



6600

# External Lighting Plan Report

## Raheen Housing Development

Proposed Residential Development

**Ballykeeffe,  
Raheen,  
Co. Limerick**

DW Raheen Developments Ltd

DKP document no  
**6600**

Project file no  
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ING Gerard (Craig) van Deventer CEng., BE(mech)., HDip CIOB, MCIBSE

M : [00] 353 (0)87 260 8080  
 E : gerard@dkpartnership.com

DKPartnership  
 70 Main Street, Applewood , Swords, Co. Dublin, Ireland  
 Reen Kenmare Co. Kerry

post@dkpartnership.com  
 www.dkpartnership.com

T : [00] 353 (0) 1813 1930  
 T : [00] 353 (0)64664 1686

 **Contents**

Section	Page
1 Introduction .....	4
2 Executive summary .....	5
3 Proposed development location .....	6
4 Approach, methodology and calculation results .....	7
5 Calculation summary and conclusion .....	9
Appendix A Grid 1 external lighting illumination contour layout and illuminance calculation summary .....	11
Appendix B Grid 2 external lighting illumination contour layout and illuminance calculation summary .....	12
Appendix C Grid 3 external lighting illumination contour layout and illuminance calculation summary .....	13
Appendix D (Z) Illumination report .....	14

## 1 Introduction

### 1.1 Report purpose

This report gives information on the external lighting installation in connection with the new proposed project covering the proposed illumination categories, the resultant illumination levels and proposed light fittings.

### 1.2 Instruction

DKPartnership (DKP) have been commissioned by DW Raheen Developments Ltd, to carry out the analysis and report for the proposed development at Ballykeeffe, Raheen, Co. Limerick.

### 1.3 Development description

DW Raheen Developments Ltd. are seeking a ten year permission for a strategic housing development consisting of the provision of 384 residential house and apartment units on a ca. 10.44 hectare site located in Ballykeeffe, Raheen, Co. Limerick. The site is greenfield land that is enclosed by existing residential development to the south and east, the R510 to the west and open land to the north. Access to the site is provided by an existing entrance off a roundabout on the R510 regional road.

The proposed development will provide as follows:

- 202 no. housing units, comprising a variety of forms to include bungalows, detached, semi-detached and terraced houses. A mix of house sizes are proposed to include 20 no. two bedroom houses, 156 no. three bedroom houses and 26 no. four bedroom houses.
- 182 apartment and duplex units across 25 small scale blocks, 2 to 4 storeys in heights, throughout the development. The apartments and duplexes provide a mix of one, two, three and four bed units, comprising of 10 no. four bedroom duplex units, 10 no. three bedroom duplex units, 6 no. two bedroom duplex units, 18 no. three bedroom apartments, 92 no. two bedroom apartments and 46 no. one bedroom apartments.

The proposed development also includes;

- A childcare facility measuring 761.75m<sup>2</sup>, providing 79 childcare places (55 full time and 24 after school places), located at the south-western edge of the development.
- The provision of 377 no. car parking spaces and 311 secured bicycle parking spaces.
- The provision of 3 no. ESB sub-stations, ancillary services and infrastructure works including foul and surface water drainage, attenuation areas, landscaped public open spaces (approximately 29,500m<sup>2</sup>, or 28.2% of the total site area), landscaping, lighting, internal roads, cycle paths, and footpaths.

A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) have been prepared in respect of the proposed development.

## 2 Executive summary

### 2.1 Analysis conducted

This report analyses the illumination calculation results of the proposed lighting design in respect of new project circulation roads, adjacent public carparking and proposed common footpath.

### 2.2 Design considerations

The external lighting design has been executed using the European design standard EN 1332201 class P3 for the proposed circulation roads, adjacent public carparking and common footpath. The ecologists have reported that no particular bat foraging areas have been identified hence no particular design measures have been included for same.

