Development Control
Gloucester City Council
PO Box 3252, Gloucester, GL1 9FW
01452 396396
development.control@gloucester.gov.uk
www.gloucester.gov.uk/planning

Application for Planning Permission

Town and Country Planning Act 1990 (as amended)

Publication of applications on planning authority websites

Please note that the information provided on this application form and in supporting documents may be published on the Authority's website. If you require any further clarification, please contact the Authority's planning department.

Site Location

Disclaimer: We can only make recommendations based on the answers given in the questions.

If you cannot provide a postcode, the description of site location must be completed. Please provide the most accurate site description you can, to help locate the site - for example "field to the North of the Post Office".

Number

Suffix

Property Name

Paget Cottage

Address Line 1

The Wheatridge

Address Line 2

Address Line 3

Gloucestershire

Town/city

Gloucester

Postcode

GL4 4DF

Description of site location must be completed if postcode is not known:

Easting (x)

385435

Northing (y)

215854

Description

Applicant Details

Name/Company

Title

Mrs

First name

Jemma

Surname

Carenza

Company Name

Address

Address line 1

Paget Cottage

Address line 2

Address line 3

Gloucestershire

Town/City

Gloucester

Country

Postcode

GL4 4DF

Are you an agent acting on behalf of the applicant?

- [x] Yes
- [ ] No

Contact Details

Primary number

Secondary number

Fax number

Email address

Agent Details

Name/Company

Title

Miss

First name

Lorelie

Surname

Davies

Company Name

Brodie Planning Associates Ltd

Address

Address line 1

The Stables

Address line 2

Manor Farm Courtyard

Address line 3

Southam

Town/City

Cheltenham

Country

undefined

Postcode

GL52 3PB

Contact Details

Primary number

***** REDACTED ******

Secondary number

Fax number

Email address

***** REDACTED ******

Site Area

What is the measurement of the site area? (numeric characters only).

670.00

Unit

Sq. metres

Description of the Proposal

Please note in regard to:

- **Fire Statements** - From 1 August 2021, planning applications for buildings of over 18 metres (or 7 stories) tall containing more than one dwelling will require a 'Fire Statement' for the application to be considered valid. There are some exemptions. View government planning guidance on fire statements or access the fire statement template and guidance.
- **Permission In Principle** - If you are applying for Technical Details Consent on a site that has been granted Permission In Principle, please include the relevant details in the description below.
- **Public Service Infrastructure** - From 1 August 2021, applications for certain public service infrastructure developments will be eligible for faster determination timeframes. See help for further details or view government planning guidance on determination periods.

Description

Please describe details of the proposed development or works including any change of use

The construction of 1no. dwelling and associated works

Has the work or change of use already started?

◯ Yes
⊘ No

Existing Use

Please describe the current use of the site

residential curtilage

Is the site currently vacant?

◯ Yes
⊘ No

Does the proposal involve any of the following? If Yes, you will need to submit an appropriate contamination assessment with your application.

Land which is known to be contaminated

◯ Yes
⊘ No

Land where contamination is suspected for all or part of the site

◯ Yes
⊘ No

A proposed use that would be particularly vulnerable to the presence of contamination

◯ Yes
⊘ No

Materials

Does the proposed development require any materials to be used externally?

⊘ Yes
◯ No

Please provide a description of existing and proposed materials and finishes to be used externally (including type, colour and name for each material)

Type:
Walls

Existing materials and finishes:
N/A

Proposed materials and finishes:
Red brick and dark stained timber cladding

Type:
Roof

Existing materials and finishes:
N/A

Proposed materials and finishes:
Natural slates

Type:
Doors

Existing materials and finishes:
N/A

Proposed materials and finishes:
Aluminium framed (anthracite)

Type:
Windows

Existing materials and finishes:
N/A

Proposed materials and finishes:
Aluminium framed (anthracite)

Are you supplying additional information on submitted plans, drawings or a design and access statement?

⊘ Yes
◯ No

If Yes, please state references for the plans, drawings and/or design and access statement

- Proposed Floorplans (drg no. 3005-200);
- Proposed Elevations (drg no. 3005-201);
- Proposed Site Layout (drg no. 3005-202);
- Proposed Visualisations (drg no. 3005-203);

Pedestrian and Vehicle Access, Roads and Rights of Way

Is a new or altered vehicular access proposed to or from the public highway?

◯ Yes
⊘ No

Is a new or altered pedestrian access proposed to or from the public highway?

◯ Yes
⊘ No

Are there any new public roads to be provided within the site?

◯ Yes
⊘ No

Are there any new public rights of way to be provided within or adjacent to the site?

◯ Yes
⊘ No

Do the proposals require any diversions/extinguishments and/or creation of rights of way?

◯ Yes
⊘ No

Vehicle Parking

Does the site have any existing vehicle/cycle parking spaces or will the proposed development add/remove any parking spaces?

⊘ Yes
◯ No

Please provide information on the existing and proposed number of on-site parking spaces

Vehicle Type:
Cars

Existing number of spaces:
0

Total proposed (including spaces retained):
2

Difference in spaces:
2

Trees and Hedges

Are there trees or hedges on the proposed development site?

- [x] Yes
- [ ] No

And/or: Are there trees or hedges on land adjacent to the proposed development site that could influence the development or might be important as part of the local landscape character?

- [ ] Yes
- [x] No

If Yes to either or both of the above, you may need to provide a full tree survey, at the discretion of the local planning authority. If a tree survey is required, this and the accompanying plan should be submitted alongside the application. The local planning authority should make clear on its website what the survey should contain, in accordance with the current 'BS5837: Trees in relation to design, demolition and construction - Recommendations'.

Assessment of Flood Risk

Is the site within an area at risk of flooding? (Check the location on the Government's Flood map for planning. You should also refer to national standing advice and your local planning authority requirements for information as necessary.)

- [ ] Yes
- [x] No

Is your proposal within 20 metres of a watercourse (e.g. river, stream or beck)?

- [ ] Yes
- [x] No

Will the proposal increase the flood risk elsewhere?

- [ ] Yes
- [x] No

How will surface water be disposed of?

- [ ] Sustainable drainage system
- [ ] Existing water course
- [ ] Soakaway
- [x] Main sewer
- [ ] Pond/lake

Biodiversity and Geological Conservation

Is there a reasonable likelihood of the following being affected adversely or conserved and enhanced within the application site, or on land adjacent to or near the application site?

To assist in answering this question correctly, please refer to the help text which provides guidance on determining if any important biodiversity or geological conservation features may be present or nearby; and whether they are likely to be affected by the proposals.

a) Protected and priority species

- [ ] Yes, on the development site
- [ ] Yes, on land adjacent to or near the proposed development
- [x] No

b) Designated sites, important habitats or other biodiversity features

◯ Yes, on the development site
◯ Yes, on land adjacent to or near the proposed development
⊘ No

c) Features of geological conservation importance

◯ Yes, on the development site
◯ Yes, on land adjacent to or near the proposed development
⊘ No

Supporting information requirements

Where a development proposal is likely to affect features of biodiversity or geological conservation interest, you will need to submit, with the application, sufficient information and assessments to allow the local planning authority to determine the proposal.

Failure to submit all information required will result in your application being deemed invalid. It will not be considered valid until all information required by the local planning authority has been submitted.

Your local planning authority will be able to advise on the content of any assessments that may be required.

Foul Sewage

Please state how foul sewage is to be disposed of:

☑ Mains sewer
☐ Septic tank
☐ Package treatment plant
☐ Cess pit
☐ Other
☐ Unknown

Are you proposing to connect to the existing drainage system?

◯ Yes
◯ No
⊘ Unknown

Waste Storage and Collection

Do the plans incorporate areas to store and aid the collection of waste?

⊘ Yes
◯ No

If Yes, please provide details:

Sufficient space within the residential curtilage for outside bins and recycling storage

Have arrangements been made for the separate storage and collection of recyclable waste?

⊘ Yes
◯ No

If Yes, please provide details:

Sufficient space within the residential curtilage for outside bins and recycling storage

Trade Effluent

Trade Effluent

Does the proposal involve the need to dispose of trade effluents or trade waste?

◯ Yes
⊘ No

Residential/Dwelling Units

Does your proposal include the gain, loss or change of use of residential units?

⊘ Yes
◯ No

Please note: This question is based on the current housing categories and types specified by government.

If your application was started before 23 May 2020, the categories and types shown in this question will now have changed. We recommend that you review any information provided to ensure it is correct before the application is submitted.

Proposed

Please select the housing categories that are relevant to the proposed units

☑ Market Housing
☐ Social, Affordable or Intermediate Rent
☐ Affordable Home Ownership
☐ Starter Homes
☐ Self-build and Custom Build

Market Housing

Please specify each type of housing and number of units proposed

Housing Type:
Houses

1 Bedroom:
0

2 Bedroom:
0

3 Bedroom:
1

4+ Bedroom:
0

Unknown Bedroom:
0

Total:
1

Proposed Market Housing Category Totals	1 Bedroom Total	2 Bedroom Total	3 Bedroom Total	4 Bedroom Total	Unknown Bedroom Total	Bedroom Total
	0	0	1	0	0	1

Existing

Please select the housing categories for any existing units on the site

- ☐ Market Housing
- ☐ Social, Affordable or Intermediate Rent
- ☐ Affordable Home Ownership
- ☐ Starter Homes
- ☐ Self-build and Custom Build

Totals

Total proposed residential units	1
Total existing residential units	0
Total net gain or loss of residential units	1

All Types of Development: Non-Residential Floorspace

Does your proposal involve the loss, gain or change of use of non-residential floorspace?
Note that 'non-residential' in this context covers all uses except Use Class C3 Dwellinghouses.

- ◯ Yes
- ⊘ No

Employment

Are there any existing employees on the site or will the proposed development increase or decrease the number of employees?

- ◯ Yes
- ⊘ No

Hours of Opening

Are Hours of Opening relevant to this proposal?

- ◯ Yes
- ⊘ No

Industrial or Commercial Processes and Machinery

Does this proposal involve the carrying out of industrial or commercial activities and processes?

- ◯ Yes
- ⊘ No

Is the proposal for a waste management development?

- ◯ Yes
- ⊘ No

Hazardous Substances

Does the proposal involve the use or storage of Hazardous Substances?

◯ Yes
⊘ No

Site Visit

Can the site be seen from a public road, public footpath, bridleway or other public land?

⊘ Yes
◯ No

If the planning authority needs to make an appointment to carry out a site visit, whom should they contact?

⊘ The agent
◯ The applicant
◯ Other person

Pre-application Advice

Has assistance or prior advice been sought from the local authority about this application?

◯ Yes
⊘ No

Authority Employee/Member

With respect to the Authority, is the applicant and/or agent one of the following:
(a) a member of staff
(b) an elected member
(c) related to a member of staff
(d) related to an elected member

It is an important principle of decision-making that the process is open and transparent.

For the purposes of this question, "related to" means related, by birth or otherwise, closely enough that a fair-minded and informed observer, having considered the facts, would conclude that there was bias on the part of the decision-maker in the Local Planning Authority.

Do any of the above statements apply?

◯ Yes
⊘ No

Ownership Certificates and Agricultural Land Declaration

Certificates under Article 14 - Town and Country Planning (Development Management Procedure) (England) Order 2015 (as amended)

Please answer the following questions to determine which Certificate of Ownership you need to complete: A, B, C or D.

Is the applicant the sole owner of all the land to which this application relates; and has the applicant been the sole owner for more than 21 days?

⊘ Yes
◯ No

Is any of the land to which the application relates part of an Agricultural Holding?

◯ Yes
⊘ No

Certificate Of Ownership - Certificate A

I certify/The applicant certifies that on the day 21 days before the date of this application nobody except myself/ the applicant was the owner* of any part of the land or building to which the application relates, and that none of the land to which the application relates is, or is part of, an agricultural holding**

*** "owner" is a person with a freehold interest or leasehold interest with at least 7 years left to run.**

**** "agricultural holding" has the meaning given by reference to the definition of "agricultural tenant" in section 65(8) of the Act.**

NOTE: You should sign Certificate B, C or D, as appropriate, if you are the sole owner of the land or building to which the application relates but the land is, or is part of, an agricultural holding.

Person Role

◯ The Applicant
⊘ The Agent

Title

Miss

First Name

Lorelie

Surname

Davies

Declaration Date

28/03/2022

☑ Declaration made

Declaration

I / We hereby apply for Full planning permission as described in this form and accompanying plans/drawings and additional information. I / We confirm that, to the best of my/our knowledge, any facts stated are true and accurate and any opinions given are the genuine options of the persons giving them. I / We also accept that: Once submitted, this information will be transmitted to the Local Planning Authority and, once validated by them, be made available as part of a public register and on the authority's website; our system will automatically generate and send you emails in regard to the submission of this application.

☑ I / We agree to the outlined declaration

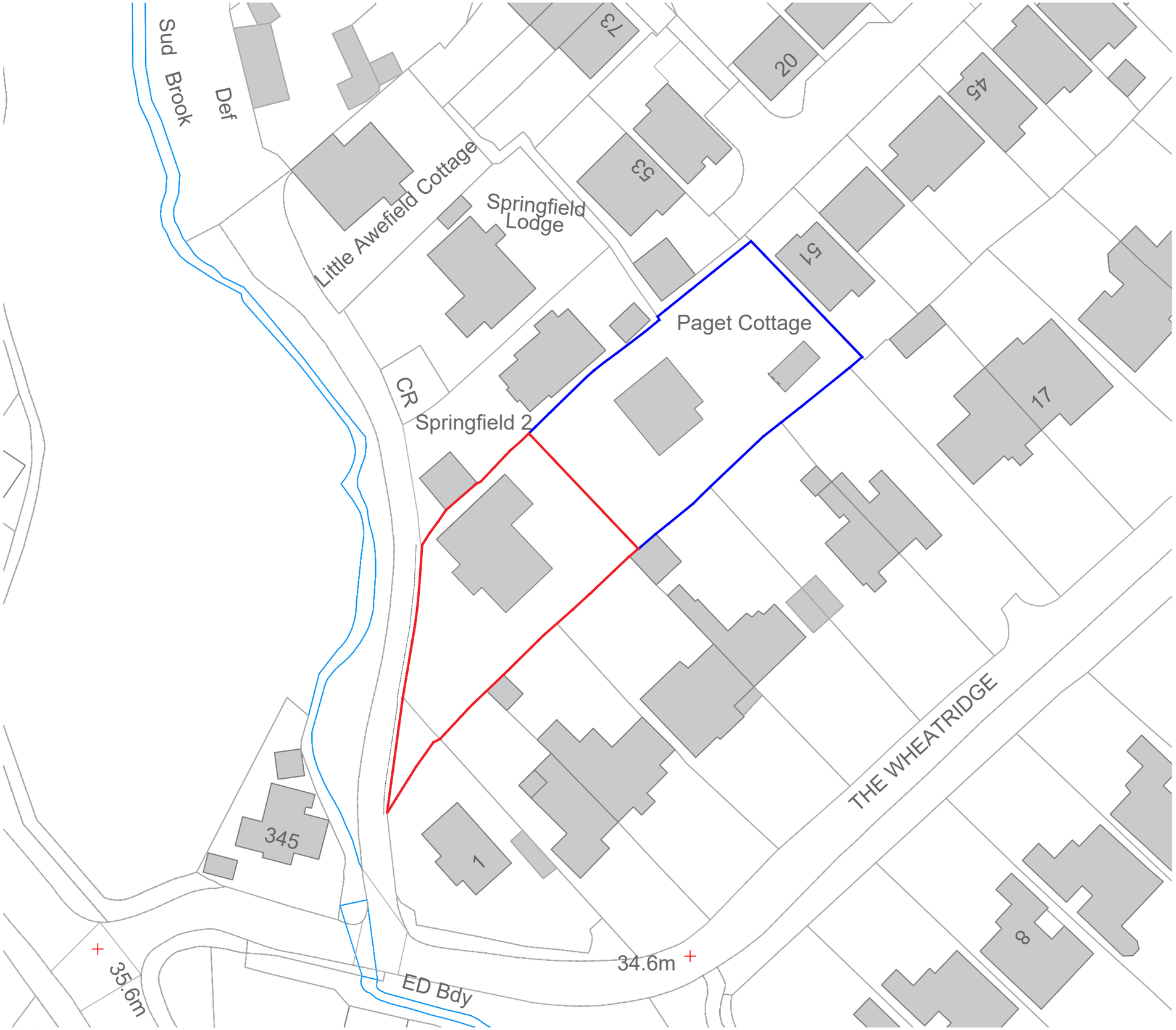
Signed

Wendy Hopkins

Date

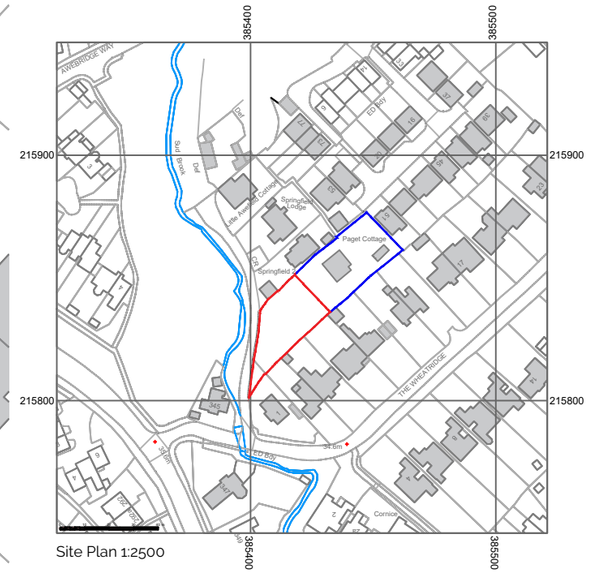
29/03/2022

rev	date	description
-	-	-



Block Plan 1:500

0 10 20 30 40 m



Site Plan 1:2500

NORTH

brodie planning associates

Planning ▪ Design ▪ Development

contact [redacted]

address
The Stables, Manor Farm Courtyard
Southam Lane, Southam,
Cheltenham, Glos, GL52 3PB.

web: www.brodieplanning.co.uk

client	ref:
Jemma Carenza	3005

project description

Construction of 1no. dwelling and associated works

location

Land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF

title

Site Location and Block Plan

drawing number	scale	date
3005-001	As noted @ A3	March '22

status	revision
PLANNING	Ø

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Southam Lane, Southam
Cheltenham, Gloucestershire
GL52 3PB

Development Management
Gloucester City Council
PO Box 3252
Gloucester
GL1 9FW

BPA Ref: 3005

15th March 2022

Submission of a full planning application for the construction of 1no. dwelling and associated works at Land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF.

Dear Development Management,

This covering letter accompanies the above planning application submitted via the Planning Portal under reference **PP-11110342.**

The following documents have been submitted for consideration:

- Site Location and Block Plan (drg no. 3005-001);
- Proposed Floorplans (drg no. 3005-200);
- Proposed Elevations (drg no. 3005-201);
- Proposed Site Layout (drg no. 3005-202);
- Proposed Visualisations (drg no. 3005-203);
- CIL Form No.1; and
- Covering Letter (this document).

The Site

The application site is located to the south-east of the city centre of Gloucester, in the residential suburb of Abbeydale. The site comprises land to the front (south-west) of Paget Cottage, which is a two-storey detached red brick property set in substantial gardens. The site itself extends to approximately 670m² and benefits from existing vehicular access off of Wheatridge Road. in addition to dense boundary vegetation.

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Cheltenham, Gloucestershire
GL52 3PB

In relation to local and national land designations for the purpose of planning policy, the site does not lie within any sensitive landscape, ecology or heritage designations. As identified on the online government flood mapping service, the site is located in Flood Zone 1 and as such, has a low probability of flooding.

The Proposal

This application seeks full planning permission for a detached residential dwellinghouse and associated works, including access, parking, landscaping, and amenity space. The proposals will create a 1.5 storey dwelling of red brick construction with elements of dark stained timber cladding, natural slates to the roof, and aluminium framed doors and windows. Internally. the property includes 3 bedrooms (2 of which include ensuites), an open plan kitchen-dining-living area, study/playroom, sitting room, first floor bathroom and ground floor WC.

While the proposed development will be situated within the front gardens of Paget Cottage, access arrangements will remain unaltered, and the existing property will continue to benefit from sizeable front and rear gardens.

Planning Policy & Assessment

Section 70(2) of the Town and Country Planning Act 1990 and Section 38(6) of the Planning & Compulsory Act 2004 requires applications for planning permission to be determined in accordance with the development plan unless material considerations indicate otherwise.

The Development Plan comprises the Joint Core Strategy (JCS) (2017) and the Gloucester Local Plan (1983). The latter of which contains only two 'saved' policies, neither of which are relevant to the consideration of this proposal. Gloucester City Council (GCC) are currently progressing an emerging City Plan which will replace the Local Plan and will include detailed planning policies to sit alongside the JCS strategic policies. However, the City Plan is currently under public examination and therefore at this time, only limited weight can be afforded to emerging policies.

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In relation to the principle of development, **JCS Policy SP2: Distribution of New Development** is of particular relevance to this proposal. The policy states:

> *2. To meet the needs of Gloucester City the JCS will make provision of at least 14,359 new homes. At least 13,287 dwellings will be provided within the Gloucester City administrative boundary, including the Winneycroft Strategic Allocation, and urban extensions at Innsworth and Twigworth, South Churchdown and North Brockworth within Tewkesbury Borough defined in Policy SA1, and sites covered by any Memoranda of Agreement.*

The breakdown of housing delivery in Gloucester City is summarised in the table below.

