

Land south and east of Adastral Park *Suffolk*

Lighting Statement

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Contents

1	Introduction	1
2	Background Information	1
3	Existing Site Conditions	3
4	Proposed Development	6
5	Summary	9
6	Limitations	9

Appendix

Lighting Survey Results

1 Introduction

- 1.1 Brookbanks Consulting Ltd is appointed by Carlyle Land Ltd and Commercial Estates Group to complete a Lighting Appraisal to support a planning application for development on land south and east of Adastral Park, Ipswich. The development will consist of:
- 2,000 Dwellings
 - Employment area of circa 0.6ha (use Class B1)
 - Primary local centre (comprising use Classes A1, A2, A3, A4, A5, B1, C3, D1 and D2)
 - Secondary centre (comprising possible use Classes A1, A3 and A5)
 - School
 - Green infrastructure (including Suitable Accessible Natural Green Space (SANGS))
 - Outdoor play areas
 - Sports ground and allotments/community orchards)
 - Public footpaths and cycleways
 - Vehicle accesses and associated infrastructure
- 1.2 The Report considers the methodology and results following the completion of investigations assessing:
- Existing Site baseline lighting conditions
 - Proposed Development lighting arrangement

2 Background Information

Location & Details

- 2.1 The proposed development lies to the east of the town of Ipswich in Suffolk. The Site is bound to the west by the A12 (London to Lowestoft Road) and also to the adjoining road to the south (Ipswich Road). The north-west of the Site is bound by the already established BT Adastral Park Complex.
- 2.2 The Site location and boundary are shown below on Figure 2a:

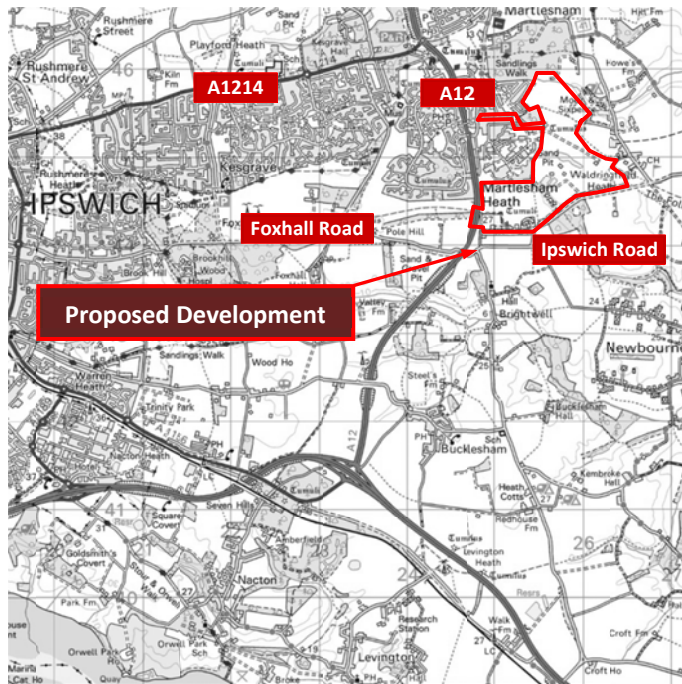


Figure 2a: Site Location

Description of Development

- 2.3 Outline application for up to 2,000 dwellings, an employment area of c0.6ha (use Class B1), primary local centre (comprising use Classes A1, A2, A3, A4, A5, B1, C3, D1 and D2), secondary centre (comprising possible use Classes A1, A3 and A5), a school, green infrastructure (including Suitable Accessible Natural Green Space (SANGS), outdoor play areas, sports ground and allotments/community orchards), public footpaths and cycleways, vehicle accesses and associated infrastructure.

Legislative Framework

- 2.4 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (1990). Lighting nuisance is given by the following definition:

"Artificial light emitted from premises so as to be prejudicial to health or a nuisance;"

- 2.5 More recently, the National Planning Policy Framework (NPPF) sets out the Government's core policies and principles with respect to planning. With regard to lighting, this includes the following relevant to the assessment:

"By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

- 2.6 The implications of the NPPF have been considered throughout this assessment

Institute of Lighting Engineers Guidance

- 2.7 Luminaires associated with any proposed development have the potential to cause light trespass into residential properties in the vicinity of the Site. The Institute of Lighting Engineers (ILE) has developed an Environmental Zone

classification system for the categorisation of assessment locations. Figure 2b below provides an overview of this information.