### 2.3 EN132201 External lighting calculation data

Given the size over the overall site the illumination calculations have been split into 3 sections (grids). Appendix A, B, C representing the illumination calculations and illustrations of the relevant grids 1, 2 and 3. We note the average illuminance for the proposed circulation roads, adjacent public carparking and common footpath using the proposed fittings to be 7.87 Lx and minimum illuminance to be 1.59 Lx both in excess of the minimum P3 targets. The illumination calculation results are based on using the following 3 types of light fittings ;

Type A, B Phillips LumiStreet 20W led 3000K on a 6.0m pole Roads and parking

Type C Bega Poletop 17W led 4000K on a 4.5m pole > Foot/cycle path

### 2.4 Calculation data results

From appendix A, B, C representing the illumination calculations and illustrations of the sites 3 grids (1,2 and3) we note the average illuminance for the proposed circulation roads, adjacent public carparking and common footpath using the proposed fittings is **7.87 Lx** and minimum illuminance is **1.59 Lx** both in excess of the minimum P3 targets.

Element	E avg (lx)	E max (lx)	E min (lx)
EN13201 standard P3 (target)	7.50	Na	1.5
Grid 1	8.26	19.29	1.61
Grid 2	7.65	20.92	1.59
Grid 3	7.69	20.31	1.57
Site average	7.87	20.17	1.59

### 2.5 Conclusion

The external (public) lighting design covering the proposed circulation roads, adjacent public carparking and common footpath as per illumination contour layouts and illuminance calculation data appendix A,B,C meets the criteria set out in EN13201 for lighting class P3. We, DKP, therefore deem the external lighting design to be in compliance with the applied standards and recommendations

### 2.6 Mitigation measures / actions

No mitigation measures required for compliance to lighting standards

### 3 Geographical overview

#### 3.1 Project location & extend.

Image 3.1 the (google) site map below indicates the location of the site approximately outlined.



Image 3.1 proposed development site boundary

## 4 Approach and methodology

### 4.1 Analysis approach

The external lighting design covers the proposed circulation roads, the adjacent public car parking and common footpath designed to achieve the EN132201 P3 class standard. The design whereas achieving the P3 standard has also been analysed to reduce the electrical load (less CO<sub>2</sub> impact and operating cost) to a minimum.

### 4.2 The extend of the external lighting sections

The following area have been including in the external (public) lighting design in the image below ;.

A = New proposed lighting covering the general circulation roads (yellow)

B = New proposed lighting on common footpath (green)



### 4.3 EN132201 external lighting data and targets

The design of the external public lighting for the proposed circulation roads, the adjacent public car parking and common footpath has been based on the lighting standard EN132201 using the class P3. All illumination calculations therefore are based on the same P3 class covering all areas.

*The table below indicates the P class minimum EN13201 illumination targets ;*

CLASS	E avg min (lx)	E min (lx)
P1	15.0	3.00
P2	10.0	2.00
P3	7.50	1.50
P4	5.00	1.00
P5	3.00	0.60

Table 4.1 Lighting standard EN132201 P class categories with P3 highlighted.



## 5 Calculation data and conclusion

### 5.1 EN132201 External lighting calculation targets

The overall average, maximum and minimum external lighting illumination calculations for the proposed circulation roads, adjacent public carparking and common footpath have been executed to achieve the P3 class as defined under EN 1332201.

### 5.2 Calculation data results

From appendix A, B, C representing the illumination calculations and illustrations we note the average illuminance for the proposed circulation roads, adjacent public carparking and common footpath using proposed fittings is 7.87 Lx and minimum illuminance is 1.59Lx both in excess of the minimum P3 targets. The illumination calculation results are based on using the following 2 types of light fittings ;

Type A, B Phillips LumiStreet 20W led 3000K on a 6.0m pole Roads and parking

Type C Bega Poletop 17W led 4000K on a 4.5m pole > Foot/cycle path

- Type C is mainly used around the site for common footpath,
- Type A/B is used for the main circulation roads and at the site entrance.

*Targets and achieved illuminance ;*

Element	E avg (lx)	E max (lx)	E min (lx)
EN13201 standard P3 (target)	7.50	Na	1.5
Grid 1	8.26	19.29	1.61
Grid 2	7.65	20.92	1.59
Grid 3	7.69	20.31	1.57
Site average	7.87	20.17	1.59

### 5.3 Overall site with light fitting type locations

The overall map is too large to give a reasonable overview on A4 scale and we therefore refer to appendix A, B and C for pole locations.

### 5.4 Light fittings applied for the purpose of illumination calculation

The details below represent a summary of the light fitting schedule applied for the illumination calculations.

