

Tritax Symmetry (Hinckley) Limited

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

The Hinckley National Rail Freight Interchange Development Consent Order

Project reference TR050007

Environmental Statement Volume 2: Appendices

Appendix 3.2: Lighting Strategy [part 1 of 3]

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Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Regulation 14

This document forms a part of the Environmental Statement for the Hinckley National Rail Freight Interchange project.

Tritax Symmetry (Hinckley) Limited (TSH) has applied to the Secretary of State for Transport for a Development Consent Order (DCO) for the Hinckley National Rail Freight Interchange (HNRFI).

To help inform the determination of the DCO application, TSH has undertaken an environmental impact assessment (EIA) of its proposals. EIA is a process that aims to improve the environmental design of a development proposal, and to provide the decision maker with sufficient information about the environmental effects of the project to make a decision.

The findings of an EIA are described in a written report known as an Environmental Statement (ES). An ES provides environmental information about the scheme, including a description of the development, its predicted environmental effects and the measures proposed to ameliorate any adverse effects.

Further details about the proposed Hinckley National Rail Freight Interchange are available on the project website:



The DCO application and documents relating to the examination of the proposed development can be viewed on the Planning Inspectorate’s National Infrastructure Planning website:

<https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/hinckley-national-rail-freight-interchange/>

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1. INTRODUCTION

Instruction

- 1.1. BWB Consulting (BWB) was instructed by Tritax Symmetry to carry out a Lighting Strategy to support the planning application for the Hinckley National Rail Freight Interchange (HNRFI) as described in Environmental Statement Volume 1: Main Statement, Chapter 3: Project Description (Document reference 6.1.3), hereafter referred to as the 'Proposed Development'.

Scope of Works

- 1.2. This report details the relevant lighting policy and guidance that have been reflected when setting the proposed lighting design parameters and criteria for the Proposed Development. This includes details of optics, mounting heights, light direction and proposed luminaires. Performance criteria for average Lux level and uniformity are defined for each type of area, task or activity throughout the Proposed Development. An indicative lighting design has been appended to this report.
- 1.3. This report describes the main forms of obtrusive light as described by the applicable national guidance. It sets out the maximum acceptable light pollution limits within the Proposed Development and explains how the external lighting design can be completed within these limits and any resultant obtrusive light can be mitigated against as much as possible.
- 1.4. This report provides mitigation methods to minimise any potentially adverse impact caused by a new lighting installation for the proposed development. The assessment of the likely effects of light pollution upon sensitive human and ecological receptors is set out in Chapters 10 and 11 of the Environmental Statement (Volume 1) which accompanies the application to the Planning Inspectorate.

2. RELEVANT POLICY AND GUIDANCE

- 2.1. The relevant international, national, and local policy documents are summarised in this section and have been considered in the production of this Lighting Strategy.

International Guidance

Commission Internationale De L'Eclairage (CIE 150)

- 2.2. The purpose of this guide is to help formulate guidelines for assessing the environmental effects of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. As the obtrusive effects of outdoor lighting are best controlled initially by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures which may be taken for existing installations. This guide refers to the potentially adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residents, sightseers, transport users to environmentalists and astronomers.

Guidelines for Minimising Sky Glow (CIE 126)

- 2.3. These guidelines prepared by Commission Internationale De L'Eclairage provide general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for lighting installations. These values must be regarded as limiting values. Lighting designers should seek to meet the lowest specifications for the design. Other uses of the open air areas at night will usually result in less stringent sky-glow requirements. Practical implementation of the general guidance is left to National Regulations.

National Guidance

Lighting in the Countryside: Towards Good Practice

- 2.4. The Office of the Deputy Prime Minister (ODPM – now Department for Communities and Local Government) in conjunction with the Countryside Commission published 'Lighting in the Countryside: Towards Good Practice' in July 1997, and a revised issue in 2001. The guidance was developed to 'provide practical advice on the prevention and control of lighting effects through appropriate action by all those involved with lighting in the countryside'. Its objective is 'to identify good practice in the planning and design of lighting in rural areas; and advise on how it can be achieved, using case study examples'. The guide aims to provide an overview and common understanding of all aspects of good lighting practice stating that close co-operation and participation is required for all those involved in planning, designing, and installing lighting schemes. The guidance provides valuable information on lighting best practice and the standard methodology outlined in this guidance document has been followed as part of this assessment. Whilst the guidance relates to 'lighting in the countryside', it is considered best practice to adopt many of the principles contained within the guidance to sites of a more urban nature.

National Planning Policy Framework

- 2.5. The National Planning Policy Framework (NPPF) provides guidance relating to planning and pollution control for new development in England. The purpose of the planning system is to contribute to achievement of sustainable development. In relation to lighting, Paragraph 180 states: "Planning policies and decisions should also ensure that new development is

appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes, and nature conservation.

National Planning Practice Guidance

- 2.6. Light Pollution Planning Practice Guidance (<http://planningguidance.planningportal.gov.uk/blog/light-pollution>) advises on how to consider light within the planning system. It recognises that artificial light provides valuable benefits to society, including extending opportunities for sport, recreation, and commerce, and can be essential to a new development. Equally, inappropriate artificial light has the potential to be obtrusive and to cause light pollution. It can be a source of annoyance, harm wildlife, and undermine enjoyment of the countryside and views of the night sky.

The National Planning Policy Statement for National Networks

- 2.7. The National Networks National Policy Statement sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State. It states that lighting impact on amenity for local communities is likely to be unavoidable but impacts should be kept to a minimum and should be at a level that is acceptable.
- 2.8. The National Networks National Policy Statement states that the Secretary of State should be satisfied that all reasonable steps have been taken, and will be taken, to minimise any detrimental impact on amenity from emissions artificial light. This should include the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

SLL Lighting Guide 1: The Industrial Environment

- 2.9. The scope of this guide is concerned with lighting for the industrial environment. In staff areas used for operational purposes, where specific tasks require a particular lighting treatment, the requirements which differ from the general recommendations of the SLL Code for Lighting are specified.
- 2.10. The Lighting Guide includes reference to the exterior lighting requirements of BS 5489 and emergency lighting as defined by BS 5266.

SLL Lighting Guide 15: Transport Buildings

- 2.11. This Lighting Guide covers all public areas of transport buildings and their related access environments such as airport terminal forecourts and railway station platforms. In staff areas used for operational purposes, where specific tasks require a particular lighting treatment, the requirements which differ from the general recommendations of the SLL Code for Lighting are specified.
- 2.12. Guidance is also given in respect of the interface between road and rail vehicle lighting and the transport installations they serve. The Lighting Guide includes reference to the exterior lighting requirements of BS 5489 and emergency lighting as defined by BS 5266.

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British Standards

BS 5489: Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas

- 2.13. This standard provides recommendations on the general principles, aesthetic and technical aspects of road lighting and advises on statutory provisions, operation, and maintenance of lighting. The standard provides recommendations for the design of lighting for all types of highways and public thoroughfares, including those specifically for pedestrians and cyclists, and for pedestrian subways and bridges.

BS 13201: Road Lighting – Part 1, 2, 3, 4: Performance Requirements

- 2.14. This standard defines lighting classes for road lighting according to photometric requirements and aiming at the visual needs of road users. It also considers environmental aspects of road lighting.

BS EN 12464-2: Lighting of Workplaces. Outdoor Work

- 2.15. This standard focuses on the recommendations for outdoor workplaces that are used at night. BS EN 12464-2 includes important recommendations on how obtrusive light can be limited, to keep night skies free of light pollution.
- 2.16. The degree of visibility and comfort required in a wide range of outdoor work places is governed by the type and duration of activity.
- 2.17. This standard specifies requirements for lighting of tasks in most outdoor work places and their associated area in terms of quantity and quality of illumination. In addition, recommendations are given for good lighting practice.
- 2.18. It is important that all clauses of the standard are followed although the specific requirements are tabulated in the schedule of lighting requirements.

