OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 8: Lighting
Appendix 8.5: Indicative Light Spill Diagrams

Document 6.8E

On behalf of
Oxfordshire Railfreight Limited

Prepared by DFL-UK Ltd
April 2025

DFL

· LIGHTING DESIGN · ELECTRICAL · SMART CITIES ·
ENERGY REDUCTION · LIGHTING IMPACT

CHAPTER 8 APPENDIX 8.5

INDICATIVE LIGHT SPILL DIAGRAMS

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Revision	**Purpose Description**	**Originated**	**Checked**	**Approved**	**Date**

Designs for Lighting (DFL) is a business built on successfully collaborating with our clients. We have over 20 years proven experience in our industry, listening to the challenges our clients face, developing the best solutions and being innovators in our specialism. Our role is to find the most effective and sustainable outcome to enhance and support your projects. We proudly work with recognised industry bodies to promote and shape the future of the industry and ensure our staff are trained to exceed the required competency levels of our industries. Above all, we ensure each project delivers against our values.

Quality

Knowledgeable

Dependable

Clear Advice

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1. INTRODUCTION

1.1. General

1.1.1. Indicative lighting calculation have been conducted for several areas of the Proposed Development. These focused on the:

- Main Site
- Rail Terminal

1.1.2. These locations has been used as they will contain the areas and tasks that would require the highest levels of lighting for safety purposes, and therefore provide a reasonable worst-case for the assessment of lighting effects for all areas of the Proposed Development.

1.1.3. Indicative Light Spill Diagrams have been created based on these calculations showing the spread of horizontal illuminance resulting from this lighting.

1.1.4. The light spill diagrams show levels of light spill at 0.2 Lux only as this is the point at which the illuminance levels fall within the boundary of natural variation, or "complete darkness"[1].

[1] Institution of Lighting Professional and Bat Conservation Trust, Guidance Note 8, Bats and Artificial Lighting At Night, Paragraph 4.54, Page 38

2. INDICATIVE LIGHT SPILL DIAGRAMS

2.1. Main Site – Indicative Light Spill Diagram

	Luminaire A	Luminaire B	Luminaire C	Luminaire D	Luminaire E
Type	Sabre 64LED 3k C2 1000mA UM SUG 42 0198 0000 100	Milano Classic-16LED-3k-C3 450 mA UMSUG 42 0081 0000 100	AXIA 3.2 5279 Integrated lenses 24 OSLON SQUARE GIANT@30...	AMPERA MAXI 5119 Flat glass 80 OSLON SQUARE GIANT@35...	AMPERA MINI 5240 Flat glass 2 4 OSLON SQUARE GIANT@55...
Lamp(s)	64 x 3k LED	16 x 3k LED	24 OSLON SQUARE GIANT@300 mA WW 730 230V	80 OSLON SQUARE GIANT@350 mA WW 730 230V	24 OSLON SQUARE GIANT@550 mA WW 730 230V
Lamp Flux (klm)	20.34	8.48	3.14	11.64	4.94
Maintenance Factor	1.00	1.00	1.00	1.00	1.00
No. in Project	502	71	26	16	5

PROJECT NAME:
Oxford SRFI

PROJECT No:
1760-DFL-ELG-XX-LD-EO-13001

SCALE: **1:1250**
DATE: **24 April 2025**

DESIGNER: **DFL-UK (JP)**

Indicative light spill diagram.
> Not for construction.
> Initial light levels shown.
> Light spill diagram does not consider blocking or shading effects of light limiting objects and represents worst-case horizontal light spill at ground floor level.
> Light spill diagram to be read in conjunction with ES Chapter 8: Lighting

Isolux contours shown:
0.2 Lux: Red

Page Size: A0
Scale: 1:1250

CHECKED BY: **DS**
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REVISION: **P01**
SUITABILITY: **S3**

