

Phase 2 Botanical Survey and Condition Assessment

Survey site address:

Dower House, Hitchin Road, Preston, Hitchin, Hertfordshire SG4 7TZ

Client:

Sat Lally

Survey date:

19th July 2024

Project:

The proposals include a new modern dwelling over two stories clad in charred timber, chalk coloured brickwork to reflect the context in which the site is surrounded. This also includes elements of glazing to metal framed sliding doors and external balustrades. In terms of accommodation the house includes six bedrooms, a study, a cloakroom and a garage at ground floor level. At the lower level there are kitchen, living, dining spaces as well as leisure spaces that include a cinema, pool, gym and yoga studio as well as a garaging with space for up to six cars. Associated landscaping will involve conversion of the remaining land to residential garden space.

LPA: North Hertfordshire District Council

Executive Summary

The following is a summary of baseline ecological conditions identified at the time of survey and work you will need to commission to obtain planning permission and/or comply with legislation and other policy.

The site contains the following habitats/communities.

Grassland

UKHabs: g3c5 *Arrhenatherum* neutral grassland.

NVC: MG1 *Arrhenatherum* grassland in transition from the early successional species poor MG1a to the species rich, lowland meadow qualifying MG1 d and e.

The grassland on site is of a moderate distinctiveness neutral subtype of moderate condition. It does not qualify as a Section 41 Habitat of Principal Importance, Annex 1 habitat or irreplaceable habitat. It does not meet SSSI or Hertfordshire wildlife site criteria. It does however provide biodiversity value in particular to invertebrates, reptiles, foraging birds and foraging bats. It is therefore assessed as being of **LOCAL** importance.

The development will lead to the loss of habitat with importance on the local level. This is unlikely to have a major adverse irreversible effect on the habitat itself due to the presence of extensive grassland habitats surrounding the site, on which losses can be accounted for via enhancement measures. The works could result in the extirpation of some species alongside any dependent invertebrates, which will lead to a biodiversity net loss.

BNG assessment is required.

A CEMP and Habitat Management and Monitoring Plan will be required via condition.

Further information including conclusions, justifications, precautionary measures and opportunities for biodiversity enhancement, is provided within the body of the report.

Limitations and Copyright

Arbtech Consulting Limited has prepared this report for the sole use of the above-named client or their agents in accordance with our General Terms and Conditions, under which our services are performed. It is expressly stated that no other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by us. This report may not be relied upon by any other party without the prior and express written agreement of Arbtech Consulting Limited. The conclusions and recommendations contained in this report are based upon information provided by third parties. Information obtained from third parties has not been independently verified by Arbtech Consulting Limited.

© This report is the copyright of Arbtech Consulting Limited. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

Version control

Status	Issue	Name	Date
Final	1.0	Fay Brotherhood BSc (Hons) MSc, FISC4, Consultant Ecologist, Botanist and Habitats Specialist	25/07/2024

Proportionality

The work involved in preparing and implementing all ecological surveys, impact assessments and measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. Consequently, the decision-maker should only request supporting information and conservation measures that are relevant, necessary and material to the application in question. Similarly, the decision-maker and their consultees should ensure that any comments and advice made over an application are also proportionate. This approach is enshrined in Government planning guidance, for example, paragraph 185 of the National Planning Policy Framework for England. The desk studies and field surveys undertaken to provide a Preliminary Ecological Appraisal (PEA) might in some cases be all that is necessary.
(BS 42020, 2013)

Table of Contents

<i>Phase 2 Botanical Survey and Condition Assessment</i>	<i>1</i>
<i>1.0 Introduction</i>	<i>5</i>
<i>2.0 Surveyor and Limitations</i>	<i>6</i>
<i>3.0 Desk Study</i>	<i>8</i>
<i>4.0 Methodology.....</i>	<i>11</i>
<i>5.0 Habitat and Community Descriptions</i>	<i>17</i>
<i>6.0 Community Classification</i>	<i>18</i>
<i>7.0 Condition Assessment</i>	<i>20</i>
<i>8.0 Assessment of Conservation Importance</i>	<i>21</i>
<i>9.0 Impacts and Recommendations.....</i>	<i>23</i>
<i>9.0 Bibliography.....</i>	<i>25</i>
<i>Appendix 1 - Vegetative Community Map</i>	<i>29</i>
<i>Appendix 2 - Proposed Development Map</i>	<i>30</i>
<i>Appendix 3 - Landscape Map</i>	<i>31</i>
<i>Appendix 4 - Photographs.....</i>	<i>32</i>
<i>Appendix 5 – Site Species List</i>	<i>39</i>

1.0 Introduction

Background

Arbtech Consultancy Ltd was instructed to undertake a botanical walkover survey and BNG Condition Assessment (variously referred to as the; “survey, report”). Project, site and client details are named on the title page. A plan of the proposal will be provided in Appendix 1 (when available if not included).

Previous Reports

Previous ecological reports have been produced for the site. These comprise the following.

- **Preliminary Ecological Appraisal (PEA) (Arbtech, September 2022).**

Due to the site

1. Containing potentially important habitats (e.g. old walls, low nutrient soils, previously developed land)
2. Being listed on Magic as hosting important habitats
3. Being at risk of INNS issues
4. Containing semi or unimproved grassland or woodland
5. Containing positive indicator species for important habitats (axiophytes)
6. The PEA being carried out in a sub-optimal period for surveying vegetation (drought)

Phase 2 botanical surveys by a suitably experienced botanist were recommended to fully classify and condition assess the habitats on site as well as identify any important species. The surveys were to be undertaken in Spring (to assess the woodland) and late Summer (to assess the grassland) and the results within would inform any Biodiversity Net Gain Calculation, habitat replacement, creation and enhancement plans.

Relevant information from the PEA is incorporated within the report.

Aims

The survey aims via a field visit to identify as full a range of plants as practical (within the limits of proportionality, practicality and the chosen sampling method, with particular attention paid to potentially Important Plants and axiophytes¹ and notable species. Using this information, the survey aims thus to;

- 1) Characterise the surveyed habitat in terms of its general vegetative sub community type and conservation importance (Important meaning; Local Biodiversity

¹ Axiophytes = worthy plants”. Indicators of habitat considered important for conservation, such as ancient woodlands, clear water and species-rich meadows.

Action Plan/list habitats-Habitats of Principal Importance e.g. those under S.41 NERC Act -Annex 1 Habitats Directive habitats and irreplaceable habitats, (which once lost cannot be recreated) (NPPF) 2023 biodiversity (186) The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024) assisted by the use of both UKHabs and where appropriate, National Vegetation Classification coding.

2) Determine the presence of Important Species. These include Schedule 8 Protected Species and Schedule 5 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019), Species of Principal Importance s.41 NERC Act (England), endemic, red listed, nationally rare/scarse species, species at the edge of their range, species on local biodiversity lists, common species present on sites containing a large proportion of the species local or regional population.

The conclusions drawn from the assessment will facilitate the following assessments of;

1) Conservation value of the site.
2) Impacts and their magnitude.
3) Recommendations for compensation, mitigation and/or enhancement.

2.0 Surveyor and Limitations

Surveyor Experience and Qualifications

The site survey was undertaken by Fay Brotherhood BSc, (Hons) MSc, FISC4 botanist and habitat specialist. She has five years of experience in conducting bat related surveys and is a botanical and habitats specialist. She holds a National Diploma in Countryside Management, a BSc Hons in Wildlife Conservation and an MSc in Environmental Management. Professionally, as both a consultant ecologist and a ranger she has 6 years of professional survey experience and over 15 years of amateur experience in the identification of plants, fungi, and more recently, lichens and bryophytes. Her MSc dissertation aimed to ascertain the relationship between species distribution and historic land use in the grass verges and green spaces of Welwyn Garden City, Hertfordshire. She actively records in Hertfordshire and her home county of Leicestershire and is a member of the British Botanical Society of Britain and Ireland (BSBI) and the British Lichen Society (BLS).

