

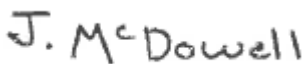
LIGHTING IMPACT ASSESSMENT

Glenbrooks Starbucks Rochdale

Document No. 28/038/LR/01

August 2026

Document Control Sheet

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Date of Issue: 08 th August 2026	File Name: Verification Report Document Ref: 28/038/LR/01	Version: 1 Status: Original

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1. MANAGEMENT SUMMARY

This report has been prepared in accordance with the guidance provided in ILP Professional Lighting Guide 04, ILP Guidance Note 01/21 *The Reduction of Obtrusive Light*, BS EN 12193 and BS EN 12464. These documents collectively set out the recognised standards and methodologies for assessing and mitigating the impact of artificial lighting on the surrounding environment.

The lighting level for the site complies with the standards set out within BS EN 12464-2:2024.

Based on the location of the proposed Starbucks unit, the site falls within Lighting Environmental Zone E3, defined as a suburban area. In accordance with the limits specified in ILP Guidance Note 01/21, the maximum permissible level of obtrusive illuminance on neighbouring residential façades is 10 lux during pre-curfew hours (up to 22:00) and 2 lux during post-curfew hours (after 22:00).

The calculations indicate that the average vertical illuminance of the dwellings adjacent to the site, measured at first-floor window height (3 metres), is 0.23 lux. This value is significantly below the pre and post-curfew threshold for Environmental Zone E3 and confirms that the proposed lighting design will not cause unacceptable levels of light intrusion. It is also noted that within the calculations, foliage has **not** been taken into account and the real illuminance value may be lower than this.

All luminaires specified within the scheme are oriented with a downward inclination of 0 degrees. This configuration ensures that upward light output is minimal and that the potential for sky glow is effectively controlled. Therefore, the impact on the night sky to be negligible and fully compliant with the requirements of the relevant guidance.

An assessment of glare has been undertaken at all locations representing first-floor windows within the closest adjacent dwellings. The calculated results demonstrate that, under normal operating conditions, glare levels do not exceed the limits set out in Table 4 of ILP Guidance Note 01/21 at any measured point, as detailed in the below table.

Address	Distance From Highest Luminous Intensity Source (M)	Limit Luminous Intensity (Table 4 GN 01/21) Candela (I)	Measured Luminous Intensity Candela (I)	Pass/Fail
Ash Tree Close	27	67.5	0.01	Pass

It is found that the proposed external lighting scheme fully complies with the requirements of ILP Guidance Note 01/21, ILP Professional Lighting Guide 04, and all other referenced standards. The calculated illuminance levels, glare control, and luminaire orientation collectively demonstrate that the installation will not give rise to any significant obtrusive light, glare, or sky glow. Therefore, it is satisfied that the lighting design meets all necessary environmental and technical criteria for Environmental Zone E3.

2. INTRODUCTION

ECS Consultants have undertaken a desktop lighting assessment for the proposed installation at the proposed Starbucks Rochdale. The purpose of this assessment was to determine whether the proposed external lighting for the new development would result in any excessive light pollution or obtrusive lighting to neighbouring residential properties.

This report has been prepared in accordance with ILP Professional Lighting Guide 04, ILP Guidance Note 01/21 – The Reduction of Obtrusive Light, BS EN 12193, BS EN 12464. It considers the potential impact on residential dwellings located on Whitehall Street. These are in the locality of the proposed site.

All obtrusive lighting has been taken from nominal measuring points along the façades of the dwellings, simulating lower and upper floor window locations.

All lighting simulations have been undertaken using Relux Lighting Software, with input values derived from verified photometric data supplied by the luminaire manufacturers. The relevant luminaire data sheets are included in Appendix C of this report.

The existing lighting within the existing carpark has not been modelled and does not fall under the scrutiny of this report.

The basis of this reporting is to verify the proposed new lighting around the proposed Starbucks unit in compliance with their specification document: Starbucks UK EMEA New Drive Thru Specification. This details the requirements of achieving an average 30 Lux at 0.4 uniformity ratio.

3. THE INSTALLATION

3.1 Lamp Post Columns

The proposed installation shall consist of 4m Root mounted lamp post columns with LED lamppost top lighting.

3.2 Luminaires

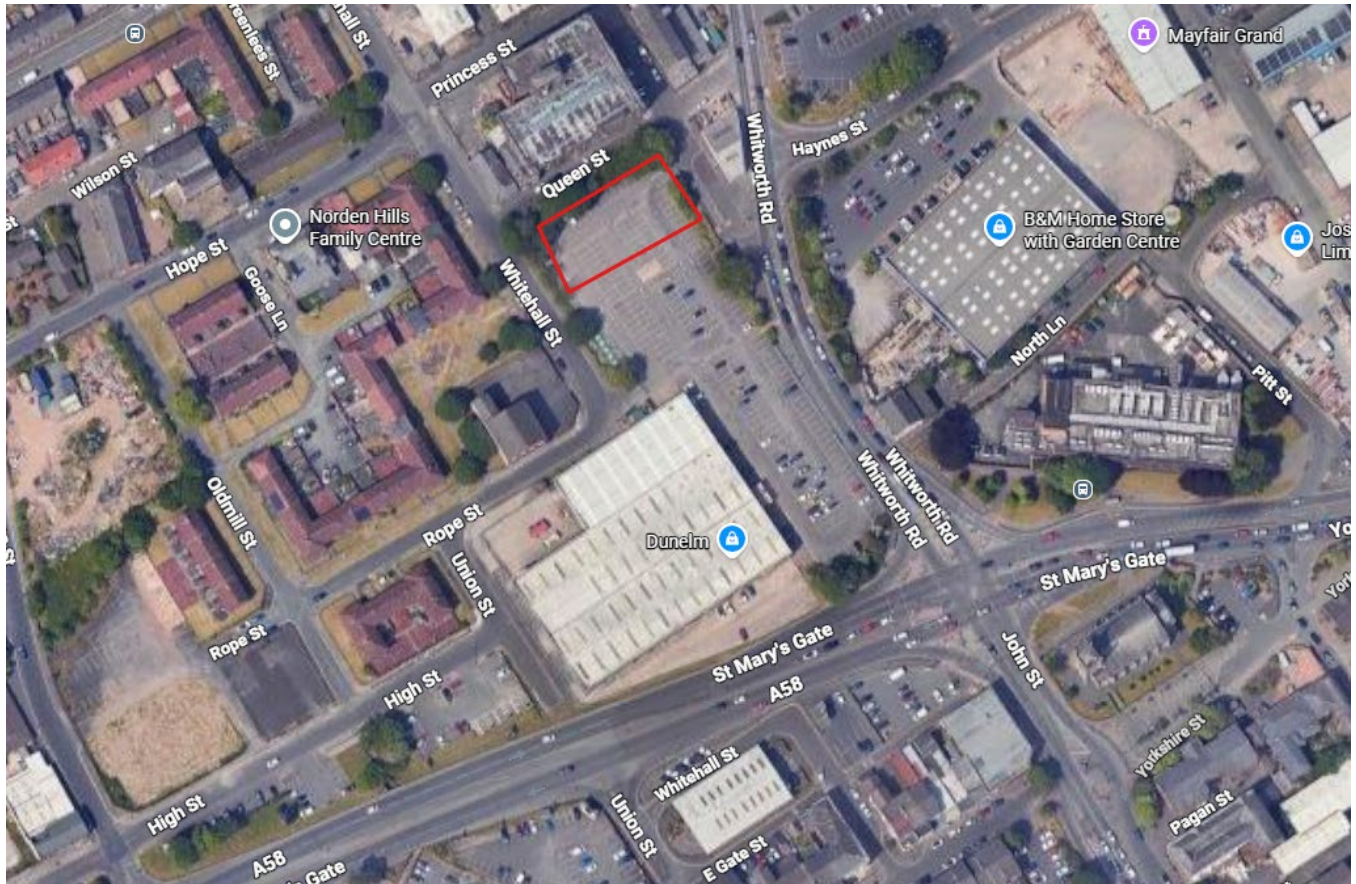
The external lighting throughout shall consist of the LED luminaire as shown in the below images:



Luminaire – Ansell Lighting Gabbro Column

4. BUILDING ZONING

The Starbucks is located in the Dunelm carpark on Whitworth Road adjacent to residential dwellings situated on Whitehall Street, the site and surroundings are located within the locality of Rochdale.



The below table indicates environment lighting zones;

Table 1 – Environmental Zones			
Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

Based on the location of the site, all intrusive lighting thresholds shall be assessed to zone E3 as detailed within the table.

5. DESKTOP SURVEY

Utilising Relux Lighting Calculation Software it has been measured that under normal operating conditions the illuminance on any neighbouring property does not exceed 2 lux.

The intrusive lighting thresholds for an E3 environmental zone is 10 lux pre-curfew and 2 lux post curfew, as detailed in the below table;

Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on properties.						
Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Note:

* If the installation is for public (road) lighting then this may be up to 1 lx.

This is the maximum permissible value for post curfew (22:00 Hours) illuminance is 2 lux.

5.1 Illuminance

When calculating the intrusive light into each of the surrounding houses, it was found that the dwellings located on Whitehall Street would be the worst affected by any intrusive lighting. These are new dwellings that line the site to the west.

The below image details in orange the boundary where I have taken the vertical illuminance at the façade of each dwelling.



When measuring the maximum vertical illuminance at the façades identified above, it was found that the highest average illuminance occurs at the first-floor window height of approximately 3 meters, with a calculated value of 0.23 Lux. This result is below the post-curfew threshold of 2 lux specified for Environmental Zone E3 in ILP Guidance Note 01/21. The detailed calculation results are presented in the table below. Based on these results, it is confirmed that the proposed lighting scheme complies with the obtrusive light limits set out in ILP Guidance Note 01/21.

