Albion Land (2013) Ltd

Catalyst Bicester

Lighting Assessment

July 2019

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Catalyst Bicester
Lighting Strategy

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1.0 Introduction

WYG Environment Planning Transport (WYG) were commissioned by Albion Land (2013) to produce a lighting strategy in support of a hybrid and an outline planning application for commercial and leisure development on land known as Bicester Gateay.

The proposed development will require the installation of a number of luminaires that have the potential to increase existing light levels at sensitive locations within the vicinity of the site. This lighting strategy considers the potential impact of light pollution from the development on nearby light sensitive receptors such as residents. The strategy provides design guidance and identifies potential constraints and set parameters for all future lighting designs to consider during the reserved matters stage of the outline application.

For the detailed element, a lighting design has been produced and assessed within the following sections of this report.

1.1 Site Location and Context

The development site currently consists of farmland and an operational poultry farm, the approximate national grid reference of which is 457538, 221077.
The proposed site is bounded by:

- Bicester Avenue Retail Park to the north;
- Wendlebury Farm to the south;
- Open agricultural land to the east; and,
- A41 Oxford Road to the west.

Reference should be made to Figure 1 for a visual representation of the application sites and surrounding area.

1.2 Lighting Design and Assessment - Overview

The proposed development will require the installation of a number of luminaires that have the potential to increase existing light levels at sensitive locations within the vicinity of the site. The following stages have therefore been conducted in order to produce a suitable lighting layout and assess potential impacts:

- Baseline survey;
- Quantitative assessment of potential lighting impacts at existing light sensitive receptors bordering the proposed development site, based on the proposed external lighting design;
- Formulation of appropriate mitigation measures, where necessary, in order to minimise the potentially detrimental impacts of the proposed lighting scheme.

2.0 Policy, Legislation and Relevant Agencies

2.1 Documents to be Consulted

The following documents will need to be consulted during the undertaking of any future lighting design on site:

- Guidance Notes for the Reduction of Obtrusive Light, The Institution of Lighting Professionals (ILP), 2011;
- National Planning Policy Framework, Ministry for Housing, Communities and Local Government, Revised February 2019;
- Planning Practice Guidance on Light Pollution, Department for Communities and Local Government, 6th March 2014, ID 31-007-20140306;
- The Conservation of Habitats and Species Regulations, 2017;
- Environmental Protection Act, 1990;
- Artificial Lighting and Wildlife Interim Guidance: Recommendations to Help Minimise the Impact of Artificial Lighting, Bat Conservation Trust, 2014;
- BS EN 12464-2: Lighting of Workplaces - Outdoor Work Places, British Standards Institute, 2007;
- BS EN 13201-4: Road Lighting – Methods of Measuring Lighting Performance, 2003;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, British Standards Institute, 2013;
- PLG 04- Guidance on Undertaking Environmental Lighting Impact Assessments, ILP, 2013; and,
- Cherwell District Council Local Plan, adopted December 2016.

2.2 Legislative Framework

Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (1990), which was amended to include the following nuisance definition:

"(fb) artificial light emitted from premises so as to be prejudicial to health or nuisance;"

Although light was described as a statutory nuisance, no prescriptive limits or rules have been set for assessment. Guidance within the National Planning Policy Guidance with regards to Light pollution has been

referred to while producing this assessment as well as documents produced by the International Commission on Illumination (CIE), Institute of Lighting Professionals (ILP) and the Chartered Institute of Building Services Engineers (CIBSE).

2.3 Design Standards

2.3.1 National Standards

The appropriate lighting design criteria for the scheme are contained within:

- BS EN 12464-2: Lighting of Workplaces - Outdoor Work Places, 2014;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, 2013; and,
- BS EN 13201-2: Road Lighting - Performance Requirements, 2003.

Good lighting design also includes luminaires that have been selected to minimise light intrusion and glare to pedestrians and drivers, as discussed within the ILP document "Guidance Notes for the Reduction of Obtrusive Light".

2.4 Planning Policy and Guidance

2.4.1 National Policy

The National Planning Policy Framework (NPPF) principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF broadly retains the principles of PPS 23: Planning and Pollution Control and with regard to light pollution, states that:

> *'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.'*

The National Planning Practice Guidance web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. It states that "for maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time". In light of this guidance, the assessment has considered the following implications of the proposed lighting design:

- *Does a new development proposal, or a major change to an existing one, materially alter light levels outside the development and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- *Does an existing lighting installation make the proposed location for a development unsuitable? For example, this might be because:*
    - *the artificial light has a significant effect on the locality;*
    - *users of the proposed development (e.g. a hospital) may be particularly sensitive to light intrusion from the existing light source.*
- *Does a proposal have a significant impact on a protected site or species e.g. located on, or adjacent to, a designated European site or where there are designated European protected species that may be affected?*
- *Is the development in a protected area of dark sky or an intrinsically dark landscape where it may be desirable to minimise new light sources?*
- *Are forms of artificial light with a potentially high impact on wildlife (e.g. white or ultraviolet light) being proposed close to sensitive wildlife receptors or areas, including where the light shines on water?*
- *Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies (because it may change natural light, creating polarised light pollution that can affect wildlife behaviour)?*

If the answer to any of the above questions is 'yes', consideration should be made for:

- where the light shines;
- when the light shines;
- how much light shines; and
- possible ecological impact.