Date of survey	Temperature (°C)	Humidity (%)	Cloud Cover (%)	Wind (km/h)	Rain
19/07/2024	30	63	1	0	None

Limitations

The assessment is based on knowledge of onsite habitat dynamics, wider landscape ecology and individual species ecology and biology as currently understood and whilst every effort has been made to describe the baseline botanical conditions within the survey area, and evaluate these features, this report cannot provide a complete characterisation of the site as this can only be provided via a number of visits carried out over the year to capture late or earlier emerging plant species that

may not have been visible at the time of the survey. This is not considered a significant limitation, as conditions on site and from previous surveys taken in context with the nature of the habitats on site are considered to provide an adequate overview of the sites value. Precautionary measures are provided where uncertainty remains.

Specific limitations comprised the following;

Biological Records Data (BRD)

- Whilst planning policy and professional standards usually call for the inclusion of biological records data (BRD), no data has yet been obtained and the report is therefore limited by lack of information on local plant distribution and the presence of any onsite or adjacent non-statutory site. In light of data collected and impact assessments made on the ground during the site visit, and precautionary measures recommended within, it is not considered that the inclusion of data would add particular weight to or alter any of the conclusions or recommendations within, however data can be added at a later date if required.

Desk Study Resources

- Data gleaned from the desk study is based upon information provided by third parties. This has not been independently verified by Arbtech Consulting Limited. Publicly data from British Geological Society and the Landis Soilscales App is of low resolution and ground truthing may be required to inform any required habitat creation works. Data on Magic cannot be relied upon to capture all Important Habitats, especially where they occur at the small and fragmentary scale.

The supporting PEA

- The submitted PEA is now out of date and its recommendations may not be up to date or reflect the authors opinions based on current conditions on site. The survey report provides updated recommendations where considered necessary.

Species-complexes and hybrids

- Certain taxa comprise 'micro-species' within larger "aggregates" the identification of which requires highly specialised skills and knowledge. Dandelions *Taraxacum*, *Hamata*, *Erythrosperma*, *Ruderalia*, *Celtica* agg, hawkweeds *Hieracium* spp, willows and sallows *Salix* spp. and brambles *Rubus* agg are specific examples. In addition, fungal taxonomy is in constant flux and new species and sub-species as well as varieties of named species are continually being named. The skill levels required to divide these are high and this means some subspecies and varieties may have been missed. The survey protocol followed here normally records ambiguous species requiring of specialist knowledge to genus level only unless subspecies can be easily divided. Notes are made where ambiguity remains, in particular if it is deemed that a lack of a definitive ID may carry a risk of failing to record a notable species. Preserved fungal samples are retained in case further analysis by e.g DNA sampling is required. Further survey is recommended if there are a sufficient number of unidentified/ambiguous fungal specimens as this may suggest the possibility of a notable mycoflora in requirement of specialist study.

All limitations have been taken into account during the evaluation of the site and requirement for further surveys and mitigation.

3.0 Desk Study

Desk Study Methodology

The desk study included a review of the magic.gov.uk database for statutory and non-designated sites and relevant non-statutory designations such as Important Plant Areas within a 2km radius of the site (farther afield sites are included if considered relevant to the assessment). Landscape value and context as well as geology and soils is ascertained from Google Satellite and historic imagery as well as important (Schedule 41 NERC) habitats mapped on Magic and geology and soils mapping on British Geological Society Map Viewer and Landis Soils app as well as any specific relevant information found via wider web search. In addition, any granted European Protected Species Licences (EPSL) for Schedule 5 (Wildlife & Countryside Act 1981) for plants held on magic.gov.uk database have been considered where these are within influencing distance of the site. The results are used to provide a broader picture as to notable species likely to be present within the locale and potentially on site. The collected species list was later analysed against UK red data book lists and local rare plants registers to ascertain conservation value.

Location plan in appendix 2

Site Context and Landscape Assessment

Landscape and Local Habitats

The site is located at National Grid Reference TL 1823 2518 and has an area of approximately 0.4ha comprising a derelict walled garden, out of use for many years but suspected to have provisioned fruit and vegetables to the adjacent Dower House, adjacent, and the Grade I listed Temple Dinsley manor house. Across the road to the north west lies the ancient Wain Wood SSSI and the site itself forms part of a large area of parkland. There is a small area of wooded pasture adjacent to the gardens south eastern boundary, beyond which, ~90m south east is a further larger block of woodland fragmented from it by a substantial acreage of semi improved grassland spread across the surrounding Princess Helena College grounds undulating topography. The site is located in a rural context on the outskirts of the village of Preston, Hitchin, on the dip slope of the Chilterns, ~300m north-east of the main residential area within the village. The surrounding landscape is one of mixed agriculture (predominantly pasture) with hedgerows and treelines providing habitat connectivity between woodlands. The site itself is designated as Wood Pasture and Parkland, forming part of the former rural estate of Temple Dinsley, which is mapped as such in its entirety. Several areas of scattered broadleaved and mixed woodland are present within the wider landscape, most of which are small and fragmented, however there is a large tract of ancient woodland, part of which is a SSSI (Wain Wood) immediately across the road ~10m to the east. Around 1.1km to the north west is a block of Open Mosaic on Previously Developed Land. Further south, ~1300m from the site is a larger area of woodland which forms Hitch wood (designated as a Country Park and hosting a regionally important barbastelle maternity roost). Within the wider landscape, London Luton Airport is situated ~6km south-west and the A1 is situated ~3.8km east.

Placed in wider landscape context, the local woodlands and wood pasture here and elsewhere in this part of Hertfordshire form remnant fragments of the once more extensive “chase” landscape of the former Great Hitch Wood, reported in the Saxon period to have encompassed much of the landscape between the River Mimram at Welwyn and Hitchin to the North. As such it can be expected that ecological contexts are likely related.

A site location plan is provided in **Appendix 3**.

Site History and Management

In the 1800's the walled garden was marked on historic maps as extant but of smaller extent, comprising a triangular shape which was extended to a square in later years. It has been managed as a garden but in recent years has fallen into disuse. In 2000 it was indicated by Google Earth to contain woodland; possibly a derelict orchard succeeding into woodland. Thus was cleared around 2016 at which point it was photographed as grass and/or ruderal vegetation. From 2020 works began taking place on the site, causing disturbance, in particular to the west of the site. Sufficient time has elapsed without disturbance for a mid-successional ruderal/grassland community to develop. The present community appears to be subject to no management,

Geology and Soils

The underlying geology comprises chalk, close to a transitional point descending from the clay with flints formation seated atop the chalk interfluvies of the Chiltern dip slope which characterises west Hertfordshire. Locally, minor pockets of glacial deposits occur which may influence geological conditions. This is overlain by freely draining lime-rich loamy soils.

Aspect and Topography

The grassland is sited upon flat terrain within the more widely slope of the eastern aspect of an interfluvium. It receives full sun but parts are likely to be shaded by the adjacent woodland in late evening.

Designated Sites

- Wain Wood SSSI (~68m west) lies on a north-east facing slope of the decalcified boulder clay which exhibits a gradation of soil types from acidic gravels at the top to base-rich loams at the bottom. It comprises broadleaved, mixed and yew woodland (lowland) in unfavourable but recovering condition. An ancient seat natural oak/hornbeam *Quercus species/Carpinus betulus* woodland, approaching the northern limit of its natural range, it represents an example of a habitat now much reduced in extent nationally through woodland clearance or felling and restocking with conifers. The wood supports an interesting butterfly community, of which purple hairstreak *Thecla quercus* is a notable example.

It is possible that the site and environs, which are designated as Wood Pasture and Parkland could host non-statutory designations, as may the non SSSI parts of Wain Wood. Hitch Wood (1.3km south west) hosts no statutory designation but is likely to contain non-statutory designations on account of the quality of the typical Hertfordshire hornbeam wood. Hosting a barbastelle maternity colony, this should qualify it as a bat SAC.

