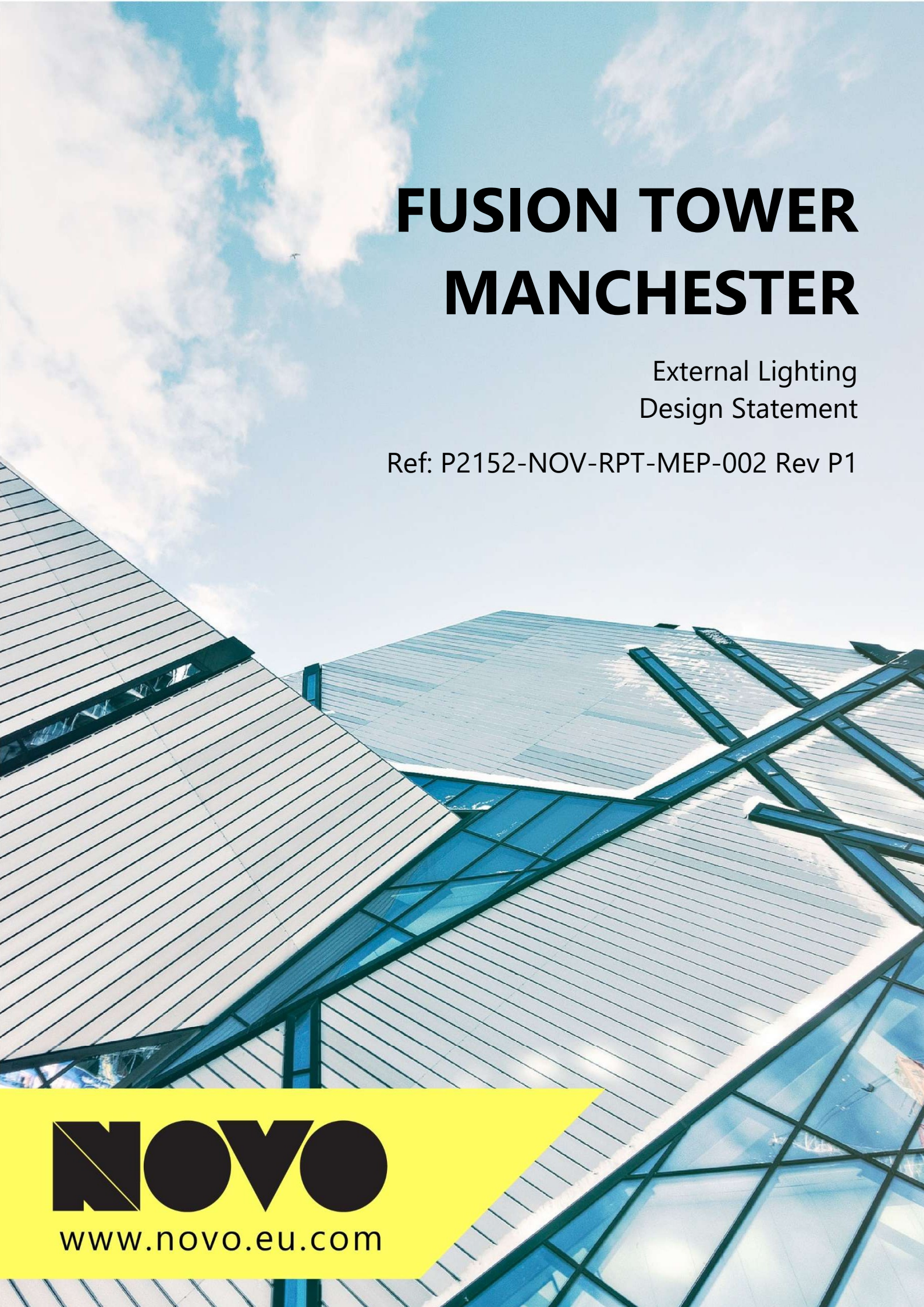
FUSION TOWER MANCHESTER

External Lighting
Design Statement

Ref: P2152-NOV-RPT-MEP-002 Rev P1



NOVO

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AMENDMENT HISTORY

REVISION	DESCRIPTION	DATE	AUTHOR	CHECKED
P1	First Issue	17.06.26	M. Houlding	R. Grubb

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1 INTRODUCTION

This report has been prepared as requested to support in providing the necessary information and documents as required by the local Council, as part of the planning conditions associated with the external lighting proposals for the site.

2 DESIGN STANDARDS

The external lighting levels are to be designed in accordance with the following standards, guidance and recommendations:

ILP publications

ILP Guidance Note 01 for the reduction of obtrusive light 2021.

Guidance Note 01/21

Environmental Zones

It is recommended that Local Planning Authorities specify the following environmental zones for exterior lighting control within their Development Plans.

Table 2: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Note
Zone E4 applies to the site, which is located within Manchester town centre (M3)

Urban, with High district brightness, with a city centre with high levels of night-time activity and busy traffic routes.

Within the lighting levels tested after completion and commissioning of the Fusion site, there is also the light contribution from the existing and surround lighting columns and other building lighting. These other external lighting influences are not captured within the Fusion lighting calculations.

British Standards

BS 5489-1:2020 Code of practice for the design of road lighting – Part 1 Lighting of roads and public amenity areas:

BS 5489-1 :2020 – Table A.5

Table A.5 — *Lighting classes for subsidiary roads*

Traffic flow	Lighting class		
	E1 to E4[A)]	E1 to E2[A)]	E3 to E4[A)]
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy [B)]	P5	P4	P3
Normal [C)]	P5	P5	P4
Quiet [D)]	P6	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in A.3.3.2.

NOTE 2 An EV lighting class using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_o needs to be as high as reasonably practicable (see 7.2.6).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N2].

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

[A)] Environmental zone, as given in ILP GN01 [N2].

[B)] Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

[C)] Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

[D)] Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road, and is mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.

BS 5489-1 :2020 – Risk assessment A.3.3.2

A.3.3.2 Risk assessment

The designer needs to undertake a design risk assessment for the road which evaluates the risks associated with a number of parameters as detailed below. Additional lighting classes can be chosen if a variable lighting regime is to be used and if there is sufficient variation in traffic usage or other relevant parameters.

The relevant parameters are as follows.

- **Traffic composition**: where the traffic composition consists of a mixture of motorized traffic or cyclists and pedestrians, the potential for impact is higher than for non-mixed usage. In such cases the risk assessment could lead to an increase in lighting level conforming to a lower lighting class.
- **Complexity of task**: factors which increase the complexity of the visual task include parked cars, school entrances and traffic calming features. If one or more of these factors are present, the risk assessment could lead to an increase in lighting level conforming to a lower lighting class.
- **Risk of crime or need for recognition of other people or their intent**: where there is a need for better recognition, an additional illuminance class (EV) from BS EN 13201-2:2015, Table 6, might be chosen.

Following the risk assessment, the designer needs to make a judgement on whether the lighting may be adjusted by one class higher or lower.

Note
Lighting class selection for the surrounding subsidiary roads has been based on Table A.5. A risk assessment in accordance with A.3.3.2 has been undertaken to account for pedestrian and cyclists' routes on pathways around the building on the ground floor, and also the wider perimeter area of the surrounding roads, and parking bays. This extended road parameter is not included within Table A.5 (therefore refer to Note 1 under Table A.5)

BS EN 13201-1:2014 Road lighting. Part 1: Guidelines on lighting classes.
BS EN 13201-2:2015 Road lighting. Part 2: Performance requirements.

BS EN 13201-2:2015-Table 3

Table 3 — P lighting classes

Class	Horizontal illuminance		Additional requirement if facial recognition is necessary	
	$\bar{E}$ [a] [minimum maintained] lx	E_{min} [maintained] lx	$E_{v,min}$ [maintained] lx	$E_{sc,min}$ [maintained] lx
P1	15,0	3,00	5,0	5,0
P2	10,0	2,00	3,0	2,0
P3	7,50	1,50	2,5	1,5
P4	5,00	1,00	1,5	1,0
P5	3,00	0,60	1,0	0,6
P6	2,00	0,40	0,6	0,2
P7	performance not determined	performance not determined		

[a] To provide for uniformity, the actual value of the maintained average illuminance shall not exceed 1,5 times the minimum $\bar{E}$ value indicated for the class.

Note
Table 3 has been utilised for the classification of the subsidiary roads. Based on the environmental zone, speed limit, and anticipated low traffic flow, Lighting Class P3 was initially selected. However, following a risk assessment in accordance with Clause A.3.3.2, a lower lighting classification of P2 has been adopted to account for the identified pedestrian routes, road risks and provide an increased level of illumination for facial recognition to aid security and CCTV operation of a busy highly populated area. The increase in lighting levels should also deter loitering and create areas that the public do not feel vulnerable.

BS EN 13201-3:2015 Road lighting. Part 3: Calculation of performance.
BS EN 13201-4:2015 Road lighting. Part 4: Methods of measuring lighting performance.
BS EN 12464-2:2014 Lighting of workplaces. Outdoor workplaces.

BS 12464-2 :2014 – Table 5.1

Table 5.1 — General requirements for areas and for cleaning at outdoor work places

Ref. no.	Type of area, task or activity	$\bar{E}_m$ lx	U_o –	R_{GL} –	R_a –	Specific requirements
5.1.1	Walkways exclusively for pedestrians	5	0,25	50	20	
5.1.2	Traffic areas for slowly moving vehicles (max. 10 km/h), e.g. bicycles, trucks and excavators	10	0,40	50	20	
5.1.3	Regular vehicle traffic (max. 40 km/h)	20	0,40	45	20	At shipyards and in docks, R_{GL} may be 50
5.1.4	Pedestrian passages, vehicle turning, loading and unloading points	50	0,40	50	20	
5.1.5	Cleaning and servicing	50	0,25	50	20	All relevant surfaces

Note
Table 5.1 utilised for general spaces

PD CEN TR 13201-1:2014 Road lighting. Guidelines on selection of lighting classes.

SLL/CIBSE Publications

LG0:2017 Introduction to light and lighting – Section 9.4 Light pollution

LG6:2016 The exterior environment.

LG21:2021 Protecting the night-time environment.

For this scheme the following minimum maintained illuminances are proposed for the design:

External Walkway Illuminance	15 Lux at 0.25 uniformity
Subsidiary Road Illuminance	20 Lux - Class P2
Slow Moving Traffic / Parking Illuminance	10 Lux at 0.4 uniformity

Most importantly the design of the external lighting scheme is to provide a safe and secure environment for people, for access/egress including general circulation around and within the confines of the area.

3 ASSESSMENT OF LIGHT IMPACT ON THE SURROUNDING AREAS

The surrounding areas of the site shall be assessed prior to carrying out the detailed lighting scheme.

By careful design, luminaire selection, locations, and distances to nearby residents' properties any proposed lighting scheme from the existing buildings are to not cause any negative visual impact to the surrounding neighbourhoods.

The proposed external lighting scheme design shall consist of luminaire types to accentuate and complement the overall building and site areas and to provide a modern / safe feel.

4 GLARE AND STRAY LIGHT CONTROL MEASURES

The following measures shall be included in the design of the external lighting to control the potential for glare, obtrusive and stray light.

a. Select wall mounted luminaires, downward distribution only, provided with control optics and fixed to building perimeter, to avoid glare and no upward light distribution as recommended by GN01:2021.

b. The light source intensities shall be limited to reduce the brightness perceived by observers as recommended by GN01:2021.

c. A combination of wall mounted luminaires and pathway bollard luminaires have been selected for the upper balcony levels, and their lighting requirements. These have been supplied with control optics that shall be designed to provide an asymmetric light distribution to minimise the light overspill from the area as recommended by GN01:2021.

The balcony levels within the building footprint are on levels 22, 24 and 26 of the building, with these areas being external

5 LIGHTING CONTROL AND OPERATION

The ground floor external lighting shall be controlled via a common timeclock / photocell arrangement, to automatically switch lighting on and off based on ambient daylight levels, with a switch for manual override by staff.
The balcony lighting on levels 22, 24 and 26 are switched locally near the balconies, but the Fusion staff have the facility on the ground floor to override these switches, so these are not left on when areas are not in use.

6 LIGHTING LEVELS SITE COMMSSIONED RESULTS

The lighting has been completed and commissioned, with actual lighting levels recorded around the perimeter of the building. These levels are taken are at ground level below the luminaires.
These results were taken at 75lux average with a lowest level at 50lux.

