13. **LIGHTING**

13.1 Introduction

13.1.1 This Chapter, which has been undertaken by WSP Environmental Ltd, provides information on the lit environment in the local area around the proposed Winchester City North development, and evaluates the significance and nature of existing and future lighting impacts which may arise as a result of the proposals to develop a new community including local services and schools.

13.1.2 The lighting assessment includes information on the baseline lighting conditions within the area and considers possible mitigation measures to reduce potential light spill, glare and sky glow from existing and future external sources of lighting. The assessment considers the potential lighting impacts during construction and operation particularly in relation to receptors including local residents, the road users and the night-time amenity of the surrounding areas. This Chapter provides an assessment of the impacts of the proposals on the night-time landscape of the surrounding areas, this however, is supplementary to the main Landscape and Visual Impact Assessment included as Chapter 11 of this ES.

13.1.3 The impacts on ecological receptors from artificial lighting are considered in Chapter 10 Ecology.

13.2 Site Description

13.2.1 Barton Farm comprises approximately 93.1ha of agricultural land, located to the north of Winchester city centre. The site lies adjacent to the west of the London to Southampton railway line, which runs along a steep embankment. The site is adjoined by residential development to the south, west and southeast; to the northeast lies the outskirts of the settlement of Headbourne Worthy. Open agricultural land extends away to the north. A number of tracks and paths cross the site.

13.2.2 The site is located immediately to the north of the central built-up area of Winchester. It adjoins Andover Road to the west, a main arterial route into the city from the north, bounded by residential development and the railway line. The northern boundary of the site is formed by Wellhouse Lane, which runs from Andover Road in the west to Worthy Lane to the east.

13.3 Assessment Methodology

Scope of the Assessment

13.3.1 A Scoping Report for an Environmental Impact Assessment (EIA) was submitted to Winchester City Council (WCC) in March 2009. The Scoping Opinion adopted on April 2009 is included at Appendix 2.1 and notes that artificial lighting should be considered in the ES.

13.3.2 A Lighting Impact Assessment has been prepared to assess the following:

- Assess the existing baseline lighting conditions on the site and in the immediate surroundings;
- Assess the likely lighting impacts during the construction and operational phases, particularly in relation to sensitive receptors. These include local residents, ecological receptors sensitive to artificial lighting, the night-time amenity of the surrounding areas and road users (including motorists, cyclists and pedestrians); and
- Provide outline mitigation measures to reduce potential light spill, glare and sky glow from future external sources of lighting.

13.3.3 It is anticipated that the recommendations contained in this Chapter will be used to inform the future detailed lighting design for the proposed development, which should be supported by predictive modelling of light spill. It is anticipated that a detailed lighting design will be developed at the detailed design stage.

Extent of the Study Area

13.3.4 The extent of the study area for the Baseline Lighting Survey has been determined to identify the baseline lighting levels within and along the boundaries of the site at key sensitive receptors, as well as within the immediate vicinity of the site. However, the study area does not consider medium or long distant views into the site as the focus of this assessment is to ensure that statutory nuisance issues from lighting associated with the proposed development towards identified receptors are effectively mitigated.

13.3.5 The study area extends to include the neighbouring residential dwellings bordering the site's western and southern boundaries, as well as to the east at Abbotts Barton.

Consultation

13.3.6 The Environmental Health Department at WCC has been consulted on the scope of the artificial lighting assessment and key issues relating to likely lighting impacts arising during construction and operation of the proposed development. A summary of the consultation responses is provided in Table 13.1 (below):

Table 13.1: Lighting Consultation Response

Consultee	Summary of Response
Winchester City Council – Environmental Health Department	The EIA should include an assessment of potential light nuisance from the proposed non-residential usages (eg community centre, primary school) upon both existing and proposed residential areas.

Method of Baseline Data Collation

13.3.7 The approach and methodology used to assess the baseline lighting conditions on and in the immediate vicinity of the site involved a desk study (including consultation with statutory consultees) and a baseline lighting survey on the site and in the immediate vicinity, as discussed below.

Desk Study

13.3.8 A desk study has been undertaken to identify relevant legislation, planning policy, good practice guidance, local designations and potential light sources in relation to lighting following the standard methodology outlined in *Lighting in the Countryside: Towards Good Practice*, DEFRA, 2001.