Environmental Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically Dark	National Parks Areas of Outstanding National 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

Figure 2b: ILE Environmental Zone Classifications

- 2.8 For each environmental zone, the guidance has identified pre and post curfew luminance levels for external lighting installations. These values are shown in Figure 2c below:

Environmental Zone	Sky Glow URL (Max %)	Light Intrusion (into windows) E_v [lux]		Luminaire Intensity I [candelas]		Building Luminance Pre-curfew
		Pre Curfew	Post Curfew	Pre Curfew	Post Curfew	Average L [candelas]
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

Figure 2c: ILE Obtrusive Light Limitations for Exterior Installations

- URL** - Upward Light Ratio of the Installation
- E_v** - Vertical luminance in lux
- I** - Light Intensity in Candelas (cd)
- L** - Luminance in Candelas per square metre (cd/m^2)
- Curfew** - the time after which stricter requirements for the control of obtrusive light will apply (usually 2300hrs)
- *** - Permitted only from public road lighting installations

3 Existing Site Conditions

- 3.1 The proposed development land is currently undeveloped and in agricultural use, resulting in areas where there is limited light spillage. There are some existing light sources, these are outlined below:

- Headlights from vehicles following the route of the A12 London to Lowestoft Road to the east of the site and Ipswich Road to the south of the site.
- Flood lights from the BT Adastral Park Complex to the north-west of the site.
- General domestic and security lighting from residential/farm properties to the south, east and west of the site.
- General domestic and security lighting from the residential area of Martlesham, beyond the A12 Dual Carriageway.

- 3.2 The boundary of the site is however outlined by mature hedgerows which act as a buffer for some of the light spillage that may enter the site from the above mentioned potential sources. These mature hedgerows are largely to be retained within the proposed development.

- 3.3 For the purposes of this assessment, the baseline lighting condition is therefore considered to be a standard non-artificially illuminated situation. The following lighting levels are generally considered representative:

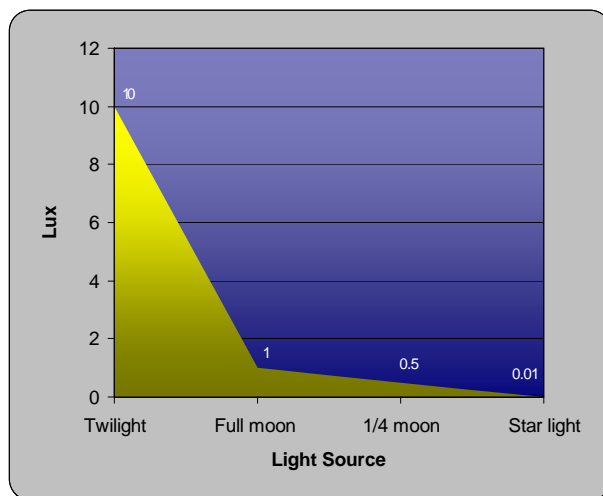


Figure 3a: Standard Non-Artificial Lighting Levels

Receptors

- 3.4 Street lighting will be required within the proposed development and this coupled with the effects of residential lighting has to be considered in the context of potential lighting sensitive receptors.

Existing Baseline Survey

- 3.5 The extent of the study area for the baseline lighting survey has been determined to identify the baseline lighting levels at the location of the Proposed Development, within and along the boundaries of the Site at key sensitive receptors.
- 3.6 Readings were taken on 17th February 2017 between the hours of 19.30 – 21.31 under skies with approximately 85% cloud cover. The moon did not have a strong visual presence and was not considered to have influenced ambient lighting levels recorded during the survey. Figures 3b and 3c illustrates this within two photographs that were taken during the site visit:

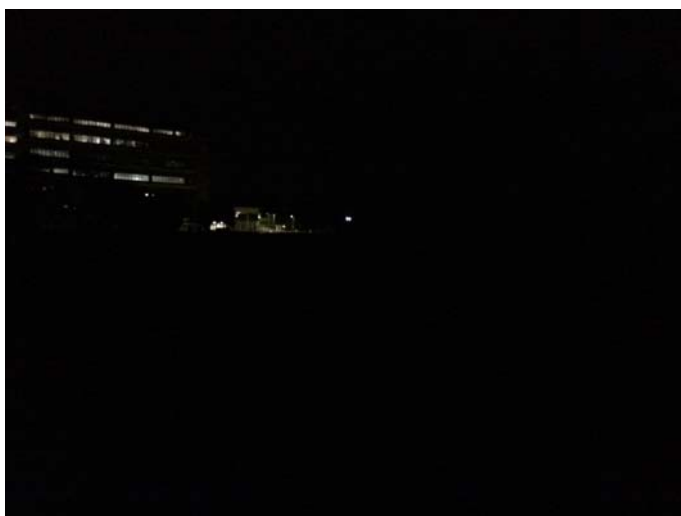


Figure 3b: View looking north-east from site (near BT Adastral Park Complex)