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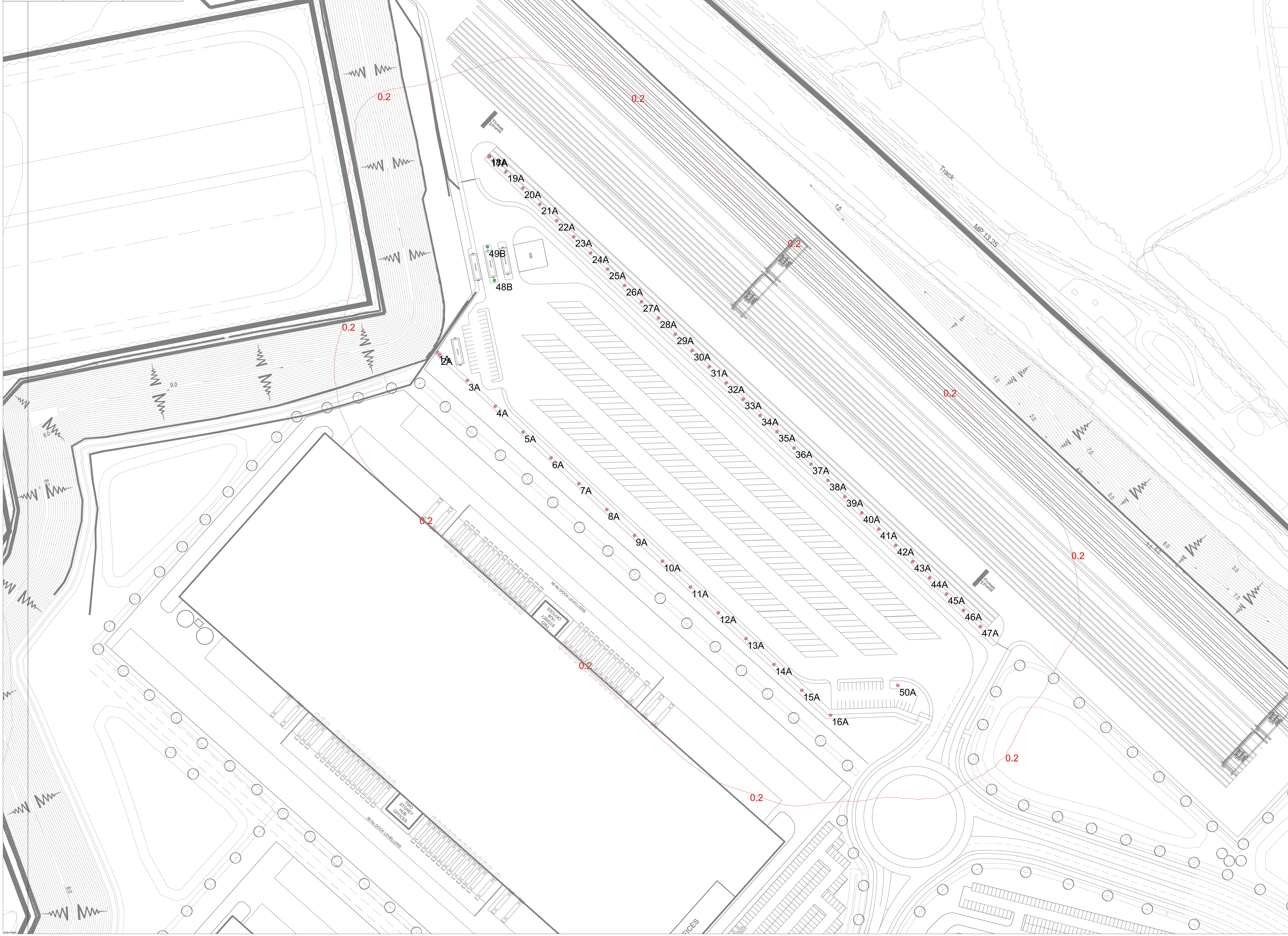
2.2. Rail Terminal – Indicative Light Spill Diagram

	Luminaire A	Luminaire B
Type	BVP651 DX50	BVP651 DX50
Lamp(s)	LED-HB 5.1S	LED-HB 5.1S
Lamp Flux (klm)	44.00	44.00
Maintenance Factor	1.00	1.00
No. in Project	48	2



PROJECT NAME:
Oxford SRFI

PROJECT No:
1760-DFL-ELG-XX-LD-EO-13002

SCALE: **1:1000**

DATE: **24 April 2025**

DESIGNER: **DFL-UK (JP)**

Indicative light spill diagram.
> Not for construction.
> Initial light levels shown.
> Light spill diagram does not consider blocking or shading effects of light limiting objects and represents worst-case horizontal light spill at ground floor level.
> Light spill diagram to be read in conjunction with ES Chapter 8: Lighting