The purchase of Biological Records Data will be required to ascertain the presence of such designations and their qualifying features should the LPA not find the recommendations within sufficient to account for the risk.

Important Plant Areas

The site is/is not within an Important Plant Area. However, the site could be contextually related to the nearest (Chilterns IPA), which is ~7km to the east by virtue of geological/landscape congruity.

Summarised Botanical Value Map

This categorises monads (1 x 1 km grid squares) as being of Low, Moderate or High botanical value according to the presence of Rare, Scarce and Threatened (RST) plant species and/or the proportion of Priority Habitat Positive Indicator (PHPI) species (axiophytes). This was developed as a way of targeting appropriate areas for tree planting (Natural England, 2023). The site is in an area of **LOW** botanical value but is adjacent to an area of **HIGH** value.

Biological Records Data

Existing biological records including important and protected plants may need to be obtained covering a 2km radius and are presented in the table below. In the interests of brevity, only those species with a reasonable likelihood of occurring on or immediately adjacent to the site are included.

Biological Records Data – Plants	
Species	Conservation Designations
Not authorised.	

Notable Species Present on Designated Sites

The following citation description from Wain Wood SSSI highlights species typical of the area in a woodland context. This can be used in planning enhancements.

The stand comprises mature pedunculate oak Quercus robur and sessile oak Quercus petraea with hornbeam standards in the south and wild cherry Prunus avium frequent in the north. Thinly developed hornbeam coppice dominates the shrub layer throughout with elder Sambucus nigra also present. Here the sparse ground flora is composed of bluebell Hyacinthoides non-scripta, bramble Rubus fruticosus, bracken Pteridium aquilinum and bryophytes. A disused pit near the centre of the wood is surrounded by standard ash Fraxinus excelsior and wild cherry with abundant dog's mercury Mercurialis perennis as ground cover. A damp open ride in the south of the wood is characteristic of unimproved acidic grassland with sheep's sorrel Rumex acetosella, yellow pimpernel Lysimachia nemorum and common centaury Centaurea erythraea. Elsewhere, drier more base-rich conditions support a ride flora indicative of calcareous grassland. Species present include field scabious Knautia arvensis, hairy St John's wort Hypericum hirsutum, lady's mantle Alchemilla filicaulis and eyebright Euphrasia officinalis. The wood supports an interesting butterfly community, of which purple hairstreak Thecla quercus is a notable example.

4.0 Methodology

Field Survey Methodology

Species Identification

Species were identified where possible in the field, supported by the use of a hand lens and/or macro photography. Where not readily identifiable in the field, descriptive location notes were made upon the field map and samples were taken via photographs (using zoom, manual focus and any light corrective factors to improve colour capture) and illustrating all identifying features such as leaf junctures, undersides, hairs, spine shapes etc).

Species data was collected using a suitable data collection app (such as iRecord), to collate photographs, grid reference and notes on habitat, relative abundance, relationships with other plants, abiotic variables (e.g. soil, aspect, topography) and other comments of note. Such apps usually provide an Auto ID service. Whilst these were used as a supportive methodology, Auto ID is notoriously unreliable. As such, any suggestions were validated or rejected via book and internet resource cross referencing (resources used are listed within the bibliography).

Where it was anticipated that more detailed examination may be required, physical samples were taken, with reference to codes of conduct for sample collection outlined in Rose et al (2006) and the Botanical Society for Britain and Ireland Code of Conduct and with respect to the Wildlife and Countryside Act 1981, which stipulates that landowner permission is required before any plant may be uprooted. Samples were identified at the desk using hand lens or microscope where necessary.

Verification by more experienced botanists such as the relevant County Recorder was sought where there was uncertainty. Where this was not possible and uncertainty over ID remains, this is noted, and species are recorded to genus level. If failure to attain a species level identification risks missing an important species, or may lead to an incorrect habitat classification, this too is noted.

UKHabs Assessment

The site was surveyed using methodologies adapted to the site's individual circumstances set out in the UKHabs user manual (UKHabs Working Group, 2018), the relevé method (Minnesota Department of Natural Resources, 2007) and the National Vegetation Classification (Rodwell, 2006), in the aim of ensuring accurate and efficient habitat classification.

An NVC survey aims to capture all plants present in similar (homogeneous) stands of plant composition and structure. In grassland, the majority of these plants are flowering plants, grasses, rushes and sedges, but some identification of mosses may be required for particular communities of plants. The method does not categorise the transition between vegetation types particularly well, and it is advised not to be used in these situations.

The composition and structure of plant communities present in similar (homogeneous) stands of grassland was assessed, to include flowering plants, grasses, rushes and sedges and mosses. The method does not categorise the transition between vegetation types particularly well, and its use in such situations is generally not advised.

A brief walk-over of the habitat was undertaken to identify both similar and differing vegetation stands prior to commencing the survey, supported by the predictions made by desk study data. If significantly different communities were found to be present, this information was used to identify distinct sampling areas for quadrat placement.

Open habitats

A minimum of 3—5 (more if considered necessary) 2x2m quadrats are placed within each similar stand corresponding to visually observable changes in vegetative characteristics, with a 10-figure grid reference recorded. 2x2m Quadrat placement choices must avoid single structure types, areas of unusually high species richness, or clear transitional zones to avoid bias and permit representative sampling. Some grasslands do present themselves as a mosaic and this can be captured via even sampling of the different sward and community types within it. It should be noted that swards tend towards variability across sites and transitions can be gradual and unavoidable. To counter this, the surveyor picked areas of sward that were clearly homogenous and displayed less “difference”. The figure below provides examples of appropriate placements in relation to compositional and structural boundaries.

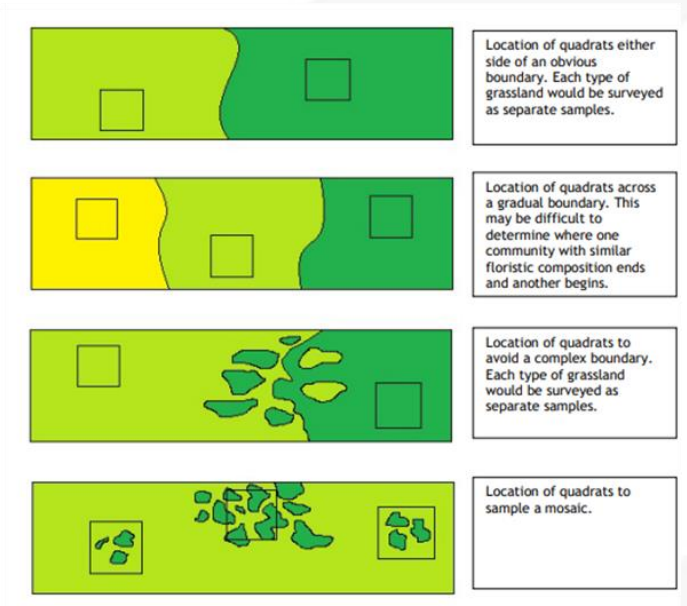


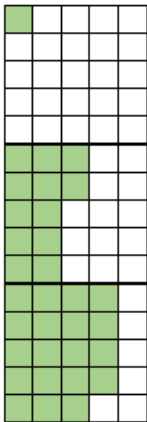
Figure: Appropriate quadrat placement in open habitats

All plants within the quadrat were recorded alongside an estimation of percentage cover, using either the DOMIN scale or Braun-Blanquet scale as illustrated in the table below, noting that whilst the DOMIN scale can be related to the simpler BraunBlanquet scale they cannot be related vice versa. Percentage totals are permitted to add up to over 100% to factor in the tendency for plants to layer themselves above one another.