Figure 3c: View looking north-west from site (at Entry to Quarry from Ipswich Road)

- 3.7 Readings were taken of the existing ambient lighting levels and existing lighting installations on the Site and in the surrounding area.
- 3.8 The following light meter, maintained and calibrated to British Standards BS-667, was used during the baseline lighting survey:
- ATP LX-8809A Serial Number: 11069302
- 3.9 The readings demonstrated that the Site in general experiences negligible levels of luminance. This is demonstrated in the attached drawing in the Appendix.
- 3.10 It is noted that the Quarrying Area in the centre of the site uses flood lighting occasionally. However, this was not in use the night that the site inspection was carried out. In addition, the Quarrying Area is proposed to be developed with the rest of the site, therefore the floodlights will be decommissioned and removed as part of the development.
- 3.11 As demonstrated in the attached drawing in the Appendix, parts of the site experience slightly higher levels of luminance. However this level of glare from the nearby BT Adastral Park Tower is not considered to be significant. Therefore it can be considered that this part of the site shall not be affected by excessive glare from adjacent light sources.

Environmental Zone Classification

- 3.12 Based on the results of the light survey and criteria shown in Figure 2c above, the area surrounding the Site is classified as Environmental Zone E2 – Intrinsically Dark. This is because all of the monitoring results indicated luminance of less than 2.0 Lux.

4 Proposed Development

Construction Lighting Impacts

- 4.1 It is anticipated that the main construction works will be associated with site clearance and preparation works, the installation of temporary and permanent access roads and footpaths, and the construction of the buildings and other structures.

- 4.2 The following temporary lighting requirements are expected during the construction phase:
- Lighting within temporary car parking and compound areas, for security and health and safety purposes.
 - Security and health and safety lighting for use within ongoing working areas.
 - Internal and external lighting for temporary office units and compound facilities.
- 4.3 To avoid undue light spill, glare and/or sky glow, such lighting can be controlled to ensure that it is sensitively installed, correctly angled with baffles if necessary. Such construction lighting will be temporary.
- 4.4 There is potential for disturbance from lighting generated from plant and construction vehicles. But this is considered infrequent and minimal due to the standard working hours requirements. Construction works would not occur during late evening or night-time hours.

Mitigation of Construction Lighting Impacts

- 4.5 A Draft Construction Environmental Management Plan (CEMP) has been prepared and submitted to the clients. This draft submitted CEMP will be provided as part of the outline planning application and will be agreed in advance of commencement of the construction activities. The CEMP can identify the location of the material storage areas, construction compound, temporary parking bays, highway works and temporary security/health and safety lighting. In considering the CEMP, impacts of the temporary lights on sensitive receptors can be reduced to a minimum.
- 4.6 The following best practice measures are identified as recommended by the ILE, CIRIA and Health and Safety Executive (HSE):
- A named individual for the public to contact should there be any complaints related to temporary lighting installations;
 - Specified working hours and the location of construction compounds should be agreed in advance. The location of the compound and storage areas should take into consideration the location of sensitive receptors.
 - Lighting should to be switched off when not required unless specifically needed for construction activities, security and/or health and safety requirements;
 - Glare caused by poorly directed lights can be minimised by ensuring that light fittings are horizontally mounted and directed away from the boundaries of the Site. Lighting should be confined to the defined area intending to be illuminated;
 - The use of appropriate hoarding (if deemed necessary) can contain surface level illumination on the boundaries of the construction areas; and
 - Light spill can be minimised by avoiding poorly sited lights on the boundary of the Site. Lighting will be located and directed so that it does not cause unnecessary intrusion to adjacent residential properties.
- 4.7 In terms of Health and Safety requirements during the construction phases, the following measures will be implemented:
- Any temporary detours of vehicles or pedestrians (e.g. any temporary footpath diversions) around then construction site should be clearly visible at all times;
 - Construction area fences located near existing roadways or walkways should be appropriately lit to assist in defining the limits of the construction area for motorists and pedestrians;
 - Temporary walkways, roads and parking areas should be illuminated to the same intensity in accordance with current guidance stipulated in the ILE Guidance Notes of the Reduction of Obtrusive Light (2005); and
 - Should hoarding be required during the construction phases, care should be taken to avoid these casting shadows on surrounding and adjacent footpaths and roads which may otherwise compromise safety.