Appendices:

A – Ground Floor External Lighting Calculations

B – Balcony Lighting Calculations

C – External Lighting Layout & Levels - Drawing No. P2152-NOV-XX-00-DR-E-6302

D – External Lighting Technical Submission

External Lighting

Installation : Ground Floor

Project number	:	P2152
Customer	:	Fusion Tower - Manchester
Processed by	:	Michael Houlding
Date	:	30.06.2025

Project description:
Fusion Tower - Manchester

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 Ansell Lighting, Wolf 19W WW (AWOLF/BLK)

1.1.1 Data sheet

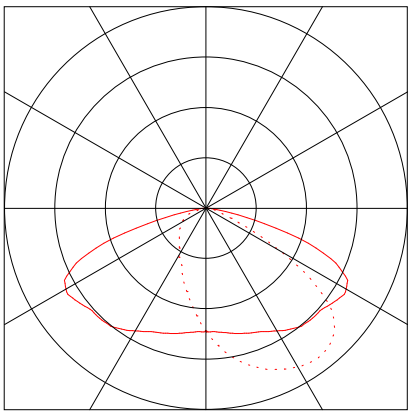
Manufacturer: Ansell Lighting

AWOLF/BLK **Wolf 19W WW**

Luminaire data		
Luminaire efficiency	:	100%
Luminaire efficacy	:	116.35 lm/W
Classification	:	A30 ↓100.0% ↑0.0%
CIE Flux Codes	:	40 76 97 100 100
Glare	:	G*5 / D6
Power	:	19.2 W
Luminous flux	:	2234 lm

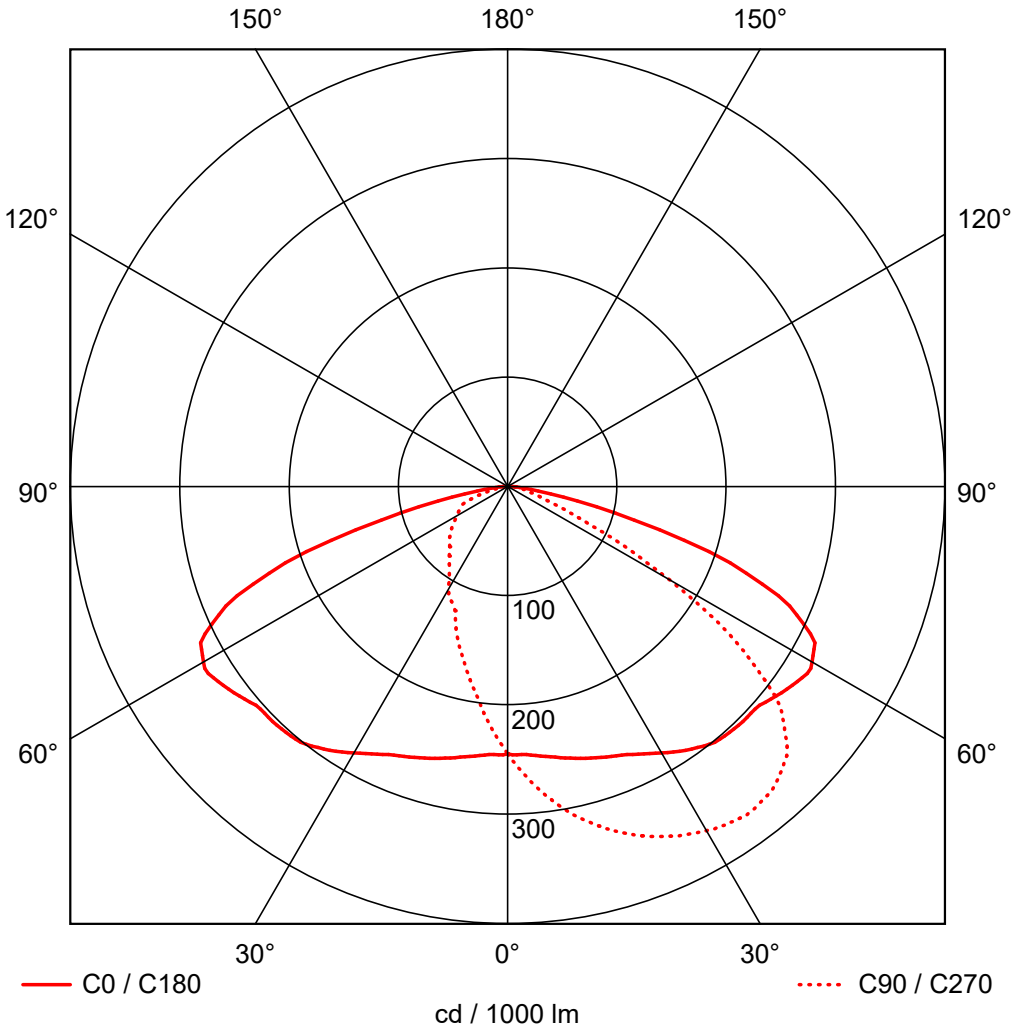
Equipped with		
Quantity	:	1
Designation	:	
Colour	:	3000
Luminous flux	:	2234 lm
Colour reproduction	:	82.9

Dimensions : 240 mm x 340 mm x 200 mm



1.1 Ansell Lighting, Wolf 19W WW (AWOLF/BLK)

1.1.2 LDC



	C90	C180	C270
0°	245	245	245
5°	274	247	215
10°	300	252	186
15°	322	258	161
20°	339	263	138
25°	353	271	119
30°	364	282	109
35°	370	293	93
40°	369	302	83
45°	358	304	76
50°	328	307	69
55°	264	318	61
60°	170	321	54
65°	85	299	49
70°	39	232	39
75°	22	120	19
80°	14	40	10
85°	8	8	5
90°	3	2	2

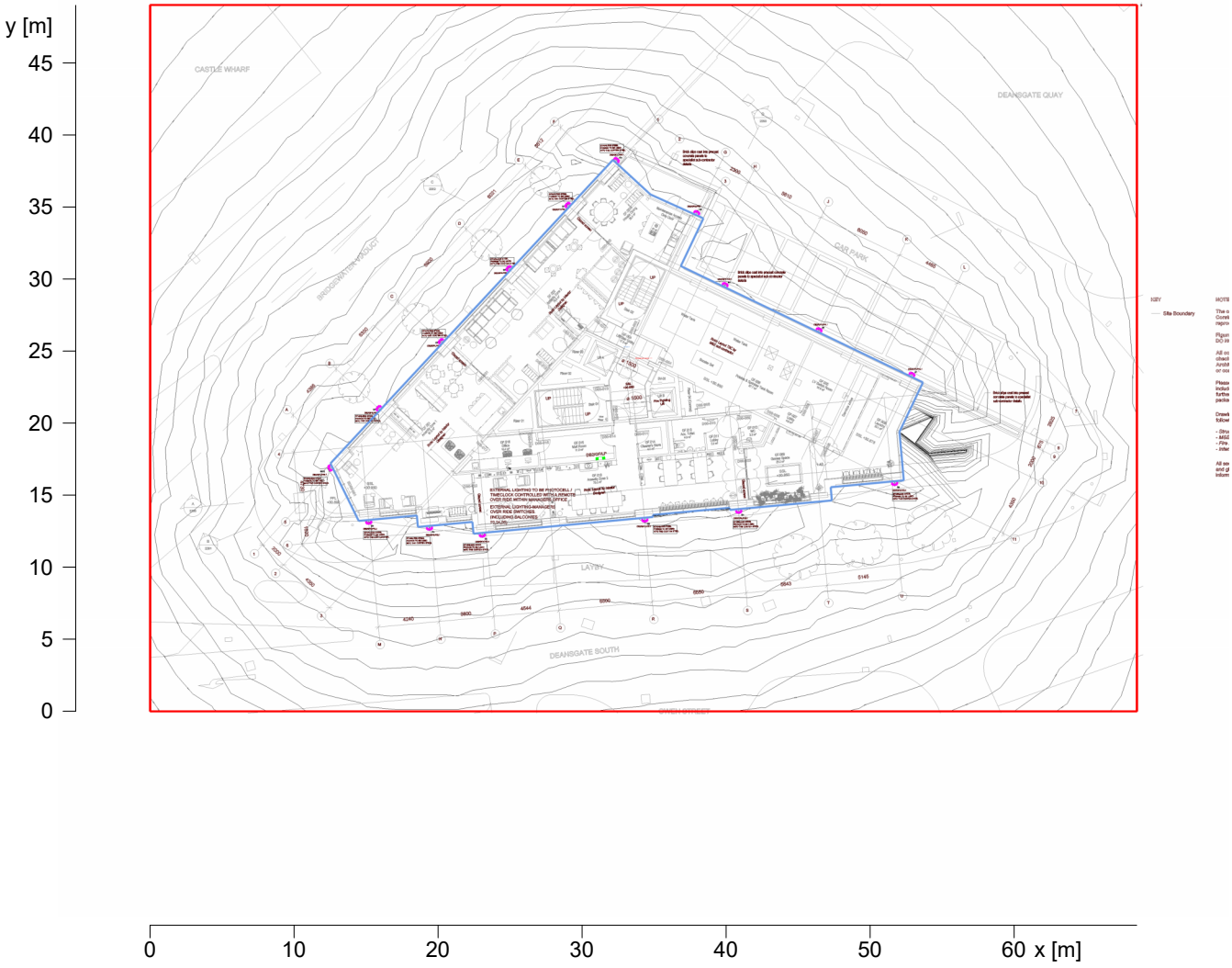
cd / 1000 lm

Manufacturer	: Ansell Lighting	Efficiency factor	: 100%
Order number	: AWOLF/BLK	Luminaire efficacy	: 116.35 lm/W (A30)
Luminaire name	: Wolf 19W WW	Light distribution	: sym. to C90-C270
Equipment	: 1 x 19.2 W / 2234 lm	Beam Angle	: 144.1° C0-C180
Dimensions	: L 240 mm x W 340 mm x H 200 mm		58.9° C90
File name	: Wolf 19W WW.ldt		8.6° C270

