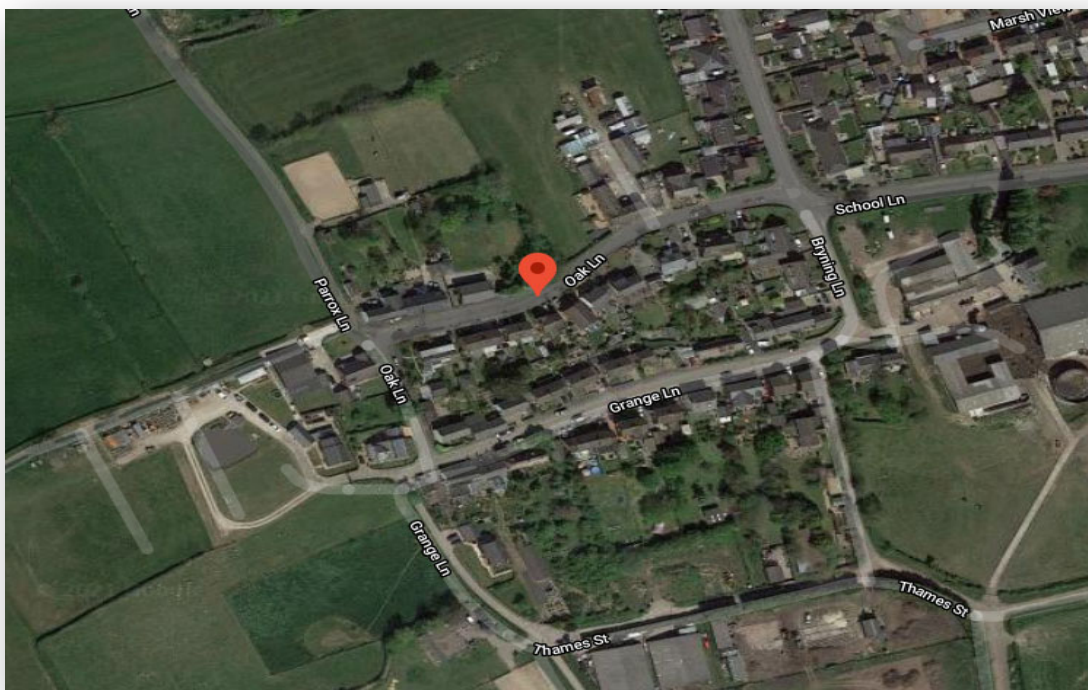


Figure 2.3 – Site location overview

3. LEGISLATION, PLANNING AND POLICY GUIDANCE

3.1 Legislative Background

- 3.1.1 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), which was amended in 2006 to include the following nuisance definition:

“artificial light emitted from premises so as to be prejudicial to health or nuisance”

- 3.1.2 Although light was described as having the potential to cause statutory nuisance, no prescriptive limits or rules were set for impact assessment purposes.

3.2 National Planning Policy Framework

- 3.2.1 The National Planning Policy Framework (NPPF), published in July 2018, sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans.
- 3.2.2 Planning policies and decisions should also ensure that the 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.

3.3 British and European lighting standards

- 3.3.1 The most applicable British Standards for lighting that relate to the proposed development are:
- *BS 5489-1: 2020 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas*
 - *BS EN 13201-2: 2015: Road Lighting: Part 2 - Performance requirements*

3.4 Relevant Lighting Standards

3.4.1 The applicable standards for outdoor lighting that relate to the proposed development are:

3.4.2 **Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021). Institution of Lighting Professionals (ILP)**

3.4.3 The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that these are incorporated into the local planning applications.

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

3.4.5 The ILP Guidance Notes define various forms of light pollution and describe a series of environmental zones and suitable criteria against which the effects of artificial lighting can be assessed.

3.4.6 Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021). Institution of Lighting Professionals (ILP) should be used in conjunction with CIE 150:2017 and CIE 216:1997 and is not a replacement for the procedures contained therein.

3.4.7 Guidance Notes for the Reduction of Obtrusive Light GN01/21 (2021) produced by the Institution of Lighting Professionals (ILP) has, therefore, been referred to for the purposes of this assessment.

3.4.8 **The Exterior Environment - Lighting Guide 6 (2016): Chartered Institution of Building Services Engineers (CIBSE)**

3.4.9 **Public Lighting Guide 04 Guidance on Undertaking Environmental Lighting Impact Assessments (2013). Institution of Lighting Professionals (ILP)**

Guidance is provided within PLG04 that outlines the best practice approach to preparing lighting assessments.

3.4.10 **CIE 150: Guide on the limitations of the effects of obtrusive light from outdoor lighting installations (2003)**

The purpose of this Guide is to help formulate guidelines for assessing the environmental impacts of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels

3.4.11 **CIE 126: Guidelines for Minimising Sky Glow (1997)**

This document gives general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for exterior lighting installations.

These values are regarded as limiting values. Lighting designers should strive to meet the lowest criteria for the design. Practical implementation of the general guidance is left to national regulations.

3.4.12 **Bat Conservation Trust Lighting Guidance; GN08/18 (2018) Institution of Lighting Professionals (ILP)**

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

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

"It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation.

It is therefore very difficult to demonstrate 'complete darkness' or a 'complete absence of illumination' on vertical planes where some form of lighting is proposed on site despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero.

Consequently, where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane.

These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light adverse behaviour (Stone,2012)."

"Dark buffers, illuminance limits and zonation dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them.

Buffer zones rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits.

The buffer zone can be further subdivided in- to zones of increasing illuminance limits radiating away from the feature"

3.5 Obtrusive Light

3.5.1 Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users.

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

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

Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. Figure 3.1 illustrates the different types of obtrusive light.

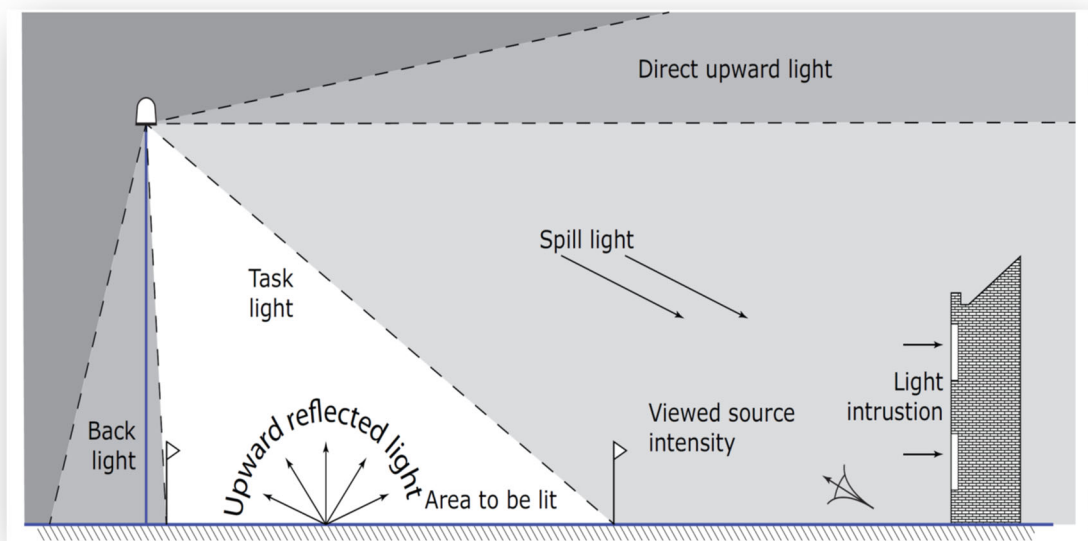


Figure 3.1: Obtrusive light diagram

Taken from Institution of Lighting Professionals: Guidance Note 01/21: Guidance notes for the reduction of obtrusive light (2021)

4. ASSESSMENT METHODOLOGY

4.1 Environmental Zone Classification

- 4.1.1 All standards consulted are nationally recognised documents, (some internationally also) which deal with all design issues associated with external lighting.
- 4.1.2 CIE Standards, the CIBSE and the Society of Light & Lighting guidance documents, all apply a common Environmental Zoning system, which is summarised in Table 4.1 below.

ENVIRONMENTAL ZONE CLASSIFICATION AND PARAMETERS			
Zone	Surrounding	Lighting Environment	Example
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty
E2	Rural	Low district brightness	Village or relatively dark outer suburban location
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town or City centres with high levels of night-time activity

Table 4.1

Notes:

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid-2019 but not retrospective.
6. Astronomical observable dark skies will offer clearer views of the Milky Way and of other objects such as the Andromeda galaxy and the Orion Nebula.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

- 4.1.3 Using Table 4.1, the assessment site would be classified as E2 Low District Brightness

4.2 Obtrusive lighting limitation for outdoor lighting installations

4.2.1 The ILP Guidance Notes for the Reduction of Obtrusive Light provide guidelines and threshold values applicable to each Environmental Zone, which are reproduced in Table 4.2 below.

