



## Lighting Calculations

### Surf Snowdonia Site

External Lighting – Car Park  
– Cabin Pathways

Date: 25/11/24  
Project No. P2435

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## External Lighting - Car Park - Cabin Pathways

Installation : Surf Snowdonia Site

Project number : P2435

Processed by : SH

Date : 25.11.2024

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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## 1.0 Luminaire data

### 1.1 LDL, Hampshire 10W 27K (HAM/10/900/27)

#### 1.1.1 Data sheet

**Manufacturer:** LDL

**HAM/10/900/27**      **Hampshire 10W 27K**

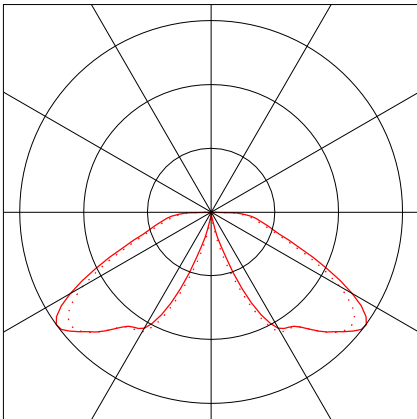
#### Luminaire data

Luminaire efficiency : 100%  
 Luminaire efficacy : 90 lm/W  
 Classification : A20  $\square$  100.0%  $\square$  00%  
 CIE Flux Codes : 26 67 91 100 102  
 UGR 4H 8H : 22.7 / 22.8  
 Power : 10 W  
 Luminous flux : 900 lm

#### Equipped with

Quantity : 1  
 Designation : 10W  
 Colour : 2700K  
 Luminous flux : 900 lm  
 Colour reproduction : Ra80

Dimensions :  $\varnothing$ 200 mm x 280 mm



## 1.0 Luminaire data

### 1.2 LDL, STREET Medium L2optic 3... (ST/M/L2/3000/727)

#### 1.2.1 Data sheet

**ST/M/L2/3000/727**      **STREET Medium L2optic 3000lm 31w 727 300mA**

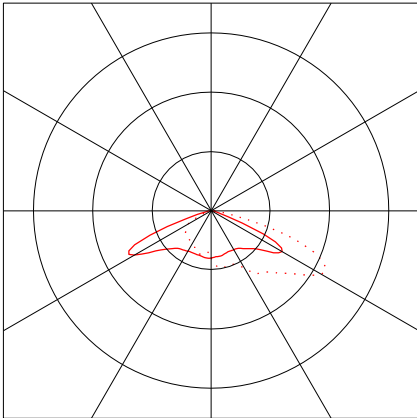
#### Luminaire data

Absolute Photometry  
 Luminaire efficacy : 97.4 lm/W  
 Classification : A20  $\varnothing$  100.0%  $\varnothing$  0.0%  
 CIE Flux Codes : 27 61 96 100 100  
 UGR 4H 8H : 30.2 / 21.6  
 Power : 30.8 W  
 Luminous flux : 3000 lm

#### Equipped with

Quantity : 1  
 Designation : LED Backlight  
 Colour : 2700  
 Colour reproduction : 71

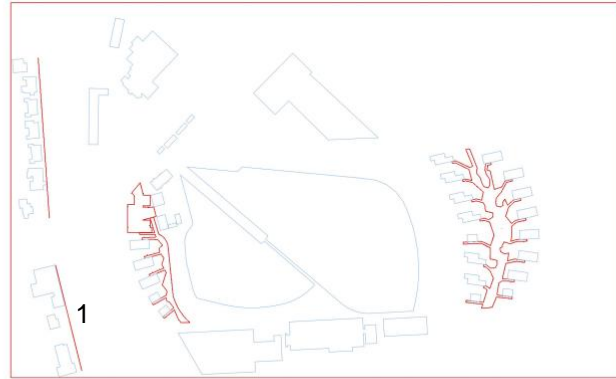
Dimensions : 500 mm x 250 mm x 100 mm



## 2.0 External

### 2.2 Summary, External

#### 2.2.1 Result overview, Obtrusive Light 1




-0 50 100 150 200 250 300 350 400 x [m]


