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DALECRETE

Captain's Barn Farm Quarry Environmental Statement Appendix 7 Ecological Impact Assessment (EcIA)

Captains Barn Farm Quarry, Leek Road, Staffordshire

Report Reference: CE-CB-1734-RP08 - Final

Report Date: 28/10/2022

Produced by Crestwood Environmental Ltd.

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CONTENTS

LIST OF APPENDICES:

LIST OF TABLES:

LIST OF PHOTOS:

LIST OF TARGET NOTES

Target Note 1: Location confidential

SUMMARY

*The Ecological Impact Assessment (EcIA) detailed in this report was commissioned by Dalecrete ('**the Client**') to inform a planning application for an extension to the current quarry.*

To fully inform the Ecological Impact Assessment, the following assessment were carried out:

- Desk study to locate the presence of any designated wildlife sites and protected species within 2km, which could be potentially affected by the Proposed Development;
- Extended Phase 1 habitat survey;
- A preliminary roost assessment for bats of trees at the Site;
- A survey 30m outside of the Site boundary, (where accessible) for badger setts; and
- A Habitat Suitability Index (HSI) on ponds at and within 500m of the Site (where accessible).

*The survey identified that the habitats at the Site were of **Low to Moderate Ecological Importance**.*

The following Phase 2 ecological surveys have been completed following the original Preliminary Ecological Appraisal (PEA) recommended the following relation to the following species/species groups:

- Bats (foraging and commuting);
- Bats (roosting);
- Breeding Birds; and
- eDNA survey

A site verification check was undertaken to determine if there had been any significant changes to the site since the previous surveys were undertaken in 2020.

The following ecological mitigation has been recommended at the Site:

- Precautionary working measures;
- Sensitive lighting scheme;

Table 1 and Table 2 outline the results of the survey, potential impacts, and any recommendations. They also assign a level of urgency to address the overall situation arising from the results.

Table 1 Situation Rating Summary Definitions

Code	Situation Rating	Example Situation (as described in Table 2)
	**Requires urgent attention/action**	To prevent (otherwise likely) breach of legislation from current activities or to prevent delays to the planning submission or project.
	**Requires attention/action, but not necessarily urgently**	Awareness of potential future issues/considerations such that future action will be required (e.g. pre-commencement surveys).
	**Currently no further urgent action required**	No current issues, but future action may be required, e.g. survey results may become 'out-of-date'.

Table 2 Summary Table of Survey Results and Recommendations

Habitats and Species	Survey Results	Potential Implications of Impact	Recommendation	Situation Rating
Habitats (incl. Veteran Trees)	Habitats included improved grassland with poor semi-improved field margins along with hedgerows and scattered trees	Loss of HPI at the Site and within the local area.	Minimise area of habitat to be lost during design stage; protect retained trees in line with BS 5837:2012	
Reptiles	Habitats of **Low suitability for reptiles**.	Potential injury/killing/disturbance **– Potential breach of the law**	Precautionary working measures required.	
Other Mammals	Habitats of **Moderate suitability for other mammals**.	Loss of habitat – **Low negative effect.**	No further surveys/action required.	
	Habitats of **Low suitability for Badger**	Loss of foraging habitat – **Low negative effect**	No further surveys/action required.	
Invertebrates (Terrestrial)	Habitat of **Low suitability for terrestrial invertebrates**.	None anticipated	No further surveys/action required	

* If the Proposed Development does not commence within 18 months of the date of survey, then update surveys are recommended.

1. INTRODUCTION

1.1 INSTRUCTION AND BRIEF

1.1.1 Crestwood Environmental Ltd. ('**Crestwood**') has been appointed by Resource UK ('**the Planning Co-ordinators**') on behalf of Dalecrete ('**the Client**') to undertake ecological surveys on land near Captains Barn Farm Quarry, Leek Road, falling within Staffordshire.

1.1.2 Crestwood has already undertaken an Extended Phase 1 Habitat Survey, as well as surveys for great crested newts, badger, breeding birds and bats. These surveys were undertaken in 2020.