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Zone	Sky Glow ULR max % (i)	Light intrusion into windows Ev measured in Lux (ii)		Luminaire intensity I (K candelas) (iii)		Building Luminance L (cd/m ²) (iv)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	
E0	0	0	0	0	0	0
E1	0	2	0(1*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1	10
E4	15	25	5	25	2.5	25

Table 4.2

- (i) **Upward light ratio of the installation – maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky**
- (ii) **Vertical illuminance measured flat at the glazing at the centre of the window**
- (iii) **Light intensity in kilo candelas**
- (iv) **Luminance in candelas per square metre (cd/m²)**
- (*) **From public road lighting installations only**

5. LIGHTING STRATEGY

5.1 Lighting Performance

- 5.1.1 The aim of the lighting strategy is to ensure that lighting is fit for purpose and compliant with British Standards and ILP guidance documentation to ensure safety and amenity of on-site operations during the hours of darkness, whilst minimising the potential for obtrusive light.
- 5.1.2 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:
- *Bat Conservation Trust Lighting Guidance; GN08/18 (2018) Institution of Lighting Professionals (ILP)*
 - *Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021). Institution of Lighting Professionals (ILP)*
 - *BS 5489-1: 2020 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas*
 - *BS EN 13201-2: 2015: Road Lighting: Part 2 - Performance requirements*

5.2 Lighting Criteria

- 5.2.1 Outdoor artificial lighting is to be provided for the following areas:
- The adopted roads and footpaths
 - Wall mounted light unit installed to the side of each front door per housing plot
 - Wall mounted light unit installed on the gable of some housing plots
 - Wall mounted light unit to the rear of each house plot

5.3 Lighting Calculations and Modelling

- 5.3.1 An external street lighting design has been prepared by Aptus Utilities for the proposed adopted streets and footpaths for the development off Oak Lane, Newton with Scales.
- 5.3.2 SHD Lighting Consultancy Ltd have used the adoptable Section 38 lighting design by Aptus Utilities to carry out this lighting impact assessment. (SHD Lighting Consultancy do not accept design responsibility for the lighting designs and strategies prepared by others.)
- 5.3.3 SHD Lighting Consultancy Ltd also completed house plot lighting calculations for wall mounted luminaires for each housing plot.
- 5.3.4 Westchurch Homes provided technical datasheets for each proposed wall mounted luminaire and suggested locations where each wall mounted luminaire shall be installed.
- 5.3.5 The development was modelled then calculated using industry standard lighting simulation software Lighting Reality.
- 5.3.6 Lighting Reality is a computer software calculation package which utilises manufacturers photometric data files to simulate the lighting output of chosen light fittings.
- 5.3.7 Light spill calculations are based on the luminaires at full output, with a maintenance factor of 1.0, as this will represent the worst-case scenario.
- 5.3.8 The light spill model does not consider physical obstructions and provides light spill details for the initial light output, therefore disregarding the maintenance factor used for ensuring the lighting design performs as required at the end of its life.
- 5.3.9 Considering this, the light spill diagram provides an exaggerated and absolute worst- case scenario with regards to the light spill at ground level, assuming no light limiting features are present.
- 5.3.10 From these calculations, drawings illustrating the illuminance levels throughout the site and at the boundary have been produced so that the lighting scheme's impact can be assessed.
- 5.3.11 The calculation model (illustrated by illuminance levels and Isolux contour lines on a drawing) does not include any proposed or existing planting/ hedgerows/ trees on site, or in the surrounding area.
- 5.3.12 An ecological appraisal report was provided by Bowland Ecology which outlines specific requirements that the artificial lighting shall include the following measures:

5.9 Any new lighting schemes will be designed so that they are 'bat friendly'. Lighting schemes will be designed in accordance with the appropriate guidance to minimise impacts on foraging bats (ILP 2018).

Figure 5.1 Extract from Ecology Appraisal from Bowland Ecology

6. OUTDOOR LIGHTING REQUIREMENTS

6.1 Potential Effects

- 6.1.1 Many of the potential effects of artificial lighting can be effectively mitigated by a suitable lighting strategy, good design and choice of suitable lighting equipment and the lighting design being carried out by a suitably qualified and competent professional.
- 6.1.2 Section 6.2 and 6.4 outline good lighting practices to be applied to the design of the artificial lighting for both the street lighting and housing plot lighting during normal operation.
- 6.1.3 The proposed street lighting scheme shall conform with guidance provided in GN08/18, which specifies specific parameters that must be met to ensure the outdoor lighting design is compliant.
- 6.1.4 It is proposed that the external street lighting shall be installed on 5m columns using luminaires mounted at five degree to the horizontal plane and shall use warm white (2700 kelvin) LED luminaires.
- 6.1.5 Each housing plot shall have wall mounted luminaires at 1800mm from ground level with downward firing warm white LED units, each having a passive infra-red (PIR) motion sensor preinstalled ensuring the light fittings are only operational when required.
- 6.1.6 Generally lighting shall be selected to provide safety and security without polluting the boundary site residents.
- 6.1.7 The light source specified for the street lighting scheme is LED, this is a low lumen output high efficiency light source with all luminaires having electronic drivers and electronic control gear
- 6.1.8 The electronic drivers and LED lamps running together produce a very efficient lighting system which reduces overall energy usage and environmental impact on natural resources.
- 6.1.9 Desk top assessments on the proposed lighting installation indicate (with respect to identified sensitive receptors) that overall surrounding light pollution levels will not be significantly influenced by the proposed lighting
- 6.1.10 It is proposed that the lighting impact can be minimised using accepted methods of lighting control, essentially limiting illuminance and controlling light spill.
- 6.1.11 These accepted methods have all been adopted within the proposed street lighting design and housing plot lighting to keep the overall impact of the lighting to a minimum.
- 6.1.12 Poorly designed lighting can contribute the following obtrusive light components:
- Light spill into windows: this is typical of wall mounted luminaires with high tilt angles
 - Upward light causing sky glow: this is typical of up-lighting
 - Glare: due to high light source intensity from floodlights
 - Intrusive light affecting ecology: caused by excessive height and tilt.

6.2 Street Lighting Design Mitigation

- 6.2.1 The adoptable street lighting system shall use 5m high lighting columns with LED luminaires that use a warm white (2700 kelvin) light source.
- 6.2.2 The adoptable street lighting luminaires are to be installed at 0° tilt to the horizontal plane.
- 6.2.3 Each luminaire is to be preprogrammed to dim to 50% lumen output from the hours of 19:00 until 07:00.

6.3 Street Lighting Upward Light and Glare

- 6.3.1 Luminaires will be installed with 0° tilt and are professional grade luminaires, designed in accordance with industry specific luminaire design and photometric standards.
- 6.3.2 Through the use of professional grade luminaires that comply with minimum luminous intensity limitations, glare will be suitably controlled and mitigated.
- 6.3.3 Figure 6.1 shows that when the street lighting luminaires are installed at 0° there is no light emitted above 90° from horizontal.

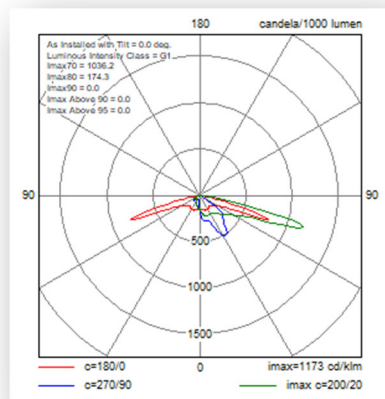


Figure 6.1 Lighting Reality polar diagram

6.4 Housing Plot Design Mitigation

- 6.4.1 Many of the potential effects of artificial lighting can be effectively mitigated by a suitable lighting strategy, good design and choice of suitable lighting equipment and the lighting design being carried out by a suitably qualified and competent professional.
- 6.4.2 The following paragraphs outline good lighting practices to be applied to the design of the artificial lighting for both the street lighting and housing plot lighting during normal operation.
- 6.4.3 The housing plot lighting shall use wall mounted LED luminaires that use a warm white (Rear and side lights to be warm white (3000 kelvin) and front lights to have a warm white (2700 kelvin) light source as warm white LED's have reduced values of blue light on the colour spectrum which is to be avoided from guidance provided in GN08/18.