Type A ; Luminaire A Phillips Lumistreet Mini 20W 3000K - 6.0m pole



Type B ; Luminaire B Phillips Lumistreet Mini 20W 3000K asymmetric - 6.0m pole



Type C ; Luminaire C Bega 17W 3000K - 4.5m pole



### 5.5 Conclusion

The external (public) lighting design covering the proposed circulation roads, adjacent public carparking and common footpath as per illumination contour layouts and illuminance calculation data appendix A,B,C meets the criteria set out in EN13201 for lighting class P3. We, DKP, therefore deem the external lighting design to be in compliance with the applied standards and recommendations.

### 5.6 Mitigation measures / actions

No mitigation measures required for compliance to lighting standards.

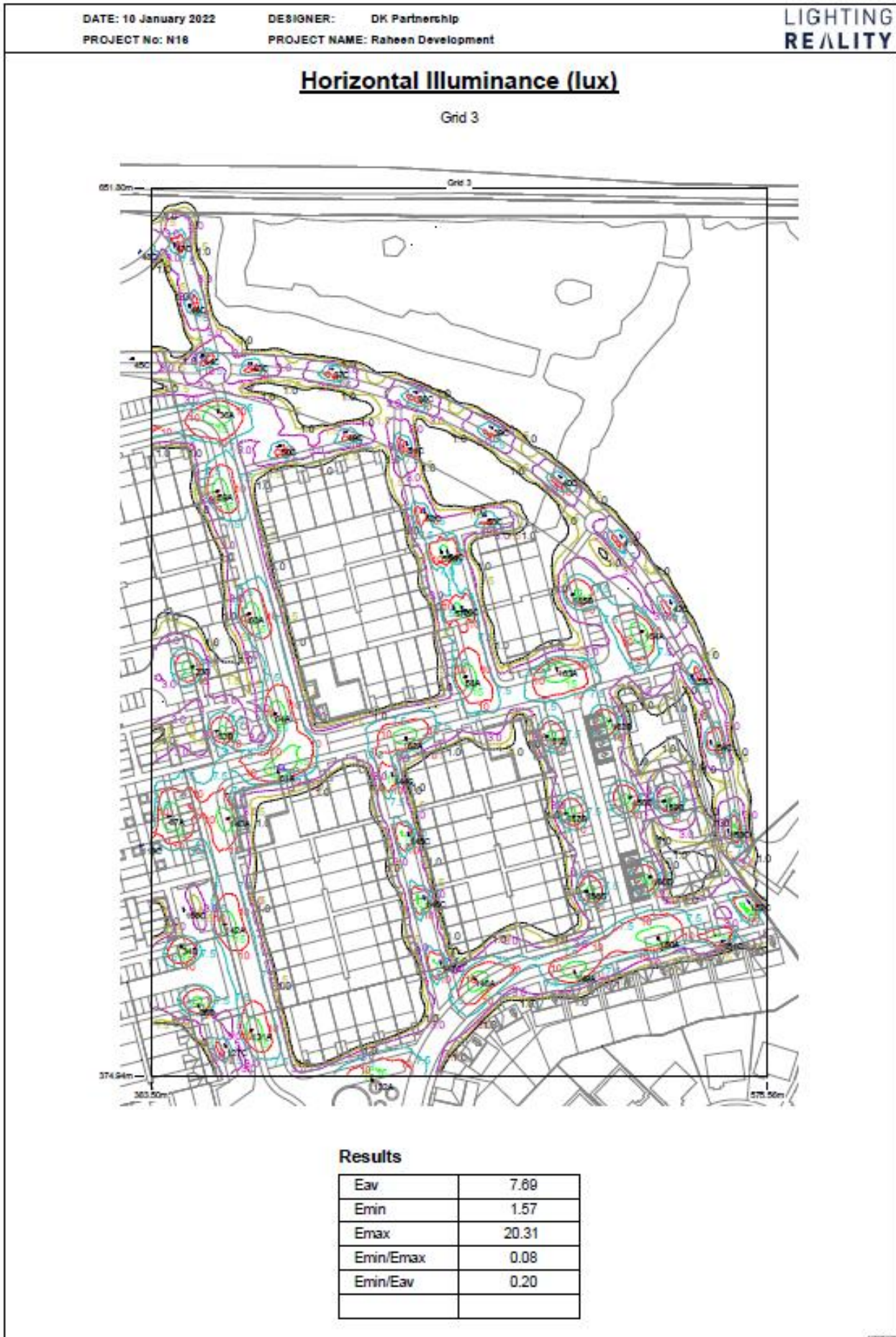
APPENDIX A Grid illumination calculations - 1 of 3