2 External Lighting

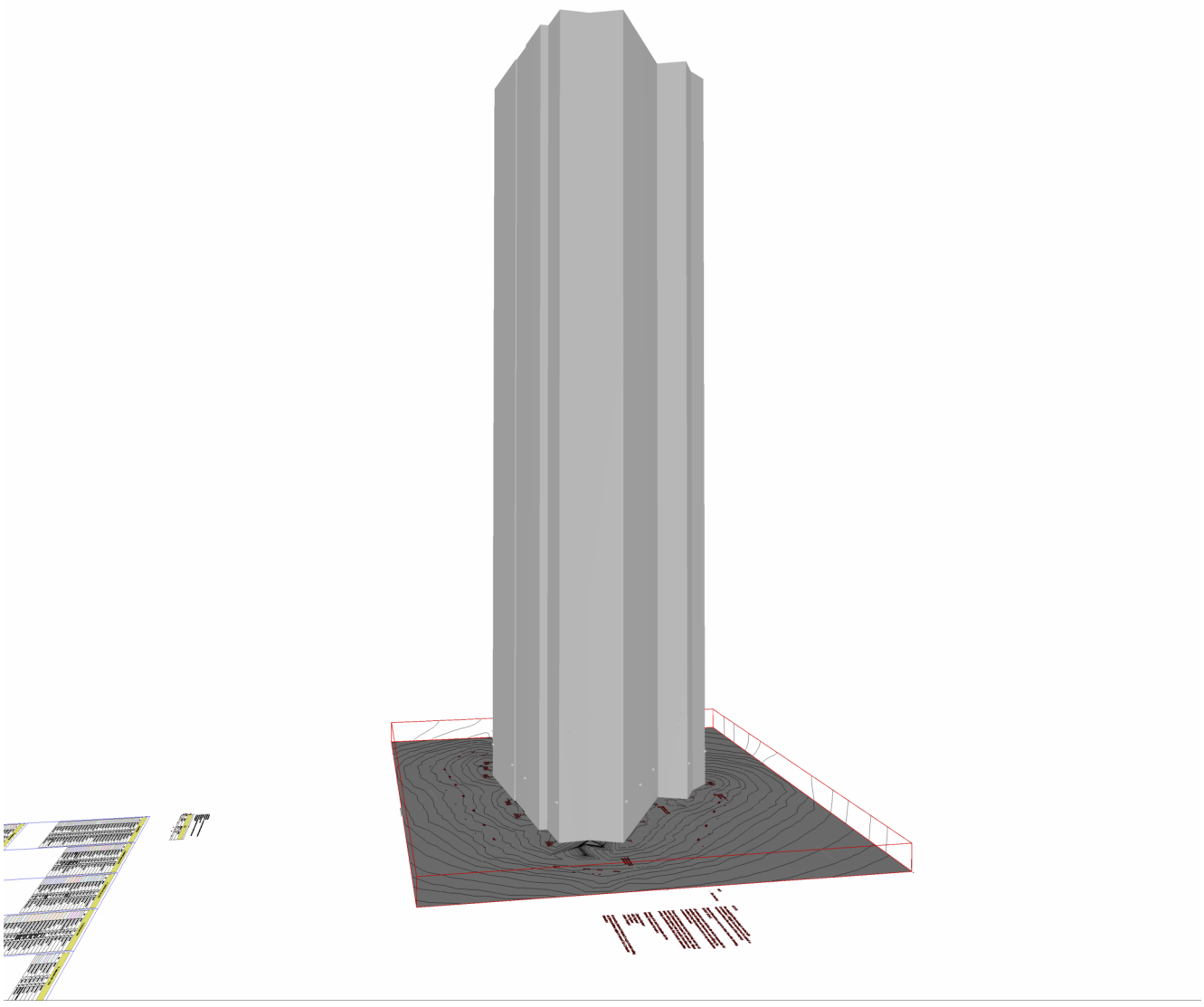
2.1 Description, External Lighting

2.1.1 Floor plan



2.1 Description, External Lighting

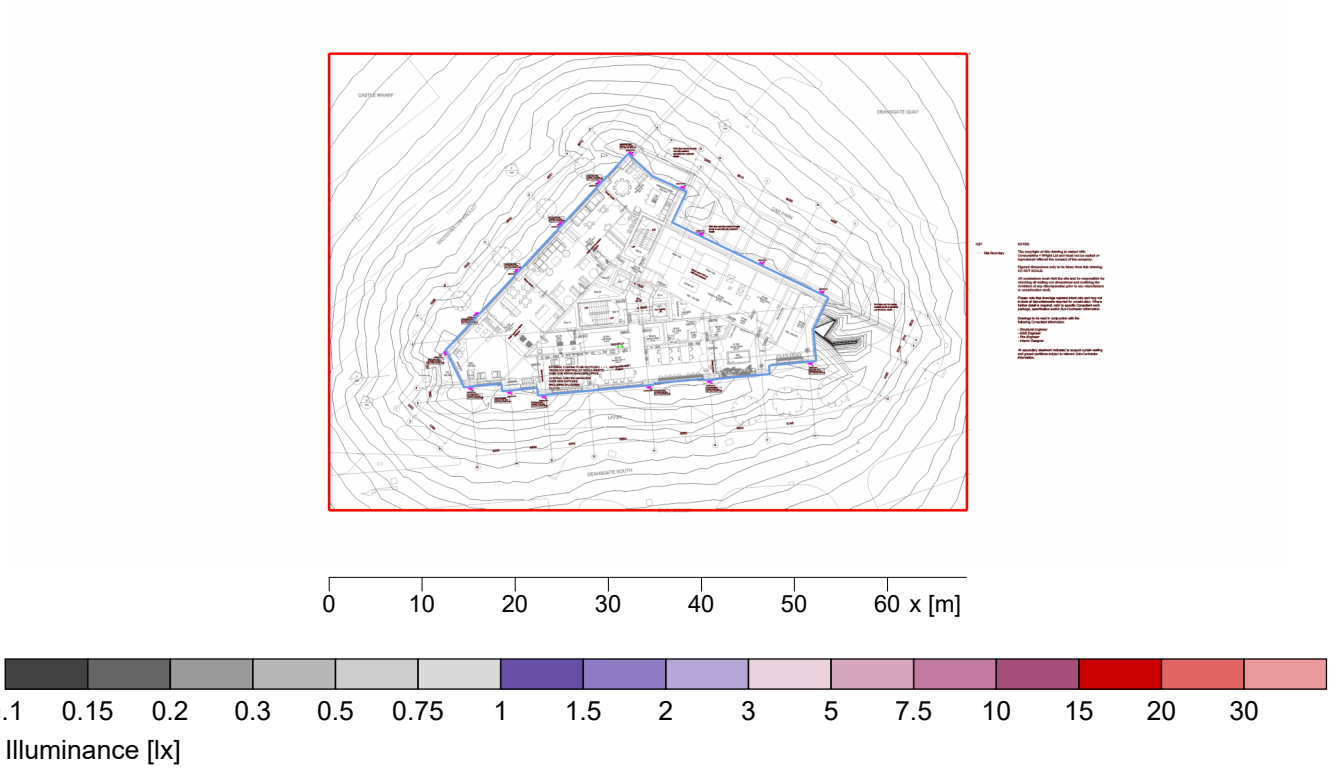
2.1.2 3D view, View 5



2 External Lighting

2.2 Summary, External Lighting

2.2.1 Result overview, Evaluation area 1



General

Calculation algorithm used	Average indirect fraction
Height (phot.centre)	4.20 m
Maintenance factor	see luminaires / maintenance plan
Luminaire luminous flux	0 lm

Evaluation area 1	**Reference plane 1.1**
	Horizontal
$\bar{E}_m$	5.37 lx
E_{min}	0.12 lx
$E_{min}/\bar{E}_m$ (U_o)	0.02
E_{min}/E_{max} (U_d)	0.00
Position	0.00 m

Major surfaces	$\bar{E}_m$		U_o	
M 1.5 (Ceiling)	0.74 lx	✓	0.01	✓
M 1.1 (Wall)	2.34 lx	✓	0.13	✓
M 1.2 (Wall)	0.79 lx	✓	0.50	✓
M 1.3 (Wall)	1.9 lx	✓	0.26	✓
M 1.4 (Wall)	1.56 lx	✓	0.36	✓

Type No.\Make

2 External Lighting

2.2 Summary, External Lighting

2.2.1 Result overview, Evaluation area 1

2 16 x 

Ansell Lighting
Order No. : AWOLF/BLK
Luminaire name : Wolf 19W WW
Equipment : 1 x 19.2 W / 2234 lm
Maintenance factor: 0.82

2 External Lighting

2.3 Calculation results, External Lighting

2.3.2 Table, Reference plane 1.1 (E)

[m]																		
45	**(0.1)**	0.2	0.3	0.4	0.6	1.1	1.8	2.2	2.3	2.1	1.4	0.9	0.6	0.5	0.3	0.2	0.2	**(0.1)**
	0.2	0.2	0.3	0.5	1	2.1	4.4	7.1	7.7	5.5	3	1.9	1.2	0.7	0.5	0.3	0.2	0.2
40	0.2	0.3	0.5	0.8	1.4	2.6	7.3	21.1	29.5	11.1	7.1	3.6	1.9	1.1	0.7	0.4	0.3	0.2
	0.3	0.5	0.8	1.3	2.5	4.7	11.4	26.7		30.7	18	7.2	3.6	2	1.2	0.7	0.4	0.2
35	0.4	0.7	1.5	2.4	4.8	10.9	28.5				17.8	14.4	7.7	4.3	2.3	1.2	0.6	0.3
	0.7	1.3	3	4.4	10.4	24.5						28.3	18.8	10.2	5.5	2.2	0.8	0.4
30	0.9	2.2	6.1	9.3	24.2									27.8	14.6	4.4	1.1	0.5
	1.1	3.1	11.3	23.2											5.2	5	1.6	0.5
25	1.2	3.7	19.3												1.5	4.2	1.4	0.8
	1.5	4	9.2	**[31.3]**	22.1				25.5	30.4	27.8	17.2	10.9	11.5	6.4	2.5	0.8	0.3
20	1.3	3	6.8	13.3	18.6	18.3	14.8	8.8	9.2	9.2	9.5	5.6	4.2	3.7	2.5	1.1	0.4	0.2
	0.7	1.4	2.9	5.1	6.2	5.8	5.2	3.5	3.5	3.1	2.8	2.2	1.6	1.2	0.9	0.5	0.3	0.2
15	0.5	0.8	1.3	1.8	2.4	2.4	2.1	1.6	1.4	1.3	1.2	1	0.8	0.6	0.4	0.3	0.2	**(0.1)**
	10			20			30			40			50			60	[m]	

Illuminance [lx]



Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 5.4 lx
Minimum illuminance	E_{min}	: 0.1 lx
Maximum illuminance	E_{max}	: 31.3 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 46.45 (0.02)

RELUX®

Installation : Balcony Area-22,24,26

Project number	:	P2152
Customer	:	Fusion
Processed by	:	Matthew Morgan
Date	:	17.06.2026

Project description:
Lighting _Emergency Lighting Calculation

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 Ansell, BOLLARDS - Taurus (ATAUB/1 (10W 4000K))

1.1.1 Data sheet

Manufacturer: Ansell

ATAUB/1 (10W 4000K) **Freestanding uplighter** **BOLLARDS - Taurus**
ATAUB/1
BOLLARDS
Taurus LED

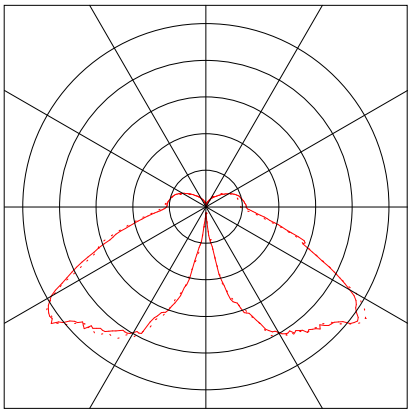
• Robust die-cast aluminium bollard with a textured graphite finish suitable for education, commercial and hospitality outdoor applications
• CCT selectable between 3000K and 4000K and power selectable; offering a choice of 3 outputs, in one luminaire
• High efficiency upto 100lm/w
• Die-cast aluminium head with polycarbonate lens
• Innovative base plate design allows greater installation flexibility
• Supplied c/w root mounting kit
• Integral emergency option
• Integral PIR option

Luminaire data

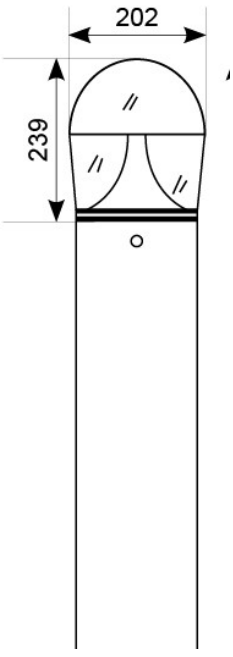
Absolute Photometry		
Luminaire efficacy	:	117.66 lm/W
Classification	:	B21 ↓83% ↑17%
CIE Flux Codes	:	27 64 89 83 100
UGR 4H 8H	:	22.3 / 22.8
Control gear	:	Electronic ballast
Power	:	9.7 W
Luminous flux	:	1141.3 lm
Dimensions	:	Ø200 mm x 90 mm

Equipped with

Quantity	:	1
Designation	:	LED
Colour	:	







1 Luminaire data

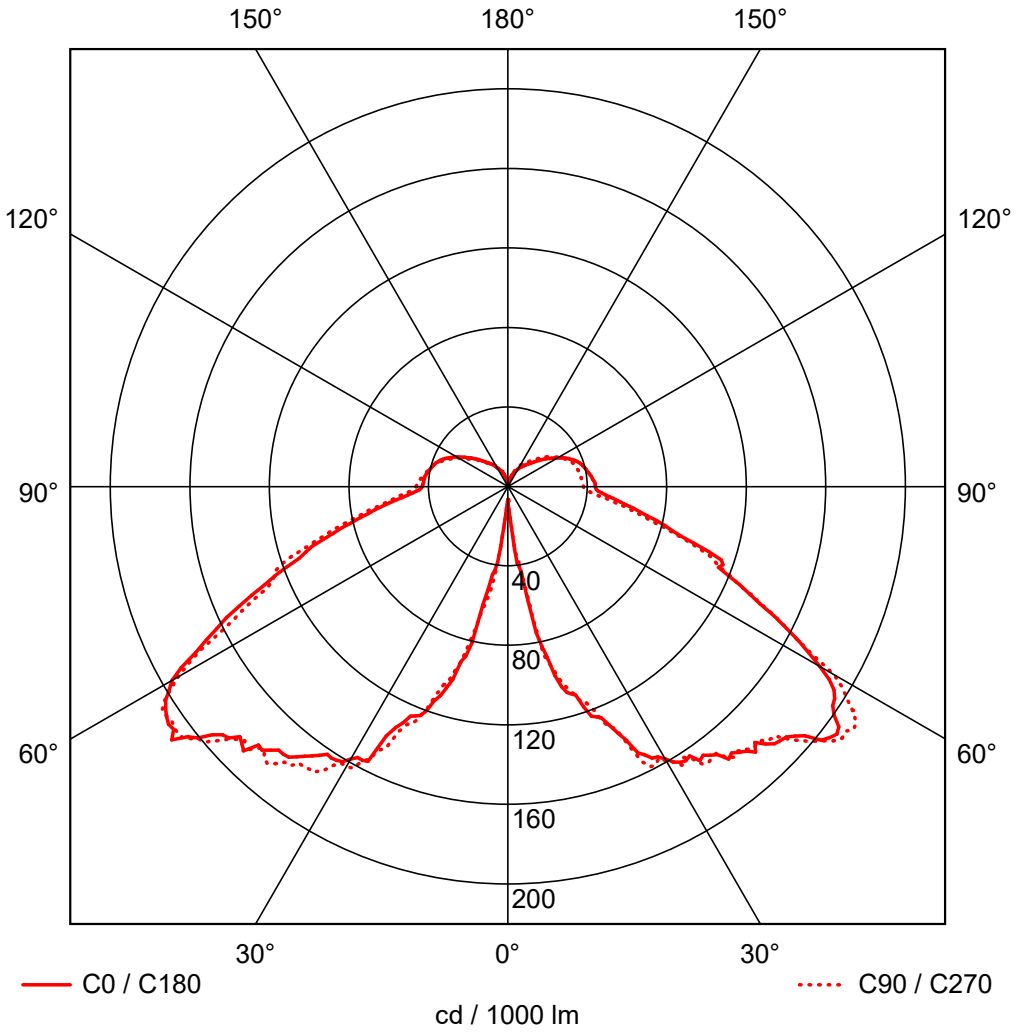
1.1 Ansell, BOLLARDS - Taurus (ATAUB/1 (10W 4000K))