Local Guidance

Blaby District Council Core Strategy (2013)

- 2.19. Policies CS2, CS12, CS14, CS16, CS17, CS18 and CS23 contain the following strategic objective:
- *‘vi) to protect the important areas of the District’s natural environment (species and habitats), landscape and geology and to improve biodiversity, wildlife habitats and corridors through the design of new developments and the management of existing areas by working with partners;’*

Blaby District Local Plan (2019)

- 2.20. Development Management Policies 1 and 2 state that development proposals will:
- *‘Provide a satisfactory relationship with nearby uses that would not be significantly detrimental to the amenities enjoyed by the existing or new occupiers, including but not limited to, consideration of: i. privacy, light, noise, disturbance and overbearing effect;’*
- 2.21. Development Management Policy 13 ‘Land Contamination and Pollution’ seeks to ensure that development proposals are not affected by or cause land contamination or pollution.

The following clauses are included in relation to Lighting:

- *'The NPPF encourages good design to limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*
- *'Artificial light provides valuable benefits, including safety and security of people and premises, extending opportunities for sport and recreation, and can be essential to a new development. Equally, artificial light is not always necessary, has the potential to become what is termed 'light pollution' or 'obtrusive light' and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife, undermine enjoyment of the countryside or detract from enjoyment of the night sky. For maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time.'*
- *'Development proposals will be supported where they are accompanied by a detailed investigation of the issues and appropriate mitigation measures are identified to avoid any adverse impact upon the site or adjacent areas:*

Clause d) Close to a source of noise or light pollution and/or the proposal may be a source of noise or light pollution.'

Hinckley & Bosworth Borough Council Site Allocations and Development Management Policies DPD (2006-2026)

- 2.22. The Site Allocations and Development Management Policies Document (DPD) allocates land to deliver the development requirements outlined in the Hinckley and Bosworth Core Strategy such as housing, employment, recreation, green spaces, community uses and leisure uses.
- 2.23. Policy DM7 'Preventing Pollution and Flooding' states the following in relation to Light Pollution:
- *Light pollution (also known as obtrusive light) is caused by excessive artificial light being directed into the night sky. Outdoor lighting can cause intrusive and unnecessary light pollution in urban, suburban and rural areas, although it is in the countryside that light pollution is most noticeable. Excessive artificial light at night is visually intrusive impacting on local amenity, intrinsically dark landscapes, nature conservation and can cause physiological problems, in addition to it being a significant waste of energy. It is therefore vital to ensure appropriate controls on external lighting to avoid or mitigate against these adverse effects.*
 - *The Guidance Notes for the Reduction of Obtrusive Light (2020) highlight the elements of obtrusive light which cause the greatest impact. These are defined as:*
 - *Sky Glow, which is the brightening of the night sky;*
 - *Glare, the uncomfortable brightness of a light source when viewed against a darker background; and*
 - *Light Intrusion, the spilling of light beyond the boundary of the area being lit.*
 - *The reduction of light pollution should not compromise crime prevention and public safety and alternative technological solutions should be explored to ensure these elements are not compromised whilst also mitigating against obtrusive light.*
- 2.24. Policy DM10 'Development and Design' states that Developments will be permitted

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providing that the following requirements are met:

- *a) It would not have a significant adverse effect on the privacy and amenity of nearby residents and occupiers of adjacent buildings, including matters of lighting, air quality (including odour), noise, vibration and visual intrusion.*

Institute of Lighting Professionals (ILP) Guidance**ILP Guidance Notes for the Reduction of Obtrusive Light (Guidance Note 01/21)**

2.25. This guide is intended to be used in the planning context and can be applied through planning conditions. It sets out best practice for lighting design and control of obtrusive light (light pollution), defines environmental zone categories based on their capacity to absorb lighting effects, and gives guidance on the limitation of obtrusive light in terms of sky glow, glare and light trespass for each category. It therefore echoes the approach set out in the National Planning Policy Framework that impacts can and should be controlled by appropriate design rather than refusal.

2.26. This Guidance Note recommends that the immediate environment is classified into an environmental zone based on ambient lighting levels in the surrounding area. The environmental zones are detailed in **Table 2.1**. Zone E0 requires the most strict level of control and E4 the lowest.

Table 2.1: Environmental Zones.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places.
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations.
E3	Suburban	Medium district brightness	Small town centres or suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night- time activity.

ILP Guidance Note 08 for Bats and artificial lighting in the UK.

2.27. This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios.

2.28. The Guidance Note provides recommendations for appropriate external lighting

specification:

- *All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.*
- *LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.*
- *A warm white spectrum should be adopted to reduce blue light component.*
- *Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.*
- *Column heights should be carefully considered to minimise light spill.*
- *Only luminaires with an upward light ratio of 0% and with good optical control should be used.*
- *Luminaires should always be mounted on the horizontal, i.e., no upward tilt.*
- *As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.*

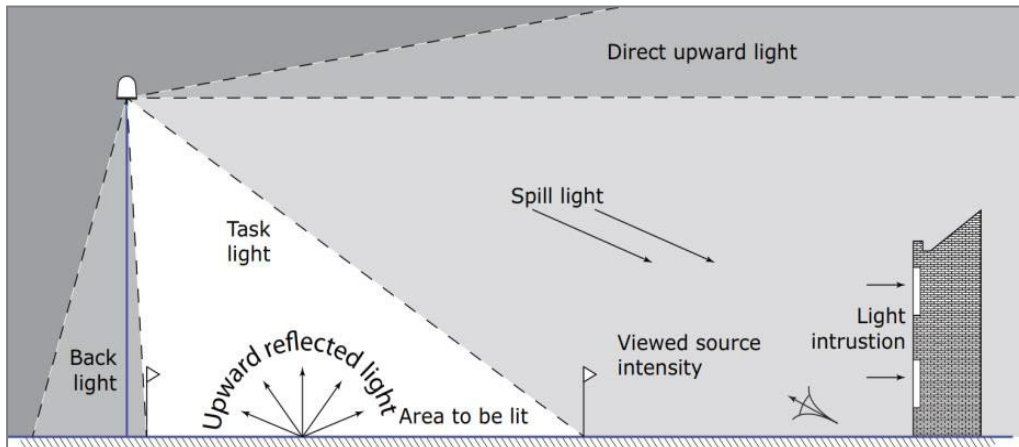
ILP Professional Guidance 05 for The Brightness of Illuminated Advertisements

- 2.29. This document is intended to provide pragmatic guidance to all people involved with exterior illuminated signage and advertisements within the British Isles.
- 2.30. This document provides clear guidance on illuminated signage.
- 2.31. Illuminated signage and advertisements have become an integral part of our street scene and they are designed to have an impact. When considering any application for illuminated signage, thought should be given to how it is to be viewed within the street scene. One sign on its own may have a minimal impact on the street scene however many signs may have a negative impact on the street scene confusing the visual task or visual amenity.

3. LIGHT POLLUTION

- 3.1. Light pollution is a generic term for all the adverse impacts that artificial lighting can have after dark. The main types of light pollution are shown diagrammatically in **Figure 3.1**.

Figure 3.1: Types of Light Pollution – Source: ILP Guidance Note 01/21.



- 3.2. Contributing to these direct effects are three design aspects that should be considered alongside the purpose for a new lighting installation and the type of sensitive receptors found in the local area. These are described later in this report.

Types of Light Pollution

Light Spill (Light intrusion, back light)

- 3.3. Light spill is 'the spilling of light beyond the boundary of the site on which a light source is located', such that it causes a noticeably adverse effect. More simply, light spill is often termed as the intrusion of light into homes. It can also have a negative effect on wildlife and ecological systems local to an installation.
- 3.4. As set out in the ILP Guidance Notes, the limits for light spill vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. Through careful design, it can readily be ensured that this impact is prevented and that the illumination falling within any residential property can be reduced to zero. This is incorporated into the Lighting Strategy contained within this report.