0	Boundary line at 0 lx	0.1
	Illuminance [lx]	
<b>General</b>		
	Calculation algorithm used	Average indirect fraction
	Maintenance factor	0.80
	Total luminous flux	93300 lm
	Total power	1024 W
	Total power per area (115193.70 m <sup>2</sup> )	0.01 W/m <sup>2</sup>
	Upward light ratio (RUL)	0.00

#### Illuminance

Average illuminance	$E_m$	0.01 lx
Minimum illuminance	$E_{min}$	0 lx
Maximum illuminance	$E_{max}$	0.03 lx
Uniformity $U_o$	$E_{min}/E_m$	1:4.99 (0.2)
Diversity $U_d$	$E_{min}/E_{max}$	1:14.3 (0.07)

#### Type No.\Make

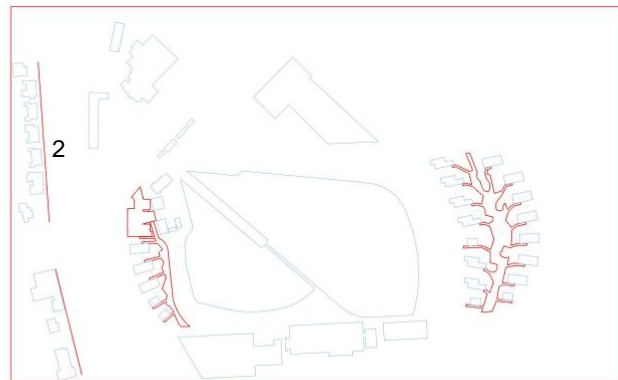
1 87 x  Order No. : HAM/10/900/27  
 Luminaire name : Hampshire 10W 27K  
 Equipment : 1 x 10W 10 W / 900 lm

2 5 x  Order No. : ST/M/L2/3000/727  
 Luminaire name : STREET Medium L2optic 3000lm 31w 727 300mA  
 Equipment : 1 x LED Backlight 30.8 W / 3000 lm

The ULR value has been calculated without obstruction by other objects.

## 2.2 Summary, External

### 2.2.2 Result overview, Obtrusive Light 2



-0 50 100 150 200 250 300 350 400 x [m]



0 0.1

Illuminance [lx]

#### General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	93300 lm
Total power	1024 W
Total power per area (115193.70 m <sup>2</sup> )	0.01 W/m <sup>2</sup>
Upward light ratio (RUL)	0.00

#### Illuminance

Average illuminance	$E_m$	0.01 lx
Minimum illuminance	$E_{min}$	0 lx
Maximum illuminance	$E_{max}$	0.04 lx
Uniformity $U_o$	$E_{min}/E_m$	1:--- (---)
Diversity $U_d$	$E_{min}/E_{max}$	1:--- (---)

#### Type No.\Make

1 87 x Order No. : HAM/10/900/27  
 Luminaire name : Hampshire 10W 27K  
 Equipment : 1 x 10W 10 W / 900 lm



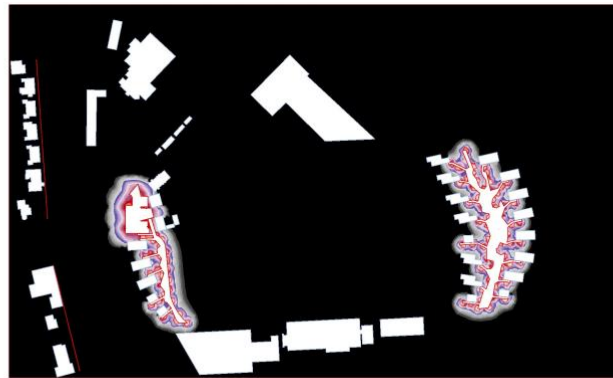
2 5 x Order No. : ST/M/L2/3000/727  
 Luminaire name : STREET Medium L2optic 3000lm 31w 727 300mA  
 Equipment : 1 x LED Backlight 30.8 W / 3000 lm



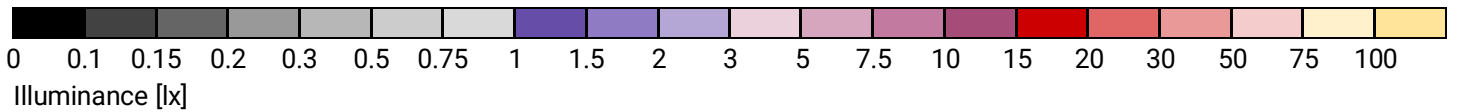
The ULR value has been calculated without obstruction by other objects.

