LIGHTING ASSESSMENT REPORT

FOR

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Regional Distribution Centre
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AT

ASHBOURNE ROAD
BUXTON

SEM1190
APR 2023

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1. Introduction

This document forms the Lighting Assessment for the proposed Aldi foodstore associated access and landscaping works on development land at Ashbourne Road, Buxton. This document has been compiled by SEM Technology Ltd on the behalf of the applicant, Aldi Stores Ltd.

The proposed development includes a new 1,805m^2 ALDI retail store with approximately 153 car parking spaces and associated landscaping. A new 600m^2 Nursery and 4No 100m^2 retails units and 1No 200m^2 retail unit.

1.1 Local Panning Criteria

The following planning condition relates to lighting assessment.

"Condition 29 - No phase of development hereby approved shall be first occupied, until an external lighting scheme relating to that phase has been submitted to and approved in writing by the Local Planning Authority. Any artificial lighting associated with the development must conform to requirements to achieve compliance with the Obtrusive Light Limitations for Exterior Lighting Installations for Environmental Zone - E2 contained within Table 1 of the Institute of Light Engineers Guidance Notes for the Reduction of Obtrusive Lighting, GN01-21. No external lighting within any phase of development shall be installed except in accordance with the approved scheme. All external lighting shall be switched off between the hours of 2330 and 0700 on any day."

Subsequent information was issued to the team to assist in complying with the discharge of the condition.

Table 1 – Obtrusive Light Limitations for Exterior Lighting Installations

Environmental Zone	Sky Glow ULR [Max %](1)	Light Intrusion (into Windows) Ev [lux] (2)		Luminaire Intensity I [candelas] (3)		Building Luminance Pre-curfew (4)
		Pre- curfew	Post- curfew	Pre- curfew	Post- curfew	Average, L [cd/m2]
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

(1) **Upward Light Ratio –** Some lighting schemes will require the deliberate and careful use of upward light, e.g. ground recessed luminaires, ground mounted floodlights, festive lighting, to which these limits cannot apply. However, care should always be taken to minimise any upward waste light by the proper application of suitably directional luminaires and light controlling attachments.

(2) **Light Intrusion (into Windows)** – These values are suggested maxima and need to take account of existing light intrusion at the point of measurement. In the case of road lighting on public highways where building facades are adjacent to the lit highway, these levels may not be obtainable. In such cases where a specific complaint has been received, the Highway Authority should endeavour to reduce the light intrusion into the window down to the post curfew value by fitting a shield, replacing the luminaire, or by varying the lighting level.

(3) **Luminaire Intensity –** This applies to each luminaire in the potentially obtrusive direction, outside of the area being lit. The figures given are for general guidance only and for some sports lighting applications with limited mounting heights, may be difficult to achieve.

(4) **Building Luminance –** This should be limited to avoid over lighting, and related to the general district brightness. In this reference building luminance is applicable to buildings directly illuminated as a night-time feature as against the illumination of a building caused by spill light from adjacent luminaires or luminaires fixed to the building but used to light an adjacent area.

The developer needs to demonstrate compliance with these requirements, by supplying appropriate information on

- Sky glow
- Light trespass
- Source intensity
- Building luminance

The report will aim to satisfy this condition.

2. Lighting Design

The car park lighting design for this scheme has been based on Aldi's standards for security and safety of its staff and customers.

Aldi Stores utilise an average figure of 20-25Lux across the car park to satisfy the above requirements. The lighting manufacturer, Holophane, have been used to illuminate Aldi car parks for over 18 years and are a reputable company within the industry.

The lighting design proposal for the store at Buxton has the following design statistics

Table 2.1 – Design Statistics			
Description	**Average**	**Minimum**	**Min / Avg**
Car Park	21 lux	6 lux	0.29
Loading Bay	24 lux	12 lux	0.50
Road	20 lux	9 lux	0.45
Spill Calc	0 lux	0 lux	N/A

To achieve the lighting levels in table 2.1 the following quantities and types for light fittings have been used.