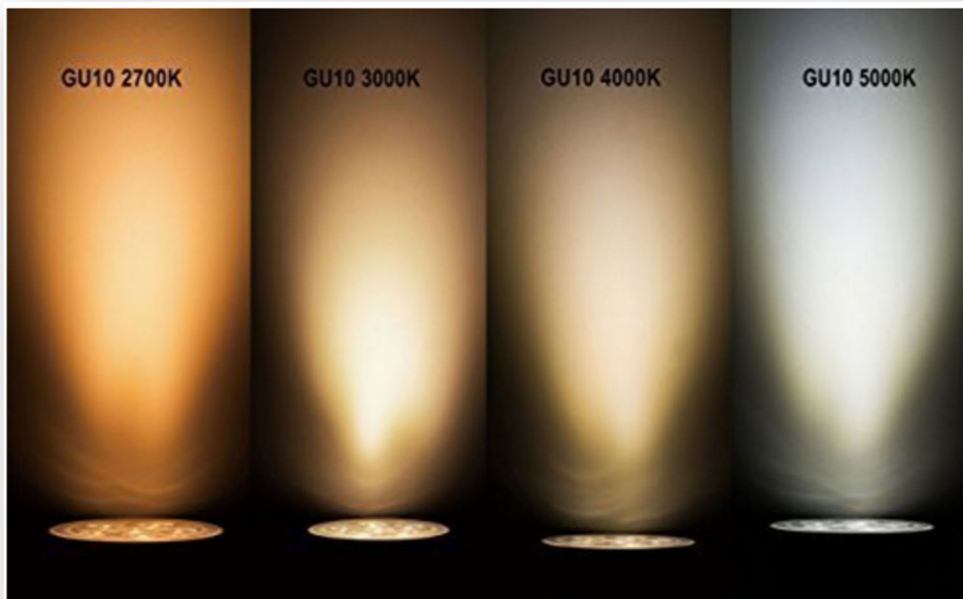


Figure 6.2 – Example of various colour correlation temperatures (shown in kelvin (K))

- 6.4.4 The housing plot wall mounted lighting units have LED light sources that are downward facing only, meaning the luminaire lens point to ground, reducing any upward light spill which is to be avoided from guidance provided in GN08/18.
- 6.4.5 Each housing plot light fitting have integral PIR motion sensors, meaning the light fittings are only activated when needed.
- 6.4.6 Any variation of the lighting units shown in appendix A will result in the provided lighting calculations, Isolux line drawings and information provided in this assessment report being incorrect and not in compliance with GN08/18.
- 6.4.7 In summary it is our considered opinion that the proposed lighting installation will not have any significant negative impact on the immediate environment with respect to lighting pollution or energy usage and that all sensible steps have been taken within the design stage of this lighting scheme to keep the impact to the environment to a minimum.

6.5 Housing Plot Upward Light and Glare

- 6.5.1 Each wall mounted light unit have downward facing LED light sources and are professional grade luminaires, designed in accordance with industry specific luminaire design and photometric standards.
- 6.5.2 Through the use of professional grade luminaires that comply with minimum luminous intensity limitations, glare will be suitably controlled and mitigated.
- 6.5.3 Figure 6.3 shows the front wall mounted light units when installed will direct all of the light output in the downward direction only.

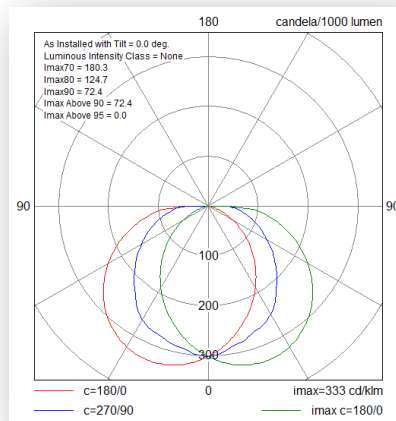


Figure 6.3 Lighting Reality polar diagram (Rear and Side wall mounted light units)

- 6.5.4 Figure 6.4 shows the front wall mounted light units when installed will direct all of the light output in the downward direction only with a narrow beam angle.

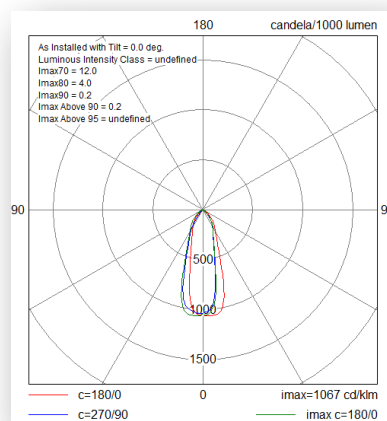


Figure 6.4 Lighting Reality polar diagram (Front wall mounted light units)

7. CONCLUSION

7.1 Street Lighting Design Conclusion

- 7.1.1 The lighting strategy and assessment outlines the lighting design criteria for the street lighting design of the proposed development, to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the environment. This is achieved through compliance with relevant British Standards and lighting industry guidance.
- 7.1.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights of the luminaires, tilt angle, colour temperature of the exterior light sources to those specified in Section 6.
- 7.1.3 The exterior lighting outlined in the lighting strategy shall comply with the requirements for an E2 Environmental Zone as per Tables 4.1 & 4.2.
- 7.1.4 In summary it is our considered opinion that the proposed street lighting design complies with recommendations provided in ILP GN08/18. Compliance has been achieved by:
- The use of warm white (2700k) LED light sources which have reduced levels of blue light
 - Reduced mounting height of the luminaires on lower-level 5m lighting columns.
 - Aiming the luminaires directly towards the ground by installing the luminaires at 0° to the horizontal plane

7.2 Housing Plot Design Conclusion

- 7.2.1 The lighting strategy and assessment outlines the lighting design criteria for the proposed development and includes the housing plot outdoor wall lighting, to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the environment. This is achieved through compliance with relevant British Standards and lighting industry guidance.
- 7.2.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights of the luminaires, tilt angle, colour temperature of the exterior light sources to those specified in Section 6.
- 7.2.3 The exterior lighting outlined in the lighting strategy shall comply with the requirements for an E2 Environmental Zone as per Tables 4.1 & 4.2.
- 7.2.4 Each wall mounted light fitting uses downward firing warm white (<3000k) LED light source and operate on passive infra-red motion detectors, which ensures light is only active when needed and also include dawn-dusk light sensors, ensuring the wall mounted light fitting, only operate during the hours of darkness.
- 7.2.5 In summary it is our considered opinion that the proposed housing plot lighting design is compliant with recommendations provided in ILP GN08/18.

8. APPENDIX A

8.1 Luminaire details

- 8.1.1 The street lighting design uses a system of 5m lighting columns each with a post top mounted LED luminaire with a warm white (2700k) light source, mounted at 0° tilt and shall be dimmed to 50% lumen output from the hours on 19:00 until 07:00 in accordance with Lancashire County Council's lighting strategy.



Figure 8.1 Example of Urbis Axia 3.1 luminaire

- 8.1.2 The housing plot rear and side wall mounted luminaires are to be mounted at 1800mm from floor level and have warm white (3000k) light sources and have downward firing lighting only.



Figure 8.2 Example of Ansell bulkhead (rear and side lighting)

- 8.1.3 The housing plot front wall mounted luminaires are to be mounted at 1800mm from floor level and have warm white (2700k) light sources and have downward firing lighting only.



Figure 8.3 Example of DETA wall light (front lighting)

9. APPENDIX B

9.1 Street Lighting Calculation Report

DATE: 14 July 2021
DESIGNER: Liam Stuckey
PROJECT No: AP0524-692_RevD
PROJECT NAME: Oak Lane, Newton-With-Scales



Designed to the BS5489-1:2020, Class P5 and in the accordance of Lancashire County Council's Specification.
Areas that do not meet Emin are accepted due to ecological considerations laid out in ILP GN08/2018

RevA: New Site Layout
RevB: Applied LCC 2700K Lantern at 0 degree tilt to comply with ILP GN08/2018
RevC: 2700k Lantern incorporated
RevD: Moved 11A to future proof development at LCC request

Maintenance Factor: 0.87

Desired Lighting Levels:
Eav: 3.00 to 4.50
Emin: 0.60

Outdoor Lighting Report

PREPARED BY: Liam Stuckey
Aptus Utilities
Units 19, 20 Barrs Fold Rd,
Westhoughton, Bolton
BL5 3XP
01204 325000
07936937969
E-mail:
liam.stuckey@aptusutilities.co.uk
abigail.aspin@aptusutilities.co.uk
Website: <https://aptusutilities.co.uk/>

Layout Report

General Data

Dimensions in Metres Angles in Degrees
 Grid Origin 344461.6m x 430683.1m
 Area 207.5m x 201.6m
 Sample Spacing 1.49m x 1.49m