2.4.2 Local Policy

Cherwell District Council adopted their Local Plan in December 2016. This outlines the Council's broad planning strategy. Following a review of policies within the local plan, the following policy was identified as being relevant to the proposed development from an lighting perspective:

"Policy ESD 15: Character of the Built and Historic Environment;

"Successful design is founded upon an understanding and respect for an area's unique built, natural and cultural context. New development will be expected to complement and enhance the character of its context through sensitive siting, layout and high-quality design. All new development will be required to meet high design standards. Where development is in the vicinity of any of the District's distinctive natural or historic assets, delivering high quality design that complements the asset will be essential.

New development proposals should:

…

- *Consider the amenity of both existing and future development, including matters of privacy, outlook, natural lighting, ventilation, and indoor and outdoor space"*

3.0 Methodology

The Lighting Assessment includes the establishment of baseline ambient light conditions and an evaluation of impacts associated with the proposed lighting design. This includes an assessment of change in light obtrusion at existing receptor locations.

Light modelling was conducted using DIALux software, an independent lighting model which is capable of calculating artificial lighting scenes in interior and exterior scenarios. The model incorporates ILP, CIE 112 and BS EN 12464-2 calculation methodologies and is commonly used for lighting impact assessment.

3.1 Lighting Design

The proposed lighting scheme for the health and racquet club was designed in accordance with the standards outlined earlier in Section 2.3 and guidance by the project architects. A detailed lighting design and lighting specifications can be found in Appendix A. The design of the lighting has been conducted in a manner such as to address two potentially conflicting needs; namely, on the one hand, to provide a safe environment for the movement of staff and customers when the natural lighting levels fall and allowing the suitable light levels for CCTV and, on the other hand, to meet the light obtrusion limitations stated within the relevant standards and guidance in order to avoid any detriment to local amenity.

In accordance with BS EN 12464-2: Lighting of Work Places - Outdoor Work Places, 2014 the staff car park area has been lit to an average of 15 lux. The tennis courts have been lit to an average of 400lux in accordance with Artificial Sports Lighting Design Guide 2012.

3.1.1 Obtrusive Light

Baseline light conditions were determined during a site survey of the existing site and surrounding area. A lighting model was subsequently developed to represent the proposed external lighting scheme and to enable the obtrusive light from the proposed development to be calculated at local receptors.

The ILP has developed an Environmental Zone classification system for the categorisation of sensitive receptor locations based on typical levels of baseline obtrusive light. This is summarised in Table 1.

Table 1 Environmental Zone Classification

Category	Description	Examples
E0	Dark landscapes	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Intrinsically dark landscapes	National Parks, Areas of Outstanding National Beauty, etc
E2	Low district brightness areas	Village or relatively dark outer suburban urban locations
E3	Medium district brightness	Small town centres or suburban locations
E4	High district brightness areas	Town/city centres with high levels of night-time activity

For each Environmental Zone, recommended obtrusive light limits for exterior lighting installations have also been determined. These are summarised in Table 2.

Table 2 Obtrusive Light Limitations for Exterior Lighting Installations

Environmental Zone	Max Sky Glow ULR[a] (%)	Light Trespass (into Windows) Ev (lx)[b]		Source Intensity I (kcd)		Building Luminance Pre-curfew
		Pre-curfew[d]	Post-curfew[e]	Pre-curfew[d]	Post-curfew[e]	Average L[c] ($Cd.m^{-2}$)
E0	0	0	0	0	0	0
E1	0	2	1(*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

NOTE:
(a) Upward light ratio of the installation - maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky.
(b) Vertical Illuminance measured flat at the glazing at the centre of the window.
(c) Luminance.
(d) Typically considered to be between 07:00 and 23:00
(e) Typically considered to be between 23:00 and 07:00
(*) Permitted only from public road light installations

The assessment determined the lighting levels and Environmental Zone classification in the vicinity of the proposed development through the baseline survey. Modelling of the lighting scheme was conducted and predicted obtrusive light values compared with the relevant guidelines, as detailed within Table 2.

The potential environmental effects of the proposed development are identified, in so far as current knowledge of the site and development allows. The significance of potential environmental effects is assessed according to their scale (magnitude) and the sensitivity of the receptors.

