

11 EXTERNAL LIGHTING

11.1 INTRODUCTION

11.1.1 This chapter sets out the approach to assessing any likely significant effects of the Proposed Development in terms of external lighting. It describes the assessment methodology; the baseline conditions at the Site and surroundings; the likely environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.

11.2 RELEVANT POLICY

National Policy Statement for National Networks (NPSNN), (Dept for Transport, Dec 2014)

11.2.1 The NPSNN provides specific guidance regarding the assessment of Nationally Significant Infrastructure Projects including Strategic Rail Freight Interchanges. Section 5 of the NPSNN provides guidance regarding the methodological and other issues regarding the assessment of generic impacts, and includes a section regarding lighting (alongside issues relating to dust, odour, smoke and steam).

11.2.2 The guidance underlines the importance of lighting impacts in the context of the amenity of nearby communities, and offers general advice regarding the importance of ensuring that any effects are minimised through design and mitigation measures. It is consistent with the guidance provided in the National Planning Policy Framework.

11.2.3 Paragraph 5.87 of NPSNN sets out the criteria by which the acceptability of the Proposed Development will be determined in relation to lighting effects:
“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 of odour, dust, steam, smoke and artificial light. This includes the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

11.2.4 Paragraph 5.146 of NPSNN explains what the assessment should entail in relation to lighting effects:
“The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include any noise and light pollution effects, including on local amenity, tranquillity and nature conservation.”

11.2.5 The NPSNN encourages limitation of impacts, on both humans and ecology, by good design. Its premise is that the potential impacts caused by external lighting will not be a reason for refusal provided the assessment demonstrates that potential adverse effects will be minimised. The requirements of the NPSNN have informed the environmental impact assessment of the Proposed Development.

ILP Guidance Notes (2011)

11.2.6 Professional design guidance is given in *Guidance Notes for the Reduction of Obtrusive Light* (Guidance Note 01, Institution of Lighting Professionals, 2011, hereafter referred to as the *ILP Guidance Notes*). This guidance is intended to be used in the planning context and can be applied through planning conditions or requirements in a Development Consent Order. 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 NPSNN that impacts can and should be controlled by appropriate design.

11.2.7 *ILP Guidance Notes* recommends that the immediate environment is classified systematically as shown in Table 11.1.

Table 11.1: *ILP Guidance Notes* environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
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

11.2.8 *ILP Guidance Notes* then make recommendations for limiting obtrusive light (light pollution) appropriately according to the environmental zone in which the lighting would be situated. The stringency depends on the capacity to absorb lighting effects, with E0 requiring the tightest level of control and E4 the lowest.

Local Planning Policy

11.2.9 SNC Supplementary Planning Guidance *Light Pollution* is the only extant document that sets out the Council's policy on lighting in any detail. It is very dated but it does give relevant principles. It states the following over-arching policy:

"Where planning permission is required for an external lighting scheme or where external lighting is required as part of a development proposal, planning applications will normally only be favourably considered where:

(i) the lighting scheme should not exceed that which is required for the satisfactory undertaking of the task involved;

and (ii) glare and spillage is minimised through good design, particularly in areas of open countryside, on the edge of settlements, adjacent to highways or in other environmentally sensitive settings;

and (iii) illuminance is appropriate to the surroundings and character of the area as a whole;

and (iv) the lighting is positioned to minimise the impact on the surroundings;

and (v) (sic) there is no significant adverse impact on the local community or environment".

11.2.10 Adherence to the recommendations given above under NPSNN and *ILP Guidance Notes* will ensure that the requirements of this Supplementary Planning Guidance are fully met.

11.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Methodology – general

- 11.3.1 The assessment methodology is qualitative and desk based, looking at the likely effects of the Development during both construction and operation. The baseline conditions are determined by the existing provision of lighting on the Main Site, the Bypass Corridor and in the surrounding area.
- 11.3.2 The methodology is based on the principles set out in *Guidance on undertaking environmental lighting impact assessments* (Professional Lighting Guide 04, Institution of Lighting Professionals, 2013). This guidance is supplemented for this assessment by *Controlling light pollution and reducing energy consumption* (Guidance Note, Scottish Executive, March 2007) which introduces additional assessment parameters that are particularly relevant for rural settings. Reference is also made to *ILP Guidance Notes*.