1.1.3 The ecological surveys, as described in Section 1.3, have been used to inform the assessment made within this Ecological Impact Assessment (EcIA).

1.2 SITE LOCATION AND CONTEXT

1.2.1 The survey was undertaken on land near Captain's Barn Farm Quarry – centred at National Grid Reference (NGR) SJ 94900 45800 ('**the Site**'). The boundary of the Site (red line) is shown on Plate 1.

1.2.2 The Site currently comprises agricultural fields and field boundary hedgerows with trees, the majority of surrounding land use is agriculture, with the existing quarry and areas of woodland to the east.

Plate 1 Site Location Plan

1.2.3 In the local area the main habitat wildlife corridors present are the River Blithe, located circa 630m south of the Site, as well as the numerous hedgerows within the local and wider areas.

1.2.4 Fragmented areas of woodland within the local area and scattered trees may act as ecological "stepping stones" to provide some connectivity within the wider landscape.

1.3 PURPOSE AND SCOPE

1.3.1 The purpose of the surveys, assessment and report is to provide ecological advice in respect of the design and construction of the Proposed Development, and to identify ecological constraints, which may be a relevant material consideration from a planning and/or a legislative perspective.

1.3.2 The scope of the surveys included within the brief are detailed in Table 3. These surveys form the baseline for the Preliminary Ecological Appraisal (PEA), which assesses the potential impacts and effects of the Proposed Development, in line with the current Guidelines for Preliminary Ecological Appraisal 2017 (CIEEM, 2017).

Table 3 Survey Purpose and Scope

Survey	Purpose and Scope
Desk Study	To locate the presence of any designated wildlife sites and protected species within 2km, which could be potentially affected by the Proposed Development.
Extended Phase 1 Habitat Survey	To record the presence and extent of habitats and the likelihood of protected and notable species of fauna and flora being present within the Site.
Preliminary Roost Assessment (PRA)	To determine the suitability of trees at the Site for roosting bats.
Habitat Suitability Index Assessment (HSI)	To determine the suitability of ponds within 500m of the Site (where accessible) to support great crested newts.
Initial Badger Survey	To check the Site and within 30m of the Site boundary (where accessible) for the presence of badger setts or evidence of badger.

1.3.3 The description of the Site and the results of the survey(s) relate to the findings at the time of the field survey(s) only; 28/07/2022.

1.4 SUMMARY OF PROPOSALS

1.4.1 The Client is applying for planning permission for a western extension to the existing quarry ('**the Proposed Development**').

1.4.2 A red line boundary was provided by the Client prior to undertaking the survey.

1.4.3 The following is understood to form part of the Proposed Development:

- The extension of the existing quarry into the Site will be split into two phases (Phase 4 and Phase 5). The Phases will be split vertically, to ensure uptake of both sand and gravel (as a geographic divide of resource across the Site has been identified as part of borehole investigations) over both Phases:

  Phase 4: will comprise the south-eastern extent of the Site; and

  Phase 5: will comprise the north-western extent of the Site.

- The client is seeking permission to work the extension (Phases 4 & 5) before the permitted Phase 3 for operational reasons, namely the lack of gravel in Phase 3.

- The existing plant site area will remain in place and will be utilised for all Phases of the existing mineral extraction operations, as well as the proposed extension area.

1.5 SUMMARY OF HISTORIC SURVEY INFORMATION

1.5.1 Several surveys were undertaken by Crestwood Environmental in 2020 listed below.

- Preliminary Ecological Appraisal undertaken on 26th of May 2020, report reference: CE-CB-1734-RP01
- Great Crested Newt eDNA survey undertaken on 26th June 2020, report reference: CE-CB-1734-RP02
- Three Breeding Bird Surveys undertaken in May and June 2020, report reference: CE-CB-1734-RP03
- Bat activity surveys undertaken in June, July and September 2020, report reference: CE-CB-1734-RP04

1.5.2 This report is intended to update and supersede historic survey information.

1.6 OTHER RELEVANT INFORMATION

1.6.1 In addition to those listed above, the following documents are also referred to within this report:

- Planning policies in the National Planning Policy Framework ('**NPPF**') (HMSO, 2019);
- The Minerals Local Plan for Staffordshire (2015 - 2030) - Adopted February 2017 (Staffordshire County Council, 2017);
- Biological Records Report (SER, 2020); and
- Staffordshire Biodiversity Action Plan (Staffordshire Biodiversity Partnership, 2020).

