

# Planning Statement

Reserved Matters Application,  
Bicester Arc (Bicester Business Park),  
Land off Oxford Road, Bicester -  
Outline planning permission  
23/01080/OUT

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## Executive Summary

### Introduction and Overview

This Reserved Matters planning application is submitted to Cherwell District Council as the Local Planning Authority by Peveril Securities Limited (the Applicant). It is aimed at delivering employment development and job creation on Bicester Arc.

The proposed Reserved Matters proposal comprises the following:

*Details of access, appearance, landscaping, layout and scale relating to the proposed development of a Class E(g)(i) (formerly B1(a)) office/commercial building and associated development, plus associated car parking.*

The proposed development is considered to be in accordance with the key planning policy objectives of the adopted Cherwell Local Plan 2011-2031 (Part 1) to deliver economic growth at Bicester and remains compliant with outline planning permission (ref: 17/02534/OUT and the subsequent s73 ref: 23/01080/OUT).

The benefits that the development will bring in terms of providing a catalyst to larger scale economic development at Bicester Arc and the implementation of long intended employment growth on the site are 'very significant' and relate to the following areas:

1. The grant of permission for the employment building on the site will attract further interest and greater investment.
2. The proposal will generate circa 435 FTE jobs.
3. A scheme with a construction value of £25m, which will generate circa 200 direct full-time equivalent construction jobs annually, in addition to the permanent jobs being created.
4. The ability to demonstrate that planning permission is already approved to the employment market allows the Bicester Arc site to attract end users to the town, as 'immediately available' space in direct competition to Oxford.
5. The Reserved Matters application includes a BREEAM Pre-Assessment Report that demonstrates how the building will achieve BREEAM 'Very Good'.
6. The Reserved Matters application also includes an energy strategy to seek carbon reduction as part of the design approach for the building.



The Reserved Matters proposal is to accommodate office development at Bicester Arc. It is the Applicant's intention to speculatively bring forward this development when Reserved Matters approval is granted.

Given the strong favourable balance of benefits against impacts, and the significant compliance with relevant planning policies and the outline planning conditions, Cherwell District Council can grant approval for the application without delay.





## 1.0 Introduction

### 1.1 Introduction and Overview

- 1.1.1 This Planning Statement sets out the planning background and case in support of a Reserved Matters planning application submitted by Peveril Securities Limited (the Applicant) for development of land on Bicester Arc (Bicester Business Park) for a Class E(g)(i) office/employment building.
- 1.1.2 To provide some background to the Applicant, Peveril Securities is a national development company based in the Midlands who have delivered a significant number of new employment and commercial sites throughout the country. It also specialises in delivering commercial developments, most recently an example of a largescale commercial development is the Unity Square office scheme in the centre of Nottingham, which is a significant office development being provided to meet the requirements of HMRC. Another recent development example is a 162,580 sqm Amazon warehouse at Summit Park on the Ashfield/Mansfield border.
- 1.1.1 The Applicant owns the Bicester Arc site having acquired it from the previous owners in 2020. The application submitted (see below) is for the purposes of delivering the employment development and long-term economic growth.
- 1.1.2 The background to this planning application is that the site is part of land granted outline planning permission for up to 60,000 sq.m. of office floor space. This historically has been referred to as part of the 'Bicester 4' area including the adjacent Tesco site and is an allocation for B1 employment purposes in the adopted Cherwell Local Plan 2011-2031 (Part 1).
- 1.1.3 The original outline planning permission and subsequent S73 amends encompass this Reserved Matters application site as the western part of Bicester Arc fronting on to the A41 Oxford Road.



## 2.0 Application Content

### 2.1 Introduction

2.1.1 This Reserved Matters application is submitted to Cherwell District Council, as the Local Planning Authority, seeking approval for a phase of employment development of the Bicester Arc site.

### 2.2 Scope of Submission

2.2.1 The application plans submitted for determination are those set out below and have been prepared by SEL Design :

- Location Plan
- Block Plan
- Proposed Site Plan
- Proposed Elevations
- Proposed Floor Plans 00 01
- Proposed Floor Plans 02 03
- Proposed Roof Plan and Sections
- Cycle Store and Bins
- Water Pump Building
- Substation Building
- Elevation Details
- Site and Floor Levels
- Landscaping
- F100 Ecopark BNG Masterplan
- 05935-5PA-MP-00-DR-A-9011 Phasing Plan

2.2.2 In addition to the plans, the following documents are also submitted in support of this planning application:



- Completed application forms
- Planning Statement
- EIA Compliance Statement
- Design and Access Statement
- Indicative BREEAM Pre-Assessment Report (Planning Statement Appendix A)
- Energy and Sustainability Statement (Planning Statement Appendix B)
- Drainage Strategy Drawings (Planning Statement Appendix C)
- Odour Assessment and Covering Letter (Planning Statement Appendix D)
- Ecological Appraisal (Planning Statement Appendix E)
- Biodiversity Net Gain (Planning Statement Appendix F), comprising:
  - Ecology Technical Note – Overall Biodiversity Net Gain Calculations;
  - Phase I Office Biodiversity Ecology Statement; and
  - BNG Metrics.

2.2.3 There is an existing Section 106 Agreement that relates to the Bicester Arc approved outline planning consents. This mainly deals with matters relating to highways and transportation including contributions towards improvements to public transport on a phased basis. This Reserved Matters application is compliant with the agreed approach to highways matters set out within the Section 106 and designed within the Section 278 agreed with Oxfordshire County Council.

2.2.4 The highway proposals remain as approved for the Bicester Arc site as do the contents of the Section 278 works associated with that approval.



## 3.0 Development Description

### 3.1 Introduction

- 3.1.1 The Reserved Matters proposals seek approval for an office building development within Phase 1 of Bicester Arc (of Phasing Plan 05935-5PA-MP-00-DR-A-9011), comprising:

*Details of access, appearance, landscaping, layout and scale relating to the proposed development of a Class E(g)(i) (formerly B1(a)) office/commercial building and associated development, plus associated car parking.*

### 3.2 Proposed Development

- 3.2.1 The building proposed would have previously been regarded as a 'Use Class B1(a)' development now classed as Use Class E(g)(i) following the changes to the Town and Country Planning (Use Classes) Order 1987 (as amended) in 2021.
- 3.2.2 The total new office/employment floorspace is some 7,180 sq.m (GEA) in area.
- 3.2.3 The Reserved Matters proposal is for office development.

### 3.3 Programme

- 3.3.1 The Applicant's strategy is to deliver the development, if approved by Cherwell District Council, speculatively following approval of Reserved Matters and the associated pre-commencement discharge of condition submissions.



## 4.0 Planning Policy Context

### 4.1 Introduction

4.1.1 The Reserved Matters application is made under the outline planning permission 23/01080/OUT for:

*The erection of a business park of up to 60,000 sq.m (GEA) of flexible Class B1(a) office / Class B1(b) research & development floorspace; associated vehicle parking, landscaping, highways, infrastructure and earthworks.*

### 4.2 Statutory Development Plan

The Cherwell Local Plan 2011 – 2031 Part 1, re-adopted December 2016

4.2.1 The Cherwell Local Plan 2011-2031 Part 1 (CLPP1) was originally adopted in July 2015 and remains the appropriate Statutory Development Plan. The addition of Policy Bicester 13 meant that the Plan was re-adopted on 19 December 2016. Part 1 of the Local Plan only allocated strategic sites, and Part 2 was due to allocate smaller sites, however it was not progressed and has been replaced by the emerging Local Plan 2040.

4.2.2 The CLPP1 sets out broadly how the district will grow and change over the plan period and contains policies to help deliver Local Plan’s spatial vision. The CLPP1 identifies a Spatial Strategy for how growth is to be managed, with “...*the bulk of the proposed growth in and around Bicester and Banbury*” (para vi., page 10). It seeks to develop a sustainable local economy by ensuring “...*that there is a supply of employment land to meet the needs of the District for the plan period*” (para xi., page 10).

4.2.3 The Site, subject of this application, is allocated on the Policies Map as land committed for employment development as ‘Bicester 4’. CLPP1 Policy Bicester 4: Bicester Business Park states:

*“...This site to the southwest of Bicester, bounded by the A41 to the north and west, is proposed for employment generating development in the form of a high quality B1 office scheme.*

#### *Employment*

- *Jobs created – up to approximately 6,000 jobs. Site constraints and implementation of alternative use planning permissions may reduce numbers slightly.*
- *Use classes – B1a (Office).”*



4.2.4 Policy Bicester 4 goes on to set out requirements in terms of infrastructure needs and key design and place shaping principles, including (inter alia):

- *“Proposals should comply with Policy ESD15*
- *A distinctive commercial development that provides a gateway into the town*
- *A high quality design and finish, with careful consideration given to layout, architecture, materials, colourings and building heights to reduce overall visual impact...*
- *...Development proposals to be accompanied and influenced by landscape/visual and heritage impact assessments...*
- *...Biodiversity should be preserved and enhanced...*
- *...Demonstration of climate change mitigation and adaptation measures including exemplary demonstration of compliance with the requirements of policies ESD 1 – 5...*

4.2.5 CLPP1 ‘Policy PSD 1: Presumption in Favour of Sustainable Development’ states:

*“When considering development proposals the Council will take a proactive approach to reflect the presumption in favour of sustainable development contained in the National Planning Policy Framework. The Council will always work proactively with applicants to jointly find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.*

*Planning applications that accord with the policies in this Local Plan (or other part of the statutory Development Plan) will be approved without delay unless material considerations indicate otherwise.”*

4.2.6 CLPP1 Policy SLE 1 deals specifically with employment development and states:

*“Employment development on new sites allocated in this Plan will be the type of employment development specified within each site policy in Section C ‘Policies for Cherwell’s Places’. Other types of employment development (B Use class) will be considered in conjunction with the use(s) set out if it makes the site viable...”*

4.2.7 The supporting text to CLPP1 Policy SLE 1 states

*“Significant employment growth at Bicester will be encouraged and we [Cherwell District Council] will:*

- *encourage green technology and the knowledge based sectors, exploiting its position*



*in the Oxford/Cambridge Corridor...*

- *maintain and increase the motorsport industry and other performance engineering...*
- *encourage high tech companies..."*

4.2.8 CLPP1 Policy ESD 15 relates to the character of the built and historic environment and states:

*"...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."*

4.2.9 Policy ESD 15 goes on to set out criteria against which new development should adhere to, including (inter-alia):

- *"Be designed to deliver high quality safe, attractive, durable and healthy places to live and work in..."*
- *Deliver buildings, places and spaces that can adapt to changing social, technological, economic and environmental conditions*
- *Support the efficient use of land and infrastructure, through appropriate land uses, mix and density/development intensity*
- *Contribute positively to an area's character and identity by creating or reinforcing local distinctiveness and respecting local topography and landscape features, including skylines, valley floors, significant trees, historic boundaries, landmarks, features or views, in particular within designated landscapes, within the Cherwell Valley and within conservation areas and their setting..."*

4.2.10 Policy ESD 15 adds:

*"The design of all new development will need to be informed by an analysis of the context, together with an explanation and justification of the principles that have informed the design rationale. This should be demonstrated in the Design and Access Statement that accompanies the planning application."*

Saved, Retained Policies of the Adopted Cherwell Local Plan 1996

4.2.11 The 'saved' policies of the Cherwell Local Plan 1996 (CLP 1996) remain part of the Development Plan. The saved policies are those that were originally saved on 27 September



2007, and which have not been replaced by policies within the adopted CLLP1.

- 4.2.12 CLP 1996 Policy C28 relates to the layout, design, and external appearance of new development. This requires layout, design, and external appearance, including external materials of development proposals to be sympathetic to the character of the context.

### 4.3 Material Considerations

#### National Planning Policy Framework (NPPF), Published September 2023

- 4.3.1 National Planning Policy is contained within the National Planning Policy Framework ('NPPF' or 'the Framework' hereafter). The NPPF includes the Government's planning policies for England, highlighting the economic, social, and environmental roles of planning, and its contribution to meeting the mutually dependent objectives of a strong, responsive, and competitive economy; strong vibrant and healthy communities; and the protection of the natural, built and historic environment.
- 4.3.2 The NPPF establishes that the purpose of planning is to contribute to the achievement of sustainable development (Paragraph 7) and then in Paragraph 8 identifies three overarching objectives which need to be pursued in mutually supportive ways to achieve sustainable development: economic, social and environmental:
- **An economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
  - **A social objective** – to support strong, vibrant, and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe built places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
  - **An environmental objective** – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.
- 4.3.3 At the heart of the NPPF is a presumption in favour of sustainable development (Paragraph 10), which should be applied both through the plan-making and decision-making (Paragraph 11) process.





4.3.4 Paragraph 11 states that:

*“...For decision-taking, this means:*

- c) approving development proposals that accord with an up-to-date development plan without delay; or*
- d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date (footnote 8) granting permission unless:
 
  - i. the application of policies in this Framework that protect areas or assets of importance provides a clear reason for refusing the development proposed (footnote 7); or*
  - ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.”**

4.3.5 Section 4 deals with the decision-making process, with Paragraph 38 stating that *“local planning authorities should approach decisions on proposed development in a positive and creative way...and work proactively with applicants to secure developments that will improve the economic, social and environmental conditions of the area. Decision-makers at every level should seek to approve applications for sustainable development where possible.”*

4.3.6 Paragraphs 54-56 set out the Government’s position on planning conditions and obligations, identifying that planning conditions should be kept to a minimum and only imposed where they meet the relevant tests for the imposition of conditions (Paragraph 55). Paragraph 57 places the onus on Applicants to demonstrate whether circumstances justify the need for a viability assessment during the application stage.

4.3.7 Paragraph 81 in Section 6 states that planning policies and decisions should help create conditions in which businesses can invest, expand and adapt. This paragraph also states that *“Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development...”*.

4.3.8 Section 9 promotes sustainable transport, with Paragraph 105 stating: *“Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health...”*.

4.3.9 The policies set out in Section 12 seek to achieve well designed places, highlighting that the



creation of high-quality buildings and places is fundamental for the planning and development process (Paragraph 126). Paragraph 126 goes on to state that “...*good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities...*”.

Planning Practice Guidance (Published 2014, (as amended))

4.3.10 Further to the publication of the NPPF, the over-arching policies are supplemented by guidance in the Planning Practice Guidance (PPG), a web-based resource which provides enhanced clarity on the interpretation of policies in the NPPF. The PPG has been subject to some updates since its first publication. For ease of reference, the relevant paragraphs are set out below.

4.3.11 **Design** – Paragraph: 001 (Reference ID: 26-001-20191001) reiterates Paragraph 130 of the NPPF stating: “...*permission should be refused for development of poor design that fails to take the opportunities available for improving the character and quality of an area and the way it functions, taking into account any local design standards or style guides in plans or supplementary planning documents. Conversely, where the design of a development accords with clear expectations in plan policies, design should not be used by the decision-maker as a valid reason to object to development*”.

Non-Statutory Cherwell Local Plan 2011

4.3.12 The Non-Statutory Cherwell Local Plan 2011 was intended to review and update the Local Plan adopted in 1996. Due to changes to the planning system introduced by the Government, work on this plan was discontinued prior to adoption. The Non-Statutory Cherwell Local Plan 2011 is not part of the statutory development plan but was approved as interim planning policy for development control purposes in December 2004.

Cherwell Local Plan Review 2040

4.3.13 A new district wide Local Plan to 2040 is being prepared to meet assessed development needs for employment, housing, leisure, community facilities and infrastructure and to provide a strategy for the pattern scale and quality of development across the district.

4.3.14 As this plan is at the early stages of plan making, very limited weight is given to it in decision making.

4.3.15 Paragraph 48 of the NPPF sets out that decision-takers may give weight to relevant policies in emerging plans according to their stage of preparation, the extent to which there are unresolved objections to relevant policies, and their degree of consistency with policies in the NPPF.



## 5.0 Planning Case in support of Reserved Matters Approval application

### 5.1 Introduction

5.1.1 The determination of the planning application by Cherwell District Council falls to be determined in accordance with planning law as set out in Section 38(6) of the Planning and Compulsory Purchase Act 2004; Section 70(2) of the Town and Country Planning Act 1990 and the Government's planning policies in the National Planning Policy Framework (referred to as 'the NPPF' hereafter).

5.1.2 The determination process is set out in more detail in Section 2 of the NPPF. This applies a presumption in favour of sustainable development – which is defined in Paragraph 10 of the NPPF. For reasons set out below, it is considered the application proposes substantial development that benefits from this presumption.

### 5.2 Relevant Development Plan policies and key issues for determination arising

#### Policy objectives for the delivery of economic growth in Cherwell and in Bicester, in particular

5.2.1 Enabling the economic growth of Bicester in a location which has already been accepted as appropriate for employment-based growth is what is being proposed by the development subject of this planning application.

#### Employment strategy

5.2.2 One of the strategic objectives (SO 1) of the Local Plan is *“To facilitate economic growth and employment and a more diverse local economy with an emphasis on attracting and developing higher technology industries”*. The site of Bicester Arc as a whole was granted outline planning approval, reflecting its allocation as part of land allocated through Policy Bicester 4: Bicester Business Park of the Local Plan for a new business park. This policy provides for the creation of former Class B1a development, i.e. offices, and related development.

5.2.3 Policy Bicester 4 was seen as part of the means to achieving strategic objective SO 1 of the Local Plan. The Council's ability to achieve the objective relies not just on granting planning permissions but for the development which benefits from planning permission to be deliverable. This is affected by market trends for employment development and a need for the Council to achieve a balance between providing a range of employment sites that attracts inward investment and for there to be availability of suitable housing to support new people coming into the area to take up jobs.



Design

- 5.2.4 In terms of layout, design and external appearance of new development, Policies ESD 15 and C28 detail the criteria which should be adhered to. The design rationale for the proposed development is discussed in detail in the submitted Design and Access Statement and the proposal accords with the provisions of the above policies.

Outline Planning Permission

- 5.2.5 The outline planning approval requires that a series of environmental planning reports and studies are included as part of Reserved Matters proposals. These are included in full at Appendices A-F and summarised below.

**Condition 6**

- 5.2.6 Condition 6 reads:

*“All reserved matters submissions relating to a phase shall be accompanied by details of the existing and proposed ground levels as well as finished floor levels of all proposed buildings within that phase. Where the proposed ground and floor level details are approved as part of the reserved matters approval for that phase, the development in that phase shall be undertaken in accordance with those approved levels.*

*Reason - To ensure that the proposed development is in scale and harmony with its surroundings and to comply with Policy ESD 15 of the Cherwell Local Plan 2011-2031, saved Policy C28 of the Cherwell Local Plan 1996 and Government guidance contained within the National Planning Policy Framework.”*

- 5.2.7 The Reserved Matters proposals includes a drawing package which includes the details required by Condition 6.

**Condition 7**

- 5.2.8 Condition 7 reads:

*“All applications for approval of reserved matters that provide details of proposed buildings shall be accompanied by information that demonstrates that the buildings will achieve BREEAM 'very good' standard based on the criteria applicable at the date of this decision.*

*Reason - In the interests of ensuring sustainability in construction in accordance with the requirements of Policy ESD3 of the Cherwell Local Plan 2011-2031 Part 1.”*



5.2.9 The Reserved Matters proposal includes a BREEAM Pre-Assessment Report (see Appendix A). The reports confirm the credits that are to be achieved and that overall, that a Very Good rating will be achieved by the proposed development.

**Condition 8**

5.2.10 Condition 8 reads:

*“All applications for approval of reserved matters relating to a phase shall be accompanied by details of the on-site renewable energy provision to be incorporated into that phase. Development within that phase shall take place in accordance with the approved details of on-site renewable energy provision and no development shall be occupied until the approved on-site renewable energy provision for that phase is operational, and shall be retained as such thereafter.*

*Reason - In the interests of ensuring that major development takes all reasonable opportunities to operate more sustainably in accordance with the requirements of Policy ESD5 of the Cherwell Local Plan 2011-2031 Part 1.”*

5.2.11 The Reserved Matters proposal include an Energy and Sustainability Statement (see Appendix B) which detail the on-site renewable energy provision to be incorporated as part of the delivery of this Reserved Matters development proposal.

5.2.12 The renewable energy strategy is underpinned by the desire to deliver a wide range of positive responses to climate change and the ambitions of Cherwell District Council’s planning policies and the UK wide target of zero carbon. The proposal improves biodiversity, increases green space, reduces the impact on the local surface water drainage, significantly reduces energy use, and maximises the potential to benefit from continued decarbonisation of the electricity grid where possible.

**Condition 10**

5.2.13 Condition 10 reads:

*“All applications for approval of reserved matters relating to each phase shall be accompanied by details of a surface water drainage scheme for that phase (in accordance with the principles embodied within Sustainable Drainage Systems (SuDS) and the approved surface water drainage strategy for the overall site approved by condition 9). The development shall thereafter be constructed in accordance with the*



*approved surface water drainage scheme and no development shall be occupied within each phase until the approved drainage scheme is completed.*

*Reason - To ensure that the development does not increase risk of flash flooding in an extreme storm event in accordance with the requirements of Policy ESD7 of the Cherwell Local Plan 2011- 2031 Part 1 as well as Government guidance contained in the National Planning Policy Framework.”*

5.2.14 The Reserved Matters proposal includes a Drainage Strategy Plan prepared by Curtins (see Appendix C).

5.2.15 The Drainage Plan also refers to Condition 14 of the outline permission, which reads:

*“No development shall take place within each phase until a detailed scheme of foul drainage for the development within that phase has been submitted to, and approved in writing by, the Local Planning Authority. The foul drainage scheme shall be completed in accordance with the approved scheme prior to the occupation of any building within that phase and retained as such thereafter.*

*Reason - To ensure satisfactory drainage of the site in the interests of public health, to avoid flooding of adjacent land and property and to comply with saved Policy ENV1 of the Cherwell*

*Local Plan 1996, Policy ESD6 of the Cherwell Local Plan 2011-2031 Part 1 and Government*

*guidance contained within the National Planning Policy Framework. This information is required prior to commencement of any development on the appropriate phase as it is fundamental to the acceptability of the scheme.*

5.2.16 The Foul Water Drainage Layout for the proposed Reserved Matters development satisfies Condition 14 in relation to this phase of development.

**Condition 11**

5.2.17 Condition 11 reads:

*“All applications for approval of reserved matters relating to a phase shall be accompanied by an odour report (produced by an appropriately qualified professional) detailing the measures necessary to minimise the potential for occupants of the development within that phase to experience nuisance caused by the proximity of the nearby Bicester Sewage Treatment Works.*

*The development within each phase shall thereafter be carried out in accordance with the necessary measures set out in the approved odour report for that phase.*



*Reason - In the interests of ensuring the development is compatible with the existing surrounding land uses in accordance with the requirements of Policy Bicester 4 of the Cherwell Local Plan 2011-2031 Part 1 as well as Government guidance in the National Planning Policy Framework.”*

5.2.18 The Reserved Matters proposal includes an Odour Assessment prepared by Air Quality Consultants, along with a Covering Letter (see Appendix D). The odour assessment concluded that, across the wider development site, “the overall odour effects are ‘not significant’”. This conclusion was supported by the findings of sniff testing (undertaken by AQC) and dispersion modelling (undertaken by Olfasense and commissioned by Thames Water). In terms of this reserved matters application, the proposed building is located outside of the 5 OUE/m3 contour as predicted by the modelling, and the results of six field odour surveys support the modelling and show that there are no significant effects within the application boundary. There are no constraints to the proposed development in terms of odours from the nearby Bicester STW.

**Condition 12**

5.2.19 Condition 12 reads:

*“All applications for reserved matters approval relating to a phase shall be accompanied by a biodiversity statement that has regard to the ecological information contained within Appendix B to the Environmental Statement Addendum (June 2018) and shall include an assessment of the ecological implications of development within that phase together with the measures to be incorporated within that phase to help mitigate/enhance ecological interest on the site. Development within the phase must thereafter take place in accordance with the measures contained within the approved biodiversity statement for that phase.*

*Reason - To ensure that the ecological impact of the detailed phases of the overall development are fully understood and coordinated through an overarching ecological strategy for the site in accordance with the requirements of Policy ESD10 of the Cherwell Local Plan 2011-2031 Part 1 as well as Government guidance contained in the National Planning Policy Framework.”*

5.2.20 The Reserved Matters proposal includes an Ecological Appraisal (see Appendix E) and Ecology Technical Note/Ecology Statements, along with the associated BNG Metrics (see Appendix F). These reports in combination address the requirements of Condition 12 and confirm that a net gain in biodiversity will be delivered by the Eco Park and the proposed development.



## 6.0 Planning Balance

### 6.1 Introduction

6.1.1 This section of the Planning Statement provides an assessment of the planning balance having regard to the planning matters considered in the earlier Sections. The factors that weigh against the grant of planning permission have been considered, as appropriate, against those in favour of granting planning permission in the table below:

Issue	Weighting
Investment into Bicester	Very Positive +
Delivery of additional employment floorspace	Very Positive+
Proposed use accords with extant planning permission	Very Positive+
Economic Operational – jobs	Very Positive +
Economic Operational – spend in the community	Very Positive +
Policy Compliance – Development Plan	Very Positive +
Policy Compliance – NPPF	Very Positive +
Site Accessibility	Very Positive +
Design	Very Positive +
Provision of construction phase employment opportunities	Positive +
Drainage	Neutral
Highways	Neutral

**Key:**

Scale		
Positive ↓ Negative	Very Positive	
	Positive	
	Moderate	
	Limited	
	Very Limited	
	Neutral	
	Very Limited	
	Limited	
	Moderate	
	Negative	
	Very Negative	

6.1.2 As demonstrated in the above table, there are no negative factors that should weigh against the grant of Reserved Matters approval.

6.1.3 In addition to this, there are several economic, social and environmental benefits arising from the proposed development (NPPF Paragraphs 7-9), that are rated as ‘very positive’ and ‘positive’ and carry significant weight in the planning balance.





6.1.4 These include investment in Bicester, along with the provision of new employment floorspace and the economic benefits to the local economy both through job creation associated with the proposed development and the construction stage.

6.1.5 As such, there are no factors identified that would weigh against the grant of planning permission.



## 7.0 Summary and Conclusion

7.1.1 This Reserved Matters application is submitted to Cherwell District Council by Peveril Securities (the Applicant) and is aimed at delivering employment development and job creation on the Bicester Business Park (Bicester Arc). The planning application is for the following proposed development:

*Details of access, appearance, landscaping, layout and scale relating to the proposed development of a Class E(g)(i) (formerly B1(a)) office/commercial building and associated development, plus associated car parking.*

7.1.2 The proposed development is in accordance with the key planning policy objectives of the Council's Local Plan to deliver economic growth at Bicester and to make a contribution to job creation.

7.1.3 The benefits that will be delivered through the grant of planning permission are significant and relate to the following areas:

1. The grant of permission for the employment building on the site will attract further interest and greater investment.
2. The proposal will generate circa 435 FTE jobs.
3. A scheme with a construction value of £25m, which will generate circa 200 direct full-time equivalent construction jobs based upon a 12 month development programme, in addition to the permanent jobs being created.
4. The ability to demonstrate to the employment market that the Bicester Arc site is 'underway' which will attract end users to the town as competition to Oxford.
5. The Reserved Matters application includes a BREEAM Pre-Assessment Report that demonstrates how the building will achieve BREEAM 'Very Good'.
6. The Reserved Matters application also includes an energy strategy to seek carbon reduction as part of the design approach for the buildings.

7.1.4 Given the strong favourable balance of benefits against impacts, and the significant compliance with relevant planning policies and the outline planning conditions, Cherwell District Council can grant approval for the application without delay.



Appendix A – Indicative BREEAM Pre-Assessment Reports



## BREEAM New Construction 2018

Bicester Office 1

Pre-assessment

Bicester Arc Office Park

25 September 2023      Assessment report



Marks & Spencer's BREEAM Excellent Cheshire Oaks store (Image: Marks & Spencer)

## Assessment references

<b>Registration number:</b>	TBC	<b>Date created:</b>	9/11/2021
<b>Created by:</b>	Dan Williams		

## Site details

<b>Site name:</b>	Bicester Arc Office Park		
<b>Address:</b>			
<b>Town:</b>			
<b>County:</b>			
<b>Postcode:</b>			
<b>Country:</b>	United Kingdom		


## Certificate details

The certificate will have the name of the architect (if entered above) and the name of the developer (from above).

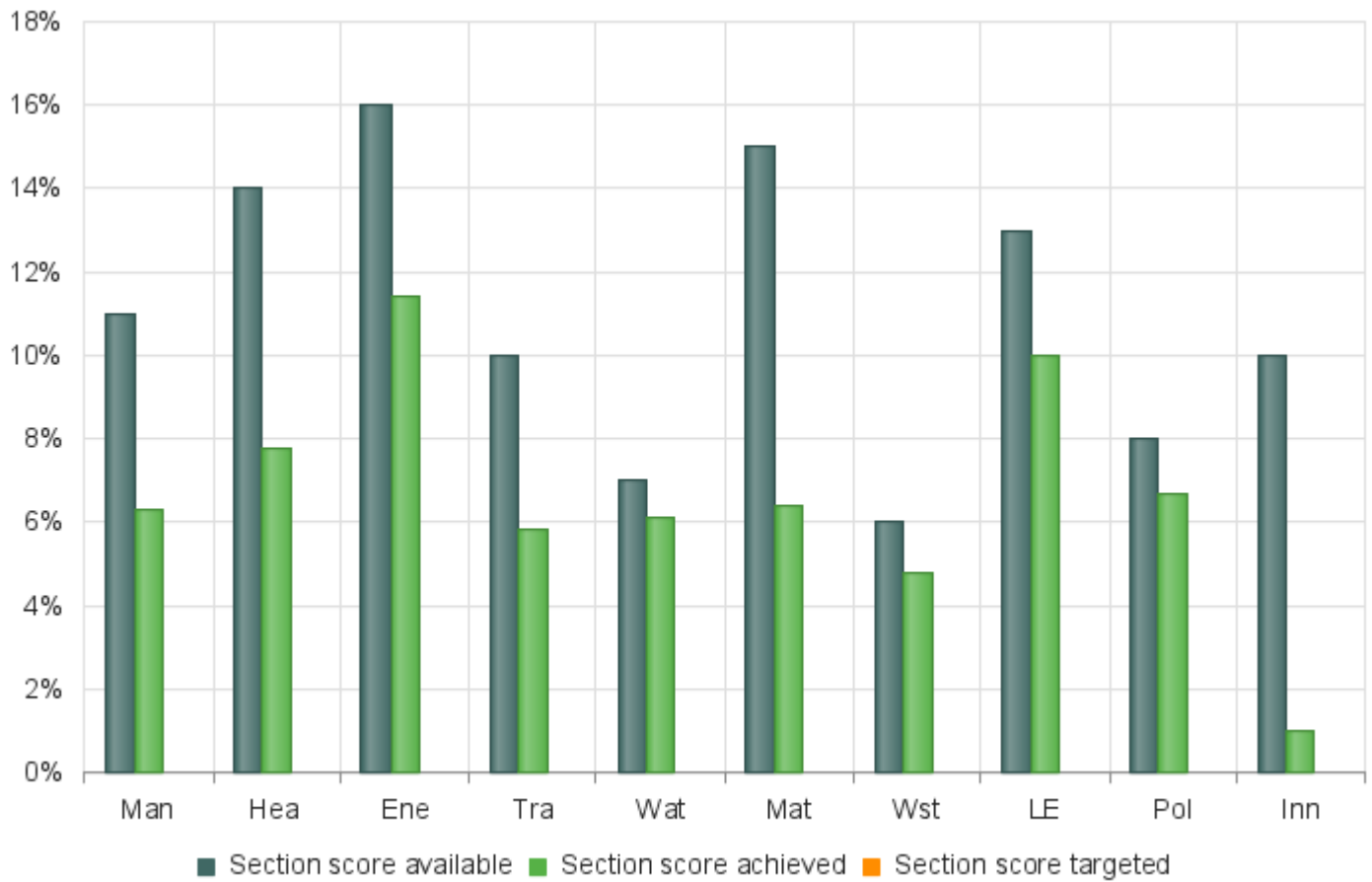
Any other names to appear on the certificate are listed below:

Name	Label
------	-------

## BREEAM Rating

	Credits available	Credits achieved	Credits targeted	% Credits achieved	Weighting	Category score	Target score
<b>Man</b>	21.0	12.0	0.0	57.14%	11.00%	6.28%	0.00%
<b>Hea</b>	18.0	10.0	0.0	55.56%	14.00%	7.77%	0.00%
<b>Ene</b>	21.0	15.0	0.0	71.43%	16.00%	11.42%	0.00%
<b>Tra</b>	12.0	7.0	0.0	58.33%	10.00%	5.83%	0.00%
<b>Wat</b>	8.0	7.0	0.0	87.50%	7.00%	6.12%	0.00%
<b>Mat</b>	14.0	6.0	0.0	42.86%	15.00%	6.42%	0.00%
<b>Wst</b>	10.0	8.0	0.0	80.00%	6.00%	4.80%	0.00%
<b>LE</b>	13.0	10.0	0.0	76.92%	13.00%	10.00%	0.00%
<b>Pol</b>	12.0	10.0	0.0	83.33%	8.00%	6.66%	0.00%
<b>Inn</b>	10.0	1.0	0.0	10.00%	10.00%	1.00%	0.00%
<b>Total</b>	139.0	86.0	0.0	61.87%	-	66.34%	0.00%
<b>Rating</b>	-	-	-	-	-	 <b>Very Good</b>	Unclass

## Performance by environmental category



## Indicator scores



More information (<https://www.breeam.com/news/new-breeam-indicators-to-be-added-to-breeam/>) about the BREEAM indicator scores

## Issue scores

Please Note: X means the exemplary credit for the relevant issue

### Management

Man 01 Project Brief and design

**0 / 4**

Man 02 Life cycle cost and service life planning

**1 / 4**

Man 03 Responsible construction practices

**5 / 6** X: 0 / 1

Man 04 Commissioning and handover

**4 / 4**

Man 05 Aftercare

**2 / 3**

### Health and Wellbeing

Hea 01 Visual comfort

**2 / 5** X: 0 / 2

Hea 02 Indoor air quality

**2 / 4** X: 0 / 1

Hea 04 Thermal comfort

**2 / 3**

Hea 05 Acoustic performance

**3 / 3**

Hea 06 Security

**0 / 1** X: 0 / 1

Hea 07 Safe and Healthy Surroundings

**1 / 2**

### Energy

Ene 01 Reduction of energy use and carbon emissions

**9 / 13** X: 0 / 5

Ene 02 Energy monitoring

**2 / 2**



Ene 03 External lighting

**1 / 1**

Ene 04 Low carbon design

**1 / 3**

Ene 05 Energy efficient cold storage

**N/A**

Ene 06 Energy efficient transportation systems

**2 / 2**

Ene 07 Energy efficient laboratory systems

**N/A**

Ene 08 Energy efficient equipment

**N/A**

## Transport

Tra 01 Transport assessment and travel plan

**2 / 2**

Tra 02 Sustainable transport measures

**5 / 10**

## Water

Wat 01 Water consumption

**4 / 5** X: 0 / 1

Wat 02 Water monitoring

**1 / 1**

Wat 03 Water leak detection

**2 / 2**

Wat 04 Water efficient equipment

**N/A**

## Materials

Mat 01 Life cycle impacts

**0 / 7** X: 0 / 3

Mat 02 Environmental impacts from construction products

**1 / 1**

Mat 03 Responsible sourcing

**3 / 4** X: 0 / 1

Mat 05 Designing for durability and resilience

**1 / 1**

Mat 06 Material efficiency

**1 / 1**

## Waste

Wst 01 Construction waste management

**3 / 4** X: 0 / 1

Wst 02 Use of recycled and sustainably sourced aggregates

**1 / 1** X: 0 / 1

Wst 03 Operational waste

**1 / 1**

Wst 04 Speculative finishes (Offices only)

**1 / 1**

Wst 05 Adaptation to climate change

**1 / 1** X: 0 / 1

Wst 06 Design for disassembly and adaptability

**1 / 2**

## Land use and ecology

LE 01 Site selection

**0 / 2**

LE 02 Ecological risks and opportunities

**2 / 2** X: 0 / 1

LE 03 Managing impacts on ecology

**3 / 3**

LE 04 Ecological change and enhancement

**3 / 4** X: 0 / 1

LE 05 Long term ecology  
management and  
maintenance

**2 / 2**

## Pollution

Pol 01 Impact of refrigerants

**3 / 3**

Pol 02 Local air quality

**0 / 2**

Pol 03 Flood risk  
management and reducing  
surface water run-off

**5 / 5**

Pol 04 Reduction of Night  
Time Light Pollution

**1 / 1**

Pol 05 Noise attenuation

**1 / 1**

## Innovation

Inn 01 Innovation

**0 / 0** X: 1 / 10

## Initial details

Technical manual issue number : Issue 3.0

Project scope : Fully fitted

Building type (main description) : Office

Sub-group : General office building

Assessment stage : Design (interim)

Building floor area (GIA) : 6600 m<sup>2</sup>

Building floor area (NIFA) : 5573 m<sup>2</sup>

Is the building designed to be untreated? : No

Building services - heating system type : Air system

Building services - cooling system type : Air-conditioning

Does the building have external areas within the boundary of the assessed development? :  
Yes

Are commercial or industrial-sized refrigeration and storage systems specified? : No

Are building user lifts present? : Yes

Are building user escalators or moving walks present? : No

Are there any water demands present other than those assessed in Wat 01? : No

Are there statutory requirements, or other issues outside of the control of the project, that impact the ability to provide outdoor space : No

Are there any systems specified that contribute to the unregulated energy load? : No

Are the Post-occupancy stage credits targeted in Ene 01 issue? : No

Are laboratories present? : No

Are there fume cupboard(s) and/or other containment devices present? : No

## Category assessment

### Management (Man)

#### Man 01 Project Brief and design

To optimise final building design through recognising and encouraging an integrated design process and robust stakeholder engagement.