Address	Maximum Lux Level at First Floor (3.5m)	Environmental Zone E3 Maximum Vertical Light (lx) (Table 3 GN01/21)	Pass/Fail
Whitehall Street	0.23	2 Lx Post-Curfew	Pass

5.2 Sky Glow

Sky glow refers to the brightening of the night-time sky caused by artificial illumination, resulting from the scattering and reflection of light by moisture and dust particles in the atmosphere. In accordance with guidance set out in ILP Professional Lighting Guide 04. All luminaires in the proposed installation have been specified with a beam angle of less than 85 degrees, ensuring minimal upward light emission. This design approach effectively limits the contribution of the scheme to sky glow. Based on these measures, I consider the potential for sky glow from the proposed lighting to be negligible and fully acceptable.

A measurement has been taken from a height of 15m across the entire site, it has been confirmed by this method that there is no upwards illumination from the site.

5.3 Glare into Residential Properties

Glare is typically classified into two categories: disability glare and discomfort glare. Disability glare occurs when a bright light source is viewed directly, such as an oncoming vehicle at night, and can temporarily impair vision. Discomfort glare, while less severe, can cause visual discomfort if experienced over prolonged periods.

In this assessment, glare has been evaluated using obtrusive light and glare ratings, with illuminance measured at the façades of each dwelling, as described in Section 5.1. The proposed lighting scheme has been designed to ensure that glare remains well within acceptable limits.

The upper limit for the glare rating has been set at 23.3, this is in accordance with Design Light Consortium - Enhanced Lighting Requirements. At this level, glare is considered effectively unnoticeable. The detailed results of the glare assessment for each property are provided in the table below, demonstrating that the proposed installation complies fully with the relevant guidance and standards.

	Glare Rating GR
Unbearable	90
	80
Disturbing	70
	60
Just Admissible	50
	40
Noticeable	30
	20
Unnoticeable	10

It is noted that the Design Light Consortium is a United States standard, though it has been used within this report for illustrative purposes.

When conducting studies into obtrusive lighting all measured values are benchmarked against set criteria are taken from the Institute of Lighting Professionals Guidance Note 01/21 Table 4 as detailed below;

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m^2)					
		$0 < A_p \leq 0.002$	$0.002 < A_p \leq 0.01$	$0.01 < A_p \leq 0.03$	$0.03 < A_p \leq 0.13$	$0.13 < A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd) ^s	E0						
	Pre-curfew	0	0	0	0	0	0
	Post-curfew	0	0	0	0	0	0
	E1						
	Pre-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	2,500
	Post-curfew	0	0	0	0	0	0
	E2						
	Pre-curfew	0.57 d	1.3 d	2.5 d	5.0 d	10 d	7,500
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	500
	E3						
	Pre-curfew	0.86 d	1.9 d	3.8 d	7.5 d	15 d	10,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	1,000
	E4						
	Pre-curfew	1.4 d	3.1 d	6.3 d	13 d	26 d	25,000
	Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	2,500

When considering the intrusive illuminance, the limiting values are identified in table 4 of the ILP Guidance note 01/21. The below table identifies the worst-case intrusive light into the identified properties. The highest luminous intensity affected the dwellings at the first-floor window.

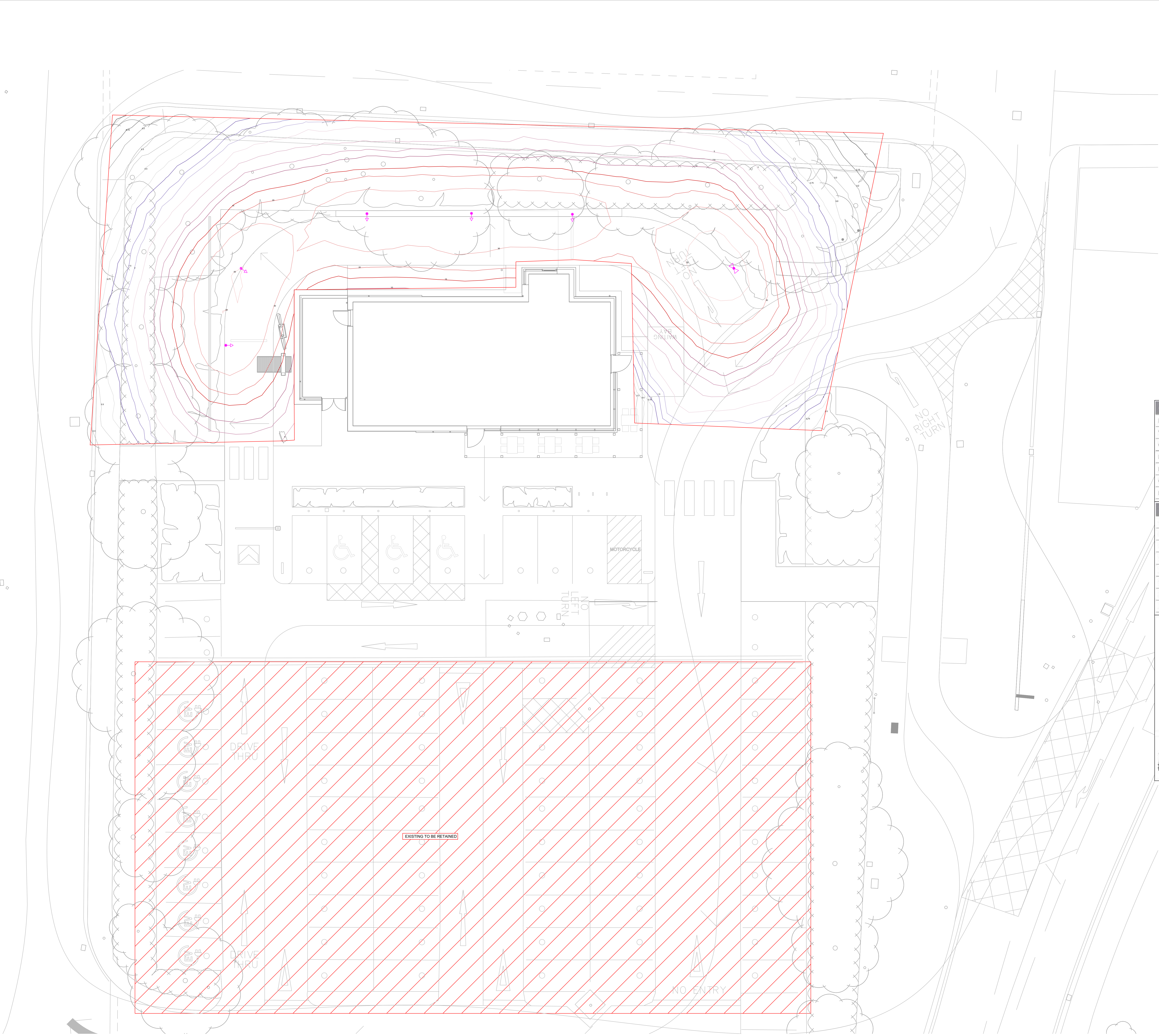
The table below is based upon the worst-case luminaire of the 5 measurements taken.

Address	Distance From Highest Luminous Intensity Source (M)	Limit Luminous Intensity (Table 4 GN 01/21) Candela (I)	Measured Luminous Intensity Candela (I)	Pass/Fail
Whitehall Street	27	67.5	0.01	Pass

Based on the results presented in the table above, the highest measured luminous intensity at the first-floor windows of the identified properties is well below the limiting values set out in Table 4 of ILP Guidance Note 01/21. Each property demonstrates compliance with the relevant intrusive light limits, with all measured values comfortably within the allowable thresholds. I can therefore confirm that the proposed lighting scheme meets the ILP standards for obtrusive light and will not result in unacceptable light intrusion to neighbouring dwellings.

APPENDICES

APPENDIX A



LIGHTING LEGEND	
SYMBOL	DESCRIPTION
	SINGLE LED FLOODLIGHT ON 4m GALVANISED TUBULAR STEEL LIGHTING COLUMN FIXED AT 0° TILT
	TWIN LED FLOODLIGHT ON 4m GALVANISED TUBULAR STEEL LIGHTING COLUMN FIXED AT 0° TILT

LUX LEVELS	
	50 LUX
	30 LUX
	20 LUX
	15 LUX
	10 LUX
	7.5 LUX
	5 LUX
	3 LUX
	2 LUX
	1.5 LUX
	1 LUX

GENERAL NOTES	
1	THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ECS ELECTRICAL ENGINEERING SPECIFICATIONS.
2	THIS DRAWING IS INDICATIVE AND IS INTENDED TO HIGHLIGHT THE PROPOSED LOCATION FOR ELECTRICAL SERVICES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINAL DETAILED DESIGN AND COORDINATION WITH ARCHITECTURAL, STRUCTURAL AND OTHER SERVICE ELEMENTS ASSOCIATED WITH THE INSTALLATION. ALL DIMENSIONS, CABLE ROUTES AND EQUIPMENT QUANTITIES ARE FOR GUIDANCE ONLY AND MUST BE VALIDATED, FINALISED AND COORDINATED BY THE CONTRACTOR.
3	THE CONTRACTOR SHALL NOTE THIS DRAWING HAS BEEN PRODUCED USING LIMITED SITE SURVEY INFORMATION. THE CONTRACTOR SHALL INCLUDE TO CARRY OUT AN INTRUSIVE SURVEY AND TO PRODUCE DRAWINGS THAT REFLECT THE INSTALLATION.
4	ALL EQUIPMENT SHALL BE INSTALLED & LOCATED TO MAINTAIN SPATIAL REQUIREMENTS TO FACILITATE ACCESS & MAINTENANCE IN LINE WITH MANUFACTURERS RECOMMENDATIONS AND GOOD PRACTICE GUIDES.
5	ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS GUIDELINES.
6	DO NOT SCALE FROM THIS DRAWING.
7	ALL DETAILS ARE APPLICABLE TO EVERY DRAWING UNLESS INDICATED OTHERWISE.

