



# Environmental Lighting Impact Assessment Report

## Station Road, Meltham – Phase 2

Project number: SHD828

Document reference: SHD828-SHD-HLG-STAT-RP-EO-Lighting Assessment Report-R0

Revision	Purpose of document	Compiled by	Reviewed by	Review date
R0	Planning	Steve Higham	Steve Higham	10/02/2023



SHD Lighting Consultancy Ltd

📧: [info@shdlighting.co.uk](mailto:info@shdlighting.co.uk)

☎: 07834 490 192

🌐: [shdlighting.co.uk](http://shdlighting.co.uk)



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## **1. INTRODUCTION**

### **1.1 General**

- 1.1.1 This report has been prepared by SHD Lighting Consultancy Ltd on behalf of HNA Architects to develop a sensitive lighting strategy to support the planning application for the development of an area accessed off Station Road, Meltham (hereafter referred to as the *Proposed Development*).
- 1.1.2 The report has been prepared by SHD Lighting Consultancy Ltd to the best of our knowledge using the information provided by HNA Architects.
- 1.1.3 The report assesses the potential effects of obtrusive light that could arise from outdoor artificial lighting at the Proposed Development.
- 1.1.4 The lighting design and assessment should be carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.1.5 SHD Lighting Consultancy specialise in outdoor lighting design and lighting impact studies and has the knowledge, experience and professional qualifications to undertake lighting design calculations and environmental lighting impact assessment reports.
- 1.1.6 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.
- 1.1.7 The principal objective is to identify the effects associated with obtrusive light on identified sensitive receptors and proposes suitable mitigation measures.
- 1.1.8 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).
- 1.1.9 Light pollution can also create negative effects on ecological receptors in the area, particularly concerning bat roosts and foraging corridors.
- 1.1.10 The lighting impact assessment considers the maximum adverse scenario of the proposed artificial lighting, to assess the significance of the potential effects on identified receptors.

## **2. LEGISLATION, PLANNING AND POLICY GUIDANCE**

### **2.1 Legislative Background**

- 2.1.1 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 to be prejudicial to health or nuisance”

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

### **2.2 National Planning Policy Framework**

- 2.2.1 The National Planning Policy Framework (NPPF), published in March 2012, revised in July 2018, updated in February 2019 and most recently revised on 20th July 2021, sets out Government's planning policies for England and how they are expected to be applied. It also provides a framework for local plans.
- 2.2.2 Planning policies and decisions should also ensure that the Proposed 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 Proposed Development.

## 2.3 Relevant Lighting Standards

2.3.1 The applicable standards for outdoor lighting that relate to the Proposed Development are:

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

2.3.2 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

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

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

2.3.4 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.

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

2.3.5 Lighting Guide 6 provides information and guidance on lighting in the exterior environment particularly light pollution, energy use and long-term sustainability.

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

2.3.6 Guidance is provided within Public Lighting Guide 04 which outlines the best practice approach to preparing lighting assessments.

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

- 2.3.7 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 the areas where bats have been identified.
- 2.3.8 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- into zones of increasing illuminance limits radiating away from the feature” (refer to Figure 2.1)

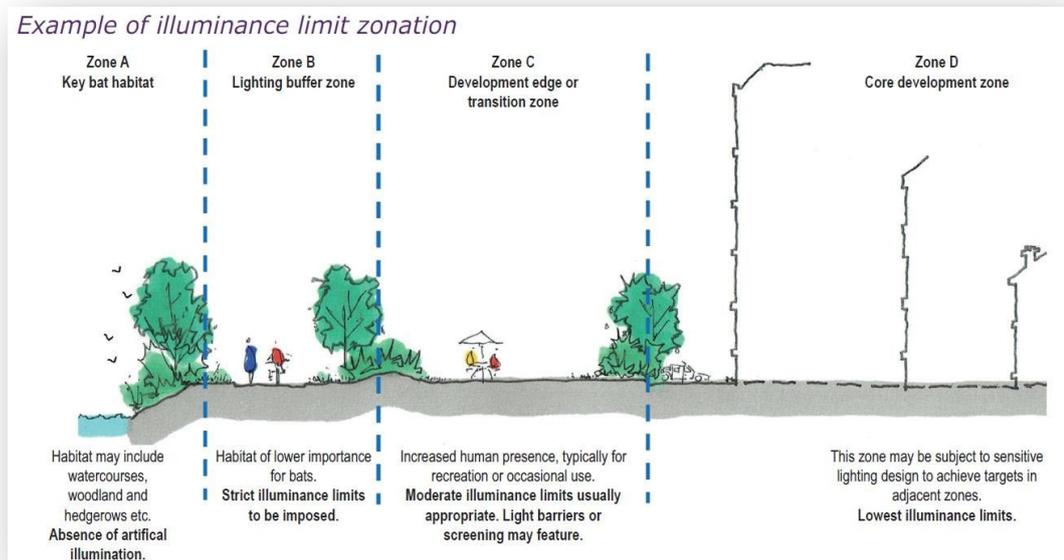


Figure 2.1

Extract from The Institution of Lighting Professionals: Guidance Note 08/18: Bats and artificial lighting in the UK (2018)

### 3. ASSESSMENT METHODOLOGY

#### 3.1 Environmental Zone Classification

- 3.1.1 All standards consulted are nationally recognised documents, (some internationally also) which deal with all design issues associated with external lighting.
- 3.1.2 CIE Standards, the CIBSE and the Society of Light & Lighting guidance documents, all apply a common Environmental Zoning system, which is summarised in Table 3.1 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 nighttime activity

Table 3.1

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 upon 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 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 relative intrinsic value in the UK.

- 3.1.3 Using Table 3.1, the Proposed Development would be classified as having an environmental zone of **E2 Low district brightness**

### 3.2 Obtrusive Light

- 3.2.1 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.
- 3.2.2 Nuisance / intrusion, The spilling of light beyond the area or property being lit. Light nuisance can include intrusion into windows of neighbouring properties, but it can also cause issues to habitats and areas of high biodiversity interest.
- 3.2.3 Sky glow, this is the glow that is visible around urban areas resulting from the scattering of artificial light. Sky glow is light from reflected surfaces and badly directed light sources illuminating air molecules and other particles. A major effect of sky glow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source.
- 3.2.4 Glare, the uncomfortable brightness of a light source when viewed against a contrasting darker background. Glare forms a veil of luminance from poorly controlled and directed lighting that reduces contrast and visibility.