##### Assessment criteria

Stakeholder consultation (interested parties) : No

Project delivery planning : No

Prerequisite: Have the client and the contractor formally agreed performance targets? : No

**Credits awarded : 0**

#### Man 02 Life cycle cost and service life planning

To promote the business case for sustainable buildings and to deliver whole life value by encouraging the use of life cycle costing to improve design, specification, through-life maintenance and operation.

##### Assessment criteria

Elemental LCC : No

Component level LCC options appraisal : No

Capital cost reporting : Yes

Capital cost of the project : 0.25 Â£k/m<sup>2</sup>

**Credits awarded : 1**

#### Man 03 Responsible construction practices

To recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.

##### Assessment criteria

Prerequisite: Are all timber and timber-based products used during the construction process of the project 'legally harvested and traded timber'? : Yes

Environmental management : Yes

Prerequisite: Have the client and the contractor formally agreed performance targets? :	Yes
BREEAM Advisory Professional (site) :	No
Responsible construction management :	2
Monitoring of construction site impacts :	Yes
Utility consumption :	Yes
Transport of construction materials and waste :	Yes
Exemplary level criteria - Responsible construction management :	No

#### Key Performance Indicators: Construction site energy use

Energy consumption (total) - site processes :	10 kWh
Energy consumption (intensity) - site processes :	10 kWh/project value

#### Key Performance Indicators: Construction site greenhouse gas emissions

Process greenhouse gas emissions (total) - site processes :	10 KgCO <sub>2</sub> eq
Carbon dioxide emissions (intensity) - site processes :	10 KgCO <sub>2</sub> eq/project value

**Credits awarded : 5**

## Man 04 Commissioning and handover

To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.

#### Assessment criteria

Commissioning testing schedule and responsibilities :	Yes
Commissioning - design and preparation :	Yes
Testing and inspecting building fabric :	Yes
Handover - have a technical and a non-technical building user guide been developed prior to handover? :	Yes
Handover - have a technical and a non-technical training schedule been prepared around handover? :	Yes

**Credits awarded : 4**

## Man 05 Aftercare

To ensure the building operates in accordance with the design intent and operational demands, through providing aftercare to the building owner and occupants during the first year of occupation.

### Assessment criteria

Is this a speculative development? :	No
Aftercare support :	Yes
Commissioning - implementation :	Yes
Post occupancy evaluation :	No
The client or building occupier commits funds to pay for the POE in advance. :	No

**Credits awarded : 2**

## Health and Wellbeing (Hea)

### Hea 01 Visual comfort

To encourage best practice in visual performance and comfort by ensuring daylighting, artificial lighting and occupant controls are considered.

#### Assessment criteria

Control of glare from sunlight :	Yes
Daylighting (building type dependent) :	0
View Out :	No
Internal and external lighting levels, zoning and controls :	Yes
Exemplary level criteria- Internal and external lighting levels, zoning and control :	No

**Credits awarded : 2**

### Hea 02 Indoor air quality

To encourage and support healthy internal environments with good indoor air quality.

#### Assessment criteria

Pre requisite: Indoor air quality (IAQ) plan :	Yes
Ventilation :	Yes
Emissions from building products :	1
Post-construction indoor air quality measurement :	No
Exemplary level criteria- Emissions from building products :	No

#### Key Performance Indicators

Total volatile organic compound (TVOC) concentration :	1 $\hat{1}\frac{1}{4}$ g/m <sup>3</sup>
Formaldehyde concentration :	1 $\hat{1}\frac{1}{4}$ g/m <sup>3</sup>

**Credits awarded : 2**

### Hea 04 Thermal comfort



To ensure the building is capable of providing an appropriate level of thermal comfort.

### Assessment criteria

Thermal modelling :	Yes
Design for future thermal comfort :	No
Thermal zoning and controls :	Yes

### Key Performance Indicators

PMV and PPD Indices :

**Credits awarded : 2**

## Hea 05 Acoustic performance

To ensure the building is capable of providing an appropriate acoustic environment to provide comfort for building users.

### Assessment criteria

Criteria performance requirements or SQA bespoke requirements? :	Criteria performance requirements
Sound insulation :	1
Indoor ambient noise level :	Yes
Room acoustics :	Yes

**Credits awarded : 3**

## Hea 06 Security

To encourage the planning and implementation of effective measures that provide an appropriate level of security to the building and site.

### Assessment criteria

Security of site and building :	No
Exemplary level criteria :	No

**Credits awarded : 0**

## Hea 07 Safe and Healthy Surroundings

To encourage the provision of safe access around the site and outdoor space that enhances the wellbeing of building users. .

### Assessment criteria

Safe Access : Yes

Outside Space : No

**Credits awarded : 1**

# Energy (Ene)

## Ene 01 Reduction of energy use and carbon emissions

To minimise operational energy demand, primary energy consumption and CO<sub>2</sub> emissions.

### Energy performance

Country :	England
Can a .inp file be uploaded? :	No
Without the .inp file being uploaded only the standard methodology can be used. This may impact the number of credits that can be awarded. :	
Energy Production by Technology :	
Photovoltaic systems (Actual) :	150 kWh/m <sup>2</sup>
Photovoltaic systems (Notional) :	130 kWh/m <sup>2</sup>
Wind turbines (Actual) :	0 kWh/m <sup>2</sup>
Wind turbines (Notional) :	0 kWh/m <sup>2</sup>
CHP generators (Actual) :	0 kWh/m <sup>2</sup>
CHP generators (Notional) :	0 kWh/m <sup>2</sup>
Solar thermal systems (Actual) :	0 kWh/m <sup>2</sup>
Solar thermal systems (Notional) :	0 kWh/m <sup>2</sup>
Energy & CO <sub>2</sub> Emissions Summary :	
Actual building energy demand :	40 MJ/m <sup>2</sup> yr
Notional building energy demand :	100 MJ/m <sup>2</sup> yr
Actual building primary energy consumption :	40 kWh/m <sup>2</sup> yr
Notional building primary energy consumption :	100 kWh/m <sup>2</sup> yr
Actual building CO <sub>2</sub> -eq emissions (BER) :	40 KgCO <sub>2</sub> -eq/m <sup>2</sup> yr
Notional building CO <sub>2</sub> -eq emissions (TER) :	100 KgCO <sub>2</sub> -eq/m <sup>2</sup> yr

**Towards carbon negative (exemplary credits)**

Zero net CO<sub>2</sub>-eq emissions : No

**Energy performance - Building score**

Heating and cooling demand energy performance ratio (EPRdem) : 0.29

Primary consumption energy performance ratio (EPRpc) : 0.0

Total BREEAM credits achieved : 5.0

CO<sub>2</sub>-eq energy performance ratio (EPRco2-eq) : 0.299

Overall building energy performance ratio (EPRnc) : 0.589

% improvement BER/TER : 60.0 %

**Prediction of operational energy consumption**

Has a design workshop focusing on operational energy performance been carried out? : Yes

Additional energy modelling to generate predicted operational energy consumption figures carried out? : Yes

Predicted energy consumption targets by end use, design assumptions and input data reported? : Yes

Risk assessment to highlight any significant design, technical, and process risks? : Yes

**Post-occupancy stage (exemplary credits)**

Maximum credits achieved in Ene 02 Energy monitoring? : Yes

The client or building occupier commits funds to pay for the post-occupancy stage? : No

The energy model is submitted to BRE and retained by the building owner? : No

**Credits awarded : 9**

**Ene 02 Energy monitoring**

To encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption. To enable managers and consultants post-handover to compare actual performance with targets in order to inform ongoing management and help in reducing the performance gap.

**Assessment criteria**

Sub-metering of end use categories : Yes

Sub-metering of high energy load and tenancy areas : Yes

**Credits awarded : 2**

## Ene 03 External lighting

To reduce energy consumption through the specification of energy efficient light fittings for external areas of the development.

### Assessment criteria

External lighting has been designed out? : No

Is external lighting specified in accordance with the relevant criteria? : Yes

**Credits awarded : 1**

## Ene 04 Low carbon design

To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems.

### Assessment criteria

Has the first credit within Hea 04 been achieved? : Yes

Passive design analysis : No

Free cooling : No

Low and zero carbon technologies : Yes

### KPI

Total on-site and/or near-site LZC energy generation :

Expected energy consumption and CO<sub>2</sub>-eq emissions reduction resulting from passive design measures :

Energy consumption :

CO<sub>2</sub>-eq emissions :

Expected energy consumption and CO<sub>2</sub>-eq emissions reduction resulting from passive design measures as a percentage :

Energy consumption :

CO<sub>2</sub>-eq emissions :

Expected reduction in CO<sub>2</sub>-eq emissions resulting from the LZC technologies :  
 Expected reduction in CO<sub>2</sub>-eq emissions resulting from the LZC technologies as a percentage :

: 1

**Credits awarded**

## Ene 05 Energy efficient cold storage

To encourage the installation of energy efficient refrigeration systems, in order to reduce operational greenhouse gas emissions resulting from the system's energy use.

**Assessment criteria - N/A**

## Ene 06 Energy efficient transportation systems

To encourage the specification of energy efficient transport systems within buildings.

**Assessment criteria**

Energy consumption : Yes

Energy efficient features - Lifts : Yes

**Credits awarded : 2**

## Ene 07 Energy efficient laboratory systems

To encourage laboratory areas that are designed to minimise their operational energy consumption and associated CO<sub>2</sub> emission

**Assessment criteria - N/A**

## Ene 08 Energy efficient equipment

To encourage installation of energy efficient equipment to ensure optimum performance and energy savings in operation

**Assessment criteria - N/A**

## Transport (Tra)

### Tra 01 Transport assessment and travel plan

To reward awareness of existing local transport and identify improvements to make it more sustainable.

#### Assessment criteria

Travel plan : Yes

**Credits awarded : 2**

### Tra 02 Sustainable transport measures

To maximise the potential for local public, private and active transport through provision of sustainable transport measures appropriate to the site.

#### Assessment criteria

Prerequisite : Yes

Location type (based on existing AI) : AI <25

Number of points achieved overall : 5

**Credits awarded : 5**

#### Comments :

AI 3.66

## Water (Wat)

### Wat 01 Water consumption

To reduce the consumption of potable water for sanitary use in new buildings through the use of water efficient components and water recycling systems.

#### Assessment criteria

Please select the calculation procedure used :	Standard approach
Credits awarded :	4
Exemplary performance :	No

#### Key Performance Indicators

Standard approach data: :

Water Consumption from building micro-components :

Water demand met via greywater/rainwater sources :

Total net water consumption :

Improvement on baseline performance :

Key Performance Indicator - use of freshwater resource: :

Total net Water Consumption :

Default building occupancy :

**Credits awarded : 4**

### Wat 02 Water monitoring

To reduce the consumption of potable water in new buildings through the effective management and monitoring of water consumption.

#### Assessment criteria

Water meter on the mains water supply to each building :	Yes
Sub-metering/monitoring equipment on supply to plant/building areas :	Yes
Pulsed output or other open protocol communication output and BMS	Yes



connection :

The water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (L/person/day) : No

**Credits awarded : 1**

### Wat 03 Water leak detection

To reduce the consumption of potable water in new buildings through minimising wastage due to water leaks.

#### Assessment criteria

Leak detection system : Yes

Flow control devices : Yes

**Credits awarded : 2**

### Wat 04 Water efficient equipment

To reduce water consumption for uses not assessed under Wat 01 by encouraging specification of water efficient equipment.

**Assessment criteria - N/A**

## Materials (Mat)

### Mat 01 Life cycle impacts

To reduce the burden on the environment from construction products by recognising and encouraging measures to optimise construction product consumption efficiency and the selection of products with a low environmental impact (including embodied carbon), over the life cycle of the building.

#### Assessment criteria

Total Mat 01 credits achieved - taken from the Mat 01/02 Results 0

Submission Tool :

Total Exemplary credits achieved - taken from the Mat 01/02 Results 0

Submission Tool :

**Credits awarded : 0**

### Mat 02 Environmental impacts from construction products

To encourage availability of robust and comparable data on the impacts of construction products through the provision of EPD.

#### Assessment criteria

Mat 02 credit achieved - Taken from the Mat 01/02 Results Submission 1

Tool. :

**Credits awarded : 1**

### Mat 03 Responsible sourcing

To facilitate the selection of products that involve lower levels of negative environmental, economic and social impact across their supply chain including extraction, processing and manufacture.

#### Assessment criteria

Prerequisite: All timber and timber based products are 'Legally harvested and traded timber' : Yes

Has the enabling sustainable procurement credit been achieved? : Yes

Mat 03 minimum scope level : plus Substructure and hard landscaping / Internal Finishes

Percentage of available for percentage of RSM points achieved : 20 %

**Credits awarded : 3**

## Mat 05 Designing for durability and resilience

To reduce the need to repair and replace materials resulting from damage to exposed elements of the building and landscape.

### Assessment criteria

Protecting vulnerable parts of the building from damage and exposed parts of the building from material degradation : Yes

**Credits awarded : 1**

## Mat 06 Material efficiency

To avoid unnecessary materials use arising from over specification without compromising structural stability, durability or the service life of the building.

### Assessment criteria

Material optimisation measures investigated and implemented at all relevant stages : Yes

**Credits awarded : 1**

## Waste (Wst)

### Wst 01 Construction waste management

To reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimise waste going to landfill.

#### Assessment criteria

Is demolition occurring under the developer's ownership for the purpose of enabling the assessed development? : No

Compliant Resource Management Plan : Yes

Have waste materials been sorted into separate key waste groups? : Yes

Exemplary level criteria : Yes

#### KPI

Measure/units for the data being reported : tonnes

Non-hazardous construction waste (excluding demolition/excavation) - fill in to award 'Construction resource efficiency' credits :

Total non-hazardous construction waste generated :

Non-hazardous non-demolition construction waste diverted from landfill - fill in to award diversion from landfill credit :

Total non-hazardous non-demolition construction waste diverted from landfill :

Non-hazardous demolition waste diverted from landfill - fill in to award diversion from landfill credit :

Total non-hazardous demolition waste generated :

Total non-hazardous demolition waste to disposal :

Non-hazardous excavation waste diverted from landfill - fill in to award credit :

Material for reuse :

Material for recycling :

Material for energy recovery :

Hazardous waste to disposal :

**Credits awarded : 3**

## Wst 02 Use of recycled and sustainably sourced aggregates

To encourage the use of more sustainably sourced aggregates, encourage reuse where appropriate and avoid waste and pollution arising from disposal of demolition and other forms of waste.

### Assessment criteria

Is demolition occurring under the developer's ownership for the purpose of enabling the assessed development? : No

Projects Sustainable Aggregate points : 4

### KPI

Total quantity of aggregate :

% of high - grade aggregate that is recycled/ secondary aggregate by application :

**Credits awarded : 1**

## Wst 03 Operational waste

To encourage the recycling of operational waste through the provision of dedicated storage facilities and space.

### Assessment criteria

Compliant recycling and non-recyclable waste storage allocated : Yes

Static waste compactor(s) or baler(s) : N/A

Vessel(s) for composting suitable organic waste and water outlet : Yes

**Credits awarded : 1**

## Wst 04 Speculative finishes (Offices only)

To minimise the wastage associated with the installation of floor and ceiling finishes in lettable areas in speculative buildings where tenants have not been involved in their selection.

### Assessment criteria

Speculative floor and ceiling finishes : Are installed in a show area only

**Credits awarded : 1**

## Wst 05 Adaptation to climate change

To minimise the future need of carrying out works to adapt the building to take account of more extreme weather changes resulting from climate change and changing weather patterns.

### Assessment criteria

Resilience of structure, fabric, building services and renewables installation Yes

:

Exemplary level - responding to climate change : No

**Credits awarded : 1**

## Wst 06 Design for disassembly and adaptability

To avoid unnecessary materials use, cost and disruption arising from the need for future adaptation works as a result of changing functional demands and to maximise the ability to reclaim and reuse materials at final demolition in line with the principles of a circular economy.

### Assessment criteria

Design for disassembly and functional adaptability - recommendations : Yes

Disassembly and functional adaptability - implementation : No

**Credits awarded : 1**

## Land use and ecology (LE)

### LE 01 Site selection

To encourage the use of previously occupied or contaminated land and avoid land which has not been previously disturbed.

#### Assessment criteria

Percentage of proposed development's footprint on previously occupied land: :	0 %
Contaminated land :	No

**Credits awarded : 0**

### LE 02 Ecological risks and opportunities

To determine the existing ecological value associated with the site and surrounding areas, and the risks and opportunities for ecological protection and enhancement.

#### Assessment criteria

Assessment route selection :	Comprehensive
Prerequisite - Statutory obligations :	Yes
Survey and Evaluation :	Yes
Determining ecological outcomes :	Yes
Exemplary level - Wider site sustainability :	No

**Credits awarded : 2**

### LE 03 Managing impacts on ecology

To avoid, or limit as far as possible, negative ecological impacts associated with the site and surrounding areas resulting from the project.

#### Assessment criteria

Assessment route :	Comprehensive
Prerequisite - Ecological risks and opportunities :	Yes

**Credits awarded : 3**

## LE 04 Ecological change and enhancement

To enhance ecological value of the area associated with the site in support of local, regional and national priorities.

### Assessment criteria

Assessment route :	Comprehensive
Prerequisite - Managing negative impacts on ecology :	Yes
Ecological enhancement (Comprehensive route only) :	Yes
Change and enhancement of ecology (Comprehensive route only) :	2

**Credits awarded : 3**

## LE 05 Long term ecology management and maintenance

To secure ongoing monitoring, management and maintenance of the site and its habitats and ecological features, to ensure intended outcomes are realised for the long term.

### Assessment criteria

Assessment route :	Comprehensive
At least one credit achieved under LE 04 for 'Change and Enhancement of Ecology' :	Yes
Prerequisite - Statutory obligations, planning and site implementation :	Yes
Management and maintenance throughout the project :	Yes
Landscape and ecology management plan :	Yes

**Credits awarded : 2**



## Pollution (Pol)

### Pol 01 Impact of refrigerants

To reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from building systems.

#### Assessment criteria

Refrigerant containing systems installed in the assessed building? : Yes

Prerequisite: All systems (with electric compressors) comply with BS EN 378:2016 (parts 2 and 3) and (where applicable) Institute of Refrigeration Ammonia Refrigeration Systems code of practice? : Yes

Total Direct Effect Life Cycle CO<sub>2</sub>eq (DELCO<sub>2</sub>). Emissions from the system : Global Warming Potential (GWP) of the specified refrigerant(s) 10 or less? Yes

#### Leak detection

Are all the systems hermetically sealed? : Yes

**Credits awarded : 3**

### Pol 02 Local air quality

To contribute to a reduction in local air pollution through the use of low emission combustion appliances in the building.

#### Assessment criteria

Is the project required to connect to a District Heating system, and it supplies all heating and hot water demands to the building? : No

How many credits have been achieved? : 0

**Credits awarded : 0**

### Pol 03 Flood risk management and reducing surface water run-off

To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage.

#### Assessment criteria

Prerequisite: Has an appropriate consultant demonstrated and confirmed the development's compliance with all sought credits? : Yes

Has a site-specific flood risk assessment been conducted? : Yes

Annual probability of flooding :	Low
Has the pre-requisite for the Surface Water Run-Off credits been achieved? :	Yes
Has the Surface Water Run-Off - Rate credit been achieved? :	Yes
Flooding of property will not occur in the event of local drainage system failure :	Yes
Has the Surface Water Run-Off - Volume credit been achieved? :	Yes
Minimising watercourse pollution :	Yes

**Credits awarded : 5**

## Pol 04 Reduction of Night Time Light Pollution

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

### Assessment criteria

External lighting has been designed out? :	No
Does external lighting meet all relevant criteria? :	Yes

**Credits awarded : 1**

## Pol 05 Noise attenuation

To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise-sensitive buildings.

### Assessment criteria

Noise-sensitive areas/buildings within 800m radius of the development :	Yes
Is the site compliant with all relevant criteria? :	Yes

**Credits awarded : 1**

# Innovation (Inn)

## Inn 01 Innovation

To support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues.

### Assessment criteria

Number of 'approved' innovation credits achieved? : 1

**Credits awarded : 0**

**Exemplary credits awarded : 1**

Appendix B - Energy and Sustainability Statements





Where  
buildings  
come alive

Peveril Securities

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# Lakeview Drive, Bicester Arc Office

190468

**Energy & Sustainability Statement**



# Sustainability at our core.

Document Revision History			Ref	190468 Bicester Arc	
Rev	Author	Verification By	Date	Suitability	Comments / Status
C	J. RODE	C. WALDRON	27/05/2022	S4	EXECUTIVE SUMMARY UPDATED
D	J. RODE	C. WALDRON	24/11/2022	S4	COMMENTS INCORPORATED
E	J. RODE	C. WALDRON	27/09/2023	S4	REVISED FOR NEW PART L

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# Executive Summary



Couch Perry and Wilkes have been appointed by Peveril Securities Ltd to help steer and inform the energy credentials of the Bicester Arc development at Lakeview drive and to provide an Energy Statements to demonstrate how the development will comply with planning policy relating to energy efficient design and generation of energy from renewable sources. Phase one of the development consists of an office building and a residential building. This report deals with the office building only.

The overall predicted carbon reduction achieved for the building, once all steps of the Energy Hierarchy (Be Lean – Be Clean – Be Green) have been accessed and incorporating the proposed energy efficiency measures, Air Source Heat Pumps and Solar PV, results in a betterment in comparison to the ‘baseline’ development, incorporating a gas-fired solution, when calculated with Part L 2021 emission factors which came into effect June 2022.

## Building Carbon Emissions

	Area (m <sup>2</sup> )	Regulated Annual Emissions (kgCO <sub>2</sub> /annum)	% Reduction CO <sub>2</sub> Emissions (Hierarchy stage)	Total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2021)	Estimated total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2013)
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Proposed ‘Lean’ Development	6,600	25,896	34%	34%	62%
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<b>Proposed ‘Green’ Development</b>	<b>6,600</b>	<b>24,498</b>	<b>5%</b>	<b>37%</b>	64%

The design of the Bicester Arc Office proposal is underpinned by the desire to deliver a wide range of positive responses to climate change and the ambitions of Cherwell District Council’s planning policies and the UK wide target of zero carbon. The proposal improves biodiversity, increases green space, reduces the impact on the local surface water drainage, significantly reduces energy use, and maximises the potential to benefit from continued decarbonisation of the electricity grid where possible.

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# Energy Statement: Bicester Arc Office

## 1.0 Introduction

CPW have been appointed by Peveril Securities Ltd to help steer and inform the energy credentials of the project and to produce a sustainable building energy strategy to compliment and inform design principles for the proposed office development at Lakeview Drive, Bicester. In undertaking this body of work CPW have also worked closely with the project architects to ensure a well thought out and developed energy strategy can be taken forward and employed within the development.

The proposed energy strategy is summarized within this Energy Statement to support the detailed planning application for phase 1 of the Bicester Arc development. This Energy Statement demonstrates how the development intends to comply with planning policy relating to energy efficient design and generation of energy from renewable sources. Planning Policy ESD3 requires the submission of further information concerning energy use within the building relating to BREEAM, and a further submission in relation to that condition will be made in due course.

The proposed development comprises Ground Floor (reception, office space) and 3No Upper Floor levels of office accommodation.

This statement considers that the development is required to maximise energy efficiency as far as possible by reducing the energy demand, reducing heat losses, ensuring good building fabric efficiency / passive design, encouraging useful solar gain, encouraging useful day lighting, and maximising efficiency of all fixed regulated building services systems (lighting, heating, cooling, hot water and mechanical ventilation systems).

The possibility of connecting to the Bicester District Heating Network (Elmsbrook) scheme has been considered.

This Energy Statement is intended to provide an indication of the energy efficiency of the development and to reflect the latest building design in order to provide evidence for the planning condition relating to building carbon emissions. The strategy detailed within has been followed as the design has progressed to this stage. The figures quoted are estimates based on assumed plant and specifications.

The preferred solution has been strongly influenced by local Planning Policies relating to sustainability and energy efficiency. The Cherwell District Council's Local Plan highlights the Council's desires to limit energy consumption and reduce carbon dioxide emissions through Planning Policies ESD 1-5 and Peveril Securities Ltd fully support this aspiration. It is their intention to closely follow the specific guidance of this document in order to significantly reduce carbon emissions.

In order to ensure a well-considered sustainable design process the approach to assess the energy strategy will follow the proposed energy hierarchy below:

- a) **'Be Lean' – Energy Efficient Design**
- b) **'Be Clean' – Decentralised Energy**
- c) **'Be Green' – Renewable Energy Technology**

This Energy Statement is therefore structured accordingly.

# Energy Statement: Bicester Arc Office

## 2.0 Methodology

A key objective of the energy strategy analysis undertaken is to avoid a proposal coming forward whereby poor energy efficiency is employed but renewable technologies included, only to satisfy regulatory requirements. Consideration should be given to potential increased inefficiency at part load conditions and at times when renewable energy generation is not available in this respect. The predicted energy demand for the entire development has been based upon an energy model of this specific development modelled in detail in IES software. 'Benchmark' Energy data has been derived from this model which utilises the pertinent figures from Part L 2021 to provide a basis for carrying out options analysis.

The predicted energy efficiency and emissions ratings have been informed and assessed via BRUKL calculation using VE Compliance Modelling. The energy efficiency and emissions ratings detailed have been assessed and are taken as reasonable estimates at this stage of the design, based on the following strategies and equipment specifications.

### 2.1 Grid Decarbonisation

It is widely accepted, that the previous edition of Part L of the building regulations (2013) used out of date carbon emissions factors relating to different fuel types. None more impacted by this is electrical fuel which now takes greater contribution to its production from renewable sources, rather than relying so heavily on the burning of fossil fuels. With this in mind, an updated version of Part L (2021), incorporating new emissions factors for gas and electricity in particular, has come into effect (June 2022) and recognises the ongoing decarbonisation of the electrical grid. It will therefore be that providing the option of electrically driven systems are far more attractive, in CO<sub>2</sub> emissions terms, than previously experienced.

## 3.0 Baseline Building

The baseline building for comparison is represented by the notional building, as defined in building regulations and the NCM modelling guide, for a gas-fired servicing solution for the proposed development. This baseline has been chosen to highlight any potential improvement realised by benefiting from decarbonisation of the electrical grid. 'Benchmark' data has been derived from this model to provide the basis for a suitable baseline building.

The baseline present below in carbon emissions terms shall be developed in the following sections with the carbon emissions reduction, from the level tabulated below, presented. As previously stated, the baseline for comparison considers a gas-fired solution without the benefit of the energy efficiency measures and technologies described further within this statement that are not inherent in the NCM model.

Estimated carbon emissions for the Baseline Building are taken from the IES software model and shown in the table below:

# Energy Statement: Bicester Arc Office

## Proposed 'Baseline' Building Carbon Emissions

	Area (m <sup>2</sup> )	Regulated Annual Emissions (kgCO <sub>2</sub> /annum)	% Reduction CO <sub>2</sub> Emissions (Hierarchy stage)	Total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2021)	Estimated total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2013)
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## 4.0 'Be Lean' – Energy Efficient Design

Reducing energy usage is the priority in the energy hierarchy. It is often the measure with the least cost implications, and any reduction will, in turn, reduce the requirement for on-site generation from renewable energy sources.

Achieving an optimum use of energy throughout a building's life requires the implementation of passive design to reduce the need for energy associated with controlling the environment and efficient controls to assist in occupant's use of energy.

The calculated energy demand is based on the following specification:

- Omission of gas fuel to the building to maximise benefit of decarbonising electrical grid. Highly efficient heat pumps in the form of VRF systems are proposed to meet the heating and cooling demand of the building.
- Maximising daylighting in all areas. The glazing specification will be carefully considered, aiming to provide an optimum balance between passive solar heating, limiting summertime overheating and maximising the potential for natural daylight transmission (Lt = 0.5 min. / g = 0.4 max.).
- HVAC and lighting systems to operate 'on demand' where practical.
- Practical zoning of HVAC systems.
- Weather compensation of all heating systems.
- LED lighting to be adopted throughout with automatic daylight dimming facility to the office areas.
- Mechanical ventilation to be delivered by high efficiency Air Handling Unit with heat recovery and low energy fans.
- An air permeability of 3m<sup>3</sup>/hr/m<sup>2</sup> @ 50Pa will be targeted

# Energy Statement: Bicester Arc Office

The following 'U' values are proposed for the building fabric of the new building:

Element	Criteria U-Value (W/m2K)	Notes
Glazing	U = 1.2	G-Value of 0.39 on North facing and 0.26 on South, East and West elevations
Wall	U = 0.16	Build-up TBC at later stage
Roof	U = 0.1	Build-up TBC at later stage
Ground Floor	U = 0.11	Build-up TBC at later stage
Thermal Bridging		Per the accredited details
Air tightness		3 m <sup>3</sup> /m <sup>2</sup> /hr (@ 50Pa)

Carbon emissions for the 'Be Lean' building are taken from the IES software model, converted in line with Part L 2022 emissions factors, and as detailed in the table below:

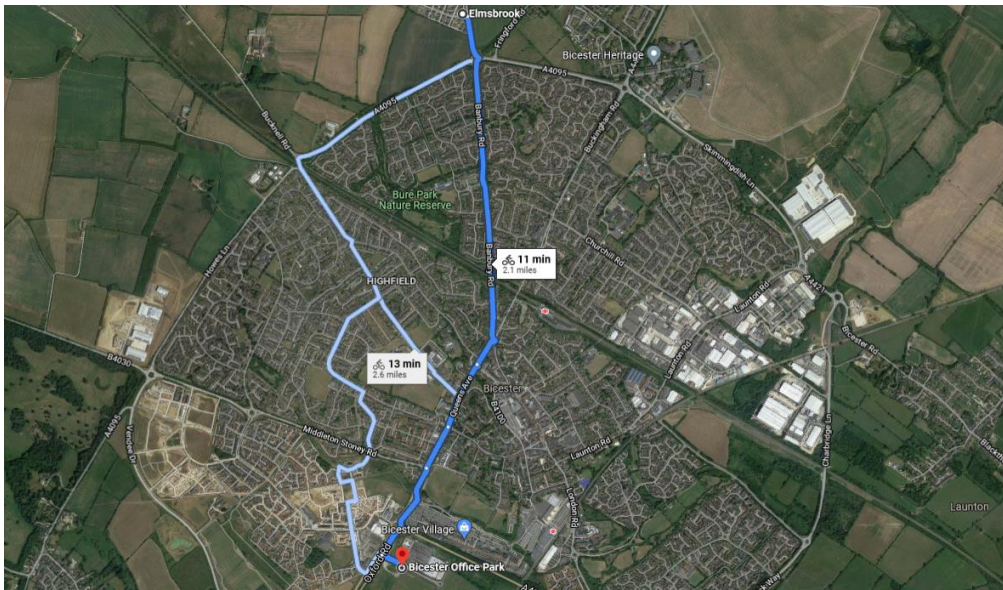
## Proposed 'Be Lean' Approach Building Carbon Emissions

	Area (m <sup>2</sup> )	Regulated Annual Emissions (kgCO <sub>2</sub> /annum)	% Reduction CO <sub>2</sub> Emissions (Hierarchy stage)	Total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2021)	Estimated total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2013)
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Proposed 'Lean' Development	6,600	25,896	34%	34%	62%

## 5.0 'Be Clean' – Decentralized Energy

Cherwell District Council's Local Plan encourages connection to existing decentralised energy and heat network through Policy EDS 4. In line with Policy EDS 4, opportunities to connect the planned development to existing or future decentralised heat distribution networks, including those featuring Combined Heat and Power (CHP) plant, have been investigated.

