East Midlands Gateway
Phase 2 (EMG2)

Document DCO 6.11B/MCO 6.11B

ENVIRONMENTAL STATEMENT

Technical Appendices

Appendix 11B

Lighting Baseline Assessment

October 2025

11

The East Midlands Gateway Phase 2
and Highway Order 202X and The East Midlands Gateway
Rail Freight and Highway (Amendment) Order 202X

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EAST MIDLANDS GATEWAY

CHAPTER 11 APPENDIX 11B

LIGHTING BASELINE ASSESSMENT

DOCUMENT DCO/MCO 6.11B

[redacted]

DFL-UK
17 City Business Centre, Hyde Street, Winchester, SO23 7TA
+44(0)1962 855080 | info@dfl-uk.com | [redacted]

ILP INSTITUTION OF LIGHTING PROFESSIONALS

nqa ISO 9001 QUALITY MANAGEMENT 0015 UKAS MANAGEMENT SYSTEMS

HEA Highway Electrical Association

PROJECT NUMBER: 2389		DOCUMENT REF: 2389-DFL-ELG-XX-RP-EO-13002			
P04	Final Issue	DS	AS	AS	14/08/2025
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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.

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1. INTRODUCTION

1.1. Executive Summary

1.1.1. This Lighting Baseline Assessment has been written by DFL (Designs for Lighting Ltd[1]), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.

1.1.2. This Lighting Baseline Assessment forms an Appendix to **Chapter 11 (Document DCO/MCO 6.11A)** of the Environmental Statement and must be read in conjunction with this document.

1.1.3. This report outlines the following:

- The desktop assessment of the EMG2 Project and Environmental Zone assessment,
- EMG2 Main Site Lighting Baseline Survey results, and
- Desktop assessment of the EMG1 Works and Highway Works lighting baseline.

[1] [redacted]

2. ENVIRONMENTAL ZONE ASSESSMENT

2.1. Introduction

2.1.1. This section details the desktop assessment that has been carried out to gain an understanding of the area surrounding the EMG2 Project, and includes:

- Assessment of the surrounding area and context, including any designated sites and areas that include existing lighting,
- Desktop assessment of the environmental zone relevant to the EMG2 Project, and

2.1.2. The full description of the **EMG2 Project can** be found in **Chapter 2 (Document DCO/MCO 6.2) and Chapter 3 (Document DCO/MCO 6.3)** of the ES.

2.2. Designations

2.2.1. According to Natural England the EMG2 Project is not located within or near an AONB[2] (National Landscapes), a National Park[3], a designated SAC[4], or a Local Nature Reserve[5].

2.2.2. The closest SSSI[6] to the EMG2 Project identified by Natural England is the Oakley Wood SSSI, which is approximately 2.6km south of the EMG2 Project.

2.2.3. There is an area of Ancient Woodland[7] approximately 150m from the proposed Highways works on the A453. This is March Covert and is home to Delta Force Paintball Nottingham.

2.2.4. No additional designated sites are identified by North West Leicestershire District Council in their Policies Maps.

2.3. Local Character

2.3.1. The areas within and surrounding the EMG2 Project are classified as countryside within North West Leicestershire District Council policies maps, with this countryside being interspersed with rural and suburban development, the M1 and several A roads, the East Midlands Airport and the supporting commercial buildings including the existing East Midlands Gate development.

2.3.2. The local character of the area surrounding the EMG2 Project is broadly rural and is primarily used for agricultural purposes. However, it is likely that there is a significant presence of existing lighting within the landscape due to the:

- East Midlands Airport,
- Existing Highways and smaller lit roads, and
- Existing commercial uses.

2.4. CPRE Night Blight Mapping[8]

2.4.1. To inform our understanding of the night-time environment, we use CPRE Nightblight mapping to better understand the current baseline light levels surrounding the EMG2 Project. The CPRE Night Blight Mapping indicates that the levels of skyward radiance within the vicinity of the EMG2 Project is between 4 - >32 Nano Watts/cm²/sr (**Figure 1**).