Sky Glow (Direct upward light)

- 3.5. Sky glow is the 'the brightening of the night sky' above illuminated areas. The brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water droplets in the atmosphere - rain, fog/mist, and snow, for example, exacerbate the effect.
- 3.6. Mitigation is achieved by complying with the recommended limits in the ILP Guidance Notes for upward light emission. The limits vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. The Lighting Strategy will ensure that these limits can be met for the Proposed Development.
- 3.7. To mitigate sky glow as much as possible, lighting must be accurately targeted and kept to a minimum, and this design principle is incorporated into the Lighting Strategy.

- 3.8. The magnitude of the impact is a matter of judgement, taking into account the existing night-time view. The magnitude is lessened for those views where an observer is subject to direct illumination from, say, a nearby streetlight, or where light spill from a nearby light source illuminates the foreground, because the observer's vision is not fully dark adapted.

Glare (Viewed source intensity)

- 3.9. Glare occurs when an individual experiences visual discomfort or disability stemming from direct views of lamp sources, or high contrast of a lighting installation against a dark background. The placement of luminaires, their photometric characteristics, and the viewing context contribute to glare, which has been noted to result from uncontrolled private lighting installations, security lighting, street lighting mounted at high level near residences or habitat.

Design Aspects

Building Luminance

- 3.10. This considers the appropriateness and scale of brightness for the lighting / highlighting of built structures. Design criteria is included within ILP guidance notes as more of a main effect. While this is addressed independently, building luminance can also be considered as an indirect contributor to light spill, sky glow and glare.

Light Levels

- 3.11. Light levels, both as designed and installed, have the potential to create areas which have a noticeable difference in brightness. A new lighting installation in an area that has not been lit or is significantly brighter than the surrounding area may affect both adjacent receptors in the form of light spill or glare, and those over a larger area by contributing to sky glow through over-lighting.

Light Colour

- 3.12. Light colour has the potential to alter an individual's perception of their environment with respect to colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths. Various wildlife species may respond differently to spectral composition depending on how reliant they are on darkness; many nocturnal animals continue their social habits and feeding behaviours with increased activity in the area while others may decrease their activity and possibly desert their habitat. This type of impact could affect pedestrians, vehicle operators and wildlife, and is likely to occur where new lighting is placed.

4. BASELINE CONDITIONS

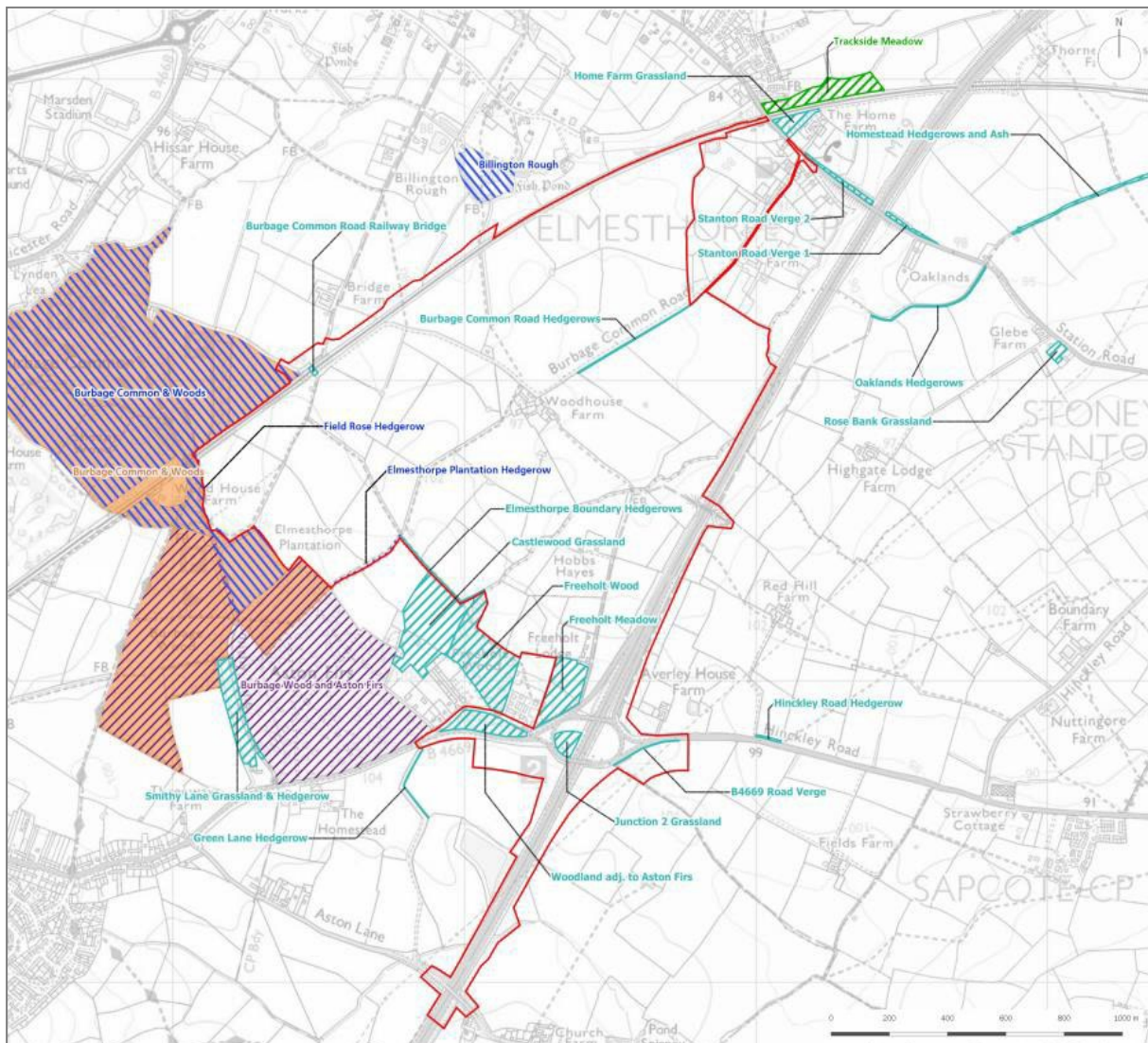
Introduction

- 4.1. The study area includes the application site, the surrounding areas and any sensitive receptors which may have a direct view towards external lighting proposals and/or which may be affected during the construction and operation of the proposed development. Coverage extends as far outside of the boundary as the distance where modelling indicates that illuminance sourced from lighting associated with the development could exceed a threshold of 1 Lux. Assessment of designation, use, habitat and external lighting condition dictates the classification of Environmental Zone across the proposed site location and surrounding areas.
- 4.2. The Proposed Development is set in a rural area. The site and immediate surroundings include some areas of natural unlit landscape however situated in relative close proximity is Stoney Stanton and Elmesthorpe, both containing illuminated highway. Also located in close proximity is the A47 highway which is also illuminated. With reference to **Table 2.1** it is therefore deemed that the Site falls into Environmental Zone E2, defined as a rural surrounding with low district brightness.
- 4.3. The following categories have been determined as potential sensitive receptors which could be impacted by any external lighting proposals of the proposed development:
 - Ecological – potential bat roost, foraging and commuting (hedgerows, waterways or treelines);
 - Residential – both occupied dwellings and potential residential development;
 - Heritage;
 - Direct Sky Glow;
 - Highway – lit and unlit; and
 - Railway.
- 4.4. No receptors have been excluded.