Isolux contours shown:
0.2 Lux: Red

Page Size: A1
Scale: 1:1000

CHECKED BY: **DS**

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REVISION: **P01**

SUITABILITY: **S3**

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TECHNICAL DESCRIPTIONS, DEFINITIONS & ABBREVIATIONS

Obtrusive Light: refers to excessive or bothersome artificial light that goes where it shouldn't, causing discomfort and disruption. *Spill light which because of quantitative, directional or spectral attributes in a given context gives rise to annoyance, discomfort, distraction or reduction in the ability to see essential information.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Sky glow: When lights are directed upwards or light is scattered by particles in the air, like dust or water droplets, it creates a glow that makes it hard to see stars. *The increase in diffuse illuminance of the night sky above that produced by natural sources such as the moon and visible star.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Vertical Illuminance: is how much light lands on upright surfaces like walls. It's measured in lux or footcandles and matters for places where the view from a vertical angle is important. *Lighting of vertical surfaces such as walls, windows, statues, sculptures and people's faces*. CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Correlated colour temperature (CCT): the appearance of light emitted by a light source measured in Kelvin (K), Lower CCT values such as 2700K represent warmer, more yellowish light, *similar to the light from older incandescent lamps. (Tcp)The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions, measured in absolute temperature on the kelvin (K) scale.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lux: measures the brightness of light as perceived by the human eye at a specific point on a surface. *The SI derived unit of illuminance, measuring luminous flux per unit area (1 lux =1 lumen/m2).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lumens: measure how bright a light appears to our eyes. *The SI derived unit of luminous flux; a measure of the total quantity of visible light emitted by a source or received by a surface (unit: lumen).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Glare: refers to an excess of bright light that makes you uncomfortable or hinders your vision. It happens when there's a big difference between a bright light and the rest of the surroundings. *Glare: condition of vision in which there is discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or by extreme contrasts.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.1.8

Luminous intensity: is light brightness or how intense the light source is. light intensity is how intense a light source is emitted or received in a particular direction, this is measured candelas and is termed as luminous intensity *Iv <of a source, in a given direction> quotient of the luminous flux, dΦv, leaving the source and propagated in the element of solid angle dΩ containing the given direction, by the element of solid angle (unit: cd =lm · sr -1.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.2.

Candela: is a measurement for the brightness of a light source, taking into account the direction in which the light is emitted. *Base unit of luminous intensity in the International System of Units (SI); the luminous power per unit solid angle emitted by a point light source in a particular direction.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Uniformity (Uo): is an explanation for the even distribution of light across an area or surface. *The overall uniformity shall be calculated as the ratio of the lowest luminance, occurring at any grid point in the field of calculation, to the average luminance.* BS EN 13201-3-2015, Calculation of Performance Section 8.3.

Luminance: is how bright a surface appears to our eyes. It considers the light coming from or reflected by an object. *Lv <in a given direction, at a given point of a real or imaginary surface> quantity defined by the formula (unit: cd · m-2 = lm · m-2 · sr-1)* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.3.

Illuminance is how much light lands on a surface per square meter. It's measured in lux. More lux means a brighter area. *Ev (unit: lx = lm · m-2) 1. <at a point of a surface> quotient of the luminous flux dΦv incident on an element of the surface containing the point, by the area dA of that element 2. <at a point of a surface> equivalent definition: integral, taken over the hemisphere visible from the given point, of the expression.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.10.

Luminaire: a light fixture, this is also sometimes referred to as a lantern or a light fitting, is a product that produces artificial light. *apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.3

ULOR: upward light output ratio or ULOR refers to the amount of light the light fixture will produce upwards as a percentage of its total light output. *RULO <of a luminaire> ratio of the upward luminous flux of the luminaire, measured under specified practical conditions with its own lamp(s) and equipment, to the sum of the individual luminous fluxes of the same lamp(s) when operated outside the luminaire with the same equipment, under specified conditions* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.12.

Maintenance factor (MF): is an allowance for how well the lights keep working overtime. It considers things like dirt on the light fittings and "wear and tear". *DEPRECATED: light loss factor ratio of illuminance produced by the lighting installation after a certain period to the illuminance produced by the installation when new Note 1 to entry: The term depreciation factor has been formerly used to designate the reciprocal of the above ratio. Note 2 to entry: The maintenance factor takes into account light losses caused by dirt accumulation on luminaires and room surfaces (in interiors) or other relevant surfaces (in exteriors, where appropriate), and the decrease of the luminous flux of lamps*. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.5.18.

***Tilt**: is how much the luminaire is lifted based on the fitting facing flat to the ground.*

***Outreach:** how far away the fitting is from the column/wall its mounted on to the light source*.

THE POWER TO MAKE LIGHT WORK

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