For the purposes of this assessment the effects of the development are considered to be 'significant' if:

- The development is predicted to exceed the maximum sky glow ULR at any surrounding receptor;
- The development is predicted to cause either an exceedance of the ILP obtrusive light trespass limitation at a receptor, or if the development is predicted to cause an increase of more than 10% at an existing receptor where the ILP obtrusive light trespass limitation is already being exceeded.

4.0 Baseline

This section provides a review of the existing lighting levels at the site in order to provide a benchmark against which to assess potential impacts associated with the development.

4.1 Baseline Survey

4.1.1 Survey Conditions

A baseline lighting survey was undertaken on the 21st November 2018. An initial survey was undertaken between 19:30 hours and 22:30 hours to establish the existing pre-curfew lighting conditions and a further survey was undertaken after 23:00 to determine existing post curfew conditions. It should be noted that conditions were not noted to change between the pre-curfew and post-curfew periods.

The survey was conducted using a Digital Lux Meter which meets CIE photopic spectral response, with a maximum resolution of 0.01 lux. The survey was undertaken with a meter resolution of 0.01 lux.

4.1.2 Survey Locations

Light monitoring was undertaken at a number of survey locations to determine variations in baseline light levels within the vicinity of the site. Where possible, monitoring at the boundary of the receptor locations was undertaken to provide the best possible representation of existing light obtrusion. Where this was not possible, monitoring was undertaken at the most appropriate representative location. Reference should be made to Figure 2 for an illustrative site map of the monitoring locations.

The purpose of the survey is fourfold:

- The survey enables quantified light levels at (or as near as possible to) local sensitive receptor locations to be measured;
- The site survey also provides an understanding of any significant landforms and vegetation that can potentially provide a pathway screen between light sources and receptors;
- The survey enables the ILP environmental zone to be determined based on sound, quantified evidence; and,
- The survey enables existing significant sources of artificial light and natural screens to be accounted for.

The survey therefore provides a robust understanding of the current artificial lighting illuminance levels currently experienced around the development site. The locations of all the light monitoring locations are summarised in Table 3 below and the results from the survey are contained in Table 4.

A series of measurements were taken at key points; a horizontal ground level measurement and four vertical measurements at 1.5m facing north east, south and west in general accordance with the recommended monitoring method in the statutory guidance issued by the ILP. Illuminance levels at a resolution of 0.1 lux can vary quite significantly over relatively small distances and even with slight changes in the plane of the lens. Therefore, the range of measurements taken over a monitoring length was recorded, in order to determine minimum and maximum illuminance at receptor façades.

Table 3 Baseline Light Monitoring Locations

Reference	Monitoring Location	Purpose of Survey	Key Local Sources of Light
L1	Wendlebury Road	Baseline light from Bicester Avenue site	Bicester Avenue Site
L2	Eastern Hedgerow Bordering Site	Baseline lighting conditions	Bicester Avenue site, wastewater treatment works and eastern railway lines.
L3	Eastern Hedgerow Bordering Site	Baseline lighting conditions	Bicester Avenue site, wastewater treatment works and eastern railway lines.
L4	Eastern Hedgerow Bordering Site	Baseline lighting conditions	Bicester Avenue site, wastewater treatment works and eastern railway lines.
L5	South Eastern Hedgerow Bordering Site	Baseline lighting conditions	Eastern railway lines and western farm site.
L6	South Eastern Hedgerow Bordering Site	Baseline lighting conditions	Eastern railway lines and western farm site.
L7	Southern Hedgerow Bordering Site	Baseline lighting conditions	Eastern railway lines and western farm site.
L8	Southern Hedgerow Bordering Site	Baseline lighting conditions	Eastern railway lines and western farm site.
L9	Road outside Promised Land Farm	Baseline light conditions from farm lighting.	Lighting from Promised Land Farm.
L10	Road Bridge over A41	Baseline light from road lighting and vehicles	A41 lighting and lighting from vehicles.
L11	Entrance to Caravan Site	Baseline light from caravan site lighting and vehicles	Caravan site lighting.
L12	Road towards Caravan	Baseline light from road lighting and vehicles	Caravan site lighting and

Reference	Monitoring Location	Purpose of Survey	Key Local Sources of Light
	Site		lighting from vehicles.
L13	Wendlebury Road, Opposite Lakeside Farm	Baseline light conditions from farm lighting.	Lighting from Lakeside Farm.
L14	Junction of Wendlebury Road and Unnamed Road	Baseline light from road lighting and vehicles	A41, Roundabout lighting and lighting from vehicles.
L15	A41/Vendee Drive Roundabout	Baseline light from road lighting and vehicles	A41, roundabout lighting and lighting from vehicles.
L16	Wendlebury Road	Baseline light from Bicester Avenue site	Bicester Avenue Site.