Ecology Receptors

- 4.5. The impact on biodiversity receptors that could be adversely affected is discussed in the **Environmental Statement: Chapter 11: Ecology and Biodiversity**.
- 4.6. **Figure 4.1** illustrates the Ecological designations plan (courtesy of EDP).

Figure 4.1: Ecological designations plan (courtesy of EDP).



4.7. The nearby Sites of Special Scientific Interest (SSSI) include:

- Burbage Wood; and
- Aston Firs.

4.8. The nearby local nature reserve sites include:

- Burbage Common and Woods.

4.9. The nearby local wildlife sites include:

- Billington Rough;
- Burbage Common and Woods;
- Field Rose Hedgerow; and
- Elmesthorpe Plantation Hedgerow.

4.10. The nearby candidate local wildlife sites (cLWS) include:

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- Trackside Meadow (adjacent to the Home Farm).

4.11. The nearby potential local wildlife sites (pLWS) include:

- Home Farm grassland;
- Homestead hedgerows and ash;
- Stanton Road verge 1;
- Stanton Road verge 2;
- Oaklands hedgerows;
- Rose Bank grassland;
- Burbage Common Road hedgerows;
- Burbage Common Road railway bridge;
- Elmesthorpe boundary hedgerows;
- Castlewood grassland;
- Freeholt Wood;
- Freeholt Meadow;
- Hinckley Road hedgerow;
- B4669 verge;
- M69 Junction 2 grassland;
- Woodland adjacent to Aston Firs;
- Smithy Lane grassland and hedgerow; and
- Green Lane hedgerow.

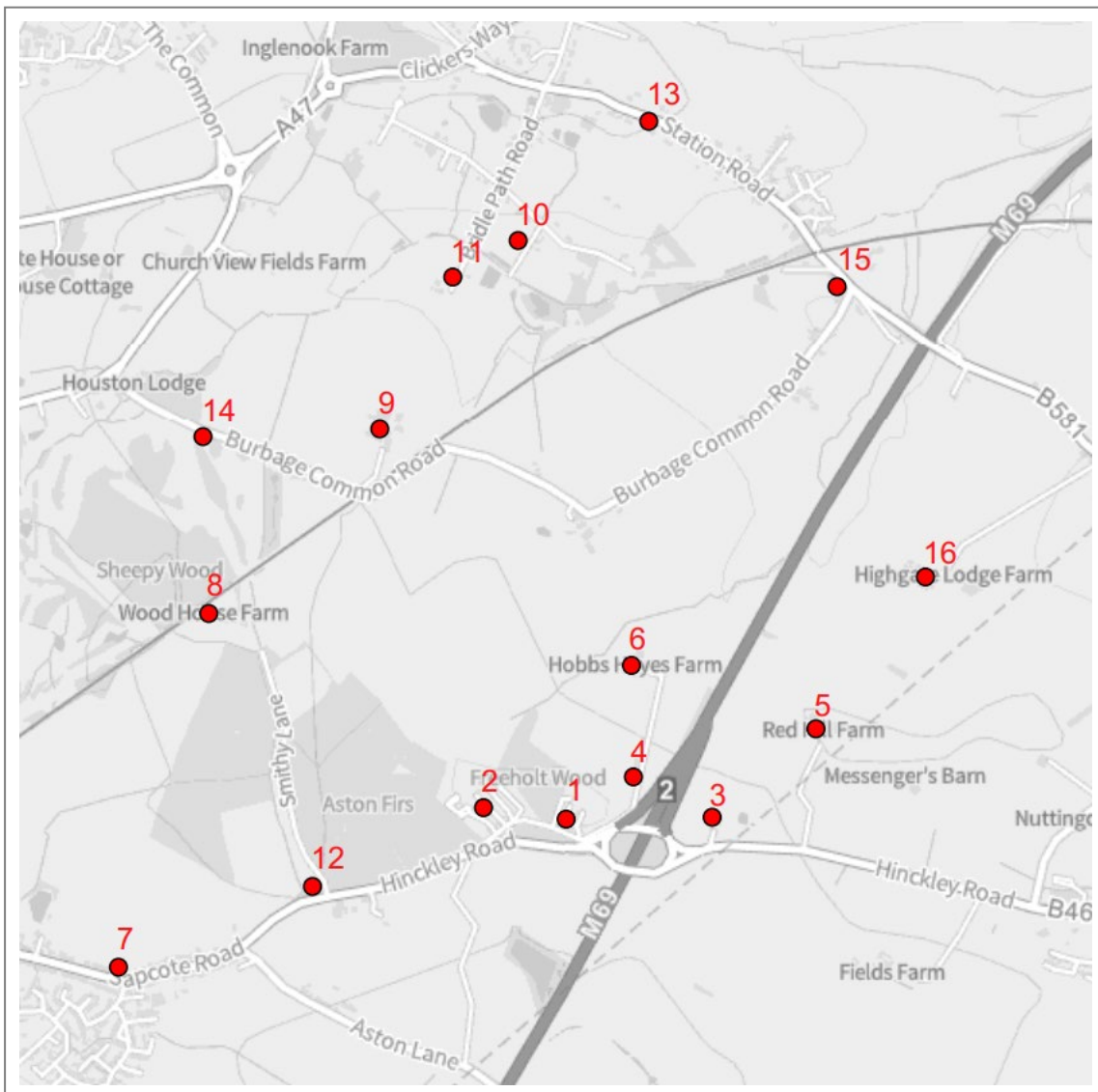
Residential Receptors

4.12. The residential receptors surrounding the site are illustrated in **Figure 4.2** and have been determined as follows:

1. Aston Firs Caravan Park;
2. Castlewood Mobile Home Park;
3. Averley House Farm;
4. Freeholt Lodge;
5. Red Hill Farm;
6. Hobbs Hayes Farm;
7. Residences along Hinckley Road / Sapcote Road;
8. Wood House Farm;
9. Bridge Farm;

10. Residences along Billington Road East;
11. Residences along Bridle Path Road;
12. Residences along Hinckley Road / Sapcote Road;
13. Residences within Elmesthorpe;
14. Residences along Burbage Common Road;
15. Residences along Stanton Road; and
16. Highgate Lodge Farm.

Figure 4.2: Residential receptors (indicated in red).



4.13. The limits for light intrusion (Illuminance in the vertical plane) for each Environmental Zone are described in **Table 4.1**, extracted from the ILP GN01/21 guidance.

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Table 4.1: Maximum values of vertical illuminance on properties.

Light Technical Parameter	Application Conditions	Environmental Zones				
		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

Natural – Sky Glow Receptors

4.14. The ILP GN01/20 guidance provides limitations for maximum allowable sky glow percentage for each Environmental Zone as shown in **Table 4.2**.

4.15. Sky glow is measured as ULR (Upward Light Ratio), the percentage of luminaire flux of a luminaire or a lighting installation that is emitted above the horizontal. Sky glow limitations depend on the Environmental Zone of the lighting installation as set out in the ILP guidance notes. The Environmental Zone categories are previously defined in this report in **Table 2.1**.

Table 4.2: Maximum values of upward light ratio (ULR) of luminaires.