APPENDIX B Grid illumination calculations - 2 of 3



APPENDIX C Grid illumination calculations - 3 of 3



**APPENDIX D Illumination calculation data.**

<p>DATE: 10 January 2022 PROJECT No: N16</p>	<p>DESIGNER: DK Partnership PROJECT NAME: Raheen Development</p>	<p><b>LIGHTING REALITY</b></p>											
<h3>Layout Report</h3>													
<b>General Data</b>													
Dimensions in Metres Angles in Degrees													
<b>Calculation Grids</b>													
ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing						
1	Grid 1	218.51	199.32	267.79	176.64	1.07	1.00						
2	Grid 2	192.46	374.94	192.06	276.86	1.00	1.11						
3	Grid 3	383.50	374.94	192.06	276.86	1.00	1.11						
<b>Luminaire A Data</b>			<b>Luminaire B Data</b>										
													
Supplier	Phlips		Supplier	Phlips									
Type	BGP212_DM90_5800_20LED_5.1S_CLO_L90_NW		Type	BGP212_DM10_3000_20LED_5.1S_CLO_L90_NW									
Lamp(s)	LED-HB 5.1S/NW		Lamp(s)	LED-HB 5.1S/NW									
Lamp Flux (klm)	5.90		Lamp Flux (klm)	3.00									
File Name	M in_BGP212_DM 51_5811_20_LED_5.1S_CLO_L90_NW.ies		File Name	M in_BGP212_DM 10_3011_20_LED_5.1S_CLO_L90_NW.ies									
Maintenance Factor	0.85		Maintenance Factor	0.85									
Imax70,80,90(cd/klm)	939.1 <del>1000</del> 0.0		Imax70,80,90(cd/klm)	534.0 <del>600</del> 0.0									
No. in Project	53		No. in Project	18									
<b>Luminaire C Data</b>													
Supplier													
Type	84589K4 (Prolongary)												
Lamp(s)	2400 lm,12W												
Lamp Flux (klm)	2.40												
File Name	BE_84589K4_PRL.ies												
Maintenance Factor	0.85												
Imax70,80,90(cd/klm)	587.2, 217.9, 0.1												
No. in Project	26												
<b>Layout</b>													
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z	
1	A	339.87	235.34	6.00	301.00	5.00	0.00	0.50	100%				
2	A	367.64	239.28	6.00	128.00	5.00	0.00	0.50	100%				
3	A	390.12	266.53	6.00	303.00	5.00	0.00	0.50	100%				
4	A	353.12	261.27	6.00	42.00	5.00	0.00	0.50	100%				
5	A	332.91	287.55	6.00	36.00	5.00	0.00	0.50	100%				
6	A	340.13	323.08	6.00	317.00	5.00	0.00	0.50	100%				
7	A	422.43	278.98	6.00	128.00	5.00	0.00	0.50	100%				
8	A	445.81	309.42	6.00	315.00	5.00	0.00	0.50	100%				