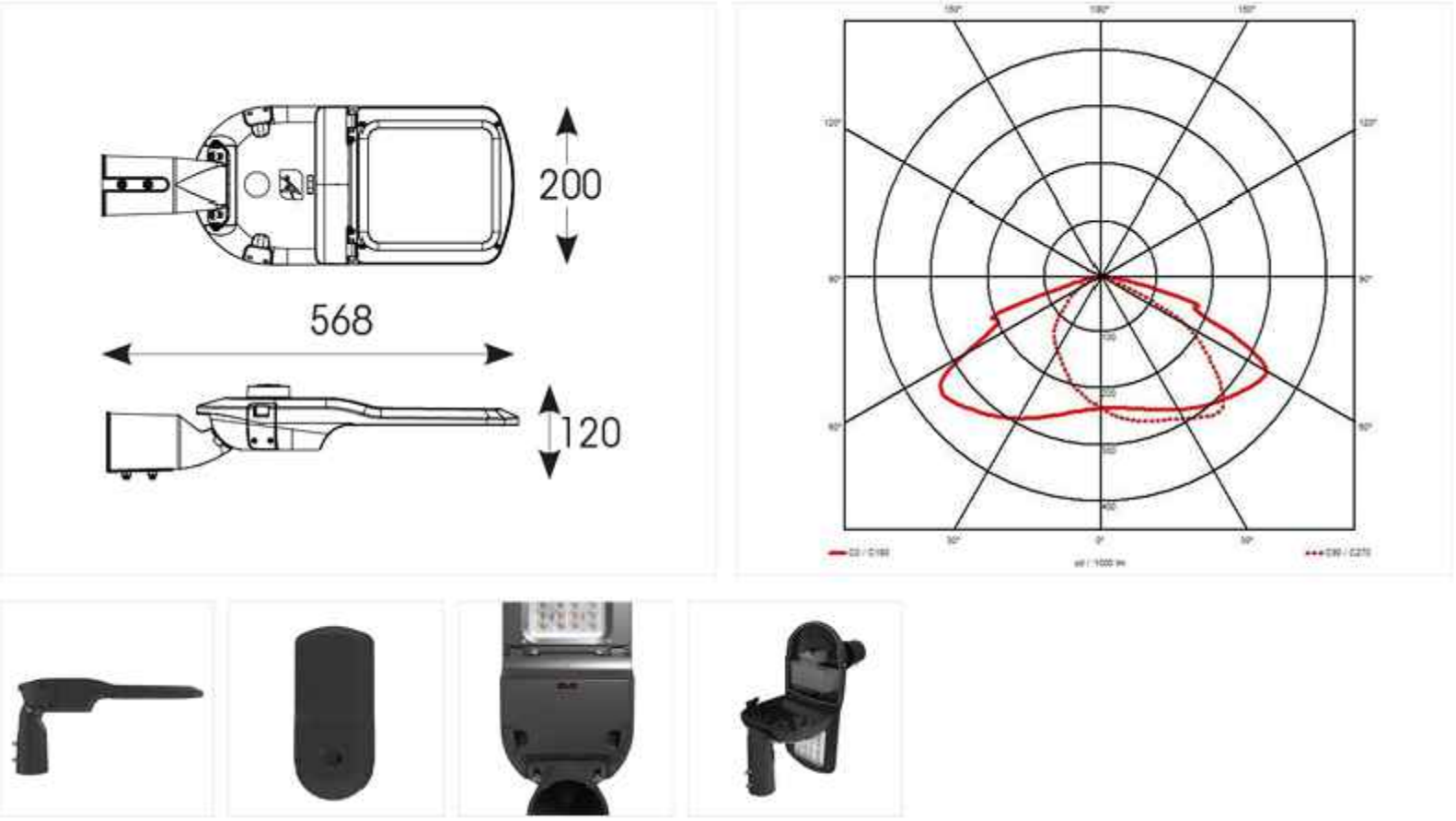
DRAWING NOTES	
SYMBOL	DESCRIPTION
	THE CONTRACTOR SHALL NOTE THE LIGHTING DESIGN IS IN LINE WITH THE IFCO-01 AND BS4489 GUIDELINES SHOWING THE LUX LEVEL DROPPING TO A SUITABLE LEVEL BEFORE REACHING THE SURROUNDING RESIDENTIAL AREA.
	THE CONTRACTOR SHALL NOTE THE LIGHTING DESIGN IS IN LINE WITH BS12464-2

GENERAL INFORMATION

Input	220-240V
Wattage	20W / 40W / 60W
Operating Temp	-20°C - 50°C
Lumens Delivered	3300lm / 6000lm / 9100lm (4000K)
lm/W	151lm/w (4000K)
CCT	3000K/4000K/5000K
Beam Angle	60/120

TECHNICAL INFORMATION

Class Protection	1
Light Source	LED
SDCM (Initial Macadam)	3
CRI	70
Internal / External	External
Surface / Recessed / Suspended	Pole
Power Factor	0.9
L70 @ 25°C	L70 B10 153000h



11	INFORMATION ISSUE.	J.M.	Jun. 2020
Rev.	Description	Revised By	Date

INFORMATION



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JOB NO.	DRAWING NO.	COMPUTER FILE	REVISION
28/038	28/038/E/02	28_038_E_02	I1
DATE	SCALE	DRAWN	CHECKED
June 2020	1:100 @ A0	J.M.	D.B.

JOB TITLE	Glenbrook, Starbucks, Rochdale
ISSUED TITLE	External Lighting Services



APPENDIX B

Lighting Calculations

Installation : ext

Project number : 28/038

Customer :

Processed by : James McDowell

Date : 13.06.2025

Object :
Installation : ext
Project number : 28/038
Date : 13.06.2025

RELUX®

1 Luminaire data

1.1 Ansell, AGAB1/1 (Gabbro Streetlight)

1.1.1 Data sheet

Manufacturer: Ansell

Gabbro Streetlight AGAB1/1

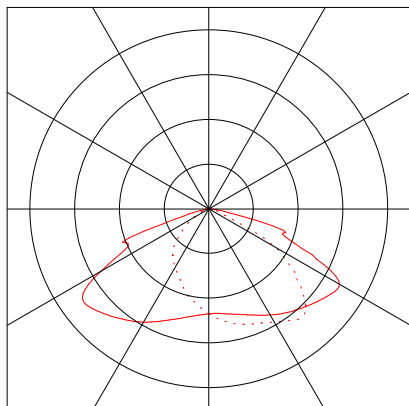
Luminaire data

Absolute Photometry
Luminaire efficacy : 132.87 lm/W
Classification : A30 ↓100% ↑0%
CIE Flux Codes : 39 77 98 100 100
UGR 4H 8H : 33.4 / 21.0
Power : 21.6 W
Luminous flux : 2868.2 lm

Equipped with

Quantity : 1
Designation : 3030led
Colour : 3000K
Colour reproduction : 70

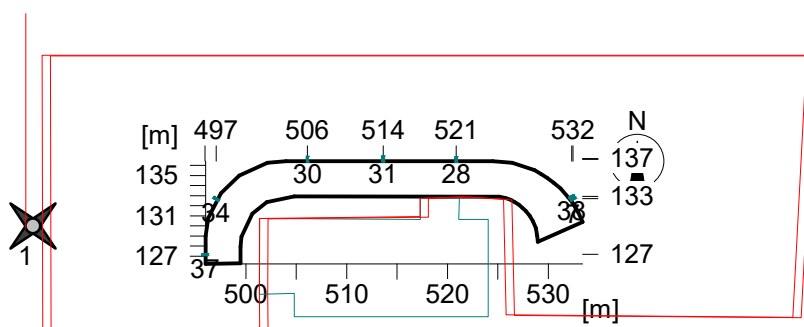
Dimensions : 568 mm x 200 mm x 109 mm



2 Exterior 1

2.1 Calculation results, Exterior 1, Light scene 1(C)

2.1.1 Luminous intensity - I(p) 1



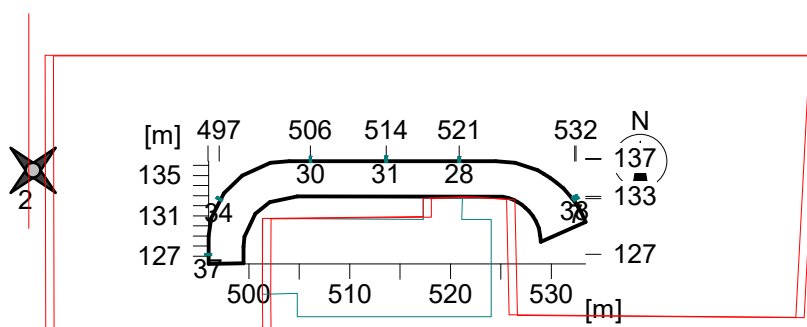
Measuring point for luminous intensity: I(p) 1

Position : x = 478.88 m, y = 129.97 m, z = 3.00 m

No.	Luminaire	Position			Lumin. intensity I[kcd]
		x[m]	y[m]	z[m]	
1	AGAB1/1, Gabbro Streetlight	506.10	136.65	3.95	0.010
2	AGAB1/1, Gabbro Streetlight	513.61	136.67	3.95	0.008
3	AGAB1/1, Gabbro Streetlight	520.86	136.60	3.95	0.007
4	AGAB1/1, Gabbro Streetlight	532.32	132.92	3.95	0.004
5	AGAB1/1, Gabbro Streetlight	497.03	132.71	3.95	0.003
6	AGAB1/1, Gabbro Streetlight	495.93	127.19	3.95	0.002
7	AGAB1/1, Gabbro Streetlight	532.46	132.72	3.95	0.000