4.8 If lighting is necessary, then there are a number of ways to minimise the effect of lighting on bats, to allow dark corridors to persist in line with paragraph 125, Chapter 11 of the NPPF. The following mitigation strategies have been taken from Bat Conservation Trust Landscape and Urban design for Bats and Biodiversity (Gunnell et al., 2012) and other referenced sources:

- In general, light sources should emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum, to avoid attracting insects and thus potentially reducing numbers in adjacent areas, which bats may use for foraging.
- The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and eliminating bare bulbs and upward pointing light fixtures.
- Additionally, lights should be located away from reflective surfaces where the reflection of light will spill onto potential foraging/commuting corridors.
- Lighting that is required for security or access should use a lamp that is PIR sensor activated, to ensure that the lights are only on when required and turned off when not in use.

Construction Summary

4.9 Any temporary impact from construction lights can be minimised and mitigated by application of the measures outlined above. Some existing vegetation will be retained at the boundaries of the Site which will help screen areas of construction and lighting from view.

4.10 Any mitigation measures can be delivered through the adoption and management of the CEMP by the on-site contractor.

Operational Lighting Impacts

4.11 The following lighting is anticipated for the Proposed Development:

- Street lighting (c. 6m columns) within the built development areas;
- Security lighting at individual properties and key entrances;
- The A12 London to Lowestoft Road for which street lighting (c. 8 or 10m columns) may be provided in the future at the location of the proposed access junction into the site.

4.12 Such lighting will result in an increase in artificial lighting instalments on the Site. But any limit will not be materially different to other residential areas in the vicinity.

4.13 Future detailed lighting design for the Proposed Development will be prepared at the detailed design stage. However, for the purposes of this outline assessment, it is anticipated that impacts from artificial lighting could arise as a result of the following:

- Type and specification of the lighting equipment used;
- The location of the lighting columns; and
- The intensity of the light source.

Mitigation of Operational Lighting Impacts

4.14 With suitable mitigation measures, any impact of new lighting to nearby existing residential and ecological receptors can be minimised. It is understood that there are bats present on the site, particularly alongside the southern border of the site with Ipswich Road and along the western border of the site with the BT Adastral Park Complex. Although, there

are not understood to be any light-sensitive bats present on the site, the new lighting strategy will consider the advice in the Bats and Lighting in the UK document, to comply with the requirements of the Bats Conservation Trust.

4.15 If lighting is necessary, then there are a number of ways to minimise the effect of lighting on bats, to allow dark corridors to persist in line with paragraph 125, Chapter 11 of the NPPF. The following mitigation strategies have been taken from Bat Conservation Trust Landscape and Urban design for Bats and Biodiversity (Gunnell et al., 2012) and other referenced sources:

- Limiting the height of lighting columns to eight meters and increasing the spacing of lighting columns can reduce spill of light into unwanted areas such as the aforementioned habitats as well as the tree containing a confirmed bat roost (T41 on the south side of Ipswich Road).
- Other ways to reduce light spill include the use of directional luminaires, shields, baffles and/or louvres. Flat, cut-off lanterns are best.
- Lighting that is required for security or access should use a lamp that is PIR sensor activated, to ensure that the lights are only on when required and turned off when not in use.

4.16 At detailed design, the presence of bats on the Site (particularly around the edges) should be taken into account when designing a lighting scheme. Lighting levels should be kept to a minimum as far as possible, in particular around the peripheries of the Site and in areas designated as public open space.

4.17 The lighting scheme will be designed to minimise light pollution, particularly as seen in views from the wider countryside of the AONB to the east and southeast. Floodlighting to sports pitches, tennis courts, car parks and public areas within and around the school and local centre should follow Suffolk County Council's Guidance in SPG 11 Recreational Floodlighting. It should also include measures such as the use of directional lighting, limiting the use of lighting to specified operating hours and implementation of lights that reduce glare and spill.