1.7 RELEVANT WILDLIFE LEGISLATION SUMMARY

1.7.1 In addition to planning policy, any development must comply with relevant wildlife legislation. A summary of key wildlife legislation is listed below (this list is not exhaustive):

- **Wildlife and Countryside Act 1981 (as amended)**: The primary piece of legislation that protects animals, plants and habitats in the UK;
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ('the Habitat Regulations'): Regulations to allocate, and safeguard, European designated sites and species;
- **Protection of Badgers Act 1992**: Legislation to protect badgers, and their setts, from injury, killing and disturbance *et al*;
- **Wild Mammals Protection Act 1997**: Legislation which protects the welfare of all species of wild mammal in the UK;
- **Natural Environment and Rural Communities (NERC) Act 2006**: The amalgamation of various environmental governing bodies to form Natural England, giving the importance of protecting biodiversity a legal basis; and
- **Hedgerow Regulations 1997**: Regulations to protect 'Important' hedgerows from removal.

Definitions

1.7.2 Definitions and abbreviations detailed within this report are provided in Appendix E1.

1.8 GENERAL LIMITATIONS

1.8.1 The Site's boundary relates to plans of the Proposed Development provided by the Client prior to undertaking the survey. Any subsequent amendments to the boundary following the survey may alter recommendations made in this report.

1.8.2 Other applications or non-implemented consents within the local area have not been considered and therefore the assessment of impacts and effects pertains solely to those associated with the Proposed Development and not cumulative effects arising from other developments in the local area.

1.8.3 A Tree Protection Order ('**TPO**') search has not been undertaken as part of this survey.

1.8.4 Unless otherwise stated within the brief, no species-specific/botanical surveys were carried out as part of the extended Phase 1 habitat survey and additional information is based on incidental observations.

1.8.5 Ecology data obtained from Local Records Centres are dependent upon people and organisations having made and submitted records for the area of interest. As a result, a lack of records for a particular habitat or species does not necessarily mean that the habitats or species do not occur within the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the Zone of Influence or are relevant in the context of the Proposed Development.

1.8.6 Available records may lack detail, in terms of location, date, type of record (e.g. observational sighting, field sign, call) and activity of species.

1.8.7 Ecological surveys are limited by factors including weather and time of year, which influence the presence of animal species and plants. The survey was undertaken in July and therefore this report represents the ecological conditions at the time of the survey.

1.8.8 Limitations regarding species specific surveys are detailed under the relevant methodology sections.

2. METHODOLOGY AND APPROACH

2.1 DEFINING THE ZONE OF INFLUENCE ('ZoI')

2.1.1 Development has the potential to impact ecological receptors beyond the site boundary; this area is known as the Zone of Influence ('**ZoI**'). The ZoI is determined by the source/type of impact, potential pathways for that impact and the location/sensitivity of the ecological receptor. For the majority of (unmitigated) impacts, the ZoI is generally considered to be the Site and immediately adjacent areas.

2.1.2 In ecological terms, the ZoI can vary depending on the affected species/species group (e.g. mobility, home-range/territory size etc.) and influenced by dispersal barriers (e.g. roads and hardstanding) which stop or reduce the likelihood of dispersal. The ZoI for species/species groups has been determined by research and professional judgement (e.g. common lizards (*Zootoca vivipara)* have restricted mobility and generally occupy smaller home ranges than other reptile species, such as grass snake (*Natrix helvetica*) (Langton & Beckett, 1995)).

2.1.3 The ZoI for ecological features at the Site has been assessed via desk study, guidance and professional judgement for species potentially present within the ZoI of the Proposed Development (see Table 4).