2.1 Calculation results, Exterior 1, Light scene 1(C)

2.1.2 Luminous intensity - I(p) 2



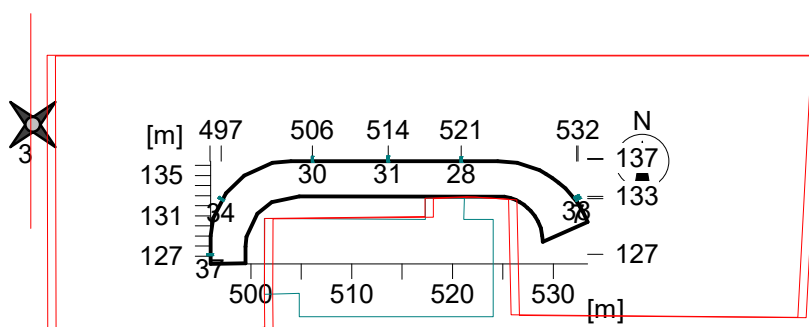
Measuring point for luminous intensity: I(p) 2

Position : x = 478.58 m, y = 135.51 m, z = 3.00 m

No.	Luminaire	Position			Lumin. intensity I[kcd]
		x[m]	y[m]	z[m]	
1	AGAB1/1, Gabbro Streetlight	506.10	136.65	3.95	0.007
2	AGAB1/1, Gabbro Streetlight	513.61	136.67	3.95	0.006
3	AGAB1/1, Gabbro Streetlight	520.86	136.60	3.95	0.006
4	AGAB1/1, Gabbro Streetlight	532.32	132.92	3.95	0.004
5	AGAB1/1, Gabbro Streetlight	495.93	127.19	3.95	0.003
6	AGAB1/1, Gabbro Streetlight	497.03	132.71	3.95	0.003
7	AGAB1/1, Gabbro Streetlight	532.46	132.72	3.95	0.000

2.1 Calculation results, Exterior 1, Light scene 1(C)

2.1.3 Luminous intensity - I(p) 3



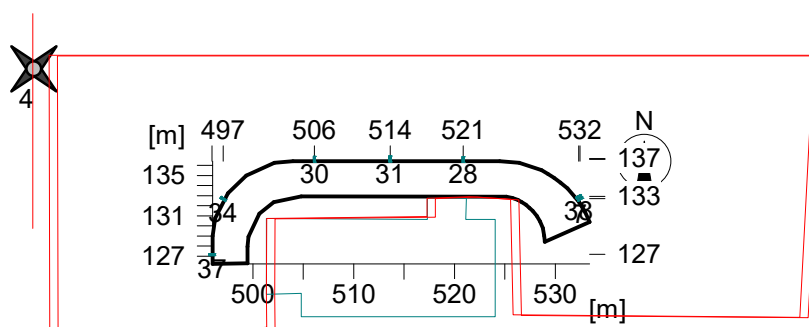
Measuring point for luminous intensity: I(p) 3

Position : x = 478.37 m, y = 140.04 m, z = 3.00 m

No.	Luminaire	Position			Lumin. intensity I[kcd]
		x[m]	y[m]	z[m]	
1	AGAB1/1, Gabbro Streetlight	532.32	132.92	3.95	0.005
2	AGAB1/1, Gabbro Streetlight	506.10	136.65	3.95	0.005
3	AGAB1/1, Gabbro Streetlight	513.61	136.67	3.95	0.005
4	AGAB1/1, Gabbro Streetlight	520.86	136.60	3.95	0.005
5	AGAB1/1, Gabbro Streetlight	495.93	127.19	3.95	0.003
6	AGAB1/1, Gabbro Streetlight	497.03	132.71	3.95	0.002
7	AGAB1/1, Gabbro Streetlight	532.46	132.72	3.95	0.000

2.1 Calculation results, Exterior 1, Light scene 1(C)

2.1.4 Luminous intensity - I(p) 4



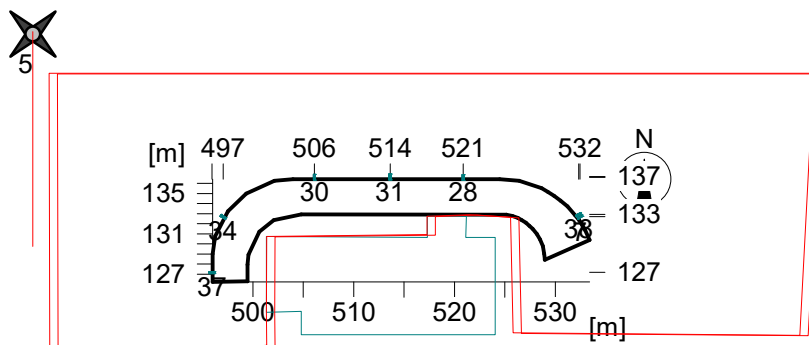
Measuring point for luminous intensity: I(p) 4

Position : x = 478.27 m, y = 145.57 m, z = 3.00 m

No.	Luminaire	Position			Lumin. intensity
		x[m]	y[m]	z[m]	
1	AGAB1/1, Gabbro Streetlight	532.32	132.92	3.95	0.006
2	AGAB1/1, Gabbro Streetlight	520.86	136.60	3.95	0.003
3	AGAB1/1, Gabbro Streetlight	506.10	136.65	3.95	0.003
4	AGAB1/1, Gabbro Streetlight	513.61	136.67	3.95	0.003
5	AGAB1/1, Gabbro Streetlight	497.03	132.71	3.95	0.003
6	AGAB1/1, Gabbro Streetlight	495.93	127.19	3.95	0.002
7	AGAB1/1, Gabbro Streetlight	532.46	132.72	3.95	0.000

2.1 Calculation results, Exterior 1, Light scene 1(C)

2.1.5 Luminous intensity - I(p) 5



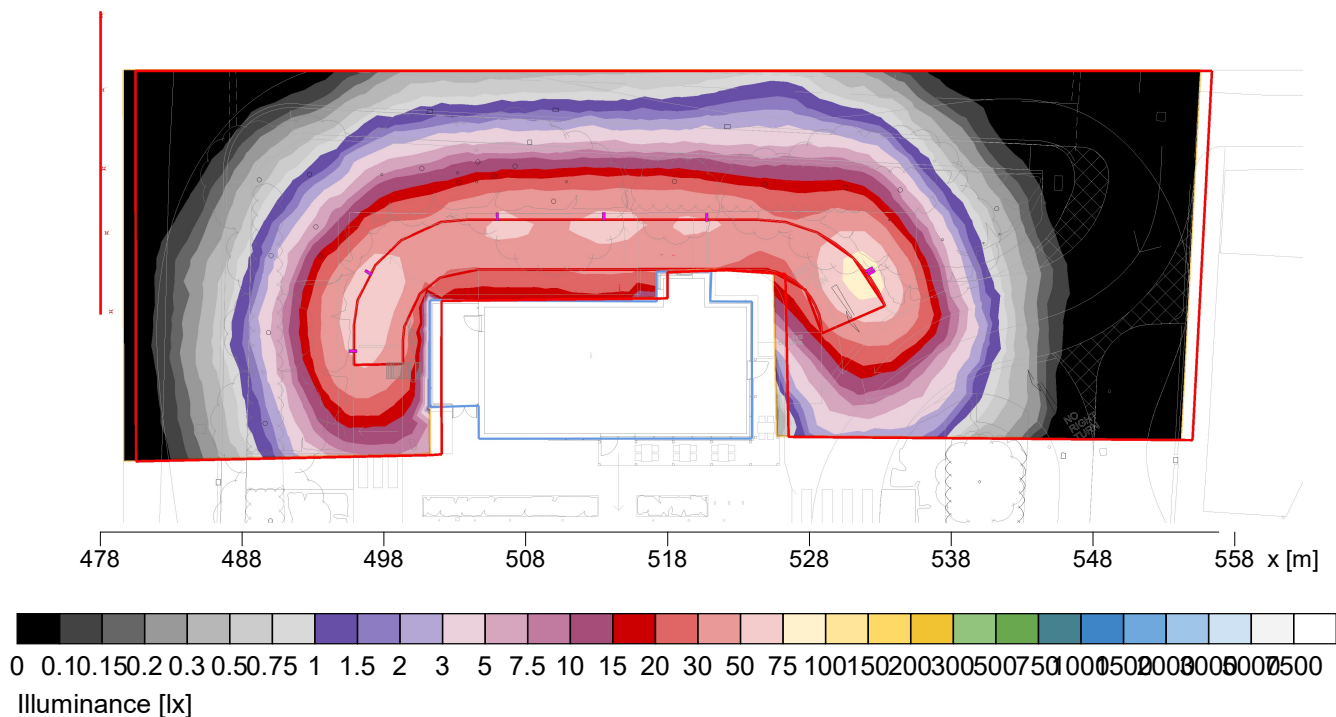
Measuring point for luminous intensity: I(p) 5

Position : x = 478.17 m, y = 150.80 m, z = 3.00 m

No.	Luminaire	Position			Lumin. intensity
		x[m]	y[m]	z[m]	I[kcd]
1	AGAB1/1, Gabbro Streetlight	532.32	132.92	3.95	0.006
2	AGAB1/1, Gabbro Streetlight	506.10	136.65	3.95	0.004
3	AGAB1/1, Gabbro Streetlight	495.93	127.19	3.95	0.003
4	AGAB1/1, Gabbro Streetlight	513.61	136.67	3.95	0.003
5	AGAB1/1, Gabbro Streetlight	520.86	136.60	3.95	0.003
6	AGAB1/1, Gabbro Streetlight	497.03	132.71	3.95	0.002
7	AGAB1/1, Gabbro Streetlight	532.46	132.72	3.95	0.000

2.1 Summary, Exterior 1, Light scene 1(C)

2.1.6 Result overview, Measuring area 1



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.00 m
Height (phot centre) [m]:	3.95 m
Maintenance factor	1.00
Total luminous flux	20090 lm
Total power	151.2 W
Total power per area (151.75 m²)	1.00 W/m²

Illuminance

Average illuminance	$\bar{E}_m$	10.6 lx
Minimum illuminance	E_{min}	0 lx
Maximum illuminance	E_{max}	84.2 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:2620 (0)
Diversity U_d	E_{min}/E_{max}	1:20800 (0)