Table 2.2 – Luminaire, Column And Bracket Package			
Description	**Item Ref**	**Quantity**	**Catalogue**
Single Fitting	AY9	4	FTS.3.LA094.AY.C9
Column	AY9	4	FTSB.6.1S.SA42.LMZ.GV
Single Fitting	FW9	2	FTS.3.LA094.FW.C9
Column	FW9	2	FTSB.6.1S.SA42.LMZ.GV
Twin Fitting	FW9	16	FTS.3.LA094.FW.C9
Column	FW9	8	FTSB.6.2S.SA42.LMZ.GV

Additional notes to support the submission are

All fittings are LED and bat friendly.
All fittings dark sky compliant
All fittings have 0.9 maintenance factor.
All external lighting to be automatically controlled for prevention of operation during daylight hours (lux meter and timeclock) and shall have an average luminous efficacy of >70lms/cw
Lighting will not operate between 10:30pm - 06:00am
Fittings backing on to adjacent properties have back light shields to avoid nuisance glare.

The full Lux plot supplementing the above statistics can be seen in
Appendix A – SEM1190 - E06 Proposed External Lighting Lux Plot - Rev T1
Appendix D – Details of manufacturers fittings and columns

3. Design Compliance

For the design to comply we need to verify that the following are within the limits for an E2 – Environmental zone.

- Sky glow
- Light trespass
- Source intensity
- Building luminance

3.1 Sky Glow

The sky glow or URL (upward light ratio) for an E2 – Environmental zone is up to 2.5%
Holophane have used their in house calculator to determine this factor and based on the fittings to be used the ULR is 0% which can be used in any environmental zone, see Table 3.1 to demonstrate compliance.

HOLOPHANE

BREEAM P183-696 - ALDI BUXTON

Total Lumens	Installation ULR	Complies with environmental zones
185,318	0%	E0 & E1 & E2 & E3 & E4
Total Upward Lumens		
0		

CATALOGUE	ITEM REF	QUANTITY	LUMENS	POWER (W)	LLM/TcW	TOTAL LUMENS	TILT (°)	ULOR (%)	TOTAL UPWARD LUMENS
FTS.3.LA094.AY.C9	AY9	4	8,606	66	130	34,424	-	0	0
FTS.3.LA094.FW.C9	FW9	2	8,383	66	127	16,766	-	0	0
FTS.3.LA094.FW.C9	2FW9	16	8,383	66	127	134,128	-	0	0

Required LLM/TcW: 70
Permissible ULR %: E0: 0% E1: 0% E2: up to 2.5% E3: up to 5% E4: up to 15%

Environmental zone level is based solely on the ULR.
The information provided is based on the latest the Institute of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light and the latest BREEAM UK construction manual 2018. This assumes that all external lighting (except safety and security lighting) can automatically be switched off between 23:00 and 07:00. If safety or security lighting is required to be on during these hours, then it should comply with the levels recommended in the ILP guidance notes.
All values shown are the result of calculations derived from product specific photometry of luminaires positioned in a fixed relationship to each other and the statistical zone. In practice the values may vary due to tolerances in column installation, luminaire orientation, and surface reflectance, the substitution of alternative luminaires will not produce comparable results.

Table 3.1 - Excerpt taken from Holophane BREEAM calculator to determine ULR

3.2 Light Trespass

The light trespass level pre curfew for an E2 – Environmental zone is up to 5 Lux into windows. The 3D lighting plot identifies the lux levels on adjacent properties to highlight potential issues.
Please see Appendix B – SEM1190 - E08 Proposed Trespass Light Lux Plot - Rev T1

Table 3.2 – Light Trespass Statistics			
Description	**Average**	**Minimum**	**Min / Avg**
Vertical at the Aldi Facade	4 lux	0 lux	0.00
Vertical 4m at the Retail Units next to access Road	3 lux	1 lux	0.33
Vertical 4m at the Retail Units	2 lux	1 lux	0.50
Vertical 4m at the Retail Units	5 lux	2 lux	0.40
Vertical 7m at the Nursery	3 lux	0 lux	0.00
Vertical 7m at the Nursery next to access Road	3 lux	0 lux	0.00
Vertical 5m at the South Houses	1 lux	0 lux	0.00
Vertical 5m at the West Houses	0 lux	0 lux	N/A

There is an average of 1-0 Lux on all residential properties visible from the car park. This complies with the Light Trespass criteria.

The Nursery and Retail Units have averages between 5-3 Lux, these figures are within the criteria and are not residential properties, its envisaged the Nursery and Retail Units will have operating times generally within 08:00 and 18:00.