Table 4 ZoI of Ecological Features

Ecological Feature	ZoI
Plants (including invasive non-native species)	Site and immediately adjacent habitats
Great crested newts and other amphibians	500m
Reptiles	1km
Badger	30m
Bats	2km
Otter and water vole	50m
Other mammals	30m
Birds	2km
Aquatic and terrestrial invertebrates	Site and immediately adjacent habitats.
Fish	Dependent on species and geographical range.

2.1.4 Site specific ZoI is referred to in terms of suitable habitat for protected species where relevant.

2.2 DETERMINING THE LEVEL OF ECOLOGICAL IMPORTANCE

2.2.1 Species and habitats at a site are assessed for their Ecological Importance. It is important that ecological features of High Importance, such as those that are of High biodiversity value or significantly contribute to ecosystem services, should be protected and enhanced where possible.

2.2.2 It should be noted that Ecological Importance is assessed on a site-by-site basis and includes a variety of factors (e.g. species abundance); therefore, the criteria for assessment may change (e.g. the presence of a rare declining species in relation to a rare stable species). Furthermore, there may be some cross over between habitats and species which could alter the assessment of the level of Ecological Importance of a particular feature (e.g. poor-quality habitat supporting protected species); therefore, the criteria for assessment detailed below should be used as a general guide only.

2.2.3 Table 5 (below) details the criteria for assessment of Ecological Importance used within this assessment.

Table 5 Criteria of Assessment for Assigning a Level of Ecological Importance

Level of Ecological Importance	Criteria for Assessment	
	Species	**Habitats**
Negligible	▪ Species of Negligible biodiversity value present.	▪ Very low/no species diversity present. ▪ Of little to no biodiversity value.
Low	▪ Species of Low biodiversity value present.	▪ Habitat of Low biodiversity value. ▪ Low floral species diversity. ▪ Unlikely to support protected species/supports small numbers of protected species.
Moderate	▪ Species of Principal Importance (SPI). ▪ Species of Moderate biodiversity value.	▪ Habitat of Principal Importance. ▪ Features of Moderate value for biodiversity. ▪ Moderate floral species diversity. ▪ Moderate potential to support protected species.
High	▪ Rare species present. ▪ Species of High biodiversity value. ▪ Abundant species present of moderate biodiversity value.	▪ Nationally designated Sites. ▪ Features rare species. ▪ Several features of High value for biodiversity (i.e. numerous features suitable to support protected species). ▪ High floral species diversity.
Very High	▪ Very rare/rare species present. ▪ Species of Very High biodiversity value.	▪ Internationally designated Sites. ▪ Supports very rare/rare species. ▪ Habitat of Very High biodiversity value. ▪ Highly suitable for protected species. ▪ Very high floral diversity.

2.3 HABITAT SUITABILITY ASSESSMENT

2.3.1 Habitats present at a Site are assessed for their suitability for protected species. It is important that Moderate/High suitability habitats, particularly those of High suitability for rare protected/notable species should be protected and enhanced where possible.

2.3.2 Table 6 (below) details the outline criteria for assessment of habitat suitability used within this assessment.

2.3.3 Professional judgement is used to determine the suitability of a habitat in relation to the Site surroundings and Site location; this outline should be used as a guide only. Suitable habitat characteristics relate to features within the habitat that facilitate the needs of protected/notable species by providing sufficient space and opportunities for sustained survival such as foraging/hunting, shelter, breeding etc.

