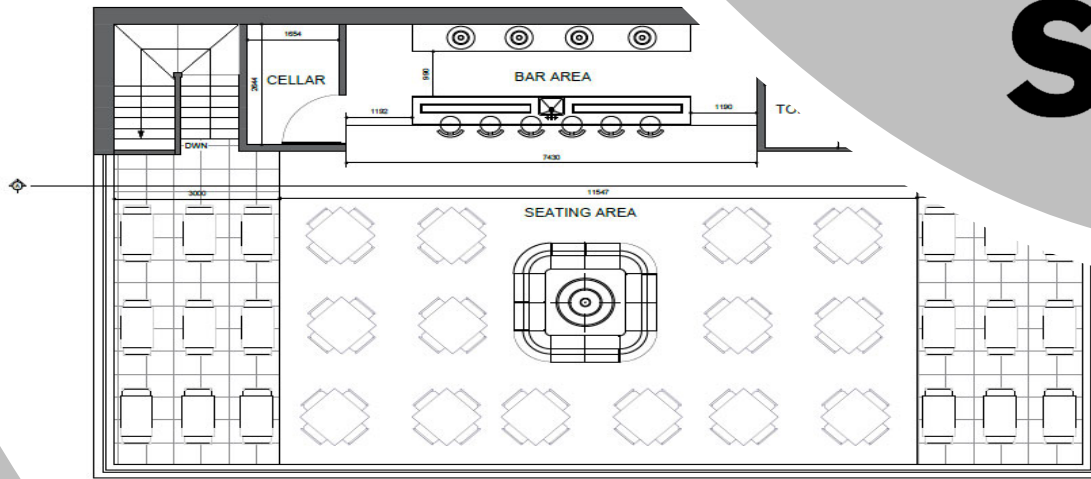
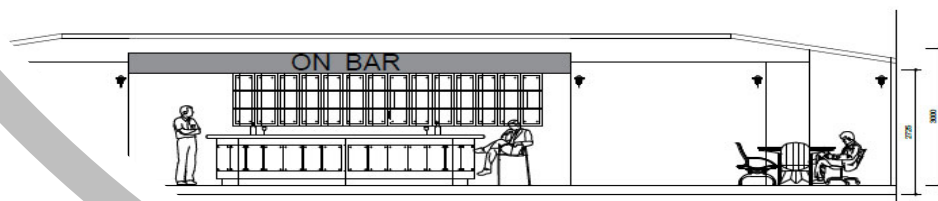




PROPOSED THIRD FLOOR



SECTION A - A

Lighting Impact Assessment Report

46 Canal Street, Manchester

Project number: SHD341

Document reference: SHD341-SHD-HLG-BOOT-RP-EO-Lighting Assessment Report-R0

Revision	Purpose of document	Compiled by	Reviewed by	Review date
R0	Planning	Steve Higham	Steve Higham	27/09/2021

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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 Mason and Marlowe to support the planning application (Reference 130922/FO/2021) for the construction of a roof terrace bar (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 information provided by Mason and Marlowe.
- 1.1.3 The Proposed Development is to be constructed on the roof of an existing building located at 46 Canal Street, Manchester
- 1.1.4 The report assesses the potential effects of obtrusive light that could arise from artificial lighting at the Proposed Development.
- 1.1.5 This lighting assessment should be carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.1.6 SHD Lighting Consultancy are a lighting consultancy who specialise in outdoor lighting design and lighting assessments and have knowledge, experience and professional qualifications to undertake lighting designs and outdoor lighting impact assessment reports.
- 1.1.7 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.
- 1.1.8 The principal objective is to identify the effects associated with obtrusive light.
- 1.1.9 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).
- 1.1.10 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.

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 so as 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 July 2021, sets out the governments planning policies for England and how they are expected to be applied and 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 Obtrusive Light

- 2.3.1 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.
- 2.3.2 Light intrusion refers to the spilling of light beyond the boundary of the area to be lit.
- 2.3.3 Sky glow refers to the brightening of the sky above towns caused by direct or reflected upward light.
- 2.3.4 Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. Figure 2.1 illustrates the different types of obtrusive light.