Type No. Make

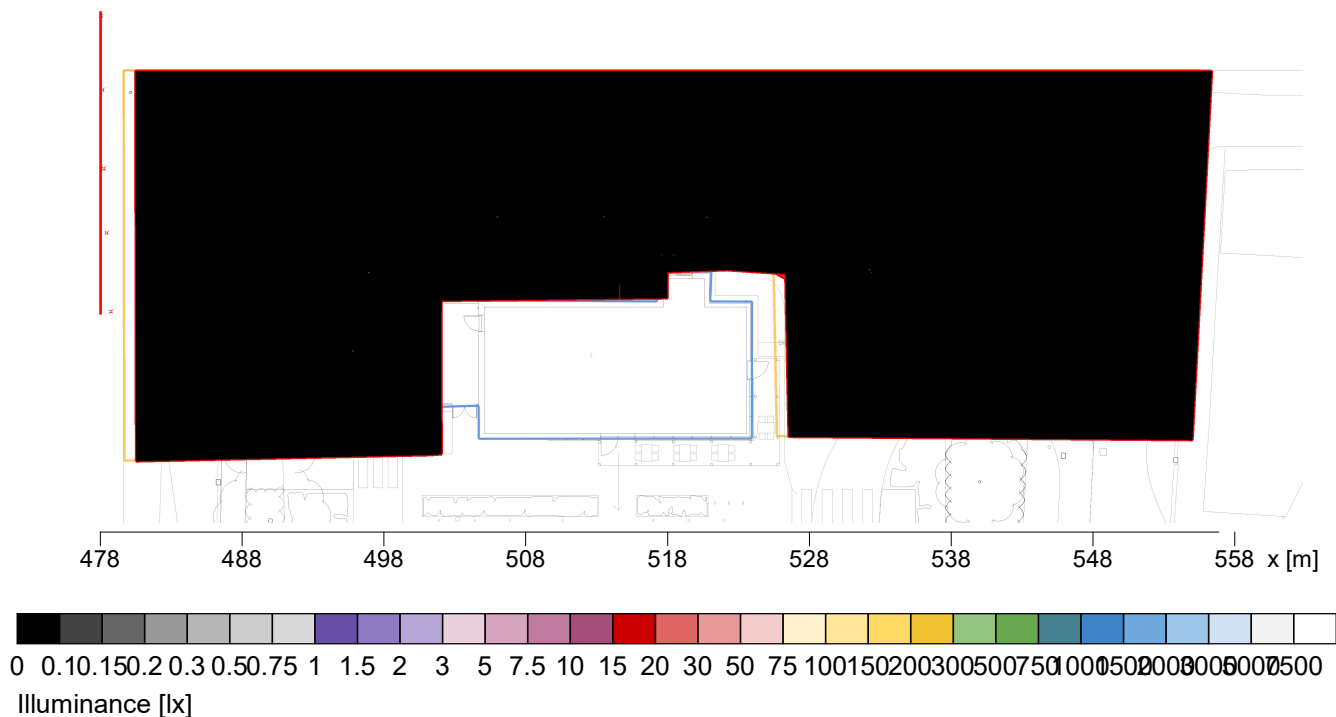
2	7 x	Ansell	
		Order No.	: Gabbro Streetlight
		Luminaire name	: AGAB1/1
		Equipment	: 1 x 3030led 21.6 W / 2870 lm

Object :
 Installation : ext
 Project number : 28/038
 Date : 13.06.2025



2.1 Summary, Exterior 1, Light scene 1(C)

2.1.7 Result overview, Measuring area 2



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	5.00 m
Height (phot centre) [m]:	3.95 m
Maintenance factor	1.00

Total luminous flux	20090 lm
Total power	151.2 W
Total power per area (151.75 m ²)	1.00 W/m ²

Illuminance

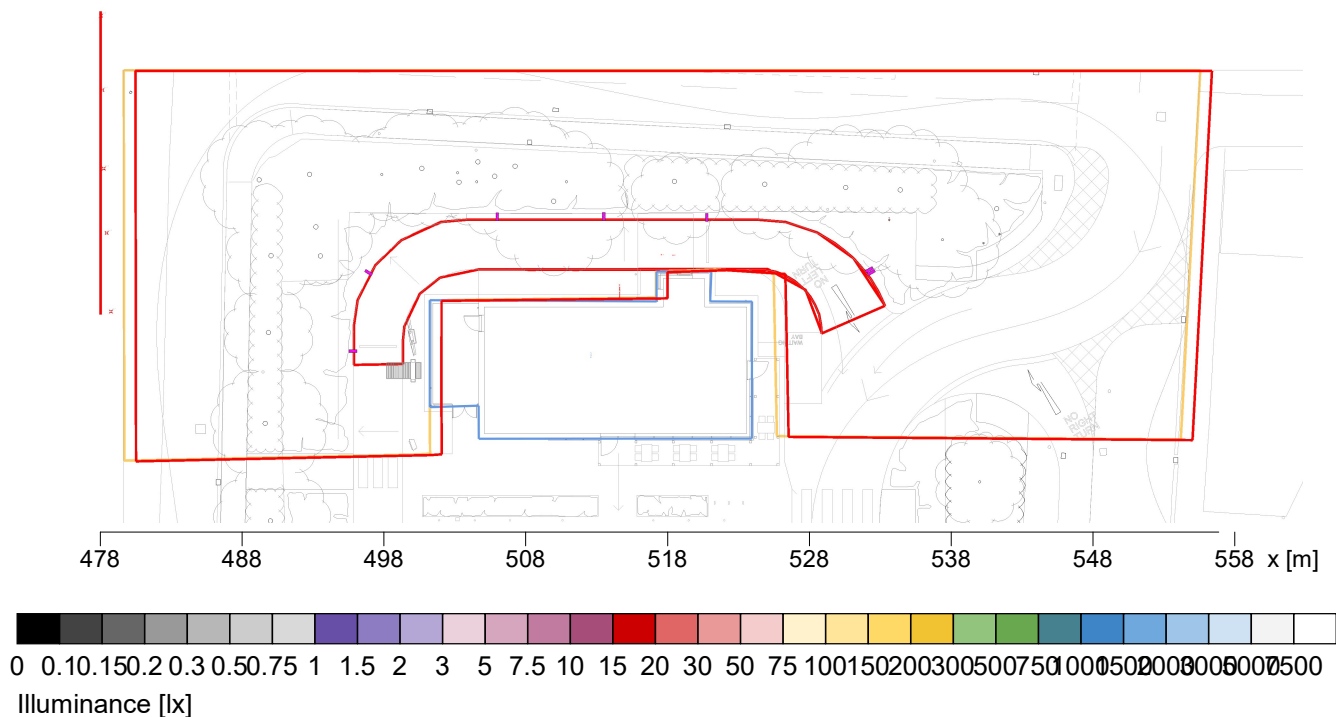
Average illuminance	$\bar{E}_m$	0 lx
Minimum illuminance	E_{min}	0 lx
Maximum illuminance	E_{max}	0 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:--- (---)
Diversity U_d	E_{min}/E_{max}	1:--- (---)

Type No. Make

2	7 x	Ansell	
		Order No.	: Gabbro Streetlight
		Luminaire name	: AGAB1/1
		Equipment	: 1 x 3030led 21.6 W / 2870 lm

2.1 Summary, Exterior 1, Light scene 1(C)

2.1.8 Result overview, Measuring area 3



General

Calculation algorithm used	Average indirect fraction
Height (phot centre) [m]:	3.95 m
Maintenance factor	1.00
Total luminous flux	20090 lm
Total power	151.2 W
Total power per area (151.75 m ²)	1.00 W/m ²

Illuminance

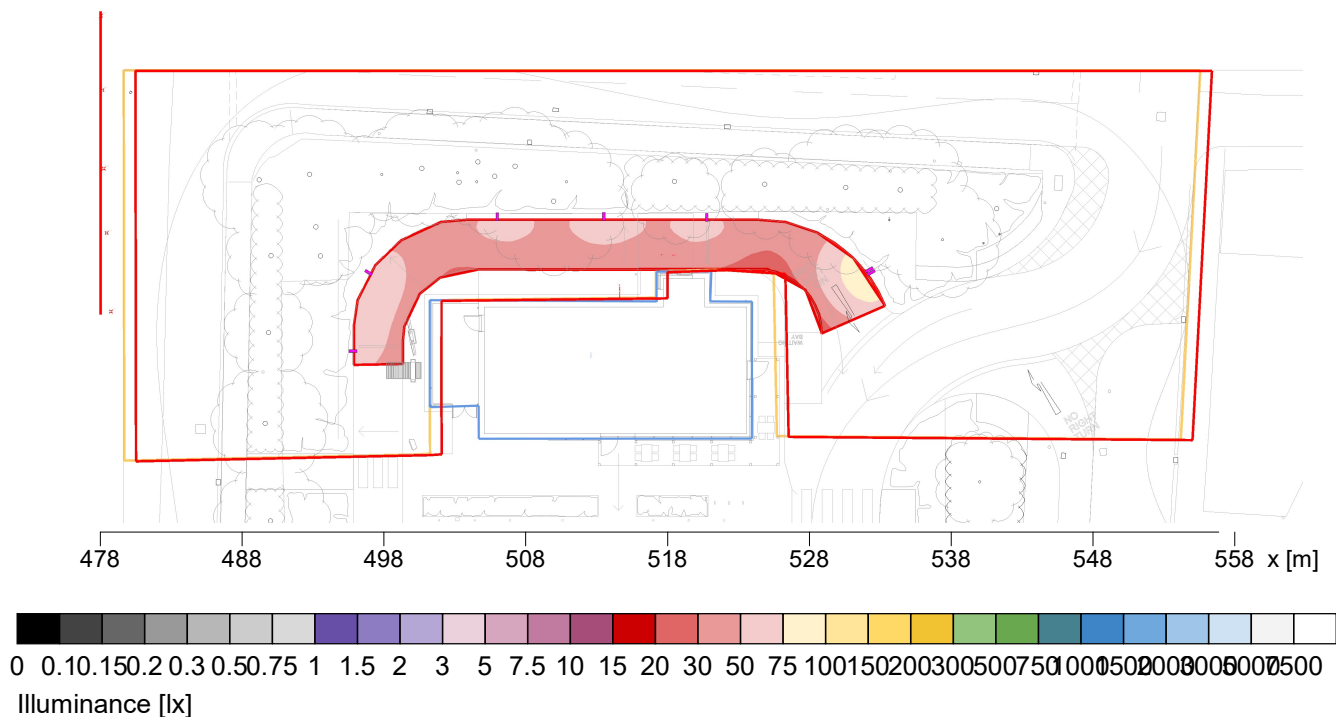
Average illuminance	$\bar{E}_m$	0.11 lx
Minimum illuminance	E_{min}	0.06 lx
Maximum illuminance	E_{max}	0.23 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	1:1.76 (0.57)
Diversity U_d	E_{min}/E_{max}	1:3.69 (0.27)