Gloucester City	Housing Supply
Completions	2,962
Commitments*	2,460
Windfall Allowance	832
Gloucester City Plan (Further Potential)	1,518
Strategic Allocations (Gloucester City)	620
Urban Extensions (Tewkesbury Borough)	4,895
Supply Total	**13,287**

Figure 1 – housing supply in Gloucester City in the JCS plan period

Building upon policies SP1 and SP2, **Policy SD10 Residential Development** outlines further details regarding appropriate location for residential development. The policy reads:

> *1. Within the JCS area, new housing will be planned in order to deliver the scale and distribution of housing development set out in Policies SP1 and SP2.*
>
> *2. Housing development will be permitted at sites allocated for housing through the development plan, including Strategic Allocations and allocations in district and neighbourhood plans*
>
> *3. On sites that are not allocated, housing development and conversions to dwellings will be permitted on previously-developed land in the existing built-up areas of Gloucester*

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City, the Principal Urban Area of Cheltenham and Tewkesbury town, rural service centres and service villages except where otherwise restricted by policies within District plans

4. Housing development on other sites will only be permitted where:

i. It is for affordable housing on a rural exception site in accordance with Policy SD12, or;

ii. It is infilling within the existing built up areas of the City of Gloucester, the Principal Urban Area of Cheltenham or Tewkesbury Borough's towns and villages except where otherwise restricted by policies within District plans, or;

iii. It is brought forward through Community Right to Build Orders, or;

iv. There are other specific exceptions / circumstances defined in district or neighbourhood.

5. Proposals involving the sensitive, adaptive re-use of vacant or redundant buildings will be encouraged, subject to the requirements of other policies including Policies SD1, INF4 and SD8. Proposals that will bring empty housing back into residential use will also be encouraged

6. Residential development should seek to achieve the maximum density compatible with good design, the protection of heritage assets, local amenity, the character and quality of the local environment, and the safety and convenience of the local and strategic road network.

The principle of residential development in this location is acceptable, as the proposals comprise 'infill' development within the City of Gloucester and therefore comply with criterion 4.ii of Policy SD10. In addition, it is important to note that Gloucester City Council cannot currently demonstrate a Five-Year Housing Land Supply. This is evidenced by the Council's monitoring reports (May 2021) which show an annual undersupply since 2011/12. The application site is located within the administrative boundary of Gloucester and therefore, in line with policy SP2, development on this windfall site would provide a contribution towards meeting the housing needs of Gloucester City.

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In regard to design, **Policy SD4 – Design Requirements** of the JCS states:

> *Where appropriate, proposals for development – which may be required to be accompanied by a masterplan and design brief – will need to clearly demonstrate how the following principles have been incorporated:*
>
> *i. Context, Character and Sense of Place*
>
> *ii. Legibility and Identity*
>
> *iii. Amenity and space*
>
> *iv. Public realm and landscape*
>
> *v. Safety and security*
>
> *vi. Inclusiveness and adaptability*
>
> *vii. Movement and connectivity*

This is mirrored in JCS **Policy SD14 Health and Environmental Quality** which states, inter alia, that:

> *New development must cause no unacceptable harm to local amenity, including the amenity of neighbouring occupants.*

Additionally, **Policy A1: Effective and Efficient Use of Land and Buildings** of the pre-submission Gloucester City Plan is of relevance. The policy states:

Development proposals are required to make effective and efficient use of land and buildings. Development proposals should:

> *1. Result in overall improvements to the built and natural environment; and*
>
> *2. Be of a suitable scale for the site and not have a significant adverse impact on the character of the locality, the appearance of the street scene, or the amenities enjoyed by the occupiers of the neighbouring properties; and*
>
> *3. Not lead to a saturation of intensified properties within the area; and*

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4. Provide adequate off-street parking, access, covered and secure cycle storage which provides for the existing and proposed use; and

5. Not prejudice the potential for the comprehensive development of adjacent land; and

6. Provide outdoor amenity space and garden space at a level that reflects the character of the area and the scale of the development; and

7. Provide adequate, well designed, appropriately located and accessible bin storage areas.

Policy **F1: Materials and Finishes** of the pre-submission Gloucester City Plan provides additional guidance regarding design. The policy reads:

Development proposals should achieve high quality architectural detailing, external materials and finishes that are locally distinctive. Developments should make a positive contribution to the character and appearance of the locality and respect the wider landscape.

Innovative modern materials will be encouraged where they strongly compliment local distinctiveness.

As illustrated by the submitted elevations (drg no. 3005-201) and visualisations (drg no. 3005-203), the proposed development has been designed sympathetically to complement the character of the surrounding area. The core external material (red brick) matches Paget Cottage and other nearby properties, while the use of dark coloured cladding and openings allows for a contemporary finish. In addition, the proposed dwelling has been sensitively sited and scaled as to make use of the gently sloping topography of the site to ensure the new dwelling is subservient in comparison to the surrounding properties, particularly Paget Cottage. Overall, the dwelling has been designed in a manner that is in keeping with the existing character of the area with a contemporary twist as to provide an attractive and appropriate addition to the settlement.

In relation to its impact on neighbouring amenity, the proposed development has been designed to respond positively to its surroundings by giving due consideration to the neighbouring properties. At 1.5 storeys in height, the proposed dwelling is subservient in scale and massing and

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therefore will not result in any overbearing impacts or loss of light to the surrounding dwellings. Moreover, in addition to sufficient separation distances between properties, openings have been sensitively placed. Therefore, it should be considered that the siting, scale and mass of the proposed development will not have a significant adverse impact on residential amenity of neighbouring occupiers in line with Policy SD4 of the JCS and Policy A1 of the pre-submission Gloucester City Plan.

Summary

In light of the above, the proposal illustrates a prime example of intelligent design, making a valuable contribution to the housing demand in Gloucester City in accordance with the requirements of Policies SP2, SD10, and SD4 of the Joint Core Strategy, Policies A1 and F1 of the pre-submission Gloucester City Plan and Section 12 of the NPPF. As such, the proposal is considered a sustainable form of development that should be approved without delay (Paragraph 11, NPPF).

I trust the above and enclosed provides you with sufficient information to validate this application and progress it towards determination. Should you require any further information, please do not hesitate to contact me.

Yours sincerely,

[redacted]
Planner

[redacted]

ECOLOGICAL IMPACT ASSESSMENT

Paget Cottage,
Little Awefield,
Abbeydale, Gloucester

Report
29th March 2022

Client:
Jemma Carenza

Report author:
[redacted]

Report reference:
C2913-1

© Swift Ecology Ltd
35 Winterway
Blockley
Moreton in Marsh
GL56 9EF
[redacted]
Website www.swiftecology.co.uk

QUALITY ASSURANCE

SURVEY CONDUCTED BY	[redacted]	**SURVEY DATE/S**	16.02.22

DATE	VERSION	PREPARED BY	CHECKED AND APPROVED BY
29.03.22	01	[redacted]	[redacted]

The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

Every reasonable attempt has been made to comply with BS 42020 (Biodiversity: Code of practice for planning and development); the CIEEM Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017); the CIEEM Guidelines for Ecological Report Writing (CIEEM, 2017). If compliance has not been achieved, justification/explanation has been given.

VALIDITY OF REPORT

The results of this assessment are only valid for a maximum of two years from the date the site visit was carried out (February 2022). Should the works be delayed beyond this date, the survey should be updated to determine any changes to the status of the site and the evaluation of impacts. It should also be noted that local planning authorities may require updated surveys within a shorter timescale than two years.

The evaluation and recommendations within this report are based on the proposed development information provided by the client (as detailed in Section 4.1 of this report). If the development proposals change, the report will need to be reviewed to determine if all recommendations remain appropriate.

CONTENTS

SUMMARY

- A Preliminary Ecological Appraisal (PEA) (including a Phase 1 Habitat Survey and protected species assessment) and a survey for invasive non-native species was carried out at land at Paget Cottage, Little Awefield, Abbeydale, Gloucester GL4 4DF on 16th February 2022. The assessments were required to inform proposals to construct a single dwelling in the front garden of the existing property.

- The purpose of this report is to identify all important ecological features that could be affected by the development; identify, describe and evaluate all the potential impacts associated with the proposed development, and identify likely significant ecological effects of the development.

- The survey area comprises 0.15 ha, which includes the application site (red line boundary, 0.7 ha) and Paget Cottage to the north (remaining blue line ownership boundary, 0.8 ha). The site consists of a lawned garden, bordered by hedgerows and trees, with Paget Cottage located in the northern section.

- The habitats present on site are amenity grassland, hedgerows, shrubs and trees. These habitats are common and widespread in the UK and it is not considered that habitat losses will result in a significant ecological impact. However, the presence of protected species cannot be ruled out, and precautionary methods and mitigation measures will be implemented to prevent harm or disturbance to retained habitats, and upon protected species including bats, badger, great-crested newt, reptiles and breeding birds.

- The background data search revealed records of great crested newts near to the application site. There are no ponds on the site, and no mapped ponds present in the local area. Given the small scale of the proposed works and low suitability of terrestrial habitats present, the risk of legal offences on great crested newt is considered to be very low. Therefore a **Non-Licensed Method Statement** is provided in Appendix 4, which includes reasonable avoidance measures for avoidance of harm to great crested newts during construction works.

- Montbretia *Crocosmia x crocosmiiflora* was recorded within the survey area. This plant species is a non-native invasive species, listed on Schedule 9 of the Wildlife and Countryside Act; it is an offence to cause this plant to grow or spread in the wild. To avoid committing an offence, an appropriate strategy for preventing further spread of this species is provided.

- Current planning policy requires that all developments must deliver biodiversity net gain or ecological enhancements. Recommendations for enhancements including bat and bird boxes and wildlife friendly native planting are provided in Appendix 5.

- The findings and conclusions of this assessment are only valid for a maximum of two years from the date it was carried out (February 2022). Should the proposed development be delayed beyond this date, the surveys should be updated; it should also be noted that regulatory authorities may require updated surveys within a shorter timescale than two years.

1 INTRODUCTION

1.1 Background

A Preliminary Ecological Appraisal (PEA) (including a Phase 1 Habitat Survey and protected species assessment) and a survey for invasive non-native species was carried out at a site known as Paget Cottage, Little Awefield, Abbeydale, Gloucester GL4 4DF on 16th February 2022. The site is centred at OS grid reference SO85421584.

The surveys and assessments are required to inform proposals for construction of a single dwelling within the front garden of the existing property. The client has confirmed that they have not commissioned any previous ecological surveys of the site.

1.2 Personnel

The survey was undertaken and this report prepared by Camilla Winder MCIEEM of Swift Ecology Ltd. Camilla Winder is employed as an Ecologist at Swift Ecology Ltd. She has 19 years' experience of undertaking professional ecology surveys and ecological consultancy work. She has undertaken a wide variety of preliminary ecological assessments and protected species surveys, including botanical and habitat surveys, and surveys for great crested newts, reptiles, bats, badgers, water voles, and breeding and wintering birds. She holds Natural England survey licences for great crested newt (Class Licence reference 2015-16312-CLS-CLS) and dormice (Class Licence reference 2016-22106-CLS-CLS).

1.3 Ecological Context

Paget Cottage is located in a suburban area on the south-east edge of the city of Gloucester. It is situated off a small road known as Little Awefield, that borders the eastern edge of the Sud Brook, within the suburb of Abbeydale. Robinswood Hill Country Park is located approximately 0.5 km to the east. To the north of the site, the conurbation of Gloucester City extends for 4 km. To the south of the site, within approximately 2 km, the M5 motorway borders the south-eastern edge of the city. Beyond lies the rural district of Upton St. Leonards and the wooded ridge of Prinknash Park and Painswick Beacon at the southern edge of the Cotswold Hills. The city of Gloucester is bordered on its eastern edge by the Gloucester and Sharpness Canal and the River Severn.

A wooded stream corridor, the Sud Brook, borders the western edge of Little Awefield and is adjacent to the south-western boundary of the site. The stream is bordered by tall trees on both sides. The Sud Brook is a tributary of the River Twyver, a tributary of the River Severn.

The site location and surrounding landscape are illustrated in Figures 1.1 and 1.2.

Figure 1.1: Paget Cottage, Abbeydale, Gloucester, showing location and landscape context

Figure 1.2 Paget Cottage, Abbeydale, Gloucester, showing red line application boundary and blue line ownership boundary.

1.4 Purpose of Report

The purpose of this report is to identify all important ecological features that could be affected by the development; identify, describe and evaluate all the potential impacts associated with the proposed development, and identify likely significant ecological effects of the development.

This report also sets out the mitigation, compensation and enhancement measures required to address significant ecological effects and to ensure compliance with nature conservation legislation and planning policy.

The legal protection/controls and planning policies relevant to the designated sites, habitats or species mentioned in this report are detailed in Appendix 1.

The report format follows the 2018 CIEEM guidance, modified to reflect the small size of the site and the limited impact of the development.

2 METHODS

2.1 Scope of Assessment

The scope of the assessment reflects the relatively small size and the likely limited impacts of the proposed development. The zone of influence is considered to be: the habitats within the red line boundary within which the development will occur; and the surrounding blue line land ownership boundary and immediately adjoining features of biodiversity interest; and the Local Wildlife Sites and other designated sites within a 2 km radius. The important ecological features considered as part of this assessment are designated sites[1], protected/priority habitats and species[2], and legally controlled invasive non-native species[3].

2.2 Background Data Search

A background data search was undertaken in February 2022 by Gloucestershire Environmental Records Centre (GCER) for records of designated sites[4] and protected, priority[5] and invasive non-native species[6] within a 2 km radius.

Reference was also made to Natural England's MAGIC website[7] for:

- Site of Special Scientific Interest (SSSI) Impact Risk Zones (IRZ) within the site;
- records of granted Natural England protected species licences within a 1 km radius (great crested newt) and 2 km radius (bats);
- records from great crested newt class survey licence returns within a 1 km radius; and,
- pond surveys (Habitat Suitability Index and eDNA) carried out by Natural England between 2017 and 2019 within a 1 km radius.

[1] Designated sites are taken to mean statutory sites designated under international conventions or European legislation, statutory sites designated under national legislation, and locally designated sites. Impact zones (e.g. SSSI) are also included.
[2] Priority habitats and species are taken to mean habitats and species of principal importance for the conservation of biodiversity in England, local biodiversity action plan habitats and species, and red-listed, rare and legally protected species, and species endemic to a country or geographic location (as defined within *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2017)).
[3] Invasive non-native animal and plant species that are listed on Schedule 9, Parts I and II respectively, of the Wildlife and Countryside Act 1981 (as amended), and EU Regulation 1143/2014 on Invasive Alien Species (as amended).
[4] Designated sites are taken to mean statutory sites designated under international conventions or European legislation, statutory sites designated under national legislation, and locally designated sites. Impact zones (e.g. SSSI) are also included.
[5] Priority species are taken to mean species of principal importance for the conservation of biodiversity in England, local biodiversity action plan species, and red-listed, rare and legally protected species, and species endemic to a country or geographic location (as defined within *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2017)).
[6] Invasive non-native animal and plant species that are listed on Schedule 9, Parts I and II respectively, of the Wildlife and Countryside Act 1981 (as amended), and EU Regulation 1143/2014 on Invasive Alien Species (as amended).
[7] https://magic.defra.gov.uk/MagicMap.aspx

2.3 Field Survey

2.3.1 General

A Preliminary Ecological Appraisal, comprising a Phase 1 Habitat survey and assessment for protected, priority and invasive non-native species, was undertaken following standard methods as described in the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017).

The survey was undertaken on 16th February by Camilla Winder of Swift Ecology Ltd. Weather conditions at the time of the surveys are shown in Table 2.1. The survey covered all land within the applicant's ownership; within red line and blue line boundaries (see Figure 3.1, Section 3). Adjacent habitats were also briefly assessed.

Table 2.1: Survey conditions

Date	Approximate start time	Weather conditions
16.02.22	10:00	Sunny, mild, 12°C.

2.3.2 Habitat Survey

The habitat survey was carried out in accordance with the Phase 1 Habitat Survey Methodology (JNCC, 2010). This comprised the following elements:

- Habitat descriptions for each separate habitat type.
- Habitat map (locations of all habitat/site boundaries, trees etc. are approximate).
- Target notes to identify particular areas of interest or concern.

2.3.3 Protected Species Assessment

The suitability of habitats for protected animal species was assessed at the same time as the Phase 1 Habitat Survey and incidental evidence of such species was recorded if encountered. Species that might be expected to be present in the geographic location include bats, dormouse *Muscardinus avellanarius*, badger *Meles meles*, otter *Lutra lutra*, water vole *Arvicola amphibius*, nesting birds, reptiles, great crested newt *Triturus cristatus* and white-clawed crayfish *Austropotamobius pallipes*.

Species including dormouse, water vole and white clawed crayfish were scoped out of this assessment due to an absence of suitable habitat within the site or zone of influence and lack of connectivity to suitable habitats within the wider area.

Bats

Within the surveyed area, the buildings include Paget Cottage (a two storey red brick detached dwelling) and a concrete panel free standing garage. As the buildings will not be directly affected they were not subject to a detailed assessment, but both were briefly assessed in terms of their suitability for bat roosting, as presence of nearby bat roosts may be impacted by the proposal. The habitats on site and the surrounding area were assessed for bat foraging and commuting potential.

Trees present on the site were subject to a brief ground-level roost assessment, to check for the presence of features with the potential to support bats (e.g. woodpecker holes, rot holes, hazard

beams, horizontal or vertical crack and splits, knot holes and flush cuts/pruning wounds) as described in Collins (2016).

The buildings and trees were assigned a roost potential category (Collins, 2016) according to the criteria outlined in Table 2.2 below, based on the results of the assessment.

Table 2.2: Guidelines for assessing the potential suitability of buildings/structures/trees for roosting bats (based on Collins, 2016).

Category	Category description
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A building or structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A building, structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only).
High	A building, structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Known roost	Building, structure or tree currently supporting bats (based on presence of bats, or evidence of use such as droppings, carcasses etc.).

Otter

Due to the close proximity of the Sud Brook, the habitats on site were assessed for their suitability to support otters. Any incidental signs were recorded if they were encountered. A full survey for these species was not undertaken.

Badger

Habitat was assessed for its suitability for badger foraging and sett digging. Any incidental signs of badgers, such as setts, latrines, foraging signs, or footprints, were recorded if they were encountered. A full badger survey was not undertaken.

Nesting birds

Habitats on site were assessed for their suitability for nesting birds. Any incidental sightings, or active/old nests were recorded.

Reptiles

The suitability of habitats on site for common reptiles (adder *Vipera berus*, grass snake *Natrix helvetica*, common lizard *Zootoca vivipara* and slow-worm *Anguis fragilis*) was assessed, based on

factors such as the quality of the foraging resource, the presence of suitable sites for basking, and the presence of refugia for shelter and hibernation. Detailed reptile surveys were not undertaken.

Great crested newt

Great crested newts use terrestrial habitat within 500 m of breeding ponds; if used by the species for resting, such habitat is protected. Terrestrial habitats on site were therefore assessed for their potential to support the species, based on factors including vegetation structure and composition, the availability of shelter and foraging resources. The proximity of ponds and intervening habitats are also an important factor in determining the likelihood of this species being present on site.

2.3.4 Other Priority Species

General habitat suitability and incidental sightings of other priority species, including species of principal importance for the purpose of conserving biodiversity in England (NERC Act 2006) and Local Biodiversity Action Plan species were noted. However, the presence of many priority species cannot be confirmed without targeted surveys (e.g. lower plants, insects) and thus the type and quality of habitats present (e.g. freshwater) will be used to help assess the likelihood of such species, being present. Species particularly considered as part of this assessment will be mostly limited to mammals, reptiles, amphibians, birds and more easily visible/identifiable plants and insects likely to be present in the geographical region, and which could potentially occur on the site.

2.3.5 Invasive Non-Native Species

Any incidental sightings of relevant invasive non-native species with legal controls were recorded. A full survey was not undertaken.

2.4 Limitations

February is not an optimal time of year for habitat survey because many plants are not in flower and/or leaf and so may not be easily identified. This is not considered to be a significant constraint to this report as the basic Phase 1 habitat types can be distinguished at this time of year, and this report constitutes an initial assessment of habitats only, not a detailed botanical study.

It should be noted that any survey based on a single site visit will miss a significant proportion of the species present on or using the site. As such this report includes an assessment only of the likely presence of protected, priority and invasive species.

3 BASELINE ECOLOGICAL CONDITIONS

3.1 Designated Sites

The locations of designated sites within a 2 km radius of the site are shown on the map provided in Appendix 2, Figure A2.1. The full data search is available on request.

3.1.1 Statutory designated sites

There are two Sites of Special Scientific Interest (SSSI) within 2 km of the site: Robin's Wood Hill Quarry SSSI (listed for its geological importance) just under 2 km to the south-west, and Hucclecote Meadows SSSI (a species-rich neutral grassland site) located just over 1.5 km to the east.

The site falls within a SSSI Impact Risk Zone for Hucclecote Meadows SSSI and Cotswold Beechwoods SAC. Cotswold Beechwoods SAC is an area of ancient woodland on calcareous soils, dominated by beech *Fagus sylvatica*, ash *Fraxinus excelsior* and pedunculate oak *Quercus robur*, and is located approximately 3.5 km to the south-east of the site.

3.1.2 Non-statutory designated sites

There are six Local Wildlife Sites (LWS), and three Local Nature Reserves (LNR), within 1 km. The nearest of these is Robinswood Hill Country Park and Local Nature Reserve (LNR), designated for semi-natural grassland habitats, located approximately 750 m to the south-west, and Matson Wood LWS is located approximately 1 km to the south-west. Saintbridge Balancing Ponds LNR is located approximately 750 m due north of the site, following the course of the Sud Brook.