13.3.9 The desk study has included consultations with WCC.

Baseline Lighting Survey

13.3.10 A day- and night-time survey was undertaken on 3 April 2003 under a clear sky, with readings being taken between 20:45 and 22:00 hours to establish the existing ambient lighting conditions both on the site and in the immediate area.

13.3.11 During the night-time visit, specific data was recorded in relation to existing lighting. The local illumination (including light spill) and luminance (glare) from externally lit buildings, highways lighting and retail facilities have been recorded. Illuminance was recorded using a Minolta T10 (Serial Number 41021018/60031036) and the luminance readings were made using a Minolta LS100 (Serial Number 79013024). In addition, photographs were taken to illustrate lighting levels and screening around the site and surrounding areas. Sensitive receptors in proximity to the site were identified as part of the desk based study and confirmed through the day-time walkover of the site and surrounding area.

13.3.12 At each of the monitoring locations, vertical illuminance was recorded from north, south, east and westerly directions. A reading of horizontal illuminance was also made at each location. Such readings enable the baseline lighting conditions on and surrounding the site to be benchmarked. The locations of the monitoring location readings are shown on Figure 13.1.

13.3.13 Additionally, a set of luminance readings were taken along with a photographed viewpoint at night-time viewpoint 1 (NV1) to obtain an indication of the current night-time scene viewed from across the site from Andover Road. NV1 is shown on Figure 13.2.

13.3.14 As part of the assessment of baseline conditions, potentially sensitive receptors to light have been identified, including:

- Residential properties to the south, northeast and west;
- Roads adjacent to the site;
- The railway line;
- Public Rights-of-Way on the site; and
- Important species sensitive to artificial light.

Table 13.2 Description of Monitoring Locations

Location	Description
NV1	B3420 Andover Road North, adjacent to Stoney Lane
A	B3420 Andover Road North, adjacent to Mountbatten Court
B	Harestock Close, adjacent to B3420 Andover Road North
C	B3420 Andover Road North, opposite Well House Lane
D	Courtenay Road
E	Park Road
F	Stoney Lane
G	On Public Right-of-Way – Centre of site
H	Well House Lane, adjacent to Well House Cottage
I	Cul-de-sac at north of Courtenay Road

13.3.15 The baseline lighting levels on and surrounding the site are described with reference to the Environmental Zone Criteria for light trespass into windows (measured in lux) as outlined in ILE Guidance Notes for the Reduction of Obtrusive Light (ILE, 2005, provided as Appendix 13.1). Both pre-curfew (referred to where light sources are switched off before the recommended 2300hrs curfew time) and post curfew (referred to if light sources remain on throughout the night-time period such as highways and street lighting) standards have been referred to as part of the assessment, and a judgement has been made as to the likelihood of light sources remaining switched on throughout the night-time period.

13.3.16 In accordance with ILE Guidance Notes (ILE, 2005), the following definitions are used to describe lighting effects in this assessment:

- **Sky glow**: the upward spill of light into the sky which can cause a glowing effect and is often seen above cities when viewed from a dark area.
- **Light spill:** the unwanted spillage of light onto adjacent areas and may affect sensitive receptors, particularly residential properties and ecological sites.
- **Glare:** the uncomfortable brightness of the light source against a dark background which results in dazzling the observer, which may cause nuisance to residents and a hazard to road users.
- **Light trespass (into Windows)**: the spilling of light beyond the boundary of a property which may cause nuisance to others.

Significance Criteria

13.3.17 The assessment of likely impacts as a result of the proposed development has taken into account both the construction and operational phases. The significance level attributed to each impact has been assessed based on the magnitude of change due to the proposed development, and the sensitivity of the affected receptor/receiving environment to change. Magnitude of change and the sensitivity of the affected receptor/receiving environment are both assessed on a scale of high, medium, low and negligible.

13.3.18 The criteria used to determine the “significance” of any change in baseline lighting levels have been defined qualitatively using professional judgement and best practice guidance (as identified above). The lighting assessment has followed the methodology outlined in “Lighting in the Countryside: Towards Good Practice” (DEFRA, 2001). The criteria used to assess the magnitude and significance of the effects of artificial lighting has been derived from the ILE Guidance Notes for the Reduction of Obtrusive Light (ILE, 2005). Reference has been made to the Environmental Zone Criteria for light trespass into windows (measured in lux) as defined as:

- E1: Intrinsically Dark Landscapes - "National Parks", Areas of Outstanding Natural Beauty (AONB) or other dark landscapes;
- E2: Low District Brightness Areas – rural, small village or relatively dark urban locations;
- E3: Medium District Brightness Areas - small town centres or urban locations; and
- E4: High District Brightness Areas – town/city centre with high levels of night-time activity.