4.18 Where residential streets and areas of open space adjoin the countryside to the east of the site, opportunities for street lighting within this area to use low level bollard lighting and other measures to limit light pollution.

4.19 Where development fronts the landscape buffer and green corridor along the northern edge of the site, lighting will be minimised and designed to limit light spill into adjacent unlit / low-lit areas.

Operational Summary

4.20 The majority of potential impacts from the Proposed Development can be minimised by the careful selection of lighting equipment and installation.

4.21 In general, it is recommended that site lighting is kept to a minimum during both the construction and operational phases, especially in areas of foraging/commuting corridors such as woodland edges, the fishing lake, east and south boundaries, as well as along retained greenspace habitat through the middle of site (heathland and the valley), with particular consideration given at points where roads dissect the aforementioned.

5 Summary

5.1 Baseline monitoring has been completed to establish the current lighting conditions across the Site. Modelling of a possible future lighting layout has been modelled

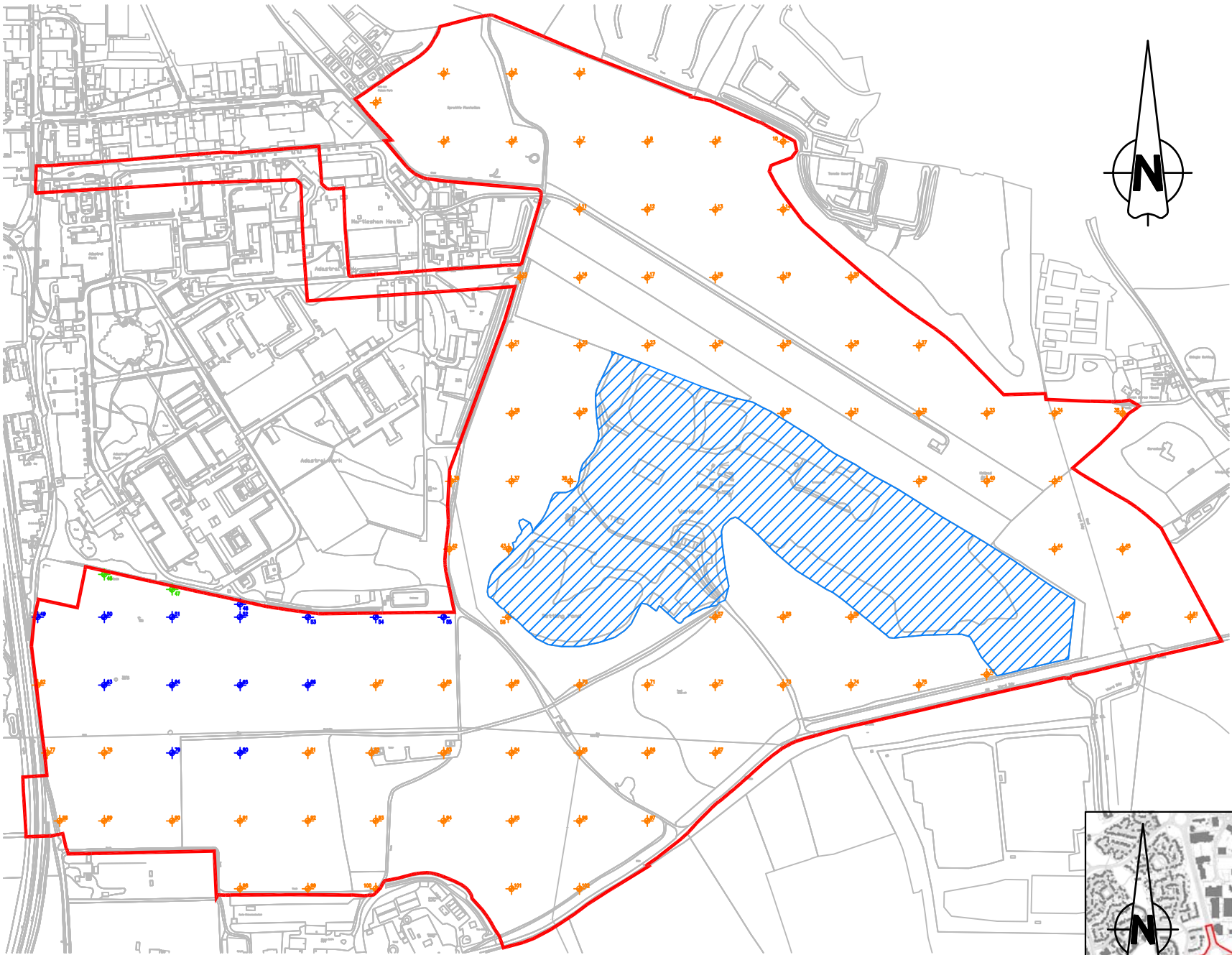
- 5.2 Any temporary impact from construction lights can be minimised and mitigated by application of best practice measures. Some existing vegetation will be retained at the boundaries of the Site, which will help screen of the construction and lighting from view. Any mitigation measures can be delivered through the adoption and management of the CEMP by the on-site contractor.
- 5.3 The majority of potential impacts from the operation of the Proposed Development can be minimised by the careful selection of lighting equipment and installation. The full lighting strategy will be addressed at the future Reserved Matters stage, which will also comply with the requirements of the Bats Conservation Trust concerning Bats and Lighting in the UK.