Light Technical Parameter	Environmental Zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) %	0	0	2.5	5	15

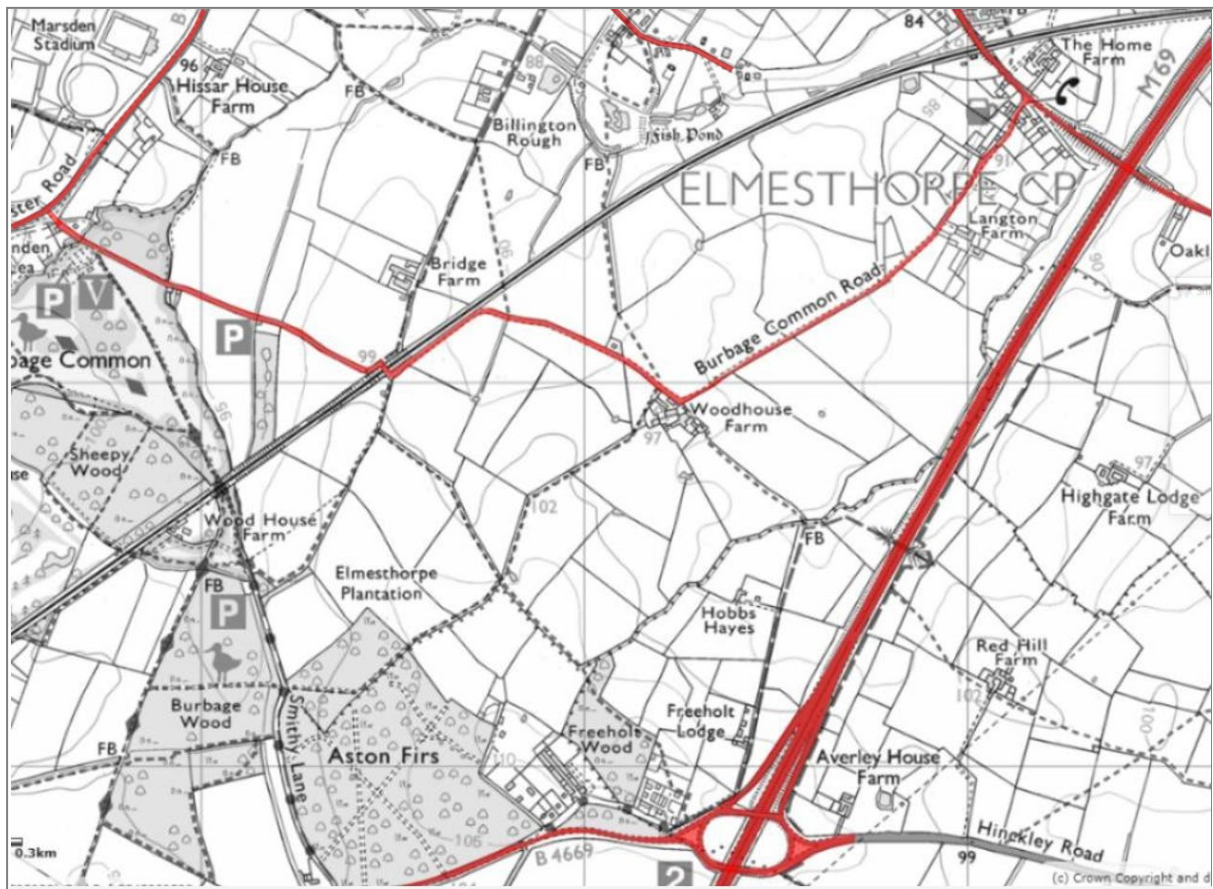
Highway Receptors

4.16. The nearby highway receptors have been identified as follows,

- The B4668 (Leicester Road);
- The B4669 (Hinckley Road);
- The M69, specifically Junction 2;
- Billington Road East;
- Burbage Common Road; and
- Station Road.

4.17. The nearby highway receptors are illustrated in **Figure 4.3**.

Figure 4.3: Highway receptors (indicated in red).



4.18. The ILP Guidance Notes for the Reduction of Obtrusive Light provide limitations for the maximum threshold increment (TI) and veiling luminance (LV) for each road classification type, as shown in **Table 4.3**.

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Table 4.3: Obtrusive light limitations for exterior lighting installations – road users.

Road Classification	Threshold Increment (TI)	Veiling Luminance (L _v)
No road lighting	15% based on adaptation luminance of 0.1cd/m ²	0.037
M6 / M5	15% based on adaptation luminance of 1cd/m ²	0.23
M4 / M3	15% based on adaptation luminance of 2cd/m ²	0.40
M2 / M1	15% based on adaptation luminance of 5cd/m ²	0.84

Road Classification – as given in BS EN 13201-2:2015 Road lighting performance requirements. Limits apply where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and for viewing directions in the path of travel.

TI - The measure of disability glare expressed as the percentage increase in contrast required between an object and its background for it to be seen equally well with a source of glare present. Note: Higher values of TI correspond to greater disability glare, the reduction in visibility caused by intense light sources in the field of view.

L_v - The luminance that would need to be superimposed on a scene in object space to reduce the scene's contrast by an amount equal to the added retinal illuminance from scattered light on the scene's retinal image. It is most commonly used to describe the contrast-reducing effect of a glare source in the field of view.

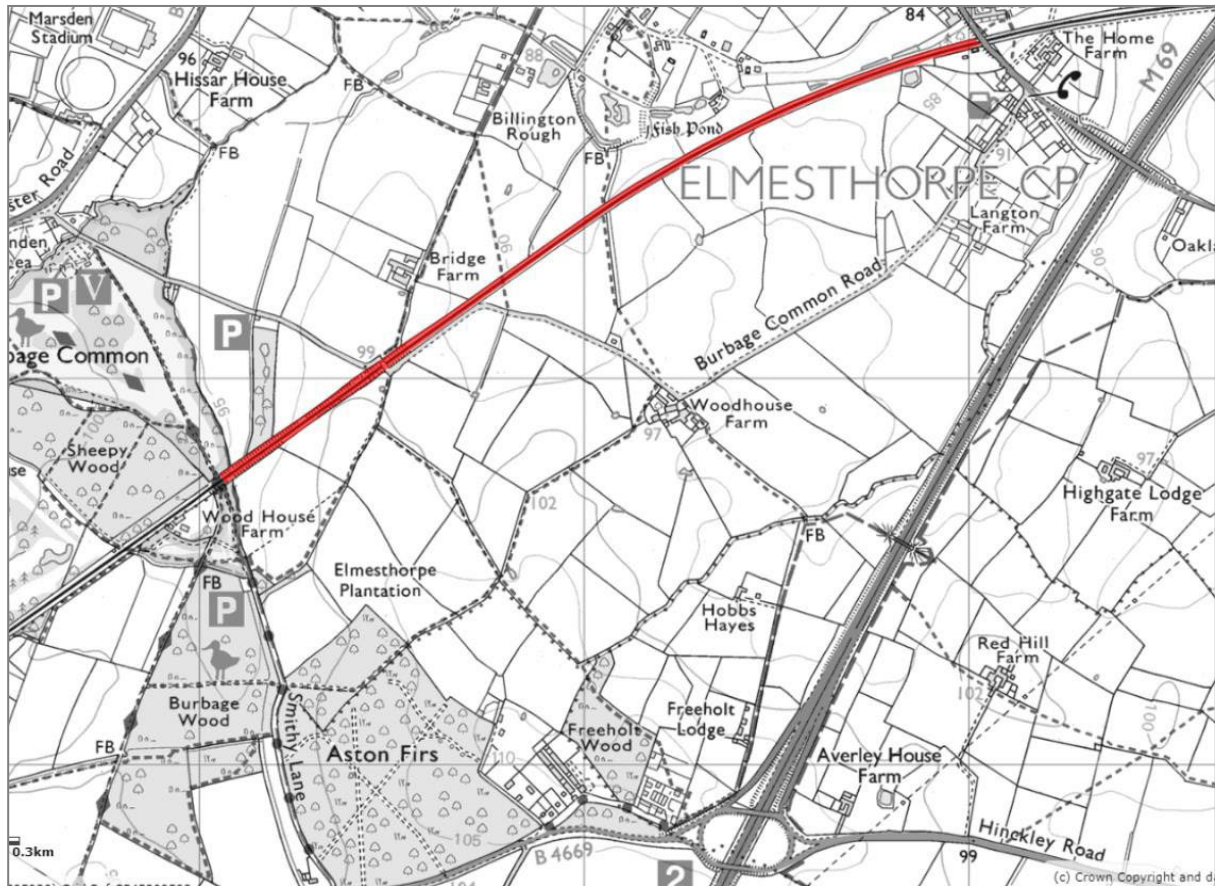
Railway Receptors

4.19. The railway receptors of the site have been identified as follows:

- The Birmingham to Peterborough railway line to the North West of the site.