13.3.19 The ILE Guidance Notes (2005) propose that where a District classification falls between two zones that the more rigorous environmental zone standards are applied in the design of the lighting eg an E2 Environmental Zone would be selected in preference to an E3 Environmental Zone. The guidelines and threshold values for the environmental zones are outlined in Table 13.3, with further details provided in Appendix 13.1. In addition, a glossary of lighting terminology used in the assessment is provided in Appendix 13.2.

Table 13.3: Obtrusive Light Limitations for Exterior Lighting Installations (ILE, 2005)

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Environmental Zones	**Sky Glow ULR (Max %)**	**Light Trespass into Windows Ev (Lux)**		**Source Intensity I (kcd)**		**Building Luminance Average, Pre-curfew**
		Pre-Curfew	**Post-Curfew**	**Pre-Curfew**	**Post-Curfew**	**Average L (cd/m^2)**
E1	0	2	1	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5	10	2	10	1.0	10
E4	15	25	5	25	2.5	25

Source: ILE Guidance Notes for the Reduction of Obtrusive Light (2005)

Notes to Table 13.3:
- ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky;
- Ev is Vertical Illuminance in Lux;
- I is Light Intensity in Candelas;
- L is Luminance in Candelas per square metre; and
- Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 11pm - 7am.

13.3.20 In the absence of statutory guidance, the ILE Guidance Notes (2005), referred to above, have been used as suitable criteria against which to assess the effects of artificial lighting. The guidance levels for light trespass into windows have been used as the principal criteria for assessing the likely impacts associated with the proposed development. However, given the subjective nature of sky glow and glare, it is difficult to quantify the potential impacts due to a number of variables, including the fact that sky glow is measured as a percentage change and glare from a light source is dependant on the type and distance from the light source. To-date there are also no set criteria to quantify the potential effects on ecological and landscape receptors.

13.3.21 Therefore, in addition to the criteria provided in the ILE Guidance Notes (2005), the impact magnitude and significance and duration of the impacts have been evaluated using the WSP assessment scale outlined below.

Impact Magnitude

13.3.22 The magnitude of any effects has been determined using the following four point scale:

- High - significant deterioration/improvement in local conditions or circumstances;
- Medium - readily apparent change in conditions or circumstances;
- Low - perceptible change in conditions or circumstances; and
- Negligible - no discernable change in conditions or circumstances.

Impact Significance

13.3.23 The overall significance of an effect has been determined by measuring the magnitude of the residual effect against:

- The number of receptors affected, which will determine the scale of an effect, whether it is local, regional or national;
- The duration of the effect;
- The type and sensitivity of the receptor affected; and
- The type of effect.

13.3.24 The significance of any effects has been measured using the four point scale outlined in Table 13.4 below:

Table 13.4: Significance Criteria used in the Assessment

Significance	Definition
Major Positive	Major decrease in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, resulting in a noticeable or major improvement in baseline conditions and is well within the recommended ILE guidance levels.
Moderate Positive	Moderate decrease in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, resulting in a moderate improvement in the current baseline conditions and is within the recommended ILE guidance levels.
Minor Positive	Minor decrease in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, resulting in a perceptible improvement in baseline conditions and is within the recommended ILE guidance levels.
Negligible	Negligible or barely perceptible change in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties and would cause a negligible or barely discernible change to current baseline conditions.
Minor Negative	Minor increase in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, would cause a minor perceptible change in baseline conditions, which are slightly above recommended ILE guidance levels but where current uses could still be maintained.
Moderate Negative	Moderate increase in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, and would result in a noticeable effect on baseline conditions, moderately in excess of the recommended ILE guidance levels.
Major Negative	Major increase in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties, and would result in a major effect on baseline conditions, significantly in excess of the recommended ILE guidance levels.

Notes to Table 13.4:

- Baseline conditions above refer to the conditions recorded on and in the immediate vicinity of the site during the baseline lighting survey.
- These classifications have been applied indicatively based on the baseline lighting conditions recorded at the Site, available information and guidance levels contained in the ILE Guidance Notes for the Reduction of Obtrusive Light (ILE, 2005).