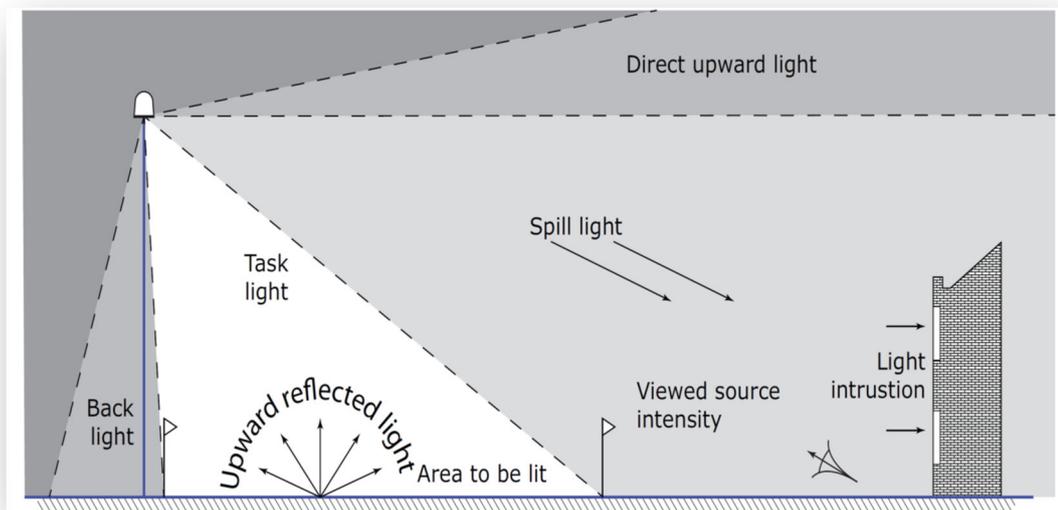


Figure 3.1: Obtrusive light diagram

Extract from The Institution of Lighting Professionals: Guidance Note 01/21:  
The reduction of obtrusive light (2021)

### **3.3 Potential Effects**

3.3.1 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.

3.3.2 Poorly designed lighting generally consists of the installation of a limited number of luminaires that are being used to light a wide area. Due to this, the lighting is normally installed with tilt angles that are too great, because there is a need to spread the light as far as possible, lighting the intended area, as well as surfaces where the lighting was not intended.

3.3.3 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.

3.3.4 It is proposed that the lighting impact can be minimised by using accepted methods of lighting control, essentially limiting illuminance and controlling light spill.

3.3.5 Generally lighting shall be selected to provide safety and security without polluting the boundary site residents.

3.3.6 These accepted methods have all been adopted within the proposed lighting design to keep the overall impact of the lighting to a minimum.

## **4. BASELINE CONDITIONS**

### **4.1 Site Overview**

- 4.1.1 The site for the Proposed Development is off Station Road, Meltham accessed from the existing road network, that is illuminated with lighting columns that are owned and maintained by the Local Authority.
- 4.1.2 The Proposed Development is the second phase of a development, which SHD Lighting Consultancy completed an environmental lighting impact assessment report in 2022.
- 4.1.3 Information in this report will assess the impact of the introduction of artificial lighting that consists of four illuminated bollards installed on stone pillars at the bottom of each housing plot driveway.



Figure 4.1: Proposed Development boundary outline (Aerial View)

## **5. LIGHTING STRATEGY**

### **5.1 Lighting Brief**

- 5.1.1 The lighting strategy aim is to ensure that lighting is fit for its purpose and to ensure safety and security for vehicles and pedestrians during the hours of darkness, whilst minimising the potential for obtrusive light.
- 5.1.2 HNA Architects provided an ecology report which identifies sensitive areas adjacent to the Proposed Development particularly an existing woodland area, facing the house plot front elevation on the opposite side of Station Road.
- 5.1.3 It is this woodland section that has been identified as a sensitive receptor.
- 5.1.4 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:
- SHD828-SHD-HLG-STAT-CA-EO-Lighting Calculation-R0
  - SHD828-SHD-HLG-STAT-DR-EO-Lighting Layout-R0
  - Environmental management plan. Station road.

### **5.2 Key Areas Requiring Lighting**

- 5.2.1 Lighting is required within the following areas:
- Private Driveways

## 5.3 Lighting Criteria



Figure 5.1: Driveway bollard positions

- 5.3.1 Figure 5.1 shows the four proposed illuminated bollard positions for each of the house plots.
- 5.3.2 Each house plot shall have a single illuminated bollard mounted on a 1200mm high stone pillar at the bottom of each drive onto Station Road.



Figure 5.2: CGI image of house style

- 5.3.3 The area on the other side of Station Road contains the woodland, described in section 5.1.2.

**5.4 Lighting Calculations and Modelling**

- 5.4.1 An external lighting calculation has been prepared by SHD Lighting Consultancy Ltd for the Proposed Development off Station Road, Meltham.
- 5.4.2 SHD Lighting Consultancy do not accept any responsibility for any lighting designs and strategies prepared by others.
- 5.4.3 The site was modelled, replicating the design provided by others, using industry-standard software Lighting Reality.
- 5.4.4 Lighting Reality is a software package which utilises the manufacturer's luminaire photometric data files to simulate the lighting output of lighting units.
- 5.4.5 It is to be noted that the lighting calculation report has been produced with a luminaire maintenance factor of 1.0 as specified in the ILP publication, Public Lighting Guide 04 – Guidance on undertaking an Environmental Assessment Report.
- 5.4.6 It defines a maintenance factor of 1.0 as being the worst-case scenario as all the outdoor lighting will be performing at peak intensity.
- 5.4.7 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.
- 5.4.8 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.
- 5.4.9 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.
- 5.4.10 The calculation model (illustrated by illuminance levels and Isolux contour lines on the layout drawing) does not include any proposed or existing planting/hedgerows/ trees on site, or in the surrounding area.

**5.5 Sensitive Receptors**

There is an existing woodland facing the Proposed Development which has been identified in the ecology report (*Environmental management plan. Station road*) as an area which has foraging bats.