More distant Local Wildlife Sites include Hucclecote Meadows LWS and LNR, comprising species-rich grassland, located 1.75 km to the east, and Barnwood Arboretum and Park LWS, located 1.9 km to the north.

A list of all designated sites within 2 km, including unconfirmed Local Wildlife Sites, can be found in Appendix 2, Table A2.1 Local Wildlife Sites and Table A2.2 Unconfirmed Local Wildlife Sites.

3.2 Habitats

3.2.1 General

The surveyed area , including the red and blue line boundaries (Figure 1.2), comprises approximately 0.15 ha, which includes Paget Cottage and surrounding garden. A large proportion of the garden comprises mown lawn, which is bordered by hedgerows, some mature trees, ornamental shrub planting, patio areas and driveway adjacent to the house and a small garage. The habitats on site are illustrated in Figure 3.1 and within Plates 3.1-3.16. Target Notes are listed in Table 3.2.

3.2.2 Amenity grassland

There are two lawn areas, one to the south-west of the house and a small lawn to the north-east of the house. Species present within the main lawn include perennial ryegrass *Lolium perenne*, with frequent creeping buttercup *Ranunculus repens*, common daisy *Bellis perennis*, and

occasional to locally frequent red fescue *Festuca rubra*, annual meadow grass *Poa annua*, cleavers *Galium aparine*, and occasional marsh thistle *Cirsium palustre*, common cat's ear *Hypochaeris radicata* and spring crocus *Crocus vernus* (a cultivated garden plant). Occasional ivy *Hedera helix* and bramble *Rubus fruticosus* were also present at margins. A small raised terrace lawn adjacent the western edge of the house comprises frequent red fescue, perennial ryegrass, creeping buttercup, and occasional germander speedwell *Veronica chamaedrys*.

The lawn area to the north-east of the house comprises abundant perennial ryegrass, frequent creeping buttercup, common daisy, a moss *Rhytidiadelphus squarrosus,* locally frequent ground ivy *Glechoma hederacea*, selfheal *Prunella vulgaris*, cock's foot *Dactylis glomerata* and occasional common mouse-ear *Cerastium fontanum*, meadow buttercup *Ranunculus acris*, thyme-leaved speedwell *Veronica serpyllifolia*.

3.2.3 Hedgerows

Hedgerow H1 is a short section of trimmed *Cotoneaster* sp. approx. length 4 m, approx. height 1 m, bordering the western boundary along Little Awefield.

Hedgerow H2 borders the south-eastern boundary of the garden. It is approximately 60 m in length, and is a trimmed, mixed native/non-native shrub hedge, approximate height varies from 2-4 m. The western most section comprises garden privet *Ligustrum ovalifolium*, field maple *Acer campestre* and elder *Sambucus nigra,* with frequent bramble (1.5 m high), followed by a taller section of cherry laurel *Prunus laurocerasus*, and cotoneaster sp. (2.5 m high), and a 4 m tall section of Leyland cypress *Cupressus leylandii*. The northern most section comprises dense bramble and ivy, to height approx. 2 m.

Hedgerow H3 comprises two sections, H3a (16 m), and H3b (5 m). It is located on a low earth bank. H3a comprises mostly garden privet and cherry laurel, trimmed, to height approximately 3 m, with occasional hawthorn *Crataegus monogyna* and elder. At the north end of H3a there is a large old dead tree stump (possibly oak or ash), cut to approx. 3 m height, and a 3 m length of dense trimmed hazel hedgerow, (height approximately 3 m). After a gap of approximately 2 m, hedgerow H3b comprises a taller outgrown section of dense hazel hedge; length approx. 5 m, height approx. 5 m. Ground flora includes lords and lady's *Arum maculatum*, wood avens *Geum urbanum*, cleavers *Galium aparine*, ground ivy *Glechoma hederacea*, with cultivated species including snowdrop *Galanthus nivalis*, daffodil *Narcissus pseudonarcissus* and sow bread *Cyclamen* sp.

H4, along the north-eastern garden boundary, comprises approximately 14 m of tall outgrown native hedgerow, located on an earth bank. Species present include frequent hazel (height approx. 3 m), with a tall cherry/damson *Prunus* sp. (height 6 m), a single ash standard (height 7 m), and occasional holly *Ilex aquifolium*. An old ivy-clad tree stump was present midway along the hedge. Ivy was frequent throughout the hedge. Mistletoe *Viscum album* was also occasional. Ground flora includes locally frequent wood spurge *Euphorbia amygdaloides* and montbretia *Crocosmia* x *crocosmiiflora.*

3.2.4 Scattered trees

At the south-western extent of the driveway, there are three tall trees along the north-western site boundary, approx. height 20 m, including two sycamore trees (one of which is clad in dense

ivy) and a fir *Picea* sp. tree. There is also a tall sycamore tree on the southern site boundary, near to the entrance to the property. A woodland ground flora understorey was present below the trees and within the ornamental shrub border, see 3.2.5 below, including lord's and lady's, common groundsel *Senecio vulgaris*, ivy, cow parsley *Anthriscus sylvestris*, wood avens, bramble *Rubus fruticosus*, ground ivy, cleavers, dandelion *Taraxacum officinale*, herb robert *Geranium robertianum* and common nettle *Urtica dioica*. Leaf litter accumulation below the mature trees may provide refuge for amphibians or hedgehogs (Target Note 1).

Adjacent to the south-west corner of the house, there is a group of three small (height 5-7 m) cherry trees *Prunus avium* and a small elder sapling. The ground flora below includes locally abundant sweet violet *Viola odorata*, with occasional lord's and lady's, cow parsley, and speedwell sp. *Veronica* sp. There are two cherry trees adjacent to the south-east corner of the garage. A small cherry sapling was present on the south-west corner of the house.

Opposite the north-eastern elevation of the house, there is a large outgrown hazel *Corylus avellana*, which is approx. height 7 m. This dense cluster of old and new hazel stems may be a remnant of a former hedgerow. A number of chewed hazel nut shells adjacent to the tree were indicative of feeding signs of wood mouse *Apodemus sylvaticus*).

To the north-western edge of the house there is a small field maple, (approx. height 5 m). This tree is in line with hedgerow H3 and H4 along the north-west garden boundary, and was likely part of the original hedgerow.

Along the north-eastern fence boundary, there is a small hazel tree and a bush orchard apple tree *Malus* sp., on low root stock, with frequent mistletoe on its branches.

3.2.5 Introduced shrubs

On the north-west edge of the garden there is an area of recent shrub planting, that comprises mostly low, trimmed ornamental shrubs, including *Escallonia*, *Euonymus*, fir sp., bay laurel *Laurus nobilis*, *Filipendula sp.,* and montbretia, as well as some native shrubs, including wild privet *Ligustrum vulgare* and gooseberry *Ribes-uva crispa.*

A small winter jasmine *Jasminum nudiflorum* shrub was present on the north-west corner of the house. To the west side of the house, there are two large topiary yew *Taxus baccata* shrubs, trimmed to a ball shape, on either side of a small rockery (approx. 1 m wide by 10 m long). The rockery is neglected with some cultivated shrubs including *Cotoneaster* sp., lavender *Lavandula* sp., *Escallonia* sp. and fir sp., and cultivated garden plants, including montbretia, lemon balm *Melissa officinalis*, spring crocus, *Aubretia*, grape hyacinth *Muscari latifolium*, bluebell *Hyacinthoides* sp., primrose *Primula vulgaris,* and creeping jenny *Lysimachia nummularia.* There are also native grassland species present, including white dead-nettle *Lamium album*, ribwort plantain *Plantago lanceolata*, Yorkshire fog *Holcus lanatus*, bramble, red fescue, perennial sow-thistle *Sonchus arvensis*, black medic *Medicago lupulina*, and selfheal *Prunella vulgaris*.

On the north-eastern garden boundary fence there are four cultivated climbers (*Clematis* sp.) planted along the boundary fence.

3.2.6 Scattered scrub

A small area in front of the gateway to the drive on the south-west boundary comprised small sapling trees such as sycamore, elder and a cultivated shrub sp., underneath the canopy of a tall sycamore tree on the garden boundary. Occasional species include climbers such as ivy, and ground flora including lords and lady's and cow parsley.

3.2.7 Buildings

Paget Cottage is located towards the northern end of the garden. It is a two-storey red brick dwelling with a pitched slate tile roof. Slates and ridge tiles are in good condition. The painted wooden barge boards and soffits at eaves are in good condition, well-sealed with no gaps. The windows are well-sealed double glazed units. The lead flashing on the two chimney stack bases and at roof joins is in good condition/well-sealed.

A small free standing garage located to the north-east of the main house is made of concrete pre-fabricated panels, with a corrugated bitumen felt roof. The sides and roof are clad in dense ivy. There are some bulbs planted along the northern edge. A honeysuckle *Lonicera periclymenum* is planted at the north-western corner.

Plate 3.1: View of Paget Cottage from south-western garden boundary.

Plate 3.2: Trees and hedgerow H1 at entrance on south-west site boundary.

Plate 3.3 Trees and scrub along the Sud Brook, opposite western boundary of Paget Cottage.

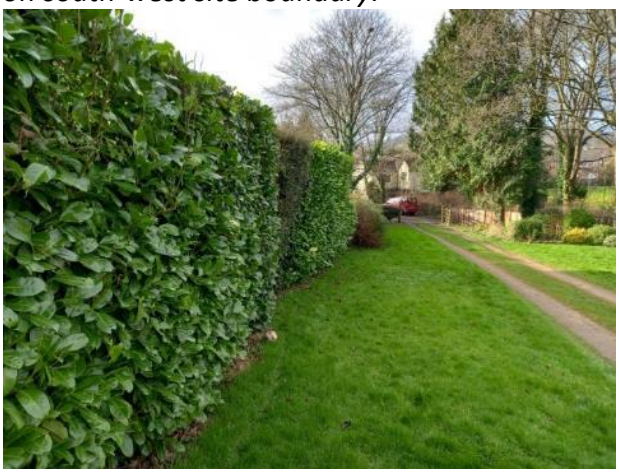


Plate 3.4: Hedgerow H2.view to south

Plate 3.5: View across main lawn to west and hedgerow H3.

Plate 3.6 View to north across amenity grassland to west side of house, Hedgerow H3a and H3b in background.

Plate 3.7: Three cherry trees adjacent south side of house and Hedgerow H3.

Plate 3.8: Small hazel tree borders the lawn edge adjacent to the house.

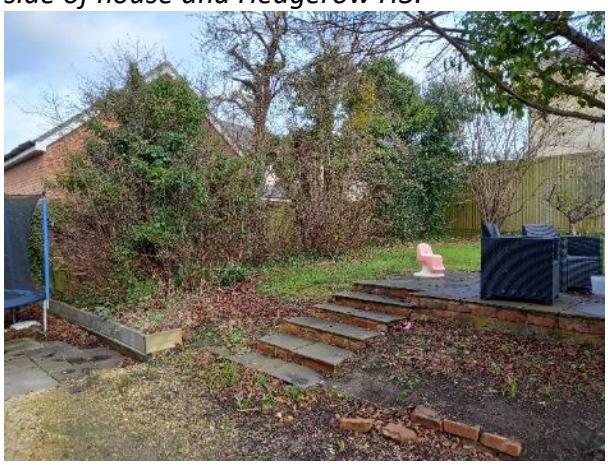


Plate 3.9: Hedgerow H3 on the northern edge of the garden.

Plate 3.10. Garage and cherry tree to north-east of house.

Plate 3.11: View to south across northern lawn area towards Paget Cottage.

Plate 3.12: Fence along fence northern boundary with small hazel and bush-apple tree on low rootstock.

Plate 3.13: Concrete panel garage, view of western edge.

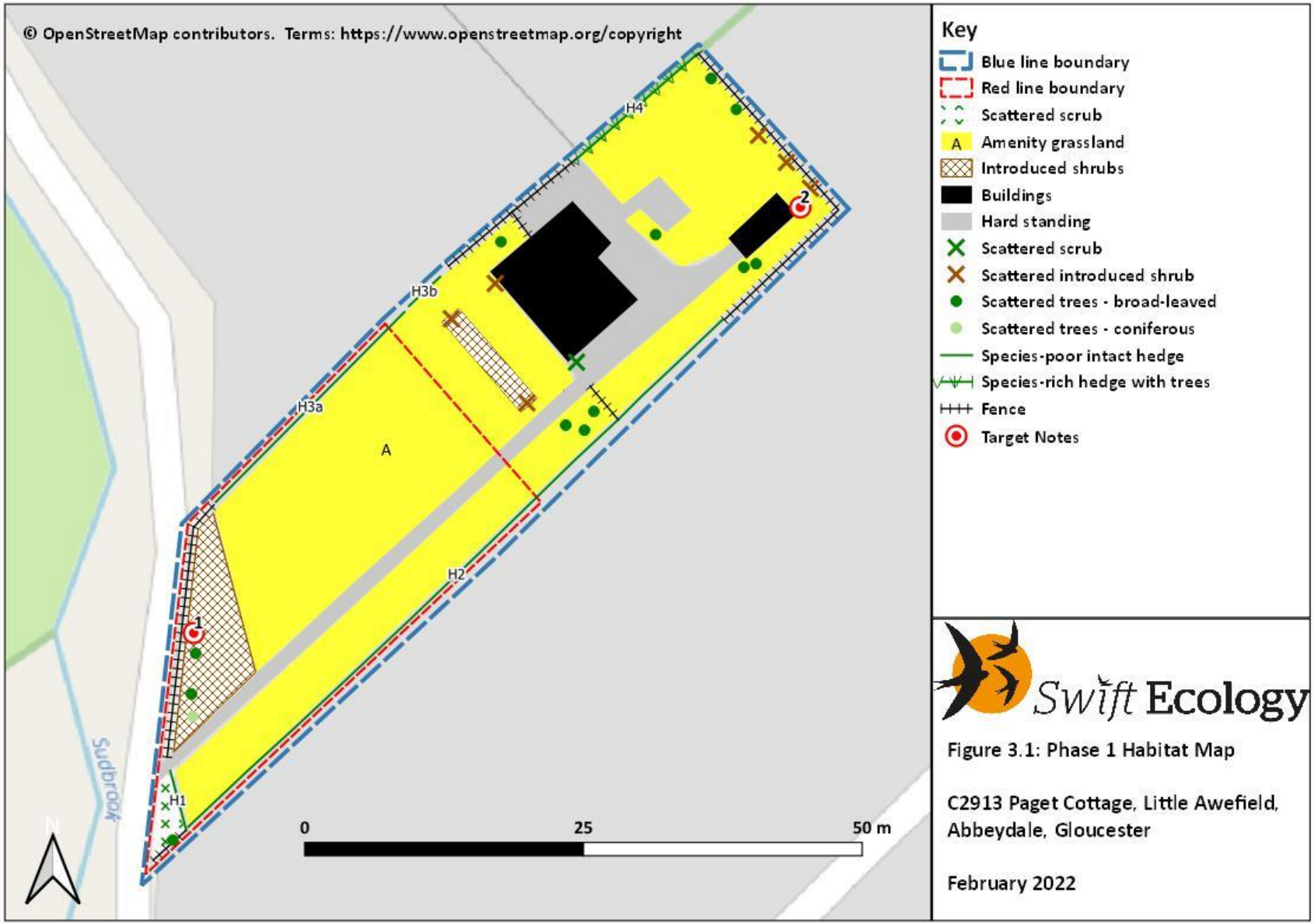
Plate 3.14: North side of garage.

Plate 3.15: Paget Cottage, south-easterm elevation.

Plate 3.16: Paget Cottage, north elevation.

Table 3.2: Target notes (all relate to Figure 3.1)

Target note	Description
1	Leaf litter below mature trees may provide terrestrial cover/refuges for amphibians or hedgehogs.
2	Mammal run across northern edge of garage from adjacent fence, probable rabbit *Orytolagus cuniculus* or hedgehog *Erinaceous europaeus.*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H4
H3b
H3a
A
H2
H1
1
2
Sudbrook
N
0
25
50 m
Key
Blue line boundary
Red line boundary
Scattered scrub
A Amenity grassland
Introduced shrubs
Buildings
Hard standing
Scattered scrub
Scattered introduced shrub
Scattered trees - broad-leaved
Scattered trees - coniferous
Species-poor intact hedge
Species-rich hedge with trees
Fence
Target Notes
Swift Ecology
Figure 3.1: Phase 1 Habitat Map
C2913 Paget Cottage, Little Awefield, Abbeydale, Gloucester
February 2022

3.3 Protected and Priority Species

Relevant protected and priority species records within 2 km of the site, are given below and maps are provided in Appendix 3. None of the records provided relate directly to the study site. The full data search is available on request.

An absence of records does not mean that a species is not present, merely that it has not been recorded. Some species records are not obtainable from the sources utilised and there may be further undetected records for such species on the study site or in the local area.

3.3.1 Bats

GCER provided 15 records of bat species from within 2 km of the site, dating from 1991 to 2018. These include in flight records of bats, individual bats, and some records that were not identified to species level. A map showing the locations of bat records within 2 km is provided in Appendix 3, Figure A3.1. There are records of *Pipistrelle* sp., common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus, Myotis* sp. bats and *Chiroptera* bat spp.

The nearest records include *Pipistrellus* sp. recorded from a suburban area approximately 600 m due north of the site (dated 1993), and a soprano pipistrelle recorded from a suburban area approximately 600 m to the south-east (dated 2017). The nearest confirmed bat roost is at Matson, approximately 1 km due south of the site (dated 2014); low numbers (maximum count 2) of common pipistrelle and one *Myotis* sp. were recorded from a roost in farm buildings.

Reference to Natural England's Magic website, which holds records of granted bat mitigation licenses issued by Natural England since 2009, identified two bat licenses issued within 2 km of the site, these include a location approximately 1.9 km to the west, (EPSM2013-6193), for a non-breeding brown long-eared bat roost, and a location just over 2 km to the south-east, in the Upton St. Leonard's area (2018-43445-EPS-MIT) including destruction of a resting place for brown long-eared bat, common pipistrelle, lesser horseshoe bat *Rhinolophus hipposideros* and soprano pipistrelle.

Assessment of habitats for bats

The Sud Brook, a wooded brook, located only a few metres from the south-western boundary of the site, provides moderate quality bat foraging habitat (given its location within a predominantly suburban setting). The brook corridor comprising tall, mature native woodland trees continues for approximately 1 km to the north and 1 km to the south of the site, and connects to other wooded stream corridor networks across the city, such as the River Twyver, located 700 m to the east and the Wotton Brook, 2 km to the north-east. As such it provides potentially important commuting and foraging habitat for bats in the local area. There is a small copse associated with the brook approximately 200 m north of Paget Cottage, which would provide foraging habitat for bats.

Much of the suburban environment surrounding Paget Cottage and the Sud Brook corridor is generally low quality bat foraging habitat (mainly comprising suburban gardens and amenity greenspace), while high levels of urban street lighting may deter more light-averse bat species. Approximately 500 m to the west, the wooded environs at the eastern edge of Robinshill Wood Country Park provide higher quality bat foraging habitat.

Assessment of buildings bats
Paget Cottage is a red brick two-storey building, with modern refurbishments, such as roof, window frames and door frames all in good condition and well-maintained, with few or no gaps to allow bat access to internal roof spaces. However the roof and other internal areas were not surveyed in detail. There may be potential access points for bats into the building via the gaps at eaves. Given the location in close proximity of a wooded stream corridor, the possibility of bat roosts present cannot be ruled out, and overall, the house is considered to offer Moderate suitability for roosting bats.

The concrete panel shed provides little in the way of potential bat roost features, and would have little or no thermal insulating properties to provide shelter for roosting bats. For these reasons, it is assessed as having Negligible bat roosting potential.

3.3.2 Otter

GCER have returned two records for otter within 1 km of the site, including feeding remains at a fishing pond at Matson (dated 2018), just under 500 m to the west of the site, and one in an urban location near to the River Twyver (dated 2017), approximately 700 m to the south-east of the site.

The Sud Brook provides suitable habitat for otters, and the close proximity of Paget Cottage and gardens, within 5 m of the western garden boundary, means that there is potential for animals to forage/explore habitats within the garden areas. There are no parts of the garden that appear to provide suitably dense vegetative cover of the type that could be used as terrestrial refuges by otters.

3.3.3 Badger

GCER hold two records of badgers within 1 km of the site, dating from 2006 to 2020. The nearest of these are two records from an area of greenspace adjacent the River Twyver, approximately 1 km m due north-east of the site. There are two records from farmland located approximately 1.5 km due south of the site, one approx. 1.25 km due east from open farmland near to the M5, and two records approximately 2 km to the west of the site, within Robinswood Hill Country Park.

Most of the badger records are associated with open grassland habitats; areas within the built-up parts the city are generally unfavourable. However the Sud Brook and amenity grassland immediately west of the brook and within the garden of Paget Cottage could offer potential badger foraging habitat. Although there is generally limited connectivity of greenspaces across the suburbs of Matson and Abbeydale, there is potential for presence of this species on or near to the site.

The level ground within the site is generally unsuitable for badger sett building and no signs of badger were recorded.

3.3.4 Birds

The GCER data search returned a large number (81) of protected and Priority bird records within 2 km. Important bird species recorded that could be present within the garden area at Paget Cottage as breeding birds, include species that nest on building eaves, such as house sparrow *Passer domesticus*, swallow *Hirundo rustica*, swift *Apus apus*, starling *Sturnus vulgaris*.