4.1.3 Survey Results

The results of the monitoring are displayed in Table 4.

Table 4 Survey Results

Reference	Recorded Illuminance (Lux)				
	Facing Up	Facing North	Facing East	Facing South	Facing West
L1	0.78	0.04	0.13	0.03	0.04
L2	0.12	0.35	0.03	0.07	0.06
L3	0.11	0.25	0.02	0.02	0.05
L4	0.12	0.07	0.03	0.02	0.07
L5	0.11	0.07	0.02	0.02	0.08
L6	0.11	0.06	0.02	0.02	0.10
L7	0.12	0.07	0.02	0.02	0.12
L8	0.11	0.11	0.03	0.03	0.08
L9	0.16	0.04	0.10	0.09	0.02
L10	0.06	0.11	0.10	0.16	0.05
L11	0.06	0.04	0.05	0.07	0.03
L12	0.04	0.06	0.03	0.06	0.04
L13	0.06	0.02	0.02	0.03	0.02
L14	0.20	0.10	0.04	0.14	0.20
L15	19.38	4.15	2.58	8.15	9.48
L16	0.16	0.06	0.13	0.09	0.08

Following the environmental lighting survey, it was concluded that the proposed development site and the surrounding area should be classified as 'Environmental Zone E2 – Low district brightness, in accordance

with the ILP guidance limits outlined within Table 2, is typically representative of small villages or rural locations.

Therefore, the permitted light trespass limit at an offsite receptor in the pre-curfew period (typically considered to be 07:00-23:00) is 5 lux and in the post curfew period (typically considered to be 23:00-07:00) is 1 lux.

4.2 Receptors

The term 'receptors' includes any persons, locations or systems that may be susceptible to changes in environmental factors as a consequence of the development.

4.2.1 Residential Receptors

During the site survey, key residential properties were identified which have the potential to be impacted by obtrusive light from the proposed development, as highlighted in Table 5. Reference should be made to Figure 3 for an illustration of the residential receptors used for the purposes of this assessment.

Table 5 Residential Receptors

ID	Description	ILP Environmental Zone
R1	Consented Bicester Gateway Hotel	E2
R2	Consented Bicester Gateway Hotel	E2
R3	Consented Bicester Gateway Hotel	E2

All of the identified residential receptors are considered to be within ILP Environmental Zone E2. Each receptor was input into the model at a height of 4.0m (bungalows and single storey building at height of 1.5m) at a distance of 10 cm from the building façade in order to represent illuminance at first floor window level, representing a typical bedroom, which is deemed to be the most sensitive receptor room.

4.2.2 Ecological Receptors

Lighting associated with the operational phase of the proposed development has the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2017) and subsequent amendments require competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Areas of Conservation). Following a review of the site and immediate surrounding area using the online MAGIC facility, the boundary of the site has been identified as potentially sensitive.

Following further consultation with project ecologists, it was determined that a number of bat species utilise

the watercourse to the east of the site for commuting/foraging purposes. The assessment has assumed that potential bat species on site will be highly sensitive to artificial light.

For the purposes of the assessment, ecological receptor locations have been included at a number of points along the length of watercourse to the east of the proposed site, at heights of 3m. Table 6 below provides a reference for these locations whilst a full spatial illustration of modelled ecological receptors is included in Figure 4.

Table 6 Ecological Receptors

ID	Description
E1	Watercourse on Eastern Boundary
E2	Watercourse on Eastern Boundary
E3	Watercourse on Eastern Boundary

5.0 Lighting Assessment (Health and Racquet Club)

Potential impacts associated with the detailed application's proposed lighting design at locations in the vicinity of the site were assessed, as described in the following sections.

5.1.1 Obtrusive Light Modelling

Building plans were provided by the architects for the development. These were used with the proposed indicative lighting design detailed in figure 5 to develop a model within DIALux of the proposed development. Reference should be made to Figure 4 for a 3D representation of the proposed model.

The model is only able to accurately represent the effects of solid structures such as buildings and walls on light obtrusion. Non-solid barriers such as trees and hedges cannot be accurately modelled and therefore the effects of these are dealt with qualitatively outside the model calculations.

The assessment has looked at the effect of the development in the pre-curfew and post-curfew periods. Both scenarios are based on the development being operational and all lighting associated with the development being turned on. This therefore represents 24-hour operation and can be viewed as worst case scenario within post-curfew periods (after 23:00).

The assessment consists of comparing the measured baseline illuminance levels at each of the receptor locations against the predicted light obtrusion from the lighting model. Where it was not practicable to measure existing illuminance at the receptor location, monitoring results from the nearest equivalent representative monitoring location are used.

The ULR of the proposed development has been calculated and referenced to the maximum permitted limitations for the relevant Environmental Zones of the receptor locations.