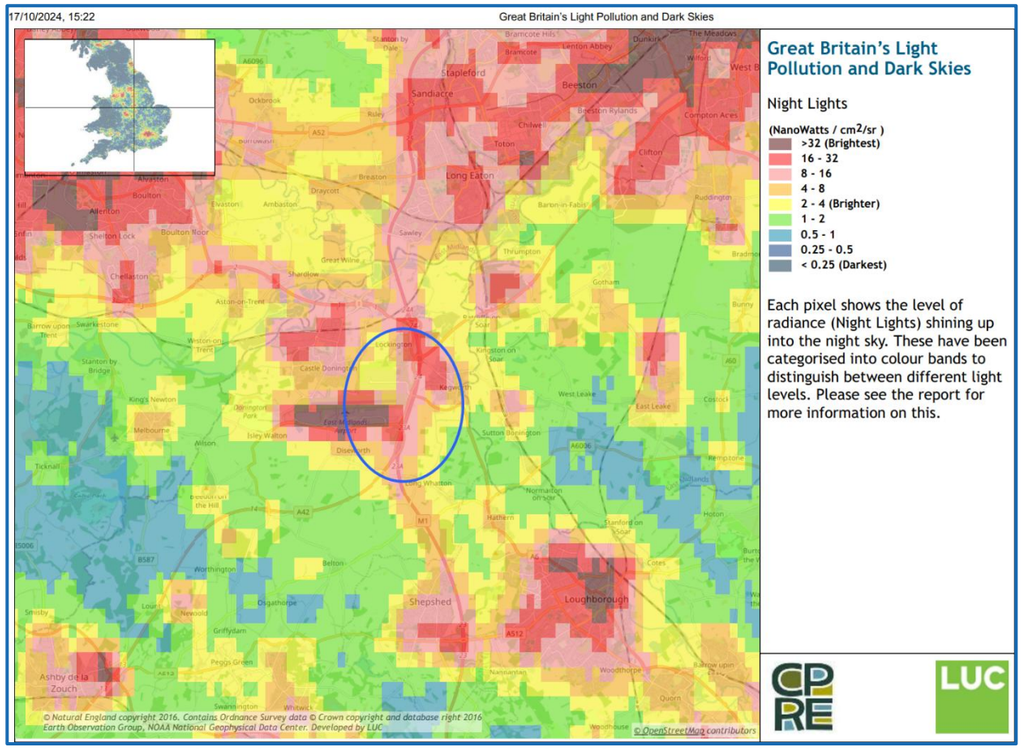


Figure 1: CPRE and LUC Skyward Radiance Mapping for the Wider Area Surrounding the Scheme.

2.4.2. The levels of skyward radiance shown in **Figure 1** indicates that the area surrounding the EMG2 Project contains a large volume of existing artificial lighting, with this likely being most concentrated on the orange to red areas.

2.4.3. These levels of skyward radiance over such a wide area indicates that the EMG2 Project and surrounding area could be classified as an E3 environmental zone; as this is typical of well inhabited rural and urban settlements, small town centres or suburban locations.

[2] Natural England: Areas of Outstanding Natural Beauty (England)
[3] Natural England: National Parks (England)
[4] Natural England: Special Areas of Conservation (England)
[5] National England: Local Nature Reserves (England)
[6] Natural England: Sites of Special Scientific Interest (England)
[7] Natural England: Ancient Woodland
[8] NightBlight Map is a visual representation of light pollution as a view from above the earth's atmosphere and indicates upward light spill based on sky glow.

2.5. Environmental Zone Classification

2.5.1. The **EMG2 Project** and the surrounding areas have been assessed against the environmental zone description detailed within ILP GN01:2021 (**Table 1**).

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks.
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, 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 or suburban locations.
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity.

Table 1: Environmental Zone Descriptions

2.5.2. The wider area surrounding the EMG2 Project contains levels of skyward radiance that would typically be associated with town centres or cities, and implies the area is of medium – high district brightness. However, the majority of the land surrounding the EMG2 Project is rural in character and is primarily used for agricultural purpose, which is typical of sparsely inhabited rural areas. This means the area can be described as both an E2 or E3 environmental zone.

2.5.3. ILP GN01:2021 provides guidance on the selection of environmental zones in these situations:

"Where an area to be lit lies close to the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone"

2.5.4. As such the Lighting Impact Assessment for the EMG2 Project will assess the proposed lighting against the requirements of an E2 environmental zone (**Table 2**).

Zone	Surrounding	Examples	Limitations		Sky Glow ULR (Max)
			Pre-curfew	Post-curfew	
E2	Rural	Sparsely inhabited rural areas,Village or relatively dark outer suburban locations	5	1	2.5%

Table 2: Limitations of the environmental zone.

2.5.5. The assessment of the environmental zone for the EMG2 Project as E2 has been accepted by the Environmental Protection Team at North West Leicestershire District Council.

3. EMG2 LIGHTING BASELINE SURVEY

3.1. Overview

3.1.1. A Lighting Baseline Survey has been conducted for the EMG2 Main Site to provide details of the existing lit conditions on and surrounding the EMG2 Main Site. This focused on the proposed EMG2 area of the EMG2 Main Site.

3.1.2. The dates and conditions during the Lighting Baseline Survey are detailed in **Table 3**.

Date	Astronomical Twilight	Moon Phase	Weather Conditions (night)	Survey Start Time
18/08/2022	21:40	Third Quarter (57% visible)	Weather conditions were dry and the sky was partially overcast. Temperature: 15° Moonlight penetration through the clouds was moderate and intermittent.	21:40

Table 3: Lighting Baseline Survey Date and Weather Conditions

3.2. Survey Methodology

3.2.1. The Baseline Lighting Survey consisted of illuminance recordings within the EMG2 Main Site, as well as contextual photography that was taken both within and surrounding the EMG2 Main Site.