Species that could nest in shrub and hedgerows on the site include dunnock *Prunella modularis*, song thrush *Turdus philomenos*, mistle thrush *Turdus viscivorous*, willow warbler *Phylloscopus trochilus*, bullfinch *Pyrrhula pyrrhula.* Associated with the brook, species including grey wagtail *Motacilla cinerea* and dipper *Cinclus cinclus* have been recorded locally, but are unlikely to nest within the site.

3.3.5 Reptiles

GCER has returned 32 records of reptiles from within 1 km, including slow worm, grass snake and common lizard, dating from 2005 to 2020. The nearest records are for slow worm, recorded at Saintbridge Nature Park, approximately 1 km due north, along the Sud Brook. There could be some habitat connectivity with the site (for mobile species such as grass snake), along the wooded brook corridor, although the dense shade of the wooded margins is not ideal reptile habitat. Other records include slow worm at 1.75 km to the east on an open field to the south of the M5, grass snake 2 km due north of the site at Barnwood Park Nature Reserve, and several records for slow worm, grass snake and common lizard at Robinswood Hill, approximately 1.75 km due west of the site.

The habitats present on the site comprise mostly trimmed hedgerows and short-mown amenity grass and provide limited opportunity for foraging or refuges for reptiles.

3.3.6 Great Crested Newt

The GCER data search returned 56 records of great crested newts from within 2 km of the site, dating from 1999 to 2020. Individual great crested newts have been recorded at two locations from within the surrounding residential built-up area, approximately 275-300 m due east of the site from 2007 and 2008.

There are also records from the eastern side of Robinswood Hill, at Matson Wood, approx. 800 m to the west and approximately 1 km due north of the site at Saintbridge Park. There is potential for animals from these sites to have some terrestrial connectivity with Paget Cottage, via the Sud Brook corridor and associated wooded margins.

There are six other great crested newt licence returns from locations approximately 1.5 km due south of Paget Cottage at open farmland at Sneedham's Green, all dated 2017.

Reference to Natural England's Magic website, which holds records of granted great crested newt mitigation licenses issued by Natural England since 2009, identified 1 licence return (confirmation of presence of great crested newts), dated 2015, at SO85391579. This grid reference is located approximately 25 metres from the south-western boundary of Paget Cottage, on the opposite side of the Sud Brook. There are no ponds mapped or visible from aerial photography at this location.

There were no national pond survey results pond surveys (Habitat Suitability Index and eDNA) as carried out by Natural England between 2017 and 2019 within a 1 km radius.

The garden habitats on site are generally suboptimal for great crested newts, comprising trimmed hedgerows and short-mown amenity grass lawn area; but leaf litter at hedgerow bases and below mature trees and shrub planting on the south-west garden boundary may provide some very

limited opportunities for terrestrial refuge for great crested newts and other amphibians, if present (Target Note 1).

3.3.7 Other Priority Animals

European hedgehog *Erinaceous europaeus*: GCER returned over 70 records for west European hedgehog *Erinaceus europaeus*, a UK Priority species, within 1 km of the site, including two records within 500 m to the north of the site, three records approximately 600 m to the north-west and one 500 m to the south of the site, all within built-up residential areas. There is potential for hedgehogs to be present on the site, e.g. at bases of hedgerows. A mammal track was seen in the grass to the north of garage, (Target Note 2), probable rabbit or hedgehog *Erinaceous europaeus*, from the fence line on the southern boundary crossing the garden to the north, towards hedgerow H4.

Common toad *Bufo bufo*: There are 43 records of common toad, a Priority species, within 2 km, many of which are from three known 'toad crossing' sites, (as listed in Appendix 2, Table A2.2, Unconfirmed Local Wildlife Sites, Froglife registered Toad Patrol locations) where toads are found crossing roads in the spring time to reach their breeding ponds. These include Matson Lane, located 550 m from the site to the south-west, Upton St. Leonard's Crossing (1.25 km from site to the south-west) and Coopers's Edge -Lobley's Drive (1.9 km from site to the north-east). Given the close proximity of these records, despite the urban setting, given the presence of green corridors, such as gardens and open spaces within the built-up areas, there is potential for toads to be present on the site.

European eel *Anguilla anguilla*: GCER has returned two records of European eel, a Priority species, within 2 km, including one record from the Sud Brook, approximately 500 m due south of the site. Although mostly confined to the water course, eels may be present in terrestrial habitats adjacent to the Sud Brook.

Polecat *Mustela putorius*: GCER returned a single record of polecat, a UK Priority species, from a rural location approx. 1.4 km to the south-east of the site. This highly mobile species could potentially forage across the nearby wooded Sud Brook and any mature trees/hedgerows on the site.

Although not protected or priority status, there are 58 records of common frog *Rana temporaria*, 28 records of palmate newt *Lissotriton helvetica* and 35 records of smooth newt *Lissotriton vulgaris* returned from within 2 km of the site.

3.3.8 Priority Plants and Fungi

Within 2 km, there are records of bluebell *Hyacinthoides non-scripta*, and green winged orchid *Anacamptis morio*. GCER returned no records of priority plant or fungi species from within the site boundary or near to the site.

3.4 Invasive Non-Native Species

GCER has returned 14 records of Canada goose *Branta canadensis* and three records of ring-neck parakeet *Psittacula krameria* within 2 km of the site.

There are records of the following non-native invasive plant species within 2 km of the site, Japanese knotweed *Fallopia japonica*, variegated yellow archangel *Lamiastrum galeobdolon* subsp. *argentatum*, giant hogweed *Heracleum mantegazzianum*, floating pennywort *Hydrocotyle ranunculoides*, and Indian balsam *Impatiens glandulifera*.

The non-native invasive plant, montbretia *Crocosmia x crocosmiiflora* is present within ornamental shrub planting area and hedgerow H4 of the garden at Paget Cottage.

4 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposal is for construction of a single detached dwelling to the south of Paget Cottage, within the red line boundary of the garden. The location and layout of the proposal is shown in Figure 4.1 below.

The proposal will require removal of hedgerow on the north-western garden boundary, and three trees on the southern boundary bordering Little Awefield will be removed. An area of recent ornamental shrub planting and an area of short-mown amenity grassland will also be lost.

The southern boundary hedgerow will be retained, and the access track along the southern edge of the plot to Paget Cottage will be retained.

Figure 4.1 Showing the red line boundary (left) and proposed site layout (right) for Land at Paget Cottage (Brodie Planning Associates, Drawings 3005-001 and 3005-02, dated March 2022).

5 ASSESSMENT OF EFFECTS

5.1 Designated Sites

Potential Impacts

No designated sites will be directly affected by the proposed development. The site is located within a SSSI Impact Risk Zones for Hucclecote Meadows SSSI and the Cotswold Beechwoods SAC. There are not considered to be any impacts in terms of site drainage/run-off, that would affect either of these sites and for which the Impact Risk Zones are triggered.

Mitigation and Compensation Measures

No mitigation or compensation measures are required for designated sites.

Significance of Residual Effects

No residual effects are anticipated.

5.2 Habitats

Potential Impacts

The proposed new dwelling in the southern part of the garden will result in the loss of approximately 0.05 ha amenity grassland, 17 m of hedgerow (H3a), and removal of three mature trees along the south-western boundary and adjacent ornamental shrub planting. Paget Cottage and gardens to the north of the plot are to be retained (within the blue line boundary) and will not be affected by the proposal.

The amenity grassland and ornamental shrub planting area are not 'semi-natural' habitats, in accordance with Phase 1 Habitat survey methodology, and as such the loss of these habitats will not result in a significant ecological impact.

Hedgerows and trees

The proposed loss of three mature trees will have a minor impact in terms of loss of intrinsic value of mature trees and associated wildlife. The proposed loss of 17 m of hedgerow H3a will have a minor impact in terms of loss of a hedgerow habitat and a wildlife corridor. Although much of this hedgerow comprises garden privet and laurel, both non-native plants. From the plans provided it appears that a few metres of dense hazel hedge at the north end of the hedgerow will be retained.

The trees at the south-west end of the garden and hedgerow H3a and H3b along the north-western garden boundary presently provide terrestrial habitat connectivity from the Sud Brook in the west, towards gardens and habitats to the north and east. The loss of such features would reduce habitat connectivity in the area. However, the hedgerow along the southern garden boundary (H2) is planned to be retained, and also provides a linear habitat feature connecting the brook to habitats to the north and east.

Impacts upon protected species that may occasionally use these habitats, and associated mitigation, are considered in Section 5.3 below.

The Sud Brook
Impacts to the wooded brook corridor will be minimal, as the brook is not directly affected by the proposal. The mature trees along the brook provide a corridor for movement of wildlife in the local area north to south along the route of the brook. There is potential for indirect impacts on the water quality through pollution or run-off incidents during site clearance, construction and operational activities. Pollution prevention measures will be implemented to avoid pollution and/or run-off from entering the local water course.

Mitigation and Compensation Measures
Hedgerows and trees
Hedgerows are a Priority habitat. Ideally as much original native hedgerow as possible should be retained within the new landscaping scheme. All retained hedgerows should be protected by a Root Protection Area by installation of temporary fencing, to protect retained trees and hedgerows, including all root plates and canopies, from construction activities, including vehicle movements, in line with British Standard *BS5837:2012 Trees in relation to design, demolition and construction – Recommendations.*

The Sud Brook: Pollution Control
- Appropriate pollution control measures will be implemented during the site clearance and construction phase, and a pollution incident response plan will be prepared in case of emergencies, e.g. fuel spills and site run-off, in accordance with standard government guidance[8].
- All contractors will be made aware of the necessity to minimise, and where possible eliminate, activities resulting in erosion and substrate/soil loss; this will include minimising excavation and surfacing works close to the watercourse/waterbody.
- Any drainage systems that are required as a part of the development, must be designed to include appropriate pollution control measures throughout the lifetime of the development, and could include the incorporation of a sustainable drainage system[9].

Significance of Residual Effects
Provided that mitigation measures to compensate for loss of trees and hedgerows, are put in place, no residual effects are anticipated.

5.3 Protected and Priority Species

5.3.1 Bats

Potential Impacts
The habitats surrounding the site are likely to offer locally important foraging and commuting opportunities for bats. Paget Cottage is assessed as offering some limited bat roosting opportunities, and is assessed as being of moderate suitability for roosting bats. The garage is assessed as having negligible suitability. However, given the distance between the new dwelling

[8] https://www.gov.uk/guidance/prevent-groundwater-pollution-from-solvents#prepare-for-emergencies-create-a-pollution-incident-response-plan
[9] https://www.gov.uk/government/publications/best-management-practices-for-urban-drainage

and Paget Cottage (approx. 12 m), no direct or indirect impacts are likely in the event of a bat roost being present.

None of the trees on the site were identified as having bat roost potential. The loss of trees at the western edge of the site and hedgerow H3a may have a minor impact through the reduction of bat foraging habitat. However the brook corridor, which is the main linear wooded corridor, just a few metres to the west, is not affected by the proposal and provides an abundance of higher quality habitat that than to be lost.

The risk of impacts upon bats and their roosts arising from the proposed works is Negligible. Loss of trees/foraging habitat is considered to be a minor (not significant) impact, given the presence of other nearby hedgerows and the wooded corridor of the Sud Brook.

Mitigation and Compensation Measures

Any proposed lighting associated with the new dwelling could impact on bat flight paths. To minimise the impact on bats during development, night-time working will be avoided, and the site will not be illuminated at night during the construction phase.

Lighting

Any exterior lighting associated with the new dwelling must be designed and sited so as not to impact on potential bat commuting/foraging features (i.e. hedgerows and trees) within the garden and especially the adjacent corridor of the Sud Brook. Mitigation measures may include some or all of the following:

- Careful placement of luminaires so that they illuminate only the required areas and minimise light spill on suitable foraging habitat nearby;

- The use of appropriate luminaires, with no UV component, warmer colours (i.e. more yellow/orange, ideally <2700 Kelvin (and 3000 Kelvin as a minimum)) and peak wavelengths higher than 550 nm;
    - LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.

- The use of luminaires with an upward light ratio of 0 % and with good optical control;

- The use of security lighting with motion sensors and short (1 minute) timers; and/or

- The use of dimming or part-night lighting.

Further information can be found in '*Bats and artificial lighting in the UK; Guidance Note 08/18*' (Miles *et al.*, 2018). and '*Domestic exterior lighting: getting it right!; Guidance Note 09/19'* (Institute of Lighting Professionals, 2019).
No compensation measures are required.

Significance of Residual Effects

Provided that mitigation measures are put in place, no residual effects on bats are anticipated.

5.3.2 Otter

Potential Impacts

The habitats present within the survey area have negligible value for otter, and this species is unlikely to occur on the site. Therefore, potential impacts upon this species resulting from the proposals are not anticipated. In the unlikely event this species may occasionally cross the site, precautionary measures for mammals will be implemented to avoid entrapment during construction.

Mitigation and Compensation Measures

- Any excavations undertaken during construction, including deep trenches or holes that will be left overnight, will be fitted with suitable ramps at either end to allow otters (and other mammals that might be able to access the site), a means of escape.

Significance of Residual Effects

Providing the above mitigation measures are put in place, no residual effects on otters are anticipated.

5.3.3 Badger

Potential Impacts

There are no badger setts on or near to the survey area and given the habitats present on the site, it is considered unlikely that badgers will establish a sett on the site in the near future. However, the presence of individual badgers commuting across the site cannot be ruled out, and thus precautionary measures are required to avoid entrapment during construction.

Mitigation Measures

- Any excavations undertaken during construction, including deep trenches or holes that will be left overnight, will be fitted with suitable ramps at either end to allow badgers, and other mammals that might be able to access the site, a means of escape. Open pipework greater than 150 mm in diameter will be blocked off at the end of each day (see BS42020 D3.3).
- If during any stage of works a badger sett is discovered, all work must stop immediately and the advice of a suitably qualified ecologist should be sought.

Compensation measures are not required for this species.

Significance of Residual Effects

Provided that mitigation and compensation measures are put in place, there should be no residual effects on badgers.

5.3.4 Birds

Potential Impacts

The removal of 17 m of hedgerow and three mature trees, as part of the development, could result in the loss of habitat for nesting birds; however, the nearby wooded brook and other adjacent hedgerows also provide habitat for nesting birds and therefore the clearance of a small number of trees is likely to have a negligible impact on birds, outside the breeding season.

Mitigation and Compensation Measures

- All nesting birds are protected by law. To avoid committing an offence, all areas of scrub removal, e.g. as part of hedgerow management, must be carried out outside of the nesting bird season (March to August, inclusive).
- If this is not possible, the habitat must be checked immediately prior to removal by a suitably qualified ecologist. If there are nesting birds present, works that would destroy, damage or disturb the nest must stop until the chicks have fledged and left the nest.
- To compensate for the loss of potential bird nesting habitat, a nest box will be installed either on the new dwelling or on a mature tree within the site. Examples of suitable boxes are provided in Appendix 5, Section A5.5.

Significance of Residual Effects

Provided that mitigation and compensation measures are put in place, no residual effects on nesting birds are anticipated.

5.3.5 Reptiles

Potential Impacts

The habitats on site are of negligible suitability for reptiles, and as such they are considered unlikely to be present. However, there are recorded populations of slow worm along the Sud Brook corridor, within 1km, but suitable areas of habitat on the site are most likely too small to support a viable population of reptiles. Nonetheless, the occasional presence of reptiles on the site cannot be completely ruled out.

Mitigation and Compensation Measures

The mitigation measures described for great crested newt below are also applicable to reptiles. Compensation measures are not required for this species.

Significance of Residual Effects

Provided that measures adopted for great crested newts are put in place, there should be no residual effects upon reptiles.

5.3.6 Great Crested Newt

Great crested newts are most likely to use terrestrial habitats within 50-100 m of ponds (Cresswell and Whitworth, 2004). There are no ponds on the site, and no mapped ponds within 250 m as indicated on OS mapping and aerial photography.

There are records of a great crested newt survey licence return (not development licence) from 2015 at a location within approximately 25 m of the site boundary. There are no indications of a pond being present at this location; the grid reference could include the Sud Brook, and/or gardens of adjacent properties.

The results returned from the data search indicate that great crested newts have been recorded approximately 300 m to the east of the site. From aerial photography, and available mapping, there are no identified garden ponds within close proximity to the site, but due to the presence of records within 50 m to 300 m, the potential for presence of great crested newts cannot be ruled out.

Photographs of the Sud Brook at this approximate location are shown in Plates 5.1.to 5.4. Great crested newts can occasionally be found in ditches and slow-flowing brooks but typically prefer still/standing water, not fast-flowing water courses such as the Sud Brook is at this location, which would not be considered as a suitable breeding habitat for great crested newts.

Plate 5.1: The Sud Brook, just south of the entrance to Paget Cottage view to south

Plate 5.2: The Sud Brook showing house located on the northern bank on the Wheatridge, view to north.

Plate 5.3: The Sud Brook, just north of the Paget Cottage entrance, view to north.

Plate 5.4: Paget Cottage driveway entrance on Little Awefield, view to north-east, with margins of the Sud Brook visible on the west side of the road.

Terrestrial habitat suitability

The garden habitats on site are assessed as being generally suboptimal for great crested newts, comprising trimmed hedgerows and short-mown amenity grass lawn areas. Leaf litter at hedgerow bases and below mature trees and shrub planting on the south-western garden boundary may provide some very limited opportunities for terrestrial refuge for great crested newts and other amphibians, if present.

Within the local area, walls, fences, buildings and roads of the surrounding residential area will act as barriers to terrestrial movement of amphibians. It is considered that due to the presence of fast-flowing water, the brook will act as a barrier to dispersal of great crested newts; however, if newts are present within terrestrial habitat on the eastern bank of the brook, or if flow levels are reduced in summer months, then there would be no barrier to dispersal of great crested newts across the tarmac road surface of Little Awefield via the open gateway to the driveway at Paget Cottage (see Plate 5.4).

The development proposal will involve some loss of some suboptimal great crested newt terrestrial habitat, such as leaf litter below trees on the south-western boundary, and disturbance of all habitats within the red line boundary, during construction work.

Mitigation Measures

Due to small scale of the proposal (0.7 ha), and unsuitability of much of the area (short-mown amenity grassland), it is considered that the works are relatively unlikely to result in legal offences upon this species, as long as strict Reasonable Avoidance Measures (RAMs) for great crested newts are adopted. These are detailed in a Non-licensed Method Statement included within Appendix 4 of this report.

Implementation of this advice will reduce the risk of legal offences upon this species sufficiently for the works to proceed without a licence from Natural England.

Significance of Residual Effects

Provided that mitigation measures are put in place, there should be no residual effects on great crested newt or any other amphibians.

5.3.7 Other Priority Animals

Potential Impacts

Occasional movements of other notable species, such as hedgehog, common toad, and polecat, cannot be ruled out completely; consequently, precautionary measures will be adopted to prevent entrapment (see 'Badger' above). If a hedgehog/toad is discovered it will be moved to a place of safety nearby, such as a sheltered hedgerow base.

Mitigation and Compensation Measures

Any newly installed boundary fencing will incorporate gaps at the base (approximately 13 cm by 13 cm) to allow hedgehogs and other animals to pass through gardens in the local area.

Significance of Residual Effects

Provided that mitigation measures are put in place, there should be no residual effects on hedgehog, common toad or any other animal.

5.3.8 Priority Plants and Fungi

Potential Impacts

There is no proposed loss of Priority plants or fungi as a result of the development.
As such there is no proposed mitigation or compensation.

Mitigation and Compensation Measures and Residual Effects

No impacts are predicted and thus no such measures are required, and no residual impacts are predicted.

5.4 Invasive Non-Native Species

Potential Impacts

The non-native invasive plant species montbretia *Crocosmia x crocosmiiflora* is present within garden planting. It is listed on Schedule 9 of the *Wildlife & Countryside Act*, for its ability to set seed and grow in the wild. Although it is not an offence to have this plant in a garden, it is an offence to allow it to set seed in the wild.

It is present in an area that will be affected by the proposal, the shrub planting at the south-western edge of the garden, and so efforts to remove and prevent its further spread will be required.

Mitigation Measures

Removal of this plant by digging, to excavate the root system, and careful disposal as garden waste (e.g. via local civic amenities site) will prevent it from further establishing/setting seed in the wild.

Significance of Residual Effects

Provided that mitigation measures are put in place, there should be no residual effects.

5.5 Cumulative Effects

Due to the nature and small scale of the proposals it is considered unlikely that there will be any cumulative effects associated with the proposed development that would have an adverse impact on designated sites, priority habitats, or protected or priority species.

The habitats that would be lost as a result of this proposal are not especially representative of high quality semi-natural habitat, comprising mainly amenity grassland and a section of trimmed non-native hedgerow.

Compensation measures for the loss of hedgerow and mature trees should include planting native hedgerow and native trees. Additional habitat enhancement measures are included in Section 6.

5.6 Summary of Mitigation, and Compensation Measures

A summary of mitigation, and compensation is given below in Table 5.2; these measures are given in detail within the sections above.