Luminaires

Luminaire A Data

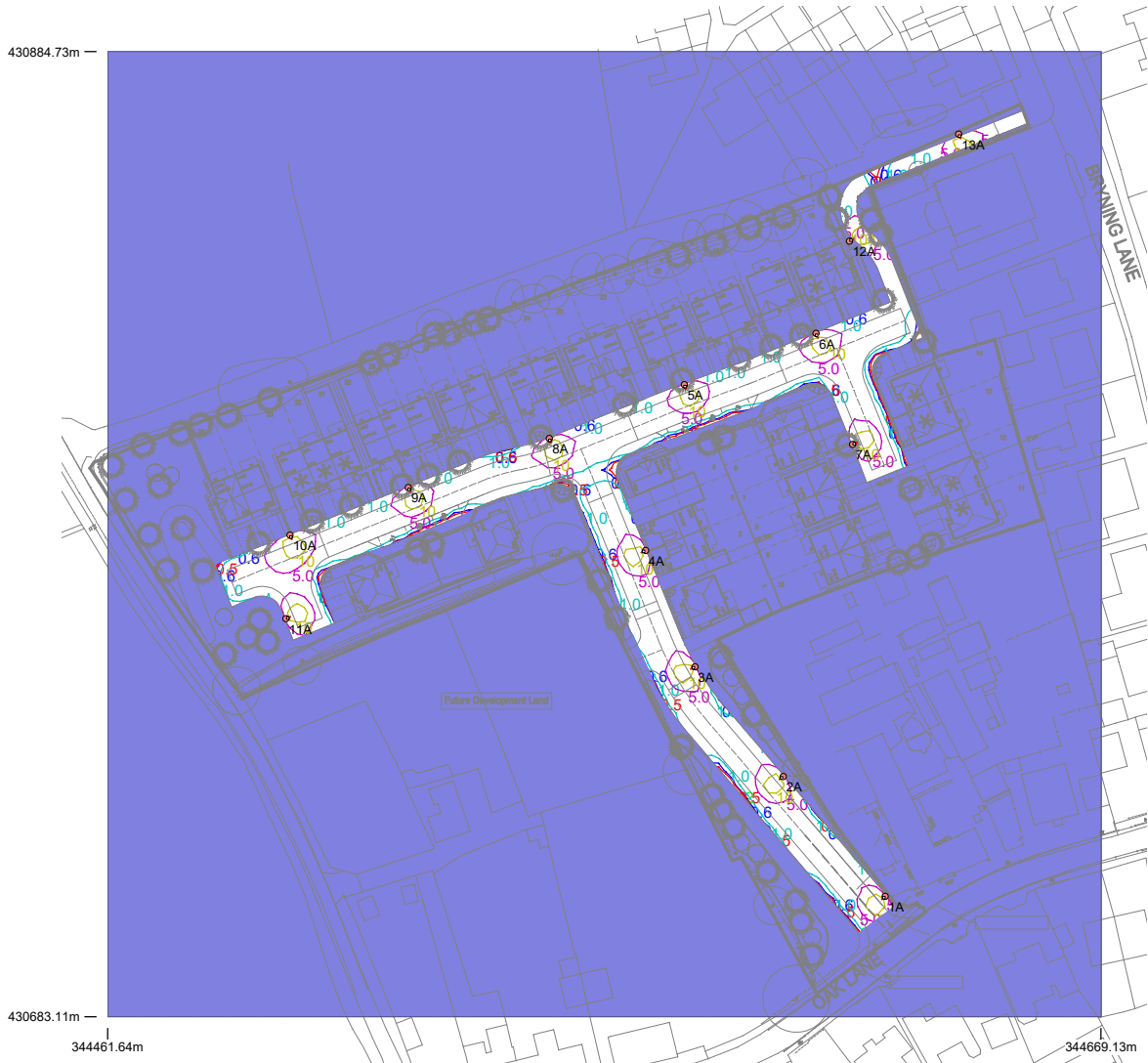
Supplier	_Local Authorities
Type	AXIA 3.1 5266 - 16 OSLO SQUARE GIA NT 160mA WW 727 230V 00-
Lamp(s)	16 OSLO SQUARE GIANT 230V
Lamp Flux (klm)	1.48
File Name	R2 S5 AXIA 3.1 5266 16 OSLO SQUARE GIANT 160mA WW 727 Integrated lenses...
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	1036.2, 174.3, 0.0
No. in Project	13

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	344624.03	430708.32	5.00	220.00	0.00	0.00	0.40			
2	A	344602.72	430733.34	5.00	216.00	0.00	0.00	0.40			
3	A	344584.29	430756.25	5.00	207.00	0.00	0.00	0.40			
4	A	344573.94	430780.53	5.00	204.00	0.00	0.00	0.40			
5	A	344582.05	430815.15	5.00	291.00	0.00	0.00	0.40			
6	A	344609.56	430825.86	5.00	292.00	0.00	0.00	0.40			
7	A	344617.19	430802.69	5.00	22.00	0.00	0.00	0.40			
8	A	344553.83	430803.93	5.00	292.00	0.00	0.00	0.40			
9	A	344524.43	430793.68	5.00	294.00	0.00	0.00	0.40			
10	A	344499.72	430783.76	5.00	294.00	0.00	0.00	0.40			
11	A	344498.86	430766.29	5.00	23.00	0.00	0.00	0.40			
12	A	344616.54	430845.17	5.00	22.00	0.00	0.00	0.40			
13	A	344639.38	430867.50	5.00	292.00	0.00	0.00	0.40			

Horizontal Illuminance (lux)

Grid 1



Results

Eav	3.43
Emin	0.32
E _{max}	17.02
E _{min} /E _{max}	0.02
E _{min} /E _{av}	0.09

10. APPENDIX B

10.1 Housing Plot Calculation Report

DATE: 12 June 2021
DESIGNER: SHD Lighting Consultancy Ltd
PROJECT No: SHD253
PROJECT NAME: Oak Lane, Newton with Scales



House Plot Outdoor Lighting

Rear and Side luminaires:
Ansell Helder LED Circular Bulkhead 12.5w 3000k Circular Black Eyelid PIR

These are to be mounted at 1800mm from floor level and have a semi circular upper light shield and integral PIR motion sensor.

Front luminaires
DETA stainless steel 4w 2700k LED fixed (downward) wall light

These are to be mounted at 1800mm from floor level and have an integral PIR motion sensor.

Private Residential Lighting

PREPARED BY: SHD Lighting Consultancy Ltd
Contact: info@shdlighting.co.uk
Phone: 07834 490 192
Website: www.shdlighting.co.uk

Layout Report

General Data

Dimensions in Metres Angles in Degrees
Grid Origin 344452.1m x 430673.2m
Area 208.0m x 192.0m
Sample Spacing 1.50m x 1.50m

Luminaires

Luminaire A Data

Supplier	
Type	L2855
Lamp(s)	UH1023-0102
Lamp Flux (klm)	0.40
File Name	PMD 0011 V1.0 - L2855LED6_Fixed Wall Light with PIR.ies
Maintenance Factor	1.00
Imax70,80,90(cd/klm)	12.0, 4.0, 0.2
No. in Project	37

Luminaire B Data

Supplier	
Type	AHELED/EB/PIR
Lamp(s)	
Lamp Flux (klm)	0.52
File Name	aheled_eb_pir.IES
Maintenance Factor	1.00
Imax70,80,90(cd/klm)	180.3, 124.7, 72.4
No. in Project	67

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	344484.99	430789.33	1.80	203.00	0.00	0.00	0.10			
2	A	344495.22	430789.80	1.80	291.00	0.00	0.00	0.10			
3	A	344502.27	430792.63	1.80	290.00	0.00	0.00	0.10			
4	A	344506.24	430794.25	1.80	292.00	0.00	0.00	0.10			
5	A	344513.45	430797.17	1.80	292.00	0.00	0.00	0.10			
6	A	344518.97	430799.41	1.80	291.00	0.00	0.00	0.10			
7	A	344522.95	430801.03	1.80	291.00	0.00	0.00	0.10			
8	A	344530.17	430803.95	1.80	291.00	0.00	0.00	0.10			
9	A	344534.68	430805.64	1.80	291.00	0.00	0.00	0.10			
10	A	344542.29	430808.75	1.80	292.00	0.00	0.00	0.10			
11	A	344549.25	430809.36	1.80	290.00	0.00	0.00	0.10			
12	A	344557.37	430812.66	1.80	291.00	0.00	0.00	0.10			
13	A	344561.86	430814.48	1.80	290.00	0.00	0.00	0.10			
14	A	344569.66	430817.63	1.80	292.00	0.00	0.00	0.10			
15	A	344575.86	430819.89	1.80	292.00	0.00	0.00	0.10			
16	A	344583.40	430822.95	1.80	290.00	0.00	0.00	0.10			
17	A	344587.90	430824.41	1.80	292.00	0.00	0.00	0.10			
18	A	344595.36	430827.43	1.80	292.00	0.00	0.00	0.10			
19	A	344602.54	430831.48	1.80	292.00	0.00	0.00	0.10			
20	A	344609.29	430833.08	1.80	292.00	0.00	0.00	0.10			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
21	A	344616.76	430840.32	1.80	22.00	0.00	0.00	0.10			
22	A	344627.73	430812.08	1.80	201.00	0.00	0.00	0.10			
23	A	344629.88	430806.78	1.80	202.00	0.00	0.00	0.10			
24	A	344609.85	430801.78	1.80	24.00	0.00	0.00	0.10			
25	A	344603.05	430809.60	1.80	114.00	0.00	0.00	0.10			
26	A	344611.96	430797.76	1.80	22.00	0.00	0.00	0.10			
27	A	344615.13	430789.91	1.80	22.00	0.00	0.00	0.10			
28	A	344616.83	430785.74	1.80	21.00	0.00	0.00	0.10			
29	A	344620.04	430777.85	1.80	22.00	0.00	0.00	0.10			
30	A	344575.33	430785.14	1.80	202.00	0.00	0.00	0.10			
31	A	344578.11	430778.30	1.80	201.00	0.00	0.00	0.10			
32	A	344582.37	430768.71	1.80	203.00	0.00	0.00	0.10			
33	A	344546.76	430784.38	1.80	22.00	0.00	0.00	0.10			
34	A	344513.80	430770.14	1.80	202.00	0.00	0.00	0.10			
35	A	344635.65	430792.53	1.80	202.00	0.00	0.00	0.10			
36	A	344637.64	430787.63	1.80	204.00	0.00	0.00	0.10			
37	B	344485.25	430795.11	1.80	113.00	0.00	0.00	0.10			
38	B	344491.25	430797.56	1.80	112.00	0.00	0.00	0.10			
39	B	344494.35	430795.39	1.80	22.00	0.00	0.00	0.10			
40	B	344498.98	430800.69	1.80	113.00	0.00	0.00	0.10			
41	B	344503.83	430802.64	1.80	111.00	0.00	0.00	0.10			
42	B	344509.15	430804.81	1.80	114.00	0.00	0.00	0.10			
43	B	344513.18	430801.76	1.80	21.00	0.00	0.00	0.10			
44	B	344515.25	430802.58	1.80	203.00	0.00	0.00	0.10			
45	B	344515.69	430807.45	1.80	112.00	0.00	0.00	0.10			
46	B	344520.55	430809.41	1.80	113.00	0.00	0.00	0.10			
47	B	344525.84	430811.57	1.80	110.00	0.00	0.00	0.10			
48	B	344530.85	430813.59	1.80	111.00	0.00	0.00	0.10			
49	B	344533.87	430814.81	1.80	113.00	0.00	0.00	0.10			
50	B	344529.75	430808.45	1.80	23.00	0.00	0.00	0.10			
51	B	344531.81	430809.24	1.80	203.00	0.00	0.00	0.10			
52	B	344536.50	430815.87	1.80	115.00	0.00	0.00	0.10			
53	B	344539.67	430817.16	1.80	111.00	0.00	0.00	0.10			
54	B	344541.83	430813.28	1.80	23.00	0.00	0.00	0.10			
55	B	344547.80	430818.89	1.80	113.00	0.00	0.00	0.10			
56	B	344551.80	430820.50	1.80	114.00	0.00	0.00	0.10			