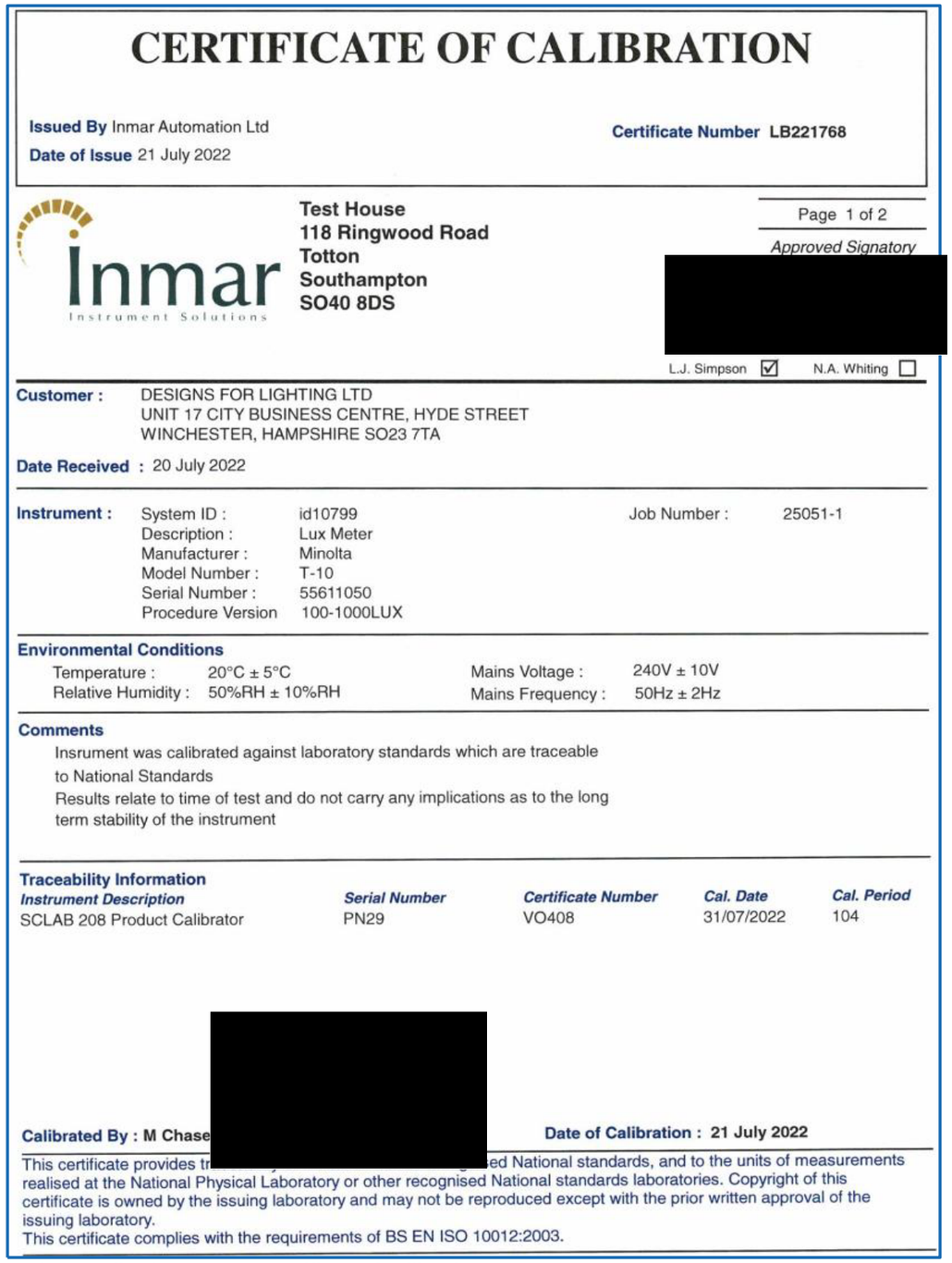
3.2.2. This was done to build an understanding of the existing lit conditions of the EMG2 Main Site, and what lighting is present in the surrounding area.

3.2.3. Illuminance measurements were taken in the horizontal plane with the illuminance meter being placed on the ground above the measurement point, and in the vertical plane at approximately 1.5m in height facing north, east, south, and west. This totalled 5 illuminance readings per measurement location.

3.2.4. Measurements were taken using a Konica Minolta T-10A illuminance meter (serial number: 55611050) which had a current calibration certificate at the time of the survey (**Figure 2**).