DOMIN scale		Braun-Blanquet scale	
Cover	Scale	Cover	Scale
91-100%	10	76 -100%	5
76-90%	9	51-75%	4
51-75%	8	26-50%	3
34-50%	7	6-25%	2
26-33%	6	1-5%	1
11-25%	5	<1%	*
4-10%	4		
< 4% (many individuals)	3		
< 4% (several individuals)	2		
< 4% (few individuals)	1		

Table: DOMIN and Braun-Blanquet Scale

Percentage covers were estimated by imagining the plant as grouped into a corner or lined against one edge of the quadrat, in terms of the number of squares filled by the plant on a 5 x 5 grid with each square representing 4% as illustrated in the table below.



4% of a quadrat
DOMIN = 4
Braun-Blanquet = 1*

48% of a quadrat
DOMIN = 7
Braun-Blanquet = 3

76% of a quadrat
DOMIN = 9
Braun-Blanquet = 5

*Below this = 1-3 on DOMIN or 1 on Braun-Blanquet

Table: Examples of percentage estimations

Relevé and Transect Methodology

In cases where it could be clearly seen by eye that the parcel was predictably homogenous throughout in terms of structure and species distribution/relative abundance it was sampled as a single quadrat or relevé plot. This was searched methodically via linear zig zag across the site until no new species were found. In this methodology, sp/m² scores were obtained directly from the relevé or using three quadrats to capture a range if there was any minor variability. The DAFOR (Dominant, Abundant, Frequent, Occasional and Rare) scale is used for UKHabs purposes. For adaptation to the relevé technique and UKHabs, DAFOR is transposed to I to V frequency scores (see **Data Processing Methodology**). In predictable stands, this often yields the same results in data processing via MAVIS as would be gained from manual analysis.

Where linear features such as grass verges were sampled, the methodology was adapted to incorporate use of transects. Again, visibly homogenous stands were sampled in transects of approximately 5 to 30m depending on the overall homogeneity or lack thereof of the community present. The surveyor must not inadvertently sample environmental gradients which may induce community change. Where gradients are apparent, the new community is sampled as a new plot, avoiding the zone of change.

Species per m² Scores

The quadrats/transects are also used to gain sp/m² scores, allowing the compilation of a range and average. It should be noted that UKHabs operates under 1m² methodology but the authors experience indicates the real world difference in results yielded between 1 and 2m² is considered to be negligible. As such, where UKHabs alone is used 1m² quadrats are employed, but when supported by NVC methodology, 2m² quadrats are used.

Important Plants Survey

A full walkover of the site was conducted in an effort to capture as full a species list as is practically possible within the limitations of the survey effort and any timing caveats. Particular attention was paid during the walkover to structural elements such embankments, boundaries, slopes, areas of short, grazed grass, areas of hard standing etc and transitional zones, which would have been avoided during NVC sampling but in which additional species adapted to differing conditions may be present.

During the survey, habitats were assessed for their suitability for important species and if identified, their presence, locations and growing conditions were recorded.

Notes were made on overall relative abundance (where appropriate) via DAFOR (Dominant, Abundant, Frequent, Occasional, Rare) scores and on any other ecological incidental observations. Again, a transposition between I-V was made for inclusion in NVC assessment if deemed appropriate in resolving ambiguity.

Condition Assessment

The surveyor aimed to capture the relevant data required to inform condition assessment and habitat characterisation for the purposes of any future Biodiversity Net Gain Assessment required for the site. This was carried out using the relevant tab under the Statutory BNG Condition Assessment Excel Workbook (Natural England (2024) and the results are incorporated later within the report.

Data Processing Methodology

The below text details how the collected data was handled post survey in the formulation of any subsequent conclusions.

Plants

UKHabs & NVC

The community on site was classified via UKHabs methodology (UKHabs Working Group, 2018) using UK Habitat Classification Version 2.01 (UKHab Ltd, 2023). Use of this was augmented by the supplementary species list and descriptions for cryptic UKHab grasslands document developed by Joshua Styles MSc AMRSB MCIEEM FISC Level 6.

Where further clarity was required, the habitat was classified giving due consideration to methodologies and habitat descriptions set out in the National Vegetation Classification (Rodwell, 1998; Rodwell 2006), and the relevant British Plant Communities Volume (Rodwell, various dates).

The collected quadrat/transect/releve data was compiled into a Floristic Data Table based on frequency and coverage. Frequency (as denoted by Roman numerals) refers to the number of times a species is found in the quadrats. The descriptive measure of frequency refers to constancy or rarity of species throughout the community. Using the DOMIN scale, species were ordered from greatest coverage and frequency to least coverage and frequency, in the understanding that NVC communities tend to be defined by their constant species. When using non-standard methodologies using for example in single stands, DAFOR or Braun-Blanquet were transposed to the relevant frequency class and associated descriptive measure as per the table below.

NVC Frequency Scores			
Frequency class	Percentage of quadrats	Descriptive measure	DAFOR transposition
I	1 - 20% (1 quadrat of 3 or 5)	Scarce	Rare
II	21- 40%	Occasional	Occasional
III	41 – 60%	Frequent	Frequent
IV	61 – 80%	Constant	Abundant
V	81 – 100%	Constant	Dominant

Table: Frequency scores and transpositions

Nomenclature follows that set out in Stace (2019). Nomenclature for other taxa (e.g bryophytes, lichens) use relevant internet resources as taxonomical changes are frequent within these groups.

Analysis was made preferentially by manual means, making use of the relevant UKHabs literature, augmented by the keys and descriptions within the appropriate volume of Rodwell's British Plant Communities, which is recommended by the author himself as the preferred means of analysis. This is because vegetative communities rarely behave in a predictably ordered manner and assigning communities via computer program can be impossible where communities exhibit transitional elements, which many do. The software program. Modular Analysis of Vegetation Information System (MAVIS) (Smart, 2000) from the Centre of Ecology and Hydrology was used as a supporting resource.

When used, the data was entered into the selected programme. Where the result was ambiguous or otherwise suspect, the analysis was ran a second time with all ruderals, shrubs and tree seedlings removed. The rational for this is based on the final, open vegetation communities (OV) part of the classification for which the presence of such species may provide a false output for the community by overriding other vegetation.

Post analysis, the potential community outputs were interpreted critically and assessed for good match using the relevant NVC handbooks and any other context providing supporting resources, taking into account any additional factors and variables that may impact final assessment. The output of MAVIS includes a series of "confidence scores". It is generally considered that 50% is the threshold for high confidence, but realistically the output rarely produces high confidence results, with the range of lower confidence options often reflecting the transitional character of the majority of real world habitats. As such, these subsidiary options should be explored alongside the top confidence options to identify where the community may exhibit elements of related communities.

5.0 Habitat and Community Descriptions

The following table/s presents the results of the field survey as compartmentalised into surveyed parcels. The description is taken from the PEA of 2022 and updated. Photographs are available in Appendix 4.

Overall Site and Habitat Description	
Walled garden Grassland	
Description	The site comprises an area of grassland which has formed within the wall garden on soils which are clearly variable, with disturbance having exposed the chalk. There are some calcareous grassland indicators present including musk thistle and (weaker indicator) great mullein however, the community visible at the time of survey is dominated by ruderals and widespread neutral indicators. It is likely that historical nutrient enrichment and other soil amendments from vegetable growing and/or its time as woodland have altered the soils somewhat. Recent disturbance events will also have created optimal conditions for ruderal colonisation. To the west of the site, a substrate of gravels and hardcore comes close to the surface, forming a mosaic of bare ground interspersed with vegetation of a variety of heights, which is generally rather sparse. To the east of the site, the vegetation present indicates wetter conditions. Creeping buttercup becomes dominant alongside reed canary grass and some stands of common reed. Some species such as mints and feverfew scattered around the site may have been relics of herb gardens and other cultivations. To the south of the site, beyond the boundary of the old wall an orchard is visible set within longer established grassland into which ruderal species do not extend far from the site. This may have been visible in aerial photographs of the then wooded site in 2000. Considering the local geology and soils, some or all of the surrounding grassland may classify as calcareous grassland.