Figure 5.2: Station Road (facing West) woodland



Figure 5.3: Station Road (facing East) woodland





**6. OUTDOOR LIGHTING REQUIREMENTS**

**6.1 Proposed Lighting Requirements**

- 6.1.1 Station Road is a privately owned road and each house plot bollard shall be used to illuminate the driveway and assist the ingress and egress of vehicles and pedestrians using the drives at night.
- 6.1.2 Due to the ecology constraints, each driveway shall have an average lighting level 0.4 lux in the proximity of the bollard, dropping down to 0.10 on the periphery of the driveways onto Station Road.

CHART OF EXAMPLE LUX LEVELS FOR REFERENCE			
Lighting Conditions	Lux Level	Lighting Conditions	Lux Level
British summer sunshine	50,000	Typical side road lighting	5
Overcast sky	5,000	Minimum security lighting	2
Well-lit office	500	Twilight	1
Minimum for easy reading	300	Clear full moon	0.25 to <1
A passageway or outside working area	50	Typical moonlight/cloudy sky	0.1
Good main road lighting	5 to 20	Typical starlight	0.001
Sunset	10	Poor starlight	0.0001

Table 6.1: Chart of example lux levels for reference

## 6.2 Driveway Bollards

- 6.2.1 Lighting of each driveway shall use an illuminated bollard and takes into consideration recommendations provided in guidance for Bats and artificial lighting in the UK (GN08/18).
- 6.2.2 This will ensure that the lighting levels provided are suitable for operational purposes, whilst ensuring the environmental surroundings are suitably mitigated against, in accordance with the guidance.
- 6.2.3 It is proposed that the illuminated bollards are mounted on top of the stone pillars at the bottom of each drive.
- 6.2.4 Each bollard is designed with louvres that will distribute light downwards only to reduce the potential for light to spill onto the boundaries surrounding the drives and upwards towards the sky.
- 6.2.5 Lighting performance parameters of the illuminated bollards are outlined in Table 6.2 below

LUMINAIRE SPECIFICATION	
Location:	On stone pillars
Luminaire Manufacturer:	Ansell Lighting
Luminaire model ref:	Monza 450mm
Luminaire style:	Bollard
Mounting height:	1200mm from ground level
Mounting type:	Pot top mounted
Light source:	75w E27 lamp
Lighting luminous intensity class:	G1 (no light above 90° from horizontal)
DESIGN PARAMETERS	
Luminaire control:	Individual photocell from each house plot

Table 6.2: Bollard lighting performance parameters

### 6.3 Bollard Parameters

- 6.3.1 The bollards each use a warm white lamps (2700k) light source which has reduced levels of blue light and this is less harmful to certain bat species. (ILP GN08/18)
- 6.3.2 Each bollard will be switched using individual photocells mounted on each house plot external wall and shall be switched at 20 lux (1:1) ratio.



Figure 6.1: Ansell Lighting Monza 450mm illuminated bollard

- 6.3.3 The lighting calculation were carried out using photometric data obtained from Ansell Lighting, which uses a 75w E27 warm white (2700k) lamp.
- 6.3.4 There is a manufacturer's option to fit a LED replacement lamp which will improve the longevity of the light source and provides the opportunity to use a LED replacement lamp with a lower lumen output, which will further reduce any light spill onto the surrounding environment.
- 6.3.5 However for the purpose of this lighting assessment, the calculations use a 75w lamp with a maintenance factor of 1.0, to represent a 'day one' worst-case scenario.

## **7. CONCLUSION**

### **7.1 Design Commentary**

- 7.1.1 The lighting strategy and assessment outline the lighting design criteria for the proposed bollard lighting at 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 lighting industry guidance.
- 7.1.2 Compliance with this lighting strategy will allow a safe and sensitive level of light for the movement of pedestrians/drivers at night, whilst reducing the potential for obtrusive light and limiting this to a negligible level and in compliance with ILP GN08/18.
- 7.1.3 In addition to mitigating the potential effects of lighting on residential amenities, ecologically sensitive receptors have been considered through the use of warm white light sources with lower blue light content and through minimising boundary light spill as far as reasonably practicable.
- 7.1.4 It is recommended that changing the 75w E27 lamp to a warm white LED equivalent lamp would reduce energy costs and reduce ongoing maintenance caused by changing incandescent lamps.
- 7.1.5 In summary it is our considered opinion that the proposed lighting installation will not have any significant negative impact on the immediate environment concerning lighting pollution and that all sensible steps have been taken within the design stage of this lighting scheme to keep the impact on the environment to a minimum.

**8. APPENDIX A****8.1 Light Spill Drawing**

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**GENERAL NOTES**

- All documents shall be checked to ensure they are compatible by the contractor before construction commences.
- In the event of apparent ambiguity or contradiction, SHD Lighting Consultancy Ltd and the overseeing organisation shall be notified immediately.
- Before construction commences, the site engineer shall ensure that all setting out information is mutually compatible with all the drawings and documents provided by the overseeing organisation and all drawings and documents are to be read in conjunction with one another.
- SHD Lighting Consultancy Ltd accept no liability in the event of not being notified and where construction work has commenced.
- This lighting design has been prepared in accordance with the HEMSA/HEA Guidance Note - CDM2015 Regulations, Issue 1.1 dated 09/04/15 - Procedure 2 and The Construction (Design and Management) Regulations 2015 - PART 3 Health and safety duties and roles - 9. Duties of designers.

**NOTES**

- All drawings and documents are to be read in conjunction with one another and are mutually compatible and shall be read as such. Any inaccuracies are to be reported to the overseeing organisation immediately.
- The information on this drawing does not account for installation considerations, site conditions or provide any form of risk assessment.
- It should be assumed by the contractor that not all services have been identified during the design period.
- It is the responsibility of the contractor to take all necessary steps to ensure that any such unidentified services are carefully located and not damaged.
- The contractor shall identify the location of any overhead electrical or communication equipment prior to the undertaking of any onsite works. Should the presence of such equipment be identified, the contractor shall consult with the relevant statutory undertaker for further guidance.
- Electrical installation work shall be carried out in accordance with the requirements of the latest edition of the IET wiring regulations, BS 7671.
- The planting of trees near to bollards is to be avoided as future growth may inhibit lighting levels.
- The calculation shown by this drawing assumes that the whole area being considered is in the same plane, i.e. there are no changes in gradient or elevation and no account has been taken for the blocking effect caused by buildings, trees, etc.
- Final bollard positions shall be agreed onsite with the overseeing organisation.
- Before construction commences, the site engineer shall ensure that all setting out information is mutually compatible with all the drawings and documents provided by the designers.
- Bollard positions indicated upon this drawing may change without prior or additional notice due to local site or environmental constraints subject to designers approval.