Impact Duration

13.3.25 In determining the overall significance of an effect distinction has been made between temporary and permanent effects based on the following WSP timescale:

- Short Term – the effects from lighting would be of short duration and would not last more than two to five years from the commencement of the works;
- Medium Term – the effects from the lighting would take five to 15 years to be mitigated; and
- Long Term – the effects from the lighting would be reasonably mitigated over a long period of time (15 years or more) and includes permanent effects.

13.4 Legislation, Planning Policy & Guidance

Legislative Framework

Clean Neighbourhoods and Environment Act (CNEA) 2005

13.4.1 The *Clean Neighbourhoods and Environment Act (CNEA) 2005* gives Local Authorities and the Environment Agency additional powers to deal with a wide range of issues by classifying light pollution as a statutory nuisance.

13.4.2 The CNEA 2005 amends section 79(1) of the *Environmental Protection Act 1990* to extend the statutory nuisance regime to include light pollution and the impacts from artificial lighting stating the following:

> *"(fb) artificial light emitted from premises so as to be prejudicial to health or a nuisance".*

13.4.3 Guidance produced on Sections 101-103 of the *CNEA 2005* by DEFRA in April 2006 extends the duty on Local Authorities to ensure their areas are checked periodically for existing and potential sources of statutory nuisances including nuisances arising from artificial lighting. Local Authorities must take reasonable steps to investigate complaints of such nuisances from artificial light. Once satisfied that a statutory nuisance exists or may occur or recur, Local Authorities must issue an abatement notice (in accordance with section 80(2) of the *Environmental Protection Act 1990*), requiring that the nuisance cease or be abated within a set timescale.

National Planning Policy

Planning Policy Statement (PPS) 23

13.4.4 At a national level, the relevant planning policy for lighting is outlined in PPS23: Planning and Pollution Control. PPS23 requires planning authorities to take account of the possible polluting impact of lighting in preparing local development documents. Support for combating light pollution was planned to be strengthened with a new annex on light pollution and a requirement for LPAs to have policies covering acceptable types of lighting. Whilst a draft has been completed, it is understood that the Government will not be taking it forward at this time. Should it be released in the future the annex would be subject to full public consultation.

Regional Planning Policy

Regional Spatial Strategy (RSS) for the South East – The South East Plan

13.4.5 There are no specific polices in the South East Plan, Core Regional Polices, relating to light pollution and the effects from the introduction of artificial light sources as part of new development proposals. The South East Plan notes however that actions and decisions associated with development and the use of land should actively encourage the conservation and, where appropriate, the enhancement of the character, distinctiveness, and sense of place of settlements and landscapes throughout the region. The South East Plan states that opportunities for creating a high quality environment should be sought, based on a shared vision that places emphasis on good design, innovation, sustainability and achieving a high quality of life.

Local Planning Policy

Winchester District Local Plan (Adopted 2006)

13.4.6 The relevant polices in relation to artificial lighting in the Local Plan include the following:

- Policy CE5 (untitled) on landscape, which states:

  "Development which fails to respect the character of the landscape, or harms the key characteristics of the Landscape Character Area concerned (as set out in Appendix 2) will not be permitted".

- Policy DP10 (untitled) on pollution (including light pollution), which states:

  "Development which may generate air, land, light, surface water or groundwater pollution, and which accords with other relevant policies of this Plan, will only be permitted where the Local Planning Authority is satisfied that it has been designed to reduce the impact to an acceptable level. Proposals should comply with statutory standards of environmental quality and environmental protection policies required by the pollution control authorities, and include a statement setting out how the requirements have been met in designing the proposal".

Guidance

13.4.7 Other guidance documents that have been referred to as part of the assessment include the following:

- Institute of Lighting Engineers (ILE) (2005) Guidance Notes for the Reduction of Obtrusive Light;
- DEFRA (2001) Lighting in the Countryside: Towards Good Practice;
- BS 5489 (2003) Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas; and
- BS 13201 (2003) Road Lighting – Part 2: Performance Requirements.

13.4.8 The ILE Guidance Notes referred to above are provided in Appendix 13.1.

13.5 Baseline Conditions

13.5.1 The site is presently unlit. There is currently highways lighting along the B3420 Andover Road North, along the western boundary of the site.

