Lighting Assessment report

Harlequin Centre, Exeter

Prepared for: Curlew Alternatives Property LP
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1. Section one: Introduction

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1.1. Background

1.1.1.1. Hollis have been appointed by Curlew Alternatives Property LP to produce a lighting impact assessment in support of a planning application to Exeter Council for the redevelopment of The Harlequin Centre, Exeter.

1.1.1.2. An original assessment was undertaken to accompany application 19/01556 submitted in November 2019. This update report has been produced to assess amended plans submitted to the council in May 2020.

1.1.1.3. The proposed new site will consist of the development of a Co-Living (Sui Generis) accommodation block and a hotel (Class C1) including bar and restaurant, following demolition of existing shopping centre and pedestrian bridge, change of use of upper floors of 21-22 Queen Street to Co-Living (Sui Generis), and all associated works including parking, landscaping, amenity areas, public realm improvements, new pedestrian bridge and provision of heritage interpretation kiosk.

1.1.1.4. This proposal reflects a revision to the scheme assessed previously.

1.1.1.5. This report provides an assessment on the existing baseline artificial lighting levels and the predicted effects of the proposed lighting design on the local neighbouring properties.

1.2. Local policy & planning condition

1.2.1.1. The recommendations within this report have been based upon the Society of light and lighting handbook and the ILP guidance on obtrusive light (GN01).

2. Section two: Executive summary

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2.1.1.1. The proposed development is close to the centre of Exeter and is mainly surrounded by retail properties including a large multi-storey shopping centre and car park with a small cluster of residential properties to the south-west of the proposed site.

2.1.1.2. Due to the position of the residential properties to the south-west of the site, the new luminaires will be visible to the residents. However, from the lighting design information produced by the lighting manufacturers, no issues with light spill or glare are anticipated.

2.1.1.3. The proposed lighting scheme meets the requirements of the recommendations of the SLL (society of light and lighting) lighting handbook and the ILP (institute of lighting professionals) Guidance on Obtrusive Light GN01 and is therefore deemed satisfactory in the absence of a specific building control condition.

2.1.1.4. It is recommended that the external up-light luminaires proposed for this site are reviewed so as to not emit any upward light, preventing contribution to sky glow or light pollution.

2.1.1.5. Any variations to the designs as appended to this document shall require review for compliance in accordance with the above.

2.1.1.6. The visual appearance of the luminaires during daylight hours fall outside of the scope of this report.

3. Section three: Assessment scope and methodology

Section three: Assessment scope and methodology

3.1. Approach

3.1.1.1. In order to assess the effects of the proposed new development and lighting strategy a site visit was undertaken on 10th October to measure existing ambient lighting lux levels within the site and at various locations along the border of the site.

3.1.1.2. Particular attention has been paid to potentially sensitive areas that may be affected by the new development. The measurements were taken between 8pm and 9pm using a factory calibrated digital light meter.

3.1.1.3. Computer generated lighting models have been produced using Relux software, by the specialist lighting manufacturers, to assess the potential lighting output of the new artificial lighting to the site and surrounding area.

3.2. Statutory Documents

3.2.1.1. No limits or set rules are set for lighting assessments, however, the following guidance documents have been referred to and are widely regarding as industry standard.

- The Society and Lighting and Lighting (SLL) lighting handbook
- Institute of Lighting Professional (ILP) Guidance Notes for reduction of obtrusive light (2011)

3.2.1.2. The SLL handbook shows five qualitative environmental zones identified by the international commission on illumination (CIE) which reflects the different levels of light pollution which can affect an area:

Table 3.1- Environmental Zones

Environmental zone	Zone description and examples of sub-zones
E1	Areas with intrinsically dark landscape: National Parks, areas of outstanding beautiful (where roads are usually unlit)
E2	Areas of 'low district brightness': outer urban and rural residential areas (where roads are lit to residential route standard)
E3	Areas of 'low district brightness': outer urban and rural residential areas (where roads are lit to residential route standard)
E4	Areas of 'high district brightness': generally, urban areas having mixed recreational and commercial land use with high night-time activity

3.2.1.3. In addition, the following SLL handbook table detailing the maximum vertical illuminance on windows, maximum luminous intensity for obtrusive luminaires and maximum building luminance produced by floodlighting, for five environmental zones:

Table 3.2 – maximum illuminance on windows, luminous intensity for obtrusive luminaires and maximum luminance produced by floodlighting

Environmental Zones	Maximum vertical illuminance on windows (Lux)		Maximum luminous intensity (cd)		Maximum building luminance (cd/m²)
	Before curfew	After curfew	Before curfew	After curfew	
E0	0	0	0	0	0
E1	2	1	2500	0	0
E2	5	1	7500	500	5
E3	10	2	10000	1000	10
E4	25	5	2500	2500	25

3.2.1.4. From table 3.1 above it can be seen that the site can be categorised as environmental zone E4. An E4 environmental zone, as shown in table 3.2, can have a maximum vertical illuminance of 25 lux before curfew* and 5 lux after curfew* with a maximum luminous intensity of 25000 candela before curfew* and 2500 candela after curfew*.