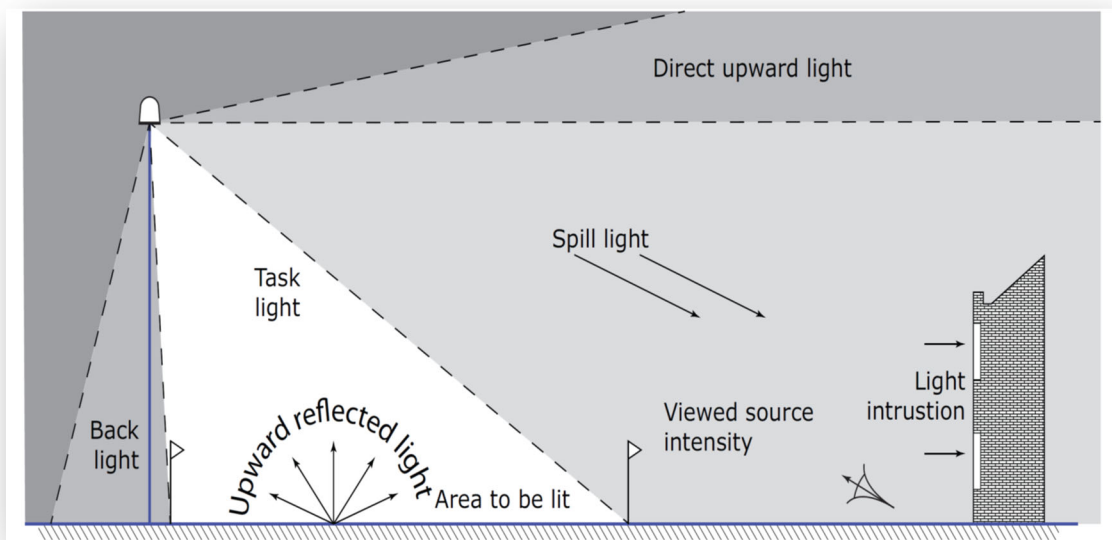


Figure 2.1: Obtrusive light diagram

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

3. BASELINE CONDITIONS

3.1 Site Overview

- 3.1.1 The site for the Proposed Development is on the roof of an existing building, located at 46 Canal Street, Manchester.
- 3.1.2 Information in this report will assess the impact on the introduction of artificial lighting to illuminate the bar area and covered seating area.

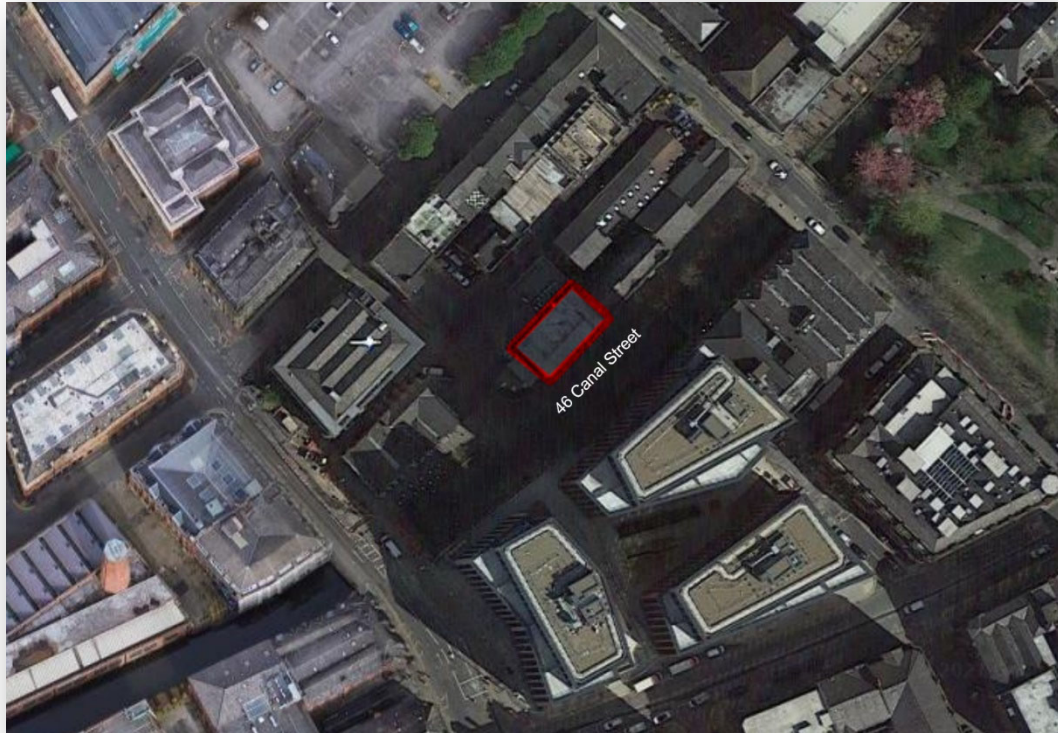


Figure 3.1: Proposed Development boundary outline (Aerial View)

4. LIGHTING STRATEGY

4.1 Lighting Brief

4.1.1 SHD Lighting Consultancy Ltd were provided with an application letter, which provided the following information.

3) If your proposals involve illumination/lighting, you will need to provide details of the nature and location of the lighting, and show how any impacts, including glare and light spill, are to be mitigated and provide details of the splay, lux levels, light spill and energy efficiency.