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**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
9	A	297.24	306.66	6.00	309.00	5.00	0.00	0.50	100%			
10	A	301.59	289.16	6.00	119.00	5.00	0.00	0.50	100%			
11	A	321.23	319.25	6.00	210.00	5.00	0.00	0.50	100%			
12	A	297.87	334.65	6.00	14.00	5.00	0.00	0.50	100%			
13	A	306.16	357.51	6.00	197.00	5.00	0.00	0.50	100%			
14	A	287.10	373.84	6.00	12.00	5.00	0.00	0.50	100%			
15	A	287.11	403.02	6.00	14.00	5.00	0.00	0.50	100%			
16	A	281.17	427.29	6.00	16.00	5.00	0.00	0.50	100%			
17	A	277.22	455.29	6.00	351.00	5.00	0.00	0.50	100%			
18	A	300.55	484.01	6.00	285.00	5.00	0.00	0.50	100%			
19	A	332.55	495.67	6.00	285.00	5.00	0.00	0.50	100%			
20	A	366.13	504.39	6.00	285.00	5.00	0.00	0.50	100%			
21	A	337.90	475.87	6.00	107.00	5.00	0.00	0.50	100%			
22	A	371.02	484.17	6.00	107.00	5.00	0.00	0.50	100%			
23	B	396.81	502.55	6.00	187.00	0.00	0.00	0.50	100%			
24	A	301.44	504.82	6.00	15.00	5.00	0.00	0.50	100%			
25	A	316.93	534.37	6.00	288.00	5.00	0.00	0.50	100%			
26	A	345.39	544.00	6.00	311.00	5.00	0.00	0.50	100%			
27	A	345.55	567.87	6.00	349.00	5.00	0.00	0.50	100%			
28	A	373.41	579.80	6.00	287.00	5.00	0.00	0.50	100%			
29	A	322.97	382.41	6.00	103.00	5.00	0.00	0.50	100%			
30	B	343.58	402.00	6.00	283.00	5.00	0.00	0.50	100%			
31	B	348.39	386.31	6.00	104.00	5.00	0.00	0.50	100%			
32	B	367.30	408.92	6.00	281.00	5.00	0.00	0.50	100%			
33	B	372.41	392.32	6.00	106.00	5.00	0.00	0.50	100%			
34	B	392.82	415.53	6.00	279.00	5.00	0.00	0.50	100%			
35	B	398.32	396.53	6.00	100.00	5.00	0.00	0.50	100%			
36	A	404.43	582.40	6.00	273.00	5.00	0.00	0.50	100%			
37	C	440.12	595.23	4.50	171.00	0.00	0.00	0.00	50%			
38	C	466.30	587.82	4.50	158.00	0.00	0.00	0.00	50%			
39	C	489.83	576.87	4.50	150.00	0.00	0.00	0.00	50%			
40	C	511.25	561.40	4.50	139.00	0.00	0.00	0.00	50%			
41	C	530.22	542.82	4.50	128.00	0.00	0.00	0.00	50%			
42	C	545.63	522.19	4.50	119.00	0.00	0.00	0.00	50%			
43	C	414.80	597.06	4.50	189.00	0.00	0.00	0.00	50%			
44	C	399.68	599.45	4.50	217.00	0.00	0.00	0.00	50%			



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**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
45	C	377.98	598.38	4.50	185.00	0.00	0.00	0.00	50%			
46	C	395.43	615.13	4.50	283.00	0.00	0.00	0.00	50%			
47	C	390.84	634.20	4.50	273.00	0.00	0.00	0.00	50%			
48	C	380.24	632.05	4.50	232.00	0.00	0.00	0.00	50%			
49	C	444.43	575.55	4.50	191.00	0.00	0.00	0.00	50%			
50	C	423.65	571.19	4.50	191.00	0.00	0.00	0.00	50%			
51	C	463.35	571.57	4.50	99.00	0.00	0.00	0.00	50%			
52	C	468.78	550.48	4.50	106.00	0.00	0.00	0.00	50%			
53	C	487.82	549.50	4.50	191.00	0.00	0.00	0.00	50%			
54	C	475.82	538.51	4.50	284.00	0.00	0.00	0.00	50%			
55	C	473.94	537.96	4.50	102.00	0.00	0.00	0.00	50%			
56	C	480.39	521.04	4.50	284.00	0.00	0.00	0.00	50%			
57	C	477.83	520.51	4.50	102.00	0.00	0.00	0.00	50%			
58	A	481.16	499.16	6.00	15.00	5.00	0.00	0.50	100%			
59	A	403.97	557.04	6.00	15.00	5.00	0.00	0.50	100%			
60	A	413.73	518.74	6.00	15.00	5.00	0.00	0.50	100%			
61	A	423.19	469.44	6.00	103.00	5.00	0.00	0.50	100%			
62	A	463.15	479.66	6.00	103.00	5.00	0.00	0.50	100%			
63	B	403.94	482.37	6.00	11.00	5.00	0.00	0.50	100%			
64	A	421.86	487.72	6.00	15.00	5.00	0.00	0.50	100%			
65	A	366.06	455.72	6.00	104.00	5.00	0.00	0.50	100%			
66	A	342.59	440.26	6.00	193.00	5.00	0.00	0.50	100%			
67	A	388.88	455.82	6.00	10.00	5.00	0.00	0.50	100%			
68	A	370.95	436.95	6.00	284.00	5.00	0.00	0.50	100%			
69	C	328.89	461.30	4.50	284.00	5.00	0.00	0.00	50%			
70	C	315.42	461.46	4.50	92.00	5.00	0.00	0.00	50%			
71	C	302.83	454.94	4.50	173.00	5.00	0.00	0.00	50%			
72	C	308.95	438.21	4.50	284.00	5.00	0.00	0.00	50%			
73	C	305.63	429.28	4.50	27.00	5.00	0.00	0.00	50%			
74	C	321.12	433.26	4.50	15.00	5.00	0.00	0.00	50%			
75	C	311.70	405.80	4.50	31.00	5.00	0.00	0.00	50%			
76	C	326.90	410.36	4.50	152.00	5.00	0.00	0.00	50%			
77	C	313.46	420.25	4.50	279.00	5.00	0.00	0.00	50%			
78	A	307.30	388.16	6.00	283.00	5.00	0.00	0.50	50%			
79	C	360.77	624.71	4.50	185.00	5.00	0.00	0.00	50%			
80	C	338.19	616.76	4.50	229.00	5.00	0.00	0.00	50%			





