

EXTERNAL LIGHTING ASSESSMENT REPORT

FOR:
Letchworth Avenue One.

A PROJECT FOR:
Letchworth Investment LLP

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1.0 INTRODUCTION

1. MBA Consulting Engineers Ltd. has been commissioned by Letchworth Investment LLP to produce an external lighting assessment report in support of the Full Planning Application for the proposed development known as Letchworth, Avenue One.
2. The planning application proposes:
“Erection of two buildings for Flexible Use Classes including Eg (ii) (iii), B2, B8, including servicing, parking, access, landscaping.”
3. The lighting scheme covers all external areas surrounding the buildings including external areas to the access roads, walkways, car parking & service yards.
4. The scheme is based on the use of LED luminaires fixed to the building façade and on lighting columns as detailed on the accompanying drawing 25020-MBA-EX-SP-DR-E-0001 Revision PL2.

2.0 LIGHTING SOLUTION

1. The lighting solution has been prepared in accordance with the current Design Standard for Exterior Lighting in conjunction with BS 5489-1:2020, BS EN 12464-2:2014, CIBSE LG6 -The Outdoor Environment and BREEAM ‘Excellent’ requirements.
2. Care has been taken when selecting the luminaires that ensures the appropriate products will greatly reduce spill light and glare to and around site boundaries and prevent sky glow.
3. Full cut-off luminaires, horizontal, “flat” floodlights and LED modules that are housed in the luminaires canopy have been generally selected.
4. Best lighting practice design guidelines have been followed in order to achieve the criteria outlined in The Institution of Lighting Professionals: Guidance Notes for the Reduction of Obtrusive Light 01/20, covering Environmental Zones E0 to E4.
5. The proposed Holophane D-Series 0&1, Denver iD Wallpack and Polar column and façade mounted luminaires have a ULR of 0% and drastically reduce the upward spread of light near to and above the horizontal.
6. The most sensitive/critical zones for minimising sky glow are those between 85 - 100° as shown in Table 1.

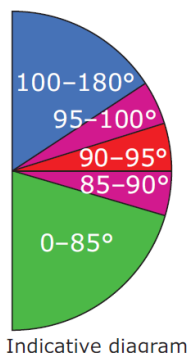


Table 1: The effect on the ability to view the night sky at various angles

Angle of light emitted (degrees)	Sky glow effect	Glare effect
100 – 180	Local	Little
95 – 100	Significant	Some
90 – 95	High	High
85 – 90	Significant	High
0 – 85	Minimal	Some

Table 1: Critical Luminaire Angles for Minimising Sky Glow - [1]

7. With the proposed luminaires being strategically placed and having zero or minimal upward light ratio (ULR), the proposed design solution meets the criteria of environmental zone E3, Lighting Environment classification of High District Brightness and Maximum Upward Light Ratio of Luminaires as indicated respectively in Tables 2 & 3.

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

Table 2: Environmental Zones - [1]

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR)/%	0	0	2.5	5	15

Table 3: Maximum Values of Upward Light Ratio (ULR) of Luminaires - [1]

8. Glare has been kept to a minimum by ensuring that the main beam angle of all the luminaires directed towards any potential observer is not more than 70 degrees as indicated in Figure 1.

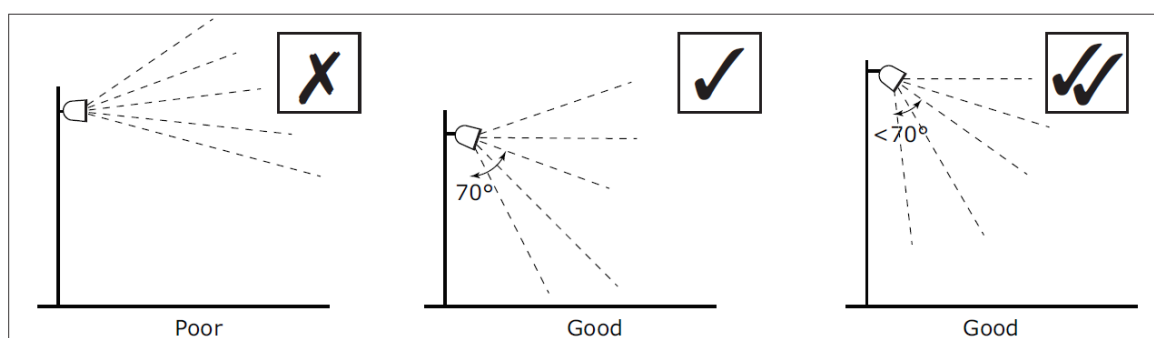


Figure 1: Luminaire Aiming Angles - [1]