# Energy Statement: Bicester Arc Office



Investigations have been carried out into the viability of connection into a local district heating network. It was found that although the Bicester District Heating Network (Elmsbrook) is located in the general vicinity of the development, with the current provisions of the existing district heating network, connection of the development was not financially feasible.

For the purpose of this assessment, and until such time that a district heat network connection is deemed feasible, carbon emissions for the 'Be Clean' building do not demonstrate any further savings than those detailed for the 'Be Lean' building, and as detailed in the table overleaf:

## Proposed 'Be Clean' Approach Building Carbon Emissions

	Area (m <sup>2</sup> )	Regulated Annual Emissions (kgCO <sub>2</sub> /annum)	% Reduction CO <sub>2</sub> Emissions (Hierarchy stage)	Total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2021)	Estimated total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2013)
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# Energy Statement: Bicester Arc Office

## 6.0 Be Green' – Renewable Energy Technology

The third stage of the energy hierarchy refers to the production of renewable and low/zero carbon energy, relating to the reduction in carbon emissions from on-site or near site renewable.

A range of approved renewable technologies have been appraised, considering the suitability, feasibility, size and capital cost of each system required to meet the target. This is summarised as below:

Technology	Brief Description	Benefits	Issues / Limitations	Feasible for Site?
<b>Solar Photovoltaic</b>	Solar photovoltaic panels convert solar radiation into electrical energy through semi-conductor cells.	<ul style="list-style-type: none"> <li>• Low maintenance / no moving parts</li> <li>• Easily integrated into building design</li> <li>• No ongoing costs</li> </ul>	<ul style="list-style-type: none"> <li>• Any overshadowing affects panel performance</li> <li>• Panels ideally inclined at 30° to the horizontal facing a southerly direction</li> <li>• Site of conservation area and heritage interest require sensitivity of building aesthetic</li> </ul>	Potentially
<b>Solar Thermal</b>	Solar thermal energy can be used to contribute towards space heating and hot water demand. The two most common forms of collector are panel and evacuated tube.	<ul style="list-style-type: none"> <li>• Low maintenance</li> <li>• Little on going maintenance costs</li> </ul>	<ul style="list-style-type: none"> <li>• Must be sized for building DHW requirements. However, local policy encourages communal heat networks</li> <li>• Doesn't suit occupancy profile of a student residential development as likely to be unoccupied over summer months</li> </ul>	No
<b>Ground Source Heat Pump (GSHP)</b>	GSHP systems tap into the earth's considerable energy store to provide heating and cooling to buildings. Installs include horizontal trench and vertical borehole	<ul style="list-style-type: none"> <li>• Minimal maintenance</li> <li>• Unobtrusive technology (once implemented)</li> <li>• Flexible installation options to meet available site footprint</li> <li>• Decarbonisation of the grid promoting electrically driven heat pumps.</li> </ul>	<ul style="list-style-type: none"> <li>• Large area required for horizontal pipes and no available space on this project</li> <li>• Full ground survey required to determine geology</li> <li>• More beneficial if cooling req</li> <li>• Integration with piled foundations must be done at early stage</li> </ul>	No – considering Air Source Heat Pump approach.
<b>Air Source Heat Pump (ASHP)</b>	As an alternative to GSHPs, ASHP systems draw energy from the air to provide heating and cooling to buildings. Installation	<ul style="list-style-type: none"> <li>• Limited plant space requirements</li> </ul>	<ul style="list-style-type: none"> <li>• External plant area required</li> </ul>	Yes – considering grid de-carbonisation for low

# Energy Statement: Bicester Arc Office

	methods include air-to-water and direct refrigerant (VRF)	<ul style="list-style-type: none"> <li>Efficient when supporting both heating and cooling (office element of development)</li> <li>Decarbonisation of the grid promoting electrically driven heat pumps.</li> </ul>		carbon heating and cooling. Technology utilized within 'Lean' stage.
<b>Wind Turbine (Roof Mounted)</b>	Wind generation equipment operates on the basis of wind turning a propeller, used to drive an alternator to generate electricity. Small scale (1kW – 15kW) turbines can be pole or roof mounted	<ul style="list-style-type: none"> <li>Low maintenance / on going costs</li> <li>Local wind speed is sufficient (<a href="http://www.bwea.com">www.bwea.com</a>)</li> <li>Excess electrical generation can be exported to grid</li> </ul>	<ul style="list-style-type: none"> <li>Planning issues</li> <li>Aesthetic impact and background noise</li> <li>Structural / vibration impact on building to be assessed</li> <li>Potential for downstream turbulence due to proximity to other buildings</li> </ul>	No
<b>Gas Fired Combined Heat &amp; Power (CHP)</b>	A CHP installation is effectively a mini on-site power plant providing both electric power and thermal heat. CHP is strictly an energy efficient measure rather than a renewable energy technology	<ul style="list-style-type: none"> <li>Potential high CO2 saving available</li> <li>Efficient use of fuel</li> <li>Excess electrical generation can be exported to grid</li> <li>Benefits from being part of an energy centre / district heating scheme</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance intensive</li> <li>Sufficient base thermal and electrical demand required</li> <li>Some additional plant space required</li> </ul>	No – does not take benefit from grid decarbonisation.
<b>Bio-Renewable Energy Sources (Automated feed wood-fuel boiler plant)</b>	Modern wood-fuel boilers are highly efficient, clean and almost carbon neutral (the tree growing process effectively absorbs the CO2 that is emitted during combustion). Automated systems require mechanical fuel handling and a large storage silo	<ul style="list-style-type: none"> <li>Stable long term running costs</li> <li>Potentially good CO2 savings</li> </ul>	<ul style="list-style-type: none"> <li>Large area needed for fuel delivery and storage, no available space on this project.</li> <li>Reliable fuel supply chain required</li> <li>Regular maintenance required</li> <li>Significant plant space required</li> </ul>	No
<b>Fuel Cells</b>	Fuel cells convert chemical energy directly into electricity by combining hydrogen and oxygen in a controlled reaction	<ul style="list-style-type: none"> <li>Virtually no pollution</li> <li>High electrical efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Early stages of commercialisation</li> <li>High technology risk</li> </ul>	No

The current and forecasted grid decarbonisation, outlined above, promotes electrically driven solutions in lieu of gas-fired considering the realistic and actual carbon emissions compared with those predicted within Part L 2013 modelling software. It is therefore proposed for this stage of the hierarchy that the development utilise Air Source Heat Pumps to meet the heating and cooling demand of the development as discussed within section 5.0 of this statement.



# Energy Statement: Bicester Arc Office

The proposed strategy to incorporate Air Source Heat Pump technology has been discussed and agreed with the project architects to ensure a coordinated solution is taken forward.

In addition to the use of Air Source Heat Pump technology, it is also deemed that the development can take benefit of a roof mounted Solar Photovoltaic (PV) array to further bolster the sustainable credentials of the development and maximise the potential for incorporation of renewable technologies.

Given that the development is at the early stages of design, plant space allocation at roof level will require further development at the next stages. However, an initial prediction dictates that an array in the order of 175m<sup>2</sup> could be incorporated without putting undue strain on the available space.

Carbon emissions for the 'Be Green' building are taken from the IES software model, converted in line with Part L 2022 emissions factors, and as detailed in the table below:

**Proposed 'Be Green' Approach Building Carbon Emissions**

	Area (m <sup>2</sup> )	Regulated Annual Emissions (kgCO <sub>2</sub> /annum)	% Reduction CO <sub>2</sub> Emissions (Hierarchy stage)	Total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2021)	Estimated total Cumulative % Reduction CO <sub>2</sub> Emissions (Part L 2013)
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## 7.0 Key Objectives of Cherwell District Council

Cherwell District Council have set out the following key objectives for reducing carbon emissions and energy demand. Peveril Securities Ltd fully support the Council in this and are specifically targeting reducing emissions by adopting the Council's strategies.

At the proposed development, the space heating and cooling requirements will be minimised through good thermal envelope design (Be Lean) before being delivered via highly efficient Air Source Heat Pumps in the form of



# Energy Statement: Bicester Arc Office

VRF systems as a low carbon heat supply. The hot water demand for the development is anticipated to be low and will be met by electric point of use systems. Core areas which will require heating only shall be provided with high efficiency direct electric panel heaters. This philosophy acknowledges the improvements in carbon emission factors of grid supplied electricity going forward and avoids a requirement for gas (or fossil fuels) being used in the building. Further, this also provides an ongoing pathway toward zero carbon in that the building carbon emissions will continue to naturally decrease as the carbon emissions of the national electricity grid continue to decrease toward zero in line with government predictions.

Additionally, various building fabric improvements are incorporated into the building design for the proposed development as listed in Section 5.0 of this report demonstrating the intention to reduce energy demand being the first priority for the scheme.

It should also be noted that the utilisation of air source heat pump technology offers superiority in terms of coefficient of performance when compared against, for instance, gas-fired only alternatives.

## 8.0 Water Efficiency

Cherwell District Council have set out key objectives for reducing water usage as detailed within Policy ESD 3 the Local Plan. Peveril Securities Ltd fully support the Council in this and are specifically targeting reducing water usage by ensuring the design of the domestic water services installations and selection of associated sanitaryware will be undertaken with the primary aim of reducing the overall water consumption of the development, considering the following strategies:

- Wash Hand Basin outlets to be fitted with flow restrictors to limit the peak flow rate to 6 litres / minute or less
- Sink outlets to be fitted with flow restrictors to limit the peak flow rate to 7 litres / minute or less
- Showers to be fitted with flow restrictors to limit the peak flow rate to 8 litres / minute or less
- WC cisterns to be specified as 5 / 3 litre, or less, dual flush type
- Where white goods are specified – washing machines and dishwashers – water efficient appliances will be considered
- Metering of the external and internal points incoming water supply will enable major leak detection of the buried water services.
- Sanitary supply shut off devices to be considered on the water connections to WCs.

## 9.0 Conclusions

Following a well-structured energy hierarchy has enabled significant carbon reductions to be made to the development. The total carbon reduction is approximately 37% over current building regulations, when compared against the notional benchmark building.

**The total predicted carbon reduction, considering the proposal above for the energy efficiency measures, Air Source Heat Pumps and Solar PV is 64% over Part L 2013 requirements (when calculated with more current Part L 2022 emissions factors) and 37% over current Part L 2021 requirements when compared against the Benchmark 'Baseline' Building incorporating the gas-fired solution.**

# Energy Statement: Bicester Arc Office

In the first stage of the energy hierarchy (Be Lean) a number of passive and high efficiency measures have been applied to reduce the energy consumption of the building through improving U-values, system efficiencies, etc. The inclusion of Air Source Heat Pump technology in the form of VRF systems also offered a good contribution leading to the bulk of carbon emission reduction coming at the first stage of the hierarchy.

In the second stage of the energy hierarchy (Be Clean) it is currently deemed not feasible for connection to the Local District Heat Network and therefore has not been considered within this Statement.

In the final stage of the energy hierarchy (Be Green) it was concluded that a Solar PV array in the order of 100m<sup>2</sup> can be incorporated into the scheme to maximize the inclusion of renewable technologies. It was noted that this addition provided an additional 5% reduction in CO<sub>2</sub> emissions above that of the 'Be Lean' building to total the 60% overall reduction.

The total predicted carbon savings at each stage of the energy hierarchy are summarized as follows:

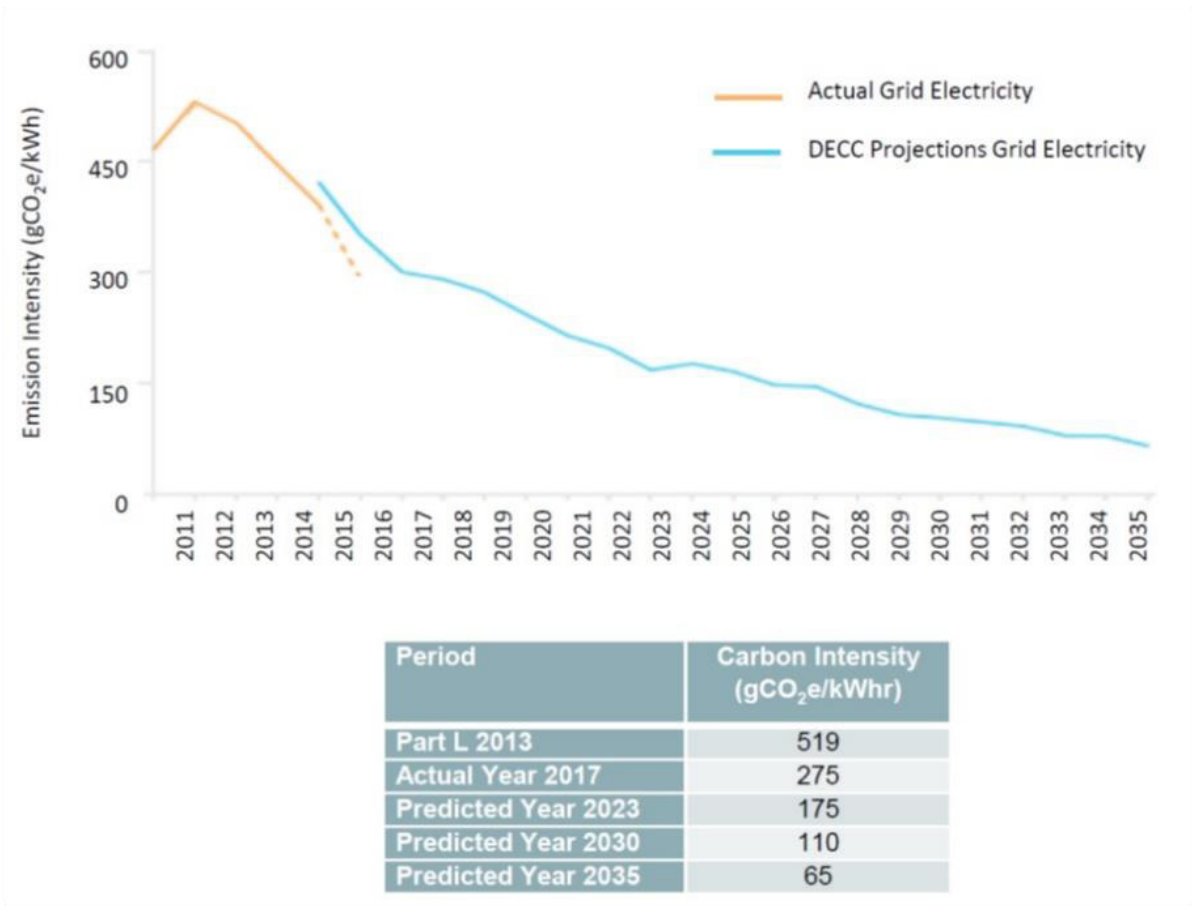
### Building Carbon Emissions

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It has also been demonstrated that the strategy proposed for the development addresses the key aspects of Council's planning policies.

The proposed strategy for the office development, via the inclusion of electrically driven equipment, will enable the development to be zero carbon ready in line with the council's aspirations. By omitting the need for a natural gas connection to the site the strategy provides a pathway for the reduction in carbon emissions further through the residual reductions forecasted within the grid as per the figure below:

# Energy Statement: Bicester Arc Office





# Energy Statement: Bicester Arc Office

## 10.0 Appendix A – Part L 2021 Proposed Building BRUKL

## Project name

**Bicester Arc Office 1**

As designed

Date: Wed Sep 27 10:33:20 2023

## Administrative information

## Building Details

Address: Bicester Arc Office 1, Bicester,

## Certifier details

Name: CPW

Telephone number: Phone

Address: Street Address, City, Postcode

## Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.22

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.22

BRUKL compliance module version: v6.1.e.1

Foundation area [m<sup>2</sup>]: 1322.33The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.89
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.68
Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	42.28
Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	40.03
Do the building's emission and primary energy rates exceed the targets?	BER =< TER   BPER =< TPER

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	First surface with maximum value
Walls*	0.26	0.16	0.39	SP000040:Surf[5]
Floors	0.18	0.11	0.12	SP000018:Surf[8]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.1	0.1	SP000031:Surf[0]
Windows** and roof windows	1.6	1.19	1.22	SP00001B:Surf[0]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors <sup>^</sup>	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

U<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]

\* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

\*\* Display windows and similar glazing are excluded from the U-value check. \*\*\* Values for rooflights refer to the horizontal position.

<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	8	3

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- VRV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	4.88	6.88	0	-	0.8
<b>Standard value</b>	2.5*	5	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

"No HWS in project, or hot water is provided by HVAC system"

### Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
00-Changing Rooms		-	-	-	1.4	-	-	-	-	-	-	N/A
11-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
13-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
21-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
23-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
31-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
33-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
12-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
22-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
32-Office		-	-	-	1.4	-	-	-	-	-	-	N/A
E-00 - N		-	-	-	1.4	-	-	-	-	-	-	N/A
E-00 - W		-	-	-	1.4	-	-	-	-	-	-	N/A
E-00		-	-	-	1.4	-	-	-	-	-	-	N/A
E-00 - S		-	-	-	1.4	-	-	-	-	-	-	N/A
N-00 - S		-	-	-	1.4	-	-	-	-	-	-	N/A
N-00 - E		-	-	-	1.4	-	-	-	-	-	-	N/A
N-00		-	-	-	1.4	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency		
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
- N		-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	Standard value	95	80	0.3
01-Stairwell		178	-	-
02-Stairwell		178	-	-
00-Left Pump Room		127	-	-
00-Changing Rooms		158	-	-
00-Washroom		267	-	-
00-Disabled WC		349	-	-
11-Stairwell		178	-	-
12-Stairwell		178	-	-
10-Storage		227	-	-
10-Tiolet		164	-	-
10-Corridor		333	-	-
11-Office		106	-	-
13-Office		106	-	-
21-Stairwell		178	-	-
22-Stairwell		178	-	-
20-Storage		227	-	-
20-Toilet		164	-	-
20-Corridor		333	-	-
21-Office		106	-	-
23-Office		106	-	-
31-Stairwell		178	-	-
32-Stairwell		178	-	-
30-Storage		227	-	-
30-Toilet		164	-	-
30-Corridor		333	-	-
31-Office		106	-	-
33-Office		106	-	-
42-Stairwell		177	-	-
41-Stairwell		297	-	-
41-Upper Floor		209	-	-
00-Comms Room		146	-	-
00-Switch Room		155	-	-
12-Office		114	-	-
22-Office		106	-	-
32-Office		106	-	-
00-Toilet		179	-	-
00-Corridor		301	-	-
E-00 - N		107	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
E-00 - W		107	-	-
E-00		104	-	-
E-00 - S		108	-	-
N-00 - S		109	-	-
N-00 - E		107	-	-
N-00		104	-	-
- N		107	-	-
00-Entrance - N		231	15	9
00-Entrance		236	15	9

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01-Stairwell	N/A	N/A
02-Stairwell	N/A	N/A
00-Changing Rooms	N/A	N/A
00-Washroom	N/A	N/A
00-Disabled WC	N/A	N/A
11-Stairwell	N/A	N/A
12-Stairwell	N/A	N/A
10-Toilet	N/A	N/A
10-Corridor	N/A	N/A
11-Office	NO (-6.6%)	NO
13-Office	NO (-1.4%)	NO
21-Stairwell	N/A	N/A
22-Stairwell	N/A	N/A
20-Toilet	N/A	N/A
20-Corridor	N/A	N/A
21-Office	NO (-6.6%)	NO
23-Office	NO (-1.4%)	NO
31-Stairwell	N/A	N/A
32-Stairwell	N/A	N/A
30-Toilet	N/A	N/A
30-Corridor	N/A	N/A
31-Office	NO (-6.6%)	NO
33-Office	NO (-1.4%)	NO
42-Stairwell	N/A	N/A
41-Stairwell	N/A	N/A
41-Upper Floor	N/A	N/A
12-Office	NO (-13.3%)	NO
22-Office	YES (+21.5%)	NO
32-Office	YES (+21.5%)	NO
00-Toilet	N/A	N/A
00-Corridor	N/A	N/A



Zone	Solar gain limit exceeded? (%)	Internal blinds used?
E-00 - N	YES (+5.4%)	NO
E-00 - W	NO (-0.2%)	NO
E-00	NO (-63.7%)	NO
E-00 - S	YES (+32.7%)	NO
N-00 - S	YES (+33.9%)	NO
N-00 - E	YES (+20.9%)	NO
N-00	NO (-63.3%)	NO
- N	YES (+4.9%)	NO
00-Entrance - N	YES (+19.7%)	NO
00-Entrance	NO (-84.6%)	NO

## Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Floor area [m <sup>2</sup> ]	6657.1	6657.1
External area [m <sup>2</sup> ]	6951	8213.4
Weather	SWI	SWI
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3
Average conductance [W/K]	2419.37	2771.51
Average U-value [W/m <sup>2</sup> K]	0.35	0.34
Alpha value* [%]	25.29	10

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

## Building Use

### % Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
<b>100</b>	<b>Offices and Workshop Businesses</b>
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

## Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	1.72	2.73
Cooling	4.02	3.81
Auxiliary	1.87	1.15
Lighting	11.78	13.83
Hot water	10.44	7.1
Equipment*	39.02	39.02
<b>TOTAL**</b>	<b>29.82</b>	<b>28.62</b>

\* Energy used by equipment does not count towards the total for consumption or calculating emissions.

\*\* Total is net of any electrical energy displaced by CHP generators, if applicable.

## Energy Production by Technology [kWh/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	2.63	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>2.63</i>	<i>0</i>

## Energy & CO<sub>2</sub> Emissions Summary

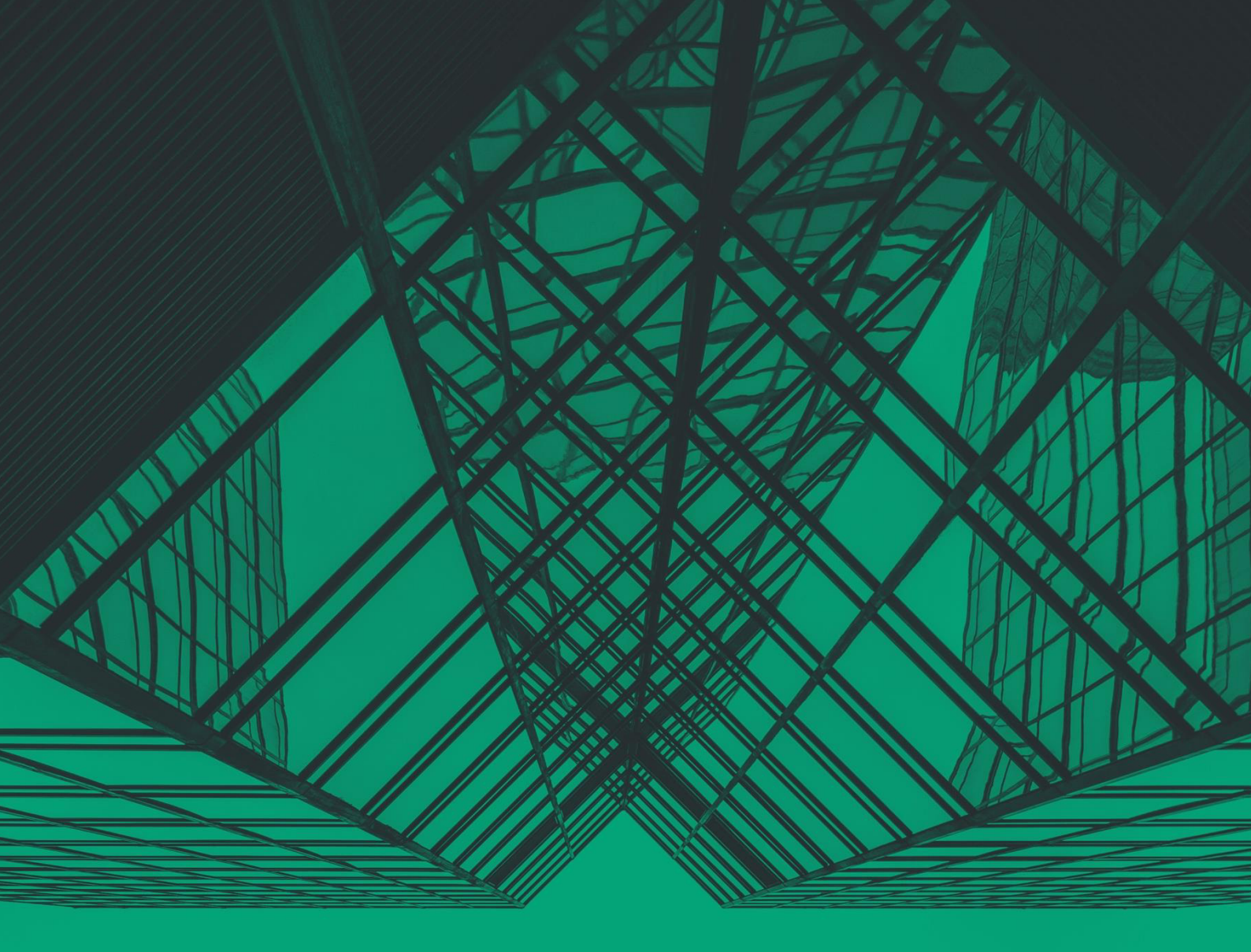
	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	98.78	90.84
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	40.03	42.28
Total emissions [kg/m <sup>2</sup> ]	3.68	3.89

## HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	28.3	71.2	1.7	4	1.9	4.55	4.88	4.88	6.88
<b>Notional</b>	27.5	63.9	2.8	3.8	1.2	2.78	4.63	----	----
<b>[ST] No Heating or Cooling</b>									
<b>Actual</b>	0	0	0	0	0	0	0	0	0
<b>Notional</b>	0	0	0	0	0	0	0	----	----

### Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type



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Appendix C - Drainage Strategy Drawings and Technical Note



*(To follow separately)*



Appendix D - Odour Assessment and Covering Letter



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Derbyshire  
DE55 2DS

26<sup>th</sup> September 2023

### **Bicester Arc Reserved Matters Application for the Development of Phase One – Odour**

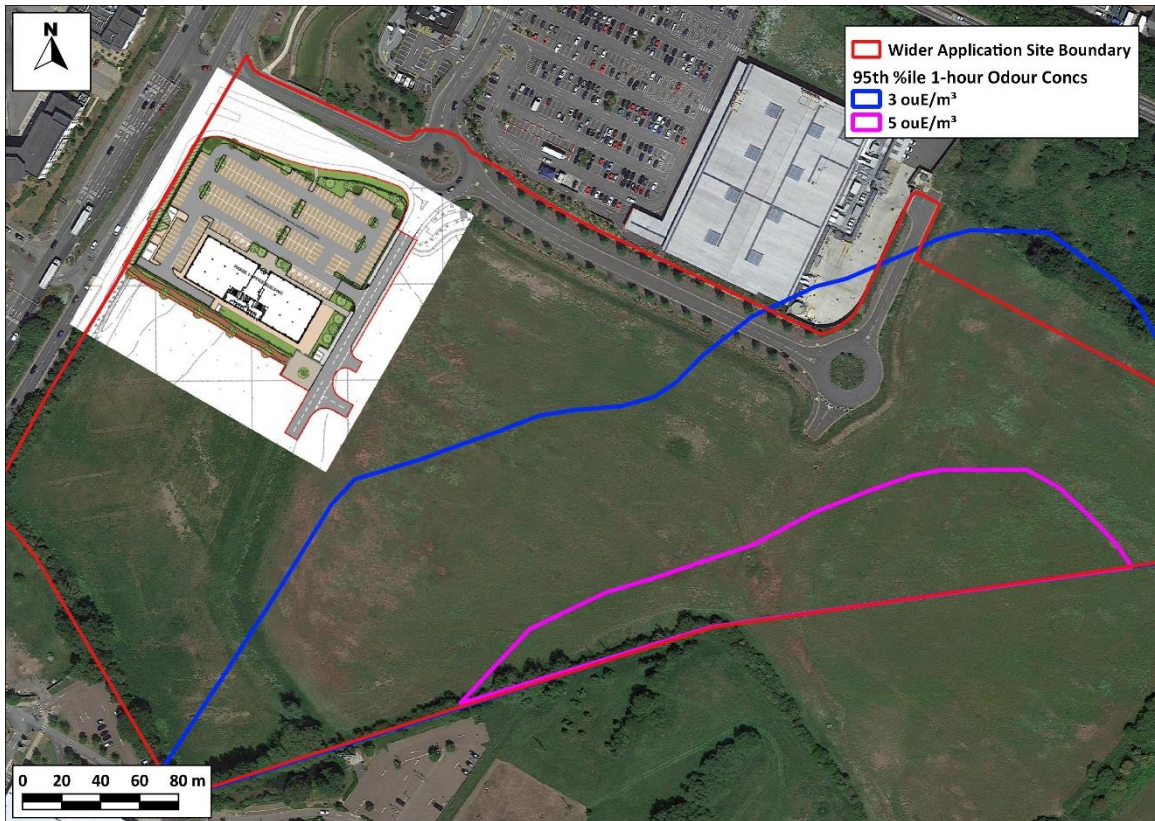
This letter provides a summary of the odour assessment undertaken by Air Quality Consultants Ltd for the wider Bicester Arc development (report reference: J10/12155A/10/F2). This summary specifically relates to the predicted odour effects at Phase One to support the associated reserved matters application for this phase of works. Planning condition 11 attached to the outline consent for the scheme (planning reference 23/01080/F) states:

*“All applications for approval of reserved matters relating to a phase shall be accompanied by an odour report (produced by an appropriately qualified professional) detailing the measures necessary to minimise the potential for occupants of the development within that phase to experience nuisance caused by the proximity of the nearby Bicester Sewage Treatment Works [STW]. The development within each phase shall thereafter be carried out in accordance with the necessary measures set out in the approved odour report for that phase.*”

*Reason In the interests of ensuring the development is compatible with the existing surrounding land uses in accordance with the requirements of Policy Bicester 4 of the Cherwell Local Plan 2011-2031 Part 1 as well as Government guidance in the National Planning Policy Framework.”*

The odour assessment concluded that, across the wider development site, “*the overall odour effects are ‘not significant’*”. This conclusion was supported by the findings of sniff testing (undertaken by AQC) and dispersion modelling (undertaken by Olfasense and commissioned by Thames Water). In terms of this reserved matters application, the proposed commercial buildings in Phase One are located outside of the 3 OU<sub>E</sub>/m<sup>3</sup> contour as predicted by the modelling, and the results of six field odour surveys support the modelling and show that there are no significant effects within the Phase One boundary. The odour contours have been overlain on a layout plan of Phase One to demonstrate the extent of impacts, as shown below.





In summary, there are no constraints to the development of commercial land use at Phase One of the Bicester Arc development in terms of odours from the nearby Bicester STW. Full details of the odour assessment, including the methodology, results and conclusions of the assessment, are set out in the odour assessment report provided with this letter.