Layout Continued

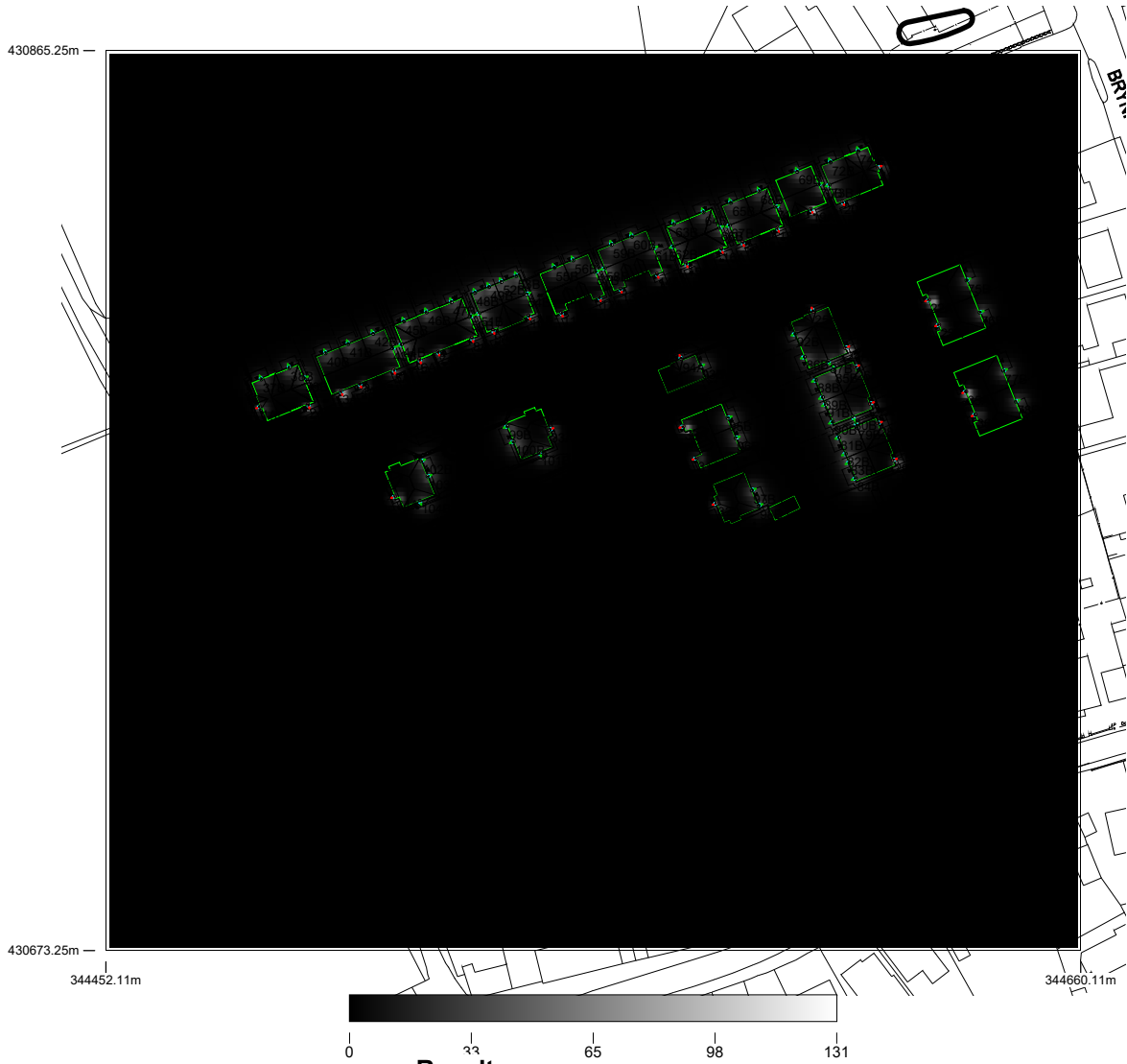
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
57	B	344556.51	430818.03	1.80	20.00	0.00	0.00	0.10			
58	B	344558.58	430818.85	1.80	202.00	0.00	0.00	0.10			
59	B	344560.01	430823.83	1.80	110.00	0.00	0.00	0.10			
60	B	344564.36	430825.57	1.80	112.00	0.00	0.00	0.10			
61	B	344568.93	430823.05	1.80	24.00	0.00	0.00	0.10			
62	B	344573.24	430823.52	1.80	203.00	0.00	0.00	0.10			
63	B	344573.35	430828.24	1.80	112.00	0.00	0.00	0.10			
64	B	344579.59	430830.77	1.80	113.00	0.00	0.00	0.10			
65	B	344585.45	430832.76	1.80	111.00	0.00	0.00	0.10			
66	B	344582.99	430827.46	1.80	22.00	0.00	0.00	0.10			
67	B	344585.24	430828.02	1.80	203.00	0.00	0.00	0.10			
68	B	344591.50	430835.24	1.80	115.00	0.00	0.00	0.10			
69	B	344599.62	430839.42	1.80	112.00	0.00	0.00	0.10			
70	B	344604.16	430836.69	1.80	23.00	0.00	0.00	0.10			
71	B	344594.95	430831.93	1.80	23.00	0.00	0.00	0.10			
72	B	344606.72	430841.40	1.80	111.00	0.00	0.00	0.10			
73	B	344606.48	430836.62	1.80	203.00	0.00	0.00	0.10			
74	B	344612.66	430843.81	1.80	110.00	0.00	0.00	0.10			
75	B	344635.72	430816.25	1.80	23.00	0.00	0.00	0.10			
76	B	344638.52	430809.38	1.80	20.00	0.00	0.00	0.10			
77	B	344643.56	430796.94	1.80	23.00	0.00	0.00	0.10			
78	B	344646.24	430790.39	1.80	23.00	0.00	0.00	0.10			
79	B	344612.35	430785.15	1.80	113.00	0.00	0.00	0.10			
80	B	344611.48	430787.20	1.80	294.00	0.00	0.00	0.10			
81	B	344608.56	430782.75	1.80	200.00	0.00	0.00	0.10			
82	B	344609.97	430779.27	1.80	203.00	0.00	0.00	0.10			
83	B	344610.74	430777.40	1.80	203.00	0.00	0.00	0.10			
84	B	344612.08	430774.04	1.80	203.00	0.00	0.00	0.10			
85	B	344607.44	430797.19	1.80	110.00	0.00	0.00	0.10			
86	B	344601.20	430799.92	1.80	202.00	0.00	0.00	0.10			
87	B	344606.26	430799.11	1.80	292.00	0.00	0.00	0.10			
88	B	344603.59	430795.00	1.80	203.00	0.00	0.00	0.10			
89	B	344605.08	430791.32	1.80	203.00	0.00	0.00	0.10			
90	B	344607.21	430786.06	1.80	203.00	0.00	0.00	0.10			
91	B	344605.69	430789.77	1.80	203.00	0.00	0.00	0.10			
92	B	344599.22	430804.85	1.80	203.00	0.00	0.00	0.10			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
93	B	344578.91	430797.93	1.80	20.00	0.00	0.00	0.10			
94	A	344574.85	430799.48	1.80	113.00	0.00	0.00	0.10			
95	B	344584.76	430786.87	1.80	22.00	0.00	0.00	0.10			
96	B	344586.48	430782.58	1.80	22.00	0.00	0.00	0.10			
97	B	344589.91	430771.45	1.80	22.00	0.00	0.00	0.10			
98	B	344591.34	430768.18	1.80	22.00	0.00	0.00	0.10			
99	B	344537.80	430785.13	1.80	203.00	0.00	0.00	0.10			
100	B	344539.10	430781.88	1.80	203.00	0.00	0.00	0.10			
101	B	344544.61	430779.54	1.80	292.00	0.00	0.00	0.10			
102	B	344519.38	430777.68	1.80	22.00	0.00	0.00	0.10			
103	B	344520.73	430774.41	1.80	22.00	0.00	0.00	0.10			
104	B	344519.08	430769.20	1.80	291.00	0.00	0.00	0.10			