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**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
81	C	330.72	598.42	4.50	244.00	5.00	0.00	0.00	50%			
82	C	340.79	587.30	4.50	108.00	5.00	0.00	0.00	50%			
83	C	353.33	598.15	4.50	185.00	5.00	0.00	0.00	50%			
84	C	312.72	593.46	4.50	197.00	5.00	0.00	0.00	50%			
85	C	288.88	586.10	4.50	207.00	5.00	0.00	0.00	50%			
86	C	266.80	574.71	4.50	215.00	5.00	0.00	0.00	50%			
87	C	248.65	560.95	4.50	227.00	5.00	0.00	0.00	50%			
88	C	233.18	545.71	4.50	231.00	5.00	0.00	0.00	50%			
89	C	260.53	549.88	4.50	346.00	5.00	0.00	0.00	50%			
90	C	285.24	545.57	4.50	3.00	5.00	0.00	0.00	50%			
91	C	218.58	526.06	4.50	232.00	5.00	0.00	0.00	50%			
92	C	209.62	506.32	4.50	226.00	5.00	0.00	0.00	50%			
93	C	207.26	489.23	4.50	277.00	5.00	0.00	0.00	50%			
94	C	211.13	465.34	4.50	282.00	5.00	0.00	0.00	50%			
95	C	215.73	441.72	4.50	278.00	5.00	0.00	0.00	50%			
96	C	220.60	417.71	4.50	285.00	5.00	0.00	0.00	50%			
97	C	228.01	394.62	4.50	290.00	5.00	0.00	0.00	50%			
98	C	235.05	371.52	4.50	290.00	5.00	0.00	0.00	50%			
99	C	201.16	518.05	4.50	277.00	5.00	0.00	0.00	50%			
100	C	195.65	541.02	4.50	280.00	5.00	0.00	0.00	50%			
101	C	191.28	561.35	4.50	290.00	5.00	0.00	0.00	50%			
102	C	310.60	552.49	4.50	31.00	5.00	0.00	0.00	50%			
103	C	329.08	570.33	4.50	55.00	5.00	0.00	0.00	50%			
104	C	209.76	533.66	4.50	251.00	5.00	0.00	0.00	50%			
105	C	226.82	552.45	4.50	215.00	5.00	0.00	0.00	50%			
106	C	269.76	522.43	4.50	197.00	5.00	0.00	0.00	50%			
107	C	289.43	528.10	4.50	197.00	5.00	0.00	0.00	50%			
108	B	251.23	379.78	6.00	286.00	5.00	0.00	0.50	100%			
109	B	274.60	385.81	6.00	286.00	5.00	0.00	0.50	100%			
110	A	266.37	369.16	6.00	109.00	5.00	0.00	0.50	100%			
111	C	242.47	348.58	4.50	290.00	5.00	0.00	0.00	50%			
112	C	356.85	377.49	4.50	103.00	0.00	0.00	0.00	70%			
113	C	359.15	368.12	4.50	103.00	0.00	0.00	0.00	70%			
114	C	358.39	532.44	4.50	103.00	0.00	0.00	0.00	70%			
115	C	361.91	518.60	4.50	103.00	0.00	0.00	0.00	70%			
116	C	342.65	411.51	4.50	287.00	0.00	0.00	0.00	25%			