Table 6 Outline Basis for Assessment for Assigning a Level of Habitat Suitability

Level of Habitat Suitability	Relevant Criteria for Assessment
Negligible	▪ No important habitat characteristics suitable for protected/notable species or important to sustain the known presence of protected/notable species in adjacent off-site habitats.
Low	▪ A higher degree of recognised important habitat characteristics absent than present for the particular protected/notable species. ▪ Largely isolated habitat that is not well-connected by other suitable habitats (e.g. habitat corridors) or with largely impermeable 'barriers' restricting movement of protected/notable species in the wider area. ▪ Provides the potential for protected/notable species to be present in limited numbers but may be lacking one or more recognised key habitat requirements. ▪ Level of habitat suitability applies to majority of protected/notable species.
Moderate	▪ A higher degree of recognised important habitat characteristics present than absent, but with some deficiencies. ▪ Fairly well-connected by other suitable habitats (e.g. habitat corridors) or with a small number of (or 'low permeability') 'barriers' present providing some restriction to the movement of the protected/notable species in the wider area. ▪ Suitable for protected/notable species in borderline noteworthy numbers but with some vulnerability to decline. ▪ Level of habitat suitability applies to majority of protected/notable species.
High	▪ All important habitat characteristics present suitable to support a particular protected/notable species in a largely self-sustaining population with good resilience. ▪ Well-connected by other suitable habitats (e.g. corridors) or with essentially no 'low permeability barriers' present restricting the movement of the protected/notable species in the wider area allowing free movement (e.g. between meta-populations). ▪ Level of habitat suitability applies to majority of protected/notable species.

2.4 DESK STUDY

2.4.1 Table 7 (below) identifies sources of information for the desk study.

Table 7 Desk Study Information

<table>
<tr><th>Source of Information</th><th>Information Sought</th><th>Study Area</th><th>Use of Information</th></tr>
<tr><td>Biodiversity Action Plan (BAP)</td><td>Priority Habitats and Priority Species*</td><td rowspan="2">N/A</td><td rowspan="9">To inform the field survey and report recommendations.</td></tr>
<tr><td>Staffordshire Biodiversity Action Plan (Staffordshire Biodiversity Partnership, 2020)</td><td>Local Priority Habitats and Priority Species*</td></tr>
<tr><td rowspan="5">Staffordshire Ecological Record (SER) (SER, 2020)</td><td>Protected species</td><td rowspan="5">2km</td></tr>
<tr><td>Notable/Species of Principal Importance*</td></tr>
<tr><td>Statutory sites</td></tr>
<tr><td>Local Wildlife/Non-statutory wildlife sites</td></tr>
<tr><td>Schedule 9 invasive species</td></tr>
<tr><td rowspan="3">MAGIC Map (DEFRA, 2020)</td><td>Statutory sites</td><td>2km</td></tr>
<tr><td>Priority Habitats/Habitats of Principal Importance (NERC Act)*</td><td>250m</td></tr>
<tr><td>Granted European Protected Species Licences</td><td>1km</td></tr>
<tr><td rowspan="2">Google Earth (Google Earth, 2020)</td><td rowspan="2">Ponds</td><td rowspan="2">500m</td><td rowspan="2">Locate ponds within 500m for great crested newt.</td></tr>
</table>

* 'Priority Habitats/Species' within UK BAP or Local BAP (JNCC & DEFRA, 2012). HPI/SPI listed under the NERC Act 2006 (HMO, 2006).

2.5 FIELD SURVEY

2.5.1 The field surveys were carried out on 28/07/2022 by Ben Macmillan (Assistant Ecologist).

2.5.2 The weather conditions at the time of survey are shown in Table 8.

Table 8 Survey Weather Conditions (28/07/2022)

Parameter	Recorded Figure
Temperature (°C)	23
Cloud Cover (in Oktas)	4/8
Precipitation	None
Wind Speed (Beaufort Scale)	2

Extended Phase 1 Habitat Survey

2.5.3 The method used for the extended Phase 1 habitat survey is based on guidelines provided by JNCC (JNCC, 2010) and CIEEM (CIEEM, 2017). During the survey visit, habitat types and signs of protected or notable species were recorded and mapped using specific standard mapping colours and target notes. The presence of any protected/notable species is also recorded.

Hedgerows

2.5.4 The method for defining species richness within hedge habitats is based on guidelines provided within the 'Hedgerow Survey Handbook' by DEFRA (DEFRA, 2007); which defines a species rich Hedge habitat as one with "*at least 5 or more native woody species within 30m of Hedgerow, or Hedgerows which contain fewer woody species but a rich basal herbaceous flora*".