**Adam Dawson**  
Principal Consultant  
Air Quality Consultants Ltd



## **Odour Assessment: Bicester Arc, Cherwell**

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April 2023



Experts in air quality  
management & assessment

## Document Control

<b>Client</b>	Peveril Securities Ltd	<b>Principal Contact</b>	Steve James (Sladen Estates)
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<b>Job Number</b>	J10/12155A/10
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<b>Report Prepared By:</b>	Paul Outen
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### Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J10/12155A/10F1	28 April 2023	Draft	Laurence Caird (Technical Director)

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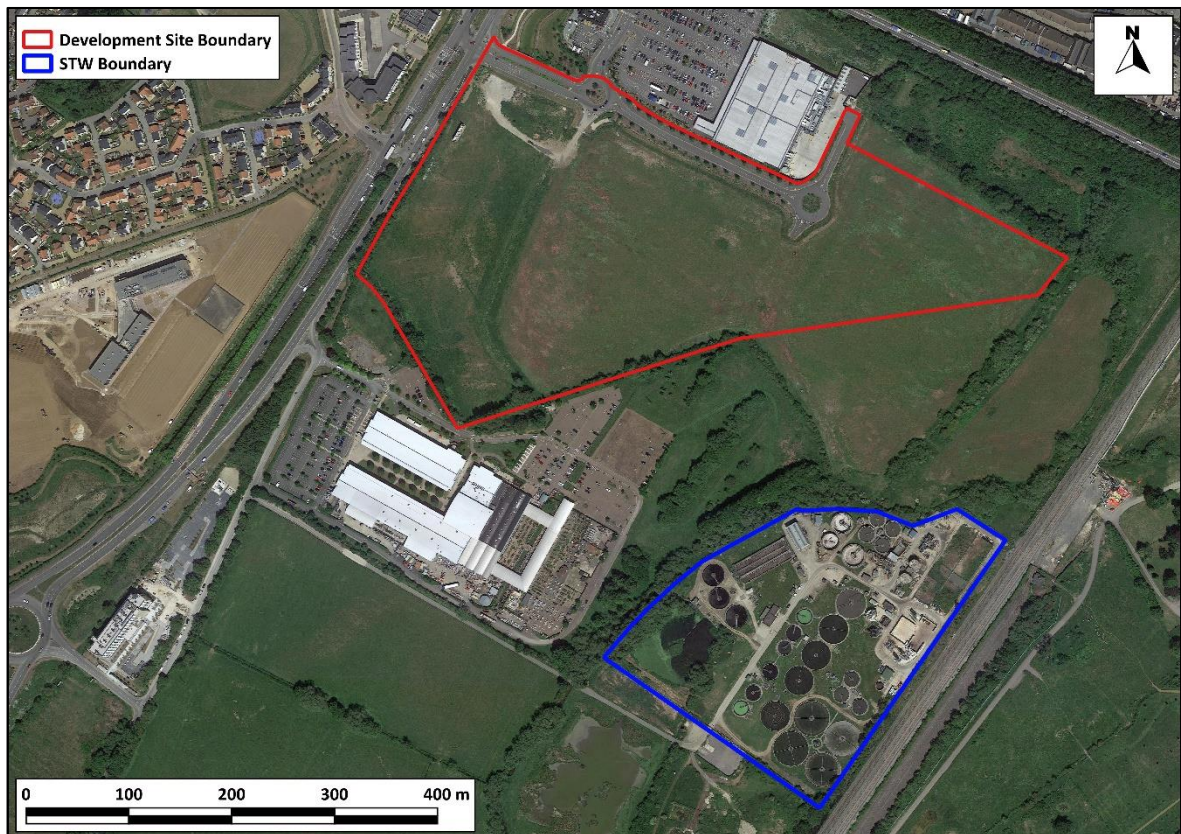
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# 1 Introduction

- 1.1 This technical note describes the assessment of odour effects associated with Bicester Sewage Treatment Works (STW) on the proposed Bicester Arc development located to the north of the STW, which comprises office development across a number of phases. The STW has the potential to generate unpleasant odours which may adversely impact upon future users of the proposed development. The assessment has been carried out by Air Quality Consultants Ltd (AQC) on behalf of Peveril Securities Ltd. This assessment considers the entire development site and is thus provided to support the RMA planning applications for the development for all phases.
- 1.2 The development site is located approximately 180 m north of the STW; the location of the proposed development in relation to the STW is shown in Figure 1.



**Figure 1: Location of Proposed Development (includes Phases 1 and 2) and Bicester STW**

Imagery ©2023 Google.

- 1.3 This assessment identifies the potential odour effects associated with the STW and uses field odour surveys (sniff tests) undertaken by AQC and the results of odour dispersion modelling undertaken on behalf of Thames Water, by its approved odour consultants, Olfasense (Olfasense UK Ltd, 2022).

## 2 Odour in Legislation, Policy and Guidance

### National Legislation

#### *Environmental Protection Act*

- 2.1 There are currently no statutory standards in the UK covering the release and subsequent impacts of odours. This is due to complexities involved with measuring and assessing odours against compliance criteria, and the inherently subjective nature of odours.
- 2.2 It is recognised that odours have the potential to pose a nuisance for residents living near to an offensive source of odour. Determination of whether or not an odour constitutes a statutory nuisance in these cases is usually the responsibility of the local planning authority or the Environment Agency. The Environmental Protection Act 1990 (1990) outlines that a local authority can require measures to be taken where any:

*“dust, steam, smell or other effluvia arising on an industrial, trade and business premises and being prejudicial to health or a nuisance...” or*

*“fumes or gases are emitted from premises so as to be prejudicial to health or cause a nuisance..”*

- 2.3 Odour can also be controlled under the Statutory Nuisance provisions of Part III of the Environmental Protection Act.

### Planning Policy

#### *National Planning Policy Framework*

- 2.4 The National Planning Policy Framework (NPPF) (2021a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

*“to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy”..*

- 2.5 To prevent unacceptable risks from pollution, the NPPF states that:

*“Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality”.*

and

*“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.*

- 2.6 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2021b), which makes clear that *“Odour...can also be a planning concern, for example, because of the effect on local amenity”*. It also provides guidance on options for mitigating impacts, and states that *“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact”*.

## **Odour Guidance**

### ***Environment Agency Guidance***

- 2.7 The Environment Agency has produced a horizontal guidance note (H4) on odour assessment and management (Environment Agency, 2011), which is designed for operators of Environment Agency-regulated processes (i.e., those which classify as Part A(1) processes under the Pollution Prevention and Control (PPC) regime). The H4 guidance document is primarily aimed at methods to control and manage the release of odours, but also contains a series of recommended assessment methods which can be used to assess potential odour impacts.

### ***Institute of Air Quality Management Guidance***

- 2.8 The latest UK guidance on odour was published by the Institute of Air Quality Management (IAQM) in 2018 (IAQM, 2018). The IAQM guidance sets out assessment methods which may be utilised in the assessment of odours for planning applications. It is the only UK odour guidance document which contains a method for estimating the significance of potential odour impacts.
- 2.9 The IAQM guidance endorses the use of multiple assessment tools for odours, stating that, *“best practice is to use a multi-tool approach where practicable”*. This is in order to improve the robustness of the assessment conclusions. Some of the methods outlined in the IAQM guidance have been adopted in this odour assessment.

### 3 Assessment Approach

- 3.1 Odour impact assessment is a challenging and subjective science. There are a number of odour assessment methods and tools that have been developed which are widely used in the UK, including desk-based methods, such as complaints analysis and qualitative risk assessment, through to field odour testing (sniff testing) and dispersion modelling. Each has its advantages and disadvantages and not all assessment methods are appropriate in every case; for example, where a potentially odorous process is proposed rather than existing, then assessment methods such as sniff testing and odour sampling are less relevant than predictive methods such as odour risk assessment. The scale and location of odorous processes is also important in selecting appropriate assessment methodologies, with more simple methodologies often sufficient for small or remotely located processes.
- 3.2 The approach to assessing the odour effects from the STW has been to use the results of odour dispersion modelling undertaken by Thames Water's consultants Olfasense, as well as semi-quantitative on-site field odour assessments (sniff testing) undertaken by AQC.

#### Odour Sniff Testing

##### *Sniff Test Methodology*

- 3.3 This assessment uses the approach set out in the IAQM Guidance on the Assessment of Odours for Planning (IAQM, 2018), as set out below.
- 3.4 The observers undertaking the sniff-tests have had their olfactory acuity checked prior to carrying out the observations to demonstrate that their sense of smell is within the 'normal' range (i.e., is neither over- nor under-sensitive to odours). On the evening before, and on the day of the observations, the observers consumed no strong food or drinks. No strongly scented toiletries were worn. These protocols are recommended in a number of odour guidance documents, including those published by the IAQM (IAQM, 2018) and Environment Agency (Environment Agency, 2011).
- 3.5 The sniff tests conducted followed the procedure described in the IAQM guidance on assessment of odours for planning (IAQM, 2018). The tests aimed to identify key characteristics of all odours detected, in particular their 'FIDOR' factors (as described in IAQM and EA guidance), which were appraised and recorded using the guidance outlined in Table 1.



**Table 1: Description of the FIDOR factors**

Factor	Description
<b>Frequency</b>	The frequency with which odours are detected.
<b>Intensity<sup>a</sup></b>	The degree to which an odour is detectable on a 0-6 scale where: 0 = No odour 1 = Very faint odour (there is probably some doubt as to whether the odour is actually present) 2 = Faint odour (the odour is present but cannot be described using precise words or terms) 3 = Distinct odour (the odour character is barely/just recognisable) 4 = Strong odour (the odour character is easily recognisable) 5 = Very strong odour (the odour is offensive; exposure to this level would be considered undesirable) 6 = extremely strong odour (the odour is offensive; an instinctive reaction would be to mitigate against further exposure)
<b>Duration</b>	The duration of exposure to detectable odours.
<b>Offensiveness</b>	The level of pleasantness or unpleasantness of odours, in relation to its Hedonic Tone. Hedonic Tone is scored on a scale of +4 to -4 where: +4 = Pleasant odours; 0 = Neutral odours; and -4 = Foul odours.
<b>Receptor sensitivity</b>	The sensitivity of the location where odours are detected, and/or the proximity of odour releases to an odour-sensitive location.

<sup>a</sup> Intensity scale has been taken from the IAQM guidance (IAQM, 2018), and is based upon the VDI 3940 scale. Odours of intensity of 4 or greater are considered to have significant potential for annoyance. Odours of intensity of 2 or less are so faint that the character of the odour cannot be described and annoyance is unlikely.

3.6 Four site visits were carried out to undertake the sniff testing, with a total of six surveys completed across the four days. During each site visit, the sniff test surveys started at the most distant location downwind of the odour source and were then carried out along a transect running across the site towards the odour source. At each location, the odour detected during each of 30 observations was recorded. Based on 5-10 seconds between each observation, each test lasted for a total of approximately three to five minutes. The intensity was noted using the criteria set out in Table 1, and, where relevant, a description of the odour was recorded. The sniff test locations are shown in Figure 2, Figure 3, Figure 4 and Figure 5 in Section 4 of this report.

### **Assessment of Odour Impacts**

- 3.7 The IAQM guidance (IAQM, 2018) includes an approach to determine the impacts of odours based on the results of sniff testing. This involves a two-stage process; the first stage is to identify the odour exposure at a sniff test location and the second stage is to combine the odour exposure with the sensitivity of the location to determine an odour impact for each location.
- 3.8 The matrix shown in Table 2 is transposed from the IAQM guidance and shows how the odour exposure at each sniff-test location is estimated. The matrix requires two parameters to be

calculated; first the average odour intensity during the sniff test ( $I_{\text{mean}}$ ), which is the average odour intensity from the 30 observations made during each test; and the second is the percentage odour time ( $t_{\geq 4}$ ), which is the percentage of time during each sniff test when an odour intensity of 4 or higher was recorded by the observer.

**Table 2: Matrix to Assess Odour Exposure at each Sniff-Test Location**

Average Intensity ( $I_{\text{mean}}$ )	Percentage odour time ( $t_{\geq 4}$ ) during the test				
	$\leq 10\%$	11-20%	21-30%	31-40%	$\geq 41\%$
6	Large	Very Large	Very Large	Very Large	Very Large
5	Medium	Large	Large	Very Large	Very Large
4	Small	Medium	Medium	Large	Large
3	Small	Medium	Medium	Medium	Medium
2	Small	Small	Medium	Medium	Medium
1	Small	Small	Small	N/A	N/A

Notes:  $I_{\text{mean}}$  should be rounded to the nearest whole number.

The following overriding considerations affect the scoring of the odour annoyance impact: if  $I_{\text{mean}} = 0$ , or if  $I_{\text{mean}} = 1$ , and  $t_{\geq 4} = 0\%$ , then the odour effect can for practical purposes be considered negligible.

- 3.9 This process identifies the odour exposure during each test. To extrapolate this to estimate the total odour exposure at a given location, the results of multiple sniff tests can be combined, applying professional judgement, and taking account of factors such as the frequency of wind conditions and the variability of the odour source being assessed.
- 3.10 Once the overall odour exposure at a given location has been estimated, the odour impact can be determined using the data presented in Table 3 which is also transposed from the IAQM guidance. The table combines the overall odour exposure with the sensitivity of the location to determine the odour impact. The IAQM guidance provides a description and examples of low, medium and high sensitivity receptors. The receptor sensitivity principally relates to the perceived level of amenity that would be expected by users of a particular land use, where land uses such as industry and farms are considered to be of low sensitivity, commercial premises and recreation facilities are considered to be of medium sensitivity, and residential properties, schools and hospitals are considered to be of high sensitivity to odours.

**Table 3: Determination of Odour Impact at each Sniff-Test Location**

Overall Odour Exposure <sup>a</sup>	Low and Medium Sensitivity Receptors
Very Large	Substantial Adverse
Large	Moderate Adverse
Medium	Slight Adverse
Small	Negligible

<sup>a</sup> Determined using the matrix in Table 2.

A further application of professional judgement then needs to be applied to conclude the significance of the odour effect on, or from, the development as a whole, taking into account the possibly different magnitudes of effects that occur at different receptors.

- 3.11 Table 3 can be used to identify the potential odour impacts at an individual location, but the guidance advises that the overall significance of odour effects on a development is determined using professional judgement, taking account of the significance of impacts at all locations. The professional experience of the consultants who completed this assessment are summarised in A1.

## Odour Dispersion Modelling

### *Dispersion Model*

- 3.12 The odour dispersion modelling was undertaken by Thames Water's approved consultants Olfasense (Olfasense UK Ltd, 2022) to identify the impact that recent upgrades to the STW have had on offsite odour impacts. The results of this modelling study have been used in this assessment when determining the overall significance of effects. The odour emission rates used in the modelling, as set out in the Olfasense report (Olfasense UK Ltd, 2022), have been reproduced in Appendix A2 for reference.

### *Model Outputs*

- 3.13 The model was run to predict the 98<sup>th</sup> percentile of 1-hour odour concentrations across the grid of receptors. The predicted 98<sup>th</sup> percentiles of 1-hour odour concentrations have been compared to the suggested benchmarks outlined in the IAQM guidance on the assessment of odours for planning (IAQM, 2018).
- 3.14 The IAQM guidance states that "*odours from sewage treatment works plant operating normally, i.e. non-septic conditions, would not be expected to be at the 'most offensive' end of the spectrum...and can be considered on par with 'moderately offensive' odours such as intensive livestock rearing*". Therefore, the odours from the STW have been assumed to be "*moderately offensive*" when assessing the significance of the impacts. This offensiveness criterion is also used in the modelling report (Olfasense UK Ltd, 2022) and thus is in agreement with Thames Water's own assessment.

- 3.15 The IAQM guidance provides descriptors for odour effects for “*moderately offensive*” odours for medium (i.e., commercial) and low (i.e., industrial use, farms, footpaths and roads) sensitivity land use. These have been set out in Table 4 below and have been used to determine the overall significance of the odour effects at the proposed development.
- 3.16 The IAQM guidance states that “*where the overall effect is greater than “slight adverse”, the effect is likely to be considered significant*”; thus, where an effect is negligible or slight adverse, the overall effect will be ‘not significant’ and thus there should be no constraint to development.

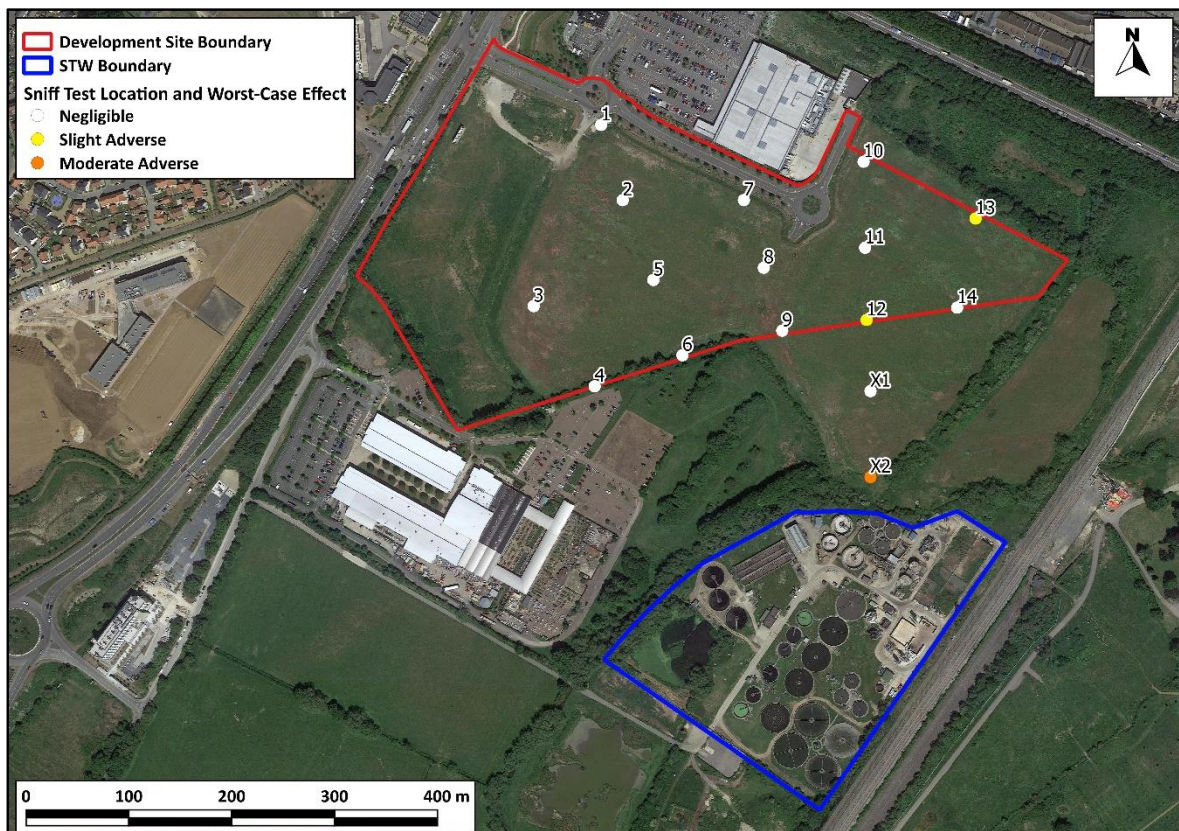
**Table 4: Odour Effect Descriptors for Impacts Predicted by Modelling – “Moderately Offensive” Odours**

Risk of Odour Impact	Odour Effect	
	Low Sensitivity Receptor (e.g., industrial use, farms, footpaths and roads)	Medium Sensitivity Receptor (e.g., commercial property/office)
≥10	Moderate	Substantial
5-<10	Slight	Moderate
3-<5	Negligible	Slight
1.5-<3	Negligible	Negligible
0.5-<1.5	Negligible	Negligible
<0.5	Negligible	Negligible

## 4 Odour Impact Assessment

### Sniff Testing

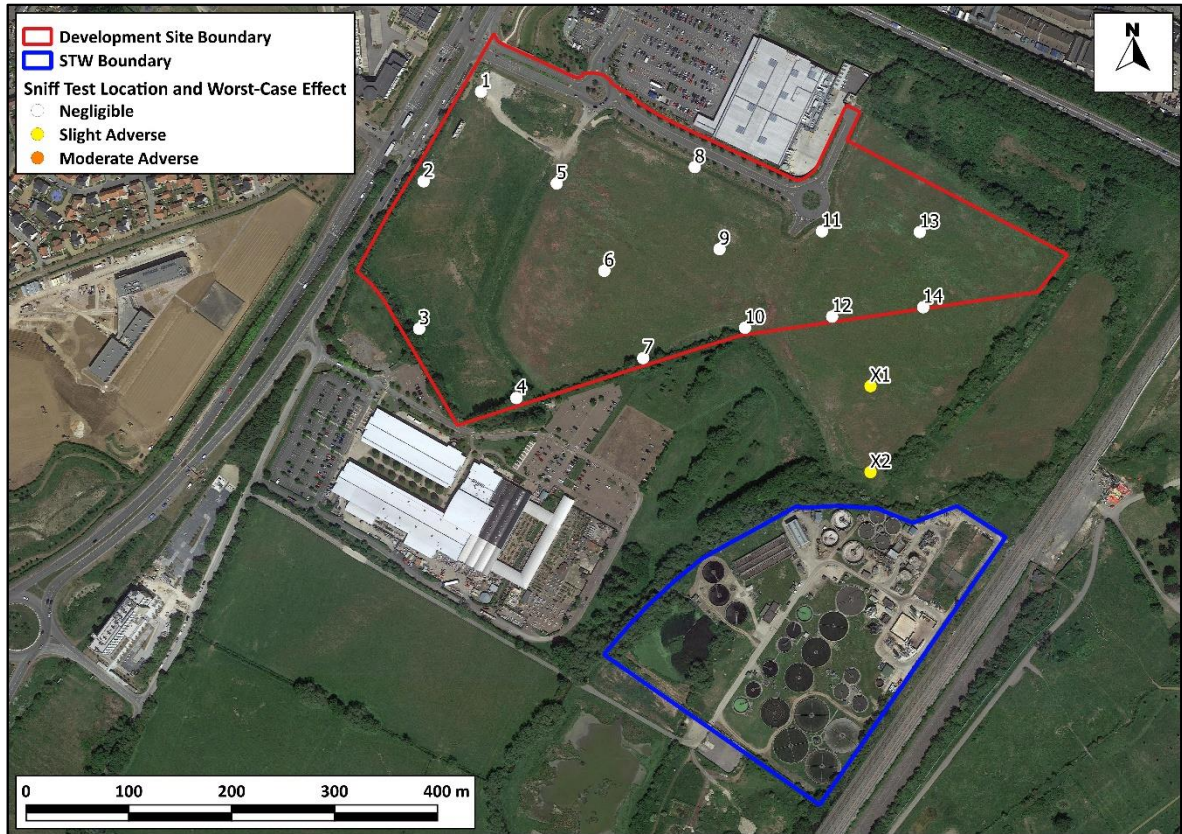
- 4.1 Four non-consecutive site visits were completed, on the 20<sup>th</sup> July 2021, 3<sup>rd</sup> August 2021, 8<sup>th</sup> September 2021 and 28<sup>th</sup> July 2022. The site visits were all undertaken during warm, dry weather when the development site was directly downwind of the STW; these conditions are conducive to a worst-case assessment in terms of odours across the site. During the first and final visits, one full odour survey per day was completed, and two full surveys were completed each day on the other two visits; thus, a total of six odour surveys were completed.
- 4.2 Figure 2, Figure 3, Figure 4 and Figure 5 show the worst-case odour effects at each test location from either of the two surveys on each day (not including the first and final visit when only one survey was completed). The results of the individual surveys from the visits undertaken on the 3<sup>rd</sup> August and 8<sup>th</sup> September 2021 are shown in Appendix A2. The odour effect at each location has been determined using the data collected during the survey and the matrices set out in Table 2 and Table 3 assuming all locations are of medium sensitivity (e.g., commercial properties).



**Figure 2: Sniff Test Results – 20<sup>th</sup> July 2021**

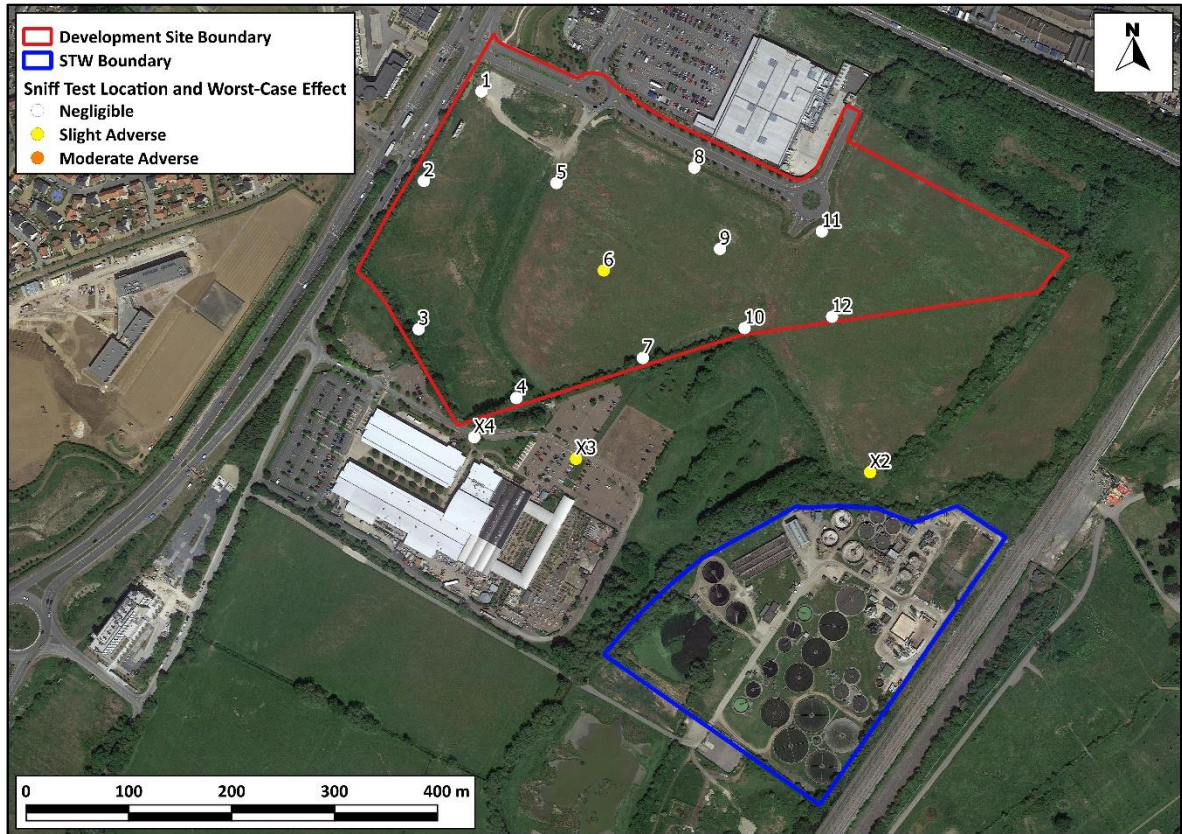
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**Figure 3: Sniff Test Results – 3<sup>rd</sup> August 2021**

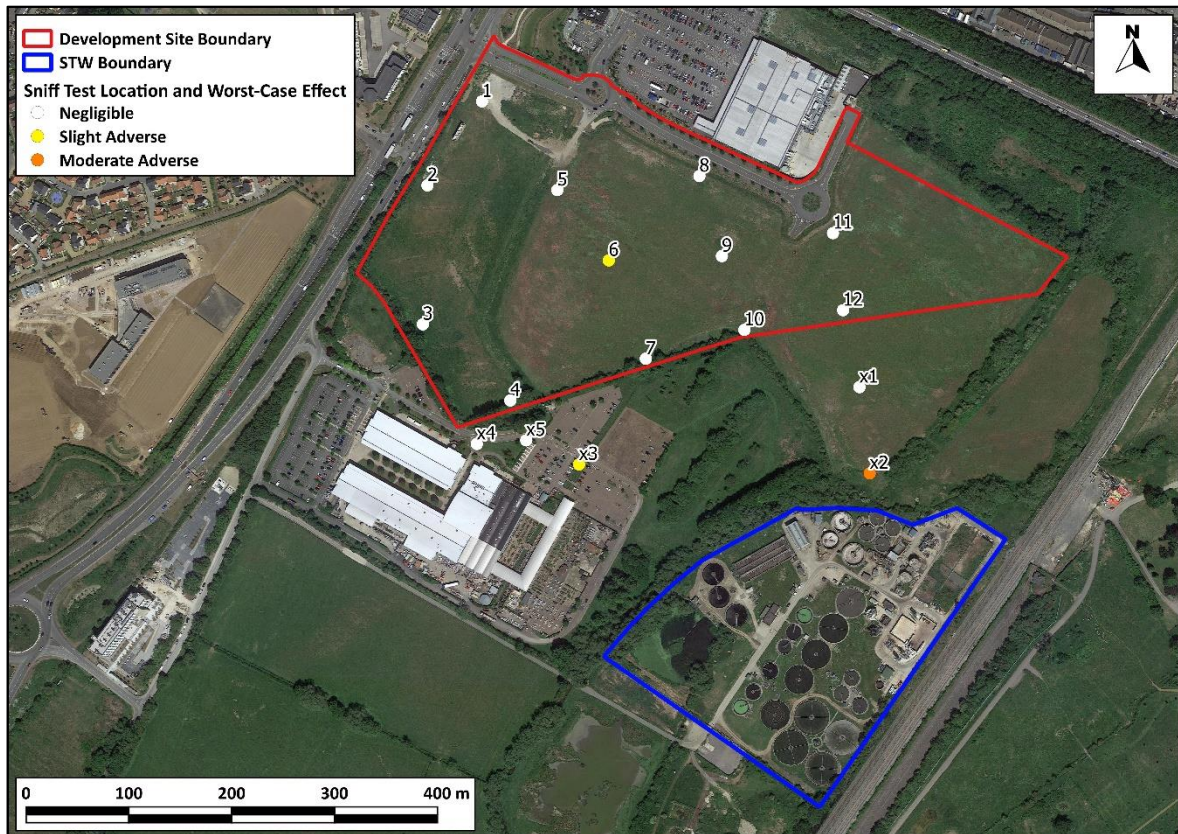
Imagery ©2023 Google.



**Figure 4: Sniff Test Results – 8<sup>th</sup> September 2021**

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**Figure 5: Sniff Test Results – 28<sup>th</sup> July 2022**

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4.3 As summary of the sniff tests is set out below.

**Sniff Test Results – 20 July 2021**

4.4 The first visit was undertaken during southerly and south-south-westerly winds with very warm temperatures reaching a high of 28°C; these conditions are conducive to worst-case odour conditions from the STW. The winds were light throughout the tests, varying from still to 2.5 m/s. The weather conditions also demonstrate that the STW was likely to be receiving influent wastewater at or below Dry Weather Flow (DWF); DWF is the typical influent rate when the wastewater is much less diluted, and thus more odorous, than during conditions with elevated rainfall.

4.5 At the majority of test locations, the assessor did not detect any odours. At locations 12 and 13, however, the assessor noted “*easily identifiable sewage odours*” which were described as being “*unpleasant*”. These odours, however, were very intermittent resulting in slight adverse effects at these locations. At location X2, which is located adjacent to the STW and outside of the site boundary, and was assessed at the end of the surveys, the assessor recorded “*very strong sewage odours*” with a maximum intensity of ‘5’; the frequency of these odours resulted in a moderate adverse effect.



### **Sniff Test Results – 3 August 2021**

- 4.6 Conditions during the second visit were again conducive to worst-case odour conditions; temperatures were warm (reaching 19°C), and winds were southerly and south-south-easterly and light.
- 4.7 Odours relating to the STW were not detected by the assessor at the majority of locations during both surveys. Sewage odours were detected at locations 1 and 10-14; however, the frequency, duration and intensity of these odours was low enough to result in negligible effects at all locations. At locations X1 and X2, which are located offsite and close to the STW, the assessor recorded “*very strong sewage odours*” with a maximum intensity of ‘5’; however, the frequency of these odours was low, and thus the effects at these locations was slight adverse.

### **Sniff Test Results – 8 September 2021**

- 4.8 During the third site visit, temperatures were warm (reaching 19°C), and winds were south-easterly to east-south-easterly and gusty, reaching speeds of up to 5.2 m/s.
- 4.9 Odours described by the assessor as being “*sewage*” in character with a maximum intensity of ‘4’ were detected during gusts of winds at two locations within the proposed development, resulting in a slight adverse effect at location 6. The odour effects at all other locations was negligible. Closer to the STW at locations offsite, sewage odours were detected resulting in slight adverse effects.

### **Sniff Test Results – 28 July 2022**

- 4.10 During the third site visit, temperatures were warm (reaching 23°C), and winds were south-easterly to east-south-easterly, reaching speeds of up to 2.5 m/s.
- 4.11 Odours described by the assessor as being related to the STW with a maximum intensity of ‘4’ were detected at two locations within the proposed development. However, the odours were intermittent and generally only detected on gusts of wind, resulting in negligible effects at all but one location where the effect was slight adverse. The assessor also noted that, at times, it was difficult to ascertain whether the stronger, unpleasant odours were being generated by the STW or from nearby agriculture. Nevertheless, any unpleasant odours that were detected have been attributed to the STW to provide a conservative assessment. In terms of the offsite locations closer to the STW - comparable to the previous surveys - strong sewage odours were detected with maximum intensities up to 5, resulting in a moderate adverse and slight adverse effect at locations X2 and X3, respectively.