4.1.2 SHD Lighting Consultancy Ltd were provided with a lighting plan '**46 Canal St. Manchester M1 3WD - LIGHTING SCHEME**' showing the locations of the proposed light fittings to be installed.

4.1.3 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:

- SHD341-SHD-ELG-CANA-CA-EO-Lighting Calculation-R0
- 46 Canal St. Manchester M1 3WD - LIGHTING SCHEME

4.2 Lighting Criteria

4.2.1 Outdoor artificial lighting is to be provided for the following areas:

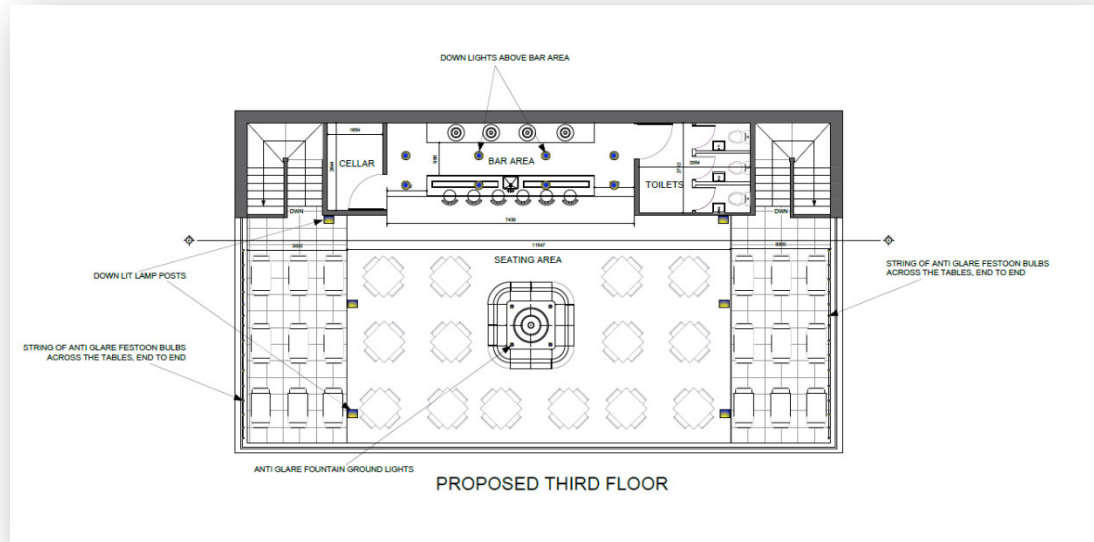


Figure 4.1: 3rd floor proposed light positions

4.3 Lighting Calculations and Modelling

- 4.3.1 An external lighting model has been prepared by SHD Lighting Consultancy Ltd for the Proposed Development.
- 4.3.2 SHD Lighting Consultancy do not accept design responsibility for any light spill.
- 4.3.3 The bar and seating area was modelled, replicating the design provided by others, using industry standard software Relux.
- 4.3.4 Relux is a computer software calculation package which utilises manufacturers photometric data files to simulate the lighting output of chosen light fittings.
- 4.3.5 It is to be noted that the lighting calculations have been produced with a luminaire maintenance factor of 1.0.
- 4.3.6 A maintenance factor of 1.0 is the worst-case scenario as all the outdoor lighting will be performing at peak intensity.
- 4.3.7 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.
- 4.3.8 Considering this, the light spill diagram provides an exaggerated and absolute worst-case scenario with regards to the light spill, assuming no light limiting features are present.
- 4.3.9 From these calculations, drawings illustrating the illuminance levels throughout the Proposed Development and at the boundary have been produced so that the lighting scheme's impact can be assessed.

5. OUTDOOR LIGHTING REQUIREMENTS

5.1 Proposed Lighting Requirements

- 5.1.1 There are two strings of festoon strings, each with fifteen lamps to be installed, spanning the rear of the seating area and are to be fixed at either end side of the seating area.