Table 5.2: Summary of Mitigation and Compensation Measures

Feature	Mitigation and Compensation Measures	How will Measure be Secured?	Significance of Residual Effects
Mitigation/compensation measures			
Sud Brook	• Standard measures to limit pollution and run-off must be implemented during the construction and operational phases.	Planning Condition	None
Hedgerows - protection	• All retained hedgerows will be protected in accordance with British Standard BS 5837:2012: Trees in relation to design, demolition and construction. Recommendations.	Planning Condition	None
Bats - lighting	• Design scheme lighting during and after construction to minimise illumination of the Sud Brook corridor and retained hedgerows that provides suitable foraging/commuting habitat.	Planning Condition	None
Badger and otter	• Precautionary measures to be installed during construction period (cover holes/pipework at night or install ramps).	Planning Condition	None
Nesting birds	• Bird nesting habitat to be removed outside of nesting season. If this is not possible, potential nesting habitat will be checked immediately prior to works commencing by a suitably qualified ecologist. If nesting birds are found, works cannot continue until the chicks fledge and leave the nest.	Planning Condition	None
Great crested newt (and reptiles)	• The development methods will be modified using reasonable avoidance measures to minimise any potential impacts upon this species, and to satisfy legislative requirements; measures are detailed in a Non-licensed Method Statement, and must be secured by planning condition. • If at any time a great crested newt or reptile is discovered, all work must stop and an ecologist must be consulted.	Planning Condition	None
Amphibians, and hedgehogs	• If a hedgehog or common toad is discovered it will be moved to a place of safety nearby. • Proposed boundary features to contain gaps at the base to allow animals free passage through the property.	Planning Condition	None
Invasive plants	• It is an offence to cause the spread of plant species listed under Schedule 9 of the WCA in the wild. Control potential spread of invasive plants such as Montbretia *Crocosmia x crocosmiiflora*.	Planning Condition	None

6 RECOMMENDATIONS FOR ECOLOGICAL ENHANCEMENT

Current planning policy requires that development projects minimise ecological damage and should contain elements of ecological enhancement. The Natural Environment White Paper (2011) and National Planning Policy Framework (2021) require that development results in net gains for biodiversity.

A variety of habitat creation and species-specific options should be implemented at the site in order to achieve biodiversity net gain, in line with local and national planning policy, and the Environment Act 2021.

6.1 Habitats

Habitat enhancement/creation that could be implemented at the site, includes the following:

- Wildlife-friendly garden design could include species-rich lawns; for lawned areas, Emorsgate Seeds EL1 – Flowering Lawn Mixture[10] (or similar alternative), will be used to provide a low maintenance lawn mix with native grass and wildflower composition.
- New native tree or hedgerow planting, such as Crab apple *Malus sylvestris* , apple *Malus* sp. varieties, Pear *Pyrus* sp., Bullace/damson *Prunus domestica* ssp. Insititia, Plum *Prunus domestica*, Rowan *Sorbus aucuparia* and ornamental cherry *Prunus* sp. varieties.
- Wildlife friendly shrub planting can provide a flowers suitable for native insect pollinators.

6.2 Protected and Priority Species

- Bird nest boxes could be provided on mature trees or integrated into the new dwelling, to provide additional nest sites, see Appendix 5, Section A5.5 for examples.
- Bat boxes could be installed on mature trees, or integrated within the new dwelling, at eaves of the building. Boxes should be constructed from materials capable of preventing squirrels and woodpeckers from enlarging entrance holes, e.g. Schwegler boxes (made from woodcrete). See Appendix 5, Section A5.6 for examples.
- Hedgehog home/s can be provided in suitable locations, such as hedgerow undergrowth, and ensure there is connectivity between gardens for hedgehogs, see Section A5.8.
- Insect homes/nest boxes could be installed on fence posts, trees or walls, see examples provided in Appendix 5, Section A5.9.

[10] https://wildseed.co.uk/mixtures/view/56

7 RELEVANT LITERATURE

Amphibian and Reptile Groups of the United Kingdom (2010). *Great crested newt Habitat Suitability Index. ARG UK Advice note 5*. ARG UK.

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APPENDIX 1 – LEGISLATION AND PLANNING POLICY

A1.1 Introduction

This section briefly lists legal protection/planning policy applying to designated sites, species or habitats mentioned in this report. It does not comprehensively reflect the text of the legislation/policy and it should not be relied upon in place of it. The following documents are relevant:

- The Local Government Act 1985;
- The Wildlife and Countryside Act 1981 (as amended);
- The Environmental Protection Act 1990;
- The Countryside and Rights of Way (CRoW) Act 2000 (in England and Wales);
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Conservation of Habitats and Species Regulations 2017, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
- EU Regulation 1143/2014 on Invasive Alien Species, as amended by The Invasive Non-native Species (Amendment etc.) (EU Exit) Regulations 2019;
- Environment Act 2021;
- The Natural Environment White Paper (England) (DEFRA, 2011);
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011), which underpins the UK Post-2010 Biodiversity Framework (JNCC & DEFRA, 2012);
- National Planning Policy Framework (MHCLG, 2021); and
- Cheltenham, Gloucester and Tewkesbury Joint Core Strategy (Adopted 2017).

A1.2 Habitats of Principal Importance

Habitats designated as being "*of principal importance for the purpose of conserving biodiversity in England"* as listed under Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006 are priority habitats for the UK Post-2010 Biodiversity Framework and form a key component of the Biodiversity Strategy for England. They are material considerations in the planning process.

A1.3 Protected Species

A1.3.1 Great crested newt, otter, and all species of British bat

The great crested newt *Triturus cristatus*, otter *Lutra lutra*, and all species of British bat (*Vespertilionidae* and *Rhinolophidae*) are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receive some limited protection under Section 9. These species are also all listed as protected species in Schedule 2 of The Conservation of Habitats and Species Regulations 2017, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which gives them full protection under Regulation 43.

It is also an offence to set and use articles capable of catching, injuring or killing such species (for example a trap or poison), or knowingly cause or permit such an action.

The great crested newt, otter and seven species of British bat are listed as species of principal importance for the purpose of conserving biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

A1.3.2 Common reptiles

Common lizard *Zootoca vivipara*, grass snake *Natrix helvetica*, slow worm *Anguis fragilis*, and adder *Vipera berus* are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). These species are included as species of principal importance for the purpose of conserving biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

A1.3.3 Birds

All species of bird are protected under Section 1 (1) of the Wildlife and Countryside Act 1981 (as amended). Certain species are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Section 1(5). There are special penalties where offences are committed for any Schedule 1 species.

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 includes 49 bird species which are of principal importance for the purpose of conserving biodiversity in England.

A1.3.4 Badger

The badger *Meles meles* is protected in Britain under the Protection of Badgers Act 1992. The legislation protects badgers and their setts.

The badger is also protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) relating specifically to trapping and direct pursuit.

A1.4 Species of Principal Importance

Various vertebrate, invertebrate, plant and fungal species potentially present in the area are listed as species "*of principal importance for the purpose of conserving biodiversity in England*" under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 2006 and form a key component of the Biodiversity Strategy for England. They are a material consideration in the planning process.

A1.5 Invasive Non-Native Species

Several invasive, non-native animal and plant species are listed on Schedule 9, Parts I and II respectively, of the Wildlife and Countryside Act 1981 (as amended). Schedule 14 (1 and 2) makes it illegal to release or allow to escape (animals) into the wild, or to plant or cause to grow (plants) in the wild, any animal or plant species listed on schedule 9 (parts 1 and 2).

EU Regulation (1143/2014) on invasive (alien) non-native species, as amended by The Invasive Non-native Species (Amendment etc.) (EU Exit) Regulations 2019, imposes restrictions on 49 animal and plant species. Strict restrictions (subject to certain exemptions) mean that these species cannot be imported, kept, bred, sold, used or exchanged, allowed to reproduce, grown or

cultivated, or released into the environment. The Invasive Alien Species (Enforcement and Permitting) Order 2019 provides enforcement provisions, prescribes offences and penalties to comply with the requirements of the regulations.

APPENDIX 2 – DESIGNATED SITES WITHIN 2 KM

Table A2.1 Local Wildlife Sites within 2 km

Status	Site name	Description	Map Ref	Distance (m)
LWS	Robinswood Hill Country Park	Semi-natural grassland	SO81/003	742
LNR	Robinswood Hill	Semi-natural grassland	-	869
LWS	Robinswood Hill Summit Section	Geological importance	166	1609
LWS	Robinswood Hill Marlstone Section	Geological importance	171	1958
LNR	Saintbridge Balancing Pond	Open water	-	764
LWS	Matson Wood	Ancient Semi-Natural Broadleaved Woodland	SO81/019/01	970
LWS	Hucclecote Meadows	Neutral species-rich grassland	SO81/053	1739
LNR	Hucclecote Meadows	Neutral species-rich grassland	-	1664
LWS	Barnwood Arboretum & Park	Species-rich woodland and rough grassland	SO81/047	1941

Table A2.2 Unconfirmed Local Wildlife Sites within 2 km

Status	Site name	Description	Map Ref	Distance (m)
pLWS	Matson Lane, Gloucester	Froglife Toad Patrol site	SO81/074	544
pLWS	Upton St. Leonard's Crossing	Froglife Toad Patrol site	SO81/070	1259
pLWS	Cooper's Edge – Lobley Drive	Froglife Toad Patrol site	SO81/077	1955
pLWS	Robinswood Hill Golf Club	Neutral grassland	SO81/019	756
pLWS	Winneycroft Farm	Orchards, veteran and mature trees with invertebrate interest. Semi-improved grassland	SO81/044	961
pLWS	Winneycroft Farm South	Semi-improved grassland, improved grassland, old pond/moat with mixed hedgerows	SO81/052	1530

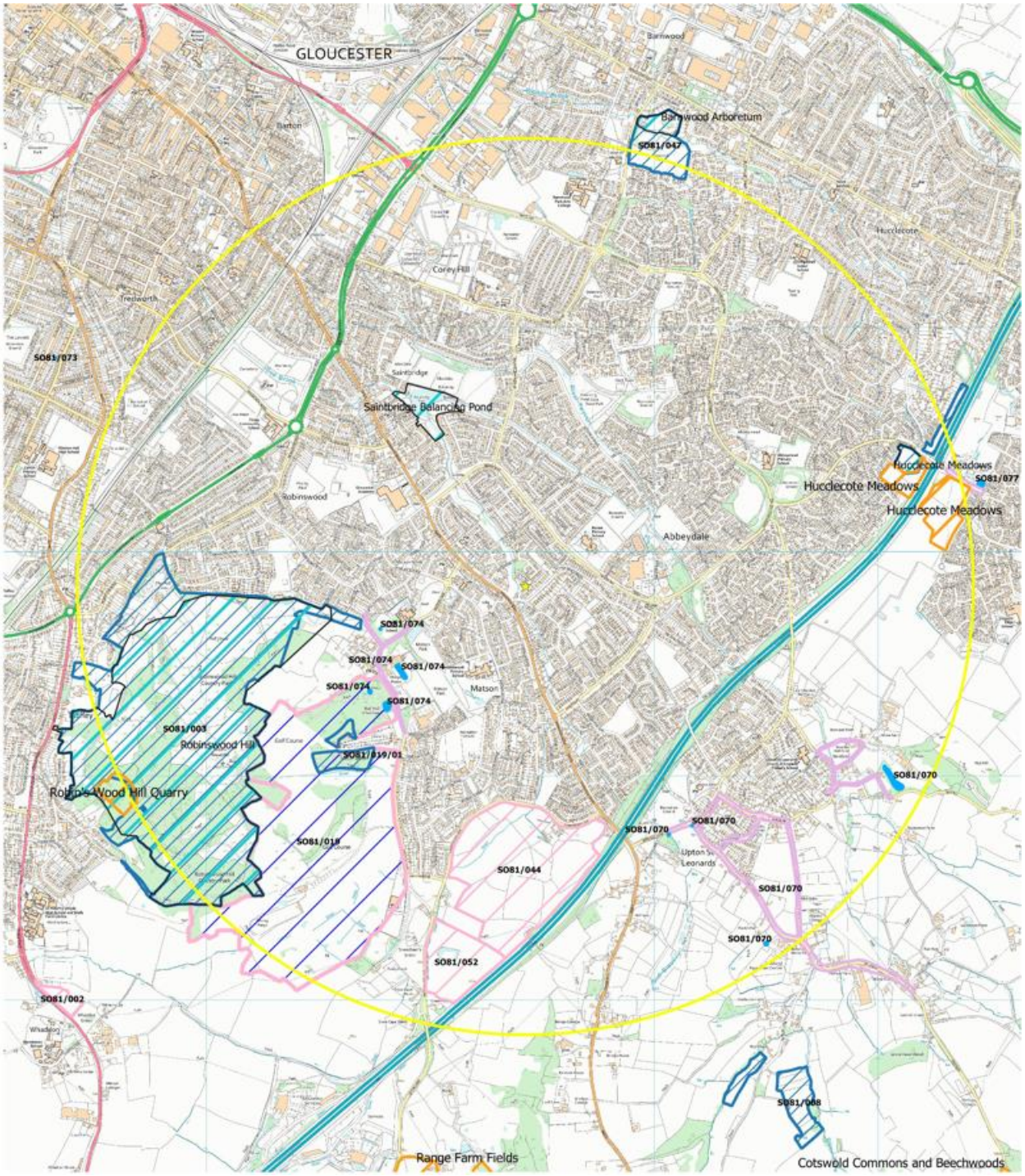


Figure A2.1 Designated sites within 2 km (GCER)

APPENDIX 3 – PROTECTED AND PRIORITY SPECIES WITHIN 2 KM

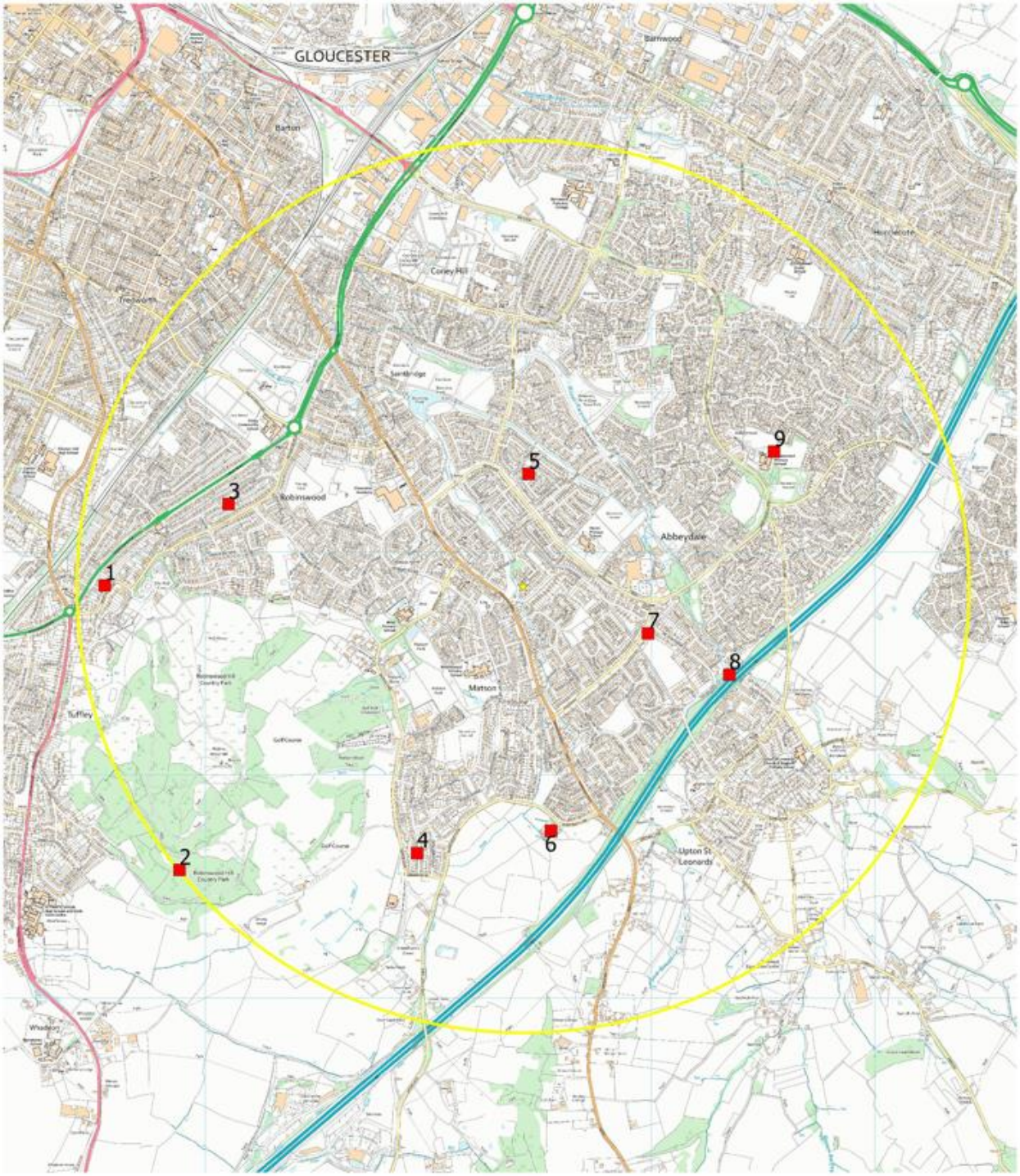


Figure A3.1. Bat species records within 2 km (GCER).

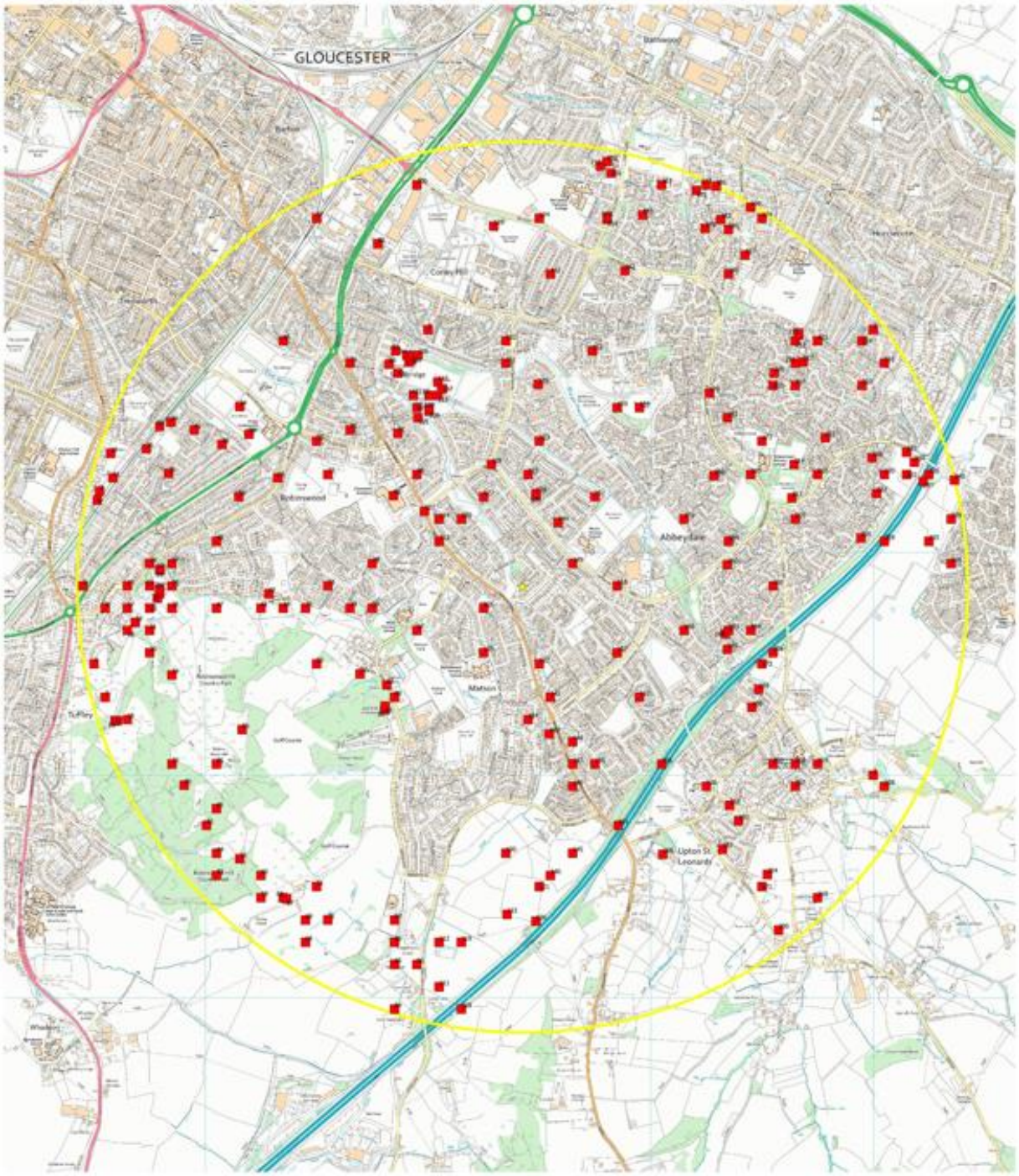


Figure A3.2 Rare and protected species records within 2 km (GCER)