Horizontal Illuminance (lux)

Grid 1



Results

Eav	1.05
Emin	0.00
Emax	130.93
Emin/Emax	0.00
Emin/Eav	0.00

Horizontal Illuminance (lux)

Grid 1



Results

Eav	1.05
Emin	0.00
Emax	130.93
Emin/Emax	0.00
Emin/Eav	0.00

Horizontal Illuminance (lux)

Grid 1



Results

Eav	1.05
Emin	0.00
Emax	130.93
Emin/Emax	0.00
Emin/Eav	0.00

11. APPENDIX C

11.1 Housing Lighting Renders



Figure 11.1: Simulated front wall lighting



Figure 11.2: Simulated rear wall lighting





AXIA 3



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.



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
- 5 sizes to provide the most accurate solutions for numerous road and urban applications
- Easy installation: pre-cabled and equipped with universal fixation 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.



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.

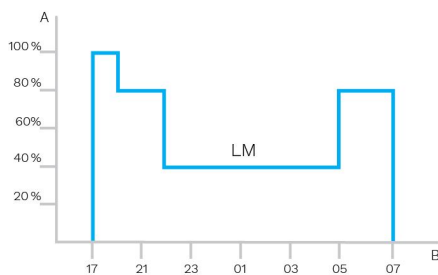




Custom dimming profile

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.

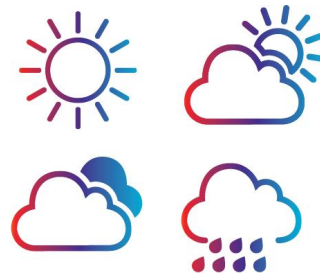


A. Dimming level | B. Time



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 parameters 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.



The Schröder Bluetooth solution consists of 3 main components:

- A Bluetooth dongle plugged into the modular driver of the luminaire (BLE transceiver)
- A Bluetooth antenna fitted on the luminaire
- A smartphone application called Sirius BLE



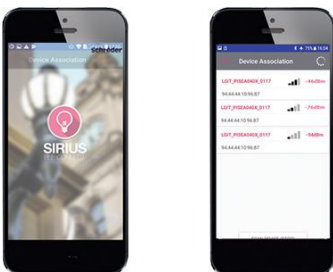
Easy to use

The Schröder Bluetooth solution is ideal for the on-site configuration of individual outdoor luminaires using Bluetooth. From the ground, the user is able to switch the luminaire on or off, adapt the dimming curve, read diagnostic data and much more. A user-friendly application called Sirius BLE provides an easy and secure access to the control and configuration functions.

Whether you are managing a lighting network in an urban or a residential area, this solution will make it easy to control your outdoor luminaires while simply standing by the pole.

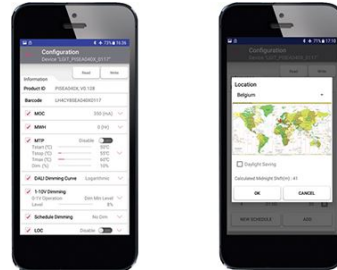
Quick and easy pairing

Get the Sirius App from Schröder. Go to the menu. Press the “SCAN DEVICE (START)” button, to search for the surrounding BLE modules. They will be displayed with a bar graphic (signal intensity) to indicate the closest and the most distant one you can reach. Click on the device you want to connect to and enter your personal access key to control the luminaire.



Defining the settings

Once you are connected to a luminaire, you can set various parameters such as the maximum output current, minimum dimming level and custom dimming profile.



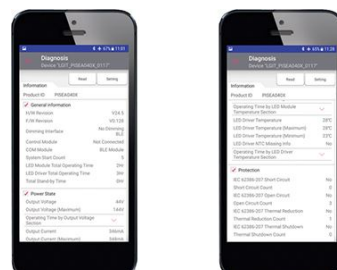
Manual dimming control

The App enables you to do a manual override to adapt the dimming levels instantly. Simply tap on the “Dimming” button in the main menu and adjust the dimming using the wheel and button. Predefined dimming levels can be applied immediately. The corresponding value is displayed on the wheel. This enables you to test the ON / OFF and dimming features of the luminaire paired to the smartphone.



On-site diagnostic

When a luminaire is paired, you can access various diagnostic information: total number of power up events, operation time of LED module and driver, total energy consumption of LED driver... etc. You can also track operating events (short circuits, thermal shutdowns...). The diagnostic values may be the current state or values accumulated to date.





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

As a founding member of the Zhaga consortium, Schröder 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

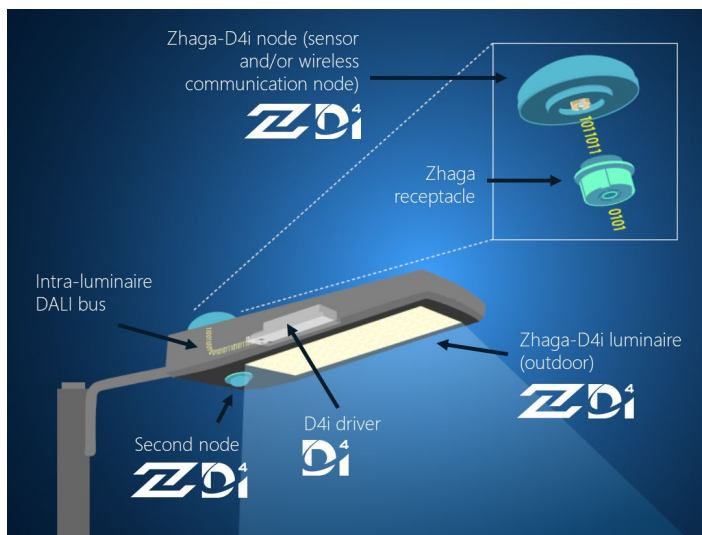
The Zhaga-D4i certification covers all the critical features including mechanical fit, digital communication, data reporting and power requirements within a single luminaire, ensuring plug-and-play interoperability of luminaires (drivers) and peripherals such as connectivity nodes.

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.

2 sockets: top and bottom

The Zhaga socket is small and suited to applications where aesthetics is essential. The architecture of Zhaga-D4i also foresees the possibility of putting two sockets on one luminaire, allowing for instance, the combination of a detection sensor and a control node. This also has the added value of standardising certain detection sensor communications with the D4i protocol.





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



Tailored experience

Schröder 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. Schröder 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

Schröder 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.

Standardisation for interoperable ecosystems

Schröder 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 Schröder EXEDRA system relies on shared and open technologies.

Schröder 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, Schröder 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. Schröder 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.

GENERAL INFORMATION

Recommended installation height	4m to 12m 13' to 39'
Driver included	Yes
CE mark	Yes
ENEC certified	Yes
ENEC+ certified	Yes
ROHS compliant	Yes
Zhaga-D4i certified	Yes
Testing standard	LM 79-08 (all measurements in ISO17025 accredited laboratory)

HOUSING AND FINISH

Housing	Aluminium Composite materials
Optic	Polycarbonate
Protector	Polycarbonate (with integrated lenses)
Housing finish	Polyester powder coating
Standard colour(s)	RAL 7040 window grey RAL 9005 Jet black
Tightness level	IP 66
Impact resistance	IK 10
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)

OPERATING CONDITIONS

Operating temperature range (Ta)	-30°C up to +45°C / -22°F up to 113°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 61000-4-5 / EN 61547
Control protocol(s)	Bluetooth, DALI
Control options	Bi-power, Custom dimming profile, Photocell, Remote management
Socket	Zhaga (optional) NEMA 3-pin (optional) NEMA 6-pin (optional) NEMA 7-pin (optional) Low voltage socket (optional)
Associated control system(s)	Sirius BLE Owlet IoT Schröder EXEDRA
Sensor	PIR (optional)

OPTICAL INFORMATION

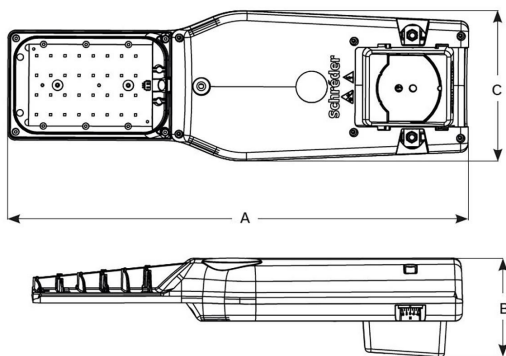
LED colour temperature	3000K (Warm White 730) 4000K (Neutral White 740)
Colour rendering index (CRI)	>70 (Warm White 730) >70 (Neutral White 740)
Upward Light Output Ratio (ULOR)	0%