In addition, the designed mounting heights and chosen luminaires ensure that greater spacing between luminaires is achieved thus reducing the number of overall lighting points and also reducing the spill and glare as indicated in Figures 2 and 3.

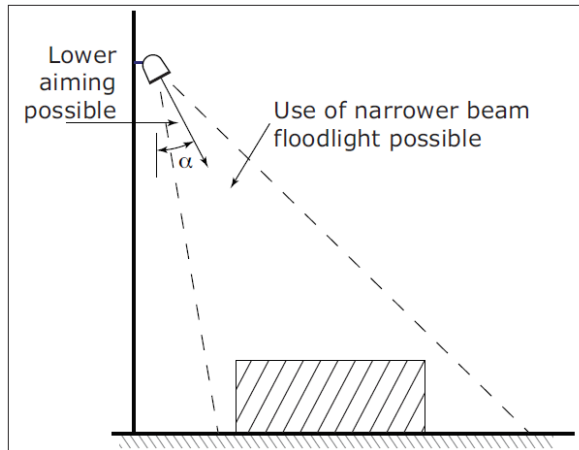


Figure 2: Higher Mounting Height – Less Spill and Glare - [1]

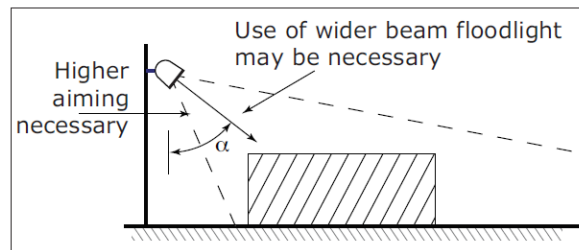


Figure 3: Lower Mounting Height – More Spill and Glare - [1]

9. Lighting pollution on adjacent properties has been kept to a minimum and in accordance with the respective environmental zone category indicated in Table 4.

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

Table 4: Maximum Values of Vertical Illumination on Properties – [1]

10. All external lighting will be controlled by automatic timeclock arrangement to assist in the control of the lighting during required hours as required going forward.

3.0 DESIGN STATISTICS

- The following table details the design statistics achieved within the various areas of the development and should be read in conjunction with the external lighting drawings provided.

Table 5: Designed Lux Levels

Statistics				
Description	Symbol	Avg	Min	Min/Avg
Shared Access Road (Landlords) 20/0.40Uo	+	20 lux	8 lux	0.40
Unit 1 Car Park - 10/0.25Uo	+	14 lux	7 lux	0.50
Unit 1 Cycles	+	7 lux	5 lux	0.71
Unit 1 Dock Doors	+	58 lux	21 lux	0.36
Unit 1 Dock Doors - 50/0.40Uo	+	50 lux	21 lux	0.42
Unit 1 Rear Walkway - 10/0.40Uo	+	12 lux	8 lux	0.67
Unit 1 Service Yard - 20/0.40Uo	+	27 lux	11 lux	0.41
Unit 2 Car Park - 10/0.25Uo	+	11 lux	6 lux	0.55
Unit 2 Cycles	+	7 lux	7 lux	1.00
Unit 2 Dock Doors - 50/0.40Uo	+	50 lux	20 lux	0.40
Unit 2 Rear Walkway - 10/0.40Uo	+	10 lux	7 lux	0.70
Unit 2 Service Yard - 20/0.40Uo	+	23 lux	10 lux	0.43
Unit 3 Car Park - 10/0.25Uo	+	11 lux	3 lux	0.27
Unit 3 Cycles	+	11 lux	10 lux	0.91
Unit 3 Dock Doors - 50/0.40Uo	+	72 lux	30 lux	0.42
Unit 3 Rear Walkway - 10/0.40Uo	+	10 lux	8 lux	0.80
Unit 3 Service Yard - 20/0.40Uo	+	20 lux	8 lux	0.40
Unit 3 Yard Access - 20/0.40Uo	+	20 lux	10 lux	0.50
Unit 3 Yard Car Park - 10/0.25Uo	+	14 lux	8 lux	0.57