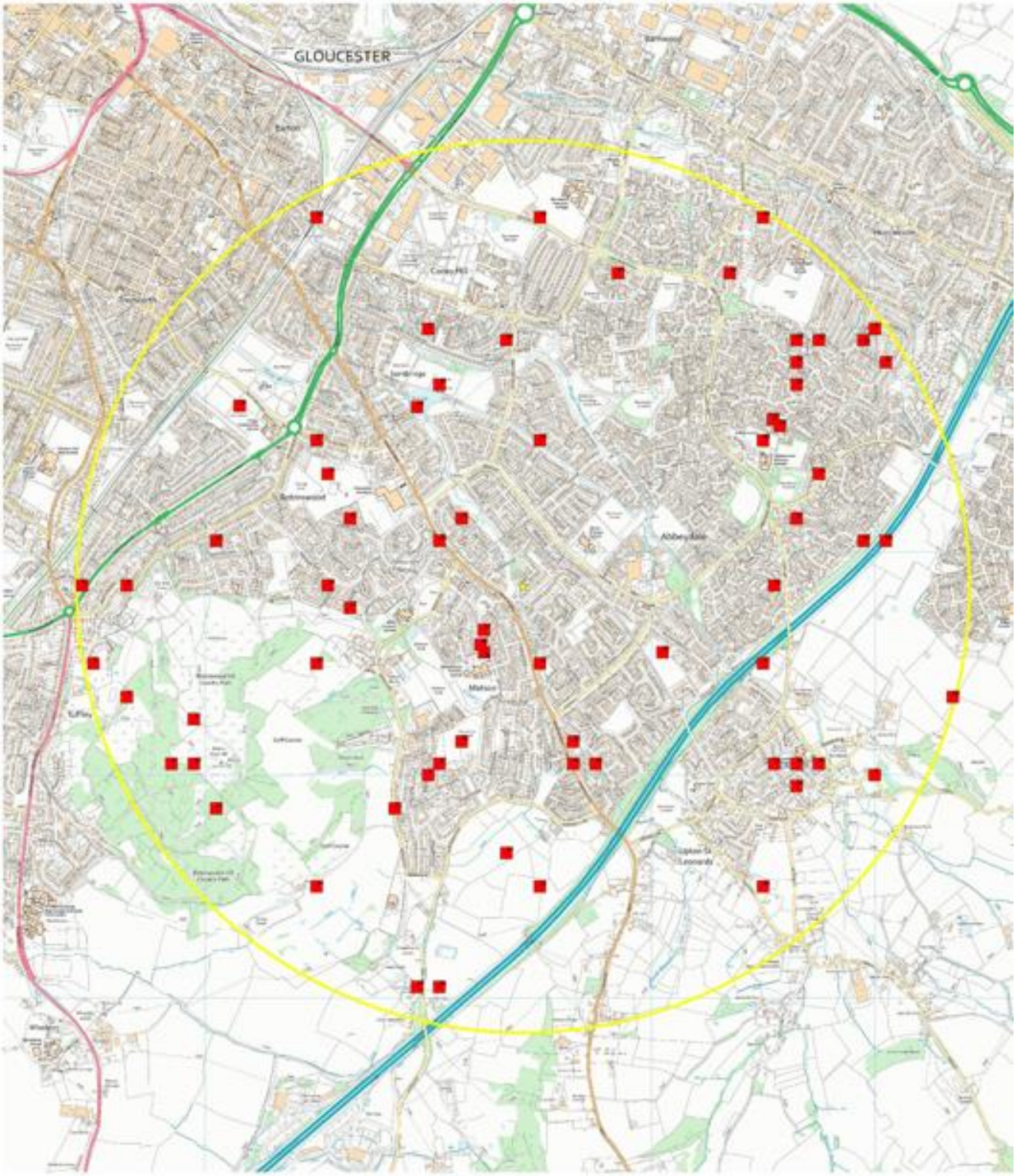


Figure A3.3 Roof nesting bird species records within 2 km (GCER)

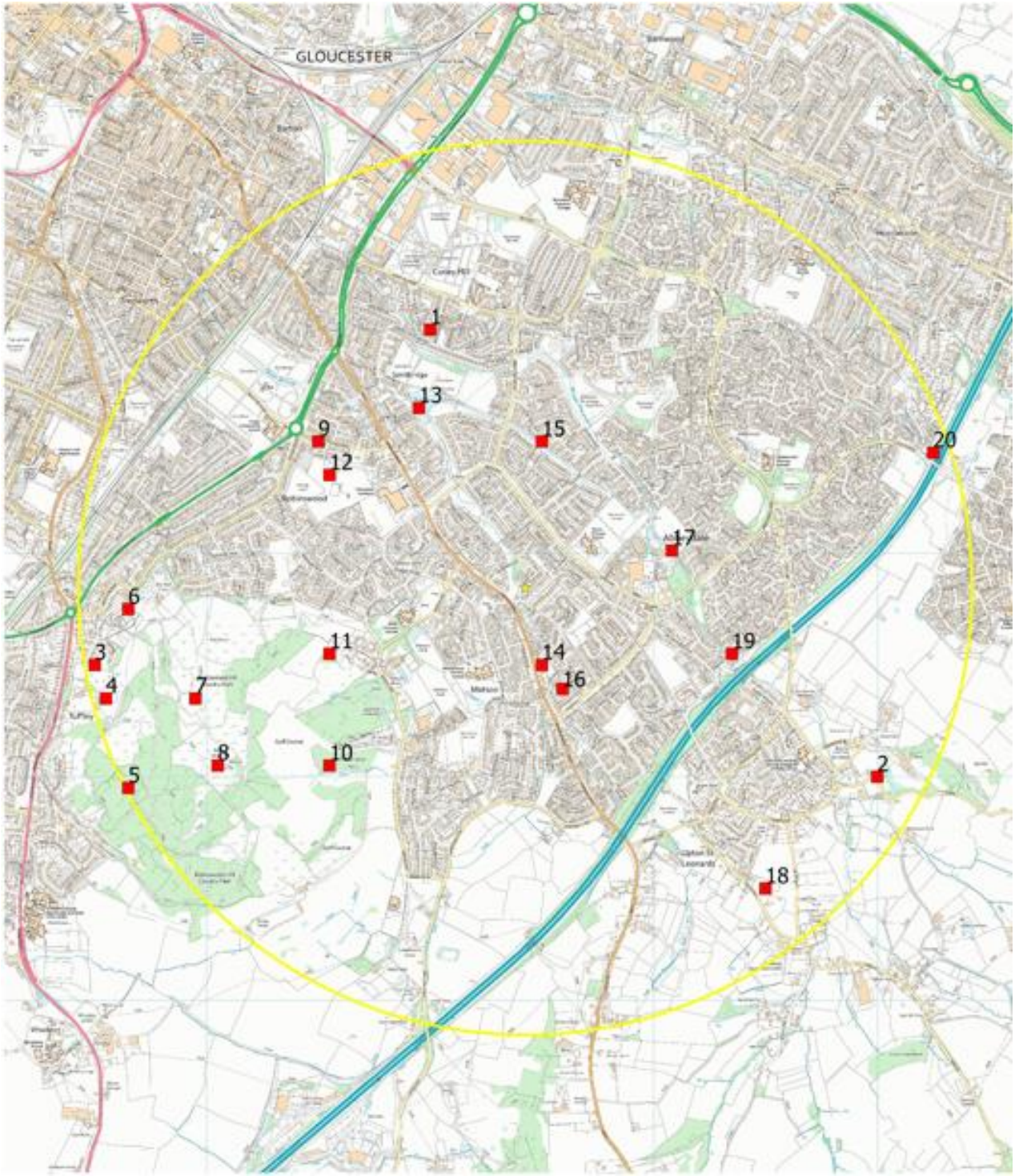


Figure A3.4 Non-native invasive species records within 2 km (GCER)

APPENDIX 4 - NON-LICENSED METHOD STATEMENT FOR GREAT CRESTED NEWTS

A4.1 Introduction

In order to ensure that great crested newts are not harmed during the site clearance works, or the construction phase, this non-licensed method statement for great crested newts contains the following elements:

- Toolbox talk to contractors;
- Timing of works to avoid the most sensitive period for this species;
- Working methods to avoid accidental harm/injury to great crested newts, if present;
- Supervision of vegetation clearance by a suitably experienced ecologist; and
- Methods to be followed in the event of a great crested newt being discovered during works.

A4.2 Tool box talk

Prior to development the contractor briefing will be provided by a suitably qualified ecologist. This will include the following as a minimum:

- Identification and ecology of great crested newts and other relevant protected/priority species (in case amphibians are found during construction works);
- A great crested newt identification sheet will be displayed on the site in a suitably visible location (see Figure A4.1);
- Awareness of habitats that might be utilised by great crested newts;
- The high level of legal protection afforded to great crested newts and the criminal sanctions that can be imposed if the relevant law is broken, including fines and imprisonment;
- Measures to avoid and reduce impacts on individual great crested newts, if present, during work;
- Procedure if a great crested newt is found on site during works;
- Procedure if other animals are found on site during works; and
- The need for biosecurity to avoid introduction of invasive, non-native species and diseases onto site or into the wider area.

A4.3 Timing of works, sensitive working methods and ecological supervision

Timing of works

As there are no suitable amphibian hibernation habitats on site (log piles, rubble etc), there are no timing constraints to the proposed works.

Preparation of grassland habitat

Prior to works commencing, amenity grassland in the development site will be maintained as a short sward (vegetation height less than 5 cm) to avoid creating suitable refuges for great crested newts.

The following measures will be adopted during construction works:

- If any areas of longer vegetation are to be removed, this will be undertaken in a staged approach, with a first cut to height 15 cm, followed one week later by a second cut to 5 cm

sward height. This will gradually reduce the suitability of the habitat for amphibians and give any such animals present the opportunity to move to areas of more sheltered habitat following the first cut.

- The removal of any trees and hedgerow sections will be undertaken in a staged process (e.g. cut to 0.5 m height, then to 10-20 cm above ground level). In the first instance the vegetation will be cut by hand (using chainsaws and or brush cutters as appropriate) to near ground level and all arisings chipped and removed from site immediately. Prior to any ground clearance, the proposed access area will be hand-searched by a suitably experienced and licensed Ecological Clerk of Works (ECoW) for any great crested newts (or other amphibians).
- If any great crested newts are found, works will stop immediately and further advice sought from the ECoW and/or Natural England. If any other amphibian or reptile species are found, they will be located to a place of safety in suitable adjacent habitat to be retained.
- Any removal of trees and hedgerows is to be undertaken outside the nesting bird season (March to August inclusive). Alternatively, the habitat to be removed will be subject to a nesting bird check by a suitably qualified ecologist immediately prior to works and the resulting ecological advice followed.
- Any other potential great crested newt habitat on site will be removed carefully under supervision by the ECoW prior to works commencing. These items will be carefully removed by hand and relocated to an undisturbed part of the site (or removed from the site);
- No construction works will be undertaken at night when great crested newts (and other nocturnal animals) are active;
- The site access groundworks will be kept as short as possible.
- Any excavations or trenches left overnight will be covered or have sloping boards installed to ensure that wildlife cannot fall in and become trapped.
- All building materials will be stored in a way that does not provide opportunities for great crested newt shelter/refuge; i.e. on land that is of low suitability for these species, such as areas of bare earth or hard standing.
- Items will be stored on pallets off the ground or kept in their protective wrappings (so far as is practicable) to prevent the likelihood of great crested newts seeking shelter underneath. Vegetation will not be allowed to grow up around stored items.
- Similarly, any potentially suitable amphibian habitat (e.g. rubble or debris) created during construction is either to be immediately compacted on site, stored off the ground in skips or removed from site.

A4.4 Procedures to follow if a great crested newt is found

- **If a great crested newt is found during the works, all work must stop immediately and the advice of a suitably qualified ecologist should be sought.**
- Telephone numbers of such will be held on site (Swift Ecology numbers: 01926 642541 and 07862 003513).
- A licence from Natural England may be needed before works can recommence.
- Should any great crested newts be injured, they will be gently placed in a secure, damp, ventilated box by the contractor and left in a cool dark place, until appropriate advice can be sought.

Figure A4.1 – Amphibian identification sheet

Great crested newt *Triturus cristatus*

Smooth newt *Lissotriton vulgaris* (female, left and male, right)

Common frog *Rana temporaria*

Common toad *Bufo bufo*

APPENDIX 5 – BIODIVERSITY ENHANCEMENT

To increase the value of the proposed development site for biodiversity, consideration should be given to incorporating additional features for use by bats and birds into the design. Various nest/roost boxes are available, including designs that are incorporated into the fabric of the converted buildings, and others that are placed on the outside of retained buildings, or in nearby trees/walls. All boxes must be installed according to manufacturer's instructions. Some integrated boxes can be faced with appropriate materials to complement the building design so that they blend in.

A5.1 Bird boxes

The following bird box products can be built-in to the new buildings:

- Schwegler 1SP sparrow terrace
- Habibat terraced sparrow box
- WoodStone build-in house sparrow nest box
- Terraced Sparrow Box
- Schwegler 10 swallow nest box (with optional droppings board)

Figure A5.1: Schwegler 1SP sparrow terrace (left) and Habitat terraced sparrow box (right)

Figure A5.2: WoodStone Build-in House Sparrow Nest Box (left) and Terraced Sparrow Box – custom brick facing (to match building design) (right)

A5.2 Bat boxes

Bat box products can be installed on the site in the new dwellings include integrated or external type boxes:

A5.2.1 Integrated bat boxes

Bat box products to be installed integral to walling include:

- Ibstock free access bat box A
- Ibstock enclosed bat box B
- Ibstock bat access bricks (providing access into cavity walling)
- Norfolk bat brick (providing access into cavity walling)
- Habibat 001 Bat Box Bespoke Facing
- Wildcare cavity bat box
- Schwegler 2FR bat tube

Figure A5.3: Ibstock free access bat box A (left) and Ibstock enclosed bat box B (right)

Figure A5.4: Ibstock bat access bricks providing access into cavity walling (left), and Norfolk bat brick providing access into cavity walling (right)

Figure A5.5: Habibat 001 Bat Box Bespoke Facing (left), Wildcare cavity bat box (centre) and Schwegler 2FR bat tube (right)

A5.2.2 Boxes to install on external walls

Bat boxes products that can be installed directly onto flat walls include:

- Schwegler 1FQ bat box
- Beaumaris Woodstone bat box

Boxes should be installed at least 3m above ground at building eaves, ideally on southerly aspects of buildings, in accordance with manufacturer's instructions.

Figure A5.6: Schwegler 1FQ bat box (left) and Beaumaris Woodstone bat box (right)

A5.3 Habitat enhancements for hedgehogs

Foraging and commuting enhancements

To retain connectivity within the site and between surrounding areas, long sections of impermeable fencing should be avoided as this would lead to fragmentation of suitable garden habitat for hedgehogs. Areas of such fencing should be minimised, and should contain gaps at the base to allow hedgehog passage between areas; instead, boundaries should be planted with hedgerows to allow movement of this species.

Hedgehog nesting enhancements

New sections of planted hedgerow and planted broadleaved trees, once established, will increase available nesting habitat for this species. Provision of natural nesting sites and hibernacula can be provided by incorporating log piles or piles of brushwood, and by planting areas of dense, low-growing shrubs, for example in undisturbed areas such as garden corners, beneath hedgerows and clusters of trees. Any such features should be sited away from normal garden activities, where they are unlikely to be 'tidied up'.

A5.4 Habitat enhancement for invertebrates

In addition to planting pollinator plants (A4.2-A4.3) and ponds (A4.4), purpose made 'insect homes' can provide nest sites for a range of insect species. All insect homes/boxes should be installed according to manufacturer's instruction. Suitable insect box products to be installed on the site include:

- Mini insect house
- Schwegler insect nesting aid, Woodcrete
- Schwegler clay and reed insect nest
- Bee bricks

Figure A5.7: Mini insect house

Figure A5.8: Schwegler Woodcrete insect nesting aid (left) and Schwegler clay and reed insect nest (right)

Figure A5.9: Bee bricks

DRAINAGE STRATEGY

Rev A | April 2022

1. Introduction

1.1 This Drainage Strategy has been prepared to support a planning application for the construction of a residential dwellinghouse on land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF.

1.2 This report will provide high level information on the design strategy for the surface and foul water systems that will serve the proposed development.

2. Site Location

2.1 The site is located off The Wheatridge with a National Grid Reference of SO 85408 15829. The site currently comprises garden land in association with Paget Cottage. The site location can be seen below in Figure 1.

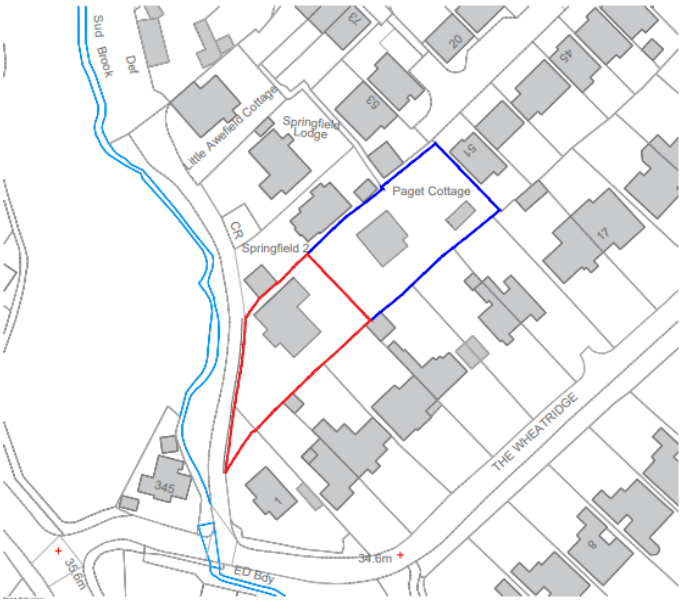


Figure 1 – Site location and adjacent watercourse

3. Flood Risk

3.1 The site is located within EA Flood Zone 1, classified as land having a less than 1 in 1,000-year annual probability of fluvial flooding (low Risk).

4. Existing Drainage

4.1 Paget Cottage is connected to a combined sewer and the manhole is located within the site confines.

4.2 There is an existing watercourse (Sud Brook) running along the south-western boundary. It is understood that the surface water runoff from the adjacent property (no. 345) discharges surface water into this ditch.

5. Drainage Strategy

Surface Water

5.1 The site drainage will need to be designed in line with Building Regulations Part H and the hierarchy of surface water discharge, which is:

1. To ground in an adequate soakaway or some other adequate infiltration system
2. A watercourse
3. A surface water sewer, highway drain, or other drainage
4. A combined sewer.

5.2 As demonstrated by online soil maps, the site is underlain by a bedrock of mudstone and soils with impeded drainage. Therefore, infiltration may not be a viable solution. Notwithstanding this, infiltration to BRE365 standards will be carried out to confirm feasibility. If the results are positive, the proposals will utilise soakaways and permeable surfaces to demonstrate no increase in run off as a result of the development proposed.

5.3 Should infiltration testing demonstrate that this is not a feasible method of surface water discharge, then it is proposed to utilise the adjacent watercourse with restricted discharge rates and attenuation. The requirement to attenuate the flows will need to be confirmed with the council however traditionally there will be a requirement to provide attenuation for the 1 in 100 year + 40% climate change event. This will involve restricting flows via a flow control to an agreed rate.

Foul Water

5.4 Foul drainage generated from the development shall be conveyed to the combined foul sewer via a manhole which is located within the site confines.

6. Ownership & Maintenance

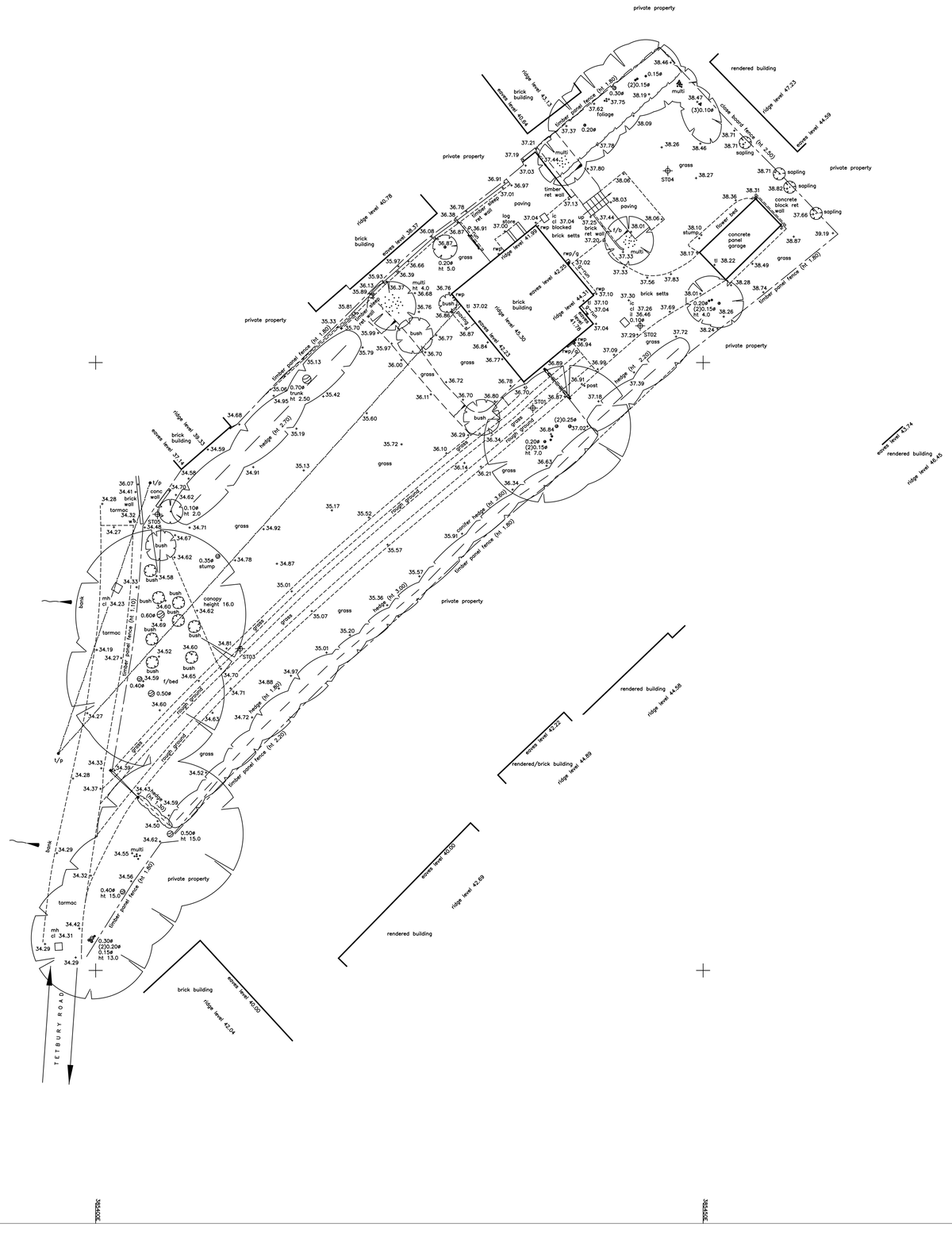
6.1 The drainage system will be under the ownership of the future occupants of the residential dwelling and they will be solely responsible for the drainage systems future maintenance and repair.