Type No. Make

2	7 x	Ansell	
		Order No.	: Gabbro Streetlight
		Luminaire name	: AGAB1/1
		Equipment	: 1 x 3030led 21.6 W / 2870 lm

2.1 Summary, Exterior 1, Light scene 1(C)

2.1.9 Result overview, Evaluation area 1



General

Calculation algorithm used	Average indirect fraction
Height (phot centre)	3.95 m
Maintenance factor	1.00
Total lamp luminous flux	14350.00 lm
Luminaire luminous flux	14340.94 lm
Total power	108.0 W
Total power per area (151.18 m ²)	0.71 W/m ² (1.54 W/m ² /100lx)

Evaluation area 1

Reference plane 1.1

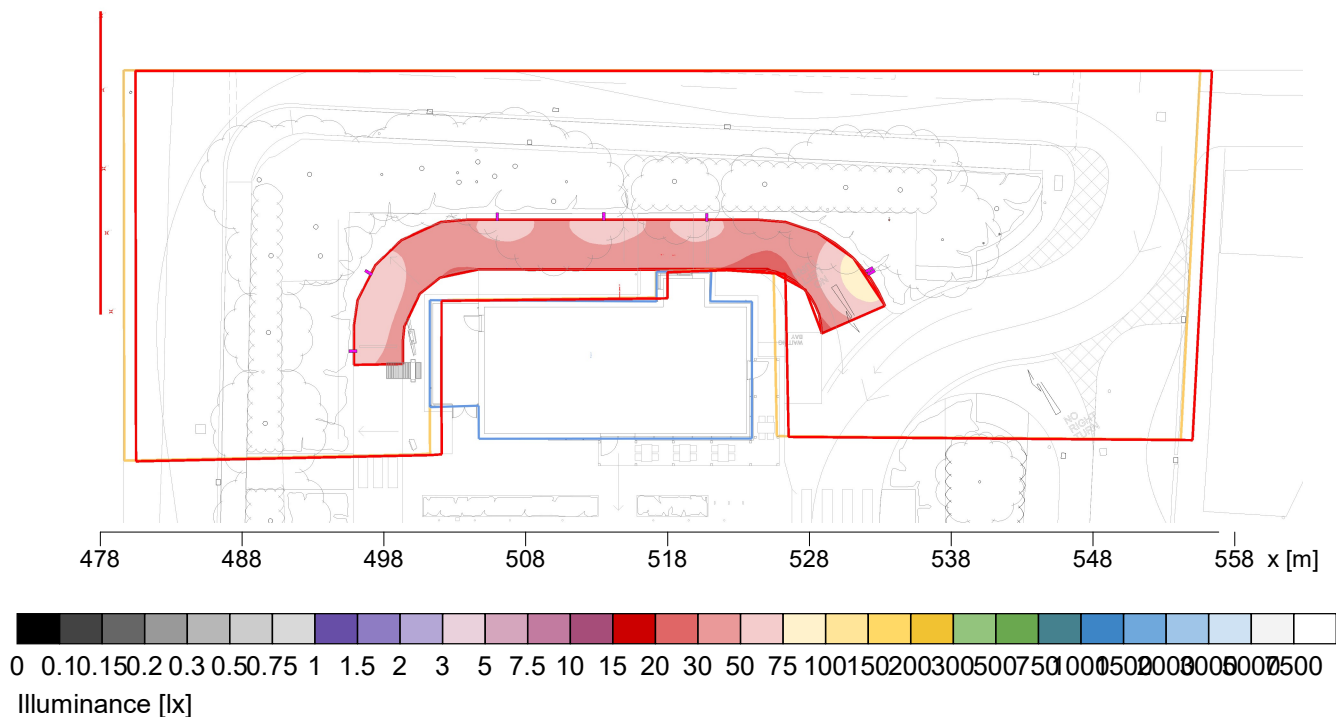
	Horizontal
$\bar{E}_m$	46.3 lx
E_{min}	20.9 lx
$E_{min}/\bar{E}_m (U_o)$	0.45
$E_{min}/E_{max} (U_d)$	0.23
Position	0.00 m

Type No. \ Make

2	5 x	Ansell	
		Order No.	: Gabbro Streetlight
		Luminaire name	: AGAB1/1
		Equipment	: 1 x 3030led 21.6 W / 2870 lm

2.1 Summary, Exterior 1, Light scene 1(C)

2.1.10 Result overview, Evaluation area 2



General

Calculation algorithm used	Average indirect fraction
Height (phot. centre)	3.95 m
Maintenance factor	1.00
Total lamp luminous flux	17220.00 lm
Luminaire luminous flux	17209.13 lm
Total power	129.6 W
Total power per area (151.75 m ²)	0.85 W/m ² (1.84 W/m ² /100lx)

Evaluation area 2

Reference plane 2.1

	Horizontal
$\bar{E}_m$	46.5 lx
E_{min}	20.9 lx
$E_{min}/\bar{E}_m (U_o)$	0.45
$E_{min}/E_{max} (U_d)$	0.23
Position	0.00 m

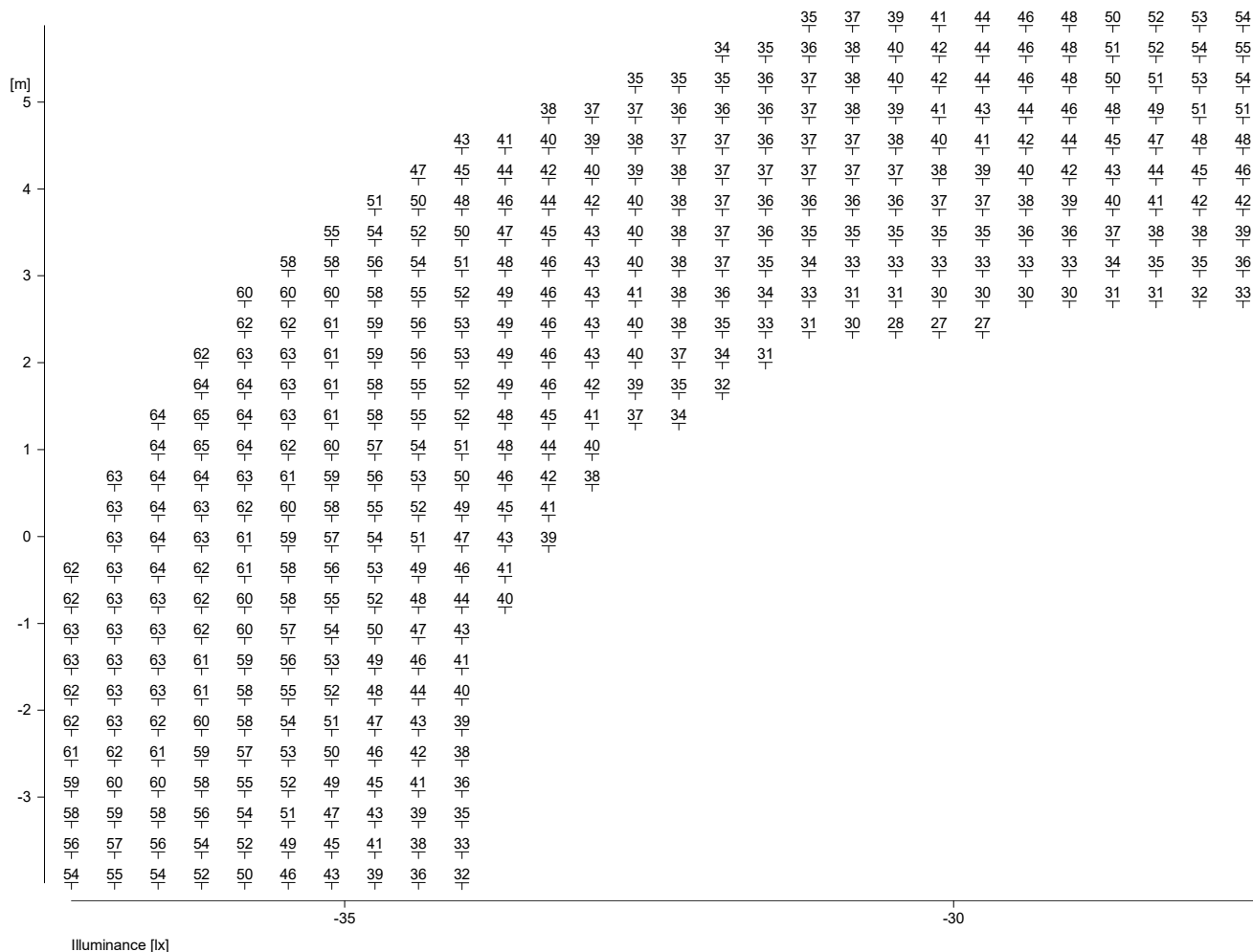
Type No. \Make

2	6 x	Ansell	
		Order No.	: Gabbro Streetlight
		Luminaire name	: AGAB1/1
		Equipment	: 1 x 3030led 21.6 W / 2870 lm