Incidental Observations	
Invertebrates	
Description	The survey was carried out on a fine and hot day of optimal flying conditions for invertebrates. Invertebrate populations on site appeared to be abundant and species/taxa thus observed included; • Butterflies and moths (including large numbers of marble white, skippers and in association with the ragwort a high cinnabar moth population). • Dock bug • Honeybee's and other bee species • Spiders • Ichneumen wasps • Swollen thighed flower beetle (and other flower bugs) • Flies

	• Snails • Hoverflies.
Reptiles & Mammals	
Description	The site and wider environs offer high habitat value to reptiles. Shrews could be heard amongst the undergrowth, indicating the site provides value to raptors and owls for its rodent populations and a deceased fallow fawn was found within the site, where it had been hidden by a presumably deceased mother.

6.0 Community Classification

Community Characterisation

The overall site species list is presented in Appendix 5. The below tables provide detail and justification for final UKHabs/NVC community classifications. The data and floristic tables informing this is available in a separate spreadsheet, which can be made available on request.

Grassland Community Classification

UKHabs: g3c5 Arrhenatherum neutral grassland.

NVC: MG1 Arrhenatherum grassland in transition from the early successional species poor MG1a to the species rich, lowland meadow qualifying MG1 d and e.

NVC

MAVIS produced the following outputs, the first containing all species and the second with ruderals removed. All results were at low confidence (under 50). This paints the picture of an unstable community in transition from a disturbed open habitat to a closed grassland that contains elements of all.

In the first run, woodland and scrub community W24 *Rubus fruticosus agg-Holcus lanatus underscrub* comes out at the top. Whilst the site is clearly not woodland underscrub, bramble and Yorkshire fog is present throughout and this is likely to represent a pre-clearance relic of the previous wooded community. This is followed by OV23d *Lolium perenne-Dactylis glomerata Arrhenatherum elatius Medicago lupulina subcommunity*. Typical of urban, recreational and otherwise disturbed scenarios, this reflects the history of repeated disturbances experienced by the site since woodland clearance. The OV23d community does have an affinity to both MG6 *Lolio-Plantaginion* and MG1 *Arrhenatherum elatius grassland* and transitions to and from both. The latter also features in the MAVIS output.

MG1 being a ubiquitous feature of unmanaged grassland, this is a reliable indicator of the developing grasslands character. The two MG1 subcommunities that appear are firstly, **MG1a Festuca rubra subcommunity**, which represents a relatively early successional stage within the Arrhenatheron and usually forming a component of newly created/formed unmanaged grasslands tends to be relatively species poor, due to its being in an early stage of species recruitment.

Secondly comes **MG1d Pastinaca sativa sub-community**. This is a more species rich variant, representing the calcareous counterpart to MG1e the *Centaurea nigra* sub-community. There is a calcareous variant of this (*Pimpinella saxifraga variant*), which does bear some resemblance to the site. Under UKHabs coding systems, both these sub communities qualify as **lowland meadow**.

In parts of the site dominated by *Urtica dioica*, **MG1b *Urtica dioica* subcommunity** is most certainly present although this part of the site was not included in analysis.

A further feature in analysis 2 is **MG9b *Cynosurus cristatus*-*Caltha palustris* grassland**. This encompasses a range of wet grassland subtypes. The site is clearly not an MG9 grassland, but its inclusion in the output reflects the contribution to the community of typically wetland species *Phalaris arundinacea* and *Phragmites australis*.

A further run on MAVIS was made regarding the eastern part of the site, where *Phalaris arundinacea* became dominant and *Phragmites australis* appeared as this represented a clear transition to a new community. Here, the top suggestion were the tall herb fen communities S28 *Phalaris arundinacea* tall-herb fen *Phalaridetum arundinaceae*, followed closely by various OV (open ground) communities, reflecting an understorey overlap with the major community on site. The author does not suggest that this part of the community represents a true fen habitat, as there is no consistent source of base rich ground water. It instead reflects a geological/hydrological anomaly in this part of the site which has created a poorly drained area likely subject to seasonal pooling.

On balance, the grassland offers no clear fit to any one community, as indicated by the MAVIS output, but can be broadly encompassed as comprising a form of **MG1 *Arrhenatherum* grassland in transition from the early successional species poor MG1a to the species rich, lowland meadow qualifying MG1 d and e.**

MAVIS analysis 1	MAVIS analysis 2 (ruderals removed)	MAVIS analysis 3 (<i>Phalaris</i> dominated areas)
NVC: W24a 33.61	NVC: OV23d 34.54	NVC: S28b 48.93
NVC: W24 33.38	NVC: OV23 33.15	NVC: S28 46.98
NVC: OV23 33.04	NVC: MG1a 33.01	NVC: S28a 45.80
NVC: OV23d 32.27	NVC: W24a 32.51	NVC: S14d 32.48
NVC: MG1 31.72	NVC: W24 32.05	NVC: S28c 31.25
NVC: MG1a 30.86	NVC: MG1 31.44	NVC: OV26e 25.91
NVC: OV25 30.23	NVC: MG1d 29.77	
NVC: MG1d 29.26	NVC: OV10d 29.54	
NVC: OV10d 28.95	NVC: OV25 29.50	
NVC: MG1b 28.89	NVC: MG9b 28.89	

Table: MAVIS runs

UKHabs

Using UKHabs coding and habitat descriptions (UK Habs Ltd, 2023), the following assesses the parcels conformation or lack thereof with higher distinctiveness acid, neutral and calcareous subtypes.

to qualify under level 4 high distinctiveness grassland classifications **g1a lowland dry acid grassland g2a Lowland calcareous grassland** or **g3a lowland meadow**, the community would need to adhere to the following criteria;

Meet at least two of the following;

1. >15 sp/m² (>12 for acid grassland) (including grasses and excluding bryophytes). **PASS Scores per quadrat were 18, 20, 22, 28 and 37.**
2. >30% cover of broadleaved herbs and sedges, excluding *Trifolium repens*, *Ranunculus repens* and injurious weeds. **PASS (around 30%)**
3. <10% cover of rye grasses and *Trifolium repens*. **PASS**

AND EITHER 4 OR MORE (2 OR MORE FOR G2A) of listed indicators at least 'present' on the DAFOR scale (this refers to both UKHabs and Styles species lists).

FAIL Autumn Hawkbit, common knapweed, orchids

AND THREE OR MORE (1 OR MORE FOR G1A) of these indicators at least 'occasional' on the DAFOR scale (but not limited to field corners or edges).

FAIL only two occ or frequent.

The site cannot qualify as either form of **g3a lowland meadow** which subsumes NVC categories MG5, MG8, MG1c-e, MG2 and MG7c as it fails on all UKHabs criteria. Given time it would likely qualify as MG1c-e.

The grassland fails to meet the criteria for any high distinctiveness subtype. Instead, the community fits most closely to the primary category of moderate distinctiveness subtype; **g3c5 Arrhenatherum neutral grassland.**

7.0 Condition Assessment

Condition Assessment

Medium Distinctiveness Grasslands

- A. "The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type (and relative to Footnote 3 suboptimal species which may be listed in the UKHab description). Note - this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only."

FAIL

- B. Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.

PASS.

- C. Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens.

PASS

- D. Cover of bracken *Pteridium aquilinum* is less than 20% and cover of scrub (including bramble *Rubus fruticosus* agg.) is less than 5%.

PASS

- E. "Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area. If any invasive non-native plant species⁴ (as listed on Schedule 9 of WCA5) are present, this criterion is automatically failed."

PASS – the criterion is passed based on the fact disturbance activities have created higher biodiversity by enhancing niche availability and structural heterogeneity.

Additional Criterion - must be assessed for all non-acid grassland types

- F. "There are 10 or more vascular plant species per m² present, including forbs that are characteristic of the habitat type (species referenced in Footnote 3 and 5 cannot contribute towards this count). Note - this criterion is essential for achieving Good condition for non-acid grassland types only."

PASS

Passes 5 or 6 criteria, including essential criterion A and additional criterion F.

Good (3)

Passes 3 - 5 criteria, including essential criterion A.