3.2.5. Night-time photography was recorded using the guidance document ILP GN010:2019. This was done at locations across the EMG2 Main Site and in key locations outside the EMG2 Main Site.

3.2.6. A DSLR camera was used, and this was mounted on a tripod.



CERTIFICATE OF CALIBRATION

Issued By Inmar Automation Ltd
Date of Issue 21 July 2022
Certificate Number LB221768

Inmar Instrument Solutions
Test House
118 Ringwood Road
Totton
Southampton
SO40 8DS

Page 1 of 2
Approved Signatory
[redacted]
L.J. Simpson ☑ N.A. Whiting ☐

Customer : DESIGNS FOR LIGHTING LTD
UNIT 17 CITY BUSINESS CENTRE, HYDE STREET
WINCHESTER, HAMPSHIRE SO23 7TA

Date Received : 20 July 2022

Instrument :
System ID : id10799
Description : Lux Meter
Manufacturer : Minolta
Model Number : T-10
Serial Number : 55611050
Procedure Version 100-1000LUX
Job Number : 25051-1

Environmental Conditions
Temperature : 20°C ± 5°C
Relative Humidity : 50%RH ± 10%RH
Mains Voltage : 240V ± 10V
Mains Frequency : 50Hz ± 2Hz

Comments
Insrument was calibrated against laboratory standards which are traceable to National Standards
Results relate to time of test and do not carry any implications as to the long term stability of the instrument

Traceability Information

Instrument Description	Serial Number	Certificate Number	Cal. Date	Cal. Period
SCLAB 208 Product Calibrator	PN29	VO408	31/07/2022	104

[redacted]
Calibrated By : M Chase
Date of Calibration : 21 July 2022

This certificate provides tr[illegible]ed National standards, and to the units of measurements realised at the National Physical Laboratory or other recognised National standards laboratories. Copyright of this certificate is owned by the issuing laboratory and may not be reproduced except with the prior written approval of the issuing laboratory.
This certificate complies with the requirements of BS EN ISO 10012:2003.

Figure 2: Illuminance Meter Certificate of Calibration

3.3. Illuminance Results

3.3.1. Illuminance measurements have been recorded in the locations shown in **Figure 3**.

Figure 3: Illuminance Measurement Locations

3.3.2. The full set of illuminance results can be seen in **Table 4**.

Illuminance Measurement Results					
Reading number	**Eh**	**E_v North**	**E_v East**	**E_v South**	**E_v West**
1	2.10	3.50	1.60	0.20	0.20
2	2.80	3.90	0.74	0.24	1.67
3	1.16	1.54	0.89	0.15	1.03
4	0.79	1.16	0.90	0.12	0.57
5	0.82	1.20	0.30	0.10	0.31
6	0.40	0.55	0.47	0.07	0.27
7	0.21	0.44	0.28	0.05	0.19
8	0.14	0.29	0.20	0.04	0.19
9	0.20	0.46	0.12	0.05	0.17
10	0.09	0.12	0.05	0.01	0.05
11	0.09	0.12	0.05	0.02	0.01
12	0.07	0.09	0.05	0.02	0.03
13	0.05	0.07	0.05	0.01	0.06
14	0.04	0.08	0.05	0.01	0.02
15	0.01	0.04	0.03	0.02	0.02
16	0.02	0.02	0.01	0.02	0.01
17	0.01	0.02	0.02	0.02	0.00
18	0.02	0.00	0.02	0.00	0.00
19	0.01	0.02	0.00	0.02	0.00
20	0.03	0.02	0.02	0.03	0.00
21	0.15	0.36	0.08	0.04	0.13
22	0.22	0.35	0.02	0.04	0.16
23	0.02	0.03	0.02	0.00	0.00
24	0.02	0.03	0.02	0.02	0.02
25	0.02	0.04	0.03	0.01	0.01
26	0.01	0.03	0.03	0.01	0.01
27	0.03	0.02	0.02	0.01	0.02
28	0.02	0.00	0.04	0.04	0.02
29	0.02	0.03	0.03	0.01	0.03
30	0.03	0.06	0.04	0.03	0.00
31	0.04	0.06	0.06	0.05	0.05
32	0.01	0.03	0.05	0.03	0.02
33	0.03	0.05	0.05	0.05	0.02
34	0.09	0.23	0.04	0.02	0.08
35	0.08	0.26	0.16	0.03	0.05
36	0.06	0.08	0.04	0.02	0.00
37	0.11	0.12	0.08	0.04	0.07
38	0.12	0.12	0.08	0.06	0.07
39	0.10	0.07	0.07	0.04	0.03
40	0.06	0.04	0.03	0.04	0.04
41	0.10	0.09	0.02	0.05	0.03
42	0.10	0.09	0.11	0.07	0.05
43	0.13	0.09	0.12	0.08	0.03
44	0.14	0.13	0.13	0.07	0.07

Table 4: EMG 2 Illuminance Results

3.3.3. The maximum, minimum and average illuminance recorded in the lighting survey can be seen in **Table 5**.

Maximum, Minimum and Average Illuminance Recorded during the Lighting Baseline Survey	
	Illuminance
Maximum	3.90
Minimum	0.00
Average	0.20

Table 5: EMG2 Maximum, Minimum and Average Illuminance

3.3.4. The majority of the survey area is considered dark, with the majority of illuminance readings taken not exceeding 0.1Lux.