- The height of the lighting fixtures in all areas have been reduced to help and prevent excessive light spill. Special optics and back light filters have also been introduced to the lighting fixtures to further assist where required.
- The results obtained, including all the additional controls and measures as detailed above, ensure the results fall in line with the respective guidelines Environmental Zones E3 inclusive as detailed in Section 2 of this report.
- As further detailed on the drawing any potential light spill over the boundaries into adjoining areas including neighboring properties has been kept to the minimum which is detailed on the drawing as a blue contour line which clearly details the expected spill zone from the respective level.

4.0 LUMINAIRE DETAILS

4.1 D-SERIES 0 AND 1 STREETLIGHT AND WALL MOUNTED LED LUMINAIRE

1. The D-SERIES Streetlight luminaire has a single-piece die-cast aluminium housing that conforms to EN1706 AC-46500 with integral heat sink fins to optimise thermal management through conductive cooling. Figure 4 indicates an image of the proposed respective luminaires.
2. LED modules are IP65 with individual lenses, and high-grade aluminium housing to transfer heat away from the LEDs and dissipate through the finned housing for cooling.
3. The LED driver is mounted in direct contact with the finned housing for cooling to promote low operating temperature and long system life.
4. The housing is completely sealed against moisture and environmental contaminants (IP65).
5. The luminaire has been chosen for pedestrian access path, car parking and service yard.
6. With 0% upward light ratio this luminaire complies with Environmental Zones E0 to and including E4.



Figure 4: D-Series 1 luminaire

4.2 DENVER ID WALL LED LUMINAIRE

1. The Denver iD Wall luminaire consists of a die cast aluminum body with LED modules which are sealed with a high transparency glass. The luminaire is available in five different output optics: symmetric, asymmetric, long & narrow, forward throw and high beam long and narrow. The long and narrow optic distribution has been used on this project to suit the area being lit. Figure 5 indicates an image of the proposed luminaire.
2. The luminaire is completely sealed against moisture and environmental contaminants (IP65).
3. With 0% upward light ratio this luminaire complies with Environmental Zones E0 to and including E4.
4. The luminaire has been chosen for the access paths around the perimeter of building.



Figure 5: Denver iD Wall luminaire

4.3 WALLPACK

1. The Two-piece die-cast aluminum housing, that conforms to EN1706 AC-46500, with integral heat sink fins to optimize thermal management through conductive cooling.
2. 1 or 2 ×10 LED modules are IP65 with individual lenses. The high-grade aluminum housing transfers heat away from the LEDs and dissipates heat through the finned housing for cooling.
3. The LED driver is mounted separately from the LED modules to promote low operating temperature and long system life. Housing is completely sealed against moisture and environmental contaminants (IP65).
4. Luminaire is suitable for wall mounting only. Installation via the rear-housing with cable entry via rear, top, bottom or sides. 3000K or warmer must be selected for IDA dark sky certification.



Figure 6: WALLPACK luminaire

4.4 POLAR 1

1. Indoor and outdoor floodlight. Die cast aluminum body, coated with polyester anticorrosion powder, silver color, 4mm thick tempered transparent glass, silicon gasket, electronic driver 220-240V50/60Hz.
2. Manufactured in accordance with EN / IEC 60598-1:2018.



Figure 7: Polar 1 luminaire

5.0 CONCLUSION

1. The total lighting solution has been carefully generated to ensure the immediate environment has been protected including the properties adjacent to the site.
2. The illumination that would normally be free flowing from site boundaries has been restricted and has been further designed to mitigate any potential impact to properties adjacent to the proposed site.
3. Careful consideration has also been taken to ensure no loss of amenity due to glare through shielding of the lamps, choice of luminaires and efficient mounting heights.

6.0 REFERENCES

[1] – 2020/01 - Institute of Lighting Professionals – GN 01/20 Guidance Note for the reduction of obtrusive light.