Lighting Survey

13.5.2 A lighting survey was undertaken on 3 April 2003 under a clear sky, with readings being taken between 20:45 and 22:00 hours.

13.5.3 The site remains unchanged (unlit) since the date of the survey and it is considered that the baseline survey results remain representative of the site and surrounds.

13.5.4 Readings of illuminance (light spill) were recorded at a total of nine locations (A-I) in the vicinity of the site. Additionally, luminance (glare) readings and a further set of illuminance readings were taken along with an illustrative photographed viewpoint (NV1). The locations are illustrated on Figure 13.1, and the results of the survey are presented in Table 13.2 below:

Table 13.2 Comparison of Illuminance Levels Surrounding the Proposed Site

	VERTICAL ILLUMINANCE (LUX)				
LOCATION	***Facing North***	***Facing East***	***Facing South***	***Facing West***	**Horizontal Illuminance (Lux)**
1	2.3	4.3	4.9	0.30	3.3
A	0.91	6.8	3.4	2.5	6.0
B	0.40	0.34	0.05	0.46	0.11
C	2.8	7.5	5.7	0.46	4.1
D	0.39	1.2	0.10	1.1	0.18
E	0.09	1.9	0.46	0.37	0.52
F	0.35	0.74	0.50	1.2	0.32
G	0.01	0.03	0.07	0.04	0.07
H	0.02	0.05	0.06	0.04	0.08
I	0.07	1.7	2.1	0.09	0.69

The Site

13.5.5 At present lighting on the site is limited, with just a small number of security lights in the area of Barton Farm itself. Scattered lights are visible in all directions, but predominantly to the southwest, towards the centre of Winchester. Due to the lack of significant lighting both the vertical and horizontal illuminance levels recorded in the centre of the site were low, less that 0.1 lux. Although these levels are typical of an E1 Zone, the presence of lighting in the surrounding areas indicates that the area should be considered an E2 Zone, a low brightness district, typical of a rural location.

Well House Lane

13.5.6 The only lighting along Well House Lane (between Andover Road and the railway line), is provided by passing vehicles and lighting associated with Well House Lane Cottage. Although street lighting can be seen on the B3420 to the west, the illumination levels recorded at this location are similar to those on the site, with both horizontal and vertical levels being recorded below 0.1 lux. Such levels are typical of an E1 Zone, however, the presence of lighting in the surrounding areas indicates that Well House Lane should be considered an E2 Zone, a low brightness district, typical of a rural location.

Courtenay Road, Abbots Barton

13.5.7 Street lighting is provided along Courtenay Road, comprising 6m high columns located on alternate sides of the road at 30m intervals. Old fashioned post top luminaires with orange low pressure sodium lamps are used, offering poor control in terms of upward light loss and light spill. Additionally lights from windows, sky glow and lighting in Winchester city centre and highways lighting along the B3420 Andover Road were also visible.

13.5.8 Monitoring Locations D and I provide details of the typical vertical and horizontal illumination levels along Courtenay Road, the maximum levels recorded were 2.13 lux (facing south) and 0.69 lux respectively. These illuminance levels indicate low overall illuminance levels and that prior to any curfew time the levels of light into windows of the nearby residential properties would be unlikely to cause a nuisance, primarily due to current underlighting.

13.5.9 The residential area including Courtenay Road should be considered to be an E2 Zone, typical of a rural or small village location.

Surrounding Residential Areas

13.5.10 The street lighting in Courtenay Road is typical of that installed in the residential areas surrounding the site. Typically street lighting in these roads comprising 6m high columns located approximately 30m apart on alternate sides of the road, fitted with old fashioned orange low pressure sodium lamps. The luminaires are generally of the post top type, considered unsuitable for rural areas, with a smaller number of both reflector and refractor optic luminaires. A number of lamp units were not functioning at the time of visit. At monitoring locations E and F, both in residential roads, with moderate traffic use, the maximum vertical and horizontal illuminance levels recorded were 1.9 lux and 0.52 lux respectively.

B3420 Andover Road North – West of the Site

13.5.11 Night-time Viewpoint 1 (NV1; Figure 13.2) and Monitoring Location A are representative of both residential and highways receptors along the B3420. The highways lighting along the B3420 operates continuously throughout the hours of darkness. Reflector optic luminaires, with a shallow bowl lens and white high pressure sodium lamps are mounted on approximately 8m high columns on alternate sides of the road at an interval of approximately 35m. Such light fittings provide good control of upward light loss and light spill.