3.2.1.5. *Curfew is defined by the local authority for when a luminaire must be switched off. This is typically 11pm-7am.

4. Section four: Baseline conditions

Section four: Baseline conditions

4.1. Location

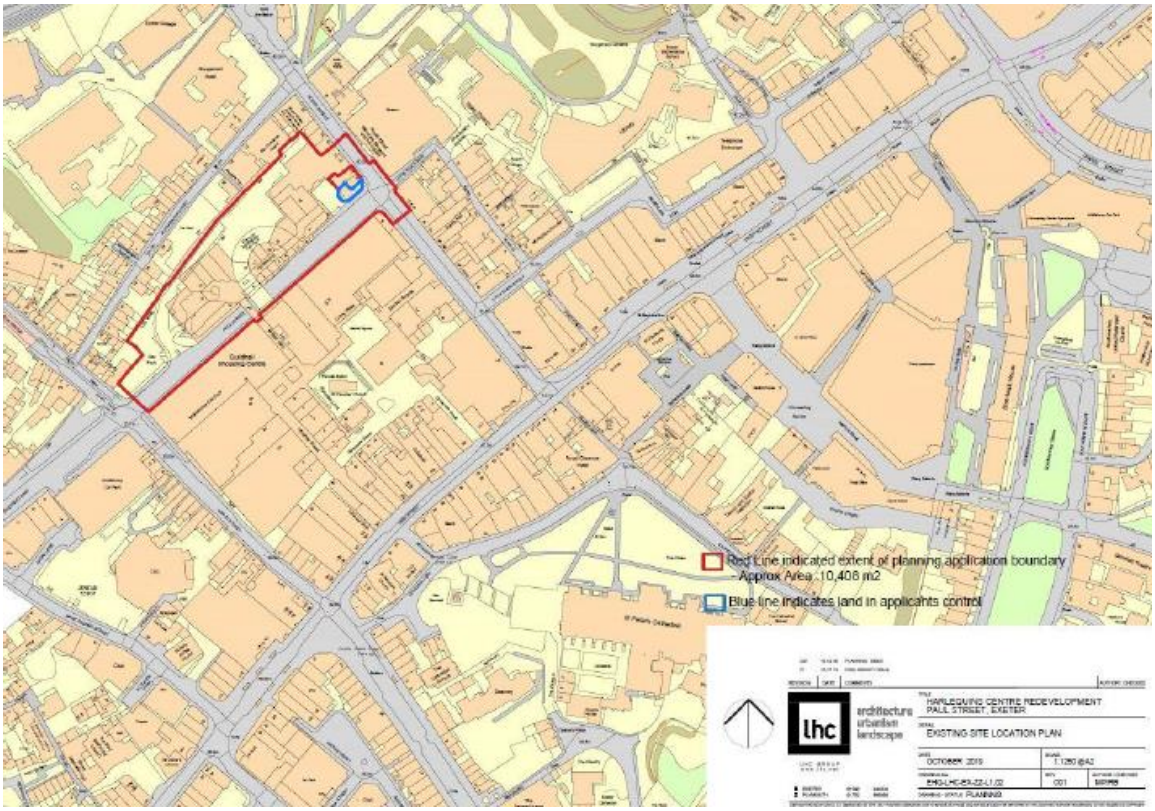
4.1.1.1. The site is located close to the centre of Exeter, with Paul St. to the South-East and Queen St. to the North-West.

4.1.1.1.1. The site is bordered to the South-East by the Guildhall Shopping Centre, a large multi retail development with multi-storey carpark.

4.1.1.2. To the North-East of the site is Queen Street, a busy high street with retail, fast food outlets and a large hotel.

4.1.1.3. Residential properties are located to the South-West of the proposed development site.

4.2. Site location plan



4.3. Existing Site & surroundings

4.3.1.1. The site is bordered to the North-East by Queen Street, a busy high road with retail, fast food outlets and a large hotel.