Moderate (2)

"Passes 2 or fewer criteria;

OR

Passes 3 or 4 criteria excluding criterion A and F."

Poor (1)

The site passes 4 criteria excluding criterion A but passes additional criterion F and is therefore assessed as being in **MODERATE** condition.

8.0 Assessment of Conservation Importance

Conservation Importance of habitats and species on site.

Habitats

The grassland is not a Section 41 Habitat of Principal Importance, nor is it an Annex 1 Habitat. The community on site does not meet SSSI designable criteria, nor is it likely to meet those for local wildlife sites in Hertfordshire. However, the grassland community on site has intrinsic importance for its hosting of a disturbed chalk substrate on which some calcicoles have either colonised or emerged from the seed bank post woodland clearance.

It should also be noted that the community present on site reflects a poor version of a disturbance dependant "Breckland" grassland typical of Hertfordshire and wider East Anglia, that is notoriously difficult to classify at NVC level due to its seemingly resembling a mixture of early successional, ruderal and MG1d communities with affinities to (and at times compliance with) CG7 calcareous grasslands. This transitional nature means it is difficult to slot into an s.41 or other high value category, but it nevertheless has value for being a locally distinctive assemblage.

As such, it represents a restorable calcareous grassland resource, with a clear local identity. The surrounding grasslands are likely to also contain calcareous soils and similar habitat around (and within) the site could be created were they subject to soil stripping.

In addition, the habitats on site will be of importance in maintaining biodiversity within the site across a range of taxa and.

As such, they are assessed as being of **LOCAL importance**.

Important Species

Vascular Plants

No species were present with any protections beyond the more general ones afforded to all wild plants under the Wildlife and Countryside Act 1981 and no important species in terms of s.41, red list or nationally/locally scarce designations were observed during the snapshot in time of which the survey was undertaken. It is possible that important species could be present earlier in the season, as the site hosts optimal conditions for early season therophytes.

There are some species of importance for the fact their extirpation from the site could lead to extinction locally and could also lead to the loss of any invertebrates with direct dependencies.

- Pyramidal orchid *Anacamptis pyramidalis* This is a pioneer of disturbed ground and is increasing nationwide. As such it does not qualify as a species in requirement of urgent conservation measures, however good practice and the avoidance of biodiversity net losses should aim to preserve and create habitat for this species.
- Great mullein *Verbascum thapsus* – associated with the mullein moth.

Schedule 9 Invasive Species

No Schedule 9 Invasive Species are present on site.

Potentially problematic species (non s.9)

Buddleja davidii

9.0 Impacts and Recommendations

Impact Assessment & Recommendations

Impact Assessment

The development will lead to;

- The loss of a developing grassland habitat with importance on the local level as a future calcareous grassland resource. This is unlikely to have a major adverse irreversible effect at habitat level due to the presence of extensive grassland habitats surrounding the site, on which losses could be accounted for via enhancement measures (subject to further survey and possibly soil testing).
- The works could result in the extirpation of some plant species alongside any dependent invertebrates, which will lead to a biodiversity net loss.
- No important species were noted on site other than on the local level. These could be lost from the site, incurring a biodiversity net loss.
- Loss of attendant invertebrate populations (although it is possible that this may be mitigated by surrounding habitat which is predominantly grassland).
- Spread of buddleia into surrounding grassland.

Recommendations

Appropriate mitigation or compensation will be required against habitat losses.

Biodiversity Net Gain

A Biodiversity Net Gain (BNG) Assessment will be required to ascertain and determine the difference between the baseline and post development habitat value of the site. The development must achieve a 10% gain in habitat units if it is to achieve BNG. Developers must aim to achieve BNG on site or in land immediately connected to it.

Should BNG not be achievable on site (the likely outcome), then gains must be achieved via offsite measures. These take the form of BNG credits towards biodiversity improvement works on alternative BNG land. These are designed to be used as last resort and are paid per habitat unit, starting at approximately £45,000 per unit to the landowner.

It is advised the developer first explore their options for retaining/creating habitat onsite.

As the site contains a range of valuable semi natural habitats, some of which are in degraded condition, the site may present the landowner with a substantial financial opportunity were it to be used as BNG offsetting land.

Habitat Management Plan

A Management and Monitoring Plan will be required as part of any onsite BNG agreement to detail how habitats and species will be preserved on site and managed into the future for at least 30 years. Recommended measures are as follows;

- Creation of calcareous grassland around the site. This will need to be subject to survey. Soil stripping may be required.
- Spread the top layer of chalk and rubble present on site in replacement/enhanced grassland areas to preserve seedbank.
- Creation of chalk banks and bunds would provide ideal colonisation opportunities for calcicoles.
- Implementation of grazing regimes and/or yearly hay cuts across retained grassland
- Incorporation of green roofing designed to recreate the sparsely vegetated early successional nature of the site.

Further Survey & reporting.

- The site may host herpetofauna (most likely reptiles) and may have high invertebrate interest. Further survey may be disproportional considering the extensive acreage of surrounding grassland which can be maintained and enhanced to support these groups, however a precautionary method statement supported by ecological supervision is recommended to avoid killing or injuring them and encourage their movement out of the site (this applies also to mammalian fauna such as badgers).
- A CEMP is therefore recommended via condition to detail how wildlife will be safeguarded.

9.0 Bibliography

- Arbtech Consultancy Ltd (2022). Preliminary Ecological Appraisal.
- Bailey, D., Bailey, J., Davies, K., Davies, V., Hayward, L., Jordan, M., Nichol, P et al., 2015 - 17. Red List of Fungi for Great Britain: <https://www.fungustrust.org.uk/page/red-lists/51/>
- Blamey, M., Fitter, S. R., & Fitter, A. (2003). *Wild Flowers of Britain & Ireland*. A. & C. Black.
- Bosanquet, S.D.S., Ainsworth, A.M., Cooch, S.P., Genney, D.R., & Wilkins, T.C. (2018). Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 14 Non-lichenised Fungi. Joint Nature Conservation Committee, Peterborough.
- Bon, M. (1987). *The Mushrooms and Toadstools of Britain and North-western Europe*. Hodder & Stoughton Ltd.
- Buczacki, S., Shields, C., Ovenden, D. (2013). *Collins Fungi Guide: The most complete field guide to the mushrooms & toadstools of Britain & Ireland*. HarperCollins Publishers
- British Bryological Society (2010). *Mosses and Liverworts of Britain and Ireland – a Field Guide*. British Bryological Society.
- British Geological Survey. BGS Geology Viewer. <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>
- British Standard 42020 (2013). Biodiversity – Code of Practice for Planning and Development.
- British Standard 8683:2021 (2021). Process for Designing and Implementing Biodiversity Net Gain.
- Buczacki, S., Shields, C., & Ovenden, D. (2012). *Collins fungi guide: The most complete field guide to the mushrooms and toadstools of Britain and Ireland*. HarperCollins.
- Chartered Institute of Ecology and Environmental Management (2017). Guidelines for Preliminary Ecological Appraisal. 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2017). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- Chartered Institute of Ecology and Environmental Management (2020). Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK. 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