4.20. The nearby railway receptors are illustrated in **Figure 4.4**.

Figure 4.4: Railway receptors (indicated in red).



4.21. BS 5489-1 provides qualitative guidance on minimising light spill and glare to railway lines but does not contain specific threshold limits. The following guidance shall be put in place:

- Light spill should be minimised in the vicinity of a railway bridge crossing/passing above a road;
- Columns should be placed as far away as practicable from a rail bridge or the fence line of railway track;
- Unwanted glare should be minimised for the train driver by the use of luminaires conforming to an appropriate G class selected from BS EN 13201-2:2015 or shielding.

Heritage Receptors

4.22. The heritage receptors are shown in **Figure 4.5**. These have been identified as follows:

- The Home Farm (Grade II Listed);
- The Wentworth Arms (Grade II listed); and
- Grade II listed residences along Station Road.

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Figure 4.5: Heritage receptors.



5. LIGHTING STRATEGY

Introduction

- 5.1. This section sets out the design principles and external lighting strategy for the Proposed Development.
- 5.2. An indicative external lighting design has been prepared which meets all parameters and criteria as set out in this report. The external lighting design is included in **Appendix 1**.
- 5.3. A modern external lighting installation is vitally important to the Proposed Development for many reasons including, but not limited to, the following:
 - To provide safety for pedestrians from moving vehicles, railway and cranes;
 - To provide ease of wayfinding and navigation for staff and visitors;
 - To provide security and deter antisocial behaviour;
 - To set the architectural scene and urban landscape;
 - To control direction signage and their relationship with other illuminated material;
 - To protect installations from accidental or deliberate damage; and
 - To allow safe access and maintenance.
- 5.4. It is important that the lighting applications provide both an aesthetic quality and also the appropriate levels of illumination required for the space they inhabit.
- 5.5. This section focuses primarily on the operational phase lighting strategy. A sub-section specific to construction phase lighting strategy is included at the end of this section.

Proposed Development

- 5.6. The Proposed Development covers an area of approximately 268 hectares (ha). The Main HNRFI Site covers an area of approximately 187 ha and is for up to 850,000 square metres gross internal area of warehousing and ancillary buildings.
- 5.7. The Site lies 3 km to the north-east of Hinckley, in Blaby District in Leicestershire, in a level area of mixed farmland to the north-west of M69 Junction 2. The Nuneaton to Felixstowe railway forms the north-western boundary of the site, with the M69 motorway defining the south-eastern boundary. To the south-west of the Site are blocks of deciduous woodland, including Burbage Wood (an ancient woodland), Aston Firs and Freeholt Wood, and two traveller community sites. Beyond the north-eastern Site boundary lies the village of Elmesthorpe, a linear settlement on the B581 Station Road.

Design Parameters

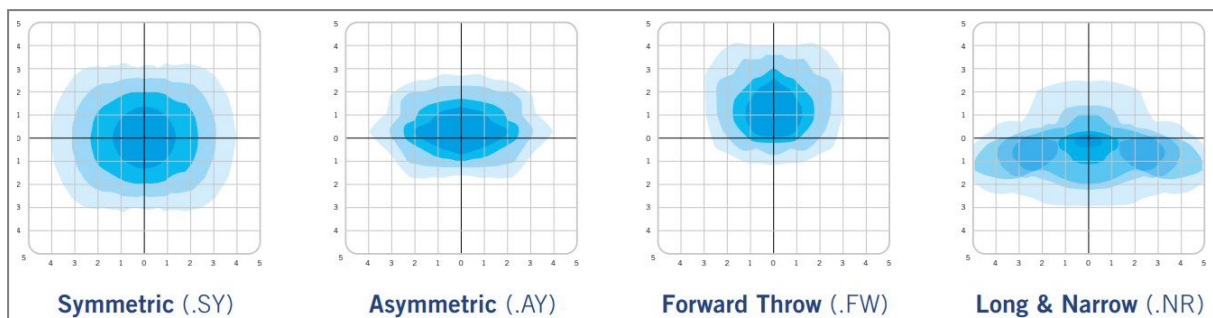
- 5.8. All external lighting shall be provided in accordance the Relevant Policies and Guidance. It will be designed to minimise obtrusive light and optimise energy use. Lighting will comply with recommendations for Environmental Zone E2 given in ILP Guidance Notes for the Reduction of Obtrusive Light (Guidance Note 01/21).
- 5.9. Luminaires will be LED light source to provide optimum energy efficiency and accurate targeting of light output to keep obtrusive light effects to the absolute minimum.
- 5.10. High mast lighting shall be introduced where standard column mounted lighting is deemed impractical. The use of high mast lighting shall be limited to the Rail Terminal, including the

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Railway Chord and Container Handling Area, and the Railport Returns Area.

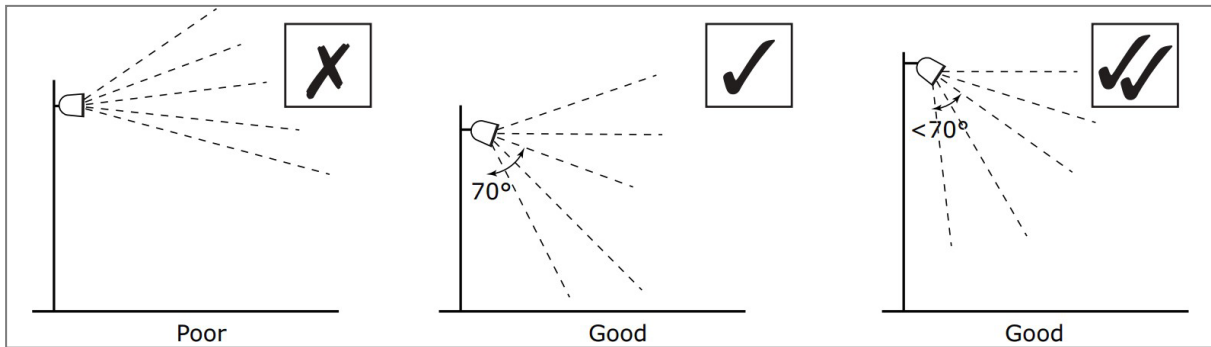
- 5.11. External lighting will be provided wherever necessary to provide a safe and secure environment for staff and other users after dark. ‘Secured by Design’ principles will be adopted and emphasis will be placed on achieving good uniformity of light distribution. All illumination levels will be set as low as practicable while complying with safety and security recommendations. Spill of light onto building facades and outside of the target area for illumination will be minimised through careful design, specification and positioning of lighting equipment.
- 5.12. At the outer edges of the Proposed Development luminaires will as far as practicable be positioned so that they are out of view of sensitive receptors. Mounding, fencing and planting that is being provided for visual and noise reduction reasons will be recruited to assist in achieving this.
- 5.13. At the outer edges of the Proposed Development luminaires will be complete with back light shields or optics with sharp cut off will be used where required to minimise impact on sensitive receptors.
- 5.14. Luminaires shall generally be mounted on buildings and on standard lighting columns and shall be arranged to maximise the amount of light reaching trafficked hard surfacing while minimising spill light onto adjacent areas.
- 5.15. Lighting levels will be suitable for pedestrian, vehicular and railway access, and the operation of a CCTV system. Lighting will be installed to provide sufficient illumination for safe circulation and to promote a feeling of safety and security.
- 5.16. G4 compliant luminaires shall be utilised for the road and area lighting. The G rating of a luminaire relates to the luminous intensity of light emitted at angles of 70, 80 and 90 degrees when the luminaire is mounted at a tilt of zero degrees to the finished surface that it is lighting.
- 5.17. Luminaires must utilise optimum optical distribution to direct exactly where needed while allowing maximum spacing between luminaries and minimise the required number of columns. Examples are illustrated in **Figure 5.1**.