13.5.12 Glare was recorded at 71.5cd/m^2 from a security light located on buildings at Barton Farm, at a distance of approximately 150m. However, the highways lighting also generated significant glare, up to 626.5 cd/m^2.

13.5.13 Maximum levels of vertical and horizontal illuminance recorded at Monitoring Location A were 6.8 lux (facing east) and 6.0 lux respectively. These levels are considerably higher than the surrounding residential areas, and would indicate that light into windows could exceed the 5 lux guidance level prior to curfew for an E2 Zone. Therefore the area along the B3420 to the west of the site should be considered to be an E3 Zone, of medium brightness, typical of urban locations.

B3420 Andover Road North – Northwest of the Site

13.5.14 Monitoring Locations B and C are adjacent to the B3420, to the northwest of the site. The highways lighting is similar to that provided at NV1, with the addition of a number of extra lamps to provide sufficient coverage of the junction areas.

13.5.15 Glare from the lamps was recorded between 941.1 and 36.75 cd/m^2, and although the maximum value is high, the recorded level of glare very quickly reduces with distance from the light source.

13.5.16 Levels of illumination are similar to other stretches of the B3420, with maximum vertical and horizontal illuminance recorded at 7.5 lux (facing south) and 4.1 lux respectively at Location C. Monitoring Location B on Harestock Close is separated from the B3420 by a 6-8m tall hedge, which provides excellent screening of light spill, with the maximum vertical and horizontal illuminance levels recorded to be 0.46 lux (facing west) and 0.11 lux respectively. These locations should be considered an E3 Zone, of medium brightness.

13.6 Identification and Evaluation of Key Impacts

Construction Phase

13.6.1 The assessment of the effects of lighting during construction has been based on outline information regarding the project proposal. The principal lighting impacts which are often associated with construction sites and would be relevant at this location are as follows:

- temporary floodlighting particularly during the winter months;
- temporary security lighting;
- lights at height associated with construction of structures;
- lights in the contractors compound and car parking areas;

- light spill and glare towards surrounding residential receptors areas predominantly to the south and west of the site; and
- glare from illuminated advertisements.

13.6.2 Construction impacts are temporary in their nature, however prior to mitigation the impacts could range between minor to major negative.

Operational Phase

13.6.3 A detailed lighting design will be prepared for the development by specialist lighting contractors, this is, however, not available at this time and is anticipated to be drawn up at later detailed design stages in consultation with WCC (as a likely condition of development). It is expected that the lighting to be installed on the site will be predominantly street lighting along distributor and residential roads. Other lighting expected will include car park lighting, lighting for the park and ride site, security lighting and any lighting of recreational facilities e.g. NEAPs and LEAPs. Dedicated pedestrian and cycle ways may require lighting. The proposed pedestrian and cycle route connecting to Worthy Road to the east of the site should not be lit for reasons of visual impact.

13.6.4 The playing fields are not proposed to be floodlit, and therefore potential light nuisance impact from such lighting is not considered.

13.6.5 This section describes potential impacts from lighting such as glare, light spill and skyglow and appropriate mitigation measures.

13.6.6 Any car park lighting and street lighting should be designed to comply the guidance contained within BS5489-1:2003 and BS13201-2:2003, with the appropriate level for the proposed use of each road taken into account. Average illuminance levels range from 3.5 lux for residential roads in a low crime area, to 10 lux where night time use is likely to be high, particularly those associated with local amenities.

13.6.7 The following potentially significant lighting impacts from the operational phase of the proposed development are listed below:

- light spill and glare from the installation of street lighting on distributor and residential roads across the site;
- light spill from windows in the development;
- fugitive upwards lighting from street lighting (will add to sky glow in the surrounding area);
- temporary and intermittent glare from the headlamps of vehicle using the site ;and
- potential glare and light spill from security lighting.

13.6.8 Prior to mitigation the impacts from particularly light spill and glare should be considered to be of up to moderate negative impact, due to the very low levels of existing lighting on the site. Prior to mitigation the impacts from vehicle lights and on sky glow in the surrounding area should be considered to be minor to moderate negative impacts.