5.1.2 Model Results

Residential Receptors

Table 7 compares the measured baseline data and the modelled proposed development lighting arrangements. These results are compared against the ILP pre-curfew and post-curfew criteria limits for ILP Environmental Zone E1 , in accordance with the classifications detailed in Table 2.

Table 7 Residential Receptor Assessment Results

ID	ILP Pre-curfew Criteria (Lx)	ILP Post-curfew Criteria (Lx)	Measured Baseline Illuminance (lx)		Predicted Model Illuminance (lx)	Increase in Illuminance from Baseline to Proposed (lx)	
			Baseline Minimum	Baseline Maximum		Baseline Minimum	Baseline Maximum
R1	5	1	0.04	0.20	0.62	0.58	0.42
R2	5	1	0.04	0.20	0.69	0.65	0.49
R3	5	1	0.04	0.20	0.70	0.66	0.50

The model predicts that there will be negligible increases in the minimum baseline obtrusive light levels at several receptors. However, the ILP pre-curfew and post-curfew criteria for Environmental Zones E2 are not predicted to be exceeded as a result of the development. As such, the proposed development is not predicted to result in any significant adverse impacts with respect to local sensitive residential locations.

5.1.3 Ecological Receptors

The results at the ecological receptors are contained in Table 8 below.

Table 8 Ecological Receptor Results

Receptor	Lux
E1	0.02
E2	0.03
E3	0.04

As shown in Table 8 above, the results at all ecological receptors is well below 1 lux. Therefore the effect of the development is 'negligible'.

5.1.4 Dark Sky Assessment

The model has been used to calculate the predicted Upward Light Ratio (ULR) of the proposed external lighting scheme. Model outputs predict a sky glow figure (ULR) of 0.5%.The ILP sky glow limitation for an area classified as Environmental Zone E2 is 2.5% ULR. As such the proposed lighting scheme meets the ILP sky glow limitations and is therefore not considered to result in detrimental impacts on the dark sky landscape.

6.0 Design Standards and Guidance (Outline Applications)

Any future detailed lighting design for the commercial developments should be undertaken in a manner such as to address two potentially conflicting needs; namely, on the one hand, to provide a safe environment for the movement of staff when the natural lighting levels fall and, on the other hand, to meet the light obtrusion limitations stated within the relevant standards and guidance in order to avoid any detriment to local amenity, and wildlife.

Future detailed lighting design on site should follow the national standards below;

6.1.1 National Standards

- BS EN 12464-2: Lighting of Work Places - Outdoor Work Places, 2014;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, 2013; and,
- BS EN 13201-2: Road Lighting - Performance Requirements, 2003.

6.1.2 Best Practice Design

As well as meeting the statutory design standards outlined above, the future lighting design should seek to meet a number of criteria to ensure that the environmental effects of artificial lighting are managed to a high standard. These criteria are:

- In accordance with the ILP guidance, the area surrounding the proposed development site has been classified as an ILP E2 Environmental Zone and as such, the illuminance levels at the windows of residential properties should not exceed 5 lux in the pre-curfew period (typically considered to be 07:00 to 23:00) and 1 lux in the post-curfew period (typically considered to be 23:00 to 07:00);
- All external lighting schemes must not have an upward lighting ratio (ULR) of more than 1%;
- All new column mounted luminaires should be fitted with flat glass where appropriate to aid 0% upward light discharge;
- Where appropriate, luminaires on the site boundary should be fitted with light baffles to prevent light spill;
- Lighting should be controlled via light level sensors;
- The location and design of luminaires will be such as to minimise the impact on operators using the road to north;

- The use of directional LED lights within any future design is recommended as these can minimise light spillage beyond the boundaries of the site and can provide a more focused beam of light for areas which require lighting;
- The proposed schemes of lighting should include provisions for white light sources (4000k). The lighting assessment shows compliance with guidance by the Bat Conservation Trust which specifies lights to be < 4200 kelvin in colour to avoid white and blue wavelengths of the light spectrum which serves to reduce insect attraction;
- Lighting along the roads should be uniform and achieve the criteria set out in BS EN 13201-2: Road Lighting - Performance Requirements, 2003 for residential roads;
- Lighting around the Ecological corridor to the watercourse to the south of the site should be kept to a minimum;
- Lighting of the new employment area should be designed to avoid light spilling over the wooded areas to the south and east of the site due to potential for bat roosts and nearby adjacent residential receptors.

7.0 Conclusions

WYG Environment Planning Transport (WYG) were commissioned by Albion Land (2013) Ltd to produce a lighting strategy in support of a hybrid and an outline planning application a proposed development on land known as Bicester Catalyst.