3.3.5. Some parts of the survey area are significantly brighter, particularly in the vicinity of the existing A453 – Hunter Road Roundabout, where readings exceed 3 lux in places.

3.3.6. The results shown in **Table 4** and **Table 5** are typical of rural locations that contain isolated areas of artificial lighting. This supports the assessment of the environmental zone as E2.

3.3.7. The illuminance results are supported by contextual photography that was recorded across the survey area. These are shown in **Section 3.4**.

3.4. Lighting Survey Photography

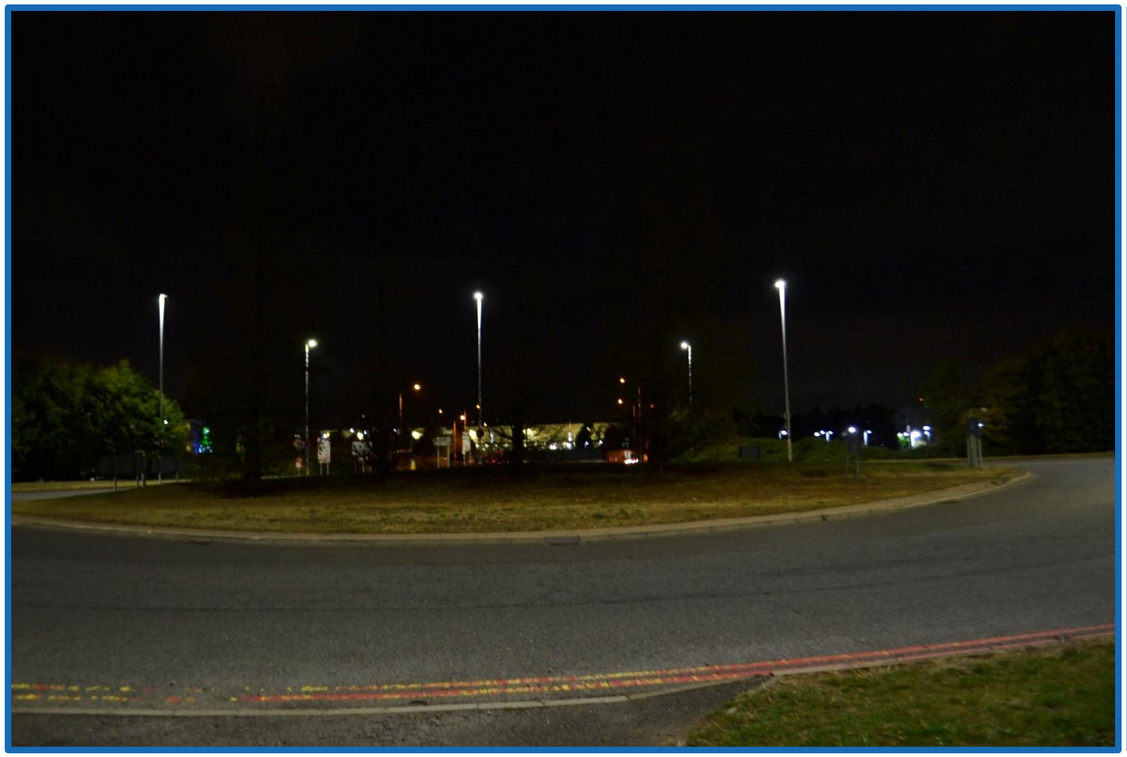


Figure 4: View of the A2453 Hunter Road Roundabout facing north

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 0.77 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