### **Summary**

- 4.12 Odours from the STW were not detected at significant levels across the development site; they were intermittent and low enough in intensity to result in negligible effects at most locations. Furthermore,

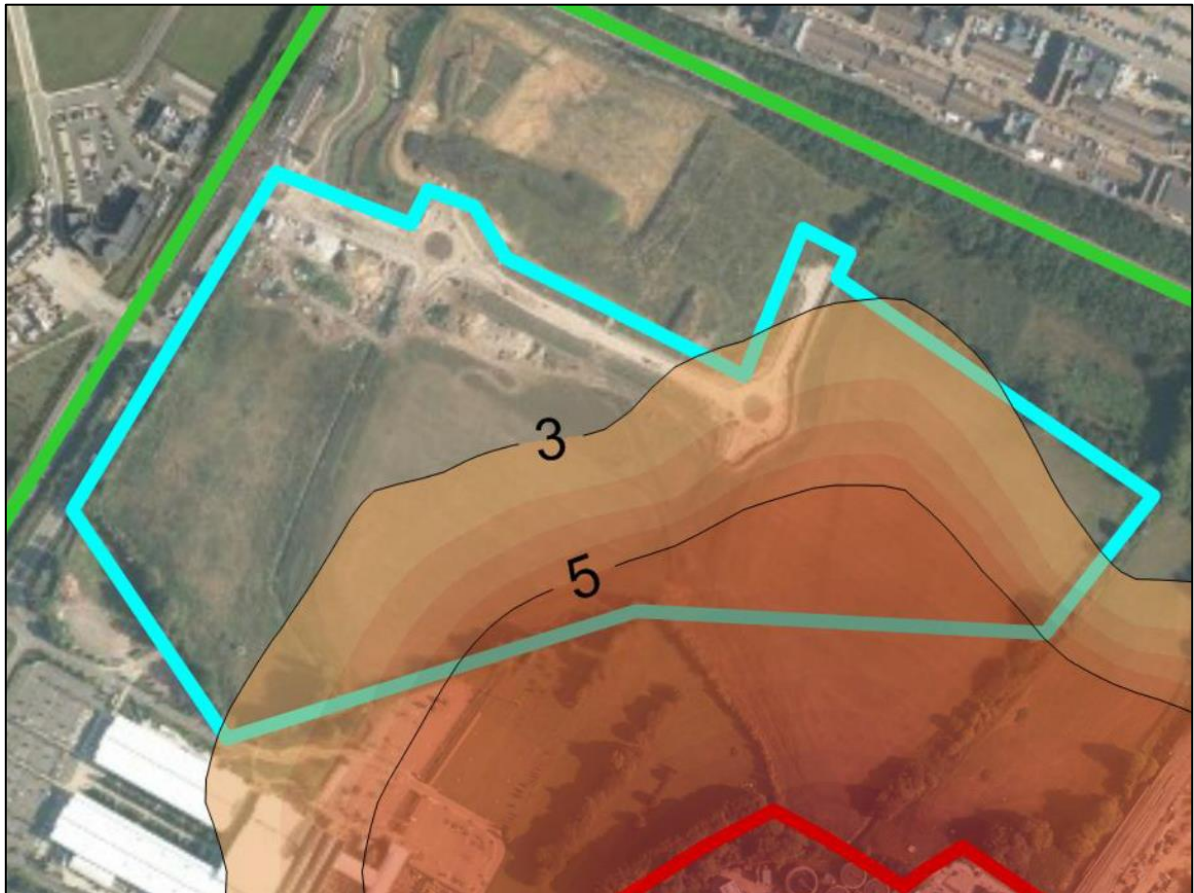
it should also be noted that the sniff tests were all undertaken during meteorological conditions which were conducive to elevated odour generation from the STW and thus worst-case for the sniff tests; warm temperatures with light winds, and low rainfall in the days preceding the tests resulting in influent levels at the works being close to, or below, DWF.

- 4.13 Whilst some slight adverse effects are observed within the development site boundary, the IAQM guidance (IAQM, 2018) is clear that “*where the overall effect is greater than ‘slight adverse’, the effect is likely to be considered significant*”. Thus, based upon the findings of the sniff tests, there are no significant adverse effects for medium sensitivity land use (i.e., commercial development) at any location at the development site. Based upon the results of the six field surveys, the odour effects at all locations within the development site are ‘not significant’.

## Odour Dispersion Modelling

### *Model Results*

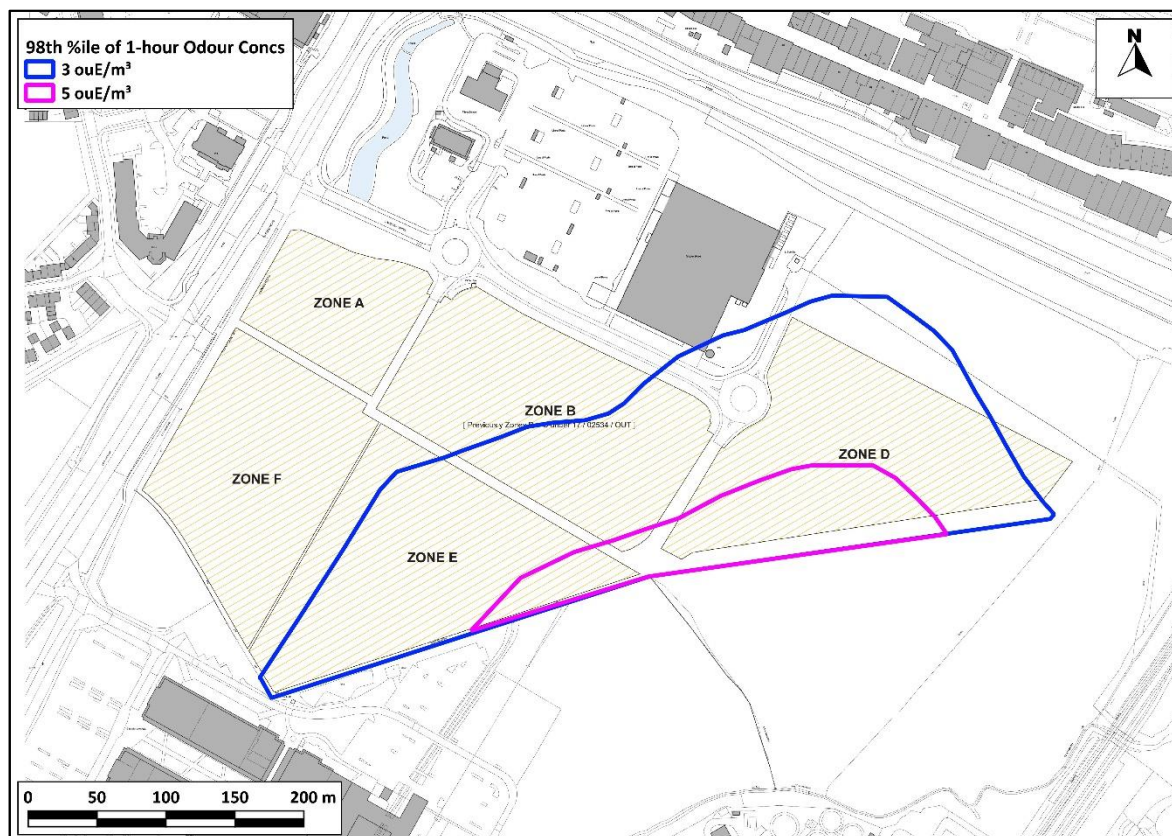
- 4.14 The results of the modelling undertaken by Thames Water’s approved consultants are presented in Figure 6 below. The figure shows the modelled odour concentrations, with the 3 and 5  $\text{OU}_E/\text{m}^3$  concentration lines labelled. These can be used to determine the potential odour effects using the criteria in Table 4. It should be noted that the 1.5  $\text{OU}_E/\text{m}^3$  contour was not included in the model outputs in the report (Olfasense UK Ltd, 2022); Thames Water does not assess any land use against this criterion and uses the 5  $\text{OU}_E/\text{m}^3$  criteria for assessment against office use.



**Figure 6: Contour plot of 98<sup>th</sup> Percentile of 1-hour Odour Concentrations (OU<sub>E</sub>/m<sup>3</sup>)**

Image obtained from the odour report commissioned by Thames Water (Olfasense UK Ltd, 2022).

4.15 The odour contours have been reproduced and overlain onto a parameters plan of the proposed development, as shown in Figure 7.



**Figure 7: Contour plot of 98<sup>th</sup> Percentile of 1-hour Odour Concentrations Overlain on Development Parameters Plan**

Contains section of 5plus Architect's drawing number 05935-5PA-MP-00-DR-A-9010.

### **Potential Odour Effects**

- 4.16 As set out in Table 4, medium sensitivity development (e.g., commercial and office use) would be suitable within the 3  $\text{OU}_E/\text{m}^3$  contour (slight adverse and thus 'not significant'); however, odour effects within the 5  $\text{OU}_E/\text{m}^3$  contour would be moderate adverse and thus 'significant'. The report commissioned by Thames Water states the following:

*"Odour dispersion modelling of the current operations at the works indicates that odours from the STW pose a potential risk of odour impact across a proportion of the development land, with the C98, 1-hour = 5  $\text{OU}_E/\text{m}^3$  isopleth predicted to encompass approximately 12% of the land.*

*Taking account of the proposed usage of the development land (commercial offices), any development in the area encompassed within the C98, 1-hour = 5  $\text{OU}_E/\text{m}^3$  isopleth is likely to be at risk of odour impact."*

### **Overall Significance of Odour Effects**

- 4.17 The results of the sniff tests undertaken by AQC demonstrate that there are no significant adverse effects for the office use at any location at the development site.

- 4.18 The results of the modelling study commissioned by Thames Water (Olfasense UK Ltd, 2022) demonstrate that approximately 88% of the development site is suitable for office development (i.e., commercial/office use); however, approximately 12% of the site lies within the 5 OUE/m<sup>3</sup> and thus the odour effects at this location are moderate adverse and thus 'significant' if office buildings are located within this area. It should be noted that it would be acceptable to have car parking within the 5 OUE/m<sup>3</sup> contour, as this represents a lower sensitivity and transient land use.
- 4.19 It is of AQC's professional judgement that the overall odour effects for the whole proposed development are 'not significant'. The overall judgement is made in accordance with IAQM guidance (IAQM, 2018), which states that the assessment of the significance of odour effects should be based on the drawing together of findings from multiple odour assessment tools, applying an appropriate amount of weight to each tool according to how well-suited it is to the study scenario in question. Whilst it is recognised that the modelling study predicts significant effects for a small area of the development site closest to the STW, the multiple sniff tests undertaken by AQC under worst-case meteorological conditions suggest that the model appears to be overpredicting and that odour effects are 'not significant' for commercial use at any location on the site. Nevertheless, it is recommended that the layout of the site be designed with consideration to odours, and that any commercial building located within the 5 OUE/m<sup>3</sup> contour area be fitted with mechanical ventilation which draws air from roof level and/or the façades facing north or northwest, away from the STW, where odour concentrations will be lowest.



## 5 Summary

- 5.1 The odour effects of Bicester STW on the nearby proposed Bicester Arc development have been assessed using sniff testing (undertaken by AQC) and dispersion modelling (commissioned by Thames Water (Olfasense UK Ltd, 2022)).
- 5.2 The results of the sniff tests demonstrate that the site is suitable for commercial development, and that the odour effects will be 'not significant'. The dispersion modelling demonstrates that, whilst the vast majority of the site is suitable for the proposed land uses, a small area of land closest to the STW will experience 'significant' odour effects if developed for commercial use.
- 5.3 It is of AQC's professional judgement that the overall odour effects are 'not significant'. This overall judgement is made in accordance with IAQM guidance (IAQM, 2018), which states that the assessment of the significance of odour effects should be based on the drawing together of findings from multiple odour assessment tools, applying an appropriate amount of weight to each tool according to how well-suited it is to the study scenario in question. It is recommended, though, that the design of the proposed development is discussed with Thames Water during the planning application process.

## 6 References

Environment Agency (2011) *H4 Odour Management. How to comply with your environmental permit.*

HMSO (1990) *Environmental Protection Act 1990.*

IAQM (2018) *Guidance on the assessment of odours for planning v1.1.*

Ministry of Housing, Communities & Local Government (2021a) *National Planning Policy Framework*, Available:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/779764/NPPF\\_Feb\\_2019\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf).

Ministry of Housing, Communities & Local Government (2021b) *Planning Practice Guidance*, Available: <https://www.gov.uk/government/collections/planning-practice-guidance>.

Olfasense UK Ltd (2022) *Odour impact assessment for land to the north west of Bicester sewage treatment works.*

## 7 Appendices

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## A1 Professional Experience

### **Laurence Caird, MEarthSci CSci MEnvSc MIAQM**

Mr Caird is a Technical Director with AQC, with over 17 years' experience in the field of air quality and odour management and assessment. He has carried out air quality and odour assessments for a wide range of residential and commercial developments, airports, industrial processes, road schemes and energy-from-waste installations throughout the UK and abroad. Mr Caird's experience in terms of odour assessment includes odours from poultry farms and other intensive livestock farming, wastewater treatment, brewing and distilling, meat processing, sugar refining, various processes using paints and solvents and a large number of commercial kitchens. He has acted as expert witness in relation to the assessment of air quality or odour impacts at a number of previous planning appeals, and is a contributory author to the IAQM's *Guidance on the assessment of odours for planning*.

### **Paul Outen, BSc (Hons) MEnvSc MIAQM**

Mr Outen is a Principal Consultant with AQC, with over 13 years' experience in the assessment of air quality and odours. He undertakes air quality and odour assessments covering residential and commercial developments, industrial installations, road schemes, energy centres and mineral and waste facilities. These involve qualitative assessments, and quantitative modelling assessments using the ADMS dispersion models, for both planning and permitting purposes. He has also acted as expert witness in relation to the assessment of odour impacts presented at public inquiries. Mr Outen has a particular interest in odour assessment, and has extensive experience in the assessment of odours across a wide range of industries throughout the UK, Europe and Asia. He also has experience in pollutant monitoring techniques. He regularly undertakes site audits for various installations to advise on pollution control and mitigation strategies. He is a Member of both the Institution of Environmental Sciences and Institute of Air Quality Management.

## A2 Sniff Test Results

A2.1 The results of the individual field odour surveys from the site visits undertaken on the 3<sup>rd</sup> August 2021 and 8<sup>th</sup> September 2021 are shown in the figures below.

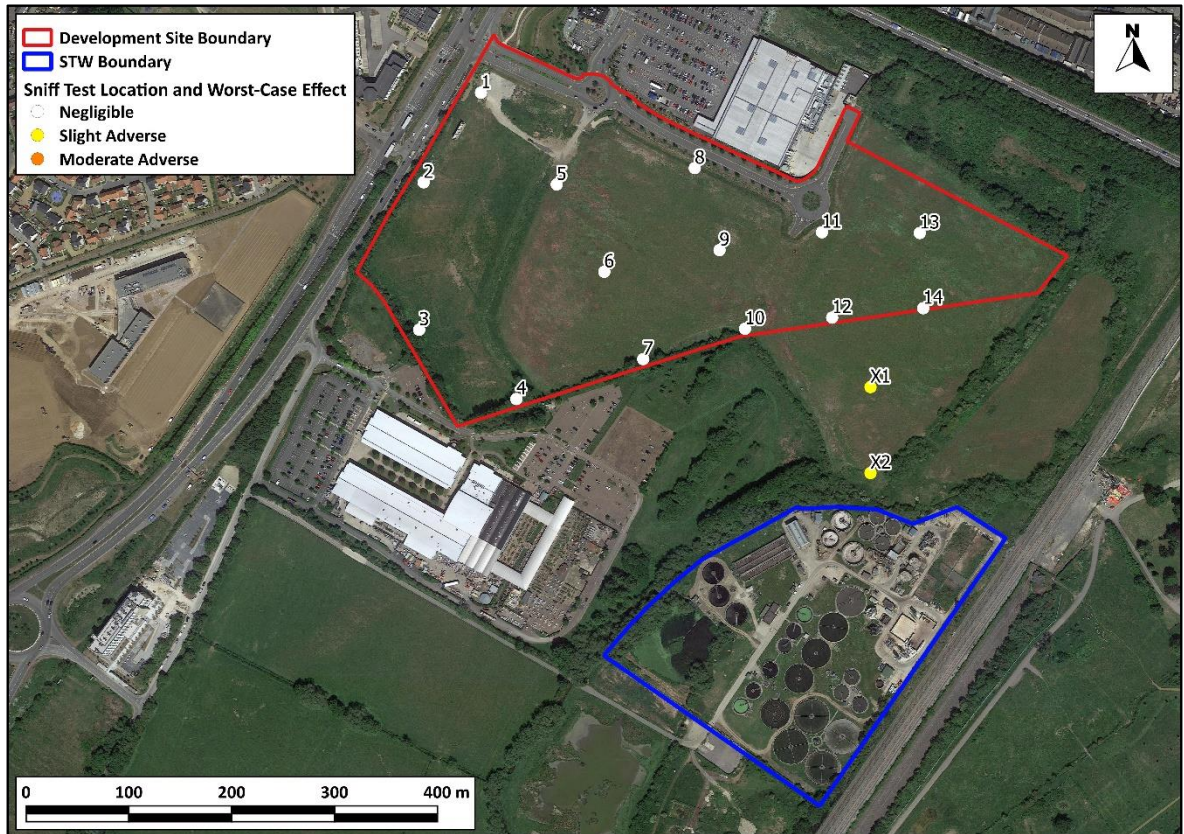
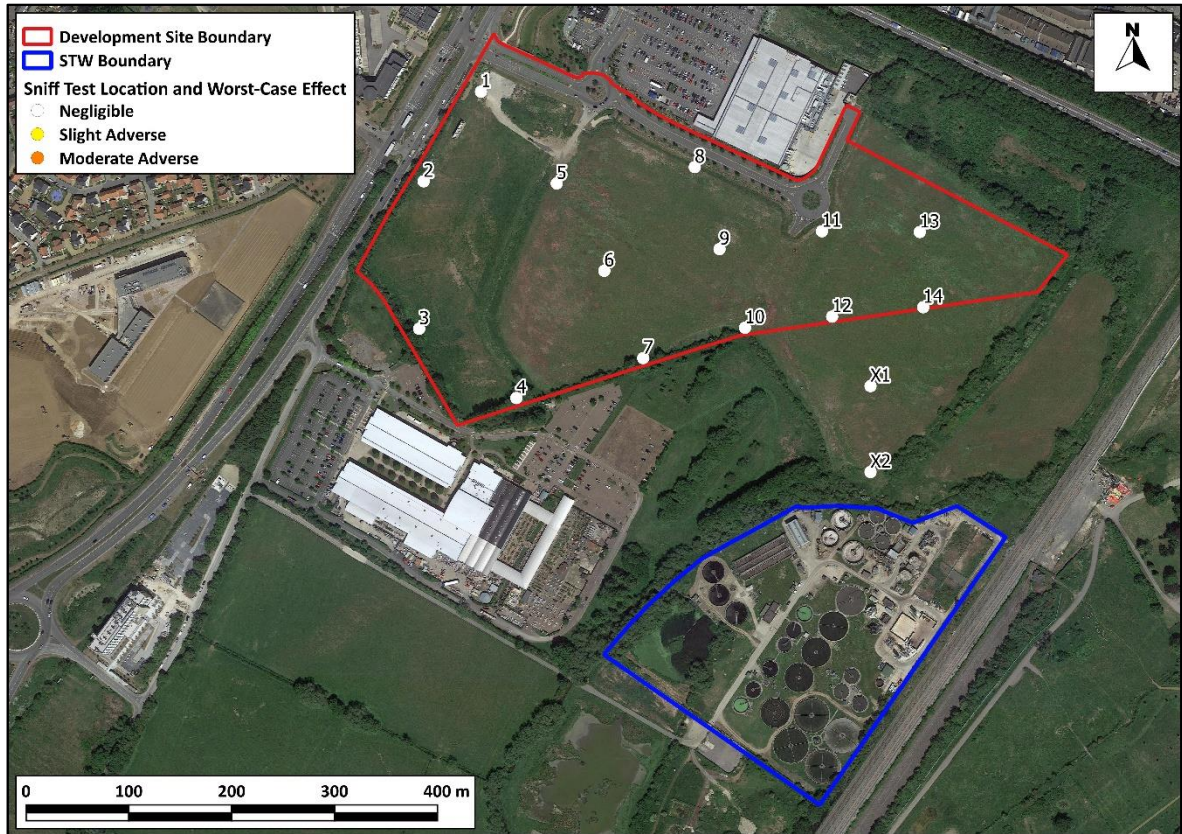


Figure A2.1: Sniff Test Results – 3<sup>rd</sup> August 2021 Survey 1

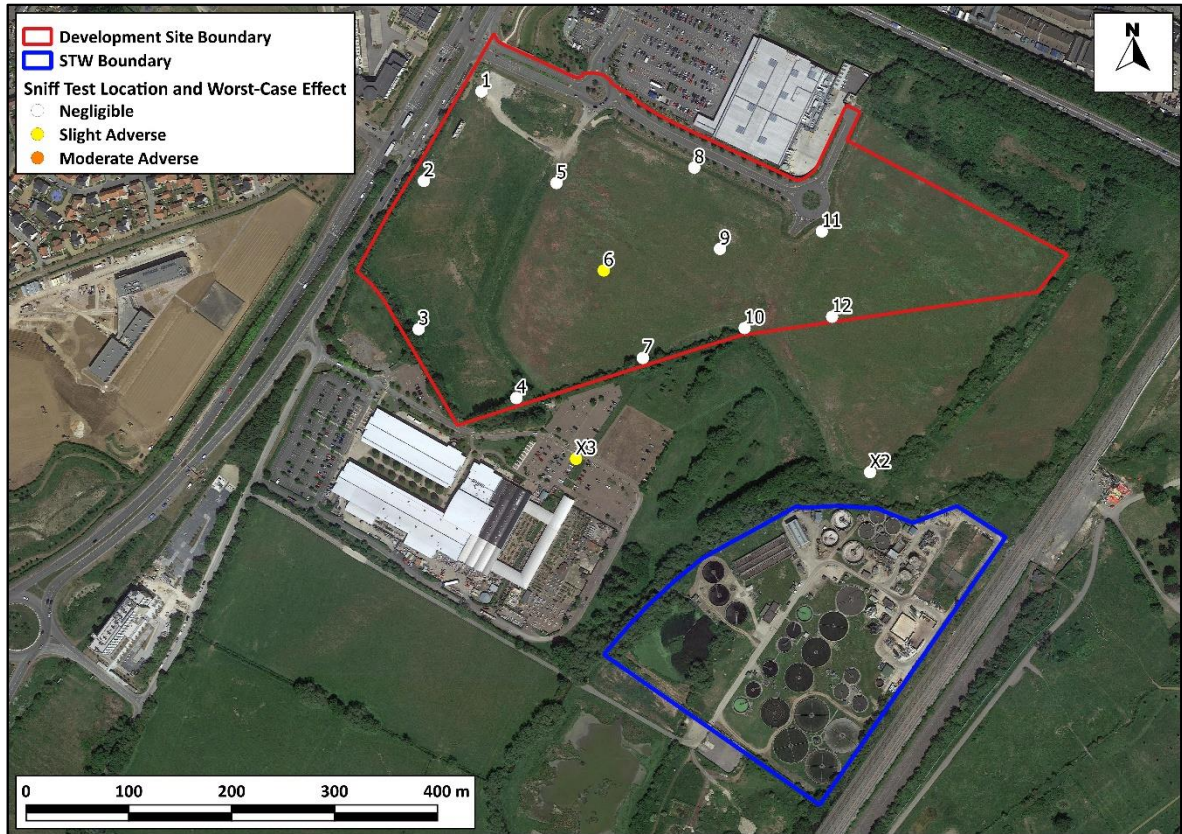
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**Figure A2.2: Sniff Test Results – 3<sup>rd</sup> August 2021 Survey 2**

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**Figure A2.3: Sniff Test Results – 8<sup>th</sup> September 2021 Survey 1**

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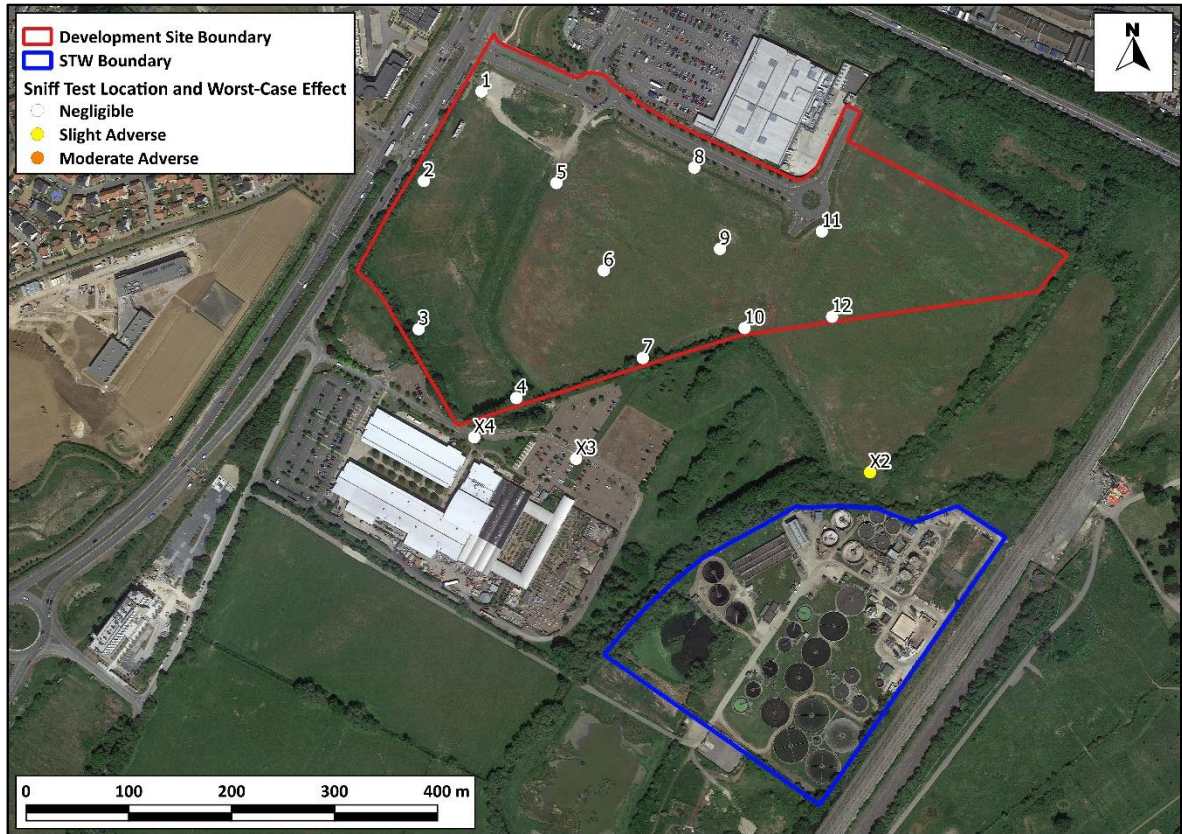


Figure A2.4: Sniff Test Results – 8<sup>th</sup> September 2021 Survey 2

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## A3 Modelled Emission Rates (Olfasense UK Ltd, 2022)

A breakdown of the estimated odour emissions under summer conditions from each aspect of the sewage treatment process under current site operations is presented in the table below. The emission rates presented in the table have been adjusted to reflect the frequency of occurrence of each odour source and are hence 'time-weighted'.

Table 6: Contribution of emissions from each aspect of the treatment process

Stage of treatment	Source	Emission rate [ou <sub>e</sub> /s]	Contribution to total site emissions
Preliminary Treatment	Pumping stations	754	1.5%
	Inlet channels	4533	8.8%
	Screens	546	1.1%
	Rag and grit skips	225	0.4%
Storm water	Pumping station and channels	1648	3.2%
	Screens and skip	113	0.2%
	Storm tanks (storm water)	2540	4.9%
	Storm tanks (retained sediment)	667	1.3%
Primary Treatment	Distribution channels	673	1.3%
	Primary settlement tanks	5859	11.3%
	Settled sewage	458	0.9%
Secondary Treatment	Activated sludge plant	1626	3.1%
	Primary filters (inc. distribution)	2730	5.3%
	Primary humus tanks	269	0.5%
	Secondary filters (inc. distribution)	1824	3.5%
	Secondary humus tanks	271	0.5%
Sludge storage and handling	PST desludge sumps	112	0.2%
	PFT feed PS	74	0.1%
	PFT	352	0.7%
	PFT supernatant chambers	306	0.6%
	PFT OCU	159	0.3%
	Blend tanks PS	86	0.2%
	Blend tanks	1484	2.9%
	Centrate sump	1046	2.0%
	Raw sludge hopper	230	0.4%
	Liming plant (conveyors and mixers)	3404	6.6%
	Limed sludge cake day pad	17183	33.2%
	Limed sludge cake daily export (Mon:Fri)	315	0.6%
	RAS/SAS handling	922	1.8%
	Humus sludge return PS	22	<0.1%
	Storm returns & sludge liquor PS	1328	2.6%
<b>TOTAL</b>		<b>51759</b>	<b>100%</b>

Appendix E – Ecological Appraisal





Peveril Securities

**Bicester Arc**

**Ecological Appraisal**

June 2023



**FPCR Environment and Design Ltd**

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Figure 2: Phase 1 Habitat Plan

Figure 3: Transect Route and Static Detector Location Plan

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Figure 8: Breeding Bird Survey Results, June 2021

**APPENDICES**

Appendix A: Breeding Bird Survey Information

Appendix B: Static Bat Detector Results

Appendix C: Detailed HSI Scores for Each Pond

Appendix D: eDNA Results

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## 1.0 INTRODUCTION

- 1.1 The following report has been prepared by FPCR Environment and Design Ltd. on behalf of Peverill Securities and considers the ecological implications of the Bicester Arc development and the dedicated 'eco park' on land off Lakeview Drive, Bicester (hereafter referred to as 'the Site'). The Site is centred approximately at Ordnance Survey Grid Reference: SP 579 215.

### Site Context

- 1.2 The Site boundary is shown in **Figure 1** and is approximately 17 hectares (ha). It is located between a large Tesco superstore to the north and Bicester Garden Centre and sewage treatment plant to the south. To the west is the A41 and urban development and to the east is a railway line and beyond this arable farmland.
- 1.3 The Site was subject to an outline planning application in 2017 (Ref 17/02534/OUT) for the erection of a business park of up to 60,000 sq.m (GEA) of flexible Class B1(a) office / Class B1(b) research & development floorspace; associated vehicle parking, landscaping, highways, infrastructure and earthworks.
- 1.4 This was then subject to a s73 application (Ref 23/01080/F) to vary conditions 4 and 34 of the above consent.
- 1.5 This report is to provide an update the suite of ecology information that was produced for the above application.

### Scope of Appraisal

- 1.6 This Ecological Appraisal describes the current ecological interest within and around the Site, which has been identified through standard desk- and field-based investigations. It then considers the potential ecological impacts and opportunities for ecological enhancement based on the landscape masterplan in the context of relevant legislation and planning policy as well as the comments received from Cherwell District Council on 29<sup>th</sup> September 2021. Finally, it identifies the necessary additional measures to avoid, mitigate or provide compensation for potential impacts, and the mechanisms for securing such measures.

## 2.0 METHODOLOGY

### Desk Study

- 2.1 Consultation information was requested from the Thames Valley Environmental Records Centre (TVERC).
- 2.2 The Multi Agency Geographic Information for the Countryside (MAGIC) website was also consulted for statutory designated sites data<sup>1</sup>.
- 2.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence<sup>2</sup> (Zoi), as follows:
- 15km around the Site for sites of International Importance (e.g. Special Areas of Conservation [SACs], Special Protection Areas [SPAs], Ramsar sites);
  - 2km around the Site for sites of National/ Regional importance (e.g. Sites of Special Scientific Interest [SSSIs] and National Nature Reserves [NNRs]); and
  - 1km around the Site for non-statutory sites of County / local importance (eg Local Wildlife Sites [LWSs], statutory sites of county importance (Local Nature Reserves [LNRs]) and species records (e.g. protected, or Section 41 NERC species of principal importance<sup>3</sup> and notable species).
- 2.4 Further inspection, using colour 1:25,000 OS base maps ([www.ordnancesurvey.co.uk](http://www.ordnancesurvey.co.uk)) and aerial photographs from Google Earth ([www.maps.google.co.uk](http://www.maps.google.co.uk)), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.

### Habitats/Flora

- 2.5 The Site was surveyed on 31<sup>st</sup> March 2021 using the standard Extended Phase 1 Habitat Survey methodology (JNCC, 2010<sup>4</sup>), as recommended by Natural England to identify specific habitats of ecological interest. Whilst the species lists should not be regarded as exhaustive, sufficient information was gained during the survey to enable robust assessment of habitat present.
- 2.6 During the Extended Phase 1 Surveys, hedgerows were surveyed individually using the Hedgerow Evaluation and Grading System (HEGS) to enable identification and evaluation of hedgerows of nature conservation importance within the Site. Hedgerows were graded on a scale of 1-4, within which grades 1 and 2 are generally considered to be of nature conservation priority as shown in **Table 1**.

**Table 1: Conservation Value of Hedgerows**

Grade	Value of Hedgerow
-1, 1, 1+	High to Very High
-2, 2, 2+	Moderately High to High
-3, 3, 3+	Moderate
-4, 4, 4+	Low

<sup>1</sup> [www.magic.defra.gov.uk](http://www.magic.defra.gov.uk) (accessed 06.09.21)

<sup>2</sup> Zone of Influence - the areas and resources that may be affected by the proposed development

<sup>3</sup> Natural Environment and Rural Communities Act 2006 species listed under Section 41 (formally UKBAP species)

<sup>4</sup> JNCC, 2010. *Handbook for Phase 1 habitat survey - a technique for environmental audit*

- 2.7 Hedgerows were also assessed against the Wildlife criteria provided in Part II of Schedule 1 of the Hedgerows Regulations 1997. Qualifying as an 'important' hedgerow requires the hedgerow assessed to be greater than 30 years of age and contain species listed in Schedule 5 (animals) and 8 (plants) of the Wildlife and Countryside Act 1981 (as amended), birds categorised as declining breeders (Category 3) within the 'Red Data Birds in Britain' (Batten 1990), or any species categorised as 'endangered', 'extinct', 'rare' or 'vulnerable' by any of the British Red Data Books.
- 2.8 Hedgerows are also considered important should they satisfy any of the following criteria:
- That the hedgerow is referred to in a record held by a biological records centre as containing protected plants (within 10 years) or birds and animals (within five years); or
  - That the hedgerow contains one of the following criteria per average 30m section surveyed:
    - seven Schedule 3 species; or
    - six Schedule 3 species and three listed features (see below); or
    - six Schedule 3 species, including one of the following: black poplar, large-leaved lime, small-leaved lime or wild service-tree; or
    - five Schedule 3 species and four listed features; or
    - four Schedule 3 species, two listed features and lying adjacent to a bridleway or footpath;
  - Listed features to include:
    - A bank or wall which supports the hedgerow along at least half of its length;
    - Gaps which together do not exceed 10% of the length of the hedgerow;
    - At least one standard tree per 50m of hedge;
    - At least three Schedule 2 woodland species within the hedgerow;
    - A ditch along at least one half of the length of the hedgerow;
    - Connections scoring 4 points or more (1 point per connection of the hedgerow with another, two points per connection of the hedgerow to a pond or broad-leaved woodland; and
    - A parallel hedge within 15 m of the hedgerow.
- 2.9 An update survey was conducted on 21 April 2023 to determine if there had been any material changes to the habitats within the Site in the intervening period.