**STATUTORY SERVICE NOTES**

- Current statutory service record plans should be obtained by the contractor / overseeing organisation before the commencement of any street lighting installation or removal works.
- All services are to be located and identified prior to installing or removing any lighting columns.
- Installation and Removal works should be carried out in accordance with Energy Network Association Technical Specification 43-8, Electricity at Work Regulations 1989, Construction Design and Management (CDM) 2015 & G39/r1 and all other relevant Health and Safety Executive regulations.
- All works in the vicinity of any overhead cables shall conform to the requirements of Health and Safety Executive, Guidance Note GS6 "Avoidance of danger from overhead power lines"
- All works in the vicinity of underground mains or cables shall conform to the requirements of Health and Safety Executive, Health and Safety Guidance HGS47 "Avoiding danger from underground services" and any additional requirements specified by the relevant undertaker.
- The contractor will be responsible for liaison with the undertakers and for programming the agreed protection and / or diversion works to any statutory undertakers apparatus into the overall works programme

The details provided on this drawing are subject to comments by all the relevant approving authorities or overseeing organisation. No construction works shall take place until technical approval has been obtained by the approving authority or overseeing organisation. It is to be understood that these drawings and the information shown are preliminary only and shall not be used for construction. Should the contractor commence work on site prior to obtaining technical approval, then it is entirely at their own risk and no liability shall be accepted by SHD Lighting Consultancy Ltd.

City 4	Proposed illuminated bollard of 450mm nominal height as supplied by Ansell Lighting mounted on 1200mm stone pillar.
Bollard Reference:	Monza Inox
Mounting Type:	Post top mounted on stone pillar
Manufacturer Ref:	AME27045/SS
Luminaire Wattage:	75 w
Colour Temperature:	Warm White (2700k)
Luminous Intensity:	G1
Control Type:	Each housing plot has an external photocell (20 lux 1:1)
Supply:	Individual housing plot supply to each individual illuminated bollard
Primary Isolator:	Double pole Isolator with 32A double pole switch with BS88-2 6A HRC fuse within base compartment of each bollard and a 16A fuse within each house plot.
Internal Wiring:	Internal wiring to luminaire shall be 1.5mm <sup>2</sup> PVC insulated flexible cable



Ansell Monza Inox Stainless Steel 450mm bollard

**ISOLUX CONTOUR KEY:**

- 0.10 Isolux contour line
- 0.20 Isolux contour line
- 0.40 Isolux contour line

Law Coyt

Hall

FS

Cor

R0	INITIAL DESIGN FOR REVIEW AND COMMENT	10/02/2023	SRH
REV	DESCRIPTION	DATE	BY



info@shdlighting.co.uk 07834 490 192 www.shdlighting.co.uk

SCHEME:	STATION ROAD, HUDDERSFIELD		
DRAWING:	PRIVATE LIGHTING DESIGN		
CLIENT:	HNA ARCHITECTS		
DRAWING NUMBER:	SHD88-SHD-HLG-STAT-DR-ED-Layout.R0	DRAWN:	SRH
	SHEET 1 OF 1	CHECKED:	SRH
CONTRACT NUMBER:	SHD828	APPROVED:	
	DATE: 10/02/2023	SCALE @ A1	1:250
		REVISION:	R0

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION

**9. APPENDIX B****9.1 Lighting Spill Calculation Report**

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**DATE:** 10 February 2023  
**DESIGNER:** SHD Lighting Consultancy Ltd  
**PROJECT No:** SHD828  
**PROJECT NAME:** Station Road, Huddersfield - Phase 2



Monza Inox Stainless Steel 450mm 75W Stainless Steel

Each bollard is mounted on a 1200mm stone pillar per housing plot.

An individual photocell per house plot shall switch the bollards between dawn and dusk (switched at 20 lux 1:1 ratio)

## **Private Drive Lighting Report**

**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

### Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1: Private Lighting	94.64	-49.17	108.00	70.35	1.50	1.50
2	Grid 2: Vertical Grid 1 - ...	111.22	-49.70	40.01	10.00	1.00	1.00
3	Grid 3: Vertical Grid 2 - ...	150.04	-39.17	40.02	10.00	1.00	1.00

### Luminaires

#### Luminaire A Data

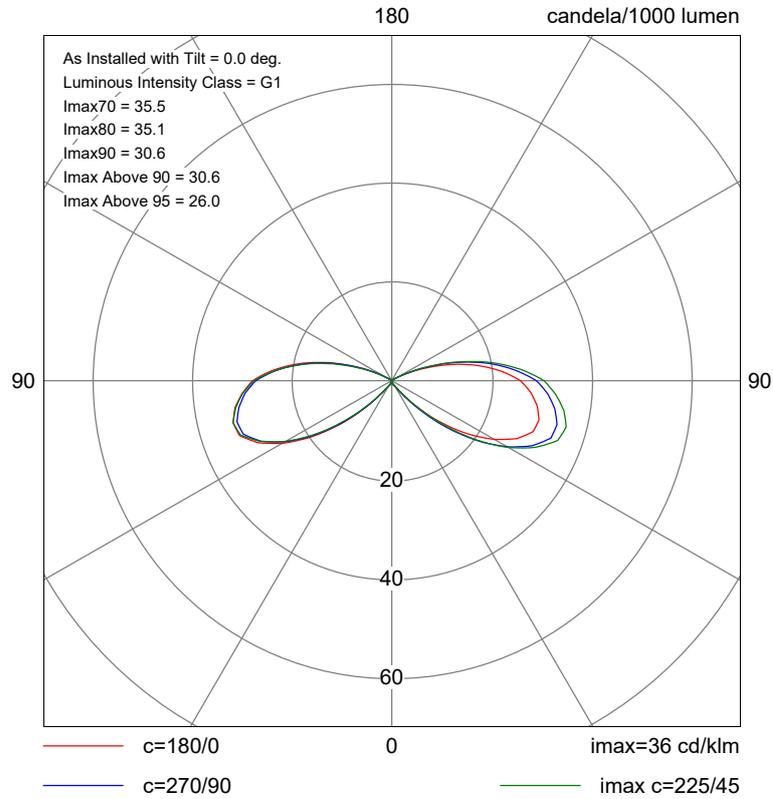
Supplier	
Type	AMENITY - Monza
Lamp(s)	IAA-O60/c 75
LampFlux(klm)/Colour	0.26 ww/2700K/1A
File Name	ame27100_bl.ltd
Maintenance Factor	1.00
Lum. Int. Class	G1
No. in Project	4

### Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	166.81	-24.71	1.50	292.00	0.00	0.00	0.00			
2	A	157.50	-28.44	1.50	292.00	0.00	0.00	0.00			
3	A	148.20	-31.70	1.50	292.00	0.00	0.00	0.00			
4	A	131.58	-36.29	1.50	292.00	0.00	0.00	0.00			

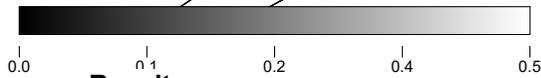
## Polar Diagram

### Luminaire A AMENITY - Monza



# Horizontal Illuminance (lux)

Grid 1: Private Lighting

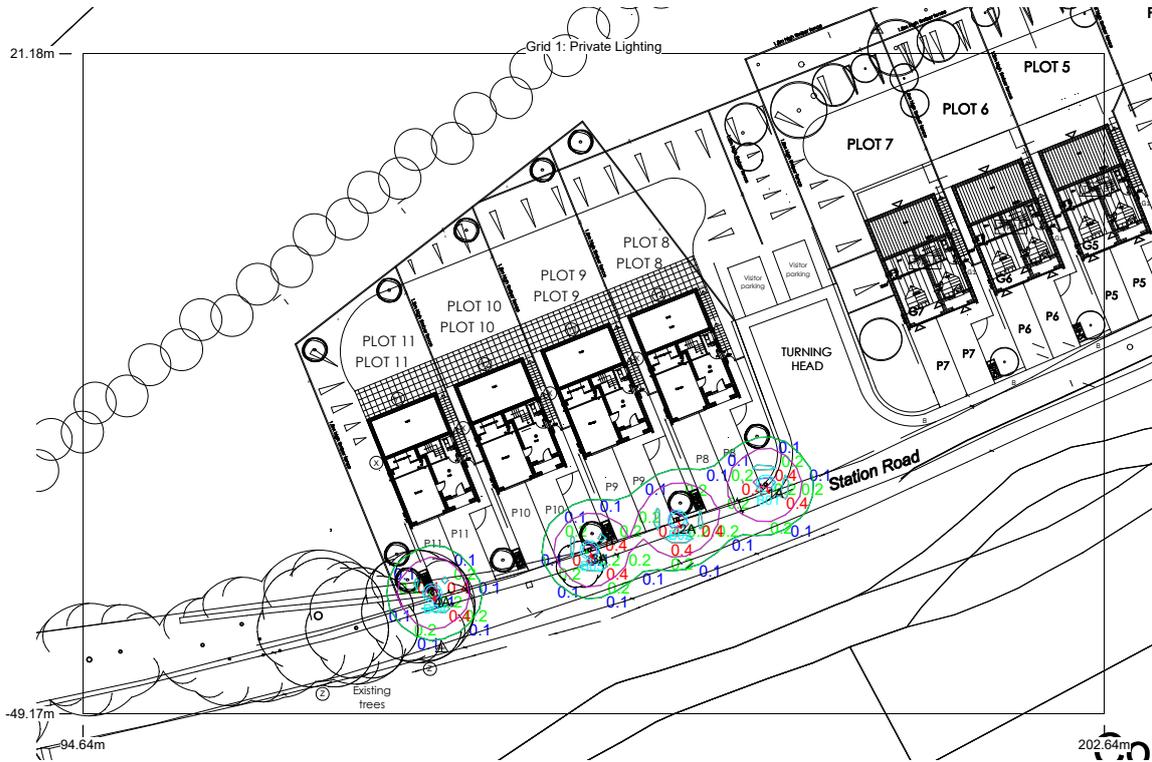


## Results

Eav	0.02
Emin	0.00
E <sub>max</sub>	0.48
E <sub>min</sub> /E <sub>max</sub>	0.00
E <sub>min</sub> /E <sub>av</sub>	0.01

## Horizontal Illuminance (lux)

Grid 1: Private Lighting



### Results

Eav	0.02
Emin	0.00
Emax	0.48
Emin/Emax	0.00
Emin/Eav	0.01

# Horizontal Illuminance (lux)

Grid 1: Private Lighting

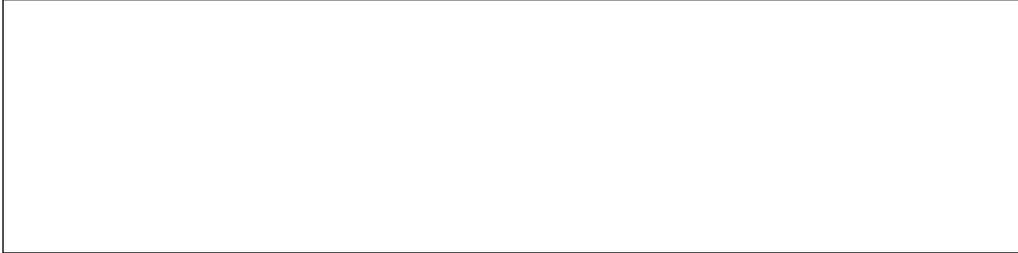


## Results

Eav	0.02
Emin	0.00
Emax	0.48
Emin/Emax	0.00
Emin/Eav	0.01

## Illuminance (lux)

Grid 2: Vertical Grid 1 - Woodland

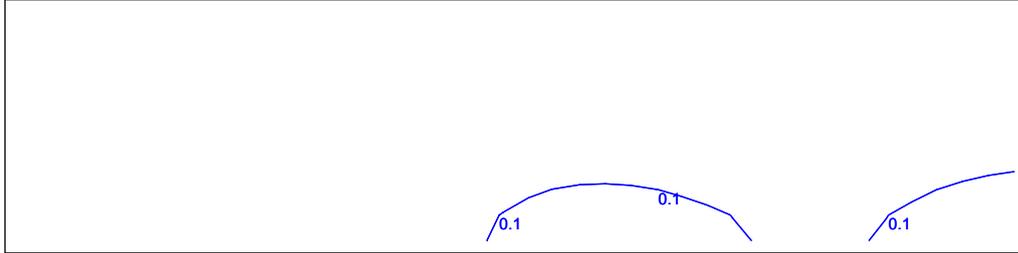


### Results

Eav	0.03
Emin	0.00
E <sub>max</sub>	0.18
Emin/E <sub>max</sub>	0.01
Emin/Eav	0.07