LUMINAIRE SPECIFICATION	
Location:	Seating Area
Luminaire Manufacturer:	Generic
Luminaire model ref:	N/A
Luminaire style:	Individual LED lamps
Mounting height:	1800 FFL
Mounting type:	Festoon
Light source:	2700k 4w 425lm LED

Table 5.1: Seating Area lighting performance parameters

- 5.1.2 There are six recessed downward firing spotlights above the bar area

LUMINAIRE SPECIFICATION	
Location:	Above Bar
Luminaire Manufacturer:	Synergy Lighting
Luminaire model ref:	Axiome
Luminaire style:	Downlight
Mounting height:	2200 FFL
Mounting type:	Recessed
Light source:	4000k 9w 857lm LED

Table 5.2: Above Bar lighting performance parameters

- 5.1.3 Wall lights are to be installed at equal distances either side of the bar area and towards the front section of the covered seating area. The wall lights are to be downward firing wall mounted units.

LUMINAIRE SPECIFICATION	
Location:	Wall Lights
Luminaire Manufacturer:	Generic
Luminaire model ref:	N/A
Luminaire style:	Down firing wall light
Mounting height:	1800 FFL
Mounting type:	Wall mounted
Light source:	4000k 9w 450lm LED

Table 5.3: Wall lights lighting performance parameters

- 5.1.4 There is to be a centrally placed fountain area between both seating areas. The ground plinth of the fountain shall have four upward firing ground mounted recessed spotlight, highlighting the features of the fountain structure.

LUMINAIRE SPECIFICATION	
Location:	Fountain lights
Luminaire Manufacturer:	Generic
Luminaire model ref:	N/A
Luminaire style:	Uplighter
Mounting height:	Recessed in fountain plinth
Mounting type:	Ground mounted
Light source:	4000k 9w 450lm LED

Table 5.4: Fountain lighting performance parameters

5.2 Potential Effects

5.2.1 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 without cowels or louvers.
- Glare: due to high light source intensity from floodlights angled incorrectly.
- Intrusive light affecting ecology: caused by excessive height and tilt.

5.2.2 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.

5.2.3 The following paragraphs outline good lighting practices to be applied to the design of the artificial lighting required for the adoptable lighting during normal operation.

5.2.4 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.

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

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

5.3 Mitigation

5.3.1 Using desktop calculations as shown in Appendix A all installation of the wall lights and bar lighting shall ensure that luminaires are focused downwards, with the inclination angle set at 0° as this will reduce any glare potential from each of the LED luminaires.

5.3.2 Any variation to the tilt angle will result in the provided lighting calculations and Isolux line drawings being incorrect.

6. CONCLUSION

- 6.1.1 The lighting strategy and assessment outlines the lighting design criteria for the lighting of the Proposed Development, to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the environment.
- 6.1.2 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 excessive 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.

7. APPENDIX A

7.1 Light Calculation Report

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46 Canal Street, Manchester

Installation : Proposed Lighting

Project number : SHD341

Customer : Mason and Marlowe

Processed by : SHD Lighting Consultancy Ltd

Date : 28.09.2021

Project description:

All luminaire styles are indicative only and may be subject to change during construction.

All luminaire positions have been taken from information provided on design drawing '46 Canal St. Manchester M1 3WD - LIGHTING SCHEME' and may be subject to change during construction.

The following values are based on precise calculations performed on calibrated lamps and luminaires, and their configurations, whereby gradual, unavoidable deviations can occur in practice. All guarantee claims are excluded for the specified data.

This exclusion of liability applies irrespective of the legal grounds for both damages and consequential damages suffered by users and third parties.

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1 Luminaire data

1.1 Generic, 4W (!4W Globe)

1.1.1 Data sheet

Manufacturer: Generic

!4W Globe 4W

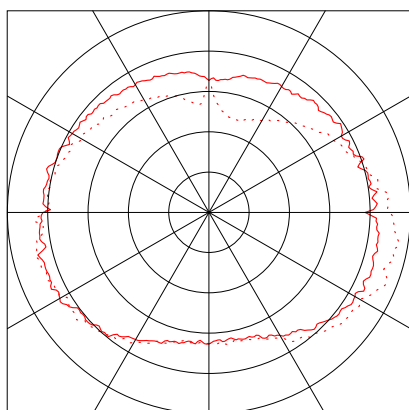
Luminaire data

Luminaire efficiency : 100%
Luminaire efficacy : 106.25 lm/W
Classification : C22 ↓51.4% ↑48.6%
CIE Flux Codes : 22 47 74 51 100
UGR 4H 8H : 23.9 / 23.9
Power : 4 W
Luminous flux : 425 lm

Equipped with

Quantity : 1
Designation : LED
Colour : 2700
Luminous flux : 425 lm
Colour reproduction : 80