1.1.1 Data sheet

Emergency Lighting
Light source from normal operation with reduced flux
Luminous flux : 114 lm

1.1 Ansell, BOLLARDS - Taurus (ATAUB/1 (10W 4000K))

1.1.2 LDC



	C0	C90	C180
0°	7	7	7
10°	58	54	45
20°	123	116	120
30°	158	159	158
40°	175	178	176
50°	195	199	194
60°	181	190	195
70°	115	111	118
80°	64	60	68
90°	44	38	43
100°	41	37	41
110°	37	35	37
120°	29	29	30
130°	21	23	22
140°	14	17	16
150°	10	12	11
160°	6	7	7
170°	2	2	3
180°	0	0	0
	cd / 1000 lm		

Manufacturer	: Ansell	Luminaire efficacy	: 117.66 lm/W (B21)
Order number	: ATAUB/1 (10W 4000K)	Light distribution	: asymmetric
Luminaire name	: BOLLARDS - Taurus	Beam Angle	: -- C0
Equipment	: 1 x LED 9.7 W / 1141.3 lm		-- C90
Dimensions	: D 200 mm x H 90 mm		-- C180
File name	: ataub-1_10w_4000k.ldt		-- C270

1 Luminaire data

1.2 Ansell, BULKHEADS - Wolf Black... (AWOLF/BLK/M3 (C...)

1.2.1 Data sheet

Manufacturer: Ansell

AWOLF/BLK/M3 (CW 19W) **Ceiling mounted luminaire** **BULKHEADS - Wolf Black 4000K**
AWOLF/BLK/M3
FLOODLIGHTING
Wolf CCT Wallpack

• Modern, robust die-cast aluminium low glare wall pack suitable for commercial and industrial applications
• Advanced lens technology offers wide distribution for optimum spacing and uniformity; whilst ensuring minimal uplight and light pollution
• Reduced light pollution with less than 2% upward light distribution
• Helps with compliance with Dark Skies recommendations
• Power selectable; offering a choice of 3 outputs, in one luminaire
• High efficiency up to 140 Lm/W
• Electrostatic paint finish for enhanced corrosion resistance
• Multiple conduit entry and BESA fixing points
• 20mm East and West side entry for surface conduit and through-wire
• Dimmable and Smart options available

Operating Temp -20°C to 40°C

• Suitable for external use
• 5 Year Product Warranty
• IP65

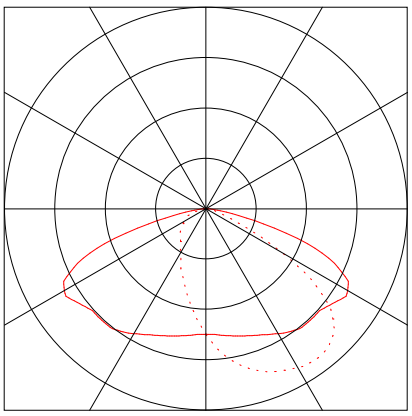
Luminaire data

Absolute Photometry		
Luminaire efficacy	:	123.24 lm/W
Classification	:	A30 ↓100% ↑0%
CIE Flux Codes	:	40 76 97 100 100
Glare	:	G*5 / D6
Control gear	:	Electronic ballast
Power	:	19.41 W
Luminous flux	:	2392 lm

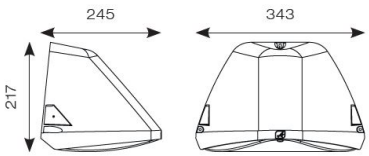
Dimensions : 240 mm x 340 mm x 200 mm

Equipped with

Quantity	:	1
Designation	:	LED single 840
Colour	:	4000K
Colour reproduction	:	--







1 Luminaire data

1.2 Ansell, BULKHEADS - Wolf Black... (AWOLF/BLK/M3 (C...)

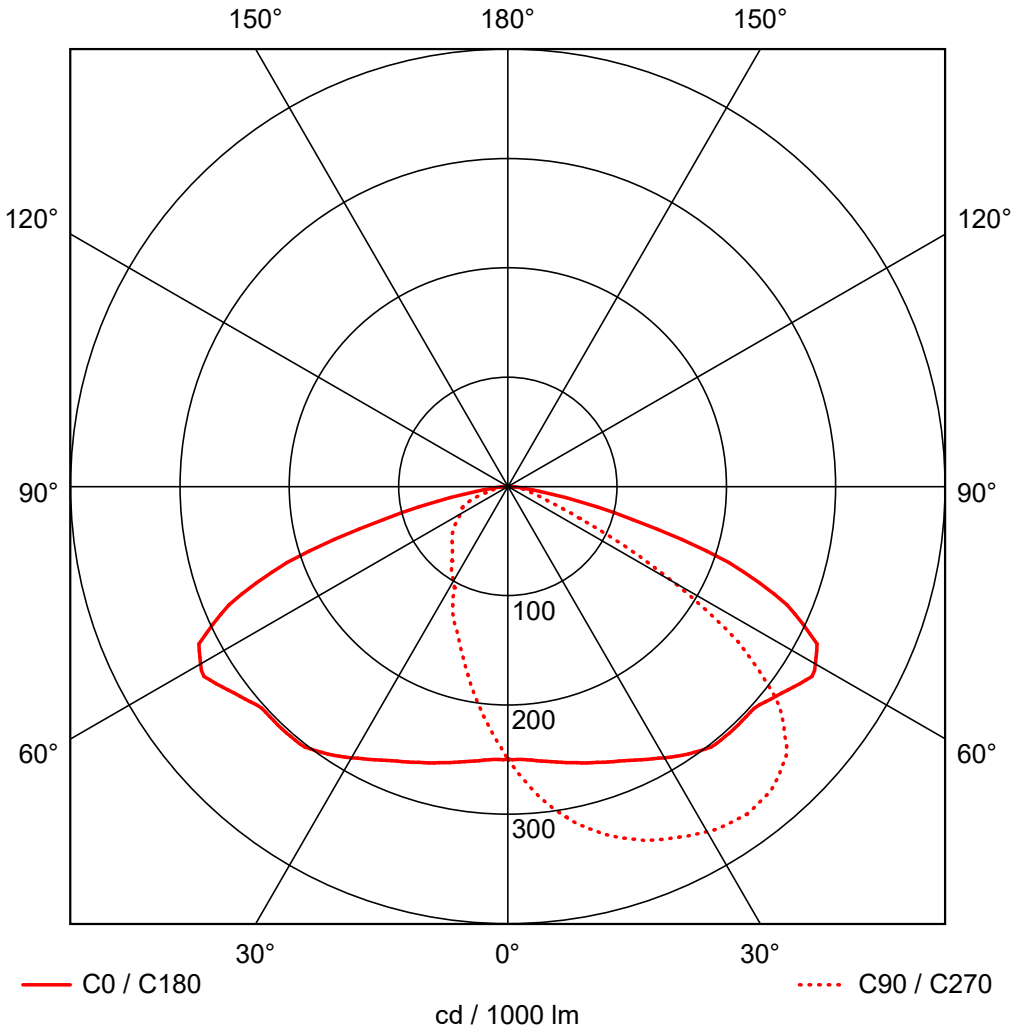
1.2.1 Data sheet

Emergency Lighting
Light source from normal operation with reduced flux
Luminous flux : 239 lm

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1.2 Ansell, BULKHEADS - Wolf Black... (AWOLF/BLK/M3 (C...)

1.2.2 LDC



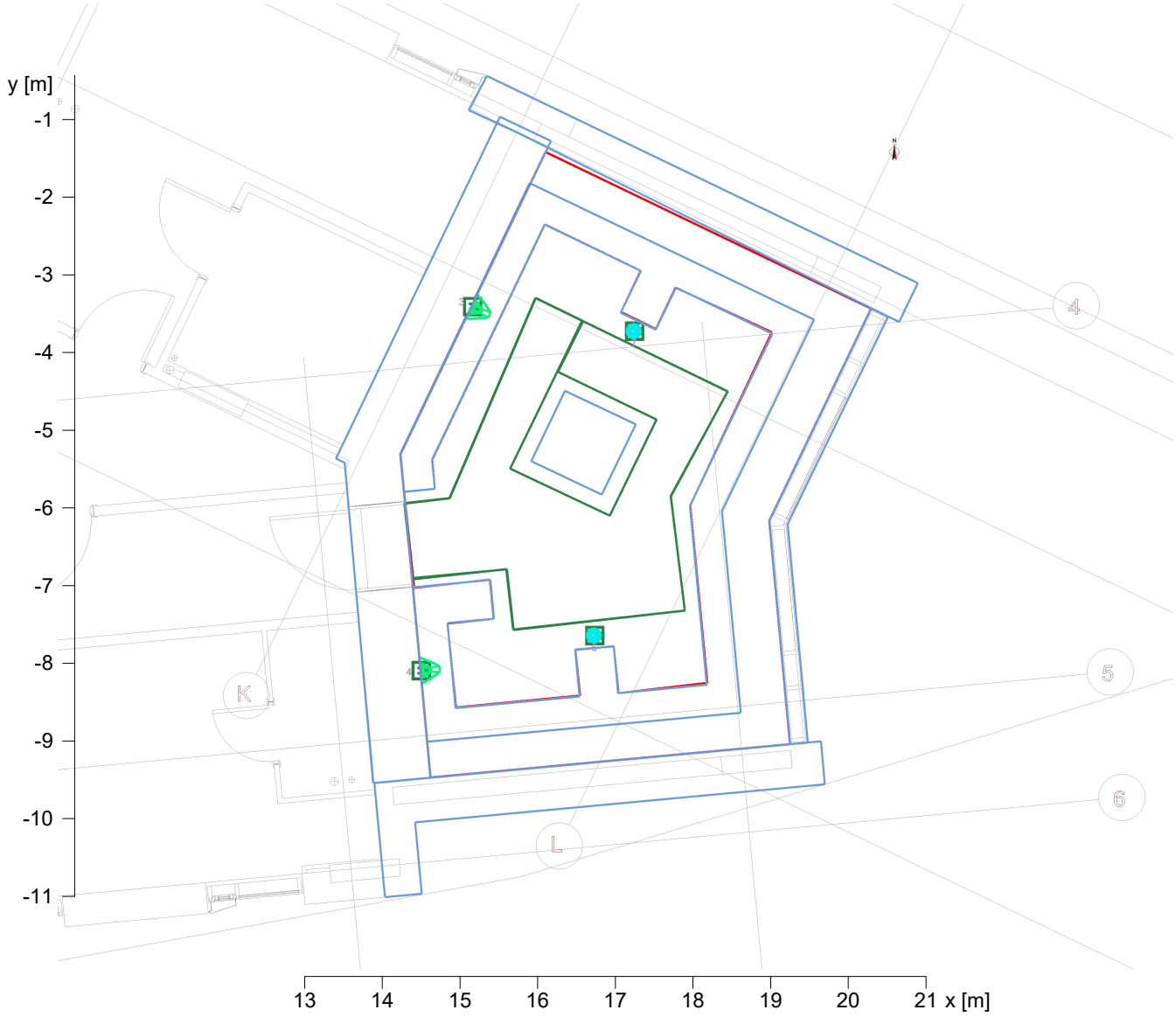
	C90	C180	C270
0°	249	249	249
5°	280	251	218
10°	307	256	188
15°	328	262	161
20°	344	268	139
25°	355	276	120
30°	364	286	99
35°	370	297	90
40°	368	303	79
45°	357	303	72
50°	327	307	66
55°	268	319	59
60°	174	325	51
65°	85	297	46
70°	39	230	35
75°	22	118	18
80°	14	41	10
85°	8	9	4
90°	3	2	2
	cd / 1000 lm		