- CIEEM-CIRIA-IEMA (2019) Biodiversity Net Gain – Good Practice Principles for Development.
- Cranfield Soils and Agriscapes Institute. Landis Soilscales Viewer. <https://www.landis.org.uk/soilscales/>
- CIEEM (2022). Welsh Government's Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System CIEEM Briefing Paper September 2022 <https://cieem.net/wp-content/uploads/2022/08/Net-Benefits-briefing.pdf>
- DEFRA (2007). Hedgerow Survey Handbook. A Standard Procedure for Local Surveys in the UK. Defra, London.
- DEFRA (2024). The Statutory Biodiversity Metric User Guide.
- DEFRA (2024). The Statutory Biodiversity Metric – Technical Annex 1: Condition Assessment Sheets and Methodology.
- Dobson, F. S. (2005). *Lichens: an illustrated guide to the British and Irish species*. Richmond Publishing (revised 2018).
- English Nature (2004). *Waxcap grasslands – an assessment of English Sites*. ENRR555.
- First Nature (2023). Fungi. <https://www.first-nature.com/fungi/>
- Fitter, R., & Fitter, A. (1984). *Collins guide to the grasses, sedges, rushes and ferns of Britain and northern Europe*. William Collins Sons & Co. Ltd.
- Flint, A.R (2014). The biodiversity of the Wealden ghyll woodlands: species richness, abundance and distribution patterns in a rare and fragmented habitat. <https://cris.brighton.ac.uk/ws/portalfiles/portal/4752179/Andrew+Flint+PhD+2014+CD+Rom+version++scanned+signature.pdf>
- Google Earth.
- Griffith, G.W., Roderick, K., Graham, A and Causton, D.R. (2012). Sward management influences fruiting of grassland basidiomycete fungi. *Biological Conservation* 145, 234-240
- Griffith, G.W, A.P Detheridge and Bye, R (2022). Use of eDNA analysis of soil samples to evaluate the fungal conservation value of grassland areas in the South West Peak; lessons for woodland creation proposals
- Griffith, G., (2013). DNA bar-coding as a tool for fungal conservation: fast and economical identification at any time of year. In Practice 80, 35-36.
- HMSO: Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 <https://www.legislation.gov.uk/uksi/2019/579/contents/made>
- HMSO: Countryside & Rights of Way Act (2000) <http://jncc.defra.gov.uk/page-1378>
- HMSO: Natural Environmental and Rural Communities Act (2006) <http://www.legislation.gov.uk/ukpga/2006/16/contents>
- HMSO: Wildlife and Countryside Act 1981 (as amended 01.04.1996) <http://jncc.defra.gov.uk/page-1377>
- Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey a technique for environmental audit. http://jncc.defra.gov.uk/PDF/pub10_handbookforphase1habitatsurvey.pdf

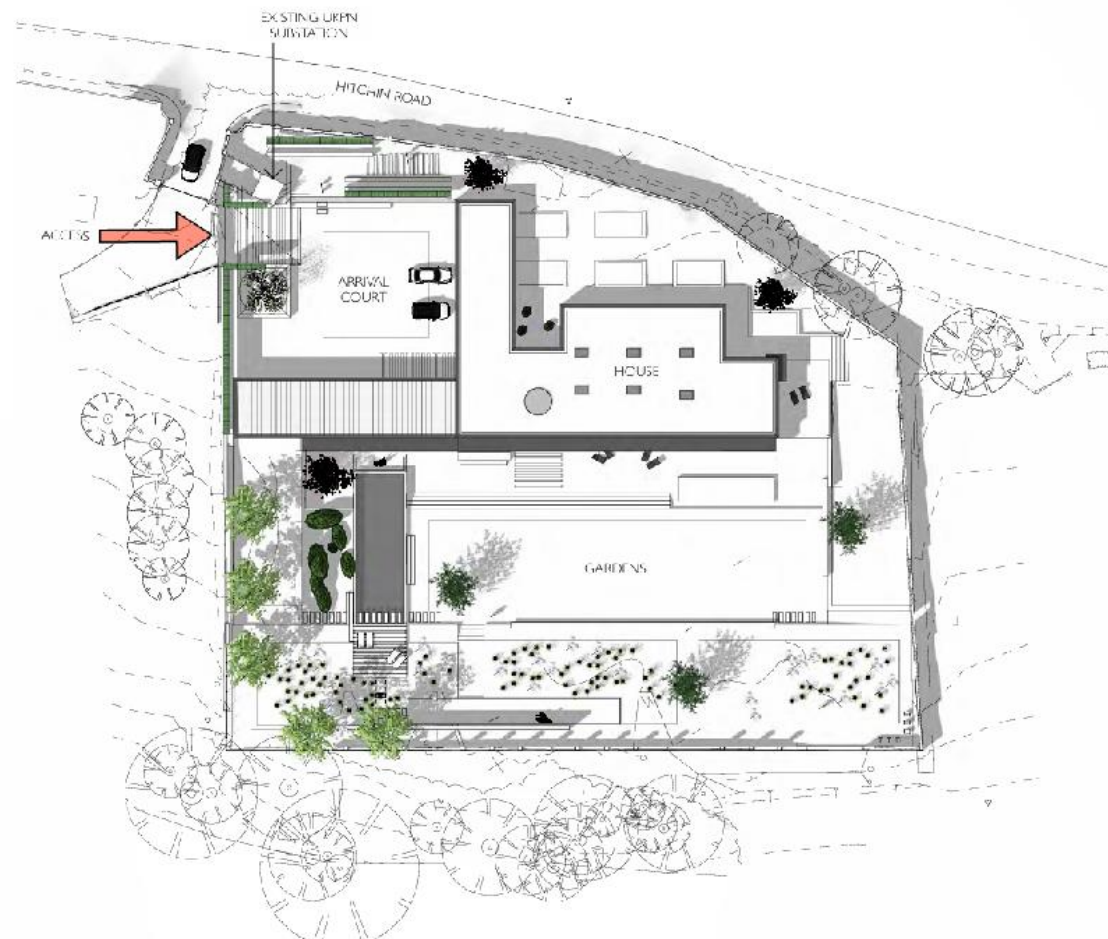
- Magic Database. <http://www.magic.gov.uk/MagicMap.aspx>
- Kibbey, G. (2020-2023). *Mushrooms and Toadstools of Britain & Europe Volumes 1-4*.
- Merryweather, J. (2020). *Britain's Ferns: A Field Guide to the Clubmosses, Quillworts, Horsetails and Ferns of Great Britain and Ireland* (Vol. 15). Princeton University Press.
- Minnesota Department of Natural Resources. 2007. A handbook for collecting vegetation plot data in Minnesota: The relevé method. Minnesota County. Biological Survey, Minnesota Natural Heritage and Nongame Research Program, and Ecological Land Classification Program. Biological Report 92. St.Paul: Minnesota Department of Natural Resources
- National Planning Policy Framework (2023). <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Natural England (nd) A statement of English Nature's views about the management of Roecliffe Manor Lawns Site of Special Scientific Interest (SSSI). <https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/2000453.pdf>
- Natural England (2001). Roecliffe manor lawns Site of Special Scientific Interest (SSSI). <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/2000453.pdf>
- Natural England Designated Sites View. <https://designatedsites.naturalengland.org.uk/SiteSearch.aspx>
- Natural England (2023). Summarised botanical value map [https://www.data.gov.uk/dataset/86b755f2-b28f-48c9-b5b6-648d6bab6c40/summarised-botanical-value-map#:~:text=The%20summarised%20botanical%20value%20map,Priority%20Habitat%20Positive%20Indicator%20\(PHPI\)](https://www.data.gov.uk/dataset/86b755f2-b28f-48c9-b5b6-648d6bab6c40/summarised-botanical-value-map#:~:text=The%20summarised%20botanical%20value%20map,Priority%20Habitat%20Positive%20Indicator%20(PHPI))
- Naturespot. Recording the Wildlife of Leicestershire and Rutland. Available at: https://www.naturespot.org.uk/species_library
- Norton, J, (2016). A Field Guide to the NVC – Part 2: Introduction to grasslands and classification of Dry Neutral Grassland. Flora News. Newsletter of the Hampshire & Isle of Wight Wildlife Trust's Flora Group No. 50 Spring 2016. https://hantsplants.uk/assets/documents/flora_news/Flora%20News%20Spring%202016.pdf
- Phillips, R., & Reid, D. A. (2006). *Mushrooms*. Pan Macmillan.
- Poland, J & Clement E,J (2020). *The Vegetative Key to the British Flora A New Approach to Naming British & Irish Vascular Plants Based on Vegetative Characters*. John Poland.
- Price, D. (2020) *A Field Guide to Grasses, Sedges and Rushes*. The Species Recovery Trust (v.10).
- Price, D & Bealey, C. (2022). *A Field Guide to Bryophytes*. The Species Recovery Trust (v.1).
- Rald E. (1995). "Vokshatte som indikatorarter for mykologisk verifulde overdrevslokaliteter". Svampe. 11: 57–65.