17/01/2022



DATE: 10 January 2022  
PROJECT No: N16

DESIGNER: DK Partnership  
PROJECT NAME: Raheen Development



**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
117	C	380.72	441.73	4.50	13.00	0.00	0.00	0.00	70%			
118	C	380.20	446.70	4.50	13.00	0.00	0.00	0.00	70%			
119	C	333.02	328.02	4.50	13.00	0.00	0.00	0.00	50%			
120	C	353.38	327.03	4.50	111.00	0.00	0.00	0.00	50%			
121	C	378.98	334.05	4.50	121.00	0.00	0.00	0.00	50%			
122	C	385.74	335.99	4.50	310.00	0.00	0.00	0.00	50%			
123	C	376.93	321.77	4.50	218.00	0.00	0.00	0.00	50%			
124	C	397.28	346.79	4.50	193.00	0.00	0.00	0.00	50%			
125	C	402.65	339.23	4.50	33.00	0.00	0.00	0.00	50%			
126	C	419.28	354.75	4.50	208.00	0.00	0.00	0.00	50%			
127	C	406.79	383.98	4.50	117.00	0.00	0.00	0.00	50%			
128	A	457.59	328.12	6.00	7.00	5.00	0.00	0.50	100%			
129	A	460.19	364.64	6.00	347.00	5.00	0.00	0.50	100%			
130	A	444.22	380.08	6.00	219.00	5.00	0.00	0.50	100%			
131	A	414.53	389.07	6.00	16.00	5.00	0.00	0.50	100%			
132	A	452.49	373.29	6.00	111.00	5.00	0.00	0.50	100%			
133	C	351.80	219.02	4.50	125.00	5.00	0.00	0.00	50%			
134	C	344.60	204.62	4.50	242.00	5.00	0.00	0.00	50%			
135	C	252.98	330.18	4.50	299.00	5.00	0.00	0.00	50%			
136	C	264.01	310.32	4.50	302.00	5.00	0.00	0.00	50%			
137	C	273.91	292.98	4.50	290.00	5.00	0.00	0.00	50%			
138	C	289.88	270.56	4.50	304.00	5.00	0.00	0.00	50%			
139	C	303.12	251.24	4.50	303.00	5.00	0.00	0.00	50%			
140	C	315.38	234.06	4.50	317.00	5.00	0.00	0.00	50%			
141	C	364.75	334.64	4.50	13.00	0.00	0.00	0.00	50%			
142	A	406.27	422.02	6.00	16.00	5.00	0.00	0.50	100%			
143	A	407.81	455.23	6.00	196.00	5.00	0.00	0.50	100%			
144	C	458.74	468.51	4.50	103.00	0.00	0.00	0.00	70%			
145	C	463.80	449.93	4.50	103.00	0.00	0.00	0.00	70%			
146	C	468.67	430.14	4.50	103.00	0.00	0.00	0.00	70%			
147	C	473.80	409.90	4.50	103.00	0.00	0.00	0.00	70%			
148	A	484.15	405.29	6.00	318.00	5.00	0.00	0.50	100%			
149	A	515.59	406.91	6.00	105.00	5.00	0.00	0.50	100%			
150	A	541.61	417.39	6.00	105.00	5.00	0.00	0.50	100%			
151	C	561.38	416.88	4.50	16.00	0.00	0.00	0.00	70%			
152	C	569.94	428.92	4.50	133.00	0.00	0.00	0.00	70%			



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PROJECT No: N16

PROJECT NAME: Raheen Development

**Layout Continued**

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Dimmed to	Target X	Target Y	Target Z
153	C	563.33	451.56	4.50	277.00	0.00	0.00	0.00	70%			
154	C	557.90	479.14	4.50	279.00	0.00	0.00	0.00	70%			
155	C	551.92	499.48	4.50	295.00	0.00	0.00	0.00	50%			
156	B	518.77	432.39	6.00	17.00	5.00	0.00	0.50	100%			
157	B	512.65	456.62	6.00	17.00	5.00	0.00	0.50	100%			
158	B	533.10	461.79	6.00	196.00	5.00	0.00	0.50	100%			
159	B	543.00	460.40	6.00	17.00	5.00	0.00	0.50	100%			
160	B	539.34	436.93	6.00	192.00	5.00	0.00	0.50	100%			
161	B	506.56	480.70	6.00	17.00	5.00	0.00	0.50	100%			
162	B	526.75	485.66	6.00	196.00	5.00	0.00	0.50	100%			
163	A	509.89	501.87	6.00	284.00	5.00	0.00	0.50	100%			
164	A	536.83	513.52	6.00	207.00	5.00	0.00	0.50	100%			
165	B	514.66	524.84	6.00	18.00	5.00	0.00	0.50	100%			
166	C	393.84	426.43	4.50	108.00	0.00	0.00	0.00	30%			