2 Exterior 1

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.1 Table, Reference plane 1.1 (E)



Part1

Height reference plane	: 0.00 m
Average illuminance	$\bar{E}_m$: 46 lx
Minimum illuminance	E_{min} : 21 lx
Maximum illuminance	E_{max} : 92 lx
Uniformity U_o	$E_{min}/\bar{E}_m$: 1 : 2.21 (0.45)

2 Exterior 1

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.1 Table, Reference plane 1.1 (E)

55	55	56	55	54	53	52	50	49	48	47	47	48	49	50	51	53	54	55	56	56	57	57	57	56	55	54	53	52
56	56	56	56	55	53	52	50	49	48	47	47	47	49	50	51	53	54	55	56	57	57	57	57	56	55	54	53	51
54	55	55	54	53	52	51	49	48	47	46	46	47	48	49	50	52	54	55	56	56	56	56	56	55	54	53	52	50
52	52	53	52	51	50	49	48	46	45	45	45	45	46	47	49	50	52	53	54	54	54	54	54	53	52	51	50	49
49	49	50	49	48	47	46	45	44	44	43	43	44	44	45	47	48	49	50	51	51	51	51	51	50	49	48	47	46
46	46	46	46	46	45	44	43	42	41	41	41	41	42	43	44	45	46	47	48	48	49	48	48	47	46	46	45	44
43	43	43	43	43	42	41	40	40	39	39	39	39	40	41	42	43	44	44	45	45	46	45	45	44	44	43	42	41
40	40	40	40	40	39	38	38	37	36	36	36	37	37	38	39	40	41	42	42	42	42	42	42	41	41	40	39	38
37	37	37	37	36	36	35	34	34	34	34	34	34	35	35	36	37	38	39	39	40	40	39	39	38	38	37	36	36
33	33	33	33	33	32	32	31	31	31	31	31	31	32	32	32	33	34	34	35	36	36	36	36	35	34	34	33	33

-25

-20



Part2

2 Exterior 1

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.1 Table, Reference plane 1.1 (E)

50	49	49	49	49	50	51	52	53	54	54	54	53	53	52	51	49	47	45	43	41	38	36	35	33	32	32	31	
50	49	49	49	49	50	51	52	53	54	55	55	54	53	52	51	50	47	45	43	40	38	36	35	33	33	32	32	32
49	48	48	48	48	49	50	51	53	54	54	54	54	53	52	50	48	47	44	42	40	38	36	34	33	33	32	32	33
48	47	47	47	47	48	49	50	51	52	52	52	52	51	50	48	47	44	43	40	38	36	35	34	33	32	32	33	33
46	45	45	45	45	46	47	48	49	50	50	50	49	48	47	46	44	42	40	38	37	35	34	33	32	32	32	33	34
43	43	43	43	43	44	44	45	46	46	47	46	46	45	44	43	41	40	38	36	35	33	32	31	31	31	31	32	33
41	40	40	41	41	42	42	43	43	44	44	43	43	42	41	39	38	37	35	34	32	31	30	30	29	30	30	31	33
38	38	38	39	39	39	40	40	41	41	41	41	40	39	38	36	35	34	33	31	30	29	28	27	27	27	29	30	32
35	35	36	37	37	38	38	38	38	39	39	39	38	36	35	34	32	31	30	29	27	27	26	25	25	26	27	28	30
33	33	33	36	37	37	37	37	34	37	38	37	37	32	31	30	29	28	27	26	25	24	24	24	24	24	25	26	28
																									23	25	27	25

-15

-10



Part3

Object :
Installation : ext
Project number : 28/038
Date : 13.06.2025



2 Exterior 1

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.1 Table, Reference plane 1.1 (E)

[illegible]

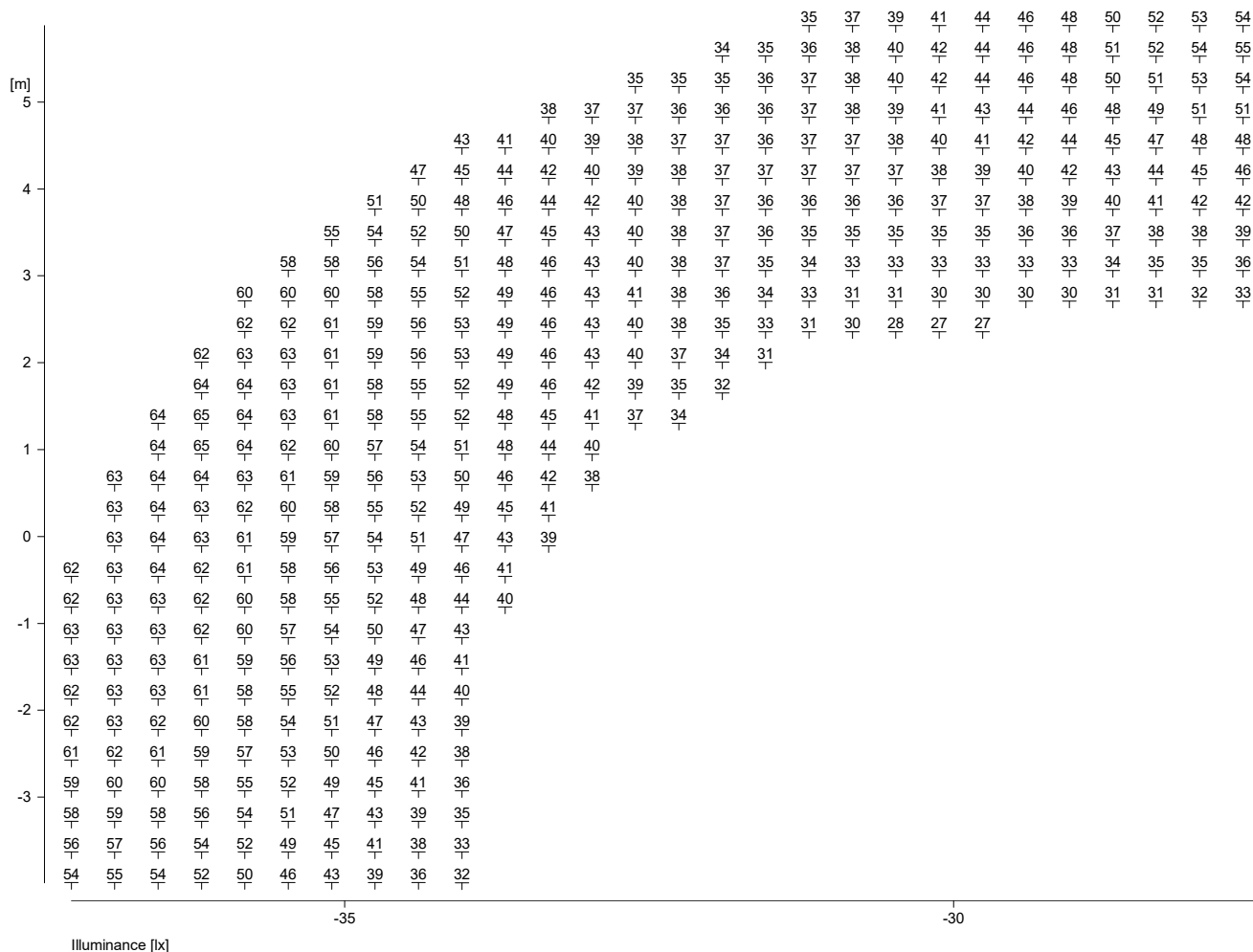
-5 [m]



Part4

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.2 Table, Reference plane 2.1 (E)



Part1

Height reference plane	: 0.00 m
Average illuminance	$\bar{E}_m$: 46 lx
Minimum illuminance	E_{min} : 21 lx
Maximum illuminance	E_{max} : 92 lx
Uniformity U_o	$E_{min}/\bar{E}_m$: 1 : 2.22 (0.45)

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.2 Table, Reference plane 2.1 (E)

55	55	56	55	54	53	52	50	49	48	47	47	48	49	50	51	53	54	55	56	56	57	57	57	56	55	54	53	52
56	56	56	56	55	53	52	50	49	48	47	47	47	49	50	51	53	54	55	56	57	57	57	57	56	55	54	53	51
54	55	55	54	53	52	51	49	48	47	46	46	47	48	49	50	52	54	55	56	56	56	56	55	54	53	52	50	
52	52	53	52	51	50	49	48	46	45	45	45	45	46	47	49	50	52	53	54	54	54	54	54	53	52	51	50	49
49	49	50	49	48	47	46	45	44	44	43	43	44	44	45	47	48	49	50	51	51	51	51	51	50	49	48	47	46
46	46	46	46	46	45	44	43	42	41	41	41	41	42	43	44	45	46	47	48	48	49	48	48	47	46	46	45	44
43	43	43	43	43	42	41	40	40	39	39	39	39	40	41	42	43	44	44	45	45	46	45	45	44	44	43	42	41
40	40	40	40	40	39	38	38	37	36	36	36	37	37	38	39	40	41	42	42	42	42	42	42	41	41	40	39	38
37	37	37	37	36	36	35	34	34	34	34	34	34	35	35	36	37	38	39	39	40	40	39	39	38	38	37	36	36
33	33	33	33	33	32	32	31	31	31	31	31	31	32	32	32	33	34	34	35	36	36	36	36	35	34	34	33	33

-25

-20



Part2

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.2 Table, Reference plane 2.1 (E)