The assessment has concluded that the risk of the proposed scheme resulting in exceedances of either the ILP pre-curfew or post-curfew obtrusive light limitations at local residential receptors will be low. As such the proposed development is not predicted to result in any significant adverse impacts with respect to local sensitive residential locations.

A site survey was conducted in order to quantify baseline lighting within the vicinity of the proposed development and to identify existing sensitive receptors.

Following the adoption of the proposed design standards and guidelines in this strategy the proposed development will not conflict with any national or local planning policies and not have a significant effect on surrounding light sensitive receptors such as local residents and ecological receptors along the boundary.

The assessment has concluded that, provided the specified lighting design is implemented, the sky glow levels associated with the development will not have a significant effect on the surrounding dark sky landscape.

The assessment demonstrates that the proposed development does not conflict with any national or local planning policies.

Units and Abbreviations Used

CIBSE	Chartered Institute of Building Services Engineers
CIE	Commission on Illumination
ILP	Institute of Lighting Professionals
LDF	Local Development Framework
LP	Local Plan
CS	Core Strategy
DPD	Adopted Development Plan Documents
SPD	Adopted Supplementary Planning Documents
SG	Endorsed Supplementary Guidance Documents
NGR	National Grid Reference
PPS	Planning Policy Statement
NPPF	National Planning Policy Framework
Lx	Lux
ULR	Upward Lighting Ratio
WYG	WYG Environmental Planning and Transport

Figures

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WYG ENVIRONMENT

Project:

Bicester Catalyst

Client:

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Drawing Title:

Figure 1: Site Boundarys

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NA	DC	12/07/19	B

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WYG ENVIRONMENT

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Drawing Title:

Figure 2: Light Monitoring

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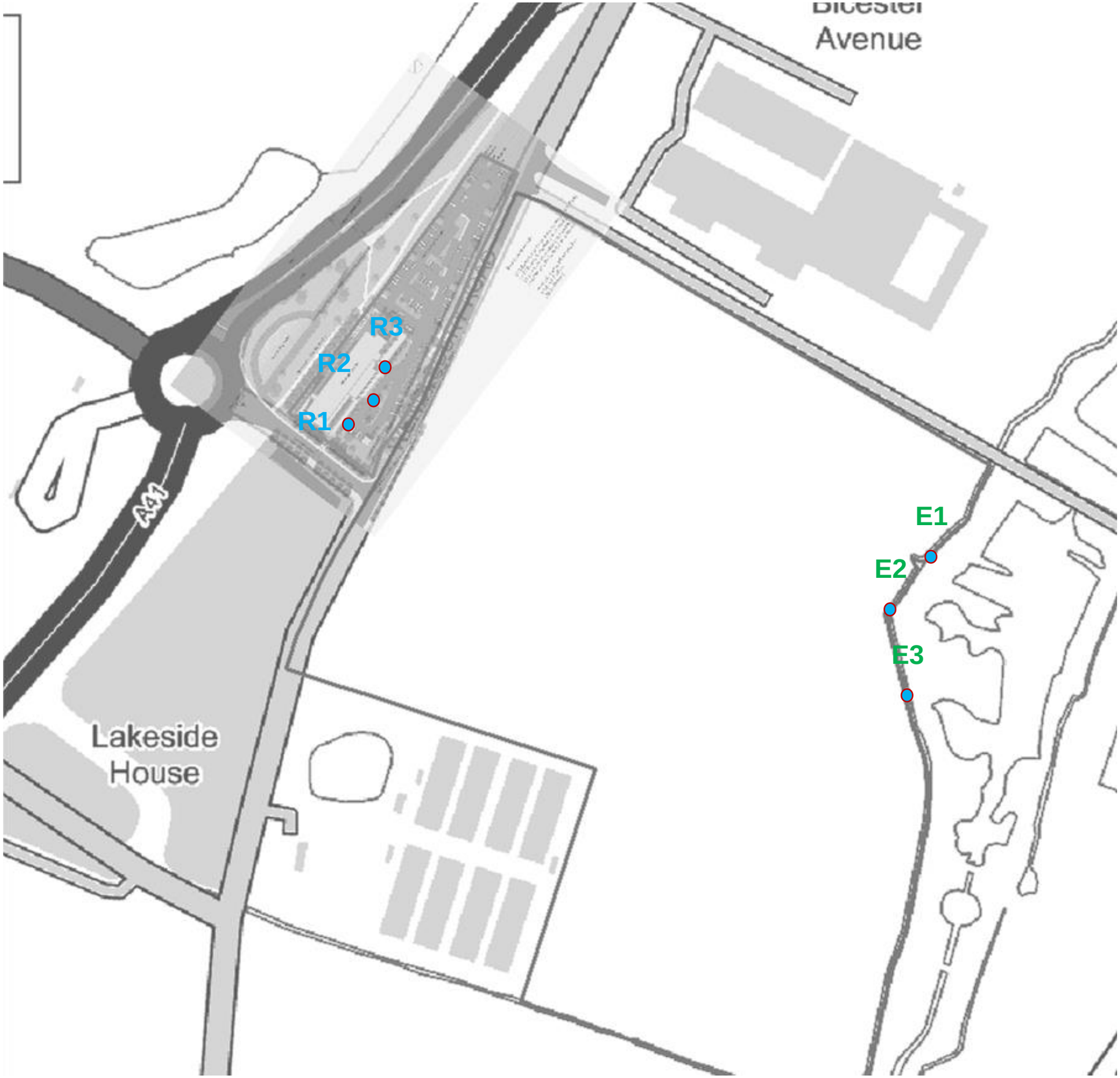