LIM0221

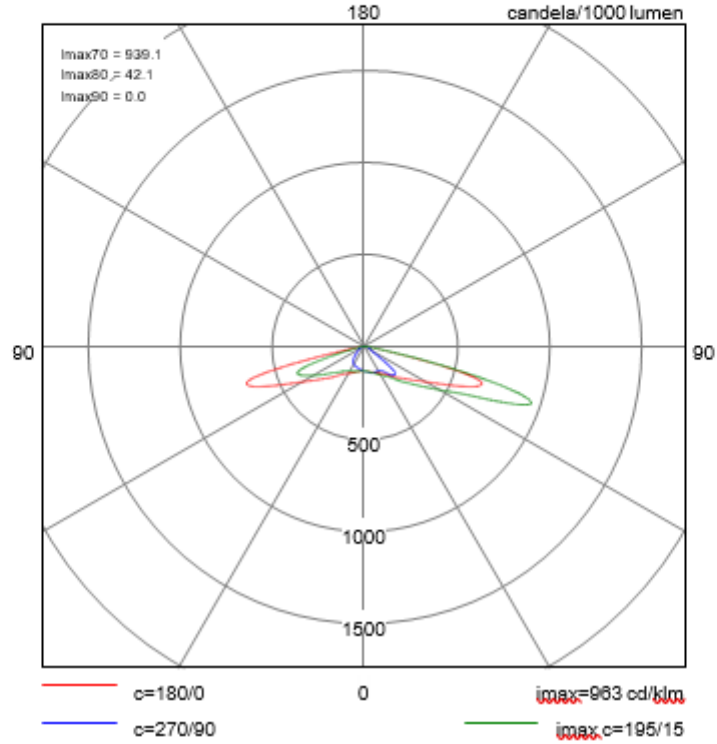
DATE: 10 January 2022  
PROJECT No: N16

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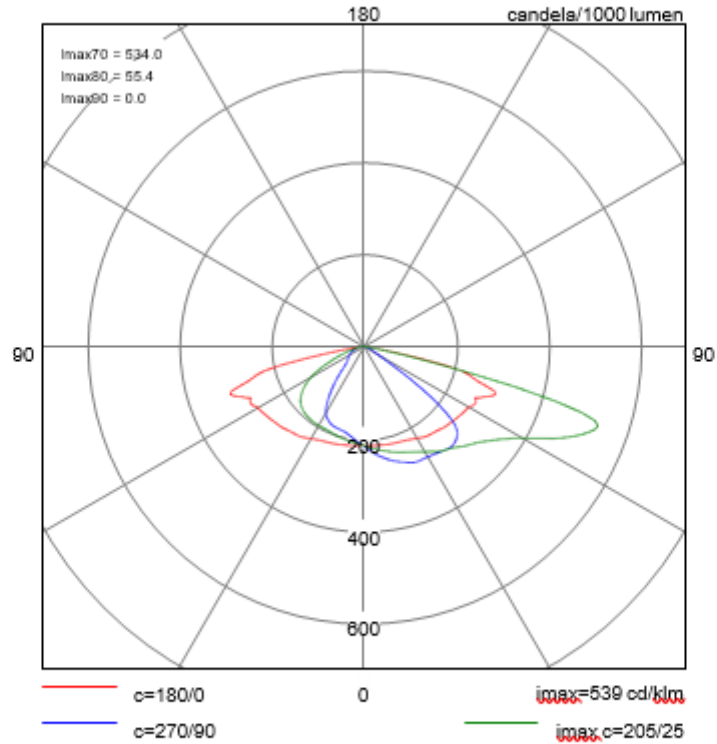
**LIGHTING  
REALITY**

### Polar Diagrams

#### Luminaire A\_BGP212\_DM50\_5800\_20LED\_5.1S\_CLO\_L90\_NW



#### Luminaire B\_BGP212\_DM10\_3000\_20LED\_5.1S\_CLO\_L90\_NW



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**Polar Diagrams Continued**

**Luminaire C\_84589K4 (Preliminary)**