## **Fauna**

- 2.10 During the surveys, observations and signs of suitable habitat for any species protected under Part I of the Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats & Species Regulations 2017 (as amended) and the Protection of Badgers Act 1992 were noted. Consideration was also given to the existence and use of the Site by other notable fauna such as those listed on the Natural Environment and Rural Communities (NERC) Act, Section 41 (S41) as species which are of principal importance for the conservation of biodiversity in England. Consideration was also given to those species listed as Local Biodiversity Action Plan (LBAP) or Red Data Book (RDB) species.

## Bats

### Tree Assessments

- 2.11 The tree assessments were conducted from ground level, with the aid of a torch and binoculars and were undertaken on the 31<sup>st</sup> March 2021 by an experienced ecologist from FPCR. This was updated on 21<sup>st</sup> April 2023. During the survey Potential Roosting Features (PRF) for bats such as the following were sought (based on p16, British Standard 8596:2015<sup>5</sup>):
- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
  - Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems).
  - Woodpecker holes.
  - Cracks/splits in stems or branches (horizontal and vertical)
  - Partially detached or loose bark or bark plates.
  - Cankers (caused by localised bark death) in which cavities have developed.
  - Other hollows or cavities, including butt rots.
  - Compression of forks with occluded bark, forming potential cavities.
  - Crossing stems or branches with suitable roosting space between.
  - Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where potential roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
  - Bat or bird boxes.
  - Other suitable places of rest or shelter.
- 2.12 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features may reduce or enhance the potential.
- 2.13 Based on the presence of the above features, trees were classified into general bat roost potential groups. **Table 2** broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in the survey guidance<sup>6</sup>.
- 2.14 Although the British Standard 8596:2015 document groups trees with moderate and high potential, these have been separated below to allow more specific survey criteria to be applied.

<sup>5</sup> British Standards Institute 2015. *BSI 8596:2015 BSI Standards Publication Surveying for bats in trees and woodland - Guide*. BSI Standards Ltd.

<sup>6</sup> Collins, J. 2016. *Bat Conservation Trust Bat Surveys for Professional Ecologists - Good Practice Guidelines* (3<sup>rd</sup> edition).

Table 2: Classification and Survey Requirements for Bats in Trees

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	A Natural England derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) <b>and</b> nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence. Works to trees were undertaken under supervision in accordance with the approved good practice method statement provided within the licence. <b>However</b> , where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.
High Potential	A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	Where the tree will likely be affected by development, a combination of aerial assessment by roped access bat workers (if appropriate) <b>and/or</b> nocturnal survey during appropriate period (May to August). Following additional assessments, a tree may be upgraded or downgraded based on findings. If roost site/s are confirmed and the tree or roost is to be affected by proposals a licence from Natural England will be required. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.
Moderate Potential	A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.	Where the tree will likely be affected by development a combination of aerial assessment by roped access by bat workers <b>and/or</b> nocturnal survey during appropriate period (May to August). Following additional assessments, a tree may be upgraded or downgraded based on findings. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate. If a roost site/s is confirmed a licence from Natural England will be required.
Low Potential	A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.	No further survey required but a precautionary working method statement may be appropriate.
Negligible/ No potential	Negligible/no habitat features likely to be used by roosting bats	None.



Transect Survey

- 2.15 Transect surveys were undertaken at dusk in May, July and September 2021, with the transect route predetermined prior to survey in order to comprehensively cover all areas of the site. These included point count stops to identify activity levels around the features of potential value to bats likely to be affected by proposals (i.e. hedgerows, tree lines and dense scrub). Each point count was c.5-minutes long, during which time all bat activity within range was recorded.
- 2.16 The transects commenced at sunset and continued until approximately two hours after sunset. Each was walked at a steady pace and when a bat passed by, the species, time and behaviour was recorded to help to form a general view of the bat activity on site and highlight any habitats features particularly associated with bat activity.
- 2.17 Surveyors used ultrasonic bat detectors (Wildlife Acoustics Inc. Echo Meter Touch® bat detectors in conjunction with Echo Meter Touch® app and Apple Inc. iPad®, during the transect surveys.
- 2.18 Post-survey, calls were analysed using Kaleidoscope Pro 4.5 (Wildlife Acoustics 2017), by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. From this, the level of bat activity across the Site in relation to the abundance of individual species foraging and commuting was assessed.
- 2.19 The transects were undertaken when conditions were suitable (i.e. when the ambient air temperature exceeded 10°C and there was little wind and no rain) see **Table 3**.

**Table 3: Transect & Static Survey Conditions**

Date	Sunset/ Sunrise	Temperature at start of survey °C	Rain (0-5)	Wind (0-5)	Cloud %
26.05.21	21:07	13	0	2	10
12.07.21	21:20	18	0	1	90
13.09.21	19:23	15	0	3	20

Automated Static Bat Detector Survey

- 2.20 A passive static recording broadband detector (Song Meter® SM4BAT+ bat detectors), with outputs saved to an internal storage device, was deployed to supplement the manual transect survey, in line with industry guidance.
- 2.21 Monitoring took place in May, July and September 2021 with the device staying in place for a minimum of 5 nights. The data from any additional nights were assessed for the presence of Annex II bat species only. The recorded data was analysed using Kaleidoscope Pro 4.5 and Bat Sound software to assess the species assemblage and relative level of bat activity on site. The recording units were deployed during periods of suitable weather conditions (little no rain/wind and temperatures above 10°C at sunset). The locations of the devices are shown in **Figure 3**.

**Great Crested Newts**

- 2.22 Two ponds are located adjacent to the Site boundaries: an ornamental pond in the north opposite McDonalds (P1) and one on the southern boundary in the grounds of the garden centre (P2). There are another two ponds within a 500m radius: a balancing pond to the west, across the A41 (P3) and waterbodies associated with the sewage treatment works to the south, across the brook (collectively referred to as P4). Only the ponds adjacent to the boundaries were permitted access for survey. Water body locations are shown in **Figure 2**.

Habitat Suitability Index

2.23 A habitat suitability index (HSI) assessment was undertaken on Ponds P1 and P2. This assessment<sup>7</sup> provides a measure of the likely suitability that a waterbody has for supporting great crested newts (GCN) *Triturus cristatus*. Whilst not a direct indication of whether or not a pond will support GCN generally, those with a higher score are more likely to support the species than those with a lower score and there is a positive correlation between HSI scores and ponds in which GCN are recorded. Ten separate attributes are assessed for each pond to calculate the suitability of the ponds to support GCN:

Geographic location	Presence of water-fowl
Pond area	Presence of fish
Pond drying	Number of linked ponds
Water quality	Terrestrial habitat
Shade	Macrophytic coverage

2.24 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the scale set out in **Table 4** below. Using the index score the predicted presence of GCN being found within a pond can be made, based on the proportion of ponds typically occupied at that suitability level.

**Table 4: HSI Score and Suitability for Supporting Great Crested Newts**

HSI score	Pond Suitability
<0.5	Poor
0.5 - 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

2.25 An assessment of the suitability of terrestrial habitats to support GCN was also completed within the Site. Suitable terrestrial habitat includes shelter habitat such as scrub and rank vegetation and habitat that could provide suitable hibernation sites such as rubble piles or tussock grassland.

eDNA Surveys

2.26 Environmental DNA (eDNA) sampling was undertaken of P1 and P2 in the 2021 survey season to determine the presence/absence of GCN in accordance with the Technical Advice Note for field and laboratory sampling of GCN eDNA (WC1067)<sup>8</sup>. This methodology has been approved by Natural England for the determination of GCN presence/absence. Pond P1 was sampled again in the 2023 season.

2.27 Sampling was undertaken by appropriately licenced ecologists who collected a sample of water from each pond (during suitable weather conditions avoiding heavy rain). Sampling was undertaken using kits obtained from ADAS. The methodology comprised taking samples of agitated water from 20 locations around each pond and mixing thoroughly. 15ml of this water

<sup>7</sup> Oldham et al. 2000. *Herpetological Journal* 10(4); Evaluating the Suitability for the Great Crested Newt.

<sup>8</sup> Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. *Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

was then placed into each of the six sterile sample tubes containing preservative, precipitates and a DNA sequence that was used for degradation control. All samples were stored in accordance with the protocols provided by the laboratory. The samples were then transported under suitable conditions for analysis. Following analysis, results provided by the laboratory could have one of three outcomes described in **Table 5** below. One kit is required for ponds up to 1ha then an additional kit is required for each additional hectare of pond area.

**Table 5: Description of Possible Results of eDNA Analysis**

Result	Description
Positive	A positive result means that eDNA from GCN was detected and they have been present within the water in the 20 days preceding sampling. An eDNA score would be provided indicating the number of positive replicates from a series of twelve.
Negative	DNA from GCN was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided. Degradation can occur through poor storage of the samples or kits and inhibition can occur through unexpected chemicals in the sample.

### Breeding Birds

- 2.28 A scoping Breeding Bird Survey (BBS) comprising a single visit was undertaken on 20th April 2021 by an experienced ornithologist from FPCR.
- 2.29 The survey methodology employed was broadly based on that of territory mapping as developed by the British Trust for Ornithology (BTO)<sup>9</sup>. All birds encountered (seen or heard) were recorded on a field survey plan using standard BTO species codes and symbols for bird activities and to denote activity, sex and age where appropriate. Birds were considered to be holding a territory and therefore likely to be utilizing the Site for breeding activities if they were displaying breeding behaviours, such as: singing, nest building, food carrying or territorial defence. If birds did not display such behaviours, e.g. they were only recorded flying over the Site, they were considered non-breeders. Breeding evidence used in this report follows EOAC guidelines 1979, as summarised in **Appendix A**.
- 2.30 The survey visit was undertaken between sunrise and 11.00 hrs. A route was mapped out prior to the survey being undertaken, with particular attention to linear features, such as hedgerows and watercourses. The survey was not undertaken in unfavourable conditions such as heavy rain or strong wind, which may negatively affect the results. The conditions throughout the survey visit are shown in **Table 6**.

**Table 6: Conditions during the Breeding Bird Survey**

Date	Cloud (%)	Rain	Wind	Visibility
20.04.21	10	None	Gentle breeze	Excellent

### Badger

- 2.31 A badger survey was undertaken by an experienced ecologist from FPCR on 31st March 2021 in accordance with standard methodology<sup>10</sup> to document any evidence which would indicate the

<sup>9</sup> Bibby, C.J., N.D. Burgess & D.A. Hill. 2000. *Bird Census Techniques*: 2nd Edition. London: Academic Press.

presence of badgers both on the Site and locally. Evidence of badger occupation and activity sought included:

- Setts: including earth mounds, evidence of bedding and runways between setts;
- Latrines: often located close to setts, at territory boundaries or adjacent to favoured feeding areas;
- Prints and paths or trackways;
- Hairs caught on rough wood or fencing;
- Other evidence: including snuffle holes, feeding and playing areas and scratching posts.

2.32 Where setts are found, their status and level of activity is noted. Sett status is broadly categorised as follows:

- *Main sett* – usually continuously used with many signs of activity around, a large number of holes and conspicuous spoil mounds;
- *Annexe sett* – usually located close to a main sett and connected to it by well used paths. Annexe's may not be continuously occupied;
- *Subsidiary sett* – lesser used setts comprising a few holes and without associated well-used paths. Subsidiary setts are not continuously occupied;
- *Outlier sett* – one or two holes without obvious paths. These are used sporadically.

2.33 Level of activity is described as:

- *Well used* – clear of debris, trampled soil mounds and obviously active, with signs of activity such as presence of prints, dislodged guard hairs around the entrances;
- *Partially used* – some associated debris or plants at the entrance. Could be used with minimal excavation and usually with signs of activity within the vicinity, for example, badger pathways;
- *Disused* – partially or completely blocked entrances.

### Reptiles

2.34 A reptile presence/absence survey was undertaken in 2021 across all areas of the Site identified as offering potential suitable habitat to reptiles.

2.35 The survey was undertaken based on current best practice guidelines as detailed within the Herpetofauna Workers Manual<sup>11</sup> and Froglife Advice Sheet<sup>12</sup>. Methods involved a search for basking reptiles on/under naturally occurring and strategically positioned artificial refugia placed in locations that offered the most suitable habitat for common reptiles. i.e. structurally diverse habitats, with variable vegetation heights, tangled or thorny areas, mosaics, bare patches or ecotones. Locations of the refugia are shown in **Figure 4**.

2.36 Surveys were undertaken in between May and September 2021 by suitability experienced ecologists. The prevailing weather conditions, including relative wind speed, cloud cover, ambient temperatures and any other notable weather, are provided in **Table 7**.

2.37 Guidelines recommend that surveys are undertaken during the following periods:

<sup>10</sup> Harris, S., Cresswell, P. and Jefferies, D. 1989. *Surveying Badgers*, Mammal Society.

<sup>11</sup> Gent, T. and Gibson, S. 2012. *Herpetofauna Workers' Manual*. Pelagic Publishing.

<sup>12</sup> Froglife 1999. Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. *Froglife Advice Sheet 10*.

- At temperatures of between 9°C & 18°C;
- On sunny/cloudy days with little or no wind;
- Between 07:00 & 11:00 hrs ('AM survey') or between 16:00 & 19:00 hrs ('PM survey') (note: if temperature conditions are suitable the surveys can be undertaken outside of these periods).

2.38 In addition, guidelines also recommend:

- Using regularly spaced felt as artificial refugia, with a black upper side;
- Approaching refugia from a downwind direction, casting no shadow and making sure not to disturb basking animals when checking;
- That lifting and replacing tins, to check for the presence of reptiles, underneath, is undertaken with care to avoid potential harm to any animals underneath;
- That the location and number of tins are mapped to aid survey and avoid the possibility of leaving tins in situ upon completion of the survey.

**Table 7: Data and Weather Conditions during Reptile Survey**

Survey	Date	Start Time	Temp.	Weather	Rain
1	24.05.21	10:00	10°C	Bright, 50% cloud cover, light breeze	No
2	28.05.21	10:45	15°C	Bright, 80% cloud cover, no wind	No
3	04.06.21	09:30	13°C	Bright 90% cloud cover, no wind	No
4	23.06.21	10:45	17°C	Sunny <10% cloud cover, light breeze	No
5	28.06.21	11:30	15°C	Bright, 100% cloud, slight breeze,	No
6	01.09.21	11:30	16°C	Sunny, bright, 90-100% cloud, moderate breeze	No
7	16.09.21	10:45	17°C	Sunny, 40% cloud, very light breeze	No

### Population Assessment

2.39 Where reptile populations are identified, the populations are assessed in accordance with the population level criteria as stated in the Key Reptile Site Register (HGBI, 1998)<sup>13</sup>. This system classifies populations of individual reptile species into three population categories assessing the importance of the population (**Table 8**). These categories are based on the total number of adult animals observed during individual survey occasions.

**Table 8: Key Reptile Site Survey Assessment Categories (HGBI, 1998)\***

Species	Low Population (No. of Individuals)	Good Population (No. of Individuals)	Exceptional Population (No. of Individuals)
Adder	<5	5 – 10	>10
Common lizard	<5	5 – 20	>20
Grass snake	<5	5 – 10	>10
Slow worm	<5	5 – 20	>20

\*Figures in the table refer to the maximum number of adults seen by observation and / or under tins (placed at a density of up to 10 per hectare, by one person in one day)

### **Riparian Species**

2.40 Langford Brook and the drain running through the eastern part of the Site were surveyed for their suitability to support otter *Lutra lutra* and water vole *Arvicola amphibius*.

<sup>13</sup> Herpetofauna Groups of Britain and Ireland. 1998. Evaluating local mitigation/translocation programmes: maintaining best practice and lawful standards.

- 2.41 Suitable Habitat for water voles<sup>14</sup> includes:
- Water more than 50cm deep and relatively stable;
  - Muddy bottom;
  - Static or slow flowing water;
  - Earth banks of >45° (for burrowing);
  - Dense vegetation cover on the banks of a good mix of grasses and herbs for summer food and cover and some berry bearing bushes, tubers and trees for autumn and winter food;
  - Emergent, in-channel vegetation; and
  - 1-2m wide.
- 2.42 Otter have been known to exploit a wide range of aquatic habitats, and no specific variables have been found to be preferred by otter. Suitable otter habitat is therefore a somewhat loose term<sup>15</sup> but specifically overhanging tree roost and other areas that could be used as holts or couches (resting sites) were searched for.

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<sup>14</sup> Dean, M., Strachan, R., Gow, D. and Andrews, R. 2016, *Water Vole Mitigation Handbook*. Mammal Society Mitigation Guidance Series. Eds Fiona Matthews and Paul Channin. Mammal Society, London.

<sup>15</sup> Chanin, P. 2003. *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

### 3.0 RESULTS

#### Desk Study

##### Statutory Designated Sites

- 3.1 The Site itself is not covered by any statutory designations and there are no international designations within 10km; however, four national statutory sites occur within 5km of the Site. The sites and further details are given in **Table 9**.

**Table 9: Statutory Sites of nature conservation importance within the Site's Potential Zone of Influence**

Site name	Approx. distance & direction from Site	Interest feature(s)
Wendlebury Meads and Mansmoor Closes SSSI	3.7km S	A series of traditionally-managed unimproved neutral meadows supporting a complex variety of plant communities that have developed in response to varying management, drainage and soils. Amongst the few surviving examples of calcareous clay pasture communities which were widespread throughout southern England at the turn of the century, but now rare.
Arcott Bridge Meadows SSSI	3.6km SE	Exhibit medieval ridge-and-furrow features indicating that parts, at least, have remained unploughed for many centuries. Managed as hay meadow and pasture and accordingly support a wide range of plant species which are largely confined to such old, unimproved, neutral grassland.
Ardley cutting and Quarry SSSI	3.7km NW	The grassland contains a variety of species associated with limestone grassland including quaking grass <i>Briza media</i> , basil thyme <i>Acinos arvensis</i> , clustered bellflower <i>Campanula glomerata</i> , dropwort <i>Filipendula vulgaris</i> and sainfoin <i>Onobrychis viciifolia</i> . The flora of the woodland includes lords and ladies <i>Arum maculatum</i> , wood anemone <i>Anemone nemorosa</i> and green hellebore <i>Helleborus viridis</i> . The invertebrate fauna is particularly rich along the railway cutting, with large populations of calcareous grassland butterflies like small blue <i>Cupido minimus</i> , brown argus <i>Aricia agestis</i> , dark green fritillary <i>Argynnis aglaja</i> , green hairstreak <i>Callophrys rubi</i> and Duke of Burgundy <i>Hamearis lucina</i> , all of which are uncommon in Oxfordshire.
Bure Park LNR	1.9km N	Habitats include grass meadow, young broad-leaved woodland, hedges and scrub. A small river (the Bure) runs through the site, feeding a small pond which is home to great crested newts. A balancing pond at one end of the Reserve is fed by run-off from the area.

##### Non-statutory Designated Sites

- 3.2 Non-statutory designations in Oxfordshire include Local Wildlife Sites (LWSs) which are considered of ecological value at a County level. Other non-statutory designations which may be pertinent in the locality include Cherwell District Wildlife Sites (and proposed CDWSs), which are valuable at a District level. The proposed sites have not yet been valued against the criteria for designation but for the purposes of this assessment should be treated as such.
- 3.3 The Site itself is not covered by any non-statutory designations, though there are two non-statutory sites within 2km. **Table 10** provides a summary of each.

**Table 10: Non-statutory sites of nature conservation importance within 2km of the Site**

Site name	Approx. distance & direction from Site	Interest feature(s)
Bicester Wetland Reserve LWS	300m S	Mostly wet grassland. Includes a small area of reedbed, open water (including shallow water for waders and deeper areas for other species), wet ditches, banks with tall herb and a dry grassland field to the east. The margins around the open water have swamp vegetation and areas of wet grassland. Important for over-wintering wildfowl including teal, pintail, pochard, wigeon, gadwall, snipe and water rail. It is also very important for birds which require wet grassland such as jack snipe, little ringed plover and green plover.
Promised Land Farm Meadows pCDWS	300m S	The sward is grass-dominated, with some meadow barley and yellow oat grass. A few unusual species, characteristic of ancient hay meadows have been recorded including great burnet, hay rattle, meadow knapweed (the rayed form) and pepper saxifrage. There is a spring-fed pond with marginal hard rush, celery leaved buttercup and pink water speedwell.

### Protected Species

- 3.4 Relevant records provided by TVERC are summarised in **Table 11** below and are discussed in the relevant species section.

**Table 11: Protected and Notable Species Records within 2km of the Site**

Scientific Name	Common Name	Approx. distance from Site	Date	Status
<b>Birds</b>				
Many species recorded from Bicester Wetland Reserve at 280m S including Bearded Tit, Bittern, Black-headed Gull, Black-tailed Godwit, Black Tern, Bullfinch, Common Gull, Common Sandpiper, Common Tern, Crane, Cuckoo, Curlew, Dunlin, Dunnock, Fieldfare, Gadwall, Glossy Ibis, Grasshopper Warbler, Green Sandpiper, Greenshank, Grey Wagtail, Greylag Goose, Herring Gull, Hobby, House Martin, House Sparrow, Kestrel, Kingfisher, Lapwing, Lesser Black-backed Gull, Lesser Redpoll, Lesser Spotted Woodpecker, Linnet, Little Egret, Little Ringed Plover, Mallard, Marsh Harrier, Marsh Tit, Meadow Pipit, Mistle Thrush, Mute Swan, Oystercatcher, Peregrine, Red-necked Phalarope, Red Kite, Redshank, Redwing, Reed Bunting, Ringed Plover, Ruddy Shelduck, Ruff, Shelduck, Shoveler, Skylark, Snipe, Song Thrush, Starling, Stock Dove, Swift, Teal, Tree Sparrow, Turtle Dove, Wigeon, Willow Warbler, Wood Sandpiper, Woodcock, Yellow Wagtail, Yellowhammer				
<b>Reptiles and amphibians</b>				
<i>Triturus cristatus</i>	Great crested newt	Many records from areas east of the Site, the other side of the brook around Graven Hill and the MOD site from 2011-2017		EPS
<i>Lissotriton vulgaris</i>	Smooth newt	1km NE	2013	WCA S5
<i>Rana temporaria</i>	Frog	1km NE	2017	WCA S5
<b>Mammals</b>				
<i>Erinaceus europaeus</i>	Hedgehog	Many records throughout the town from 2014-2019		NERC s.41



Scientific Name	Common Name	Approx. distance from Site	Date	Status
<i>Mustela putorius</i>	Polecat	200m SW	2012	NERC s.41
<b>Bats</b>				
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	700m W	2013	EPS
<i>Plecotus auritus</i>	Brown long eared bat	900m NE 700m N	2012 2010	EPS
<b>Plants</b>				
Wild clary <i>Salvia verbenaca</i> , Ragged robin <i>Silene flos-cuculi</i> , Hoary plantain <i>Plantago media</i>		500m N	2018	
Small flowered buttercup <i>Ranunculus parviflorus</i> , Grey club rush <i>Schoenoplectus tabernaemontani</i>		300m S	2017	
<b>Invertebrates</b>				
A number of notable beetle, moth, fly and butterfly species recorded at Gavray Drive Meadows at c.1.4km NE. Including black, brown and white letter hairstreak butterflies.				

## Field Survey

### Habitats

- 3.5 The habitat distribution within the Site is shown on **Figure 2**.

#### Improved Grassland/ Temporary Grass Ley

- 3.6 A majority of the Site was covered by improved grassland<sup>16</sup> dominated by perennial ryegrass *Lolium perenne* and Yorkshire fog *Holcus lanatus* with very few other species. The past land use history of the Site indicates however that this grassland is temporary and has been sown in a rotation between cropping cycles.

#### Dense Continuous Scrub

- 3.7 The Site was bound to the northeast by dense continuous scrub. This habitat also extended along a drain located through the east of the Site. Scrub species included willow *Salix species*, hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, common ash *Fraxinus excelsior*, blackthorn *Prunus spinosa* and field maple *Acer campastre*. The boundary scrub was edged by tall ruderal species such as green alkanet *Pentaglottis sempervirens*, common nettle *Urtica dioica*, cleavers *Galium aparine*, broad-leaved dock *Rumex obtusifolium*. cow parsley *Anthriscus sylvestris* and lesser burdock *Arctium minus*.

#### Mature Trees

- 3.8 There were several mature trees within the hedgerows and there is also a small area of mature trees cover that encroach onto the grass ley. Species include willow *Salix sp.* and common ash.

<sup>16</sup> JNCC. 1990. Handbook for Phase 1 habitat survey – a technique for environmental audit. Peterborough: JNCC

Tall ruderal

- 3.9 Tall ruderal vegetation had partially encroached onto the edges of the eastern field parcel. Species included broadleaved dock, nettle, white dead nettle *Lamium album*, spear thistle *Cirsium vulgare*, lesser burdock and a few grasses such as cocks foot *Dactylis glomerata* and false oat grass *Arrhenatherum elatius*.

Urban Bioswale

- 3.10 A bioswale along the side of Lakeview Drive was damp (but with no standing water) at the time of survey and dominated by reeds *Phragmites australis*.

Standing Water

- 3.11 A ditch runs through the eastern part of the Site. This was almost entirely shaded by scrub vegetation. The banks were steep and at the time of survey there was little standing water; most of the ditch was damp with some areas containing 1-5cm of water. There was little aquatic vegetation; being only present in the few unshaded area and consisting of water crowfoot *Ranunculus fluitans*, water-plantain *Alisma plantago-aquatica*, water-starwort *Callitriche stagnalis* and brooklime *Veronica beccabunga*. Bulrush *Typha latifolia* was present and rosebay willow herb *Chamaenerion angustifolium* and bramble was encroaching in drier areas.

Flowing Water

- 3.12 A small brook bordered the Site to the southeast and at the time of survey contained 20-30cm of fast flowing water over a varied substrate of gravel and mud. Aquatic and emergent vegetation was sparse due to the overshadowing by trees and scrub.

Hedgerows

- 3.13 There are four hedgerows bounding the Site on the western and southern boundaries. As shown in **Table 12** all except H4 scored highly under the HEGs assessment and would likely be considered important under the Hedgerow Regulations.
- 3.14 Hedgerow 1 is a mix of newly planted saplings to the eastern end and semi mature and mature hedge/trees at the western end.
- 3.15 Hedgerow H2 is more like a line of trees but is still managed as a hedgerow and thus is included as one.
- 3.16 Hedgerows H3 and H4 are relatively unmanaged hedgerows with few or no standards.

**Table 12: HEGS and Hedgerow Regulations Table**

Hedge	Woody Canopy Species	Mature trees /100m	% gaps	End Conns	Assoc. features	HEGS	REGS
H1	<i>U, Sn, Ca, Ag, Fe, Qr, Cm, Ps, Ac</i>	3	None	1	ditch	2+	Y
H2	<i>Ac, Sn, Ca, Ag, Fe, Qr, Ms,</i>	4	None	2	ditch	2+	Y
H3	<i>Cm, Sn, Ms, Ps, Fe, S</i>	1	<10%	2	ditch	-2	Y
H4	<i>Cm, Sn, Ps</i>	0	<10%	2	ditch	3	N

Species key: *Cm* - *Crataegus monogyna* (hawthorn), *Fe* - *Fraxinus excelsior* (Ash), *Ps* - *Prunus spinosa* (Blackthorn), *Qr* - *Quercus robur* (oak) *S* - *Salix* sp. (willow sp.), *Sn* - *Sambucus nigra* (elder), *Ca* - *Corylus avellana* (hazel), *U* - *Ulmus* sp. (elm sp.), *Ap* - *Acer pseudoplatanus* (sycamore), *Ac* - *Acer campastre* (field maple), *Ms* - *Malus sylvestris* (crab apple).

### Hardstanding

- 3.17 There was a small area of bare ground and hardstanding in the west of the Site that appears to be used for access onto the grass area from the A41.

## **Fauna**

### Bats

#### *Roosting – Tree Assessment*

- 3.18 There are several trees within the Site boundaries with features suitable for roosting bats such as thick ivy and some spits. These are all to be retained within the scheme and are shown in T1 to T3 on **Figure 2**.
- 3.19 There are four trees that encroach into the Site from the southern boundary and require removal, however all are considered to have negligible potential to support roosting bats. A detailed tree assessment is therefore not considered necessary.

#### *Foraging - Habitat Assessment*

- 3.20 Only records of common pipistrelle *Pipistrellus pipistrellus* and brown long eared bat *Plecotus auritus* were returned during the desk study. A majority of the Site was considered to have low suitability to support foraging and commuting bats because it is well lit by the A41 and adjacent supermarket, also temporary grass leys are an intensively managed habitat that is unlikely to support large numbers of invertebrates. Bat foraging and commuting activity is likely to be confined to the drain along the eastern section and the boundary vegetation.

#### *Transect Surveys*

- 3.21 The spring transect survey was undertaken at dusk on 26 May 2021 and recorded occasional foraging and commuting passes by common and soprano pipistrelle *P. pygmaeus*, with only two passes by noctule *Nyctalus noctula*. There were very low levels of bat activity recorded. Results are shown on **Figure 5**.
- 3.22 The summer transect survey was undertaken at dusk on 12<sup>th</sup> July 2021 and recorded occasional foraging by common pipistrelle and soprano pipistrelle only. Activity levels were very low with only four passes recorded. Results are shown on **Figure 6**.
- 3.23 The autumn transect was undertaken on 13<sup>th</sup> September 2021 and recorded a higher level of activity than previously, and additionally recorded a *Myotis* species that wasn't recorded in previous months. Bat activity was again predominantly identified as common and soprano pipistrelle. Results are shown on **Figure 7**.
- 3.24 The transect surveys did not show any particular area of the Site as being favoured by bats.

#### *Automated Static Bat Detectors*

- 3.25 The location of the static detector is shown in **Figure 3**.
- 3.26 The spring static detectors remained in situ from 21<sup>st</sup> to 25<sup>th</sup> May and recorded low levels of bat activity with an average of 4.6 registrations per hour. Activity was predominantly from common pipistrelle (82%). *Myotis* sp, soprano pipistrelle and noctule were the next most frequently recorded species at 7.5, 6.5 and 3% of activity respectively. Brown long eared bat were recorded infrequently.

- 3.27 Peaks in activity were recorded approximately two hours after sunset, and almost no activity was recorded after 1am. Activity was not closely following sunset or preceding sunrise therefore was not indicative of the presence of a nearby roost site.
- 3.28 The summer static detector remained in-situ from 22<sup>nd</sup> to 26<sup>th</sup> of July and recorded a higher level of bat activity with an average of 18.9 registrations per hour. Activity was predominantly common pipistrelle (90.5%), with less frequently encountered noctule (5%), soprano pipistrelle (2.5%), brown long-eared bat (<1%) and *Myotis* (<1%). Peaks in activity were recorded approximately two hours after sunset and again at 2-3am, over two hours before sunrise. The timing of these peaks do not indicate the presence of a nearby roost.
- 3.29 The autumn detector remained in situ from 13<sup>th</sup> to 17<sup>th</sup> September and recorded an average of 22.3 registrations per hour. Activity was again predominantly from common pipistrelle (62%) but soprano pipistrelle activity was higher than during the previous surveys (23.5%). Noctule, *Myotis* sp. and brown long-eared bat activity accounted for 9%, 3% and 1%, respectively.
- 3.30 The static bat detector results are summarised in **Appendix B**. The above data indicate a small assemblage of common and widespread light tolerant bat species uses the Site for commuting and foraging purposes.

#### Great Crested Newt and Other Amphibians

- 3.31 The grass ley and boundary scrub, trees and hedgerows were considered to provide suitable terrestrial habitat for GCN. Pond P1 was considered to have poor suitability to support breeding GCN, and pond P2 was considered to have moderate suitability.
- 3.32 Detailed HSI scores for the two ponds are shown in **Appendix C**.
- 3.33 Both P1 and P2 returned negative eDNA results for GCN (both in 2021 and 2023 for P2), as shown in **Appendix D**. Other ponds within 500m are separated from the Site by Langford Brook which is considered to be a barrier to GCN dispersal. In addition, a development to the south of the Site (ref:19/01740/HYBRID) on the same side of Langford Brook as the Site, has three ponds within its boundary. All of these ponds had negative eDNA results in 2019. GCN are therefore not considered likely to be present within the Site and are not considered further in this appraisal.
- 3.34 Common and widespread amphibians such as common frog *Rana temporaria* and toad *Bufo bufo* could potentially breed in P2 and thus use the Site in their terrestrial phase. The mostly likely habitat to be used are the boundary vegetation.

#### Breeding Birds

- 3.35 A total of 28 bird species were recorded within the Site during the breeding bird survey completed in 2021. Of these, nine were considered notable species as they appear on one or more of the following:
- Schedule 1 of Wildlife and Countryside Act (WCA) 1981 (as amended)
  - Species listed as Species of Priority Importance (SPI) under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006; and
  - Birds of Conservation Concern (BoCC) Red or Amber lists.
- 3.36 Of the 28 species, none were confirmed as breeding. Six species were considered probable breeders, including the notable skylark *Alauda arvensis* and dunnock *Prunella modularis*. The remaining four probable breeding species were all BoCC Green-listed species (low conservation

concern). The remaining 22 species recorded were considered possible breeders (15) or non-breeders (7).