Study area

- 11.3.3 Lighting effects can be experienced over a considerable distance and therefore the area for assessment includes receptors with more distant views as well as those closer to the Proposed Development (the Main Site and Bypass Corridor).
- 11.3.4 For the Main Site, the study area extends out to the villages of Milton Malsor and Blisworth to the west, the Courteenhall Road ridge to the southwest, and northern end of the Courteenhall Estate to the south and east.
- 11.3.5 For the Bypass Corridor, the study area is focused on the western side of Roade, taking in residential properties lying within 500 metres of the Corridor.

Baseline condition methodology

- 11.3.6 The night time baseline condition is assessed by a combination of desk study and night time survey, taking in as many sensitive receptor viewpoints as possible. The location, type and intensity of existing sources of light is identified in relation to each viewpoint and the sensitivity of each receptor to any future change in the lighting conditions is judged. As far as possible night time surveys are conducted in good weather.

Effect assessment and significance

- 11.3.7 Artificial lighting can give rise to several types of light pollution impact. Details are given in Appendix 11.1. Their relevance for different receptor types is set out in Table 11.2 below.

Table 11.2: Receptor types and lighting effects

Category of receptor	Potential lighting effects
(A) Residential properties within 100m of new lit development	(1) Nuisance: excessive illumination falling on bedroom windows (2) Nuisance: glare causing visual disability or discomfort (3) Loss of amenity: light spill onto property/gardens, changing their character after dark (4) Visual: light presence – light sources and other lit elements appearing in dark views (5) Visual: local sky glow appearing over new lit development
(B) Residential	(4) Visual: light presence – light sources and other lit elements appearing in dark views

properties more than 100m away from new lit development	(5) Visual: local sky glow appearing over new lit development
(C) Night time views from dark non-residential areas	(4) Visual: light presence – light sources and other lit elements appearing in dark views (5) Visual: local sky glow appearing over new lit development
(D) Transport (roads, railways, airports, navigation)	(7) Hazard: glare causing visual disability (8) Hazard: light sources affecting visibility and interpretation of signals, runway lights, etc.
(E) Night sky views	(6) Visual: general brightening of night sky, reducing visibility of stars and affecting astronomical observation
(F) Light-sensitive ecology close to new lit development	(9) Disturbance: light spill onto dark habitat, reducing its ecological value (esp. in relation to bats) (10) Disturbance: UV light emission, affecting airborne invertebrates

11.3.8 The magnitude of a lighting effect is assessed as a change from the baseline condition, taking into account the relative scale of the new effect. To do this, a draft Lighting Strategy has been set out for the Proposed Development and is included in Appendix 11.3. The Strategy is based on employing best practice design principles as appropriate to the sensitivity of the Main Site's surroundings, with a view to preventing adverse effects or, where that is not possible, keeping them to the absolute minimum. It sets out the parameters and characteristics of the lighting systems and their performance, and thus defines the principles of a future detailed lighting strategy ahead of the precise details regarding the location of all lighting on the site. The magnitude of a lighting impact is assessed on the basis that this draft Strategy has been implemented. The details of the position and number of lighting units would be prepared and submitted in accordance with the principles of the draft Lighting Strategy, for agreement by the Local Authorities post approval of the DCO.

11.3.9 Table 11.3 sets out the criteria for assessing the magnitude of impacts.

Table 11.3: Lighting impact magnitudes

Magnitude of Impact	Criteria for Assessing Impact
Large	The light pollution associated with the Proposed Development is considerably greater than the baseline situation, thus fundamentally changing the character of the nightscape (visual impacts) or exceeding ILP Guidance Notes recommendations (nuisance, loss of amenity and hazard impacts).
Medium	The light pollution associated with the Proposed Development is of a similar magnitude to the baseline situation, thus noticeably adding to it, but not fundamentally changing the character of the nightscape (visual impacts) or exceeding ILP Guidance Notes recommendations (nuisance, loss of amenity and hazard impacts).
Small	The light pollution associated with the Proposed Development is discernible but its magnitude and type are not noticeably different from the pre-Development situation.
Negligible	The light pollution associated with the Proposed Development is barely distinguishable, approximating to a 'no change' situation.