Preliminary Roost Assessment of Trees for Bats

2.5.5 All trees within the Site were inspected from ground level, recording any evidence of bat roosts, droppings, staining, scratch marks and feeding remains, or any Potential Roost Features (PRF) within the trees themselves in accordance with industry-standard best practice (Collins, 2016).

2.5.6 Based on the results of the inspection, trees were categorised for their potential suitability for roosting bats as follows in 2.5.6 (Collins, 2016).

Table 9 Potential Tree Roost Suitability for Bats

Suitability	Description
Negligible	Negligible roost features present.
Low	Tree of sufficient age/size to have PRFs but none seen from the ground or having only limited roosting potential. Buildings with 1+ PRF that could be used opportunistically by bats, but conditions not appropriate or no suitable surrounding habitat to be used on regularly or by a larger number of bats.
Moderate	Contains 1+ PRFs that could be used by bats but unlikely to support a roost of high conservation status*.
High	A structure or tree containing one or more PRFs that are obviously suitable for use by larger numbers of bats on a regular basis and for longer periods of time due to features of PRF and surrounding habitat.

* = High conservation status defined (Mitchell-Jones, 2004) as: maternity sites of rarer species; significant hibernation sites for rarer/rarest species; sites meeting SSSI guidelines; maternity sites of rarest species.

General Habitat Assessment for Bats

2.5.7 An assessment of the habitats at the Site was undertaken to determine the suitability of the Site for foraging and commuting bats, as per best practice guidelines (Collins, 2016).

2.5.8 Table 10 details the levels of suitability for bat activity at a Site, including relevant features of particular Importance.

Table 10 Habitat Suitability for Bats

Suitability	Commuting and Foraging Habitats
Negligible	Negligible habitat features on Site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape via other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in parkland situation) or a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly for foraging bats such as broad-leaved woodland, tree-lines watercourses and grazed parkland. Site is close to and connected to known roosts.

Habitat Suitability Index (HSI)

2.5.9 A HSI was conducted on ponds at, and within 500m of, the Site to assess suitability for great crested newt (*Tritarus cristatus*), in line with published methods (Oldham, et al., 2000). Factors such as pond area, water quality and macrophyte coverage are assessed and assigned a value between 0 and 1 (0 indicating an unsuitable habitat and 1 indicating optimum habitat). In ponds with a HSI score of between 0.5 and 0.59 (Below Average) the proportion of ponds occupied by great crested newt was 20%.

2.5.10 It is important to note that the HSI is not a substitute for newt surveys and the HSI score can change throughout the year due to factors such as hot/wet spells resulting in ponds drying out or flooding, growth of terrestrial and aquatic vegetation etc.

2.5.11 Each pond was categorised using the scores and categories outlined in Table 11.

Table 11 Categorisation of HSI (Oldham, et al., 2000)

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

Badger Survey

2.5.12 The survey was undertaken at and within 30m of the Site boundary (where accessible) following recognised guidance (Harris, et al., 1989). All potential habitats, where accessible, were visually surveyed for evidence of badger activity, and specifically for the presence of setts. Field signs searched for included setts, badger pathways, footprints, latrines, hair, discolouring of and damage to fencing, signs of foraging and feeding remains. Setts were assessed as being in current use ('Active') or not in current use ('Inactive') at the time of the survey (Natural England, 2009).

Invasive Plant Species

2.5.13 The Site visit included recording the presence of invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

2.6 LIMITATIONS

2.6.1 **Phase 1 habitat survey**: The optimum period for undertaking extended Phase 1 habitat surveys is between April and September (inclusive), as surveys undertaken outside of this period do not always give an accurate representation of the flora present and may require a follow up botanical survey. This is not considered to be a significant limitation due to the small extent of vegetative habitats at the Site.