- 3.37 **Table 13** provides a summary of the notable bird species and their breeding status within the Site. **Figure 8** shows their general recorded locations. A full list of results is provided in **Appendix A**.

**Table 13: Notable Bird Species Recorded at the Bicester Arc site during the Breeding Bird Survey and their recent status in Oxfordshire**

Species	Legal/ Conservation Status	Number Recorded	Breeding status	Recent Status in Oxfordshire
Greylag goose <i>Anser anser</i>	Amber list WCA Sch.1 (Pt. 2)	2 flyovers	Non-breeder	Common feral bird, occasionally breeds
Mallard <i>Anas platyrhynchos</i>	Amber list	1 flyover	Non-breeder	Very common resident
Red kite <i>Milvus milvus</i>	Green list WCA Sch. 1	2 flyovers	Non-breeder	Established resident
Skylark <i>Alauda arvensis</i>	Red list NERC S.41	7	Probable	Common resident and passage migrant
Willow warbler <i>Phylloscopus trochilus</i>	Amber list	1	Possible	Most common breeding warbler in Oxfordshire. Recent evidence of decline.
Starling <i>Sturnus vulgaris</i>	Red list NERC SPI	2	Possible	Widespread winter visitor. Much reduced breeding distribution
Song thrush <i>Turdus philomelos</i>	Red list NERC S.41	3	Possible	Common resident, perhaps declining in suburban areas. Autumn immigration augments wintering population
Dunnock <i>Prunella modularis</i>	Amber list NERC S.41	8	Probable	Common and widespread resident
Meadow pipit <i>Anthus pratensis</i>	Amber list	2	Possible	Usually abundant passage migrant and common winter visitor. Patchily distributed scarce breeder

- 3.38 The hedgerows, scrub and scattered trees provided breeding and foraging opportunities for common and widespread generalist species, with notable species including song thrush *Turdus philomelos*, dunnock, starling *Sturnus vulgaris* and willow warbler *Phylloscopus trochilus*. Dunnock was considered a probable breeder due to the observation of a pair in suitable breeding habitat, whilst song thrush, starling and willow warbler were considered only possible breeders due to the lack of breeding evidence recorded. Other species of low conservation concern utilising these habitats included green woodpecker *Picus viridis*, blackbird *Turdus merula*, robin *Erithacus rubecula*, wren *Troglodytes troglodytes*, woodpigeon *Columba palumbus* and the range of common and widespread warbler, finch, tit and corvid species recorded.
- 3.39 The internal parts of the grassland fields provided relatively limited breeding opportunities for birds. An exception was skylark, which was recorded in small numbers (seven individuals) and considered a probable breeder on Site. Meadow pipit *Anthus pratensis* was also recorded within the internal parts of the fields and was categorised as a possible breeder, however it is likely the two individuals recorded were passage migrants. Other species of low conservation concern which utilised the fields for foraging included carrion crow *Corvus corone* and magpie *Pica pica*.
- 3.40 Several bird species were only recorded flying over the Site, including the notable greylag goose *Anser anser*, mallard *Anas platyrhynchos* and red kite *Milvus milvus*.

### *Site Value*

- 3.41 The Site was assessed against published criteria for LWS selection in the Local Wildlife Sites Selection Criteria Berkshire, Buckinghamshire and Oxfordshire Version 7<sup>17</sup> to confirm whether it achieved any of the thresholds for county value on the basis of the bird assemblages recorded. The Site does not meet any of the relevant criteria and therefore does not qualify for selection as an LWS based on its breeding bird assemblage.
- 3.42 The habitats within the Site supported an assemblage of common and widespread bird species in small to moderate numbers typical of the habitats present and the size of the Site. Therefore, the Site was considered to be of no more than Local level importance for its overall breeding bird assemblage.
- 3.43 Individually dunnoek, song thrush and skylark were considered of Local importance based on the small to moderate numbers of each recorded within the Site. The other breeding bird species recorded were considered as being of only Site importance since they were either recorded in smaller numbers, noted in unsuitable breeding habitats and/or are considered common and widespread breeding species nationally and/or locally.

### Badger

- 3.44 No badger records were returned within 1km and no direct evidence of badger was recorded on the Site during the survey, however several mammal trails across the Site were noted.

### Reptiles

- 3.45 The Site provided some suitable habitat for reptile species, especially around the edges of the boundary scrub, hedges and trees and along the ditch in the east. Records of common lizard *Zootoca vivipara* and grass snake *Natrix helvetica* records were returned during the desk study but from over 1km from the Site.
- 3.46 No reptiles were recorded during any of the surveys. Reptile species are not considered likely to be present.

### Riparian Species

- 3.47 Langford Brook does provide some, albeit limited habitat for otter and water vole.
- 3.48 No records of water vole were returned during the desk study and the stretch of Langford Brook adjacent to the Site is especially limited for this species due to the lack of in-channel and bank side vegetation, providing limited suitable food or cover. Water vole are considered very unlikely to be present within the Site.
- 3.49 There are no suitable breeding or resting places for otter on the adjacent stretch of Langford Brook. It is considered likely that Langford Brook forms a small part of a much wider otter foraging territory and could therefore be used occasionally by foraging or commuting individuals.

### Other Notable Mammals

- 3.50 Records of hedgehog *Erinaceus europaeus* and polecat *Mustela putorius* were returned during the desk study and harvest mouse *Micromys minutus* has been recorded over 1km from the Site.

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<sup>17</sup> Thames Valley Environmental Records Centre and Buckinghamshire & Milton Keynes Environmental Records Centre (2018). Local Wildlife Sites Selection Criteria Berkshire, Buckinghamshire and Oxfordshire, Version 7 [Online]. Available at [http://www.tverc.org/cms/sites/tverc/files/LWS%20Selection%20Criteria\\_v7%20Aug18.pdf](http://www.tverc.org/cms/sites/tverc/files/LWS%20Selection%20Criteria_v7%20Aug18.pdf) [Accessed 01.11.21]

- 3.51 The Site is considered very unlikely to support harvest mouse with suitable habitat being limited to the small section of tall ruderal vegetation which is in itself sub optimal. This species is therefore not considered likely to be present.
- 3.52 The boundary vegetation provides some suitable vegetation for hedgehog and polecat. Rabbits are also present and are a prey species of polecat. The presence of small numbers of hedgehog and polecat in the boundary vegetation is assumed.

#### Invertebrates

- 3.53 A number of notable beetle, moth, fly and butterfly species have been recorded at Gavray Drive Meadows c.1.4km northeast of the Site. These include black hairstreak *Satyrium pruni*, brown hairstreak *Thecla betulae* and white-letter hairstreak *Satyrium w-album* butterflies. Black and brown hairstreak larvae require blackthorn scrub, and white-letter hairstreak larvae require elm species. The boundary scrub and hedgerows do support habitat suitable for the larvae of each of these butterfly species, however nectar sources for the adult butterflies are fairly limited. The presence of small numbers of each of these species cannot be discounted and is therefore assumed for the purpose of this assessment.
- 3.54 The presence of temporary grass ley (preceded by arable crops) as the predominant habitat means that insecticides have likely been applied to the Site in recent years and so a notable diversity of invertebrates is considered unlikely.

## 4.0 DISCUSSION & RECOMMENDATIONS

### Statutory Designated Sites

- 4.1 The Site supported no statutory designations for nature conservation interest, but three SSSIs and one LNR lie within the potential Zol as shown on **Figure 1**.
- 4.2 The site lies within the outer limits of the SSSI Impact Risk Zones<sup>18</sup> of Wendlebury Meads and Mansmoor Closes, Arcott Bridge Meadows and Ardley Cutting and Quarry Residential SSSIs. Development is not however listed as a development type that Natural England identify as a potential risk to the conservation status of any of these sites.
- 4.3 Given the intervening distance and absence of public footpath connectivity from the Site to the SSSIs, no material increase in recreational pressure as a result of the development is considered likely. Furthermore, there is no hydrological connectivity between the site and Arcott Bridge Meadows and Ardley Cutting and Quarry.
- 4.4 Wendlebury Meads and Mansmoor Closes SSSI also lies adjacent to Langford Brook downstream of the Site. To minimise the risk to downstream habitats including the SSSI construction operations and site management protocols to prevent pollution and soil run-off resulting in siltation and/or changes in water quality. Although the Environment Agency (EA)'s Pollution Prevention Guidelines (PPGs) have been withdrawn, they still remain the best source of guidance in relation to avoidance of pollution. Reference will be paid to PPG01-06, PPG21 and PPG22 (available on the National archives).
- 4.5 The Construction Industry Research and Information Association (CIRIA) guidance will also be followed, in particular:
- CIRIA C471 – Environmental Good Practice on Site (4th Edition) 2015;
  - CIRIA C532D – Control of water pollution from construction sites. Guidance for consultants and contractors (2001); and
  - CIRIA SP156 – Control of Water Pollution from Construction Sites (2012).
- 4.6 These measures should be detailed within an Ecological Construction Method Statement (ECMS) prepared for the development. Subject to these measures being fulfilled, no significant impacts upon water quality of Langford Brook or adjacent habitats are anticipated to arise as a result of the development.
- 4.7 Furthermore, the proposed creation of wetland habitats within the 'eco park' to the east of the Site will complement existing semi-aquatic habitats, providing a wider network of wetland habitats in the immediate area.
- 4.8 No significant impacts on local SSSIs are therefore anticipated as a result of the proposed development.
- 4.9 Bure Park LNR is situated within the urban extent of Bicester. There are no terrestrial or hydrological links between the Site and the habitats within the park, which is managed for recreation with an established network of footpaths<sup>19</sup>. The small increase in residential dwellings

<sup>18</sup> The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts

<sup>19</sup> <https://redkitedays.co.uk/bure-park-nature-reserve/>



at the Site will not result in a significant increase in residential impacts on the LNR above that which is it already designed to accommodate.

### **Non-statutory Designated Sites**

- 4.10 The Site does not support any non-statutory designations though there are two within 2km of the Site: Bicester Wetland Reserve LWS and Promised Land Farm Meadows potential CDWS.
- 4.11 Bicester Wetland Reserve LWS lies 300m south of the Site on the opposite side of Langford Brook. It is separated from the Site by the sewage treatment works and Bicester Garden Centre however, it is however hydrologically linked to the Site by Langford Brook. This non-statutory site will be protected from indirect impacts arising during construction by the precautionary working methods outlined above.
- 4.12 Promised Land Farm Meadows potential CDWS lies within the site boundary of part of a consented development (ref:19/01740/HYBRID). A majority of the Site will be lost as a result of this development and thus it is not considered further in this appraisal.
- 4.13 No significant impacts on local non-statutory sites are therefore anticipated as a result of the proposed development.

### **Habitats**

- 4.14 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within a specific policy, for example veteran trees, ancient woodland and linear habitats within the National Planning Policy Framework (NPPF);
  - A non-statutory site designation;
  - Habitats considered as habitats of principal importance for the conservation of biodiversity as listed within Section 41 (S41) of the NERC Act 2006; or
  - Habitats identified as being a Priority Habitat within the local Biodiversity Action Plan (LBAP).
- 4.15 The only habitats to fall under any of the above are the boundary hedgerows and trees. These more established habitats are considered to be of greater value to wildlife and will be largely retained and enhanced within future layouts for applications which impact these boundaries.
- 4.16 To avoid damage/disturbance of these retained features during construction it is recommended that an Ecological Protection Zone (EPZ) around the retained trees and vegetation along the watercourse should be established during the construction phase. EPZs can often be achieved through co-ordination with tree protection measures required as good arboricultural practice including BS5837 Trees in Relation to Construction – Recommendations: 2012 for trees and hedgerows, where all retained trees are protected from damage and soil compaction during works by maintaining protected Root Protection Areas (RPAs). This zone is demarcated with temporary protective fencing determined in accordance with BS 5837 (2012) and signage. It is recommended that details of such measures and their implementation are delivered through an ECMS prepared for the Site.
- 4.17 The dominant temporary grassland habitat was of limited botanical value being temporary, under intensive management and comprised of common and widespread plant species. The removal of this habitat is not considered likely to significantly impact local wildlife populations and its loss

does not represent a constraint to development. There is significant scope for enhancement within the 'eco park', which will serve to provide the mitigation and enhancements required to serve the entire development. The following being incorporated into the landscape design for this area:

- Retention of a majority of the existing boundary hedgerows and scrub;
- Creation of a pond designed, planted and managed for wildlife to compliment the habitat within the Bicester Wetland Reserve LWS;
- Creation of neutral species rich grassland;
- Enhancement of some of the temporary grass ley to become a permanent grassland;
- Planting of additional scattered native scrub throughout the 'eco park', including fruit and seed-bearing species to compliment that which is already present along the ditch and the Site boundaries;
- Creation of a quiet zone for wildlife around the pond and neutral grassland towards the rear of the 'eco park'. This will have less footpaths (and only mown rather than sealed) and signage and interpretation boards to ensure it is kept separate from the main amenity area at the front; and
- Planting of trees throughout the development to add structural and species diversity to the Site.

4.18 Design for the habitat creation in this area and the biodiversity net gain it provides for the entire development, is provided in the Bicester Arc 'eco park' Biodiversity Net Gain Technical Note<sup>20</sup>.

4.19 Specifications for new planting in the 'eco park' and other habitat creation as well as the measures to maintain existing habitats, to ensure successful establishment of new habitats, and to maintain the value of all ecological features in the long-term should be detailed within a Landscape Ecology Management Plan (LEMP) secured by planning condition.

### **Protected/Notable Species**

4.20 Certain species receive legal protection in the United Kingdom and are commonly known as 'Protected Species'. In reality, the level of protection for different species varies considerably, from protection solely against 'killing and injury' to full protection of the species and their places of refuge. Where pertinent, details of legal protection afforded to species/species-groups are provided below.

4.21 In addition to protected species, there are other species/species-groups that do not receive legal protection, but which are notable owing to their conservation status as Priority Species or other status. Details of any actual or potential notable species within the Site are identified below.

4.22 Baseline investigations have identified protected species implications for the Site relating to breeding birds, foraging and commuting bats, reptiles, badgers and hedgehogs which are discussed in turn below.

<sup>20</sup> FPCR 2023, Bicester Arc 'Eco Park' Biodiversity Net Gain Technical Note. Produced for Peverill Securities.

**Bats**

- 4.23 All bats and their roosts are afforded full legal protection under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife & Countryside Act 1981 (as amended). The purpose of the legislation is to maintain and restore protected species to a situation where their populations are favourable.
- 4.24 Under Regulation 41 of the Conservation of Habitats and Species Regulations 2017 (as amended) it is illegal to deliberately capture, injure or kill; deliberately disturb (including intentionally or recklessly) all UK bat species. This includes disturbance which impairs their ability to: breed and rear young; migrate; and hibernate; or affects their local distribution and abundance.

*Foraging and Commuting*

- 4.25 Bat activity across the Site was generally low level and comprised a small assemblage of common and widespread bat species. The majority of habitat to be lost consists of temporary grass ley which is considered to be of limited value to bats and its loss is not considered likely to significantly impact use of the site by bats.
- 4.26 The majority of more suitable habitat, mature hedgerows and trees, are to be retained and protected within the layout.
- 4.27 In addition, the habitat enhancements and creation within the 'eco park' will serve to enhance the site for foraging and commuting bats by increasing the habitat diversity present, thus encouraging invertebrate prey species. The retained hedgerows along the southern boundary also provide an east-west dark corridor for bats along the southern boundary to the 'eco park'. Future development phases that adjoin the southern boundary will ensure these retained hedgerows remain dark.
- 4.28 A sympathetic lighting scheme is recommended with the following design measures:
- The direct lighting of existing trees, scrub, hedgerows and any habitat on the 'eco park' should be avoided;
  - Road and flood lighting should avoid using mercury or metal halide lamps, and where possible utilise warmer colour lights with peak wavelengths >550nm (~3000°K);
  - Lighting should be directional and light spillage should be avoided;
  - Lighting columns should in general be as short as possible, although in some locations taller columns would allow reduced horizontal spill;
  - Lighting levels should be as low as guidelines permit and only used where required for public safety.
- 4.29 Subject to these measures being applied, it is not anticipated that the proposed development will have a significant adverse impact on foraging or commuting bats.

**Badger**

- 4.30 No evidence of badger activity was recorded during site surveys, however several mammal trails were recorded across the Site.
- 4.31 Badgers are likely to utilise on-site habitats for foraging. Therefore, construction best practice measures to be detailed within an ECMS will be followed and include:

- avoiding the use of noisy plant and machinery in the two hours before sunset within 30 metres of the brook;
  - directing any security lighting away from the brook and retained boundary vegetation;
  - covering any trenches at the end of each working day, or including a means of escape for badgers (and other mammals); and
  - capping of temporarily exposed pipe systems out of work hours.
- 4.32 In addition, the use of native fruit and seed-bearing trees within new planting will enhance foraging opportunities on the Site for badger and the sensitive lighting scheme designed for bats will ensure minimal impact on badger.
- 4.33 Subject to these recommendations, the proposed scheme is likely to have a neutral to positive impact on any badger within the area.

### **Reptiles and Amphibians**

- 4.34 In England and Wales all reptile species are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This affords them protection against killing and injuring. Common toad are listed as a Priority Species for conservation.
- 4.35 Reptiles are not considered likely to be currently present on the Site. Common and widespread amphibians could potentially breed within P2 and thus be on the Site in their terrestrial phase. The measures incorporated into the detailed landscaping scheme for the 'eco park' will enhance the Site for reptiles and amphibians and thus encourage any in the vicinity to utilise the Site and expand their range within Bicester.
- 4.36 Installation of hibernacula around the pond will provide shelter and hibernation potential where there is currently none.

### **Birds**

- 4.37 All wild birds, their nests and eggs are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:
- I. Intentionally kill, injure or take any wild bird;
  - II. Take, damage or destroy the nest of any wild bird while it is in use or being built;
  - III. Take, damage or destroy the egg of any wild bird; or
  - IV. To have in one's possession, or control, any wild bird (dead or alive) or egg or any part of a wild bird or egg.
- 4.38 In addition, further protection is afforded to those wild bird species listed on Schedule 1, prohibiting any intentional or reckless disturbance to these species while it is nest building, or at a nest containing eggs or young, or to recklessly disturb the dependent young of such a bird.
- 4.39 The habitat measures described for the 'eco park' will retain and enhance existing habitat and create further habitat for the generalist species recorded within the Site including the locally important song thrush and dunnoek. The planting of native fruit and seed-bearing species will enhance foraging opportunities for a wide range of species.

- 4.40 The loss of the grassland fields will lead to a loss of the locally important skylark as a probable breeder on Site since this species favours large open fields for breeding. The creation of species rich grassland within the 'eco park' will continue to provide some foraging and breeding resources for this species as well as other such as meadow pipit. This grassland will be managed appropriately (i.e. no cut between early April and the end of May and subsequent cuts at least seven weeks apart to enable success for later nests) to ensure it remains potential habitat for skylark. The species rich grassland to the east of the scrub/ditch dividing line will be located in a quieter area of the 'eco park' to allow reduce disturbance to ground nesting birds. Overall, considering the abundance of similar suitable grassland habitats in the wider landscape to the south of the Site it is considered that the development proposals will lead to a minor (non-significant) impact on the grassland species recorded including skylark.
- 4.41 To avoid disturbance to breeding birds, areas for ground clearance works and vegetation removal will be checked prior to removal or works by an experienced ecologist. If active nests are found, vegetation will be left untouched and suitably buffered from works until all birds have fledged. Specific advice will be provided prior to undertaking the clearance. This would be a statutory requirement due to the protection of all nesting birds and their nests under WCA. A suitably qualified ecologist would supervise this. These measures will ensure the impact of disturbance during construction to any nesting birds is reduced to negligible.
- 4.42 The proposed creation of the pond within the 'eco park' will provide an ecological enhancement by providing suitable habitat for a range of wetland birds not yet recorded within the Site. Planting the pond with an appropriate native marginal vegetation mix that includes common reed for example will provide suitable nesting opportunities for species including reed bunting *Emberiza schoeniculus* and sedge warbler *Acrocephalus schoenobaenus*. Non-native wetland plants should be avoided.
- 4.43 Additional enhancements that could be integrated with the on-going management of the Site include the erection of a mixture of nest box types on retained trees. The following provides details of suitable nest box types to be erected at suitable locations:
- A mixture of small hole (25 to 32mm diameter) boxes placed on suitable trees will provide nesting opportunities for species such as blue tit *Cyanistes caeruleus* and great tit *Parus major*. These boxes generally have a high uptake rate;
  - Small open fronted nest boxes placed on suitable trees especially those which support a climber such as ivy which provides a degree of concealment. These boxes typically attract species such as robin and blackbird; and
  - Larger wood nest boxes with large holes (45-50 mm diameter) placed on suitable trees will provide nesting for starling. These boxes will also provide suitable nesting for great spotted woodpecker *Dendrocopos major* when placed on large mature trees.
- 4.44 The inclusion within the built environment of species-specific nest boxes for house sparrow *Passer domesticus* and swift *Apus apus* will encourage these urban species which have both undergone significant local and national declines to breed on Site.

#### Otter

- 4.45 Otter are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 and are priority conservation species. They are also a European Protected Species which affords them the same level of protection as is given to bats.

- 4.46 There is some potential for otter to use Langford Brook as part of a much wider foraging territory. Otter could be disturbed whilst using this habitat during construction. The good practice measures described with regards to badgers will also avoid impacts on foraging otter.
- 4.47 Given the provision of a significant green buffer between the development footprint and the brook (the 'eco park'), and the water quality protection measures to be detailed in an ECMS, construction of the proposed development is not considered likely to have any impacts on otter potentially using the brook.
- 4.48 The habitat creation measures described will enhance the habitat adjacent to the brook and the sensitive lighting scheme will ensure that there is no disturbance from lighting during the operational phase of the development.
- 4.49 Subject to the fulfilment of these recommendations, the proposed development will have no impact on foraging otter.

#### **Hedgehog and polecat**

- 4.50 Whilst hedgehog and polecat are not currently a protected species, their populations have declined significantly in recent years, and they are considered a priority for conservation.
- 4.51 The main potential habitats for these species on the Site are the boundary hedgerows and scrub which is to be largely retained.
- 4.52 As hedgehogs hibernate within piles of dead vegetation and debris, removal of such material across the site should be conducted outside of November to February inclusive. It is also recommended that during the construction phase materials should not be stored near areas of retained habitat or otherwise should be hand searched prior to removal. The best practice measures to be followed throughout construction for badger and otter (and detailed within an ECMS) will also ensure no harm to hedgehogs occurs.
- 4.53 The habitat creation measures discussed will ensure connectivity is maintained across the Site for hedgehog as well as create additional foraging areas. No significant impacts upon hedgehogs are anticipated to arise as a result of the development.

#### **Invertebrates**

- 4.54 The boundary scrub and hedgerows do support habitat suitable for the larvae black, brown and white-letter hairstreak butterfly species, however nectar sources for the adult butterflies are fairly limited. The larval habitats are to be retained and protected during construction. Furthermore, the habitat creation measures described within paragraph 4.17 will enhance the site for these species by providing additional blackthorn and elm scrub habitat for the larvae and the species rich grassland and pond edge planting will provide an enhanced nectar source for the adults. The proposed development is considered likely to have a positive impact on these species.

## 5.0 CONCLUSIONS


- 5.1. The desk- and field-based baseline investigations have demonstrated that the habitats present within and around the Site do not pose an 'in principle' constraint to the Bicester Arc development.
- 5.2. The retention of ecologically valuable habitats within the site design and the designation of the eastern part of the site as an 'eco park' supporting wetland, scrub and species rich grassland habitats means that the site is capable of achieving an enhancement for biodiversity in addition to providing additional habitat for a range of protected and notable species.
- 5.3. On this basis, by virtue of the relatively limited constraint posed by the limited habitats and protected species interest within the site and the scale and scope of the 'eco park', the scheme is capable of compliance with relevant planning policy for the conservation of the natural environment at all levels.




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### Key

 Land in Client Ownership




 1km Search Area

### Designated sites




 Potential Local Wildlife Site (pLWS)

 Local Wildlife Site (LWS)

### Amphibians

-  Great Crested Newt
-  Palmate Newt
-  Smooth Newt

### Bats



-  Brown Long Eared Bat
-  Common Pipistrelle
-  Pipistrelle Bat Species

### Birds




-  Black-headed Gull
-  Bullfinch
-  Common Sandpiper
-  Gadwall
-  Green Sandpiper
-  Grey Wagtail
-  House Sparrow
-  Kestrel
-  Kingfisher
-  Lapwing
-  Little Egret
-  Mistle Thrush
-  Mute Swan
-  Pintail

-  Red Kite
-  Reed Bunting
-  Shelduck
-  Shoveler
-  Snipe
-  Starling
-  Swift
-  Teal
-  Tree Sparrow
-  Wigeon
-  Willow Warbler

### Invertebrates

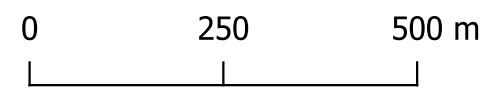
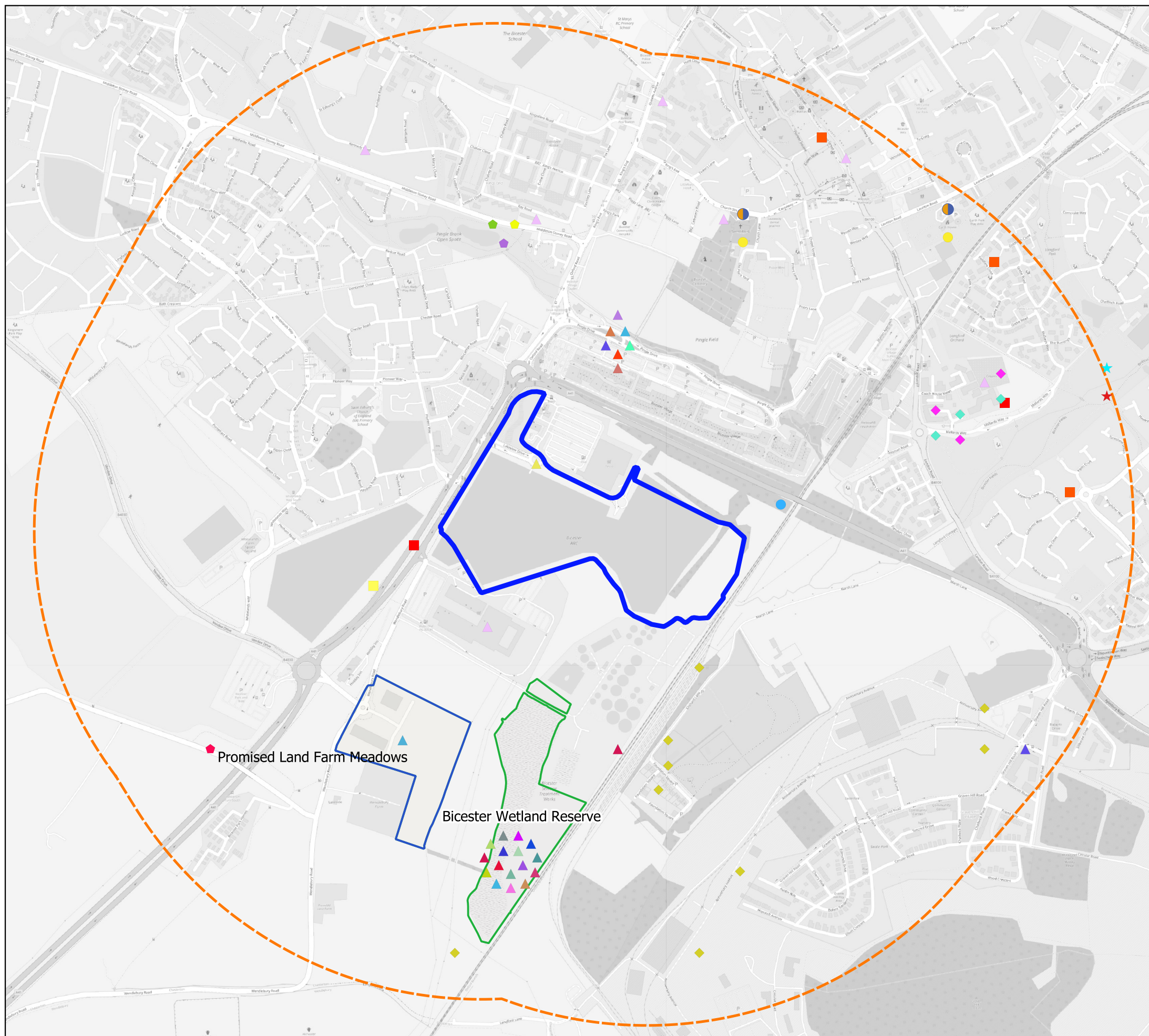
-  Brown Hairstreak
-  Large Heath

### Mammals

-  Eurasian Badger
-  Polecat
-  West European Hedgehog

### Plants

-  Dwarf Spurge
-  Hoary Plantain
-  Ragged-Robin
-  Wild Clary



client  
**Sladen Estates**

project  
**Bicester Arc,  
Bicester**

drawing title  
**CONSULTATION PLAN**

scale @ A3  
1:9,750  
drawing / figure number  
**Figure 1**

drawn  
FMH / BRJ

issue date  
28/4/2023

















rev  
**10048-E-01**

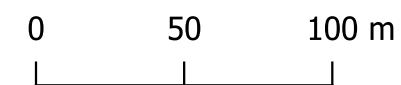
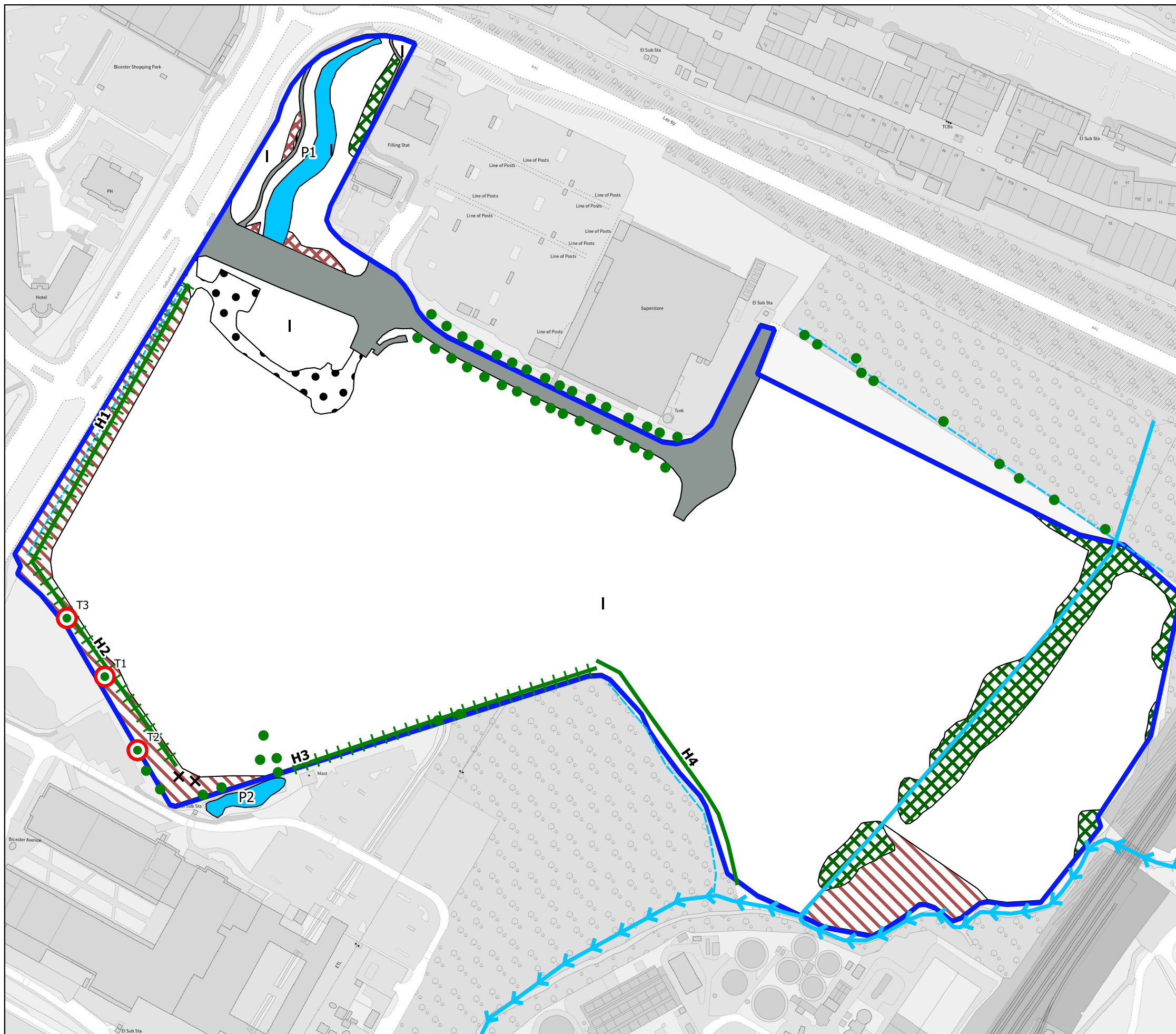