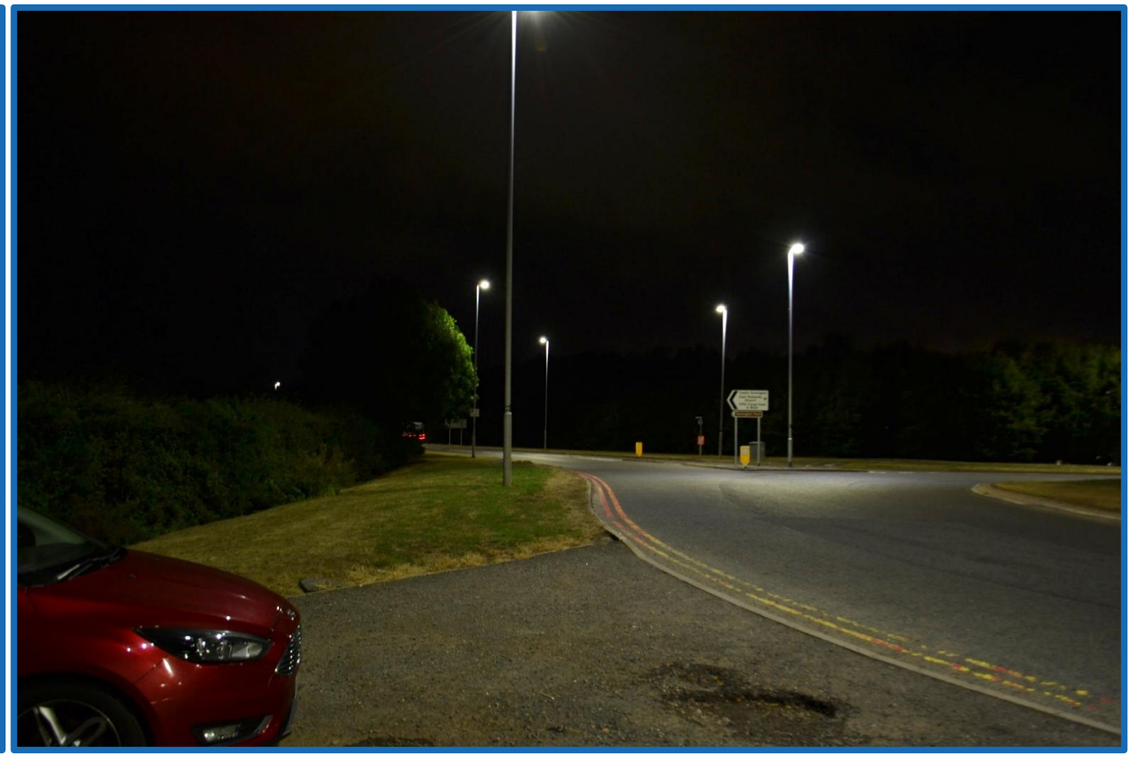


Figure 5: View of the A2453 Hunter Road Roundabout facing west

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 0.77 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 6: View of the A2453 Hunter Road Roundabout facing east

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 0.77 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 7: View of the A453 and the light spill entering the EMG2 Main Site from this road

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 1.6 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 8: View of the A453 and the light spill entering the EMG2 Main Site from this road

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 1.6 Second

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 9: View of the A453. The illumination of the clouds resulting from the East Midlands Airport can clearly be seen in this image

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 2 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 10: View of the A453. The illumination of the clouds resulting from the East Midlands Airport can clearly be seen in this image, along with the light spill into the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 3 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 11: View of the M1 from within the Scheme. The lighting associated with the slip roads can be seen in the centre and right of the image

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 3 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 12: View of the M1 from within the EMG2 Main Site. The lighting associated with the slip roads can be seen in the left the image

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 3 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 13: View of the M1 from within the EMG2 Main Site. The lighting associated with the slip roads can be seen in the centre and left of the image

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 3 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.7

Figure 14: Image of Halisham Road facing away from Cop Hall Roundabout

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 2.5 Seconds

ISO Speed: ISO-100

Focal Length: 20mm

Max Aperture: 3.8

Figure 15: View of the A453 from within the EMG2 Main Site. Lighting associated with the East Midlands Airport can also be seen in this image

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 2.5 Seconds

ISO Speed: ISO-100

Focal Length: 22mm

Max Aperture: 3.9

Figure 16: View facing south from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 2.5 Seconds

ISO Speed: ISO-100

Focal Length: 22mm

Max Aperture: 3.9

Figure 17: View facing south from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 4 Seconds

ISO Speed: ISO-100

Focal Length: 22mm

Max Aperture: 3.9

Figure 18: View of the M1 from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 6 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 19: View of the M1 from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/5.6

Exposure Time: 4 Seconds

ISO Speed: ISO-100

Focal Length: 55mm

Max Aperture: 5

Figure 20: View of the M1 from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 0.62 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

Figure 21: View of the M1 from within the EMG2 Main Site

Photograph Information:

Camera: NIKON D3100

F-stop: f/4.5

Exposure Time: 0.62 Seconds

ISO Speed: ISO-100

Focal Length: 18mm

Max Aperture: 3.6

4. EMG1 WORKS AND HIGHWAY WORKS LIGHTING BASELINE

4.1. Introduction

4.1.1. An assessment of the lighting baseline at EMG1 Works and the Highway Works has been undertaken via desktop assessment.