Dimensions : 50 mm x 50 mm x 50 mm



1 Luminaire data

1.2 Synergy Lighting, Axiome (!AXM/F/0850/4K8)

1.2.1 Data sheet

Manufacturer: Synergy Lighting

!AXM/F/0850/4K8

Axiome

Luminaire data

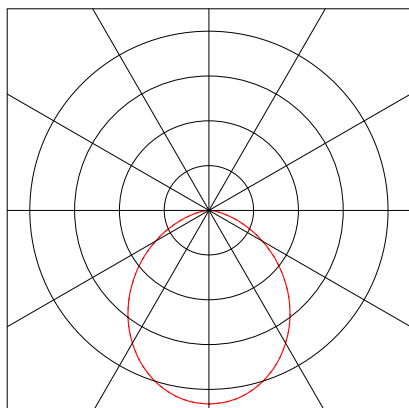
Absolute Photometry

Luminaire efficacy : 95.18 lm/W
Classification : A40 ↓99.9% ↑0.1%
CIE Flux Codes : 54 85 98 100 103
UGR 4H 8H : 29.1 / 29.1
Power : 9 W
Luminous flux : 856.6 lm

Dimensions : Ø110 mm x 2 mm

Equipped with

Quantity : 1
Designation : LED
Colour : 4000
Colour reproduction : 80



Object : 46 Canal Street
Installation : Proposed Lighting
Project number : SHD341
Date : 24.09.2021

1 Luminaire data

1.3 Generic, Wall Light - Down Only (!Wall Light)

1.3.1 Data sheet

Manufacturer: Generic

!Wall Light Wall Light - Down Only

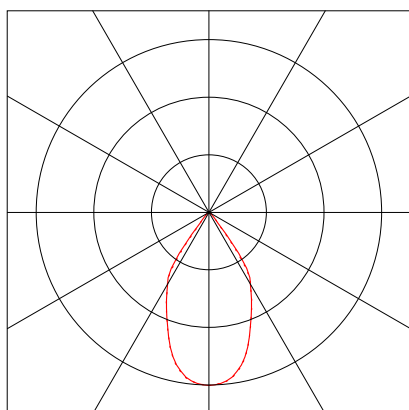
Luminaire data

Absolute Photometry
Luminaire efficacy : 49.9 lm/W
Classification : A70 ↓100.0% ↑0.0%
CIE Flux Codes : 94 99 100 100 100
UGR 4H 8H : <10.0 / <10.0
Power : 9 W
Luminous flux : 449.1 lm

Dimensions : 120 mm x 120 mm x 5 mm

Equipped with

Quantity : 1
Designation : LED
Colour : 4000 K
Colour reproduction : 82



1 Luminaire data

1.4 Generic, Uplighter (!Uplighter)

1.4.1 Data sheet

Manufacturer: Generic

!Uplighter Uplighter

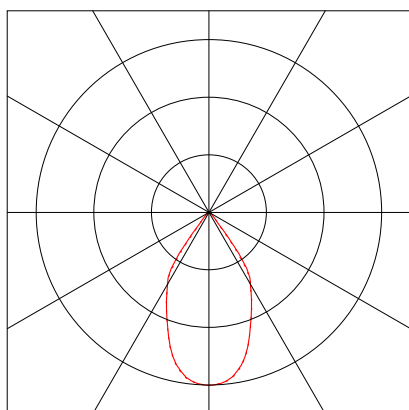
Luminaire data

Absolute Photometry
Luminaire efficacy : 49.9 lm/W
Classification : A70 ↓100.0% ↑0.0%
CIE Flux Codes : 94 99 100 100 100
UGR 4H 8H : 10.7 / 11.5
Power : 9 W
Luminous flux : 449.1 lm

Dimensions : 60 mm x 60 mm x 5 mm

Equipped with

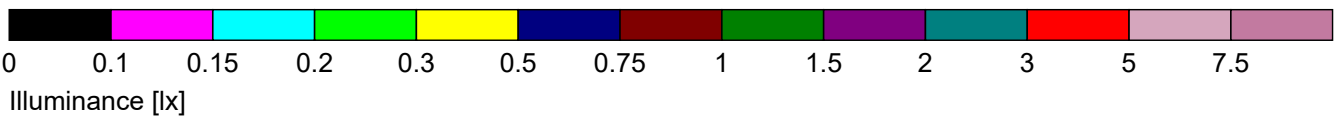
Quantity : 1
Designation : LED
Colour : 4000 K
Colour reproduction : 82



2 Exterior 1

2.1 Summary, Exterior 1

2.1.1 Result overview, Measuring area 5.1



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	9.42 m
Maintenance factor	1.00
Total luminous flux of all lamps	23930 lm
Total power	282 W
Total power per area (151.08 m ²)	1.87 W/m ²