6.2 In the event of the property being sold in the future, the maintenance responsibility together with all maintenance documentation will be transferred to any future owners.

7. Conclusions

7.1 In accordance with the drainage hierarchy, infiltration methods will be considered in the first instance for the disposal of surface water. An alternative option would be controlled discharge to the adjacent watercourse.

7.2 A pre-commencement condition should be applied to the decision notice to ensure a full surface water drainage scheme (inclusive of infiltration testing to BRE365 standards) is submitted and approved by the Local Authority.



NOTES

GENERAL NOTES :-

ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.

GRID COORDINATES ARE ORDNANCE SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION. GPS COORDINATES AND LEVELS SET AT ST03 (NO SCALE FACTOR APPLIED)

THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200

SERVICE COVERS INDICATED WHERE VISIBLE. PIPE INVERTS / DETAILS SURVEYED FROM SURFACE INSPECTION ONLY. GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED

TREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.

OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROXIMATE.

SERVICE COVERS LOCATED UNDER PARKED VEHICLES/MOBILE STRUCTURES MAYBE OMITTED.

BURIED SERVICE COVERS WILL NOT BE INDICATED.

TOPOGRAPHICAL SURVEY/UTILITY KEY :-

(ht) – height
ø – diameter
⦿ – pea trap
a/g – above ground
a/r – assumed route
av – air valve
bb – belisha beacon
bd – back drop
boll – bollard
box – bottom of shaft
bt – telecom
c/p fence – closeboard fence
c/box – control box
catv – cable television
cl – cover level
con – conifer
cr – cable riser
cwc – combined water sewer
d/chan – drainage channel
dp – depth
ejb – electric junction box
elec – electric
eot – end of trace
ep – electric pole
er – earth rod
f/bed – flower bed
fh – fire hydrant
fl – floor level
fs – fire switch
fwc – foul water chamber
fws – foul water sewer
g – gully
g/run – gully run
gr – gas riser
h/chestnut – horse chestnut
h/thorn – hawthorn
ic – inspection cover
il – invert level
ill – illuminated
int – intercepter
lp – lamp post
mh – manhole cover
mkr – marker
o/h – over head
ol – off let
osa – off survey area
OSBM – ordnance survey bench mark
p & r fence – post & rail fence
pd – pit depth
ptg – pipe to ground
re – rodding eye
ret wall – retaining wall
rs – road sign
rwp – rain water pipe
s/birch – silver birch
s/p – safety paving
sap – sapling
sec fence – security fence
sfc – soil filled chamber
sl – spot light
sp – soil pipe
st – stop tap
sv – stop valve
svp – soil vent pipe
tws – storm water sewer
TBM – temporary bench mark
tfr – taken from records
tl – threshold level
toc – top of cap
top – top of pipe
tot – top of tank
tp – telecom pole
ts – traffic signal
t/s – to surface
u/s – underside
utl – unable to lift
utr – unable to rod
uts – unable to survey
utt – unable to trace
vp – vent pipe
w/c – water filled chamber
wl – water level
wm – water meter
wp – waste pipe
wr – water riser

SURVEY CONTROL :-

STATION	EASTINGS	NORTHINGS	LEVEL
ST01	385435.985	215846.262	36.616
ST02	385444.822	215853.023	37.329
ST03	385411.891	215826.464	34.781
ST04	385447.091	215865.781	38.247
ST05	385405.086	215837.520	34.498

UTILITY SURVEY KEY :-

HATCHED AREA
BOREHOLE
CPT
TRIAL PIT
HAND PIT
WINDOW SAMPLE

ELECTRIC CABLE
WATER PIPE
FOUL SEWER
STORM SEWER
COMBINED SEWER
DUCTS
CABLE TELEVISION
DATA CABLE
TELECOM CABLE
GAS PIPE
UNIDENTIFIED SERVICE
OTHER
CCTV
TRAFFIC LIGHT
OFFSET FILL
VENT
FUEL PIPE
GAUGE LINES
PIPE
ASSUMED ROUTE
TAKEN FROM RECORDS

DISCLAIMER :-

Electromagnetic techniques have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and particularly depths, where these are critical. The completeness of the underground services information cannot be guaranteed.

This method of survey does not differentiate between live and dead services, and as such all services should be treated as live. This drawing may not include the location of all public services that may cross the site, therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing.

Private service pipes and cables in highways are not shown, but there presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. Reference should be made to historical plans and as–built drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HSG47 document avoiding dangers from underground services

Please note that factors such as ground conditions, proximity of other utilities, material and method of construction have an influence on the quality of the data collected on site.

TSA Standards – "Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate."

UTILITY NOTES

0 2 4 8 12 16 20

MIDLAND SURVEY LTD

HEAD OFFICE
[redacted]

Client	BRODIE PLANNING ASSOCIATES
Project	LAND AT PAGET COTTAGE, LITTLE AWEFIELD, ABBEYDALE, GLOUCESTER, GL4 4DF
Title	TOPOGRAPHICAL SURVEY
Date	FEBRUARY 2022
Scale	1:200@A1
Dwg No	S2812 – 1
Surveyor	W.R
Checked	M.W

Revisions

TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING

Accredited Contractor
constructionLine
THE SURVEY ASSOCIATION

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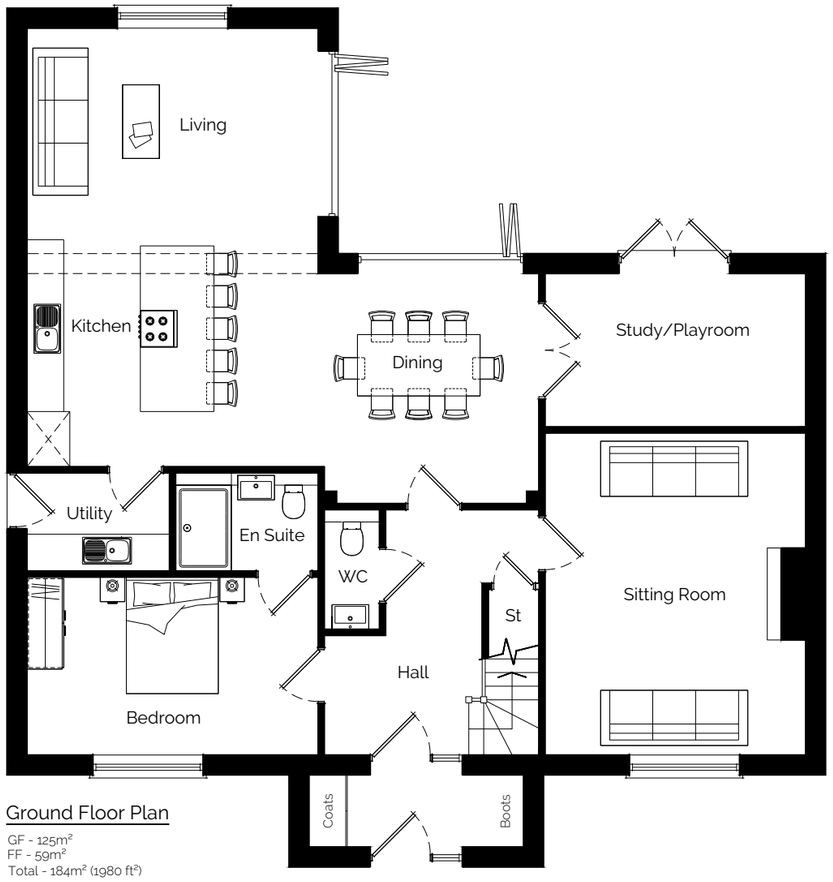
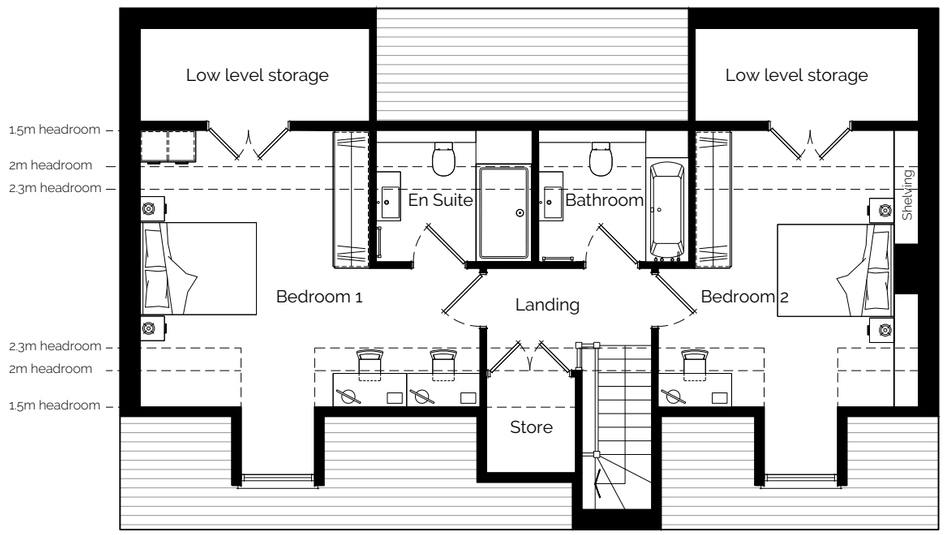
rev	date	description
-	-	-



Ground Floor Plan

GF - 125m²
FF - 59m²
Total - 184m² (1980 ft²)



First Floor Plan

brodie planning associates

Planning ▪ Design ▪ Development

[redacted]ddress
The Stables, Manor Farm Courtyard
Southam Lane, Southam,
web: www.brodieplanning.co.uk Cheltenham, Glos, GL52 3PB.

client	ref:
Jemma Carenza	3005

project description

Construction of 1no. dwelling and associated works

location

Land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF

title

Proposed Floor Plans

drawing number	scale	date
3005-200	1:100 @ A3	March '22

status	revision
PLANNING	Ø

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rev	date	description
-	-	-

SOUTH-WEST ELEVATION

SOUTH-EAST ELEVATION

NORTH-WEST ELEVATION

NORTH-EAST ELEVATION

brodie planning associates

Planning ▪ Design ▪ Development

contact [redacted]

address
The stables, Manor Farm Courtyard
Southam Lane, Southam,
Cheltenham, Glos. GL52 3PB

client	ref:
Jemma Carenza	3005

project description
Construction of 1no. dwelling & associated works

location
Land at Paget Cottage, Little Awefield,
Gloucester, GL4 4DF

title
Proposed Elevations

drawing number	scale	date
3005-201	1:100 @ A3	March 2022

status	revision
PLANNING	-

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rev	date	description
-	-	-

00.00 + Proposed level

00.00 + Existing level

ridge level 40.78
eaves level 38.37
ridge level 45.30
eaves level 42.23
ridge level 39.33
eaves level 37.14
ridge level 41.17
eaves level 37.085
ridge level 44.58
eaves level 42.22
ridge level 44.89
eaves level 40.00
ridge level 42.69

timber panel fence (ht 1.80)
hedge (ht 2.70)
new timber panel fence (ht 1.80)
gated access
conifer hedge (ht 3.60)
timber panel fence (ht 1.80)
hedge (ht 3.00)
timber panel fence (ht 1.10)
hedge (ht 1.80)
timber panel fence (ht 2.40)

Bin storage area
Bike storage area
Existing access retained
Bin collection point

+ FFL 34.75
+ 35.50
+ 34.60
34.60 +

36.39 36.76 36.76 36.87 36.70 35.79 36.00 35.42 34.68 35.60 36.10 36.70 36.70 36.87 36.63 36.34 34.59 34.58 34.48 35.91 35.57 35.36 34.60 34.19 34.27 34.60 34.88 34.60 34.27 34.72 34.39 34.52 34.43

brodie planning associates
Planning ▪ Design ▪ Development

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address
The Stables, Manor Farm Courtyard
Southam Lane, Southam,
Cheltenham, Glos, GL52 3PB.

client
Jemma Carenza

ref:
3005

project description
Construction of 1no. dwelling and associated works

location
Land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF

title
Proposed Site Layout

drawing number	scale	date
3005-202	1:200 @ A3	March '22

status
PLANNING

revision
Ø

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rev	date	description
-	-	-

VIEW 1

VIEW 2

brodie planning associates

Planning ▪ Design ▪ Development

contact

[redacted]

web: www.brodieplanning.co.uk

address

The Stables, Manor Farm Courtyard
Southam Lane, Southam,
Cheltenham, Glos, GL52 3PB.

client

Jemma Carenza

ref:

3005

project description

Construction of 1no. dwelling and associated works

location

Land at Paget Cottage, Little Awefield, Gloucester, GL4 4DF

title

Proposed Visualisations

drawing number	scale	date
3005-203	NTS @ A3	March '22

status

PLANNING

revision

Ø

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Nijhuis Saur Industries | UK & Eire

Our Ref: J-15105-L01-HG
26 October 2022

Sure Sales & Lettings
7a Worcester Street
Gloucester
GL1 3AJ

RE: Land at Paget Cottage, Gloucester, GL4 4DF

Introduction

Our client is proposing to develop a single dwelling on Land at Paget Cottage, Gloucester. As part of the planning process comments from the Local Flood Officer have been received. Therefore, Nijhuis Saur Industries, UK and Eire have been commissioned to provide the relevant information to satisfy the request of the Flood Officer.

Percolation Testing

Percolation testing was undertaken in line with BRE Digest 365, by others, on the 29th September 2022. The results of this indicated that infiltration testing failed on the basis there was no drop in the water level within the trial pit over 2 hours. As such, an infiltration based surface water drainage scheme has been ruled out on the site.

Proposed Surface Water Drainage Scheme

Due to the failed percolation testing it is proposed that the surface water drainage will comprise of an attenuation drainage option. It is noted that the request of the Local Flood Officer is that;

'the design needs to consider a controlled discharge into the brook. Any control will need to be limited to greenfield rates (Qbar) with storage provided to manage the 100yr + 40% Climate Change allowance design rainfall for the systems critical duration.'

Based on a proposed impermeable area of 263m^2 the Qbar for the site has been calculated to be 0.1 l/s. Flow rates this low can cause issues with flow control devices due to required orifice size to restrict flows to low values. As such it is proposed that a flow rate of 0.7 l/s will be utilised as this allows a practical sized orifice to be specified which would limit the restrict of blockages.

Using the proposed impermeable area and the flow rate of 0.7 l/s it has been calculated that an attenuation tank of 11m^2 and 1m depth is required to limit the flows to the 100 year event with a 40% allowance for climate change. The relevant calculations are included in **Annex A.**

It is proposed the outfall from the tank will discharge into the adjacent Sud Brook which offers an appropriate receptor for the surface water drainage for the proposed development.

The proposed surface water drainage layout is shown in **Annex B.**

Management and Maintenance

The proposed surface water drainage scheme will remain the responsibility of the property owner to manage and maintain. This should be clearly communicated to any buyer of the property. The CIRIA SuDS Manual

provides information on Sustainable Drainage Systems and the relevant extract is shown below for attenuation systems.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Figure 1. Extract from CIRIA SuDS Manual

The flow control device should be maintained in line with the manufacturer's recommendations.

Conclusions

The proposal is for a new dwelling. As part of the application process the Local Flood Officer queried the surface water drainage for the site.

Percolation testing was undertaken on the site which ruled out the use of infiltration drainage due to poor ground conditions.

The proposed surface water attenuation system will manage and limit flows from the development to ensure that flood risk is not increased elsewhere.

Yours sincerely
For and on behalf of Nijhuis Industries Ltd

Hannah Graham
Team Leader – Flood Water Management

Enc. Annex A Calculations
Annex B Proposed Surface Water Drainage Scheme

ANNEX A – CALCULATIONS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.024	Urban	0.000
SAAR (mm)	711	Region Number	Region 4

Results l/s

QBAR Rural	0.1
QBAR Urban	0.1
Q100 years	0.2
Q1 year	0.1
Q30 years	0.2
Q100 years	0.2

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	34.496	0.496	0.5	0.0	0.5	5.5	O K
30 min Summer	34.645	0.645	0.6	0.0	0.6	7.1	O K
60 min Summer	34.771	0.771	0.6	0.0	0.6	8.5	O K
120 min Summer	34.836	0.836	0.6	0.0	0.6	9.2	O K
180 min Summer	34.838	0.838	0.6	0.0	0.6	9.2	O K
240 min Summer	34.825	0.825	0.6	0.0	0.6	9.1	O K
360 min Summer	34.783	0.783	0.6	0.0	0.6	8.6	O K
480 min Summer	34.742	0.742	0.6	0.0	0.6	8.2	O K
600 min Summer	34.701	0.701	0.6	0.0	0.6	7.7	O K
720 min Summer	34.661	0.661	0.6	0.0	0.6	7.3	O K
960 min Summer	34.585	0.585	0.6	0.0	0.6	6.4	O K
1440 min Summer	34.449	0.449	0.5	0.0	0.5	4.9	O K
2160 min Summer	34.240	0.240	0.5	0.0	0.5	2.6	O K
2880 min Summer	34.132	0.132	0.5	0.0	0.5	1.5	O K
4320 min Summer	34.062	0.062	0.4	0.0	0.4	0.7	O K
5760 min Summer	34.047	0.047	0.4	0.0	0.4	0.5	O K
7200 min Summer	34.039	0.039	0.3	0.0	0.3	0.4	O K
8640 min Summer	34.034	0.034	0.3	0.0	0.3	0.4	O K
10080 min Summer	34.031	0.031	0.2	0.0	0.2	0.3	O K
15 min Winter	34.559	0.559	0.5	0.0	0.5	6.2	O K
30 min Winter	34.730	0.730	0.6	0.0	0.6	8.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	117.448	0.0	5.9	0.0	21
30 min Summer	79.010	0.0	8.0	0.0	35
60 min Summer	50.812	0.0	10.3	0.0	64
120 min Summer	31.621	0.0	12.8	0.0	114
180 min Summer	23.637	0.0	14.4	0.0	144
240 min Summer	19.105	0.0	15.5	0.0	176
360 min Summer	14.037	0.0	17.0	0.0	246
480 min Summer	11.286	0.0	18.3	0.0	316
600 min Summer	9.522	0.0	19.3	0.0	384
720 min Summer	8.282	0.0	20.1	0.0	452
960 min Summer	6.640	0.0	21.5	0.0	588
1440 min Summer	4.854	0.0	23.6	0.0	852
2160 min Summer	3.541	0.0	25.8	0.0	1192
2880 min Summer	2.828	0.0	27.5	0.0	1524
4320 min Summer	2.055	0.0	30.0	0.0	2204
5760 min Summer	1.637	0.0	31.8	0.0	2936
7200 min Summer	1.371	0.0	33.3	0.0	3616
8640 min Summer	1.186	0.0	34.6	0.0	4376
10080 min Summer	1.049	0.0	35.7	0.0	5112
15 min Winter	117.448	0.0	6.7	0.0	21
30 min Winter	79.010	0.0	9.0	0.0	35

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	34.881	0.881	0.7	0.0	0.7	9.7	O K
120 min Winter	34.969	0.969	0.7	0.0	0.7	10.7	O K
180 min Winter	34.970	0.970	0.7	0.0	0.7	10.7	O K
240 min Winter	34.954	0.954	0.7	0.0	0.7	10.5	O K
360 min Winter	34.893	0.893	0.7	0.0	0.7	9.8	O K
480 min Winter	34.830	0.830	0.6	0.0	0.6	9.1	O K
600 min Winter	34.767	0.767	0.6	0.0	0.6	8.4	O K
720 min Winter	34.707	0.707	0.6	0.0	0.6	7.8	O K
960 min Winter	34.593	0.593	0.6	0.0	0.6	6.5	O K
1440 min Winter	34.385	0.385	0.5	0.0	0.5	4.2	O K
2160 min Winter	34.122	0.122	0.5	0.0	0.5	1.3	O K
2880 min Winter	34.062	0.062	0.4	0.0	0.4	0.7	O K
4320 min Winter	34.043	0.043	0.3	0.0	0.3	0.5	O K
5760 min Winter	34.034	0.034	0.3	0.0	0.3	0.4	O K
7200 min Winter	34.030	0.030	0.2	0.0	0.2	0.3	O K
8640 min Winter	34.027	0.027	0.2	0.0	0.2	0.3	O K
10080 min Winter	34.025	0.025	0.2	0.0	0.2	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	50.812	0.0	11.5	0.0	62
120 min Winter	31.621	0.0	14.3	0.0	118
180 min Winter	23.637	0.0	16.1	0.0	150
240 min Winter	19.105	0.0	17.3	0.0	188
360 min Winter	14.037	0.0	19.1	0.0	266
480 min Winter	11.286	0.0	20.5	0.0	340
600 min Winter	9.522	0.0	21.6	0.0	414
720 min Winter	8.282	0.0	22.5	0.0	488
960 min Winter	6.640	0.0	24.1	0.0	628
1440 min Winter	4.854	0.0	26.4	0.0	912
2160 min Winter	3.541	0.0	28.9	0.0	1188
2880 min Winter	2.828	0.0	30.8	0.0	1468
4320 min Winter	2.055	0.0	33.6	0.0	2196
5760 min Winter	1.637	0.0	35.6	0.0	2864
7200 min Winter	1.371	0.0	37.3	0.0	3608
8640 min Winter	1.186	0.0	38.7	0.0	4344
10080 min Winter	1.049	0.0	40.0	0.0	5120