- Rich, T. C., & Jermy, A. C. (1998). *Plant crib 1998*. Botanical Society of the British Isles (BSBI).
- Rodwell, J. S. (Ed.). (1991). *British plant communities: volume 1, woodlands and scrub* (Vol. 1). Cambridge University Press.
- Rodwell, J. S. (Ed.). (1998). *British plant communities: Volume 2, mires and heaths* (Vol. 2). Cambridge University Press.
- Rodwell, J. S. (1991). *British plant communities: volume 3, grasslands and montane communities* (No. 3). Cambridge University Press.
- Rodwell, J. S. (1991). *British plant communities: volume 4, aquatic communities, swamps and tall-herb fens* (Vol. 4). Cambridge University Press.
- Rodwell, J.S., Dring, J.C., Averis, A.B.G., Proctor, M.C.F., Malloch, A.J.C., Schaminée, J.N.J. & Dargie T.C.D. 2000. Review of coverage of the National Vegetation Classification. JNCC Report No. 302. Peterborough: Joint Nature Conservation Committee
- Rodwell, J. S., & Joint nature conservation committee (GB). (2006). *National vegetation classification: Users' handbook*. Peterborough: Joint nature conservation committee.
- Rose, F., O'Reilly, C., Smith, D., & Collings, M. (2006). *The wildflower key: how to identify wildflowers, trees and shrubs in Britain and Ireland*.
- Rotheroe M, Newton A, Evans S, Feehan J (1996). "Waxcap-grassland survey". *The Mycologist*. 10: 23–25. doi:10.1016/s0269-915x(96)80046-2.
- Sheldrake (2020). *Entangled Life: How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures*. Penguin Random House. UK.
- Smart, S. (2000). Modular analysis of vegetation information system (MAVIS). *Lancaster. Centre for Ecology and Hydrology*.
- Stace, C. (2019). *New Flora of the British Isles* (4th Edition). C&M Floristics.
- UKHabs Working Group (2018). *UK Habitat Classification User Manual*.
- UKHabs Working Group, (2018). *UK Habitat Classification Field Key*.
- UKHab Ltd (2023). *UK Habitat Classification Version 2.01* (at <https://www.ukhab.org>).
- Wallace, H. (2021). *Grasses: A guide to identification using vegetative characters*. Field Studies Council Publications. Telford.
- Wallace, H & Prosser, M (2016). A review of the National Vegetation Classification for the Calthion group of plant communities in England and Wales.
- Wildflower Finder (nd). *Wildflower Identification Guide*. Available at: <https://wildflowerfinder.org.uk>
- Wood, E., Dunkelman, J. (2020). *Grassland fungi a field guide*. Monmouthshire Meadows Group.

Appendix 1 - Vegetative Community Map



Appendix 2 - Proposed Development Map



Appendix 3 - Landscape Map



Appendix 4 - Photographs



Photo 1: The site viewed from the south eastern corner.



Photo 2: Pile of exposed chalk from recent excavations.



Photo 3: Nettle stand to south of site



Photo 4: The wider landscape viewed facing south from the south western corner, detailing a large expanse of what appears to be unmanaged *Arrhenatherum* grassland.



Photo 5: Phalaris dominated east of the site.



Photo 6: The sward is sparse, lacking in thatch and provides plentiful bare ground opportunities for invertebrates.



Photo 7: Pyramidal orchid

Appendix 5 – Site Species List

Note = 1 equates to presence in quadrat rather than Domin score.

Scientific name	Common name	Q1	Q2	Q3	Q4	Q5	Constancy
<i>Jacobaea vulgaris</i>	ragwort	1	1	1	1	1	5
<i>Rumex conglomerata</i>	clustered dock	1		1	1	1	5
<i>Cirsium arvense</i>	creeping thistle	1	1	1	1	1	5
<i>Scorzonoides autumnalis</i>	autumn hawkbit	1	1	1	1	1	5
<i>Holcus mollis</i>	Yorkshire fog	1		1	1	1	5
<i>Medicago lupulina</i>	black medic	1		1	1	1	5
<i>Rubus fruticosus</i> agg	bramble	1	1	1	1	1	5
<i>Prunella vulgaris</i>	self heal	1		1	1	1	4
<i>Achillea millefolium</i>	yarrow	1		1	1	1	4
<i>Centaurea nigra</i>	common knapweed	1		1	1	1	4
<i>Bryophyta</i>	unidentified bryophyte	1		1	1	1	4
<i>Phalaris arundinacea</i>	reed canary grass	1		1	1	1	3
<i>Urtica dioica</i>	nettle	1			1	1	3
<i>Brachypodium sylvaticum</i>	false brome	1	1	1			3
<i>Agrostis gigantea</i>	black bent	1		1	1		3
<i>Agrostis stolonifera</i>	creeping bent	1		1		1	3
<i>Ranunculus bulbosus</i>	bulbous buttercup	1		1		1	3
<i>Verbascum thapsus</i>	great mullein	1	1	1			3
<i>Dactylis glomerata</i>	cocksfoot			1	1	1	3
<i>Arrhenatherum elatius</i>	false oat grass	1			1		2
<i>Geranium pusillum</i>	small flowered cranesbill	1			1		2
<i>Epilobium parviflorum</i>	hoary willowherb	1			1		2
<i>Stachys sylvatica</i>	hedge woundwort	1		1			2
<i>Malva neglecta</i>	prostrate mallow	1		1			2
<i>Veronica serpyllifolia</i>	thyme leaved speedwell	1			1		2
<i>Cirsium vulgare</i>	spear thistle	1		1			2
<i>Epilobium lanceolata</i>	spear leaved willowherb			1	1		2
<i>Cerastium fontanum</i>	common mouse ear				1	1	2
<i>Potentilla reptans</i>	creeping cinquefoil				1	1	2
<i>Glechoma hederacea</i>	ground ivy				1	1	2

<i>Anacamptis pyramidalis</i>	pyramidal orchid				1	1	2
<i>Geranium robertianum</i>	herb Robert	1				1	2
<i>Schrophularia nodosa</i>	common figwort		1			1	2
<i>Silene latifolia</i>	white campion			1		1	2
<i>Hypochaeris radicata</i>	cats ear				1	1	2
<i>Taraxacum officinalis</i> agg	Dandelion	1					1
<i>Epilobium hirsutum</i>	great willowherb	1					1
<i>Plantago lanceolata</i>	ribwort plantain	1					1
<i>Helminthotheca echioides</i>	bristly ox tongue	1					1
<i>Lolium perenne</i>	perennial rye grass	1					1
<i>Chaerophyllum temulum</i>	rough chervil	1					1
<i>Vulpia bromoides</i>	squirrel tail fescue	1					1
<i>Trifolium repens</i>	white clover	1					1
<i>Tripleurospermum inodorum</i>	scentless mayweed		1				1
<i>Plantago major</i>	broadleaved plantain		1				1
<i>Dipsacus fullonum</i>	teasel		1				1
<i>Danthonia decumbens</i>	heath grass		1				1
<i>Geranium molle</i>	doves foot cranesbill		1				1
<i>Agrostis capillaris</i>	common bent			1			1
<i>Myosotis arvensis</i>	field forget me not				1		1
<i>Vicia tetrasperma</i>	smooth tare					1	1
<i>Vicia sativa</i>	common vetch	1					1
<i>Tanacetum parthenium</i>	feverfew	1					1
<i>Ballota nigra</i>	black horehound			1			1
<i>Carduus nutans</i>	musk thistle				1		1
<i>Epilobium ciliatum</i>	American willowherb	1				1	1
<i>Reseda luteola</i>	weld		1				1
Sp/m2		37	28	20	18	22	