4.2. EMG1 Works Existing Lighting Assessment

4.2.1. The site of EMG1 Works are currently grass fields intersected by a lit roadway.

4.2.2. No existing artificial lighting has been identified within these fields, but there will be views of the currently installed lighting at the Railport, Intermodal Yard, East Midlands Airport and the commercial facilities currently in use by:

- DHL,
- Ceva Losistics
- Amazon
- Nestle (GXO), and
- Ceva Logistics

4.2.3. The illuminance levels for the above installed location will be similar to those that would be proposed for EMG1 Works and EMG2 Main Site. It is also likely to be compliant with BS 5489-1:2020, BS EN 13201-2:2015 and BS EN 12464-2:2014.

4.2.4. Based on the lack of artificial lighting within the EMG1 Works, but with the understanding that there is existing artificial lighting installed near these locations (**Figure 22**), it is likely that the lighting baseline levels within these location are similar to that of the proposed EMG2 Main Site location (**Table 4**).

4.2.5. This means that these locations are broadly dark but with some lighting spill emanating into the site, and that there are clear views of existing lighting from within these locations.

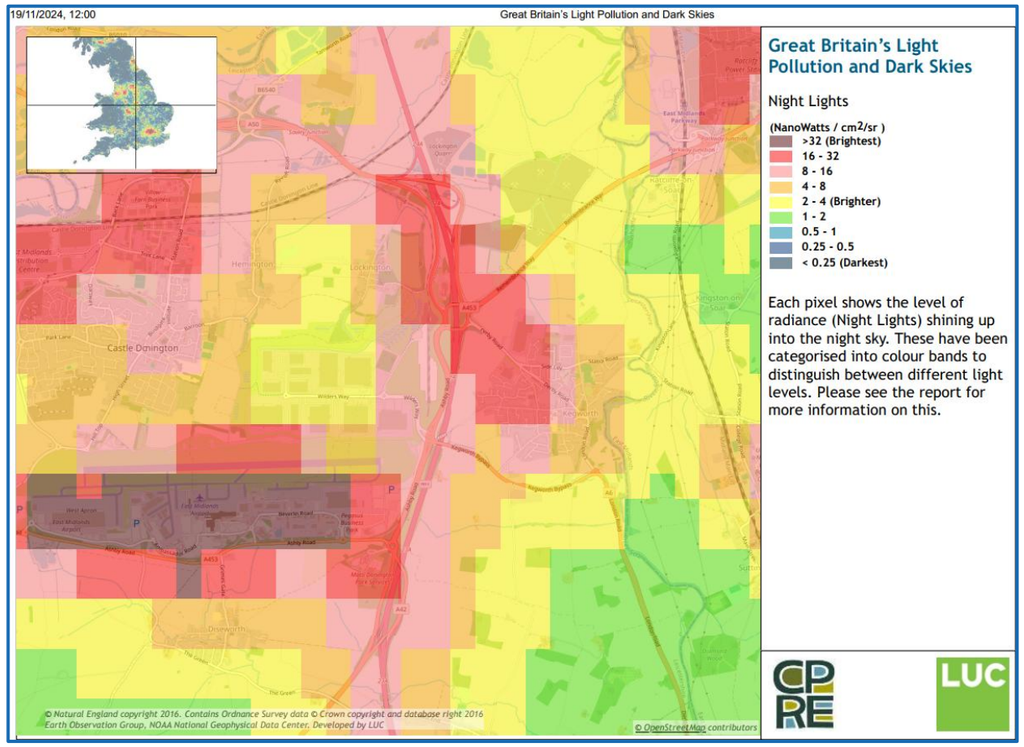


Figure 22: CPRE and LUC Skyward Radiance Mapping focused on EMG1 and EMG2 Plot 16

4.3. Highway Works Lighting Baseline

4.3.1. The following Highways and Roads have been identified as containing existing lighting:

- A42
- M1 (whole area of Order Limits).
- A453 South of Radisson Blu Hotel
- Finger Farm Roundabout
- Kegworth Interchange
- Derby Road
- A50
- Slip road to Derby Southern Bypass
- Grimes Gate in Diseworth only
- Hall Gate
- Lady Gate
- Wilders Way

4.3.2. The images contained in **Section 3.4** show examples of this lighting, providing evidence of the wide range of lighting equipment on these sections of highway and road. This equipment includes mixture of modern LED luminaires and high/low pressure sodium luminaires.

4.3.3. The following Highways and Roads have been identified as being unlit:

- A453 North of Finger Farm Roundabout
- A453 Remembrance Way (except approach to Kegworth Interchange)
- The Grn
- Grimes Gate outside of Diseworth
- Kegworth Bypass (except over M1)
- Ashby Road

4.3.4. **Figure 23** provides an indication of the distribution of external lighting across the road network within and surrounding the EMG2 Project.