LIFETIME OF THE LEDS @ TQ 25°C

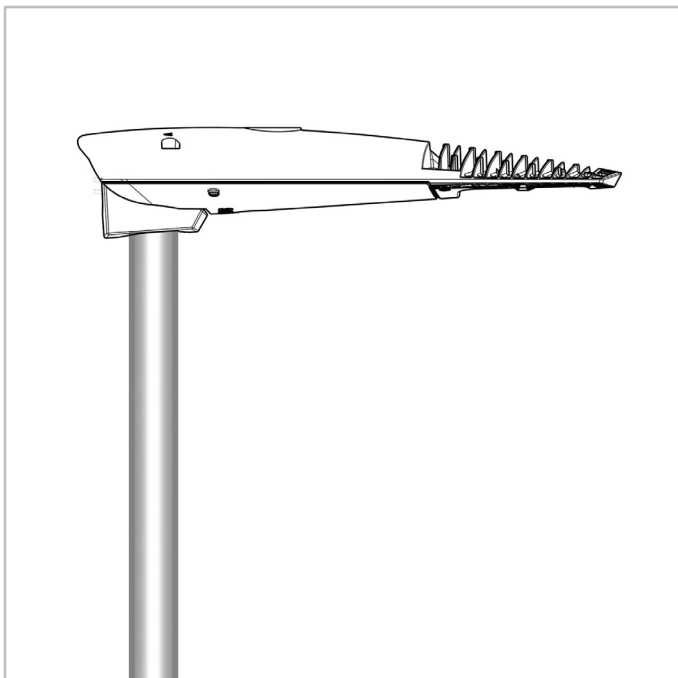
All configurations	100,000h - L90
--------------------	----------------

DIMENSIONS AND MOUNTING

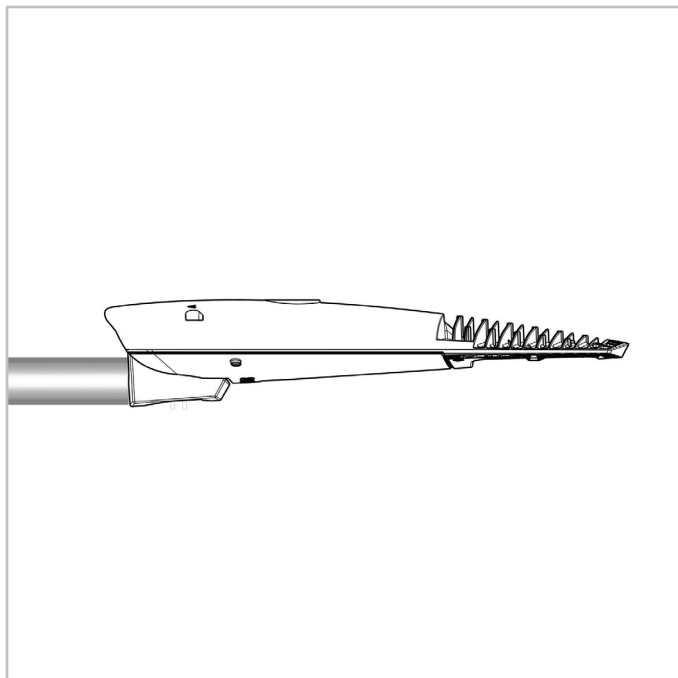
AxBxC (mm inch)	AXIA 3.1 - 513x130x191 20.2x5.1x7.5 AXIA 3.2 - 585x130x191 23.0x5.1x7.5 AXIA 3.3 - 550x130x277 21.7x5.1x10.9
Weight (kg lbs)	AXIA 3.1 - 3.6 7.9 AXIA 3.2 - 4.8 10.6 AXIA 3.3 - 6 13.2
Aerodynamic resistance (CxS)	AXIA 3.1 - 0.03 AXIA 3.2 - 0.03 AXIA 3.3 - 0.04
Mounting possibilities	Side-entry slip-over - Ø32mm Side-entry slip-over - Ø42mm Side-entry slip-over - Ø48mm Side-entry slip-over - Ø60mm Post-top slip-over - Ø60mm Post-top slip-over - Ø76mm



AXIA 3 | Post-top - Slip-over mounting for
Ø60 or Ø76mm spigot - 2xM10 screws



AXIA 3 | Side-entry - Slip-over mounting for
Ø32 (with accessory) or Ø42-60mm spigot
- 2xM10 screws





Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	
			Min	Max	Min	Max	Min	Max	Up to	Photometry
AXIA 3.1	8	300	700	1000	700	1100	8.4	8.4	131	
	8	400	900	1300	900	1400	11	11	127	
	8	600	1300	1900	1300	2100	16.6	16.6	127	
	8	700	1400	2200	1500	2400	19.4	19.4	124	
	8	850	1700	2600	1800	2800	22.8	22.8	123	
	16	200	900	1400	1000	1500	11.2	11.2	134	
	16	300	1400	2100	1500	2300	16.1	16.1	143	
	16	480	2100	3200	2300	3500	25.5	25.5	137	
	16	500	2200	3300	2300	3600	25.5	25.5	141	
	16	600	2600	3900	2700	4200	30.8	30.8	136	
	16	700	2900	4500	3100	4800	35.6	35.6	135	
	16	870	3500	5300	3700	5700	44	44	130	

Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



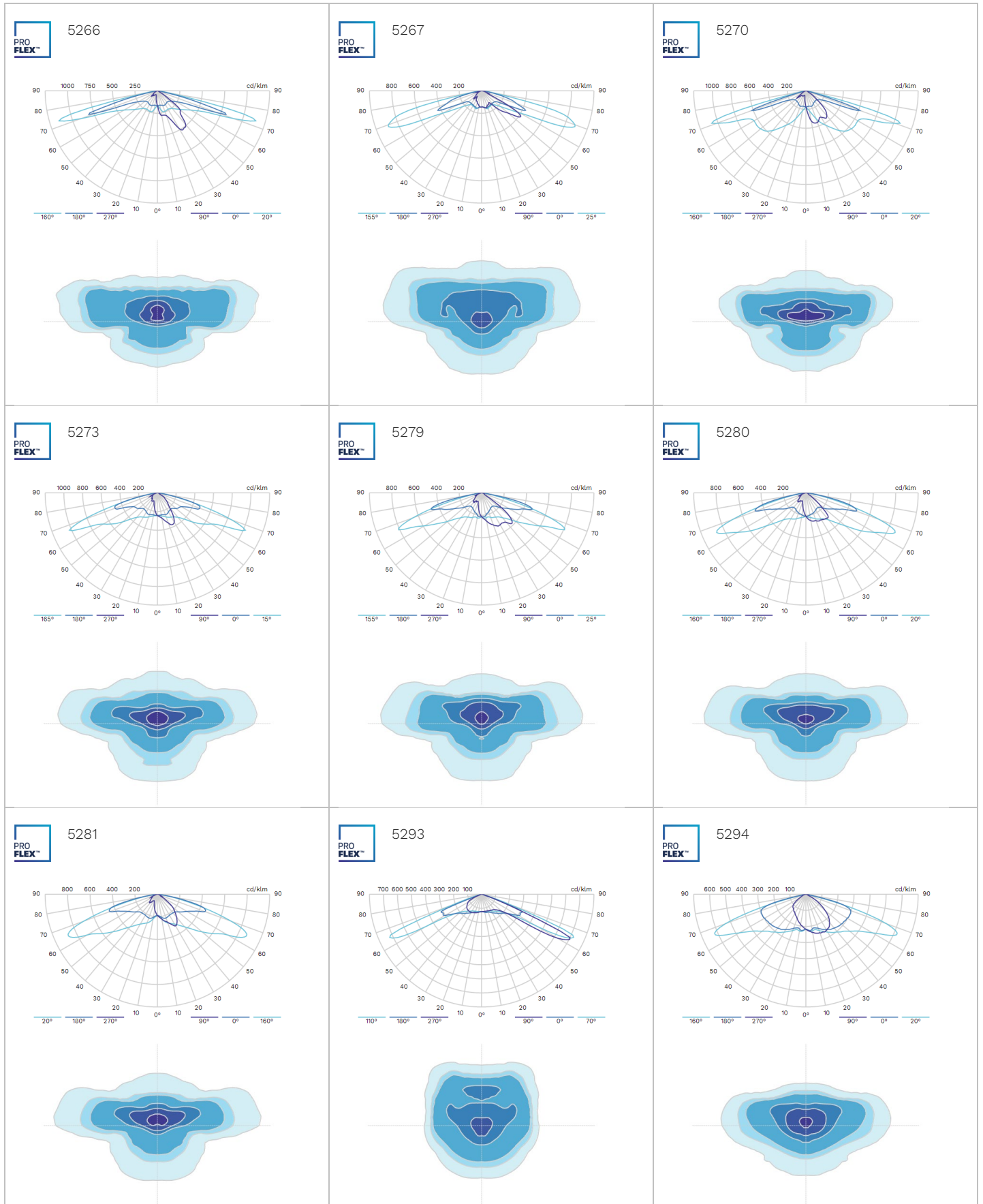
Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	
			Min	Max	Min	Max	Min	Max	Up to	Photometry
AXIA 3.2	24	200	2100	2200	2200	2300	15.3	15.3	150	
	24	300	3100	3200	3300	3400	22.4	22.4	152	
	24	400	4000	4100	4300	4400	29.7	29.7	148	
	24	500	4800	5000	5200	5400	37.2	37.2	145	
	24	590	5600	5800	6000	6200	44	44	141	
	24	700	6400	6700	6900	7100	52.5	52.5	135	
	24	800	7100	7400	7600	7900	60.5	60.5	131	
	24	900	7800	8100	8400	8700	68.5	68.5	127	
	24	1000	8400	8700	9000	9300	76	76	122	
	32	200	2800	2900	3000	3100	19.8	19.8	157	
	32	300	4100	4200	4400	4500	29.5	29.5	153	
	32	450	5900	6100	6300	6600	44.5	44.5	148	
	32	500	6500	6700	6900	7200	48.5	48.5	148	
	32	600	7600	7800	8100	8400	59	59	142	
	32	700	8600	8900	9200	9500	69	69	138	
	32	800	9500	9900	10200	10600	78	78	136	