Illuminance

Average illuminance	Em	75 lx
Minimum illuminance	Emin	9 lx
Maximum illuminance	Emax	180 lx
Uniformity Uo	Emin/Em	1:8.44 (0.12)
Diversity Ud	Emin/Emax	1:20.3 (0.05)

Type No. Make

Generic		
1	30	Order No. : !4W Globe
		Luminaire name : 4W
		Equipment : 1 x LED 4 W / 425 lm
3	6	Order No. : !Wall Light
		Luminaire name : Wall Light - Down Only
		Equipment : 1 x LED 9 W / 450 lm
4	4	Order No. : !Uplighter
		Luminaire name : Uplighter
		Equipment : 1 x LED 9 W / 450 lm

Object : 46 Canal Street
Installation : Proposed Lighting
Project number : SHD341
Date : 24.09.2021

2 Exterior 1

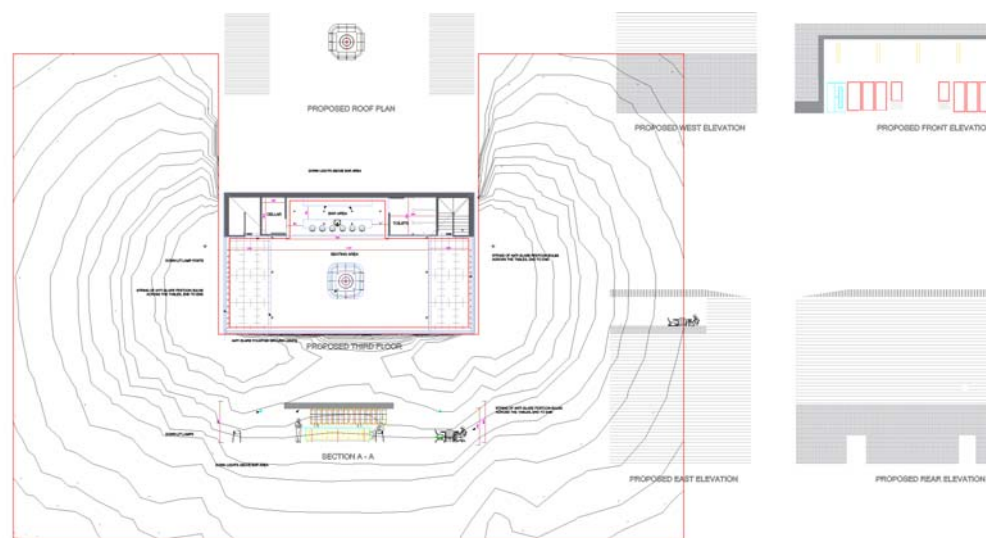
2.1 Summary, Exterior 1

2.1.1 Result overview, Measuring area 5.1

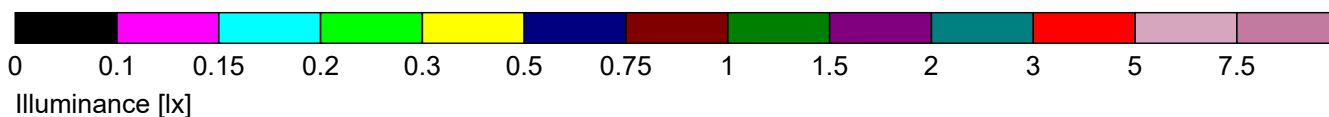
2	8	Synergy Lighting
		Order No. : !AXM/F/0850/4K8
		Luminaire name : Axiome
		Equipment : 1 x LED 9 W / 835 lm

2.1 Summary, Exterior 1

2.1.2 Result overview, Spill Light



12 18 23 28 33 38 x [m]



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	9.50 m
Maintenance factor	1.00
Total luminous flux of all lamps	23930 lm
Total power	282 W
Total power per area (151.08 m²)	1.87 W/m²

Illuminance

Average illuminance	Em	2.5 lx
Minimum illuminance	Emin	0.1 lx
Maximum illuminance	Emax	44.7 lx
Uniformity Uo	Emin/Em	1:34.6 (0.03)
Diversity Ud	Emin/Emax	1:610 (0)

Type No.\Make

		Generic	
1	30	Order No.	: !4W Globe
		Luminaire name	: 4W
		Equipment	: 1 x LED 4 W / 425 lm
3	6	Order No.	: !Wall Light
		Luminaire name	: Wall Light - Down Only
		Equipment	: 1 x LED 9 W / 450 lm
4	4	Order No.	: !Uplighter
		Luminaire name	: Uplighter
		Equipment	: 1 x LED 9 W / 450 lm

Object : 46 Canal Street
Installation : Proposed Lighting
Project number : SHD341
Date : 24.09.2021