## Illuminance (lux)

Grid 2: Vertical Grid 1 - Woodland



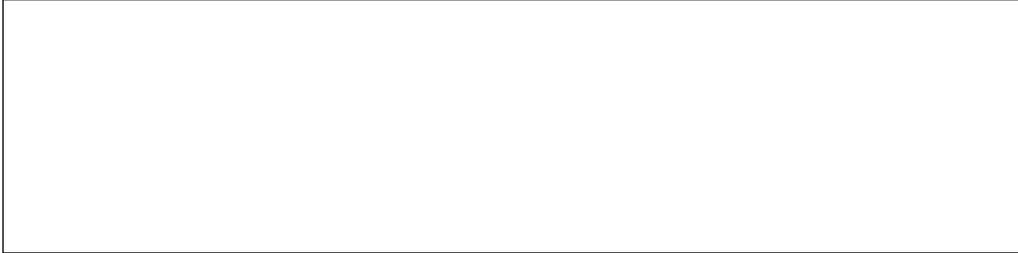
### Results

Eav	0.03
Emin	0.00
E <sub>max</sub>	0.18
E <sub>min</sub> /E <sub>max</sub>	0.01
E <sub>min</sub> /E <sub>av</sub>	0.07



## Illuminance (lux)

Grid 3: Vertical Grid 2 - Woodland

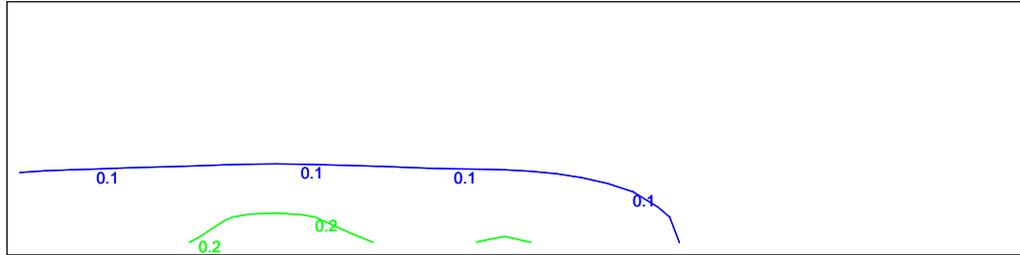


### Results

Eav	0.05
Emin	0.00
E <sub>max</sub>	0.22
Emin/E <sub>max</sub>	0.01
Emin/Eav	0.04

## Illuminance (lux)

Grid 3: Vertical Grid 2 - Woodland



### Results

Eav	0.05
Emin	0.00
Emax	0.22
Emin/Emax	0.01
Emin/Eav	0.04



**10. APPENDIX C**

**10.1 Sensitive Receptors Location Plan**



Figure 10.0: Sensitive receptors (Aerial view)

SENSITIVE RECEPTORS	
DESCRIPTION	COLOUR
Proposed Development Site Boundary	Red
Woodland Area	Green

Table 10.0: Sensitive receptors

## **11. APPENDIX D**

### **11.1 Abbreviations and Definitions**

#### **Glare**

The sensation produced by luminance's within the visual field is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility.

#### **Light trespass (nuisance)**

The light that impacts on a surface outside of the area is designed to be lit by a lighting installation. The correct legal term is a nuisance.

#### **Illuminance**

Illuminance is the quantity of light, or luminous flux, falling on a unit area of a surface. It is sometimes designated by the symbol E. The unit is the lux (lx). Luminance refers to the light given off from a source while illuminance refers to the amount of light hitting a surface.

#### **Maintenance factor**

A correction applied to a lighting calculation to allow for the build-up of dirt on a luminaire and the depreciation of the lumen output of a lamp over time. 1=100% output, 0.9=90% etc.

#### **LED**

Lighting Emitting Diodes.

#### **Colour temperature (K)**

It is the value given to the colour of the light in degrees' kelvin. It can range from 1500K to 7000K, 1500k being warm/red to 7000K being cool/blue.

#### **Luminaire**

Combination of light source, housing, and electronics, to provide light.

#### **Sky glow**

The brightening of the night sky caused by artificial lighting

## **12. APPENDIX E**

### **12.1 Manufacturers datasheets**

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## **AME27045/SS**

Monza Inox Stainless Steel 450mm 100W Stainless Steel



## **Features**

High Grade AISI 316L stainless steel bollard suitable for residential, hospitality and commercial applications (supplied less lamp)

External louvred head and opal polycarbonate diffuser

Option to add Bluetooth and WiFi enabled smart A60 lamp(s)

## General Information

---

Lamp Type	E27
Colour / Finish	Stainless Steel
IP Rating	IP44
IK Rating	IK07
Class Protection	1
Internal / External	External
Surface / Recessed / Suspended	Surface
Warranty (Years)	5
CE Mark	Yes
Width (mm)	160
Height (mm)	450
Accessories	ARMK3

---

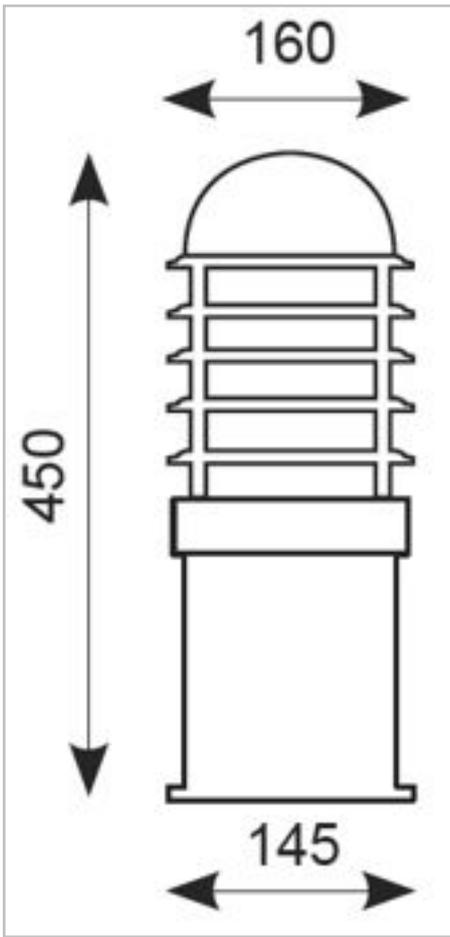
## Technical Information

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Wattage	100W
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Datasheet generated from <https://onetimepim.com> last updated Monday, June 6, 2022 12:10:39 PM