Photo 4.1 – Queen St

Photo 4.2 – Queen St

4.3.1.2. To the South-East of site is Paul Street a busy link road providing access to both the Harlequin Centre and Guildhall shopping centre. The street is currently lit via wall mounted flood lighting.

Photo 4.3 – Paul Street

Photo 4.4 – Paul Street

4.3.1.3. To the North-West of the proposed development is Iron Bridge road, which includes some residential and retail premises.

Photo 4.5 – Iron Bridge road

Photo 4.6 – Iron Bridge road

4.3.1.4. The existing residential properties, adjacent to Iron Bridge, are partially shaded by trees and a wall) approximately 3m high) offers some shading to the properties on Northerhay Street.

Photo 4.7 – Iron Bridge residential

Photo 4.8 – Service road

4.3.1.5. To the North-West rear of the site is the service road serving the Harlequin Centre.

Photo 4.9 – Harlequin service road

Photo 4.10 – Harlequin service road

4.4. Site measurements

4.4.1.1. The following site measurements were taken during a site visit attended by Malcolm Hollis engineer, Stephen O'Neill MIET, MCIBSE (Associate) on the 10th October 2019. The lux level readings, tabled below and to be read in conjunction with Fig 5.1, were taken between 8pm and 9pm. At the time of taking readings the weather was dry and overcast.

Fig 4.1 measurement position reference points

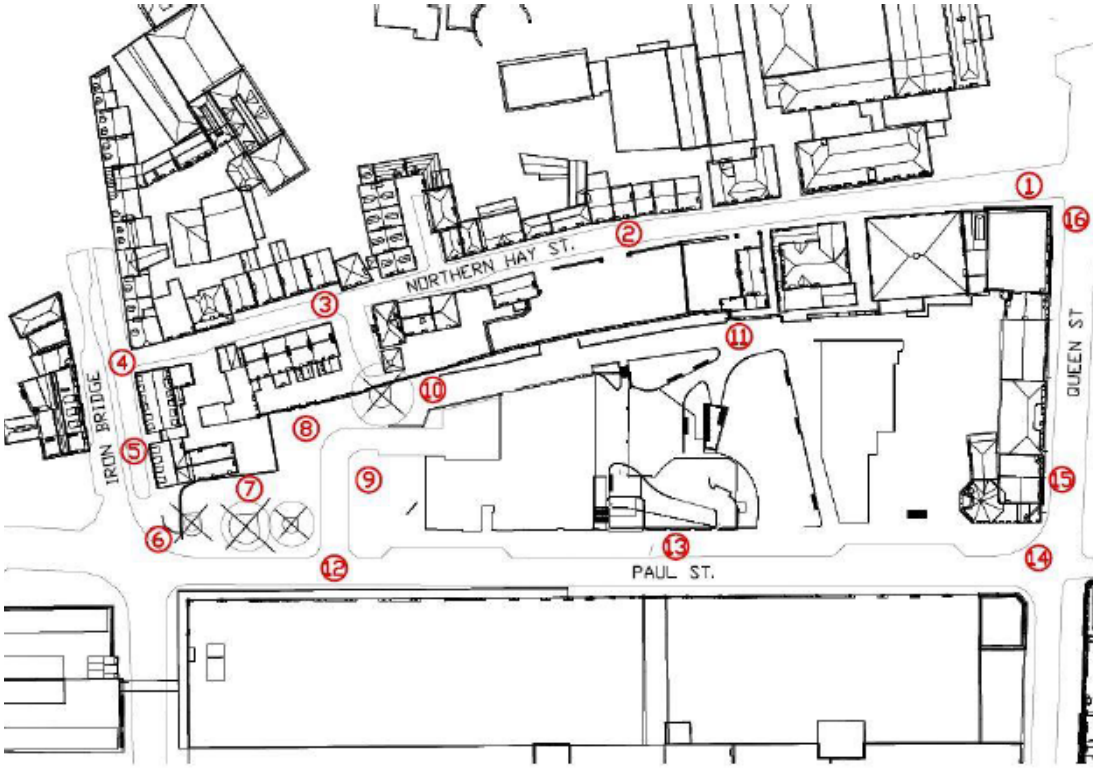


Table 4.1 – measured illuminance

Ref	Measurement position	Measured illuminance (Lux)
1	Northernhay Street	1.8
2	Northernhay Street	8.0
3	Northernhay Street	5.1
4	Northernhay Street/Iron Bridge junction	11.6
5	Iron Bridge	7.0
6	Iron Bridge/Paul Street	18.0
7	Paul Street (external carpark)	1.2
8	Harlequin entrance Paul Street road	6.0
9	Harlequin entrance road	8.0
10	Service road	2.1
11	Service road	11.0
12	Harlequin entrance road/ Harlequin entrance road junction	12
13	Paul Street	11.7
14	Paul Street/Queen St junction	16.3
15	Queen Street	12.0
16	Queen Street	20.4