6 Limitations

- 6.1 The conclusions and recommendations highlighted above are based on all available background information for the site and all design solutions are based upon the planned usage of the site.
- 6.2 Third party information has been used in the preparation of this report, which Brookbanks Consulting Ltd, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks Consulting Ltd accepts no liability for same.
- 6.3 The benefits of this report are provided solely to Carlyle Land Ltd and Commercial Estates Group. for the Proposed Development on Land south and east of Adastral Park in Martlesham near Ipswich, Suffolk.
- 6.4 Brookbanks Consulting Ltd excludes third party rights for the information contained in the report.

Appendix – Lighting Survey Results

Baseline Light Monitoring Results					
Location	Time Taken	Peak LUX	Location	Time Taken	Peak LUX
1	19:31	0.0	52	20:36	0.5
2	19:32	0.0	53	20:37	0.2
3	19:33	0.0	54	20:38	0.1
4	19:34	0.0	55	20:39	0.1
5	19:35	0.0	56	20:40	0.0
6	19:36	0.0	57	20:43	0.0
7	19:37	0.0	58	20:44	0.0
8	19:38	0.0	59	20:45	0.0
9	19:39	0.0	60	20:49	0.0
10	19:40	0.0	61	20:50	0.0
11	19:41	0.3	62	20:51	0.0
12	19:42	0.0	63	20:52	0.4
13	19:43	0.0	64	20:53	0.6
14	19:44	0.0	65	20:54	0.4
15	19:45	0.0	66	20:55	0.2
16	19:46	0.0	67	20:56	0.0
17	19:47	0.0	68	20:57	0.0
18	19:48	0.0	69	20:58	0.0
19	19:49	0.0	70	20:59	0.0
20	19:50	0.0	71	21:00	0.0
21	19:51	0.0	72	21:01	0.0
22	19:52	0.0	73	21:02	0.0
23	19:53	0.0	74	21:03	0.0
24	19:54	0.0	75	21:04	0.0
25	19:55	0.0	76	21:05	0.0
26	19:56	0.0	77	21:06	0.0
27	19:57	0.0	78	21:07	0.0
28	19:58	0.0	79	21:08	0.2
29	19:59	0.0	80	21:09	0.1
30	20:02	0.0	81	21:10	0.0
31	20:03	0.0	82	21:11	0.0
32	20:04	0.0	83	21:12	0.0
33	20:05	0.0	84	21:13	0.0
34	20:06	0.0	85	21:14	0.0
35	20:07	0.0	86	21:15	0.0
36	20:08	0.0	87	21:16	0.0
37	20:10	0.0	88	21:17	0.0
38	20:11	0.0	89	21:18	0.0
39	20:16	0.0	90	21:19	0.0
40	20:17	0.0	91	21:20	0.0
41	20:18	0.0	92	21:21	0.0
42	20:19	0.0	93	21:22	0.0
43	20:20	0.0	94	21:23	0.0
44	20:28	0.0	95	21:24	0.0
45	20:29	0.0	96	21:25	0.0
46	20:30	1.5	97	21:26	0.0
47	20:31	1.2	98	21:27	0.0
48	20:32	0.9	99	21:28	0.0
49	20:33	0.3	100	21:29	0.0
50	20:34	0.6	101	21:30	0.0
51	20:35	0.8	102	21:31	0.0



MONITORING SURVEY LOCATIONS

KEY:

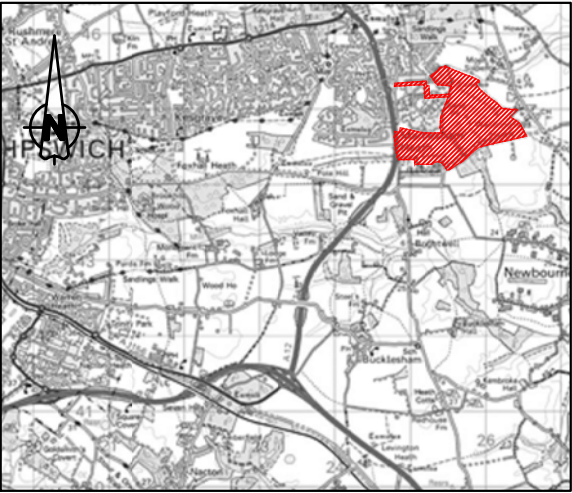
Locations with Readings of 0.0 Lux

Locations with Readings between 0.0 and 1.0 Lux

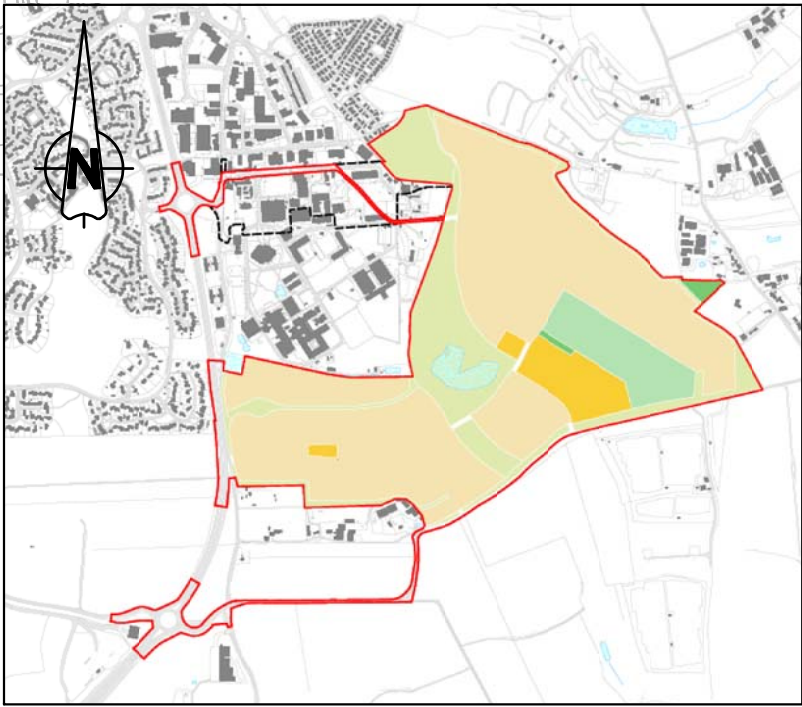
Locations with Readings between 1.0 and 5.0 Lux

Site Boundary

Inaccessible Area of Site (Quarrying Area)



GENERAL SITE LOCATION



PROPOSED SITE INTERNAL LAYOUT

Construction Design and Management (CDM)
Key Residual Risks

Contractors entering the site should gain permission from the relevant land owners and/or principle contractor working on site at the time of entry. Contractors shall be responsible for carrying out their own risk assessments and for liaising with the relevant services companies and authorities. Listed below are Site Specific key risks associated with the project.

1) Overhead and underground services

2) Street Lighting Cables

3) Working adjacent to water courses and flood plain

4) Soft ground conditions

5) Working adjacent to live highways and railway line

6) Uncharted services

7) Existing buildings with potential asbestos hazards

- NOTES:
1. Do not scale from this drawing

2. All dimensions are in metres unless otherwise stated.

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A Amendments as per client's requests.

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Carlyle Land Ltd and
Commercial Estates Group

Land South and East of
Adastral Park, Suffolk

Lighting Survey Results
Distribution and Table

Brookbanks

6150 Knights Court Solihull Parkway Birmingham B37 7WY
Tel (0121) 329 4330 Fax (0121) 329 4331
www.brookbanks.com

CARLYLE LAND LIMITED



Andrew McCloy
Recreation Consultant

bakerconsultants

BroadwayMalyan^{BM}

Brookbanks



orion.



RSK