Manufacturer	: Ansell	Luminaire efficacy	: 123.24 lm/W (A30)
Order number	: AWOLF/BLK/M3 (CW 19W)	Light distribution	: sym. to C90-C270
Luminaire name	: BULKHEADS - Wolf Black 4000K	Beam Angle	: 144.2° C0-C180
Equipment	: 1 x LED single 840 19.41 W / 2392 lm		59.3°C90
Dimensions	: L 240 mm x W 340 mm x H 200 mm		9.8° C270
File name	: awolf-blk_19w_cw.ldt		

2 Terrace 22nd Floor (With Central Planter)

2.1 Description, Terrace 22nd Floor (With Central Planter)

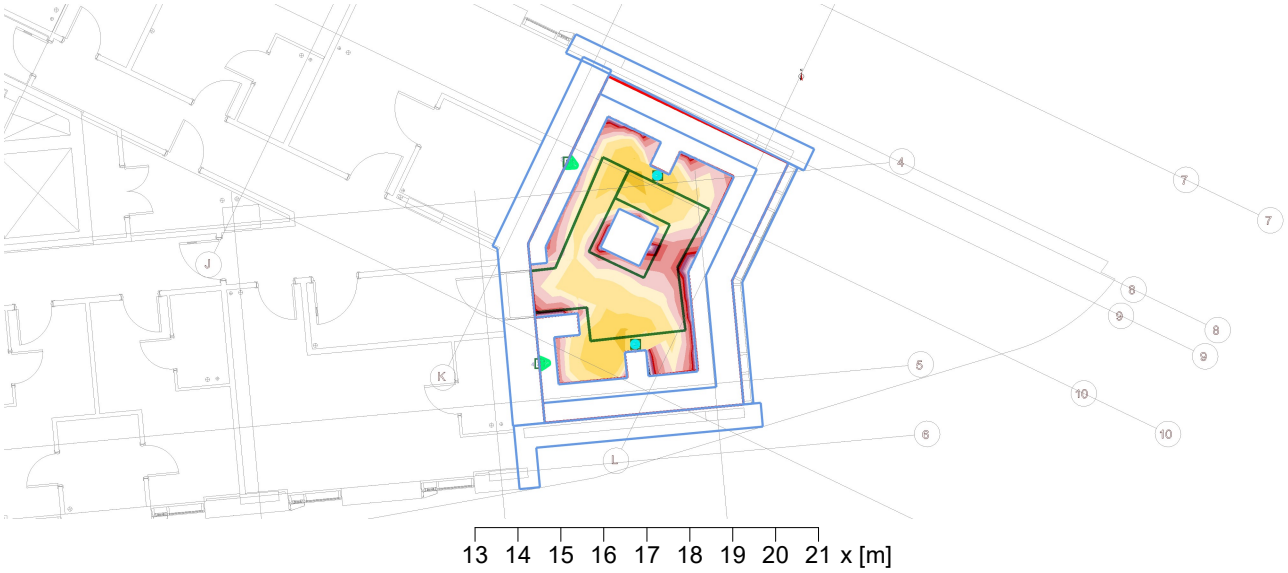
2.1.1 Floor plan



2 Terrace 22nd Floor (With Central Planter)

2.2 Summary, Terrace 22nd Floor (With Central Planter)

2.2.1 Result overview, Evaluation Area



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	7066.6001 lm
Total power	58.2 W
Total power per area (33.45 m²)	1.74 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	94 lx
Minimum illuminance	E_{min}	28 lx
Maximum illuminance	E_{max}	205 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:3.31 (0.3)
Diversity U_d	E_{min}/E_{max}	1:7.22 (0.14)

Type No.\Make

Ansell

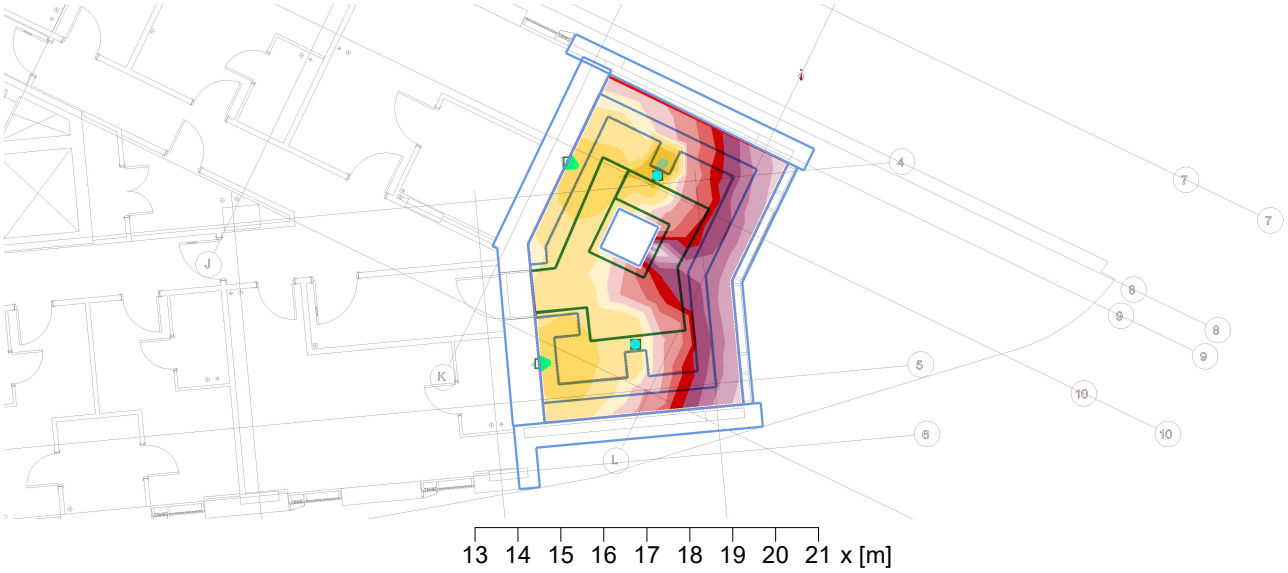
6 2E x
Order No. : ATAUB/1 (10W 4000K) -- Emergency Lighting --
Luminaire name : BOLLARDS - Taurus
Equipment : 1 x LED 9.7 W / 1141.3 lm
Emergency : 114 lm (10.0 %)

7 2E x
Order No. : AWOLF/BLK/M3 (CW 19W) -- Emergency Lighting --
Luminaire name : BULKHEADS - Wolf Black 4000K
Equipment : 1 x LED single 840 19.41 W / 2392 lm
Emergency : 239 lm (10.0 %)

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2.2 Summary, Terrace 22nd Floor (With Central Planter)

2.2.2 Result overview, Evaluation area 1



General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Luminaire luminous flux	7066.60 lm
Total power	58.2 W
Total power per area (33.45 m²)	1.74 W/m² (2.12 W/m²/100lx)

Evaluation area 1	**Reference plane 1.1**
	Horizontal
$\bar{E}_m$	82 lx
E_{min}	5.32 lx
$E_{min}/\bar{E}_m$ (U_o)	0.06
E_{min}/E_{max} (U_d)	0.02
Position	0.75 m

Type No.\Make

		Ansell		
6	2E x	Order No.	: ATAUB/1 (10W 4000K)	-- Emergency Lighting --
		Luminaire name	: BOLLARDS - Taurus	
		Equipment	: 1 x LED 9.7 W / 1141.3 lm	
		Emergency	: 114 lm (10.0 %)	

2.2 Summary, Terrace 22nd Floor (With Central Planter)

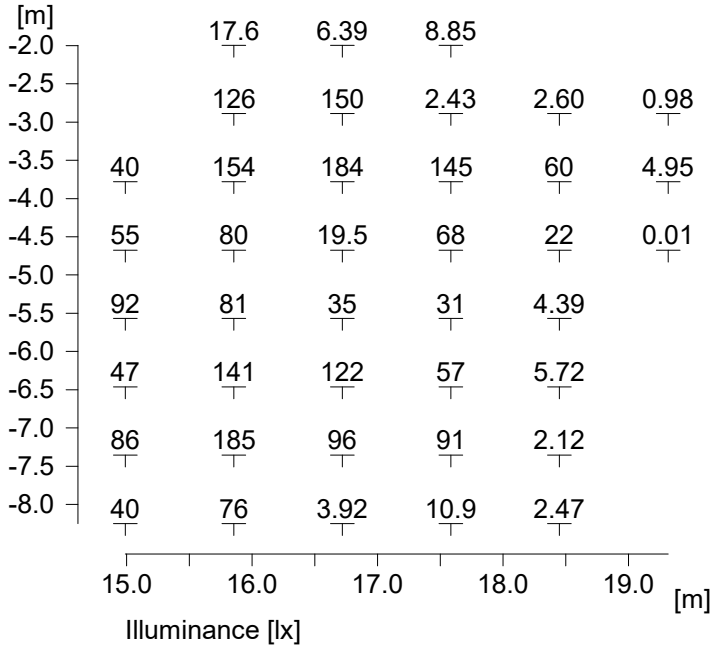
2.2.2 Result overview, Evaluation area 1

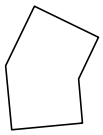
7	2E x	Order No.	: AWOLF/BLK/M3 (CW 19W)	-- Emergency Lighting --
		Luminaire name	: BULKHEADS - Wolf Black 4000K	
		Equipment	: 1 x LED single 840 19.41 W / 2392 lm	
		Emergency	: 239 lm (10.0 %)	

2 Terrace 22nd Floor (With Central Planter)

2.3 Calculation results, Terrace 22nd Floor (With Central Planter)

2.3.1 Table, Floor (E)

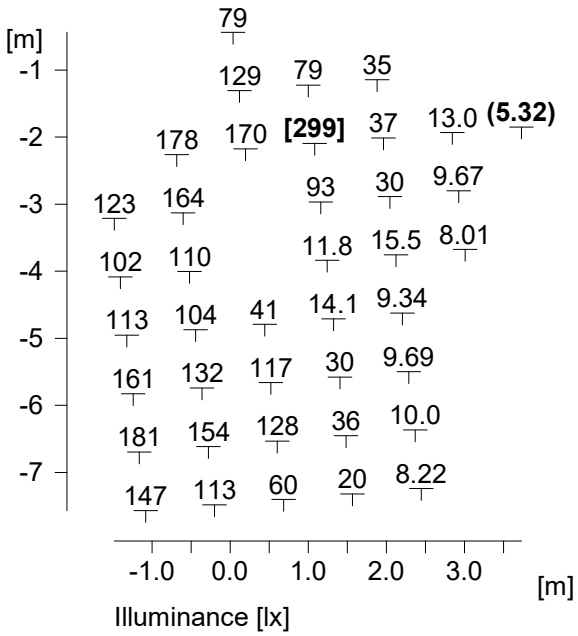




Average illuminance	$\bar{E}_m$	: 64 lx
Minimum illuminance	E_{min}	: 0.05 lx
Maximum illuminance	E_{max}	: 191 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 1237.77 (0.00)

2.3 Calculation results, Terrace 22nd Floor (With Central Planter)

2.3.2 Table, Reference plane 1.1 (E)

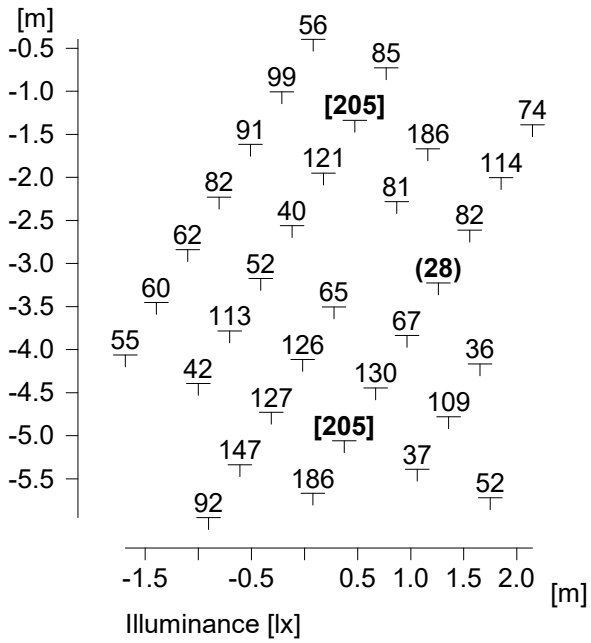


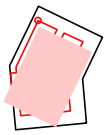
Height reference plane		: 0.75 m
Average illuminance	$\bar{E}_m$	: 82 lx
Minimum illuminance	E_{min}	: 5.32 lx
Maximum illuminance	E_{max}	: 299 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 15.41 (0.06)

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2.3 Calculation results, Terrace 22nd Floor (With Central Planter)