## 2.2 Summary, External

### 2.2.3 Result overview, Evaluation area 1



-0 50 100 150 200 250 300 350 400 x [m]



#### General

Calculation algorithm used  
Maintenance factor

Average indirect fraction  
0.80

Total luminous flux  
Total power  
Total power per area (115193.70 m<sup>2</sup>)  
Upward light ratio (R<sub>UL</sub>)


93300.00 lm  
1024.0 W  
0.01 W/m<sup>2</sup> (2.28 W/m<sup>2</sup>/100lx)  
0.00

#### Evaluation area 1

#### Reference plane 1.1

Horizontal  
E<sub>m</sub> 0.39 lx  
E<sub>min</sub> 0 lx  
E<sub>min</sub>/E<sub>m</sub> (U<sub>o</sub>) ---  
E<sub>min</sub>/E<sub>max</sub> (U<sub>d</sub>) ---  
Position 0.00 m


#### Type No.\Make

1 87 x Order No. : HAM/10/900/27  
 Luminaire name : Hampshire 10W 27K  
 Equipment : 1 x 10W 10 W / 900 lm



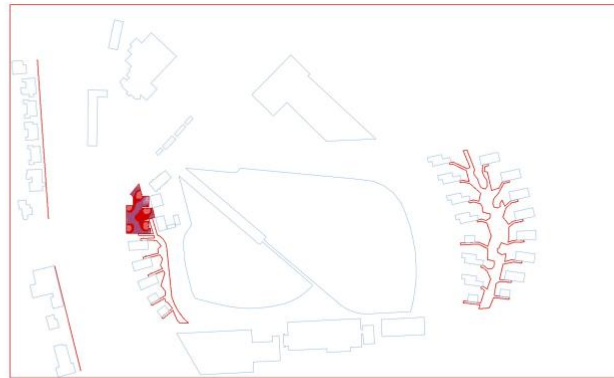
## 2.2 Summary, External

### 2.2.3 Result overview, Evaluation area 1

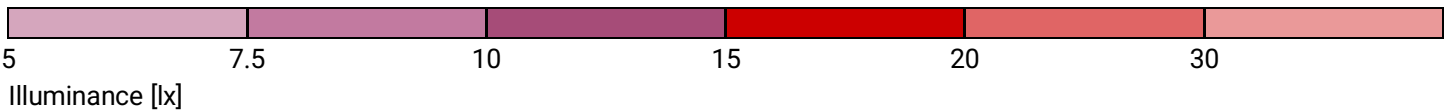
2	5 x	Order No.	: ST/M/L2/3000/727
		Luminaire name	: STREET Medium L2optic 3000lm 31w 727 300mA
		Equipment	: 1 x LED Backlight 30.8 W / 3000 lm

## 2.2 Summary, External

### 2.2.4 Result overview, Car Park



-0 50 100 150 200 250 300 350 400 x [m]



#### General


Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	15000.00 lm
Total power	154.0 W
Total power per area (450.96 m <sup>2</sup> )	0.34 W/m <sup>2</sup> (2.12 W/m <sup>2</sup> /100lx)
Upward light ratio (R <sub>UL</sub> )	0.00

#### Car Park

#### Car Park

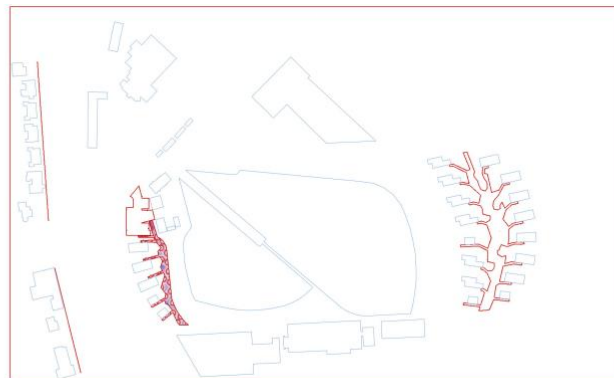
	Horizontal
E <sub>m</sub>	16.1 lx
E <sub>min</sub>	5.4 lx
E <sub>min</sub> /E <sub>m</sub> (U <sub>o</sub> )	0.34
E <sub>min</sub> /E <sub>max</sub> (U <sub>d</sub> )	0.18
Position	0.00 m