Figure 5.1: Light Distributions.



- 5.18. Luminaires shall be of the directional type that emit all their light below the horizontal plane. Glare shall be kept to a minimum by ensuring that the main beam angle of all luminaires directed towards any potential observer is no greater than 70° in line with the recommendations in ILP Guidance Note 01/21, demonstrated in **Figure 5.2**.

Figure 5.2: Luminaire aiming angles – Source: ILP Guidance Note 01/21.



Illuminated Signage

5.19. Any proposed Illuminated signage shall comply with the following guidance given in ILP PLG 05 'The Brightness of Illuminated Advertisements':

- Lighting shall be static;
- No intermittent light sources, flashing lights, moving parts or features, no exposed cathode tubing, animation or reflective material;
- Illumination in a manner reasonably required to fulfil the purpose of advertisement; and,
- Maximum permitted luminance levels in line with **Table 5.1**.

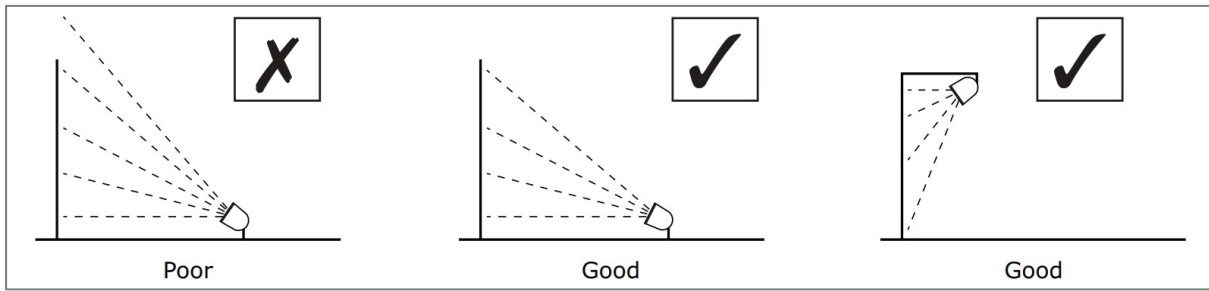
Table 5.1: Signage luminance limits in England

Illuminated area	Maximum luminance (cdm ²)
More than 10m ²	300
Not more than 10m ²	600

5.20. When lighting vertical structures such as advertising signs, light shall be directed downwards wherever possible. If there is no alternative to up-lighting, the use of luminaires with the correct optical distribution, coupled where required with shields, baffles and louvres, will help minimise spill light around and over the structure. This is demonstrated in **Figure 5.3**.

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Figure 5.3: Facade illumination – Source: ILP Guidance Note 01/21.



Residential Receptors

- 5.21. The indicative external lighting design, included in **Appendix 1**, has been produced in industry standard lighting calculation software. The design includes Lux level contour lines which assume a level, clear site. In practice, the effect of changes in elevation and obstructions such as trees and hedges will contain the light spill further than is shown in the plot, i.e., the Lux level contour lines represents the absolute worst case scenario.
- 5.22. As previously established, the maximum permissible illuminance in the vertical plane (E_v) for an Environmental Zone E2 area is 1 Lux. The residential receptors previously identified are located significantly beyond the 1 Lux contour line as demonstrated in **Appendix 1**. As such the proposed lighting scheme meets the ILP obtrusive light limitations and is therefore not considered to result in unacceptable impacts on residential properties. Any deviation to the indicative lighting design must also demonstrate this prior to any approval or installation.

Natural – Sky Glow Receptors

- 5.23. The indicative external lighting design, included in **Appendix 1**, provides details of lighting units and any associated tilt angle required to achieve the target lighting performance requirements.
- 5.24. As previously established, the maximum permissible upward light ratio (ULR) for an Environmental Zone E2 area is 2.5%. The indicative lighting design utilises luminaires that emit downward light only at zero tilt and demonstrates that the Proposed Development can be adequately lit with a 0% ULR. As such the indicative external lighting scheme demonstrates the Proposed Development can be adequately lit while not exceeding the limitations for ULR. Any deviation to the indicative lighting design must also demonstrate this prior to any approval or installation.

Special Measures close to Biodiversity-sensitive areas

- 5.25. Light spill has the potential to affect both flora (plants etc) and fauna (insects, reptiles, wild animals etc). Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat.
- 5.26. There are a number of ecological areas that will be sensitive to lighting effects. Where lighting is to be sited close to such areas there is the potential for such effects to be significant unless special measures are employed. This is particularly true for the ancient woodland and rail corridor. It is also necessary to prevent lighting effects on the proposed new bunds and landscaping around the perimeter of the Main Site.
- 5.27. All lighting sited close to ecologically sensitive areas has been designed to minimise light spill. The indicative external lighting design has been produced in collaboration with the

appointed Ecologist. The design process was iterative and was reviewed by the Ecologist at each stage to ensure light was managed at specific areas of ecological value. In cases where light spill needed to be further controlled the introduction of back light shields, optics with sharp cut off or a reduction in mounting height have been introduced to reduce as far as practicable whilst still providing adequate illumination.

- 5.28. Potential biodiversity receptors that could be adversely affected are discussed in the Environmental Statement: Chapter 11: Ecology and Biodiversity.
- 5.29. In order to minimise disturbance to potential bat habitat the following measures should be introduced, in line with the recommendations of ILP Guidance Note 08 for Bats and artificial lighting in the UK:
- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
 - LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
 - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
 - Column heights should be carefully considered to minimise light spill.
 - Only luminaires with an upward light ratio of 0% and with good optical control should be used.
 - Luminaires should always be mounted on the horizontal, ie no upward tilt.
 - As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.
- 5.30. Where bats are likely to be present guidance from ILP Guidance Note 08 for Bats and artificial lighting in the UK will be followed. Lighting will be LED type, free of UV emissions to prevent adverse effects on flying insect and bat populations.

Performance Requirements

- 5.31. All illumination levels will be set as low as practicable while complying with safety and security recommendations and the design levels set out in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and BS 5489-1 'Design of road lighting- Lighting of roads and public amenity areas'. A summary of the applicable design levels is detailed in **Table 5.2**.

Table 5.2: Proposed External Lighting Minimum Design Levels.

Type of area, task, or activity	Maintained illuminance, Em (Lux)	Illuminance uniformity, U0
Internal Access Roads	15	0.25
Link Road	20	0.40
Service Areas / Yards	30	0.40

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Rail Terminal - Crane Gantry and Container Handling	50	0.40
Lorry Parks	20	0.25
Car Parks	10	0.25
Walkways	10	0.25

- 5.32. Supplementary floodlights may also be provided to service yard areas positioned to provide local illumination of 150 Lux in front of loading doors in line with the recommendations of SLL Lighting Guide 1: The Industrial Environment.

Internal Access Roads

- 5.33. Internal Access Roads are considered all internal roads providing access to the proposed Units from the Link Road. Lighting shall be provided from standalone lighting columns with a limited mounting height not exceeding eight metres.
- 5.34. Luminaires shall be complete with purposely designed road optics to distribute the light as efficiently as possibly whilst controlling and minimising any light spill and to assist in reducing the number of columns required.
- 5.35. Lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 15 lux.