2.3.3 Table, Evaluation Area (E)



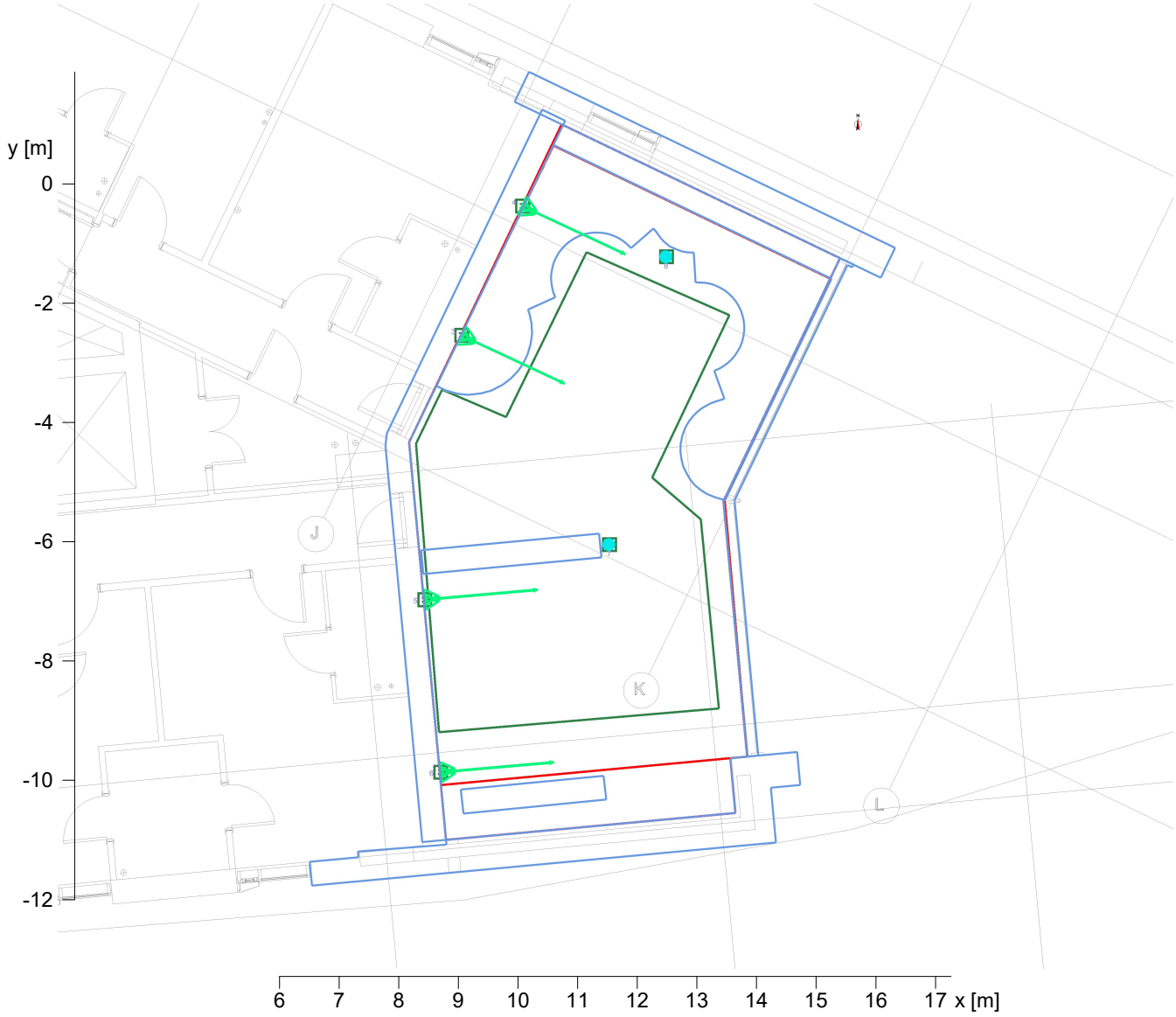


Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 94 lx
Minimum illuminance	E_{min}	: 28 lx
Maximum illuminance	E_{max}	: 205 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 3.31 (0.30)

3 Terrace 24th Floor

3.1 Description, Terrace 24th Floor

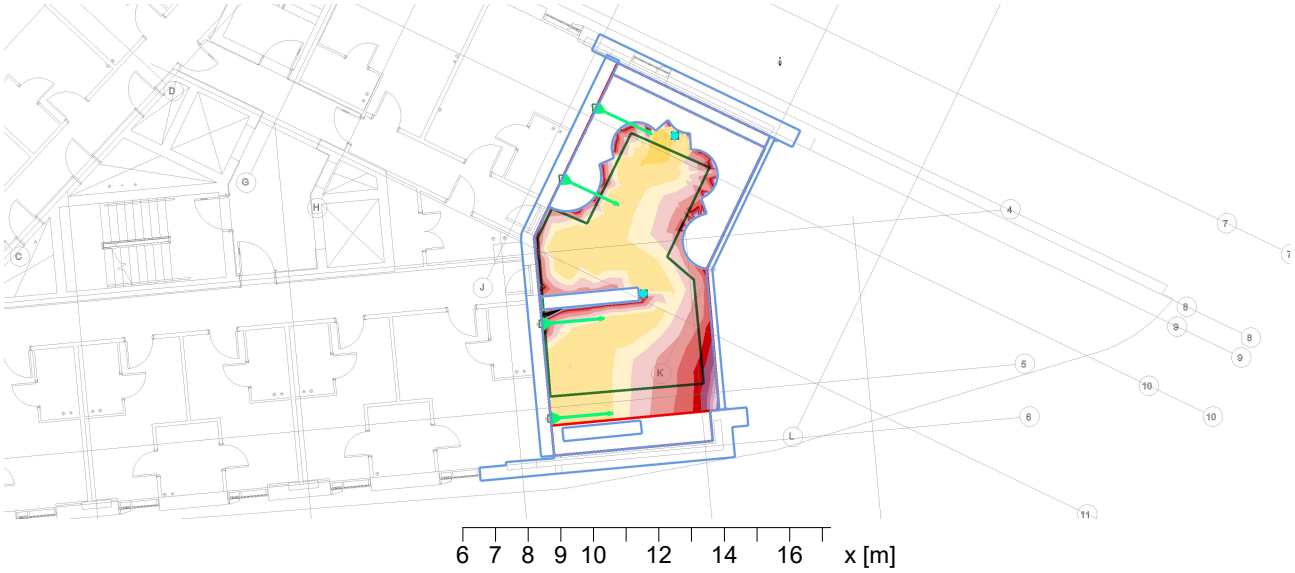
3.1.1 Floor plan

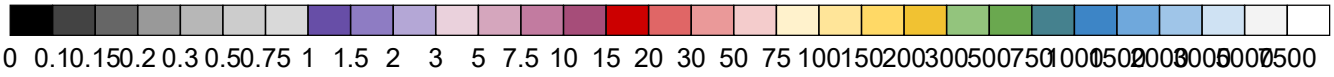


3 Terrace 24th Floor

3.2 Summary, Terrace 24th Floor

3.2.1 Result overview, Evaluation Area





General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	11850.5996 lm
Total power	97 W
Total power per area (57.38 m²)	1.69 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	83 lx
Minimum illuminance	E_{min}	14 lx
Maximum illuminance	E_{max}	152 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:6.13 (0.16)
Diversity U_d	E_{min}/E_{max}	1:11.2 (0.09)

Type No.\Make

Ansell

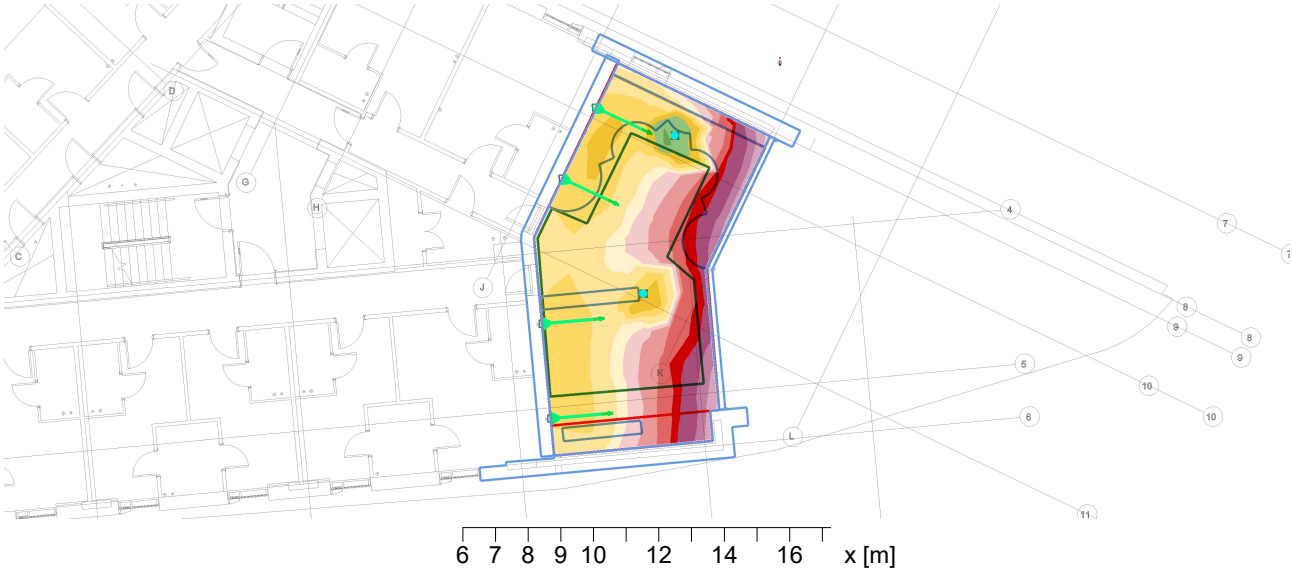
6 2E x
Order No. : ATAUB/1 (10W 4000K) -- Emergency Lighting --
Luminaire name : BOLLARDS - Taurus
Equipment : 1 x LED 9.7 W / 1141.3 lm
Emergency : 114 lm (10.0 %)

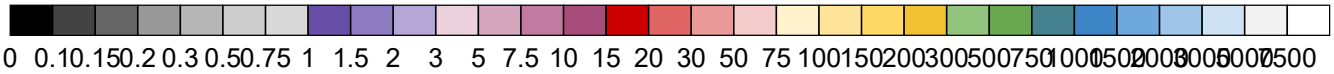
7 4E x
Order No. : AWOLF/BLK/M3 (CW 19W) -- Emergency Lighting --
Luminaire name : BULKHEADS - Wolf Black 4000K
Equipment : 1 x LED single 840 19.41 W / 2392 lm
Emergency : 239 lm (10.0 %)

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3.2 Summary, Terrace 24th Floor

3.2.2 Result overview, Evaluation area 1





General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Luminaire luminous flux	11850.60 lm
Total power	97.0 W
Total power per area (57.38 m²)	1.69 W/m² (1.61 W/m²/100lx)

Evaluation area 1	**Reference plane 1.1**
	Horizontal
$\bar{E}_m$	105 lx
E_{min}	6.57 lx
$E_{min}/\bar{E}_m$ (U_o)	0.06
E_{min}/E_{max} (U_d)	0.02
Position	0.50 m

Type No.\Make

		Ansell		
6	2E x	Order No.	: ATAUB/1 (10W 4000K)	-- Emergency Lighting --
		Luminaire name	: BOLLARDS - Taurus	
		Equipment	: 1 x LED 9.7 W / 1141.3 lm	
		Emergency	: 114 lm (10.0 %)	

3.2 Summary, Terrace 24th Floor

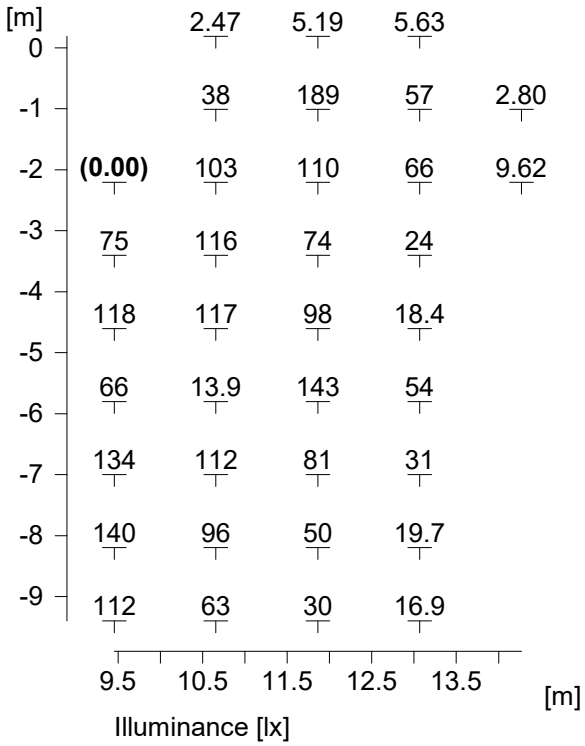
3.2.2 Result overview, Evaluation area 1