#### Type No.\Make

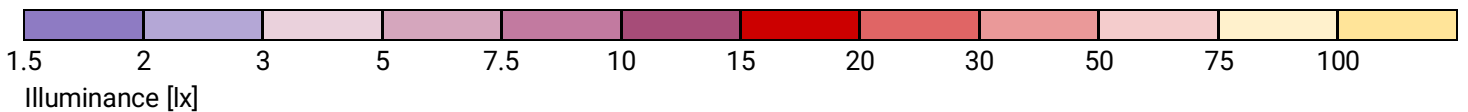
2	5 x	Order No.	: ST/M/L2/3000/727
		Luminaire name	: STREET Medium L2optic 3000lm 31w 727 300mA
		Equipment	: 1 x LED Backlight 30.8 W / 3000 lm

## 2.2 Summary, External

### 2.2.5 Result overview, Camp 1 Pathway



-0 50 100 150 200 250 300 350 400 x [m]



#### General


Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Total luminous flux	6300.00 lm
Total power	70.0 W
Upward light ratio (R <sub>UL</sub> )	0.00

#### Camp 1 Pathway

#### Camp 1 Pathway

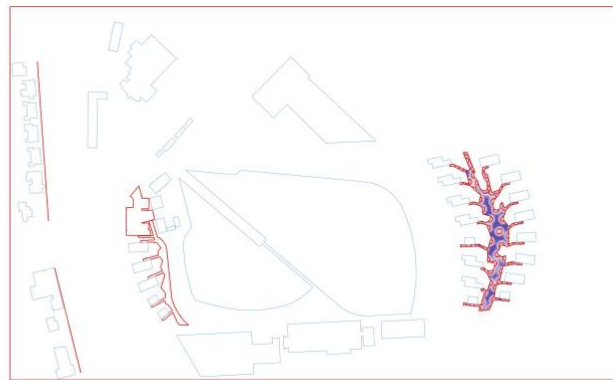
$E_m$	Horizontal
$E_{min}$	18.8 lx
$E_{min}/E_m (U_o)$	1.5 lx
$E_{min}/E_{max} (U_d)$	0.08
Position	0.01
	0.00 m

#### Type No.\Make

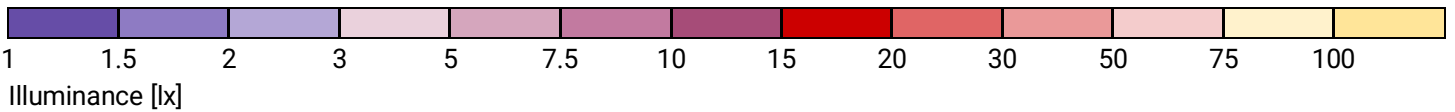
1	7 x	Order No.	: HAM/10/900/27
		Luminaire name	: Hampshire 10W 27K
		Equipment	: 1 x 10W 10 W / 900 lm

## 2.2 Summary, External

### 2.2.6 Result overview, Camp 2 Pathway



-0 50 100 150 200 250 300 350 400 x [m]



#### General

Calculation algorithm used  
Maintenance factor

Average indirect fraction  
0.80

Total luminous flux  
Total power  
Total power per area (1244.35 m<sup>2</sup>)  
Upward light ratio (R<sub>UL</sub>)

13500.00 lm  
150.0 W  
0.12 W/m<sup>2</sup> (0.76 W/m<sup>2</sup>/100lx)  
0.00


#### Camp 2 Pathway

E<sub>m</sub>  
E<sub>min</sub>  
E<sub>min</sub>/E<sub>m</sub> (U<sub>o</sub>)  
E<sub>min</sub>/E<sub>max</sub> (U<sub>d</sub>)  
Position

#### Camp 2 Pathway

Horizontal  
15.8 lx  
1 lx  
0.06  
0.01  
0.00 m

#### Type No.\Make

1	15 x	Order No.	: HAM/10/900/27
		Luminaire name	: Hampshire 10W 27K
		Equipment	: 1 x 10W 10 W / 900 lm