49	49	49	49	50	51	52	53	54	54	54	53	53	52	51	49	47	45	43	41	38	36	35	33	32	32	31		
50	49	49	49	49	50	51	52	53	54	55	55	54	53	52	51	50	47	45	43	40	38	36	35	33	33	32	32	32
49	48	48	48	48	49	50	51	53	54	54	54	54	53	52	50	48	47	44	42	40	38	36	34	33	33	32	32	33
48	47	47	47	47	48	49	50	51	52	52	52	52	51	50	48	47	44	43	40	38	36	35	34	33	32	32	33	33
46	45	45	45	45	46	47	48	49	50	50	50	49	48	47	46	44	42	40	38	37	35	34	33	32	32	32	33	34
43	43	43	43	43	44	44	45	46	46	46	46	46	45	44	43	41	40	38	36	35	33	32	31	31	31	31	32	33
41	40	40	41	41	42	42	43	43	44	44	43	43	42	41	39	38	37	35	34	32	31	30	30	29	30	30	31	33
38	38	38	39	39	39	40	40	41	41	41	41	40	39	38	36	35	34	33	31	30	29	28	27	27	27	29	30	32
35	35	36	37	37	38	38	38	38	39	39	39	38	36	35	34	32	31	30	29	27	27	26	25	25	26	27	28	30
33	33	33	36	37	37	37	37	34	37	38	37	37	32	31	30	29	28	27	26	25	24	24	24	24	24	25	26	28
																											25	27

-15

-10



Part3

RELUX®

2.2.2 Table, Reference plane 2.1 (E)

-5 [m]

August 2026

RELUX®

2.2.3 Table, Measuring area 1 (E)

Page 10 of 10

Height reference plane		: 0.00 m
Average illuminance	$\bar{E}_m$	: 10.6 lx
Minimum illuminance	E_{min}	: 0.00 lx
Maximum illuminance	E_{max}	: 84 lx
Uniformity U_o	$E_{min}/\bar{E}_m$	: 1 : 2618.52 (0.00)

Object :
Installation : ext
Project number : 28/038
Date : 13.06.2025



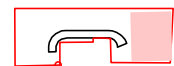
2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.3 Table, Measuring area 1 (E)

0.23	0.13	0.10	0.07	0.04	0.02	0.02	0.01	0.01	0.01	(0.00)
0.60	0.29	0.16	0.09	0.05	0.03	0.02	0.02	0.01	0.01	(0.00)
1.30	0.56	0.26	0.13	0.08	0.05	0.03	0.02	0.01	0.01	(0.00)
3.17	1.15	0.49	0.23	0.12	0.07	0.04	0.02	0.01	0.01	0.01
7.22	2.49	0.92	0.36	0.18	0.09	0.05	0.03	0.02	0.01	0.01
14.9	4.82	1.49	0.52	0.23	0.11	0.06	0.03	0.02	0.01	0.01
28	8.82	2.21	0.73	0.28	0.14	0.08	0.04	0.02	0.02	0.01
37	12.0	3.34	0.96	0.31	0.15	0.08	0.05	0.03	0.02	
32	14.3	4.52	1.07	0.30	0.13	0.07	0.04	0.02	0.02	
18.5	8.86	3.24	1.14	0.34	0.13	0.07	0.04	0.02	0.01	
8.39	4.27	1.88	0.80	0.32	0.11	0.06	0.04	0.02	0.01	
4.49	3.04	1.26	0.59	0.30	0.11	0.05	0.03	0.02	0.01	
2.52	1.50	0.63	0.40	0.21	0.07	0.04	0.03	0.02	0.01	

40

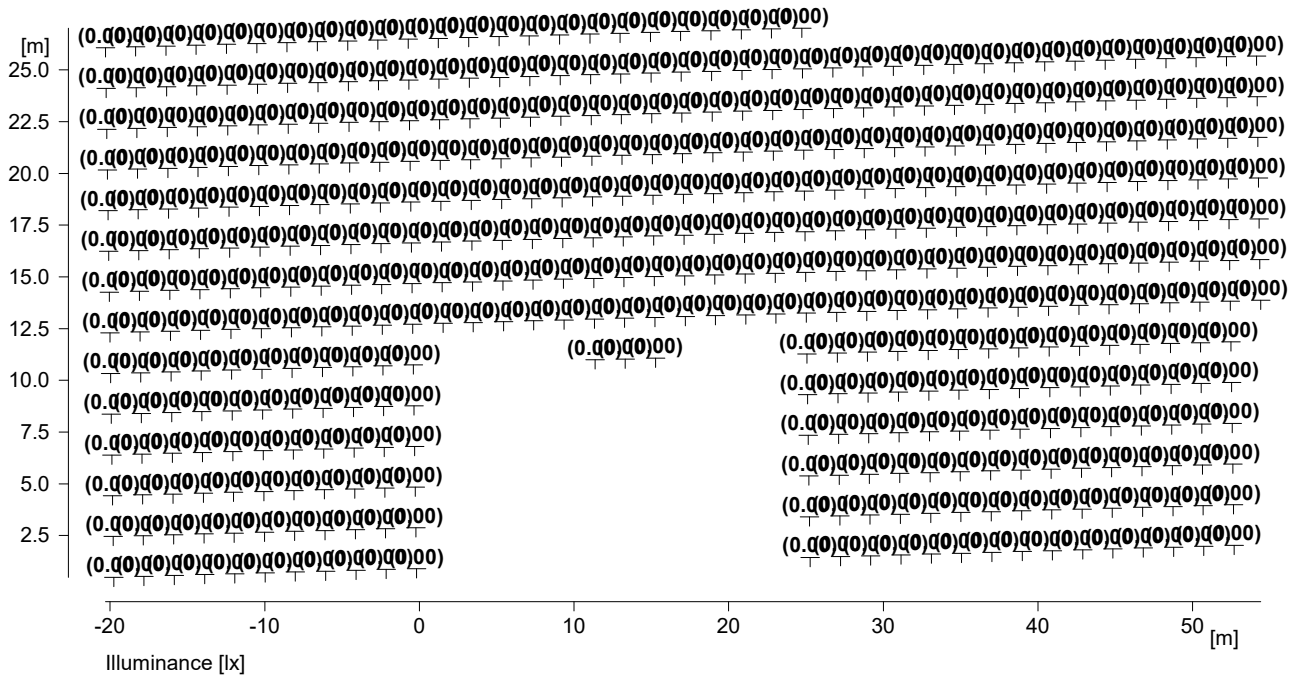
50 [m]



Part2

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.4 Table, Measuring area 2 (E)



Height reference plane		: 5.00 m
Average illuminance	$\bar{E}_m$	: 0.00 lx
Minimum illuminance	E_{min}	: 0.00 lx
Maximum illuminance	E_{max}	: 0.00 lx
Uniformity U_0	$E_{min}/\bar{E}_m$	: ---

Object :
Installation : ext
Project number : 28/038
Date : 13.06.2025



2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.5 Table, Measuring area 3 (E)

[m]	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10
3.5	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09
3.0	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09
2.5	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09
2.0	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09
1.5	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09
1.0	0.15	0.15	0.14	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.5	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09
	[0.23]	[0.23]	0.22	[0.23]	[0.23]	0.22	0.22	0.21	0.20	0.20	0.20	0.19	0.19	0.18	0.17	0.16	0.16	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10
	2		4		6		8		10		12																					
Illuminance [lx]																																



Part1

Average illuminance	$\bar{E}_m$	: 0.11 lx
Minimum illuminance	E_{min}	: 0.06 lx
Maximum illuminance	E_{max}	: 0.23 lx
Uniformity U_0	$E_{min}/\bar{E}_m$	: 1 : 1.76 (0.57)

2.2 Calculation results, Exterior 1, Light scene 1(C)

2.2.5 Table, Measuring area 3 (E)

0,10	0,10	0,09	0,09	0,09	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07
0,09	0,09	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07
0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)
0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)	(0,06)
0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)	(0,06)
0,09	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)	(0,06)	(0,06)	(0,06)
0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)	(0,06)	(0,06)	(0,06)
0,10	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07	0,07	0,07	0,07	(0,06)	(0,06)
14		16				18				20 [m]						



Part2

APPENDIX C

Luminaire Schedule



Gabbro



Part of the Streetlights product category

Model	Gabbro 1 Streetlight Grey
Code	AGAB1/1
Application	Education, Healthcare, Hospitality, Industrial, Retail

GENERAL INFORMATION

Input	220-240V
Wattage	20W / 40W / 60W
Operating Temp	-20°C - 50°C
Lumens Delivered	3300lm / 6000lm / 9100lm (4000K)
lm/W	151lm/w (4000K)
CCT	3000K/4000K/5000K
Beam Angle	60/120

MATERIAL INFORMATION

Main Material	Aluminium+Polycarbonate
Diffuser Material	Polycarbonate
Product Weight without Packaging	3.7 kg
Colour / Finish	Anthracite

TECHNICAL INFORMATION

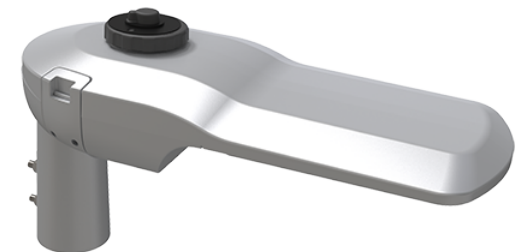
Class Protection	1
Light Source	LED
SDCM (Initial Macadam)	3
CRI	70
Internal / External	External
Surface / Recessed / Suspended	Pole
Power Factor	0.9
L70 @ 25°C	L70 B10 153000h

PRODUCT FEATURES

- Modern die-cast aluminium street light ideal for car parks and large open areas
- CCT selectable between 3000K, 4000K and 5000K and power selectable; offering a choice of up to 3 outputs, in one luminaire
- 30° head tilt (15° up or down from horizontal) allows for a wider or more narrow light distribution
- Die-cast aluminium construction and breather gland for optimal heat dissipation and performance
- Integrated spirit level for easy levelling during installation

ACCESSORIES

ASL/WB/1	Streetlight Wall Bracket 60mm
AGAB/SBA/1	Gabbro 60mm Spigot Adaptor - Grey
AGAB/PC/1	Gabbro Nema Photocell
AGAB/PC/BK/1	Gabbro Nema Photocell Black





Gabbro



Part of the Streetlights product category

Model	Gabbro 1 Streetlight Grey
Code	AGAB1/1
Application	Education, Healthcare, Hospitality, Industrial, Retail