Link Road

- 5.36. The Link Road connects M69 Junction 2 with the A47. Lighting shall be provided from standalone lighting columns with a limited mounting height not exceeding 10 metres.
- 5.37. The Link Road lighting shall comply with the lighting policies of Highways England and Leicestershire Highways that are current at the time of design. Lighting design will consider the environment in which the lighting will be situated.
- 5.38. Luminaires shall be complete with purposely designed road optics to distribute the light as efficiently as possibly whilst controlling and minimising any light spill and to assist in reducing the number of columns required.
- 5.39. Lighting will comply with the recommendations given in BS 5489-1 'Design of road lighting- Lighting of roads and public amenity areas', and the target average illuminance will be 20 lux.

Service Areas / Yards

- 5.40. Lighting for service areas / yards will be provided from column mounted luminaires around the perimeter of the yard and directed towards the building. Maximum column height will be 10 metres; a lower mounting height will be used wherever practicable. Additional luminaires may also be located over loading bays/lorry dock areas and aimed downwards, mounted at a maximum height of 10 metres.
- 5.41. Lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 30 lux.

Rail Terminal

- 5.42. For areas where gantry cranes are operating, the underside of the gantry cranes will carry floodlights to illuminate the working area immediately below the crane.
- 5.43. Lighting will generally be provided from high mast and column mounted luminaires positioned to provide optimum light distribution with minimal light spill to minimise the quantity of masts. High mast luminaires will be limited to a maximum height of 25 metres; a lower mounting height will be used wherever practicable.
- 5.44. Lighting to the container stack will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 50 lux.
- 5.45. Lighting to the rail chord will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 30 lux. Low level low output lighting may be provided between tracks if deemed a requirement for safety and security.
- 5.46. Lighting to the cripple sidings will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 10 lux.

Lorry Parks and Car Parks

- 5.47. Lorry parks and car parks will be lit by luminaires mounted on standalone lighting columns. Maximum column height will be 10 metres; lower mounting heights will be used wherever practicable.
- 5.48. The lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. The target average illuminance will be 10 lux for car parks and 20 lux for lorry parks.

Walkways

- 5.49. Walkways shall be illuminated during hours of low natural light and darkness predominantly for safety and security. Lighting shall be provided by luminaires mounted on lighting columns of as low a height as reasonably practicable. Where possible low level illuminated bollards shall be utilised.
- 5.50. Luminaires shall be complete with purposely designed pathway optics to distribute the light as efficiently as possible whilst controlling and minimising any light spill, this also assists in reducing the number of columns / bollards required to achieve the lighting levels and uniformity.
- 5.51. External walkway lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. The target average illuminance will be 10 lux.
- 5.52. Lighting to the proposed underpass under the rail chord will comply with the recommendations given in BS 5489-1 'Design of road lighting- Lighting of roads and public amenity areas' to give higher levels during daylight hours, which can be switched to lower levels of illuminance during the hours of darkness. Switching can be carried out by either time switch or photocell. The target average illuminance will be 350 lux (daytime) and 20 lux (night time).

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Luminaire Selection

- 5.53. The indicative external lighting design presented has been produced with high quality luminaires as manufactured by Holophane Lighting and Urbis Schreder. A full luminaire schedule is included in **Appendix 1**.
- 5.54. The final detailed design may deviate from the indicative external lighting design presented but must meet all parameters and criteria as set out in this report and demonstrate equal to or less than the quantity of light spill achieved. An adequate and safe level of lighting must be provided for site tasks, amenity, and security, whilst maintaining acceptable impact on the site surroundings, environment, railway and neighbouring properties.
- 5.55. Included within **Appendix 2** is the manufacturer’s literature.

Table 5.3: Proposed luminaires.

Luminaire type	Manufacturer information	Image
Column mounted Building mounted	Holophane Lighting – D-Series Mounting height 6m – 12m 2,000 – 30,000 Lumens CRI>70 Variety of optics Die-cast aluminium body IP65, IK10	
High mast	Holophane Lighting - HMAO Mounting height 20m – 30m 30,000 – 100,000 Lumens CRI>70 Variety of optics Die-cast aluminium body IP65, IK07	
Column Mounted A47 Link Road	Urbis Schreder – Ampera Evo 3 Mounting height 8m – 10m 600 – 21200 Lumens CRI>70 Variety of optics Die-cast aluminium body IP65, IK09	

Construction Phase Lighting

- 5.56. While construction phase lighting for the Proposed Development and associated highway mitigation works is expected to be short term and reversible it is important to define the parameters to minimise light pollution.
- 5.57. Lighting will operate in all external areas used by construction workers after dark in order to provide a safe and secure working environment without over lighting. High quality LED light sources with high colour rendering index (CRI) shall be utilised to maximise visibility with efficient light output.
- 5.58. Lighting shall be provided to meet the target lux level as set out in BS 12464-2 Lighting of Outdoor Workplaces without over lighting. Luminaires shall be mounted at the lowest practical mounting height, providing lighting only where lighting is required.
- 5.59. The Contractor shall specify working hours, uses of lighting, location of temporary floodlights and construction compound and agreeing these with the local council to reduce duration of impact.
- 5.60. Lighting controls should be employed to dim or switch off any lighting that is not needed.
- 5.61. Lighting that needs to be sited close to the perimeter or ecologically sensitive areas should be fitted with shielding or be switched off or dimmed when not in use.
- 5.62. Lighting should be controlled in such a way to illuminate high activity, hazardous or high security areas while reducing lighting levels at less pertinent areas.
- 5.63. The Contractor should act responsibly to adjust any temporary lighting reported as causing nuisance.

6. CONCLUSION

- 6.1. The Proposed Development Lighting Strategy supports relevant policy and guidance. An indicative external lighting design has been produced that minimises light pollution and complies with relevant policy and guidance while meeting the performance requirements set out in this report.
- 6.2. The final detailed design may deviate from the indicative external lighting design presented but must meet all parameters and criteria as set out in this document and demonstrate equal to or less than the quantity of light spill achieved.
- 6.3. An adequate and safe level of lighting must be provided for site tasks, amenity, and security, whilst maintaining acceptable impact on the site surroundings, environment, railway and neighbouring properties.
- 6.4. The reduction of light pollution should not compromise crime prevention and public safety and alternative technological solutions should be explored to ensure these elements are not compromised whilst also mitigating against obtrusive light.
- 6.5. This report will be referenced in Chapters 10 and 11 of the Environmental Statement (Volume 1) to assess external lighting impact on Biodiversity and Landscape and Views.

References

- Blaby District Council Core Strategy (2013)
- Blaby District Local Plan (2019)
- Hinckley & Bosworth Borough Council Site Allocations and Development Management Policies DPD (2006-2026)
- National Planning Policy Framework (February 2019)
- ILP Guidance Notes for the Reduction of Obtrusive Light GN01 (2021)
- ILP Guidance Note 8 Bats and Artificial Lighting (2018)
- ILP Professional Lighting Guide 05 The Brightness of Illuminated Advertisements (2014)
- Lighting in the Countryside: Towards Good Practice (2001)
- SLL Lighting Guide 1: The Industrial Environment (2018)
- SLL Lighting Guide 15: Transport Buildings (2017)
- BS 5489: Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas (2020)
- BS 13201: Road Lighting – Part 1, 2, 3, 4: Performance Requirements (2015)
- BS EN 12464-2: Lighting of Workplaces. Outdoor Work (2014)
- Commission Internationale De L’Eclairage (CIE 150) (2003)
- Guidelines for Minimising Sky Glow (CIE 126) (1997)
- National Planning Practice Guidance (2014)

Abbreviations

CEMP	Construction Environmental Management Plan
CRI	Colour Rendering Index
EIA	Environmental Impact Assessment
ES	Environmental Statement
E_m	Maintained Illuminance
E_v	Illuminance in the Vertical Plane
ILP	Institute of Lighting Professionals
LED	Light Emitting Diode
NPPF	National Planning Policy Framework
ODPM	Office of the Deputy Prime Minister
u_0	Illuminance Uniformity
ULR	Upward Light Ratio

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UV Ultraviolet