7	4E x	Order No.	: AWOLF/BLK/M3 (CW 19W)	-- Emergency Lighting --
		Luminaire name	: BULKHEADS - Wolf Black 4000K	
		Equipment	: 1 x LED single 840 19.41 W / 2392 lm	
		Emergency	: 239 lm (10.0 %)	

3 Terrace 24th Floor

3.3 Calculation results, Terrace 24th Floor

3.3.1 Table, Floor (E)



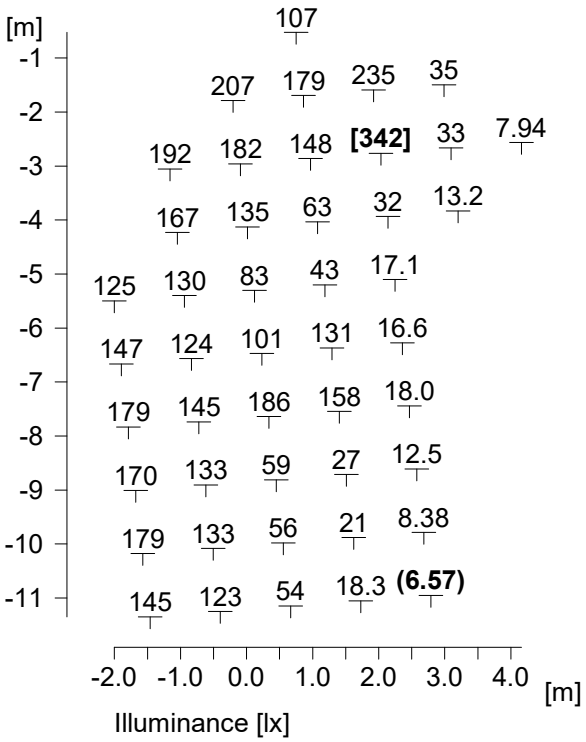


Average illuminance	$\bar{E}_m$	: 66 lx
Minimum illuminance	E_{min}	: 0.00 lx
Maximum illuminance	E_{max}	: 150 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: ---

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3.3 Calculation results, Terrace 24th Floor

3.3.2 Table, Reference plane 1.1 (E)



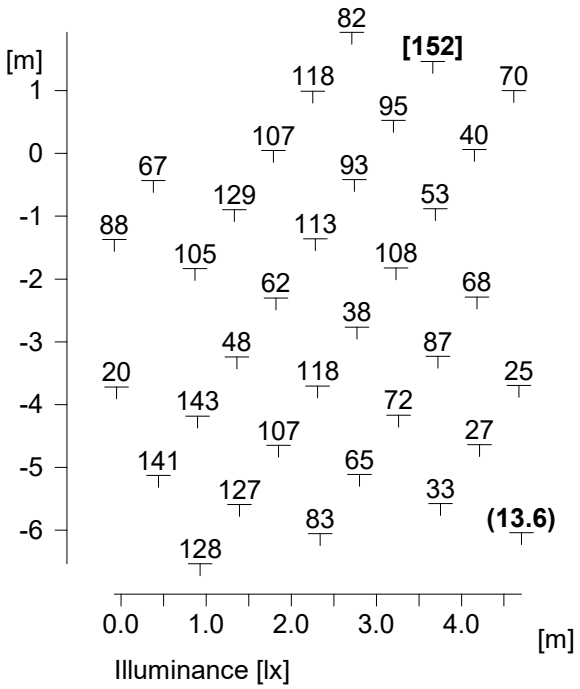


Height reference plane		: 0.50 m
Average illuminance	$\bar{E}_m$	: 105 lx
Minimum illuminance	E_{min}	: 6.57 lx
Maximum illuminance	E_{max}	: 342 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 15.98 (0.06)

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3.3 Calculation results, Terrace 24th Floor

3.3.3 Table, Evaluation Area (E)

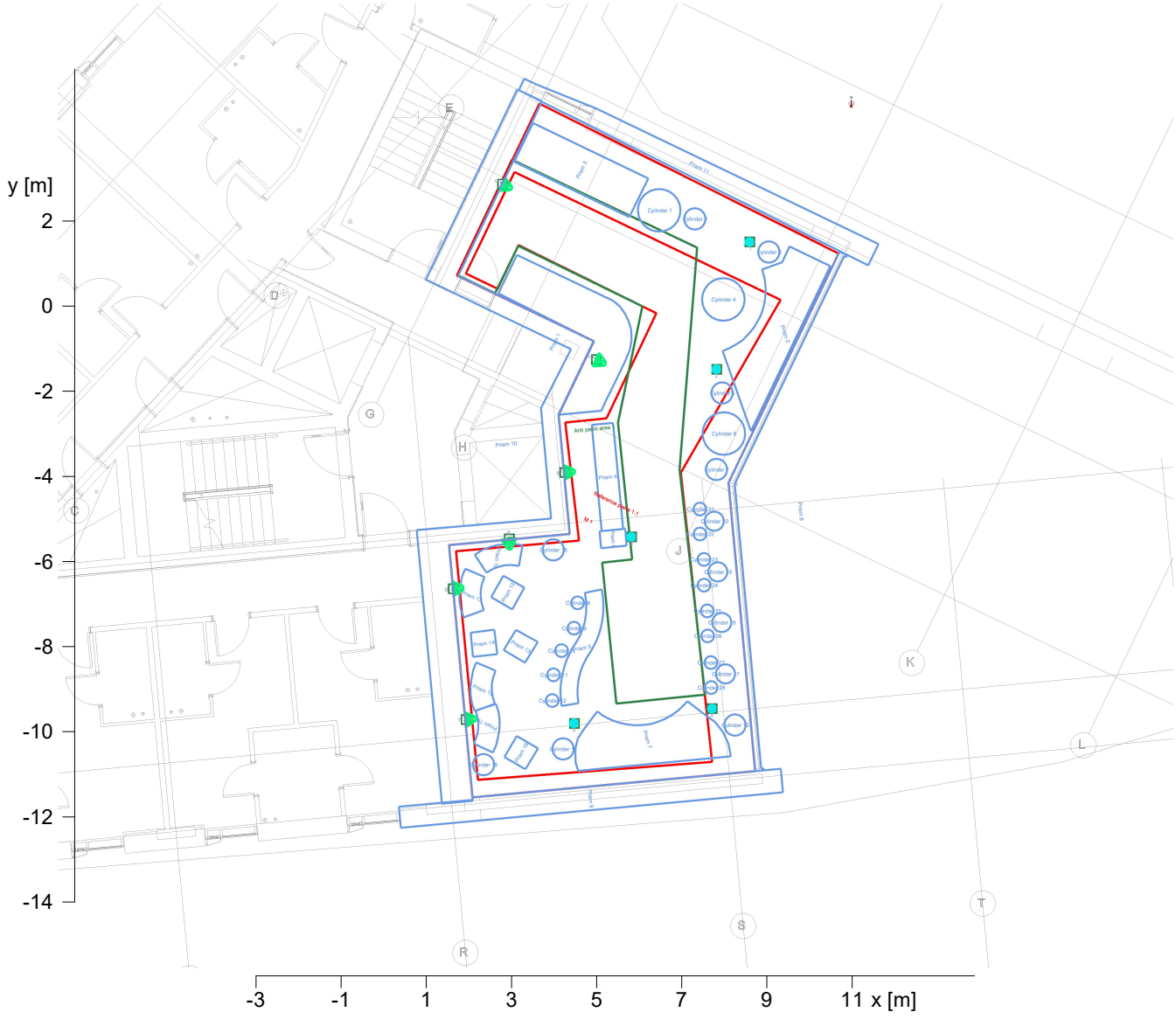


Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 83 lx
Minimum illuminance	E_{min}	: 13.6 lx
Maximum illuminance	E_{max}	: 152 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 6.13 (0.16)

4 Terrace 26th Floor (with furniture)(Copy of)

4.1 Description, Terrace 26th Floor (with furniture)(Copy of)

4.1.1 Floor plan

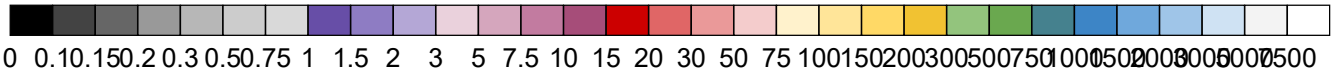


4 Terrace 26th Floor (with furniture)(Copy of)

4.2 Summary, Terrace 26th Floor (with furniture)(Copy of)

4.2.1 Result overview, Measuring area 1





Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Maintenance factor	0.80
Total luminous flux	20058.5 lm
Total power	165 W
Total power per area (88.82 m²)	1.86 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	92 lx
Minimum illuminance	E_{min}	0 lx
Maximum illuminance	E_{max}	230 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:712 (0)
Diversity U_d	E_{min}/E_{max}	1:1780 (0)

Type No.\Make

Ansell

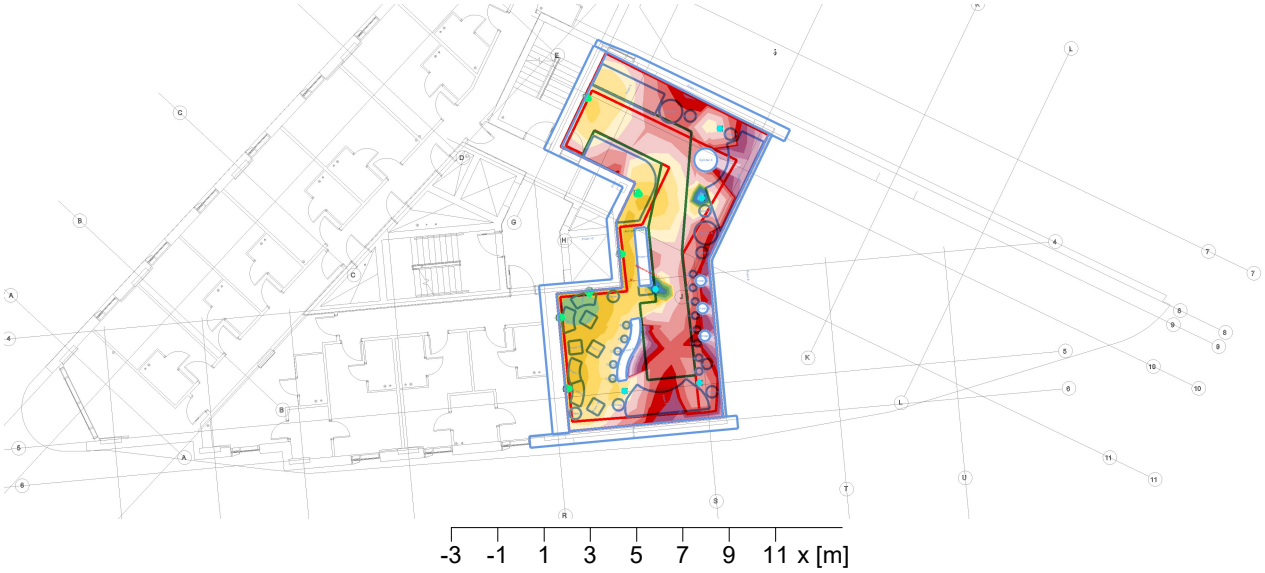
6 5E x
Order No. : ATAUB/1 (10W 4000K) -- Emergency Lighting --
Luminaire name : BOLLARDS - Taurus
Equipment : 1 x LED 9.7 W / 1141.3 lm
Emergency : 114 lm (10.0 %)

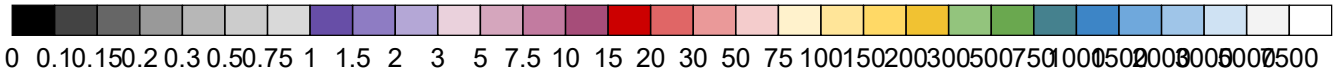
7 6E x
Order No. : AWOLF/BLK/M3 (CW 19W) -- Emergency Lighting --
Luminaire name : BULKHEADS - Wolf Black 4000K
Equipment : 1 x LED single 840 19.41 W / 2392 lm
Emergency : 239 lm (10.0 %)

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4.2 Summary, Terrace 26th Floor (with furniture)(Copy of)

4.2.2 Result overview, Evaluation area 1





Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.80
Luminaire luminous flux	20058.50 lm
Total power	165.0 W
Total power per area (88.82 m²)	1.86 W/m² (1.96 W/m²/100lx)

Evaluation area 1	**Reference plane 1.1**
	Horizontal
$\bar{E}_m$	95 lx
E_{min}	4.76 lx
$E_{min}/\bar{E}_m$ (U_o)	0.05
E_{min}/E_{max} (U_d)	0.01
Position	0.75 m