The light trespass level post curfew for an E2 – Environmental zone is up to 1 Lux into windows, however this will not be an issue as the car park lighting will be off from the hours of 22:30 to 6:00 inclusive.

3.3 Source intensity

The Source Intensity level pre curfew for an E2 – Environmental zone is up to 7,500 Candelas. The following excerpts from the manufacturers photometric data show fittings are 7,100cd and 5,222cd respectively. Both types are below the permitted values.

The Source Intensity level post curfew for an E2 – Environmental zone is up to 500cd, however this will not be an issue as the car park lighting will be off from the hours of 22:30 to 6:00 inclusive.

Please see Appendix C – SEM1190 – Photometric data

OUTDOOR PHOTOMETRIC REPORT
CATALOG: FTS.3.LA094.FW

AcuityBrands.

Manufacturer:	HOLOPHANE EUROPE LIMITED
Test #:	LTL23286P42 - SUM19030
Test Lab:	ACUITY BRANDS LIGHTING - CONYERS LAB - SCALED PHOTOMETRY
Test Date:	13 Nov 2019
Catalog:	FTS.3.LA094.FW
Description:	FACTOR STREETLIGHT
Lamp Catalog:	LA094
Lamp:	LED C.9000LM-4000K
Lamp Output:	Total luminaire Lumens: 8383.4, absolute photometry *
Input Wattage:	66
Luminous Opening:	Rectangle (L: 0.28M, W: 0.25M)
Max Cd:	7,100.4 at Horizontal: 25°, Vertical: 72.5°
Roadway Class:	SHORT, TYPE IV

OUTDOOR PHOTOMETRIC REPORT
CATALOG: FTS.3.LA094.AY

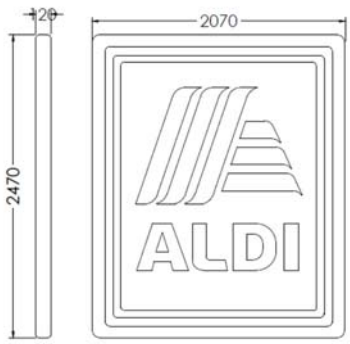
Manufacturer:	HOLOPHANE EUROPE LIMITED
Test #:	ISF 34282P5
Test Lab:	ACUITY BRANDS LIGHTING - CONYERS LAB - SCALED PHOTOMETRY
Test Date:	14 Nov 2019
Catalog:	FTS.3.LA094.AY
Description:	FACTOR STREETLIGHT
Lamp Catalog:	LA094
Lamp:	LED C.9000LM-4000K
Lamp Output:	Total luminaire Lumens: 8885.2, absolute photometry *
Input Wattage:	66
Luminous Opening:	Rectangle w/Luminous Sides (L: 0.14M, W: 0.24M, H: 0.01M)
Nema Type:	7 X 7
Max Cd:	5,222.4 at Horizontal: 57.5°, Vertical: 70°
Roadway Class:	MEDIUM, TYPE III

3.4 Building Luminance

The building Luminance level pre curfew for an E2 – Environmental zone less than 5 cd/m². There are no light fittings installed to illuminate the building. The 3D lighting plot and Table 3.2 identifies the lux levels on the Aldi façade from the car park lighting. The average on the façade is 4 Lux, which would be 4cd from 1m away.

Please see Appendix B – SEM1190 - E08 Proposed Trespass Light Lux Plot - Rev T1

The only other building lights are the Aldi Logo's, Please see below, the average of the logo's is 50.86 cd/m² this would give a light intensity of 2 Lux at 5m which is within the limits and would not cause any glare issues to adjoining properties.



ILLUMINATED BY LED'S

(Sign projects 137mm from the building)

Single faced wall mounted sign. High quality fabricated aluminium signcase, finished RAL 7016 Anthracite Grey. Sign panel is polycarbonate with screen-printed 5 colour foil logo. Signs are fully internally illuminated by LED's.

PANTONE	CMYK EQUIVALENT	AVG. CANDELAS / m²	ALLOWANCE +/-
1. PANTONE 7548	0C 12M 98Y 0K	92	10%
2. PANTONE 3564	0C 61M 100Y 0K	60	12%
3. PANTONE 2035	0C 97M 100Y 3K	28	12%
4. PANTONE 281	100C 85M 5Y 36K	2.2	5%
5. PANTONE 298	67C 2M 0Y 0K	15	5%
6. WHITE		108	5%
		50.86	