11.3.10 To assess the significance of lighting effects it is first necessary to determine the sensitivity of the receptors. This is set out in Table 11.4. The likely effects on light-sensitive ecology (receptor type F) are dealt with in Chapter 6 (Ecology and Nature Conservation).

Table 11.4: Receptor sensitivity to lighting impacts

Sensitivity	Examples of receptor
High	Rural and dark landscapes. Views over significant water bodies and large unlit spaces. SSSIs and SINC. Astronomical observatories.
Medium	Views with existing lighting visible in the middle distance or beyond. Larger villages. Conservation areas. Railways, major roads, aerodromes and navigable waterways.
Low	Urban and suburban environments. Commercial and industrial property.

11.3.11 The significance of a lighting effect is determined by the interaction of impact magnitude and receptor sensitivity. This is set out in Table 11.5. For the purposes of this assessment, a significant effect is any effect greater than minor adverse.

Table 11.5: Significance matrix for lighting effects

Magnitude of impact	Sensitivity of receptor		
	High	Medium	Low
Large	Major	Major ^a / Moderate ^b	Moderate ^a / Minor ^b
Medium	Major ^a / Moderate ^b	Moderate ^a / Minor ^b	Minor
Small	Moderate ^a / Minor ^b	Minor	Negligible
Negligible	Negligible	Negligible	Negligible
^a for <i>nuisance, loss of amenity and hazard effects</i> ^b for <i>visual effects</i>			

11.4 BASELINE CONDITIONS

Night time survey

11.4.1 A survey was carried out on 08 March 2017. The weather was calm and dry with some cloud cover and the moon phase was 85% full. Several locations were visited and photographs were taken. Details of the survey are given in Appendix 11.2.

Assessment of baseline conditions

11.4.2 The surrounding rural area to the west and south of the Main Site is largely devoid of lighting, apart from settlements such as Milton Malsor, Blisworth and a few further afield. The Main Site itself is unlit.

11.4.3 The M1 motorway, which runs alongside the eastern edge of the Main Site, is lit to motorway standards, as is the M1/A45/A508 grade separated junction. The motorway is in slight cutting and, together with the mature planting in the verges, its lighting is largely screened from most views. However, the lighting associated with the slip roads and elevated junction dumb-bell is visible in many views.

- 11.4.4 Adjacent to the east of the junction lies the Grange Park logistics park and hotels. The lighting of this park is highly visible from some surrounding viewpoints, and local sky glow is discernible above it in many views. Adjacent to the north and east side of the motorway lies the Northampton conurbation, which is well lit and creates local sky glow that is clearly visible from most viewpoints in the surrounding area.
- 11.4.5 From the survey records, it is evident that residential receptors on the north- and east-facing perimeter of both Milton Malsor and Blisworth currently see some lighting effects, especially when looking in the direction of the Northampton conurbation and Grange Park. There are significant patches of sky glow in several directions, and from more elevated positions lighting can be directly sighted. However, residential properties inside the perimeter of these settlements do not see these effects because they are screened by perimeter properties and, furthermore, any local street lighting in the field of view tends to dominate, making the subtler night time effects much less noticeable.
- 11.4.6 The baseline conditions for the Bypass Corridor are similar to those of the Main Site. Nearby residential properties currently see some lighting effects, particularly in the direction of Roade, while the Corridor itself is unlit.
- 11.4.7 Based on the assessments undertaken, and referring to the environmental zone categorisation set out in *ILP Guidance Notes*, most sensitive receptors would be considered as lying within Environmental Zone E2, defined as *Rural, Low District brightness, e.g. Village or relatively dark outer suburban locations*.
- 11.4.8 Table 11.6 summarises the existing sources of light in the area.

Table 11.6: Existing sources of light

Type	Location of source	Lighting description
Commercial, industrial and other non-residential areas	Grange Park	Area and floodlighting. Some light spill onto building facades.
	Swan Valley Industrial Estate	Area and floodlighting..
	Brackmills Industrial Estate	Major source of illumination, albeit further away than other sources.
Major highways	M1 motorway	Lit continuously northwards from Hartwell.
	A45	Fully lit.
	M1/A408/A45 grade separated interchange	Fully lit, elevated position.
Conurbations	Northampton	Street and other lighting.
Smaller settlements	Roade	Local street lighting.
	Blisworth	Local street lighting.
	Milton Malsor	Local street lighting.