Object :  
Installation :  
Project number :  
Date :

# 1 Luminaire data

## 1.1 ANSELL Lighting, LAMPARA INOX Wall Light E27 (ALE27/WL/SS)

### 1.1.1 Data sheet

---

Manufacturer: ANSELL Lighting

**ALE27/WL/SS      LAMPARA INOX Wall Light E27**

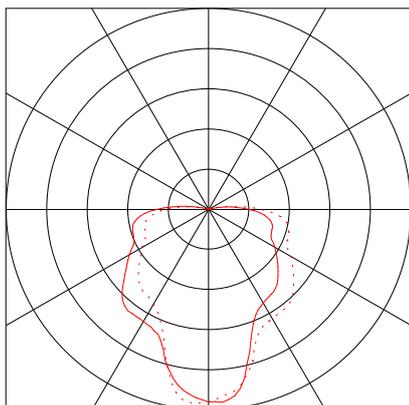
#### Luminaire data

Luminaire efficiency : 61.8%  
Luminaire efficacy : 8.06 lm/W  
Classification : A31 ↓93.1% ↑6.9%  
CIE Flux Codes : 35 62 83 93 62  
UGR 4H 8H : 21.3 / 21.4  
Power : 102 W  
Luminous flux : 821.9 lm

#### Equipped with

Quantity : 1  
Designation : 100Watt E27  
Colour : 2700  
Luminous flux : 1330 lm  
Colour reproduction : 1

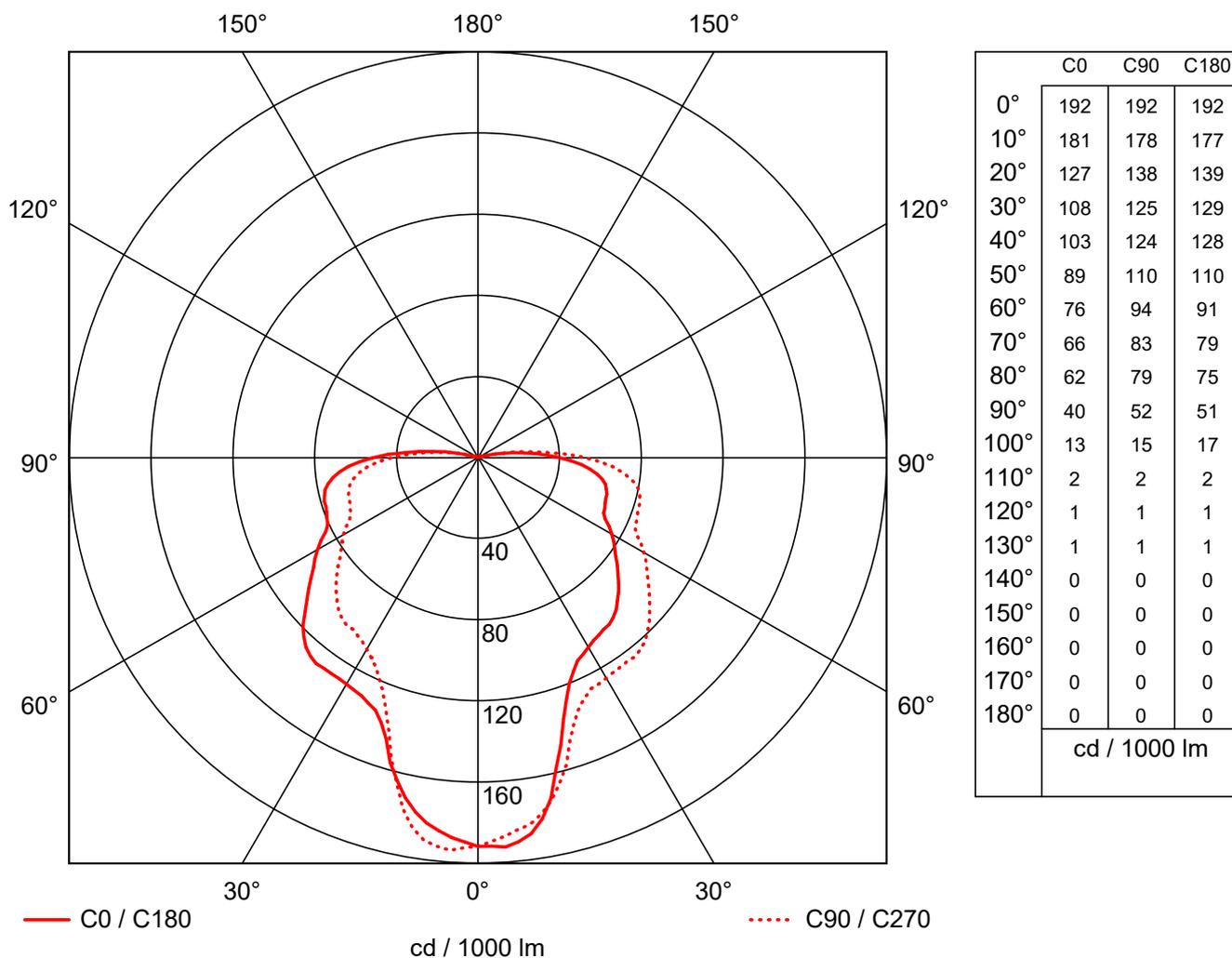
Dimensions : Ø160 mm x 170 mm



Object :  
 Installation :  
 Project number :  
 Date :

## 1.1 ANSELL Lighting, LAMPARA INOX Wall Light E27 (ALE27/WL/SS)

### 1.1.2 LDC



Manufacturer	: ANSELL Lighting	Efficiency factor	: 61.8%
Order number	: ALE27/WL/SS	Luminaire efficacy	: 8.06 lm/W (A31)
Luminaire name	: LAMPARA INOX Wall Light E27	Light distribution	: asymmetric
Equipment	: 1 x 100Watt E27 102 W / 1330 lm	Beam Angle	: 44.8° C0
Dimensions	: D 160 mm x H 170 mm		: 57.7° C90
File name	: ALE27_WL_SS.ltd		: 56.1° C180
			: 45.4° C270