13.7 Enhancement and Mitigation Proposals

Construction

13.7.1 The key opportunities to mitigate lighting impacts by implementing best practice during construction, potentially as part of a Construction Environmental Management Plan, will include:

- specified working hours, uses of lighting, location of temporary floodlights and construction compound to be agreed with Winchester City Council;
- lighting to be switched off when not required specifically for construction activities or required for security or heath and safety;
- the programme of works will take into account the location of sensitive receptors, particularly to the south and west of the site;

- glare caused by poorly directed security and flood lighting, will be minimised by positioning lights to <70 degrees and directing into the centre of the site. Particular attention will be needed regarding the potential for glare distraction to train drivers and motorists;
- light spill will be minimised by avoiding poorly sighted lights on the boundary of the development; and
- sky glow will be minimised by use of modern flood lights with appropriate shields to avoid light spilling upwards.

13.7.2 Should any illuminated advertising installed to advertise the development during construction the signage should be carefully illuminated in order to minimise glare, and follow best practice guidelines in ILE Technical Report 5, Brightness of Illuminated Advertisements (2001).

13.7.3 Additionally screening is provided by trees and the railway line to the east of the site, this will serve to minimise impacts on the residential properties to the northeast, east and southeast of the site.

Operation

13.7.4 The future detailed lighting design will be designed to use current best practice and technology, and will be agreed with Winchester City Council as part of a later Reserved Matters application. Additionally the proposals for the development include a comprehensive landscaping strategy that will further reduce the impacts of any lighting installed by providing screening.

13.7.5 It is important to note that the land uses proposed (predominantly residential) are typically lit with a lighting specification unlikely to trigger nuisance complaints. In addition to this the playing fields will not be floodlit, and there are opportunities to introduce a lighting curfew at the park-and-ride site associated with its proposed opening hours – this could be secured through Condition.

13.7.6 The impacts of the external lighting will be minimised by the installation of lighting to the minimum specification required to provide a safe night time environment for residents and others using on site facilities eg primary school. Therefore lighting will be designed to comply with the minimum illuminance levels given within the appropriate guidance.

13.7.7 Sky glow is limited in the areas surrounding the site, however, it is visible to the south in the direction of the wider Winchester urban area. The site is currently located in an E2 zone, it is therefore recommended that luminaries that conform to the E2 Environmental Zone Standard, typical of a rural town or village location, are installed. This would require luminaires that permit up to 2.5% sky glow upward lighting ratio, however, it would be prudent to choose a high specification where possible. Such a specification would have a better performance than the majority of existing light fittings in the residential areas surrounding the site.

13.7.8 All lamps used for external lighting should be high pressure sodium lamps of the same colour temperature. The whiter light emitted by high pressure sodium lamps provide superior colour rendering to the more orange low pressure sodium lamps, and additionally reduce impacts on the night time scene (due to their poor performance low pressure sodium lights have now been phased out for new development or lighting upgrades). Additionally care should be taken to minimise glare from any luminaires installed, by ensuring the correct luminaire is selected and installed correctly, in lines with the following recommendations within ILE Guidance Notes for the Reduction of Obtrusive Light (2005) – this could be secured by condition as part of a detailed lighting design to be agreed by WCC:

- Where practicable, switch off lights when not required for safety, security or enhancement of the night-time scene (this could be achieved through automatic timer in appropriate locations);
- The lighting design prepared at the detailed design stage should utilise low light pollution flat glass luminaires throughout to ensure adherence with Environmental Zone E2 requirements;
- Low level bollard lights could be proposed as a subtle alternative to taller columns along the footpaths and cycle routes;
- Avoid "over-lighting" by reference to appropriate standards;

- To keep glare to a minimum, ensure that the main beam angle of all lights directed towards any potential observer is kept below 70 degrees. It should be noted that the higher the mounting height, the lower can be the main beam angle;
- Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit;
- For road lighting, light near to and above the horizontal should be minimised.

13.7.9 The impact of glare from vehicle headlamps using the site will be minimised by the layout of the site providing limited access onto the rerouted B3420, and therefore limiting roads directly facing any existing nearby residential properties. Landscaping of the site will serve to further reduce the impact of vehicle headlights.

Residual Impacts and Effects

Construction

13.7.10 The construction works will be temporary in nature and many of the potential impacts would be minimised by application of the mitigation measures above. Overall there would be a minor negative residual impact, primarily due to the installation of lighting on areas that are currently unlit, impacting of the night time environment, particularly with respect to residential properties, roads and public rights-of-way overlooking the site.