- 11.4.9 Sensitive receptors have been identified and the existing night time conditions they experience are summarised in Table 11.7.

Table 11.7: Receptors and baseline conditions

Category of receptor	Receptors	Baseline conditions
(A) Residential properties within 100m of new lit development	Collingtree	Lighting on the M1 motorway dominates and is reinforced by local street lighting and sky glow from the Northampton conurbation. Dark night time views are virtually unobtainable.
(B) Residential properties more than 100m away from new lit development	Milton Malsor	Dark views can be glimpsed from certain properties and in certain directions. However, sky glow from the M1 motorway, Northampton Conurbation and, most noticeably, Grange Park is widely visible.
	Blisworth	Few properties have clear views towards the Site. Those that do, currently see lighting associated with the whole Northampton conurbation, including commercial/industrial development and highway lighting on the M1 motorway.
	Courteenhall village	Remoteness gives rise to many opportunities for dark night views. Towards the horizon from the north-west clockwise to the east, sky glow from the Northampton conurbation, Grange Park and M1 motorway is evident.
(C) Night time views from dark non-residential areas	Courteenhall parkland	Sky glow over the Northampton conurbation, Grange Park and M1 motorway is widely visible but otherwise views are predominantly dark.
	Grand Union Canal	Sky glow over the Northampton conurbation and Grange Park is widely visible but otherwise views are predominantly dark.
(D) Transport)	Roads, railways, airports, navigation	There are no existing adverse lighting conditions.
(E) Night sky views	Rural locations well away from all lighting (including street lights)	On a clear night good quality views of the overhead night sky are obtainable. However, in many directions the quality diminishes towards the horizon due to sky glow from lit development.
(F) Light-sensitive ecology within and very close to the Site and By Pass	Woodland and hedgerows	Habitats for light-sensitive species currently experience negligible light spill.

11.5 ASSESSMENT OF LIKELY SIGNIFICANT ENVIRONMENTAL EFFECTS

Construction

- 11.5.1 Construction related effects are temporary by nature, and change over the course of the construction period. The construction lighting effect will be managed as part of the Construction Environmental Management Plan (CEMP) (Doc 5(2)(q)). This will contain requirements to prevent light spill and glare as well as to minimise the usage of lighting, with especial care taken in proximity to ecologically sensitive locations. The CEMP will specify the types of temporary construction and security lighting to be used, the hours of operation (as part of the agreement of hours of operation of the construction site as a whole), and measures to ensure that construction and security lighting is located and maintained so as to cause minimal effects. This document is not available in draft, but will form part of the final submission.
- 11.5.2 Details of the significance of effects on receptors during construction have been determined and are given in Appendix 11.4, Table A11.4.1. The only significant effect (that is, an effect exceeding minor adverse) is on Milton Malsor properties that have full or partial views of the Main Site. Here, construction lighting effects are predicted to be moderate adverse until the northeast bunds are constructed, whereupon this effect is mitigated. No other significant effects are predicted.

Operation

- 11.5.3 On the Main Site, lighting will operate in all external working areas in order to provide a safe and secure working environment after dark. The design principles to be applied to the external lighting on the Proposed Development are set out in the Lighting Strategy given in Appendix 11.3 (see also paragraph 11.3.8) and the assessment of potential lighting effects in this Chapter is based on this Strategy in conjunction with proposed earthworks bunding and planting shown on the Parameters Plan and other submitted plans. The latter are in part a measure to help contain and limit any potential off-site lighting effects as part of a wider design strategy intended to minimise or eliminate visual impacts on nearby receptors. The landscaping strategy is based around the creation of the substantial perimeter earthworks bund around the western, northern and eastern boundaries in particular, together with tree planting (and retention of existing woodlands on-site).
- 11.5.4 The proposed Bypass will be lit at each of the three roundabouts connecting it into the existing road network. Lighting will extend back from the roundabout along each approach road, typically for a distance of about 100 metres. Lighting will comply with industry standards for highway lighting in rural locations, thus ensuring that all adverse effects are prevented or minimised as far as possible. The remainder of the road will be unlit.
- 11.5.5 Details of the significance of effects on receptors during operation have been determined and are given in Appendix 11.4, Table A11.4.2. No significant effects from lighting on the Main Site are predicted. Several properties situated relatively close to the proposed new roundabouts on the Road Bypass are likely to experience significant effects of 'light presence' (light sources appearing in dark views) but not any other type of lighting effect. This is a visual effect and is a result of the change from the current baseline conditions of relatively dark views in certain directions to a context which sees new lighting introduced. However, these properties will not experience the more intrusive adverse impacts of nuisance and loss of amenity, such as glare or light spill, as light will be directed downwards to the road surface and will not directly shine towards their properties.