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.027

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.013	4	8	0.014

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Model Details

Storage is Online Cover Level (m) 35.500

Tank or Pond Structure

Invert Level (m) 34.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	11.0	1.000	11.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0039-7000-1000-7000
Design Head (m)	1.000
Design Flow (l/s)	0.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	39
Invert Level (m)	34.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	0.7	Kick-Flo®	0.345	0.4
Flush-Flo™	0.172	0.5	Mean Flow over Head Range	-	0.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.5	1.200	0.8	3.000	1.1	7.000	1.7
0.200	0.5	1.400	0.8	3.500	1.2	7.500	1.7
0.300	0.5	1.600	0.9	4.000	1.3	8.000	1.8
0.400	0.5	1.800	0.9	4.500	1.4	8.500	1.8
0.500	0.5	2.000	1.0	5.000	1.4	9.000	1.9
0.600	0.6	2.200	1.0	5.500	1.5	9.500	1.9
0.800	0.6	2.400	1.0	6.000	1.6		
1.000	0.7	2.600	1.1	6.500	1.6		

Pipe Overflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	10.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	35.000
Roughness k (mm)	0.600		

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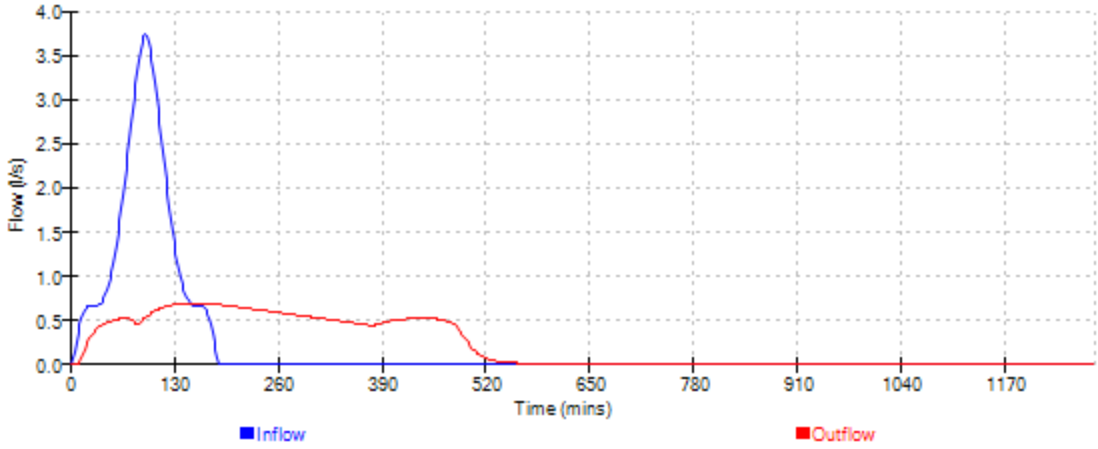
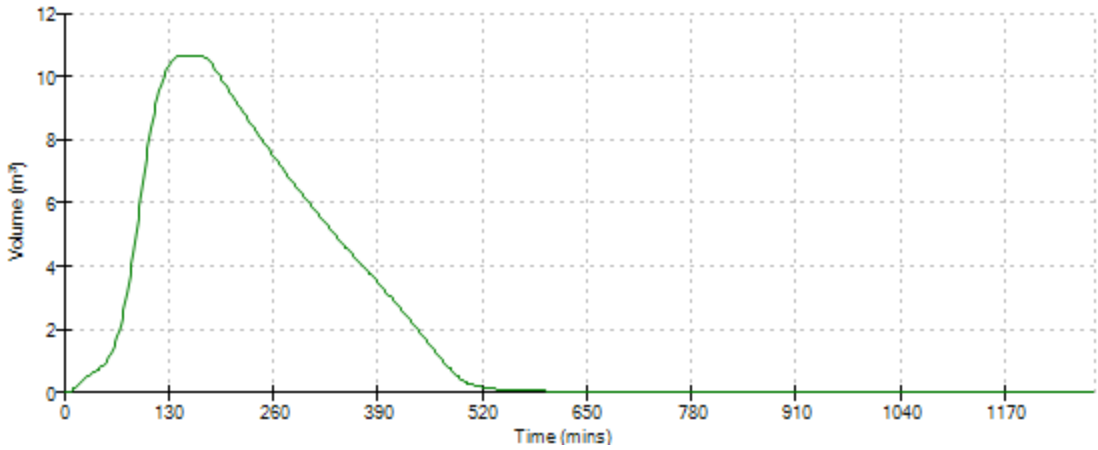
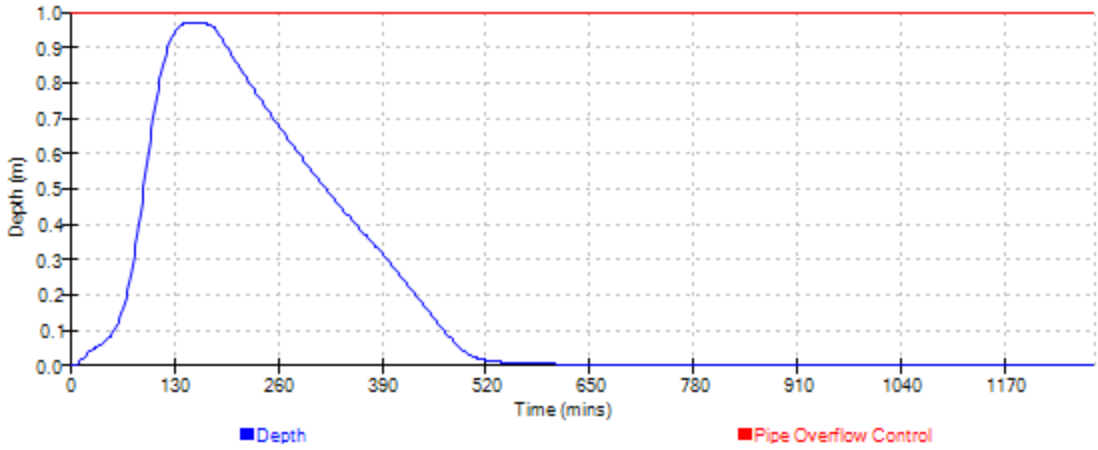
Event: 180 min Winter







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ANNEX B – SURFACE WATER DRAINAGE SCHEME

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KEY

- PROPOSED SITE BOUNDARY
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED GULLY
- OVERLAND FLOW ARROW
- PROPOSED PRIVATE SURFACE WATER POLYPROPYLENE INSPECTION CHAMBER (P.P.I.C Φ450/475mm)
- PROPOSED ATTENUATION TANK
- PROPOSED FLOW CONTROL DEVICE

ridge level 40.78
eaves level 38.37
ridge level 45.30
eaves level 42.23
ridge level 39.33
eaves level 37.14
ridge level 41.17
eaves level 37.085
ridge level 44.58
eaves level 42.22
ridge level 44.89
eaves level 40.00
ridge level 42.69
timber panel fence (ht 1.80)
hedge (ht 2.70)
new timber panel fence (ht 1.80)
gated access
hedge (ht 3.60)
hedge (ht 3.00)
timber panel fence (ht 1.10)
hedge (ht 1.80)
timber panel fence (ht 2.40)
Bin storage area
Bike storage area
Existing access retained
Bin collection point
PROPOSED ATTENUATION TANK SIZED FOR THE 100 YEAR RAINFALL EVENT WITH A 40% ALLOWANCE FOR CLIMATE CHANGE DIMENSIONS 11m³ X 1m (DEPTH)
POTENTIAL LOCATION FOR OUTFALL IN ADJACENT SUD BROOK
FLOW CONTROL CHAMBER WITH FLOW CONTROL DEVICE LIMITING FLOWS TO 0.7 l/s
conifer
+ FFL 34.75
+ 35.50
+ 34.60

HG	24.10.22	PRELIMINARY	P01
Name	Date	Remarks	Revision

INFORMATION

nijhuis
Nijhuis Saur Industries | UK & Eire
#missionwater

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NI Office	UK	Drawn by	HG	Date	24.10.22	Status	S2

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DATA ACQUISITION
CONSULTANCY

Water Infiltration Test Report

LOCATION	Paget Cottage, Little Awefield, Gloucester, GL4 4DF
ISSUE DATE	19th October 2022
FOR	Carlo Carenza
CLIENT REF.	
OUR REF.	G22447

Prepared by

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1. Introduction

In accordance with your instruction Geoinvestigate Ltd. carried out water infiltration testing on the front (southwest) lawn of Paget Cottage, Little Awefield, GL4.

It is understood that development is proposed at the site and the possibility of soakaways as a means of surface water drainage is being explored.

Geoinvestigate Ltd. were asked to investigate the permeability of soils at the site to assist in decision making and design regarding these potential SuDS options. To this end, the following has been carried out:

1. Excavation of a single (1) machine-dug trial pit (ref. TP1) to a depth of 1.70m to inspect ground conditions and carry out water infiltration testing at the specified location. Excavation and subsequent reinstatement was carried out by the client, who also provided the towable water bowser.

2. Water infiltration testing was then undertaken in TP1 on the day following excavation by a Geoinvestigate engineer according to the method described in BRE 365.

The test location is at the front/southwest of the existing property. There is a small stream ("Sud Brook") beyond the small lane which provides access to the property. The stream is approximately 2m below the level of the lane at the site location, and approximately 1.5m below the road level where it is culverted below the main road ("The Wheatridge") to the south (where the lane meets the road).

BGS mapping shows the site to be underlain by the Charmouth Mudstone Formation with no superficial deposits recorded, though weathered mudstone would be expected. Nearby BGS borehole records suggest that superficial deposits may comprise firm to stiff silty clay, although some alluvium may be present associated with the adjacent watercourse.

As such, prior to the investigation works, it was considered unlikely that natural drainage could be exploited at the site.

2. Scope of Investigation

A single (1) machine excavated trial pit (ref. TP1) was opened on 28th September 2022 by the client to a depth of 1.70m. Geoinvestigate Ltd. attended site on 29th September to inspect ground conditions and carry out water infiltration testing. The trial pit location is shown on the included site plan.

Information on the ground conditions revealed by the excavation is presented on the trial pit log which is also included in Appendix 1 of this report.

The results of the water infiltration testing are included in Appendix 2. Only one test was attempted (ref. Infiltration Test 1) with no repeat tests considered necessary due to no progress whatsoever being observed during test 1.

3. Investigation Findings

3.1 Ground Conditions Encountered

3.1.1 Machine Excavated Trial Pit

The trial pit encountered slightly silty, very sandy, gravelly clay topsoil to 0.20m bgl (below ground level) followed by made ground (or disturbed ground) to 0.50m bgl comprising firm sandy gravelly clay with gravel constituents including brick, limestone and coal.

Below the initial deposits, natural firm sandy clay was encountered to termination at 1.70m BGL. Some water was present at the base of the pit on 29th September but this was concluded to be from overnight rainfall as opposed to natural groundwater.

The trial pit was stable and roots were noted to a depth of at least 1.40m.

3.2 Water Infiltration Testing

Trial pit TP1 was excavated in order to undertake water infiltration testing.

Water Infiltration Testing was undertaken according to the method set out in BRE Digest 365 "Soakaway Design" (often referred to as DG 365 or BRE 365) with the receiving soils (test response zone) comprising only the underlying natural sandy clay subsoil (i.e. not including the topsoil or made ground horizons which would not form part of the receiving strata in any future soakaway).

No repeat tests were carried out due to the extremely poor progress of the first test.

Detailed results of the tests are presented in Appendix 2 (Infiltration Test 1).

The pit was filled with a 0.60m depth of water (to 1.10m BGL) using a rapid (petrol powered) water pump and observed for two hours. No progress whatsoever was recorded in that two hour period, with photographs taken of the measuring staff and water level at the 0, 1 and 2 hour mark (see next page).

For calculations of infiltration rates to be made using the BRE 365 method, 75% water drainage must be observed – this end point was obviously not reached in the allotted time, nor would it be reached.

It is often quoted that results in the 10^{-6} ms^{-1} range are the minimum required for soakaways etc. to be a feasible means of surface water disposal. Below, the requirements for this minimum result to be met for this test are explored:

- For a pit of this size and depth of water, the lowest permeability in that range (1×10^{-6} ms^{-1}) would have taken 35.1 hours to fall from 25% to 75% drainage.
- Assuming a linear test progress*, if we add the first 25% of drainage, this time would become 52.6 hours to reach the 75% drainage mark.
- To have any hope of reaching this result, this would have required the water level in the test to have dropped at least 11.4mm per hour.

*An approximation better than reality. In reality, the test progress slows due to reducing internal surface area and saturation or surrounding soils.

Additional Site Photographs

Photograph 1: Water level at start of test.

Photograph 2: Water level after 1 hour.

Photograph 3: Water level after 2 hours.

Photograph 4: Test Location relative to stream.

Photograph 5: Stream at position close to site.

Photograph 5: Stream at culvert below road.

4 Conclusions

Water infiltration testing has returned very poor results. No infiltration rate could be calculated for the soils.

Clay soils are not suitable for soakaway construction or as receiving soils for other means of surface water disposal to ground (such as permeable paving etc.).

Given the above, soakaways will be able to form any part of the drainage solution at this site and alternative solutions for surface water disposal will need to be explored. Connection to the mains sewer system or the adjacent stream (with permission) would be the most obvious solutions.

Similarly, other means of disposing of water to the ground will also not be suitable at this site.

Other SuDS (sustainable drainage systems) features might be considered to manage surface water runoff at the site. SuDS aim to recreate natural drainage as closely as possible (i.e. as if no development had ever taken place) in order to slow water runoff and minimise flood risk.

Possible features that could also be considered for the development include attenuation tanks (to collect and control the outflow of rainwater from the site), green roofs/walls, and rainwater harvesting. There is insufficient space at the site for features such as attenuation ponds or reed beds.

END OF REPORT

The findings and contents of this (intrusive) Site Investigation Report pertain solely to the study area(s) outlined herein and are based solely on the findings of the excavations undertaken as part of the current exercise unless otherwise stated. The findings and/or recommendations of this report do not take into account any ground conditions that may be present but have hitherto not been encountered and as such further investigation and/or a reconsideration of the findings of this report should be undertaken if such conditions are subsequently encountered or an alternative development plan or land use is subsequently proposed.

This report considers various environmental and/or geological risks posed to the site and/or proposed development and offers advice accordingly as guidance only. The findings of this report will remain valid provided no change of ground or groundwater conditions, either natural or anthropogenic, take place and no warrantee is offered or implied.

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APPENDIX 1

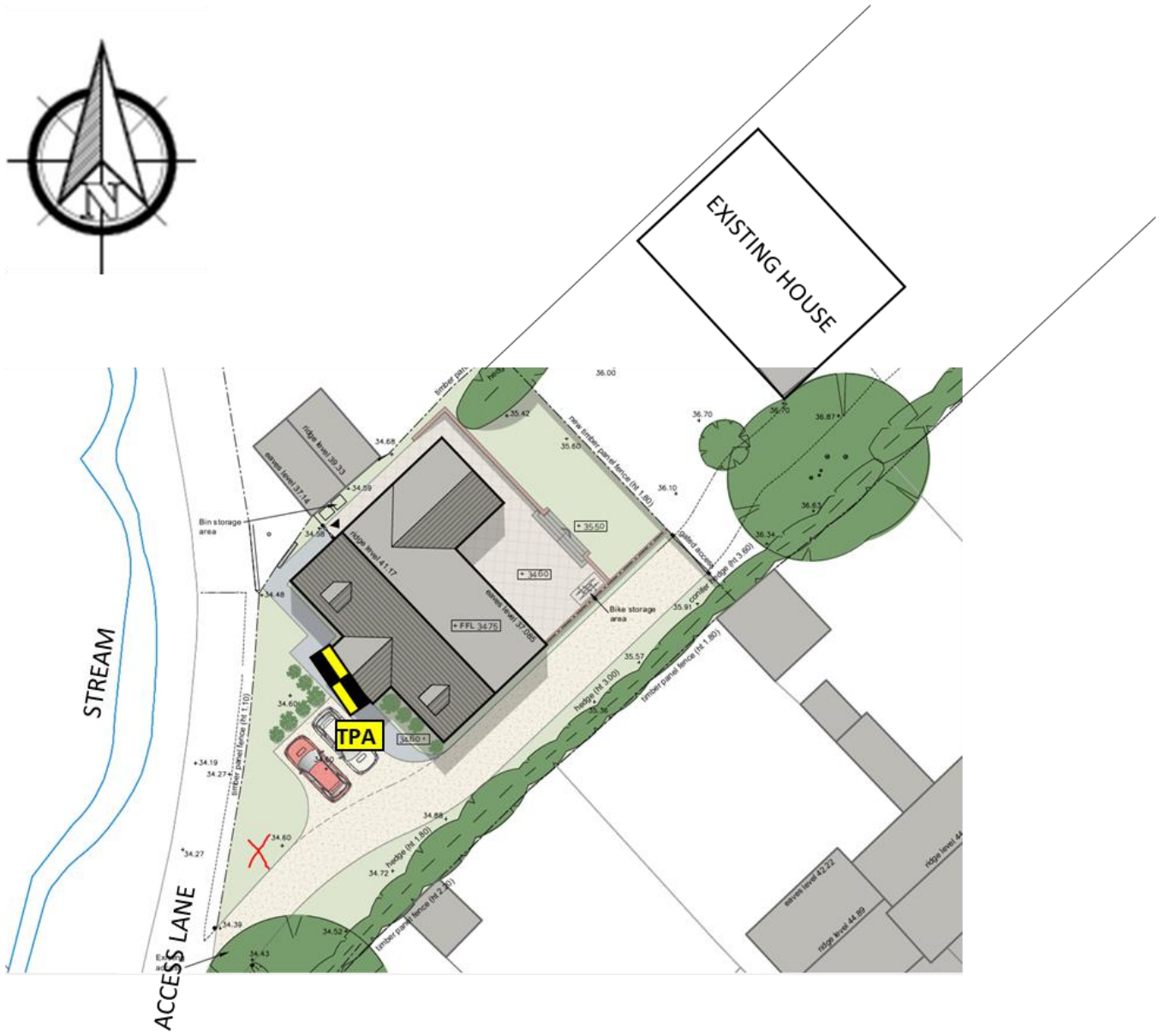
Site plan

and

Trial Pit Log

GEOINVESTIGATE Ltd.

OUR REF: G22447	YOUR REF:	SITE PLAN (NOT TO SCALE)
DATE:29/09/2022	LOCATION: Paget Cottage, Little Awefield, Gloucester, GL4 4DF	



Key

TPA

Machine Excavated Trial Pit

GEOINVESTIGATE Ltd.

Your Ref. **Our Ref**. G22447 **TP No.1** **Sheet No. 1 of 1**
Location: Paget Cottage, Little Awefield, Gloucester, GL4 4DF **DATE**: 29/09/22

Depth (m)	Description of Strata	Thick -ness	Legend	Sample	Test Type Result	Root Information	Depth to Water	Depth (m)
0.20	TURF and TOPSOIL. Loose / soft to firm very sandy slightly silty gravelly clay. Gravel is fine to coarse of brick limestone and coal.	200						0.25
0.50	MADE GROUND. Firm brown sandy gravelly clay. Gravel is fine to coarse of brick, concrete, limestone and coal. Many roots.	300						0.50
1.70	Firm pale brown occasionally mottled orangish brown sandy CLAY. Occasional fine limestone and siltstone gravel.	1200				Roots to 1.40m		0.75 1.00 1.25 1.50 1.70

Trial pit terminated at 1.70m

Trial pit dimensions:
2.20m long x 0.60m wide x 1.70m deep
Approx. 1.60m long below a depth of 1.00m

Water infiltration testing undertaken in pit following excavation according to the BR 365 method.

No repeat tests undertaken.

Filled to 1.10m below ground level, a 0.60m depth of water.

See Infiltration Test 1 results sheet for details.

Location of trial pit:

Additional photographs in main report

Soils excavated from pit:

Close up of trial pit (prior to test):

Remarks: Machine excavated to 1.70m by client on preceding day
Trial pit remained stable on completion
Some water at base of pit, probably from overnight rainfall
Roots to 1.40m

Key: **O** Disturbed sample
Cv Shear vane
W Water sample

APPENDIX 2
Water Infiltration Test Results

Infiltration Test Result

G22447
Paget Cottage, Little Awefield,
Gloucester, GL4 4DF
29 September 2022

Infiltration test 1

(TP1)

Time/s	Depth of water/mm
0	600
900	600
1800	600
2700	600
3600	600
5400	600
7200	600

Test abandoned after 2 hours due to complete lack of progress.

Pit dimensions:	
Length	1.60 m
Width	0.60 m
Depth (filled to 1100mm below ground level)	1.70 m
Depth of water in pit following filling	0.60 m
Internal surface area of pit to 50% depth (m^2):	2.28 (a_{p50})
Storage volume of pit 75% to 25% filled (m^3):	0.2880 (V_{p75-25})
Time to reach 75% filled (s):	Not reached
Time to reach 25% filled (s):	Not reached
Time from 75% depth to 25% depth (s):	- (t_{p75-25})

$$\text{Soil infiltration rate, } f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Source: BRE Digest 365 (BRE, 2007)

f = 0.2880 / (2.28 x ???)

f = N/A

TEST FAILED