Object :  
Installation :  
Project number :  
Date :

# 1 Luminaire data

## 1.2 ANSELL Lighting, MONZA INOX Bollard E27 450mm... (AME27045/SS)

### 1.2.1 Data sheet

---

Manufacturer: ANSELL Lighting

**AME27045/SS      MONZA INOX Bollard E27 450mm**

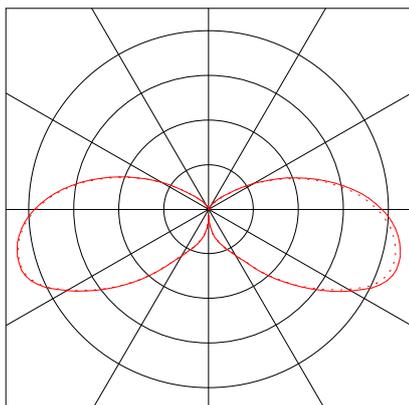
#### Luminaire data

Luminaire efficiency : 28%  
Luminaire efficacy : 3.51 lm/W  
Classification : B11 ↓67.6% ↑32.4%  
CIE Flux Codes : 10 33 67 68 28  
UGR 4H 8H : 28.8 / 28.7  
Power : 75 W  
Luminous flux : 263.2 lm

#### Equipped with

Quantity : 1  
Designation : 75Watt E27  
  
Colour : 2700K  
Luminous flux : 940 lm  
Colour reproduction : 1

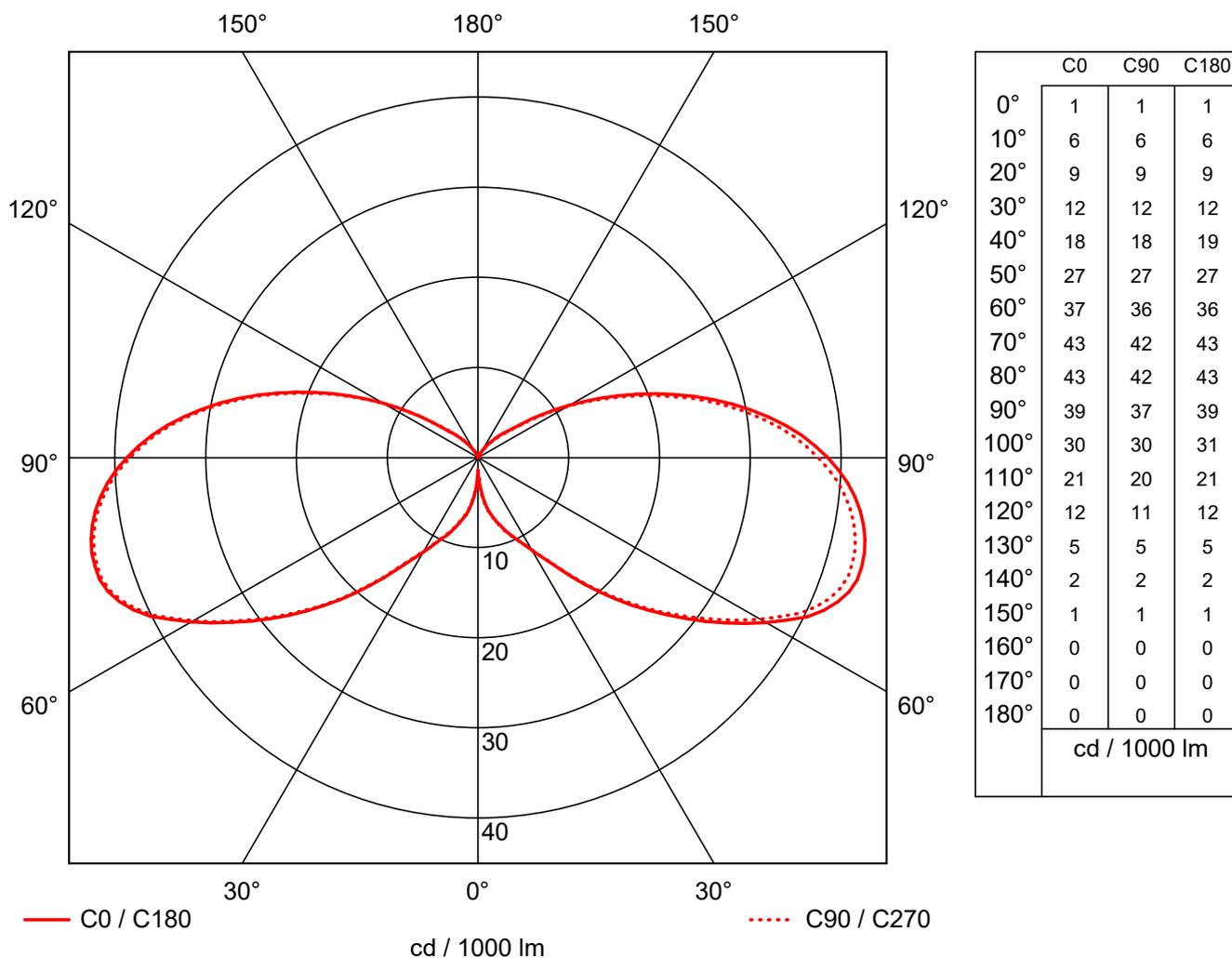
Dimensions : Ø100 mm x 160 mm



Object :  
 Installation :  
 Project number :  
 Date :

## 1.2 ANSELL Lighting, MONZA INOX Bollard E27 450mm... (AME27045/SS)

### 1.2.2 LDC



Manufacturer : ANSELL Lighting      Efficiency factor : 28%  
 Order number : AME27045/SS      Luminaire efficacy : 3.51 lm/W (B11)  
 Luminaire name : MONZA INOX Bollard E27 450mm      Light distribution : -- C0  
 Equipment : 1 x 75Watt E27      75 W /      Beam Angle : -- C90  
 Dimensions : D 100 mm x H 160 mm      -- C180  
 File name : AME27045\_SS.Idt      -- C270