2.1 Summary, Exterior 1

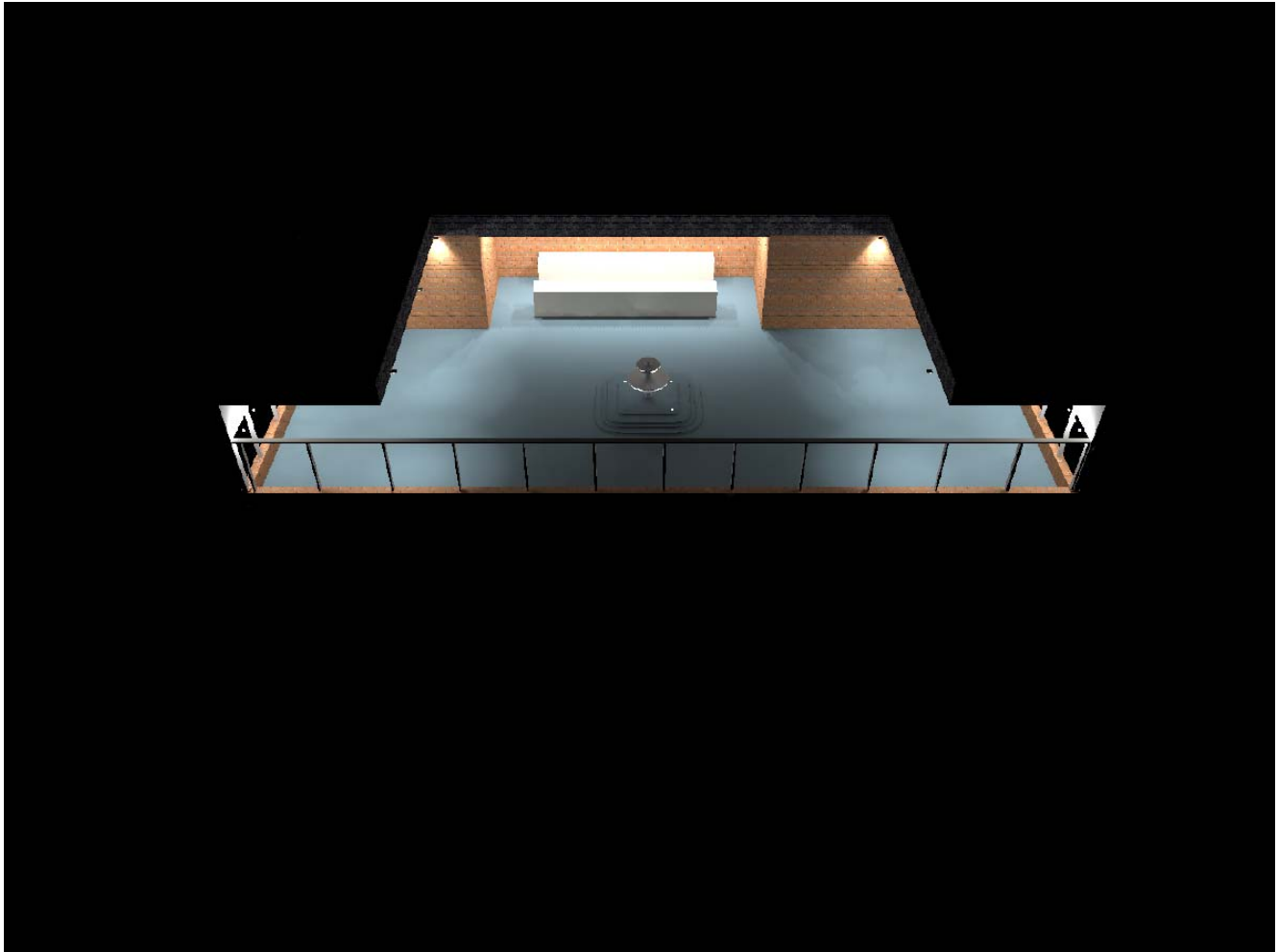
2.1.2 Result overview, Spill Light

2 8 **Synergy Lighting**
 Order No. : !AXM/F/0850/4K8
Luminaire name : Axiome
Equipment : 1 x LED 9 W / 835 lm