13.7.11 Mitigation to best available technology can be delivered as part of a CEMP for the site during construction.

Operation

13.7.12 After mitigation it is considered that there will be overall a minor negative effect from the lighting of the proposed scheme on residential receptors and road users. Taking into account the rerouted B3420, the nature of the land uses proposed and landscaping treatment, there will be a minor negative residual effect in terms of the night-time visual impact. The use of well located, modern light fittings, will minimise glare, light spill and reduce skyglow contributions to the existing skyglow above Winchester.

13.7.13 Vehicles, cyclists and pedestrian will not be adversely impacted following mitigation, as glare will be minimised through design, and lighting levels will be sufficient to provide safe transport routes (although the proposed pedestrian and cycle route connecting to Worthy Road to the east of the site should not be lit for reasons of visual impact). Lighting across the site will be compliant with British Standards, providing a safer (but less obtrusive in terms of glare) night time environment than many of the surrounding areas.

13.7.14 The potential effect on ecological receptors on and surrounding the site is considered in Chapter 10 Ecology. The best practice lighting design proposed will minimise impacts to best available technology and opportunities can be explored for dark corridors to be retained, opportunities are along the railway corridor and through the green corridor through the centre of the site.

13.7.15 Levels of illuminance at the windows of residential receptors are unlikely to be increased by the proposals, and the rerouted B3420 will provide an opportunity for the lighting along the existing B3420 alignment to be redesigned with likely improvements with respect to lighting.

13.8 Summary

13.8.1 An assessment of the external lit environment on and in the immediate vicinity of the site was undertaken as part of the baseline lighting survey. Readings of both illuminance (light spill) and luminance (glare and sky glow) were recorded at key monitoring locations supported by night time viewpoint images to illustrate the current night time scene, particularly in the vicinity of sensitive residential properties.

13.8.2 During the survey, conditions indicative of an E2 Environmental Zone were recorded on the site, which is currently unlit, and taking into account the surrounding land uses.

13.8.3 During the construction phase, the principal lighting impacts are likely to be associated with the requirement for temporary lighting to illuminate temporary car parking areas, the contractor's compound and work areas. In order to mitigate temporary impacts on surrounding sensitive receptors the lighting requirements at the site will be managed as part the CEMP. Installed lighting will involve the use of well located, modern light fittings which are directionally controlled and will be in accordance with current best practice standards and WCC requirements. The temporary lighting will be specific to those areas of the site that require illumination during the night-time period to ensure both on-site safety and security while ensuring that the effects of light spill, glare and sky glow towards sensitive receptors are effectively mitigated. Overall, the residual effect on sensitive receptors during the construction phase will be short term and temporary in nature and considered to be of minor negative significance as a worse case.

13.8.4 During the operational phase, the likely impacts include the introduction of artificial light sources as part of the Proposed Development which will result in changes to the current baseline conditions in the built development part of the site. However, the proposed realignment of the B3420 may provide an opportunity to introduce new modern lighting, potentially reducing the extent, or potentially column height, of lighting currently affecting residential receptors facing the A3420, thereby improving lighting in this location.

13.8.5 The effects on sensitive receptors will be mitigated through the implementation of a stringent lighting design, which will include the use of low light pollution fittings which retain light spill within the built development area, minimising the loss of light to the night sky and glare discomfort to on-site or neighbouring receptors (including train drivers). In addition the playing fields will not be floodlit and there are opportunities to introduce controlled lighting at the park-and-ride site, potentially including a lighting curfew. In addition to the above, landscape treatment and the orientation of buildings etc. will provide additional screening from proposed lighting on the site. Overall, the residual effect on sensitive receptors during the development's operation is considered to be of minor negative significance (worse case) compared to the existing conditions on the site.

13.8.6 Following the implementation of appropriate mitigation, the proposed development will comply with the relevant policies, legislative requirements and best practice guidance in relation to external lighting and minimising light pollution. The lighting design for the proposed development (to be prepared at later design stages) will provide the minimum amount of lighting necessary to provide a safe and secure environment for users of the site, and will minimise potential impacts on local amenity (including adjacent residential properties), the visibility of the night sky, and the safety of road users (both existing and future) to ensure that the potential effects on surrounding sensitive receptors from light spill, glare and sky glow are minimal and of an acceptable level.

13.9 References

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Public Health Act 1985;

Parish Councils Act 1957;

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