11.6 MITIGATION

Construction

- 11.6.1 The CEMP will ensure that, inter alia, any potentially significant lighting effects are sufficiently mitigated.

Operation

- 11.6.2 The Lighting Strategy (Appendix 11.3) in conjunction with proposed earthworks bunding and planting will incorporate all necessary mitigation and design measures to limit off-site lighting effects from the Main Site. Chapter 4 also provides fuller details of the visual mitigation measures.
- 11.6.3 No further mitigation for Main Site lighting is considered necessary – see below regarding residual effects.
- 11.6.4 For the proposed Road Bypass, some mitigation in the form of lower mounting heights or shields/baffles may alleviate any significant light presence effects to some extent.

11.7 RESIDUAL EFFECTS

- 11.7.1 The residual effects will be as set out in Appendix 11.4 Tables A11.4.1 and A11.4.2.
- 11.7.2 As a result of the proposed approach to mitigation and associated design measures, including the principles set out in the draft Lighting Strategy, all residual effects from the Main Site are considered minor adverse or negligible and are therefore not significant.
- 11.7.3 For those receptors potentially affected by lighting on the roundabouts of the proposed Road Bypass, any mitigation that can be applied is unlikely to be sufficient to enable the significance of the adverse light presence effects to be lowered.

11.8 CUMULATIVE EFFECTS

- 11.8.1 Any other approved development in the vicinity of the site will inevitably introduce a new element of night time lighting. This includes most notably the proposed 'Rail Central' SRFI scheme to the west, and the Northampton South Urban Extension at Collingtree to the north on the opposite side of the M1.
- 11.8.2 In the following assessment, it is assumed that each site will be designed to meet best practice standards, with lighting strategies which minimise off-site effects.
- 11.8.3 The cumulative effects of the Proposed Development in conjunction with only the Northampton South Urban Extension are expected to be approximately the same as already assessed. However, the cumulative effects in conjunction with the proposed 'Rail Central' SRFI scheme are expected to be moderate to major adverse for most of the receptors considered in this assessment. This is because the effects from the 'Rail Central' scheme are expected to be considerably greater than those arising from the Proposed Development and are therefore likely to dominate.
- 11.8.4 Consequently, cumulative effects are likely to be significant if the 'Rail Central' scheme proceeds alongside the Proposed Development.

11.9 CONCLUSIONS

- 11.9.1 The Proposed Development will include external lighting that has the potential to give rise to adverse effects. This is to be seen in the context of the existing conditions in the surrounding area, which already contains a significant amount of lighting.
- 11.9.2 A Lighting Strategy has been set out enabling assessment of potential operational lighting effects on sensitive receptors. The Strategy will minimise light pollution in all its forms.
- 11.9.3 The assessment has found that the only significant effect (an effect exceeding minor adverse) for receptors of lighting on the Main Site is likely to be on a few properties in Milton Malsor that have views of the Main Site during construction, and that this effect will be mitigated as soon as the northeast bunds are constructed.
- 11.9.4 Receptors close to the proposed Roade Bypass roundabouts will mostly experience minor adverse effects from highway lighting. However, one property will experience a moderate adverse effect of light presence and seventeen properties will experience a major adverse effect of light presence, although all other types of lighting effect will be negligible or minor adverse.
- 11.9.5 The likely effect of lighting on ecological receptors is reported in Chapter 6 (Ecology and Nature Conservation).
- 11.9.6 Based on all other major sites also implementing best practice measures and lighting strategies to minimise off-site effects, any cumulative effects are likely to be moderate or major adverse and therefore of significance.
- 11.9.7 A detailed lighting strategy, including specific details of the position and type of lighting units to be used for both the construction phase lighting and the built (operational) lighting will be agreed later in the Development Consent process. That detailed strategy will conform with the assumptions and approach set out in this chapter, Appendix 11.3 and the CEMP.