Type No.\Make

		Ansell		
6	5E x	Order No.	: ATAUB/1 (10W 4000K)	-- Emergency Lighting --
		Luminaire name	: BOLLARDS - Taurus	
		Equipment	: 1 x LED 9.7 W / 1141.3 lm	
		Emergency	: 114 lm (10.0 %)	

4.2 Summary, Terrace 26th Floor (with furniture)(Copy of)

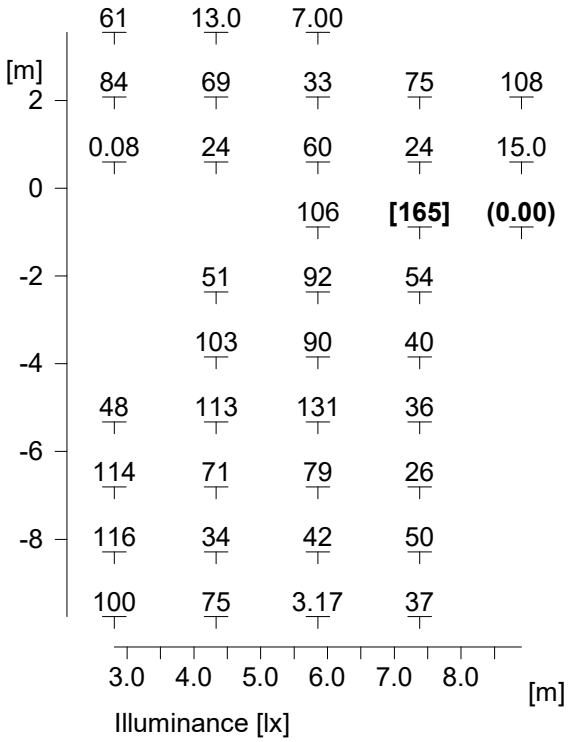
4.2.2 Result overview, Evaluation area 1

7	6E x	Order No.	: AWOLF/BLK/M3 (CW 19W)	-- Emergency Lighting --
		Luminaire name	: BULKHEADS - Wolf Black 4000K	
		Equipment	: 1 x LED single 840 19.41 W / 2392 lm	
		Emergency	: 239 lm (10.0 %)	

4 Terrace 26th Floor (with furniture)(Copy of)

4.3 Calculation results, Terrace 26th Floor (with furniture)(Copy of)

4.3.1 Table, Floor (E)





Average illuminance	$\bar{E}_m$	: 62 lx
Minimum illuminance	E_{min}	: 0.00 lx
Maximum illuminance	E_{max}	: 165 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: ---

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | CLASS | NUMBER	REVISION
P2152-NOV-XX-00-DR-E-6302	AF

LINKED FILES
20269-2010_GENERAL ARRANGEMENT - PLAN - 00 - LOWER GROUND FLOOR_STAGE 5 CONSTRUCTION_C-01_2

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DESIGNERS RISK ASSESSMENT
Under section 11, 18 - Construction (Design and Management) Regulations 2015

SAFETY, HEALTH & ENVIRONMENTAL INFORMATION
There are no significant, unusual or location specific risks which are not obvious to a competent contractor or likely to be difficult to manage

BRIDGEWATER VIADUCT

CAR PARK

LAYBY

DEANSGATE SOUTH

Brick slips cast into precast concrete panels to specialist sub-contractor details

GF.001 Amenity Zone 1 81.8 m²
GF.002 Amenity Zone 2 76 m²
GF.003 Private Dining 28.4 m²
GF.004 Lift/Stair Lobby 17.3 m²
GF.005 LV Switch Room 16.8 m²
GF.006 Laundry 33.1 m²
GF.007 Lobby 4.6 m²
GF.008 Service zone
GF.009 Games Space 23.5 m²
GF.010 Amenity Zone 3 75.2 m²
GF.011 Lobby 5.2 m²
GF.012 WC 3.2 m²
GF.013 Acc. Toilet 4.9 m²
GF.014 Cleaner's Store 4.7 m²
GF.015 Mail Room 11.8 m²
GF.016 Office 10.4 m²
GF.106 Potable & Sprinkler Tank Room 67.7 m²

Note: Layout by Interior Designer.
Note: Layout TBC by M&E sub-contractor.
Maintenance Access Only Door
Glazed screen
Water Tank
Booster Set
Lift A
Lift B Fire Fighting Lift
Riser 01
Riser 02
Riser 03
Riser 04 (Comms)
Stair 01
Stair 02
Wet Riser
SV-01
Ø 1500
SSL +30.850
SSL +30.875
FFL +30.890
DB2/GF/LP
UP
Service zone

EXTERNAL LIGHTING TO BE PHOTOCELL / TIMECLOCK CONTROLLED WITH A REMOTE OVER RIDE WITHIN MANAGERS OFFICE

EXTERNAL LIGHTING–MANAGERS OVER RIDE SWITCHES. (INCLUDING BALCONIES 22,24,26)

ED00-001

D00-001 D00-002 D00-003 D00-004 D00-005 D00-006 D00-007 D00-008 D00-009 D00-010 D00-011 D00-012 D00-013 D00-014 D00-015 D00-016 D00-017 D00-018 D00-019 D00-020 D00-021 D00-022 D00-023 D00-024

1:40

LIGHTING & SWITCHING LEGEND

SYMBOL	REFERENCE
1	ONE POLE SWITCH ('X' DENOTES No. OF GANGS)
2	TWO POLE SWITCH ('X' DENOTES No. OF GANGS)
CR	CENTRAL RETRACTION SWITCH
KS	EMERGENCY LIGHTING TEST KEY SWITCH
2W	TWO POLE ONE WAY SWITCH
AD	ABSENCE DETECTOR
PD	PRESENCE DETECTOR
MD	MICROWAVE DETECTOR
A1	30W ANSELL PACE UGR 19 BACKLIT PANEL ('/E' DENOTES EMERGENCY)
A2	40W ANSELL PACE UGR 19 BACKLIT PANEL ('/E' DENOTES EMERGENCY)
BL	BED LIGHT
DL	DESK LIGHT
C1	12W 600mm ANSELL TORNADO EVO LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
C2	15W 600mm ANSELL TORNADO EVO LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
C3	18W 600mm ANSELL TORNADO EVO LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
C4	24W 1200mm ANSELL TORNADO EVO LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
C5	30W 1200mm ANSELL TORNADO EVO LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
R1	RECESSED DOWNLIGHT ANSELL EDGE GU10 FIRE RATED
R2	RECESSED DOWNLIGHT IP65 (INCLUDED WITHIN POD SUPPLY)
S1	12W ANSELL FRESKA ('/E' DENOTES EMERGENCY)
S2	18W ANSELL FRESKA ('/E' DENOTES EMERGENCY)
F1	22W ANSELL MECURIAL ('/E' DENOTES EMERGENCY)
F2	22W ANSELL MECURIAL WITH INBUILT MICROWAVE ('/E' DENOTES EMERGENCY)
F2	22W ANSELL MECURIAL WITH INBUILT MICROWAVE WALL MOUNTED ('/E' DENOTES EMERGENCY)
G1	18W ANSELL WOLF EXTERNAL WALL LIGHT ('/E' DENOTES EMERGENCY)
H1	14W ANSELL COMFORT EVO SURFACE MOUNTED DOWNLIGHT ('/E' DENOTES EMERGENCY)
H2	20W ANSELL COMFORT SURFACE MOUNTED DOWNLIGHT ('/E' DENOTES EMERGENCY)
P1	52W RICOMAN ESTRELLA SUSPENDED LINEAR LUMINAIRE ('/E' DENOTES EMERGENCY)
E1	ANSELL MERLIN EMERGENCY LUMINAIRE (CORRIDOR)
E2	ANSELL MERLIN EMERGENCY LUMINAIRE (OPEN AREA)
E3	ANSELL FALCON SURFACE MOUNTED EMERGENCY LUMINAIRE (CORRIDOR)
E4	ANSELL FALCON SURFACE MOUNTED EMERGENCY LUMINAIRE (OPEN AREA)
E1	EMERGENCY EXIT SIGN C/W DIRECTION ARROW ANSELL EAGLE 3-IN-1
E2	EMERGENCY BULKHEAD ANSELL GUARDIAN

0 1 2 3 4 5m
1:50 SCALE

STA	REV	DESCRIPTION	DES	CHD	DATE
-	AF	AS FITTED	ML	BD	17.06.26

PURPOSE OF ISSUE
AS FITTED

NOVO Integration Ltd
7 Feast Field, Horsforth, Leeds, West Yorkshire, LS18 4TJ
t: +44(0)113 2577300 e: novocad@novo.eu.com

CLIENT
DOMIS

PROJECT
FUSION TOWER

TITLE
ELECTRICAL SERVICES
EXTERNAL LIGHTING LAYOUT & LEVELS
GROUND FLOOR

SCALE	ORIGINAL SIZE	DATE
1:50	A0	MAR'26
DRAWN: MNM	DESIGNED: MH	CHECKED: BD

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | CLASS | NUMBER	REVISION
P2152-NOV-XX-00-DR-E-6302	AF

EXTERNAL LIGHTING LAYOUT & LEVELS

FXXX.XX	TECHNICAL SUBMISSION	matic

Project:	Fusion
Project Ref No.:	50077
Technical Submission Number:	TS 013
Issued To:	Domis/Novo
Date:	20/09/2024
Product Description	Light Fitting G1 Non-Emergency
Sample Required:	
Approval Required No Later Than:	

Product/Material:



Technical Information:

Comments		Architect	Consultant	Client
Please Carry Out: (Circle appropriate A, B or C)				
No adverse comments proceed:	**A**			
Proceed in line with comments:	**B**			
Rejected:	**C**			

Approval Signatures

Architect:	
Consultant:	
Client:	

G1



Category	Bulkheads
Application	Ancillary, Commercial, Healthcare, Hospitality, Industrial, Outdoor, Retail
Specification	Performance

Wolf

Wolf CCT Multi Wattage Wallpack Black

Code: AWOLF/BLK







PRODUCT FEATURES

- Modern, robust die-cast aluminium low glare wall pack suitable for commercial and industrial applications
- Reduced light pollution with 0% upward light distribution, helps with compliance with Dark Skies recommendations, helps with compliance with Dark Skies recommendations
- High efficiency up to 120 Lm/W
- Multiple conduit entry and BESA fixing points
- Advanced lens technology offers wide distribution for optimum spacing and uniformity; whilst ensuring minimal uplight and light pollution
- Power selectable; offering a choice of 3 outputs, in one luminaire
- Electrostatic paint finish for enhanced corrosion resistance
- 20mm East and West side entry for surface conduit and through-wire

GENERAL INFORMATION	
Wattage	18/20/30W
Lumens Delivered	2200/2400/3600lm (4000K)
Lm/W	120lm/W (4000K)
Beam Angle	70/140
CRI	82
CCT	3000/4000K
Input	220/240V
Operating Temp	-20°C - 45°C
SDCM	5
Product Weight without Packaging	2.845 kg

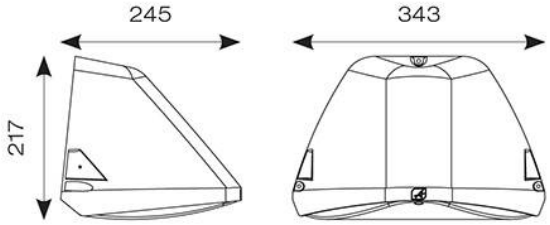
TECHNICAL INFORMATION	
Light Source	LED
Colour / Finish	Black
IP Rating	IP65
Class Protection	1
Internal / External	External
Surface / Recessed / Suspended	Pole, Wall
Lumen Depreciation	L80 84,000h
Warranty (Years)	5
CE Mark	Yes
Height	217 mm

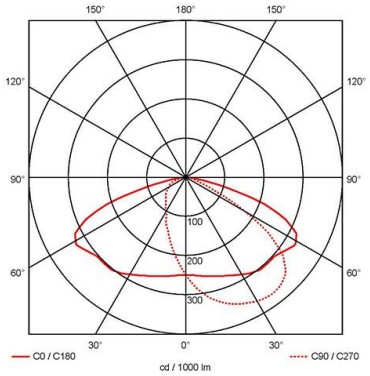


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Wolf CCT Multi Wattage Wallpack Black
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ACCESSORIES	
AWOLFB/S/BLK/1	Wolf Post Top Bracket Single Black
AWOLFB/S/SG/1	Wolf Post Top Bracket Single Silver Grey
AWOLFB/D/BLK/1	Wolf Post Top Bracket Double Black
AWOLFB/D/SG/1	Wolf Post Top Bracket Double Silver Grey