5. Section five: Proposed lighting

5.1. Proposed lighting

5.1.1.1. This section of the report is based upon the proposed lighting design, produced by Hydrock Engineering Design Consultancy.

5.1.1.2. Site lighting

5.1.1.3. The general lighting design to the site, as designed by Hydrock is made up of the following elements:

5.1.1.4. Main buildings – incorporating 18W, 1833 lumen, wall mounted external LED luminaires with direct (downward) output and 15W, 1019 lumen, in-ground LED up-light luminaires illuminating the building facades.

5.1.1.5. External circulation areas – incorporating 50W, 7681 lumens, 4m column mounted LED luminaires and 16W, 826 lumen LED bollard luminaires.

5.1.1.6. Wall recessed luminaires to steps and ramps.

5.1.1.7. All proposed luminaires are to be controlled via photocell c/w timer override facility to prohibit out of normal hours operation.

6. Section six: Impact assessment

6. Impact assessment

6.1. Results

6.1.1.1. The table 6.1 below details the calculated maximum illuminance for each measurement position as denoted in table 4.1 above.

Table 6.1 - Calculated maximum illuminance

Ref	Measurement position	Measured illuminance (Lux)	Calculated max. illuminance (Lux)
1	Northernhay Street	1.8	1.8
2	Northernhay Street	8.0	8.0
3	Northernhay Street	5.1	5.1
4	Northernhay Street/Iron Bridge junction	11.6	11.6
5	Iron Bridge	7.0	7.0
6	Iron Bridge/Paul Street	18.0	18.0
7	Paul Street (external carpark)	1.2	1.7
8	Harlequin entrance Paul Street road	6.0	6.5
9	Harlequin entrance road	8.0	8.0
10	Service road	2.1	2.1
11	Service road	11.0	11.0
12	Harlequin entrance road/ Harlequin entrance road junction	12	12.5
13	Paul Street	11.7	12.2
14	Paul Street/Queen St junction	16.3	16.8
15	Queen Street	12.0	12.0
16	Queen Street	20.4	20.4

6.2. Light spill & maximum building luminance

6.2.1.1. The final internal lighting designs were not available to aid the production of this report. However, Hollis have created a lighting design model to calculate the internal lighting to the property. This calculation has been based upon 150 lux maintained throughout as recommended by the Institute of Light and Lighting (ILP) – Lighting Handbook, table 15.2.

6.2.1.2. Our calculations conclude that the internal light spill will produce a negligible illuminance of 0.5 lux at the boundary of the proposed development. This is due to the distance to of the Harlequin Centre development and residence. It should be noted that the revised design has omitted a number of windows facing Northernhay Street. This has had minimal effect on the results of the re-calculation as the effects were negligible anyway however, the reality of this change is that whatever effect these windows wold have, have been reduced. As such, the revised proposal is an improvement on the previous design.

6.2.1.3. The results of this calculation are included within Table 6.1 – calculated maximum illuminance above.

6.2.1.4. Our calculations also show that a maximum building illuminance of 1 cd/m2 will be emitted from the window of this development. This is well within the guidance illuminance of 5 cd/m2 as indicated on the Table 3.2 – ILP GN01 maximum illuminance on windows.

6.3. Conclusion

6.3.1.1. The proposed lighting designs have taken in to consideration the effects of glare and light spill in accordance with the Society of Light and Lighting (SLL) handbook and the Institute of lighting professionals (ILP) guidance note 1 on obtrusive light (GN01).

6.3.1.2. In many areas, particularly to the North, East and West boundaries to the site, there is no predicted increase in lux levels. This is due to the size of the site and distance from the new lighting installations.

6.3.1.3. The greatest lux level increase will be to Paul Street. The calculated light spillage will increase lux levels to around 0.5 lux, however, these figures may include existing illuminance from the existing Harlequin car park and external flood lighting surrounding the development. The likelihood is that the revised development will reduce lux levels to the surrounding site.