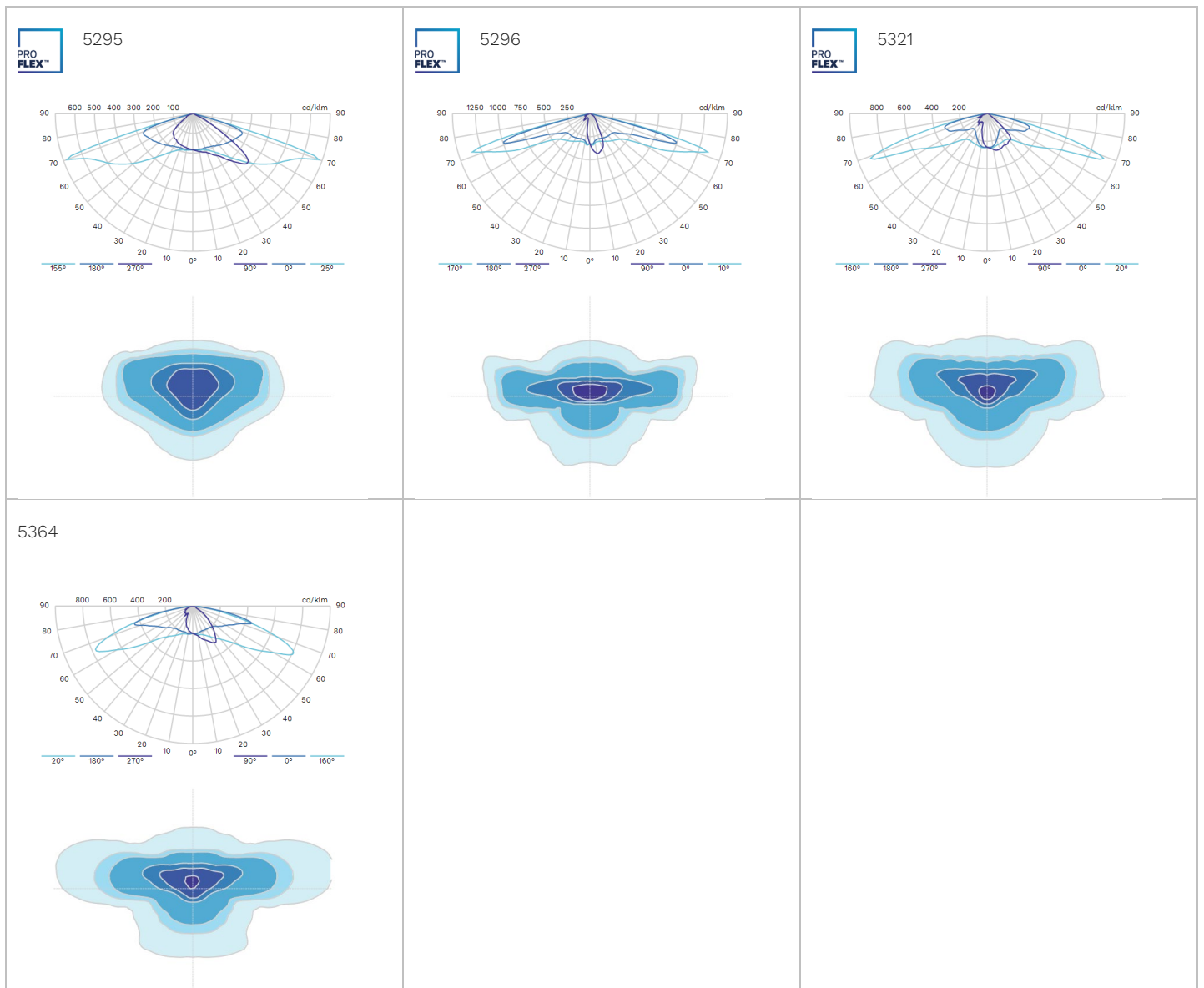
Tolerance on LED flux is $\pm 7\%$ and on total luminaire power $\pm 5\%$



Luminaire	Number of LEDs	Current (mA)	Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Neutral White 740		Power consumption (W)		Luminaire efficacy (lm/W)	
			Min	Max	Min	Max	Min	Max	Up to	Photometry
AXIA 3.3	48	200	4200	4300	4500	4600	28.6	28.6	161	
	48	300	6100	6400	6600	6800	42.5	42.5	160	
	48	400	8000	8300	8500	8900	57	57	156	
	48	550	10400	10900	11200	11600	79	79	147	
	48	600	11200	11700	12000	12500	86	86	145	
	48	700	12600	13200	13500	14100	100	100	141	
	48	800	13900	14500	14900	15500	115	115	135	
	48	880	14900	15500	15900	16600	129	129	129	
	64	200	5600	5800	6000	6200	37.7	37.7	164	
	64	300	8200	8500	8800	9100	56.5	56.5	161	
	64	420	11100	11500	11900	12400	79	79	157	
	64	500	12900	13400	13800	14400	94	94	153	
	64	600	15000	15600	16000	16700	113	113	148	
	64	700	16900	17600	18100	18800	137	137	137	
	64	880	19800	20600	21200	22100	172	172	128	

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





Stainless Steel Wall Lights



Description

This range of stainless steel outdoor wall lights are highly decorative and available in fixed and up/down models with or without PIR control, and are supplied with energy efficient LED lamps.

Features

- Available in Fixed and Up/Down
- High grade brushed stainless steel – grade 304 or 316 – suitable for use outdoors
- Include fixing screws and wall plugs
- Front shield is clear tempered glass
- GU10 lamp holder, maximum load 35W
- PIR version incorporates photocell
- Adjustable distance, time and lux levels on PIR
- Manual override facility on PIR
- 2-year guarantee (not including lamp)

Technical Specification

Voltage	230-240V 50Hz
Lamp holder	GU10
IP Rating	IP44
PIR	Range 8m x 90°
	Timer 10 secs. to 4 min.
	Lux 2 - 1000
LED lamp	4W, 6500K

- *Stainless grade 304 Not suitable for use in highly corrosive environments*

Standards

- BS EN 60598-1
- BS EN 60598-2
- RoHS compliant

Range

Stainless steel Grade 304

Up/Down	L2852LED6
Fixed with PIR	L2855LED6
Up/Down with PIR	L2856LED6
Up/Down with PIR (Tall body)	L2858LED6

Stainless steel Grade 316

Up/Down	L2872LED6
Fixed with PIR	L2875LED6
Up/Down with PIR	L2876LED6
Up/Down with PIR (Tall body)	L2878LED6

Dimensions

	Depth	Width	Height	Wall Plate
L2852/72	90	60	166	78Ø
L2855/75	105	60	90	180 x 60
L2856/76	105	60	164	180 x 60
L2858/78	105	60	228	200 x 60

All dimensions in mm



AHELED/EB/PIR



Features

All polycarbonate circular bulkhead for external applications.

Only suitable for semi commercial applications

fast loop-in / loop-out connections.

CCT selectable between 3000K, 4000K and 6500K.

Comparable performance to 28W TC-DD.

Body options of black or white.

Polycarbonate opal diffuser.

LED lifespan L70 54,000 hours.

Non-dimmable.

General Information

Lamp Type	LED
Colour / Finish	Black
IP Rating	IP54
IK Rating	IK09
Class Protection	2
Internal / External	External
Surface / Recessed / Suspended	Surface
Warranty (Years)	2
CE Mark	Yes
Diameter (mm)	215
Depth (mm)	80

Technical Information

Wattage	12.5W
Lumens Delivered	
Lm/W	
CRI	Ra 80
CCT	3000/4000/6500K
Input	220-240V
Hertz	50/60Hz
Operating Temp	-5°C to 25°C

Datasheet generated from <https://onetimepim.com> last updated Tuesday, March 30, 2021 8:29:52 AM