2 Exterior 1

2.2 Calculation results, Exterior 1

2.2.1 3D luminance (raytracing), Variable view



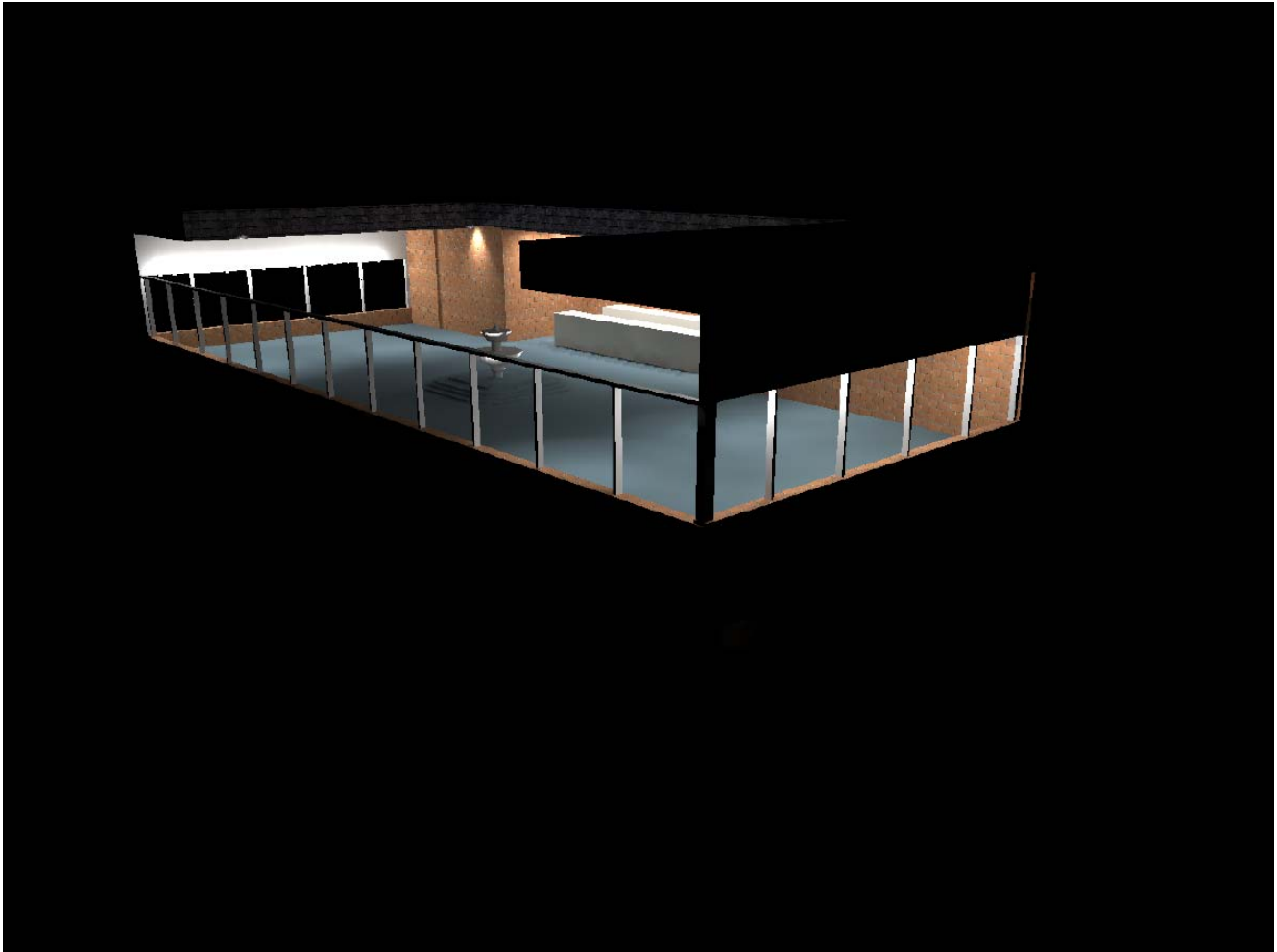
Luminance in the illustration:

Minimum: : 0 cd/m²
Maximum: : 30400 cd/m²

Artificial light calculation : Direct part, with 2 inter-reflections

2.2 Calculation results, Exterior 1

2.2.2 3D luminance (raytracing), Variable view



Luminance in the illustration:

Minimum: : 0 cd/m²
Maximum: : 65700 cd/m²

Artificial light calculation : Direct part, with 2 inter-reflections

8. APPENDIX B

8.1 Abbreviations and Definitions

Glare

The sensation produced by luminance's within the visual field that are 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)

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

Luminance

The physical measurement of the stimulus that produces the sensation of brightness measured by the luminous intensity reflected in a given direction. The unit is the candela per square metre (cd/m²). Luminance refers to the light given off from a source while illuminance refers to the amount of light hitting a surface.

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.

Maintained illuminance

The minimum light level over an area.

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 a light source, a housing, and electronics, with the purpose of providing light.

Sky glow

The brightening of the night sky caused by artificial lighting