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Figure 3: Receptors

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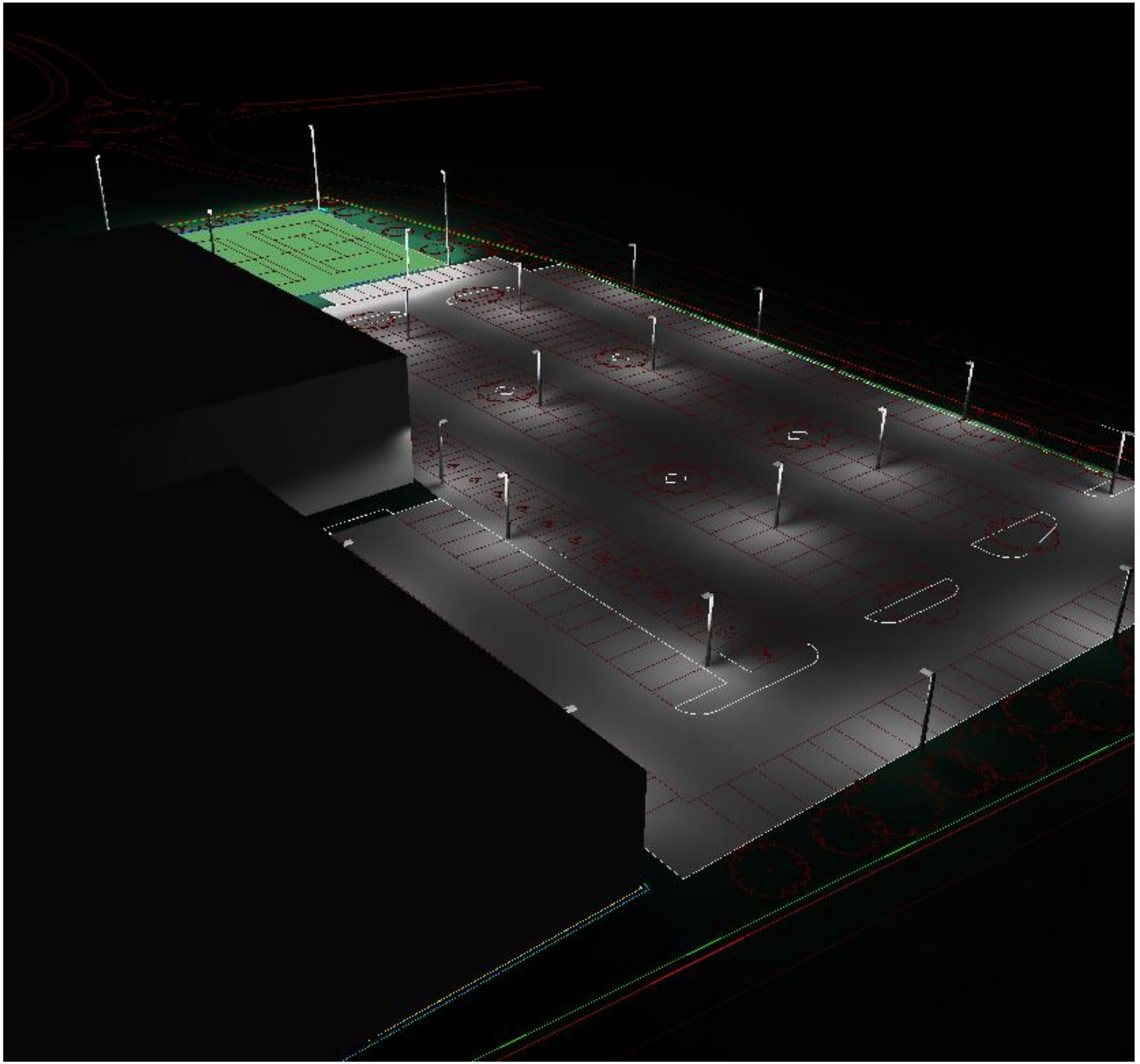

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Project:

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Client:

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Drawing Title:

Figure 4: 3D Representation of Proposed Model

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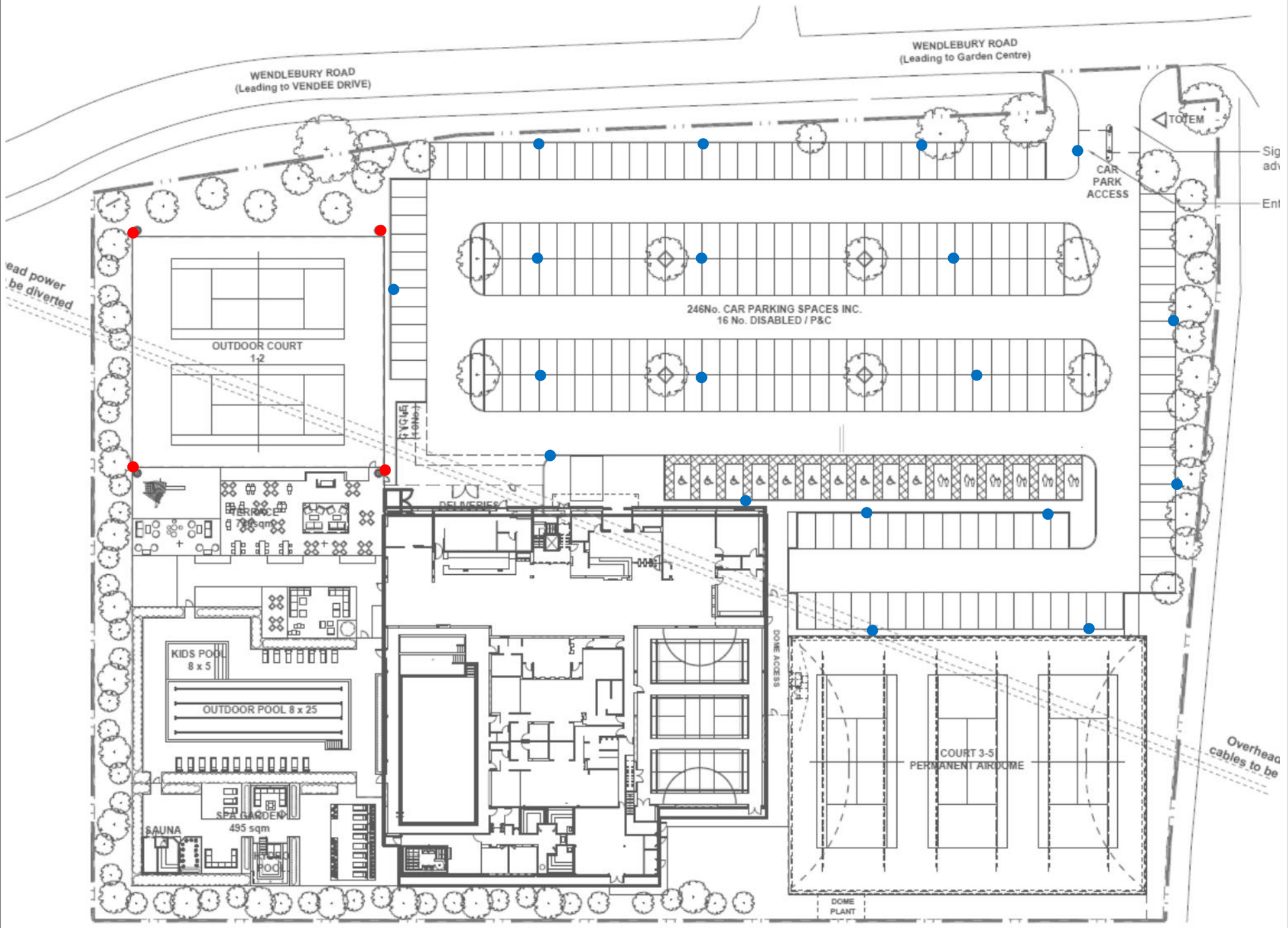
NA	DC	05/07/2019	A



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WYG ENVIRONMENT

Project:

Bicester Catalyst

Client:

Albion Land (2013) Ltd

Drawing Title:

Figure 5: Simplified Lighting Scheme

Symbol	Luminaire
●	Abacus Lighting AL6002_B MHN-FC_B AL6002_B - Challenger 1 MHN-FC_B medium 12m
●	SCHREDER 403132 AMPERA MIDI 5068 - 48 OSLON SQUARE GIANT 350mA WW 230V 00-36-649Flat glass 403132 6m High

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Appendix A – Report Conditions

This Report has been prepared using reasonable skill and care for the sole benefit of Albion Land (2013) Ltd ("the Client") for the proposed uses stated in the report by [WYG Environment Planning Transport Limited] ("WYG"). WYG exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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