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### Key

-  Land in Client Ownership
-  Bare ground
-  Built Environment: Buildings/hardstanding
-  Improved grassland
-  Introduced shrub
-  Other tall herb and fern - ruderal
-  Scrub - dense/continuous
-  Standing water
-  Standing water
-  Running water
-  Intact hedge - species-poor
-  Hedge with trees - species-poor
-  Dry ditch
-  Scrub - scattered
-  Tree with bat potential
-  Broadleaved tree



client  
Sladen Estates  
 project  
Bicester Arc,  
Bicester  
 drawing title  
PHASE ONE HABITAT PLAN



scale  
1:2,550

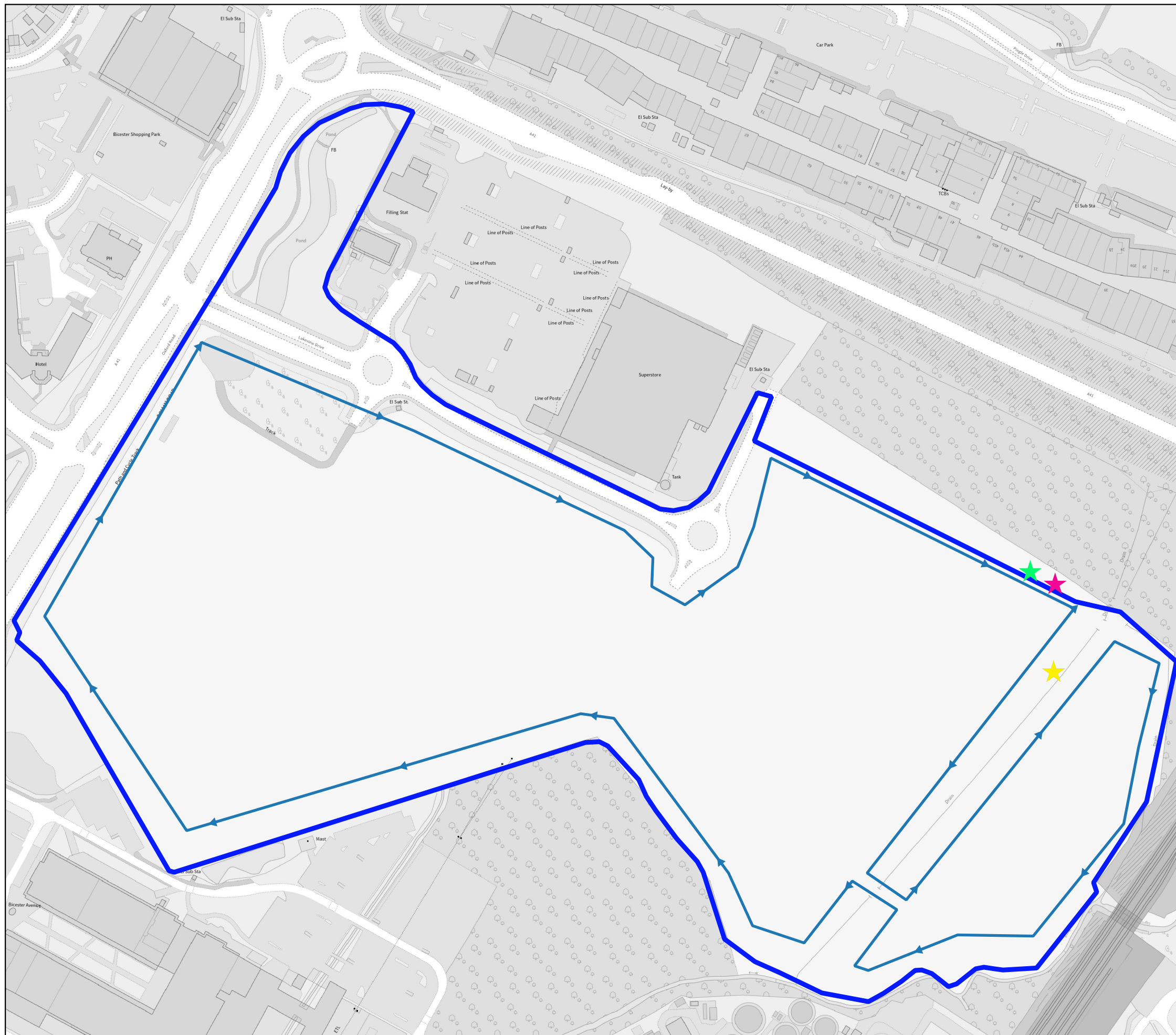
drawn  
FMH/VF

issue date  
13/6/2023

drawing / figure number  
**Figure 2a**

rev  
**10048-E-02**





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### Key

Land in Client Ownership

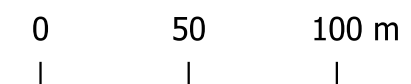
Transect Route

### Static Bat Detector Locations

Autumn

Spring

Summer



client  
**Sladen Estates**  
 project  
**Bicester Arc,  
 Bicester**

drawing title  
**BAT TRANSECT ROUTE & STATIC  
 DETECTOR LOCATION PLAN**

scale @ A3  
 1:2,550  
 drawing / figure number  
**Figure 3**

drawn  
FMH / VF  
 issue  
20/4/2023  
 rev



**10048 - E - 03**



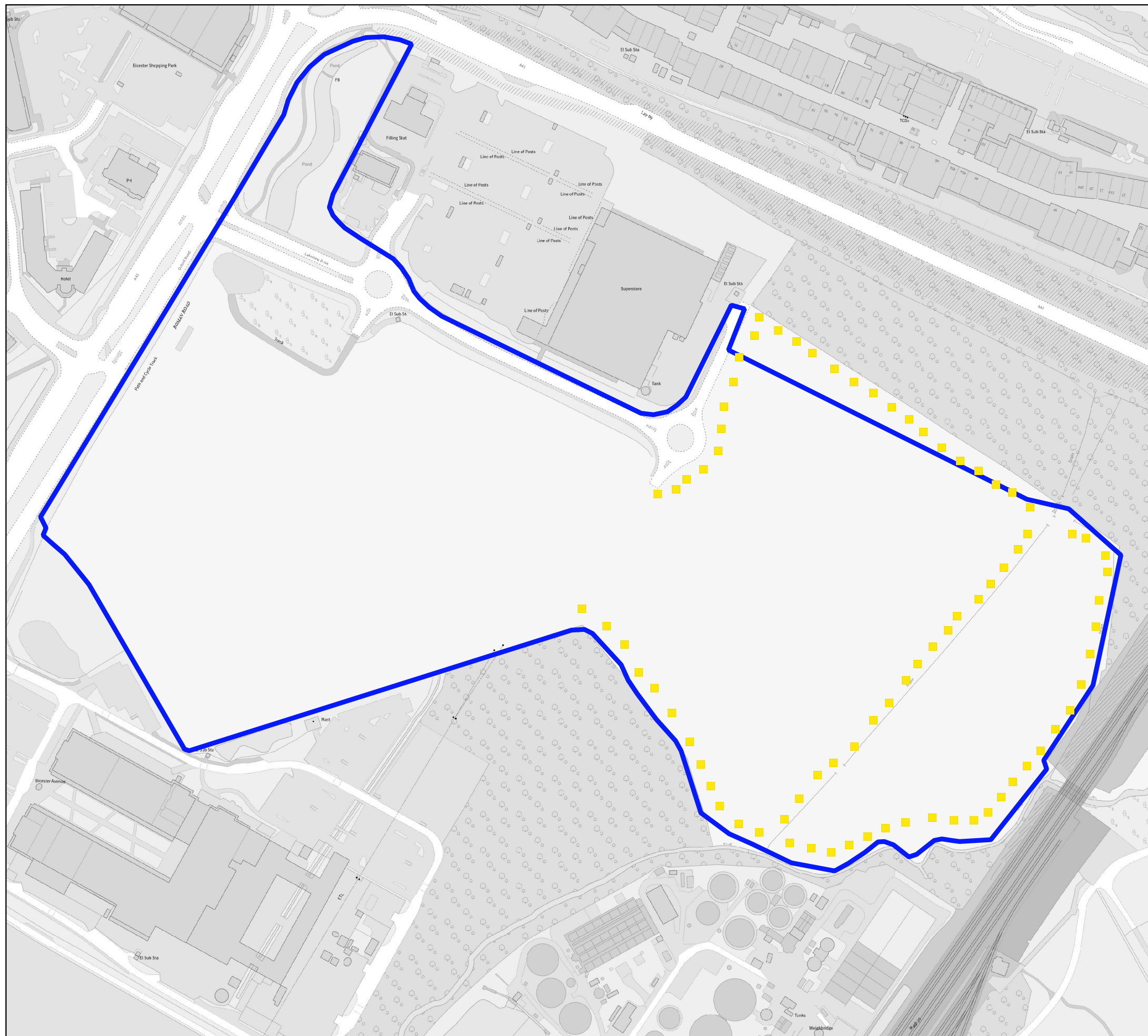
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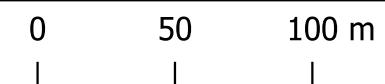
### Key

□ Land in Client Ownership

■ Reptile mats



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masterplanning ■ environmental assessment ■ landscape design ■ urban design ■ ecology ■ architecture ■ arboriculture



client  
Sladen Estates  
project  
Bicester Arc,  
Bicester  
drawing title  
REPTILE MAT LOCATION PLAN



scale  
1:2,750  
drawing / figure number  
Figure 4  
drawn  
FMH / VF  
issue date  
28/4/2023



rev  
**10048 - E - 04**

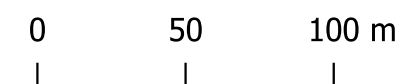
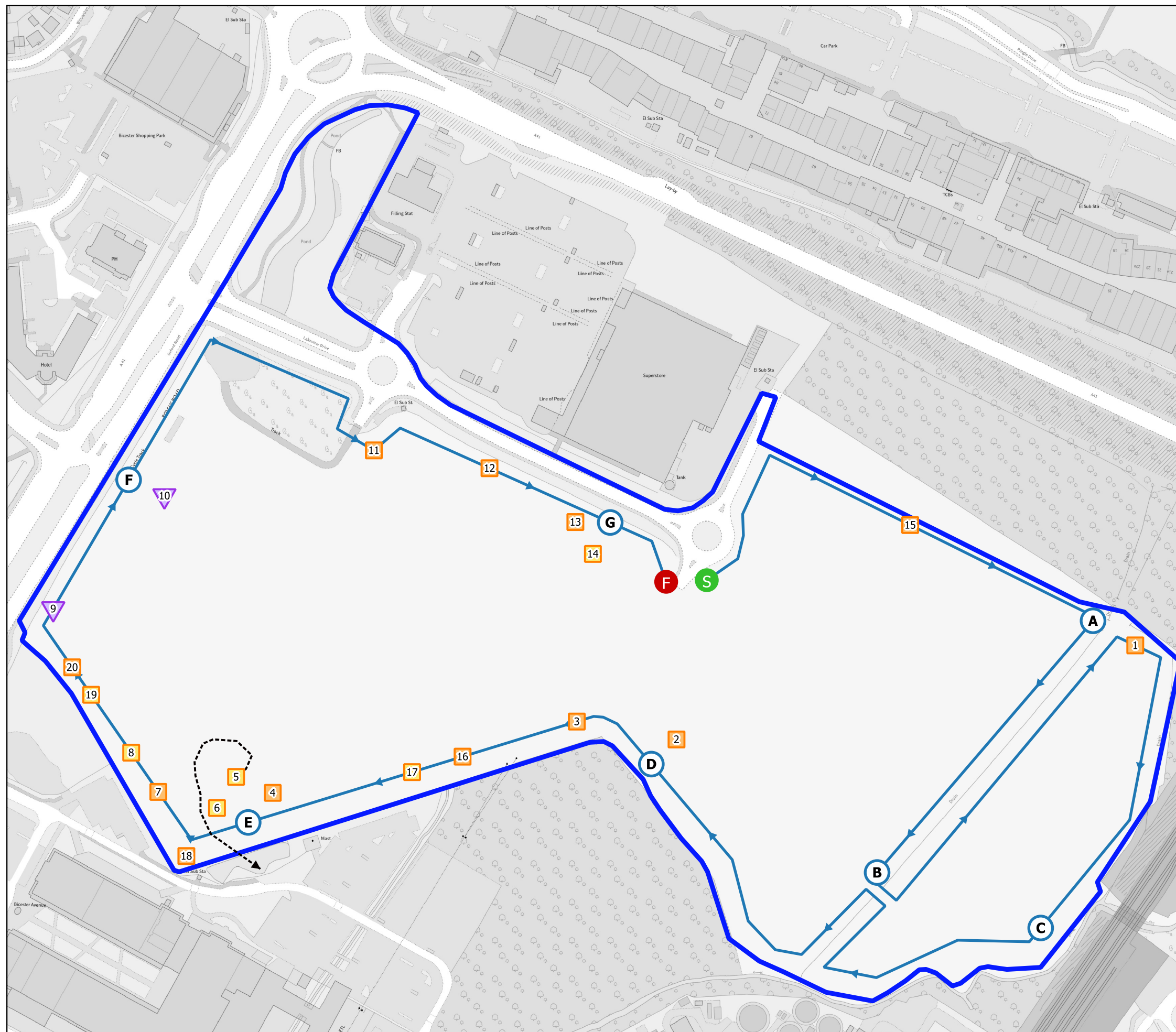


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### Key

- Land in Client Ownership
- S Start point
- F Finish point
- O Point Count Locations
- Transect Route
- Flight Arrow
- 10 Common Pipistrelle
- 10 Soprano Pipistrelle
- ▽ Noctule



Client  
**Sladen Estates**  
 Project  
**Bicester Arc,  
 Bicester**

Drawing title  
**SPRING BAT TRANSECT PLAN**

scale @ A3

1:2,550  
drawing / figure number

drawn  
FMH / VF

issue date  
28/4/2023



**Figure 5**

**10048 - E - 05**

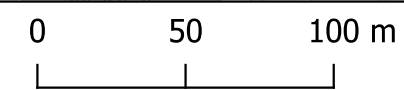
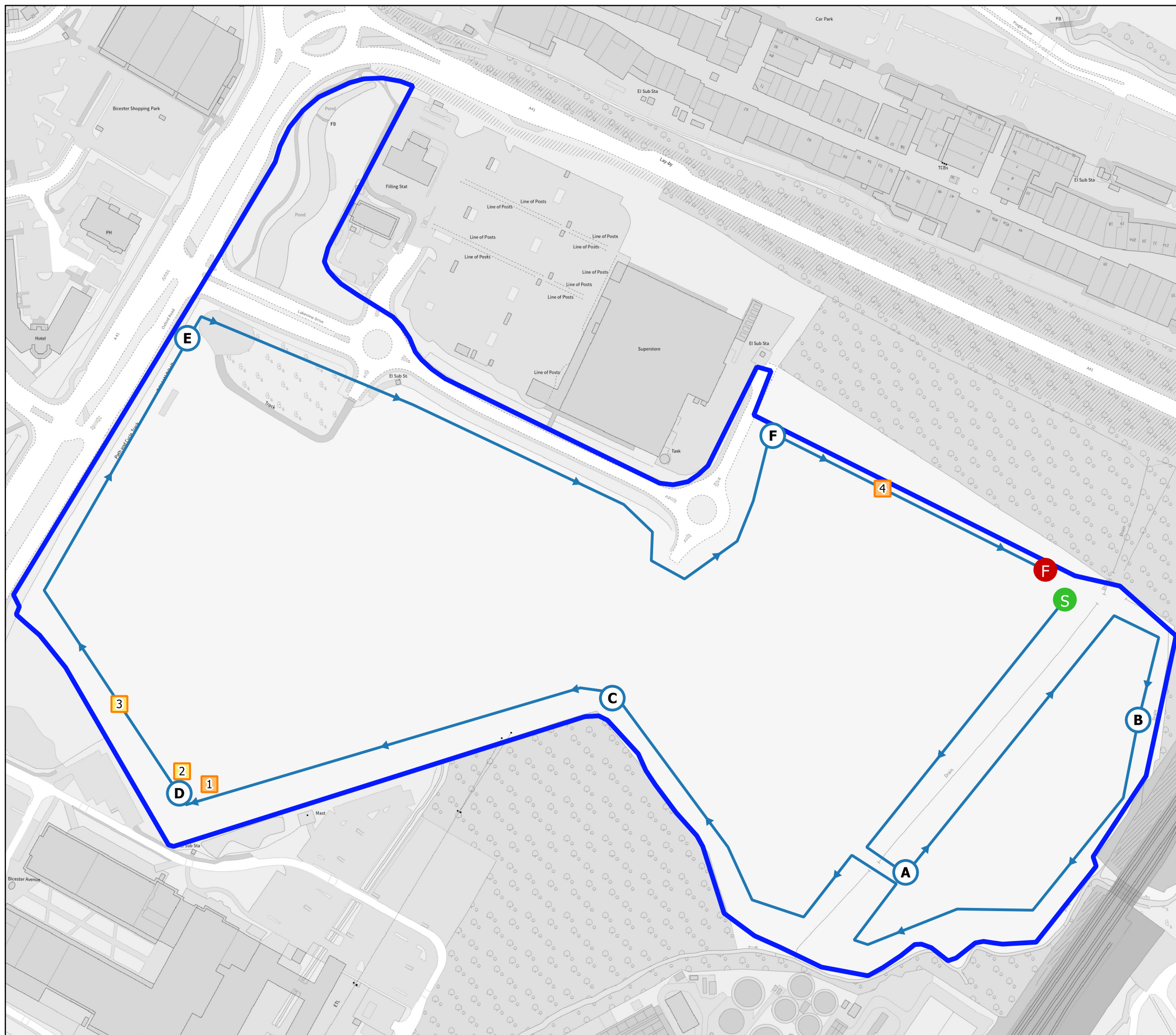


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### Key

- Land in Client Ownership
- S Start point
- F Finish point
- O Point Count Locations
- Transect Route
- 1 Common Pipistrelle
- 2 Soprano Pipistrelle



client  
**Sladen Estates**  
project  
**Bicester Arc,  
Bicester**  
drawing title  
**SUMMER BAT TRANSECT PLAN**  
scale @ A3  
1:2,550  
drawing / figure number  
**Figure 6**  
drawn  
FMH / VF  
issue date  
28/4/2023



rev  
**10048 - E - 06**

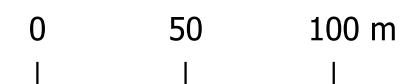
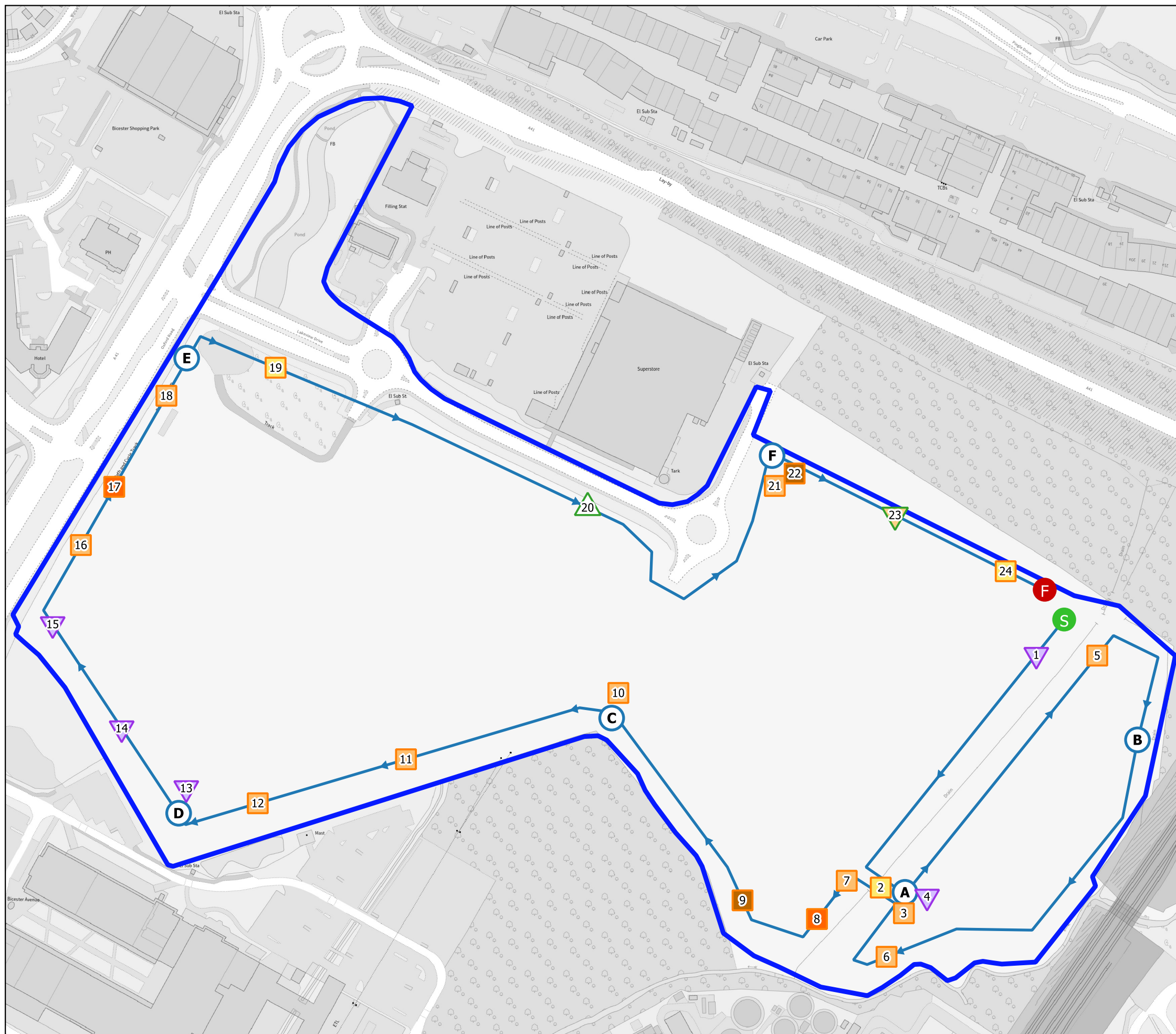


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### Key

- Land in Client Ownership
- Start point
- Finish point
- Point Count Locations
- Transect Route
- Common Pipistrelle
- Common Pipistrelle & Pipistrelle species
- Common Pipistrelle & Myotis species
- Soprano Pipistrelle
- Common & Soprano Pipistrelle
- Myotis Species
- Noctule



Client: Sladen Estates  
 Project: Bicester Arc, Bicester  
 Drawing Title: AUTUMN BAT TRANSECT PLAN  
 Scale: A3 1:2,550  
 Drawing / Figure Number: Figure 7  
 Drawn: FMH / VF  
 Issue Date: 28/4/2023  
 Rev: 10048 - E - 07




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### Key

 Land in Client Ownership

 Fly over only

#### BoCC Red-Listed Species

 Skylark

 Song Thrush

 Starling

#### BoCC Amber Listed Species

 Dunnock

 Greylag Goose

 Mallard


 Meadow Pipit


 Willow Warbler

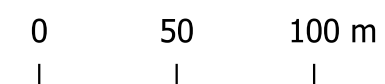
#### BoCC Green List Species

 Red Kite

#### Additional Protections

 NERC Species of Principle Importance

 Schedule 1 Species



client  
Sladen Estates

project  
Bicester Arc,  
Bicester

drawing title  
SCOPING BREEDING BIRD SURVEY RESULTS  
- LOCATIONS OF NOTABLE SPECIES

scale@A3  
1:2,750

drawn  
IJ / MJF

issue date  
28/4/2023



drawing / figure number  
**Figure 8**

rev  
-



## Appendix A: Scoping Breeding Bird Survey Results & EOAC Criteria for Categorisation of Breeding Status

Species: British Common Name	Species: Latin name	Survey 1	Conservation Status & Protection	Breeding status <sup>1</sup>
Greylag goose	<i>Anser anser</i>	2 flyovers	Amber list WCA Sch.1 (Pt. 2)	Non-breeder F
Mallard	<i>Anas platyrhynchos</i>	1 flyover	Amber list	Non-breeder F
Red kite	<i>Milvus milvus</i>	2 flyovers	Green list WCA Sch.1	Non-breeder F
Buzzard	<i>Buteo buteo</i>	1 flyover	Green list	Non-breeder F
Woodpigeon	<i>Columba palumbus</i>	46 + 5 flyovers	Green list	Possible S, H
Green woodpecker	<i>Picus viridis</i>	1	Green list	Possible S, H
Magpie	<i>Pica pica</i>	6	Green list	Possible H
Jay	<i>Garrulus glandarius</i>	1	Green list	Possible H
Jackdaw	<i>Corvus monedula</i>	2 flyovers	Green list	Non-breeder F
Rook	<i>Corvus frugilegus</i>	1	Green list	Non-breeder UH
Carrion crow	<i>Corvus corone</i>	7 + 1 flyover	Green list	Possible H
Blue tit	<i>Cyanistes caeruleus</i>	11	Green list	Probable P, S, H
Great tit	<i>Parus major</i>	7	Green list	Probable P, S, H
Skylark	<i>Alauda arvensis</i>	7	Red list NERC S.41	Probable A, S, H
Swallow	<i>Hirundo rustica</i>	3 flyovers	Green list	Non-breeder F, UH
Long-tailed tit	<i>Aegithalos caudatus</i>	1	Green list	Possible H
Willow warbler	<i>Phylloscopus trochilus</i>	1	Amber list	Possible S, H
Blackcap	<i>Sylvia atricapilla</i>	8	Green list	Probable A, S, H
Wren	<i>Troglodytes troglodytes</i>	14	Green list	Possible S, H
Starling	<i>Sturnus vulgaris</i>	2	Red list NERC S.41	Possible H

<sup>1</sup>European Ornithological Atlas Committee, 1979. *Categories of Breeding Bird Evidence*. European Ornithological Atlas Committee.



Species: British Common Name	Species: Latin name	Survey 1	Conservation Status & Protection	Breeding status <sup>1</sup>
Blackbird	<i>Turdus merula</i>	5	Green list	Possible H
Song thrush	<i>Turdus philomelos</i>	3	Red list NERC S.41	Possible H
Robin	<i>Erithacus rubecula</i>	14	Green list	Possible S, H
Dunnock	<i>Prunella modularis</i>	8	Amber list NERC S.41	Probable P, S, H
Meadow pipit	<i>Anthus pratensis</i>	2	Amber list	Possible H
Chaffinch	<i>Fringilla coelebs</i>	2	Green list	Possible S, H
Greenfinch	<i>Chloris chloris</i>	2	Green list	Probable P, H
Goldfinch	<i>Carduelis carduelis</i>	2 + 4 flyovers	Green list	Possible S, H
<b>Total No. Species:</b>		<b>28</b>		

**Breeding Status evidence can be broken down into four sections, each with their own codes, as defined by the European Ornithological Atlas Committee:**

**Confirmed breeder**

**DD** – distraction display or injury feigning

**UN** – used nest or eggshells found from this season

**FL** – recently fledged young or downy young

**ON** – adults entering or leaving nest-site in circumstances indicating occupied nest

**FF** – adult carrying faecal sac or food for young

**NE** – nest containing eggs

**NY** – nest with young seen or heard

**Probable breeder** - Evidence accumulated during the survey indicates that the bird species is breeding on site.

**P** – pair in suitable nesting habitat

**T** – permanent territory (defended over at least 2 survey occasions)

**D** – courtship and display

**N** – visiting probable nest site

**A** – agitated behaviour

**I** – brood patch of incubating bird (from bird in hand)

**B** – nest building or excavating nest-hole

**Possible breeder** - Evidence accumulated during the survey indicates that the bird species could be breeding on site, but the evidence is less conclusive than that obtained for probable breeders.

**H** – observed in suitable nesting habitat

**S** – singing male

**Non-breeder**

**F** – flying over

**M** – migrant

**U** – summering non-breeder

**UH** – observed in unsuitable nesting habitat

**Appendix B: Static Bat Detector Results**

Dates	Survey Hours	Total Av. per hour	Total Registrations	Noctule		Common Pipistrelle		Soprano Pipistrelle		Brown Long-eared		<i>Myotis</i> species		<i>Pipistrelle</i> species	
				Period Total	Peak Count	Period Total	Peak Count	Period Total	Peak Count	Period Total	Peak Count	Period Total	Peak Count	Period Total	Peak Count
21-25.05.21	44	4.6	201	6	5	165	70	13	6	1	1	15	4	1	1
22-26.07.21	46	18.9	869	46	26	788	355	22	9	7	3	6	2	0	0
13-17.09.21	62	22.3	1380	129	39	858	401	324	207	11	8	45	12	13	6

## Appendix C: HSI Results of the Ponds

Suitability Index	Criteria	Definition	Possible Score	P1	P2
SI <sub>1</sub>	Geographic Location	Zone A - optimal	1	1	1
		Zone B - marginal	0.5		
		Zone C - unsuitable	0.01		
SI <sub>2</sub>	Pond Area	Pond surface area to the nearest 50m <sup>2</sup>	*	0.8	0.8
SI <sub>3</sub>	Permanence	Never Dries	0.9	0.9	0.9
		Rarely dries (Dries no more than 2/10 years or in drought)	1		
		Sometimes dries (Dries between 3/10 years to most years)	0.5		
		Dries annually	0.1		
SI <sub>4</sub>	Water Quality	Good (abundant & diverse invertebrate community)	1	0.01	0.33
		Moderate (moderate invertebrate community)	0.67		
		Poor (low invertebrate diversity, few submerged plants)	0.33		
		Bad (clearly polluted, pollutant tolerant invertebrates present, no submerged plants)	0.01		
SI <sub>5</sub>	Shade	% shade of pond perimeter to at least 1m from the shore	*	1	0.6
SI <sub>6</sub>	Waterfowl	Absent (no evidence of waterfowl, excluding moorhen)	1	0.01	0.67
		Minor (waterfowl present, though little impact)	0.67		
		Major (severe impact of waterfowl)	0.01		
SI <sub>7</sub>	Fish	Absent (no records of fish stocking and no fish seen during survey)	1	1	0.67
		Possible (no evidence of fish, but conditions suggest)	0.67		
		Minor (small numbers of crucian carp, goldfish or)	0.33		
		Major (dense populations of fish present)	0.01		
SI <sub>8</sub>	Pond Count	No. ponds within 1 km of survey pond not separated by major barriers and divided by 3.14	*	0.32	0.32
SI <sub>9</sub>	Terrestrial	Good (extensive habitat offering good opportunities for foraging and shelter surrounding pond)	1	0.33	0.67
		Moderate (habitat offering opportunities for foraging and shelter, but not extensive and does not completely surround pond)	0.67		
		Poor (habitat with poor structure, offering limited opportunities for foraging and shelter)	0.33		
		None (No suitable habitat around pond)	0.01		
SI <sub>10</sub>	Macrophytes	% pond surface area occupied by macrophyte cover (excluding duckweed) and submerged plants reaching the surface	*	0.3	0.9
HSI Score = (SI <sub>1</sub> *SI <sub>2</sub> *SI <sub>3</sub> *SI <sub>4</sub> *SI <sub>5</sub> *SI <sub>6</sub> *SI <sub>7</sub> *SI <sub>8</sub> *SI <sub>9</sub> *SI <sub>10</sub> ) <sup>1/10</sup>				0.27	0.64
Pond Suitability (<0.5 = poor; 0.5-0.59 = below average; 0.6-0.69 = average; 0.7-0.79 = good; >0.8 = excellent)				Poor	Average

Client: Hayley Tomlin,  
FPCR Environment and Design Ltd



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172 Chester Road  
Helsby  
WA6 0AR

Tel: 01159 516747  
Email: Helen.Rees@adas.co.uk

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Sample ID: ADAS-0491                      Condition on Receipt: Low Sediment                      Volume: Passed  
Client Identifier: 10048                      Description: pond water samples in preservative  
Date of Receipt: 23/04/2021                      Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control <sup>†</sup>	2 of 2	Real Time PCR	26/04/2021
Degradation Control <sup>§</sup>	Within Limits	Real Time PCR	26/04/2021
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	26/04/2021
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 <sup>-4</sup> ng/μL) <sup>#</sup>	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees                      Report Issued by: Dr Ben Maddison

Signed:                       Signed: 

Position: Director: Biotechnology                      Position: MD: Biotechnology

Date of preparation: 29/04/2021                      Date of issue: 29/04/2021

*eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.*

*\* If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

*<sup>†</sup> Recorded as the number of positive replicate reactions at expected C<sub>t</sub> value. If the expected C<sub>t</sub> value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.*

*<sup>§</sup> No degradation is expected within time frame of kit preparation, sample collection and analysis.*

*<sup>#</sup> Additional positive controls (10<sup>-1</sup>, 10<sup>-2</sup>, 10<sup>-3</sup> ng/μL) are also routinely run, results not shown here.*

## Appendix 1: Interpretation of results

### Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

### What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)

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Sample ID: ADAS-0495                      Condition on Receipt: Good                      Volume: Passed  
Client Identifier: not supplied              Description: pond water samples in preservative  
Date of Receipt: 23/04/2021              Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control <sup>†</sup>	2 of 2	Real Time PCR	27/04/2021
Degradation Control <sup>§</sup>	Within Limits	Real Time PCR	27/04/2021
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Sample ID: ADAS-707                      Condition on Receipt: Low Sediment                      Volume: Passed  
Client Identifier: P1, 10048                      Description: pond water samples in preservative  
Date of Receipt: 19/05/2023                      Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control <sup>†</sup>	2 of 2	Real Time PCR	23/05/2023
Degradation Control <sup>§</sup>	Within Limits	Real Time PCR	23/05/2023
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Report Prepared by: Dr Helen Rees                      Report Issued by: Dr Ben Maddison

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Position: Director: Biotechnology                      Position: MD: Biotechnology

Date of preparation: 23/05/2023                      Date of issue: 23/05/2023

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Appendix F – Biodiversity Net Gain