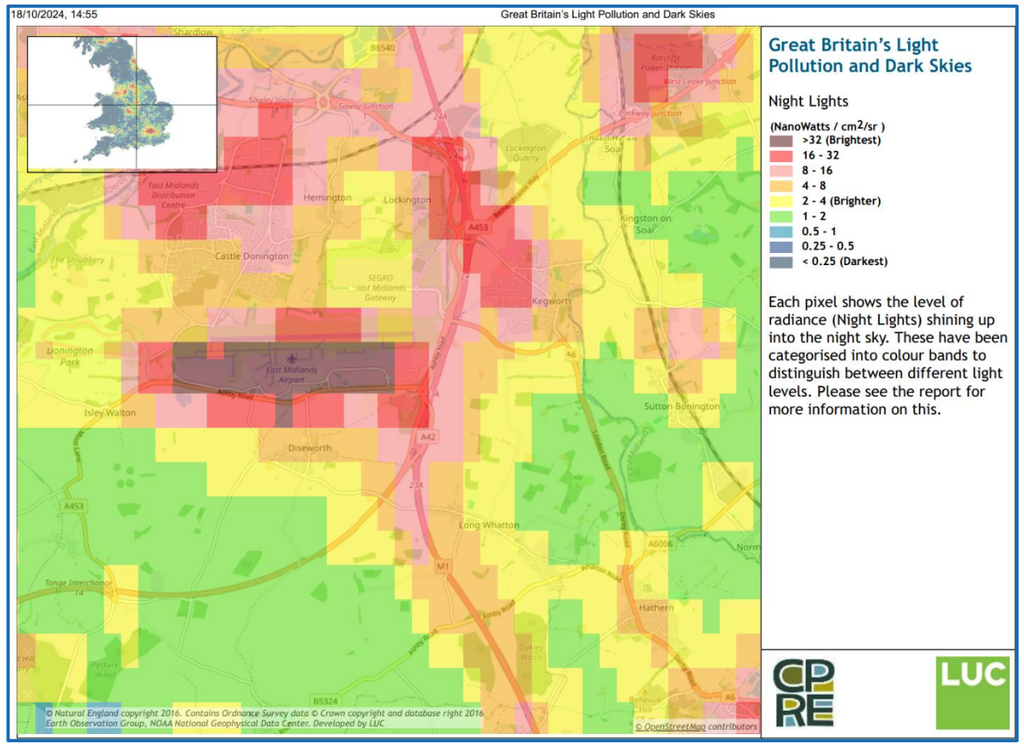


Figure 23: CPRE and LUC Skyward Radiance Mapping for the Scheme and Surrounding Area.

4.3.5. As can be seen in **Figure 23** there is a concentration of skyward radiance along the M1, Kegworth Interchange, the East Midland Airport, and north of Castle Donnington and west of Herrington (orange – red areas). This indicates that there is a higher volume of artificial lighting in these areas, which is supported by the images from the Lighting Baseline Survey in **Section 3.4**.

4.3.6. It can also be seen in **Figure 23** that the levels of skyward radiance reduces, the further the distance from the M1, Kegworth Interchange, the East Midland Airport, Castle Donnington Herrington. This is indicated by the yellow – green areas.

5. SUMMARY

5.1. Environmental Zone

5.1.1. The area surrounding the EMG2 Project is a broad mixture of commercial uses, rural settlement and more suburban settlement interspersed with agricultural land.

5.1.2. There is a large volume of existing artificial lighting in the area, but this is primarily concentrated on the East Midland Airport, its associated infrastructure and the highway network. This existing lighting is visible across the landscape and is affecting the district brightness of the surrounding area.

5.1.3. Due to the above, the EMG2 Project and the surrounding area can be classified as either an E2 or E3 environmental zone based on the descriptions from ILP GN01:2021 (**Table 1**).

5.1.4. Guidance from ILP GN01:2021 recommends that in cases such as this, that the environmental zone with the most rigorous restrictions is used. As such, the EMG2 Project will be assessed against E2 environmental zone limitations (**Table 2**).

5.2. Lighting Baseline

5.2.1. As evidenced in **Section 3**, **Section 4, Figure 1**, **Figure 22** and **Figure 23,** artificial lighting is prominent in the landscape. However, the direct effects of this lighting are concentrated close to the lit areas. This is shown by the illuminance results detailed in **Table 4** which were recorded in the proposed location of EMG2.

5.2.2. This shows that although there is a large presence of existing lighting within and surrounding the EMG2 Project, there are large areas of darkness also in this area.

5.2.3. This indicates that although several of the receptors to lighting identified in **Chapter 11** have direct views of existing lighting that they will not be experiencing significant existing direct effects of lighting. There are likely to be minor direct effects on these receptors by the existing lighting directly adjacent to them, but the further the distance from the existing lighting the lower the lighting effect will be.

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*.

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Daniel Spreadborough
Senior Engineer

+44 (0)1962 855080

daniel.spreadborough@dfl-uk.com

[redacted]

17/18 City Business Centre, Hyde Street, Winchester, Hampshire, SO23 7TA

[redacted]