6.3.1.4. The lighting had been designed carefully to reduce any impact to surrounding residents, however, it is recommended that up-light luminatres are reviewed so as to reduce any light pollution.

6.3.1.5. It can be seen from the above figures that the lighting spillage to residential properties surrounding this site are all well within the 5 lux maximum illuminance permitted and the luminous intensity is anticipated to be less than 2500 cd/m2 as required in table 3.2 above.

6.3.1.6. The results of the analysis indicate that the proposed development is in compliance with the Society of Light and Lighting (SLL) handbook and the Institute of Lighting Professionals (ILP) guidance note 1 on obtrusive light (GN01). Therefore, it is not anticipated that the development will cause nuisance light spill or glare to the surrounding residence.

Appendix A

Proposed Lighting design

Luminaire Schedule							
Index	Manufacturer	Luminaire Type	Luminous Flux	Mounting height(m)	Connected Load	Colour Temp (K)	Image
W1	Thorn	Aquaforce Pro	5180 Lm	Within Public Footbridge	42 W	3000	
X1	Thorn	D-CO LED	608 Lm	Inground	12 W	3000	
X2	Fagerhult	Opalume	7681 lm	4	50.3W	3000	
X3	Thorn	Urba Bollard LED	826 Lm	1	16 W	3000	
X4	Thorn	Satin 2 LED	1019 Lm	Inground	15 W	3000	
X5	Thorn	Alumet LED	1709 Lm	4	21 W	3000	
X7	Thorn	Piazzall LED	1844 Lm	2.7	16 W	3000	
X8	Bega	24313	4381 lm	Stair/Ramp	31.6W	3000	
X9	Thorn	Linn LED	436 Lm	Stair/Ramp	11.3 W	3000	

Design Criteria			
#	Name	Average	Uo
1	Pedestrian Walkway 1	5 Lux	0.25
2	Road to Underground Parking	10 Lux	0.25
3	Urban Oasis Garden	20 Lux	0.25
4	Courtyard Garden	20 Lux	0.25
5	Walk path 1	5 Lux	0.25
6	Walk path 2	5 Lux	0.25
7	Stairs/Steps	50 Lux	0.25
8	Footbridge (Internal)	150 Lux	0.5

KEY PLAN

ISOLINE

0.5 Lux
1 Lux
5 Lux
10 Lux
20 Lux
50Lux

NOTES

1. ALL DIMENSIONS ARE TO BE CHECKED ON SITE BEFORE THE COMMENCEMENT OF WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS' AND SERVICE ENGINEERS' DRAWINGS AND SPECIFICATIONS. THIS DRAWING IS COPYRIGHT.
3. PLEASE REFER TO LUMINAIRE SCHEDULE FOR LUMINAIRE TYPES, COLUMN HEIGHT AND QUANTITIES ON THE DRAWING WITH THE TABLE PROVIDED.
4. BUILDING MOUNTED LUMINAIRES SHALL BE PROVIDED WITH A PHOTOCELL.
5. LIGHTING TO BE IN LINE WITH BS EN 12464-2 STANDARDS & LIGHTING GUIDE 6 FOR OUTDOOR PLACES.
6. EXTERNAL LIGHTING CIRCUITRY TO BE CONFIRMED AT FURTHER DESIGN STAGES

REVISIONS

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P05	Suitable for Review & Comment					
	TD	07/05/20	CE	07/05/20	DB	07/05/20
P04	Suitable for Review & Comment					
	AP	24/10/19	GR	24/10/19	DB	24/10/19
P03	Suitable for Review & Comment					
	AP	26/09/19	GR	26/09/19	DB	26/09/19
P02	Suitable for Review & Comment					
	AP	20/09/19	GR	20/09/19	DB	20/09/19
P01	Suitable for Review & Comment					
	AP	27/06/18	GR	27/06/18	DB	27/06/18

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CLIENT

Curlew Alternative Asset Management

PROJECT

The Harlequins Centre

TITLE

Electrical Services
External Lighting Strategy
Ground Floor

HYDROCK PROJECT NO.	SCALE @ A0
C-09377	1 : 200
STATUS DESCRIPTION: SUITABLE FOR REVIEW & COMMENT	STATUS: S3
DRG NO. (PROJECT-ORIGINATOR-VOLUME-LEVEL-TYPE-ROLE-NUMBER): EHQ-HYD-XX-00-DR-ME-00010	REVISION: P05

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