2.6.2 Typical and notable plant and invasive non-native species are recorded for different habitat types and reflect the conditions at the time of survey. This is not intended to be a detailed inventory of the plant species present in the survey area, as this is not required for the purposes of Phase 1 habitat survey.

2.6.3 **HSI**: The number of ponds present in the local area was found using various mapping information; there is the potential for some ponds (particularly smaller/newly created ponds) to have not been identified during the desk study due to outdated mapping data, ponds being newly created etc. and therefore may not have been assessed for their suitability for great crested newt.

2.6.4 **Invasive Species**: Whilst every effort was made to record invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), it should be noted that a specific survey for these species was not undertaken as part of the extended Phase 1 habitat survey.

2.7 IMPACTS AND EFFECTS METHOD OF ASSESSMENT

2.7.1 To help inform the design of the Proposed Development and the planning/decision making process, an assessment of the likely impacts/effects on ecological features has been made taking into account the following impact/effect types in line with relevant guidance (CIEEM, 2017), (CIEEM, 2016).

2.7.2 A description of the criteria to assess, on a scale of Negligible to High, the degree and type of change on ecological receptors are provided in Table 12.

Table 12 Classification of Nature of Effect & Scale of Importance

Classification/ Scale of Importance		Nature of Effect	Summary of Effect
Negligible	Not Important	Negative	Effects are minor such that no important negative change to the ecological receptor occurs or irreversible damage occurs to an ecological receptor of negligible Ecological Importance.
		Neutral	Effects are either absent or such that no overall net change to the ecological receptor occurs.
		Positive	Effects are minor such that no important positive change to the ecological receptor occurs.
Low		Negative	Likely to create a small change to ecological receptors without causing long-term or irreversible damage to the integrity/status of an ecological receptor or causing long-term or irreversible damage to an ecological receptor of low Ecological Importance.
		Positive	Likely to create a small change to ecological receptors providing short-term minor benefits to the integrity/status of an ecological receptor.
Moderate*		Negative	Likely to create a moderate change to ecological receptors, including partial loss, medium-term or reversible damage to the integrity/status of an ecological receptor or without causing long-term or irreversible damage to a habitat of moderate Ecological Importance.
		Positive	Likely to create a beneficial change on an ecological receptor, without improving integrity/status of an ecological receptor.
High*	Important	Negative	Likely to create a substantial change to ecological receptors, including loss, or long-term or irreversible damage on the integrity/status of a valued ecological receptor or without causing long-term or irreversible damage to a habitat of

			high to very high Ecological Importance.
		Positive	Likely to create a substantial beneficial change to ecological receptors, improving the integrity/status of a valued ecological receptor.

*Moderate to High negative effects will be highly unlikely to apply to ecological receptors of Negligible to Low Ecological Importance (as defined in Table 5).

3. RESULTS AND EVALUATION

3.1 PLANNING POLICY

3.1.1 Development Plan for the Site and potentially affected area comprises:

- National Planning Policy Framework ('**NPPF**') (HMSO, 2019); and
- The Minerals Local Plan for Staffordshire (2015 - 2030) (Staffordshire County Council, 2017).

3.1.2 National and Local planning policies which are relevant to the Proposed Development are detailed below:

- NPPF: 15. Conserving and Enhancing the Natural Environment - Paragraphs 170 – 183;
- Policy 4: Minimising the Impact of Mineral Development; and
- Policy 6: Restoration of Mineral Sites.

3.2 DESIGNATIONS

Statutory Wildlife Sites

3.2.1 There are no statutory wildlife sites within 2km of the Site boundary.

Non-Statutory Wildlife Sites

3.2.2 There are 6 non-statutory wildlife sites within 2km of the Site boundary; these are outlined in Table 13 and designated as Local Wildlife Site ('LWS'); and Retained Biodiversity Alert Site ('BAS').

Table 13 Non-Statutory Wildlife Site within 2km of the Site

Site Name	Designation	Proximity to the Site	Description
Creswell's Piece	LWS	Adjacent to eastern Site boundary	Semi-natural broad-leaved woodland with banks, dry heath/acid grassland mosaic and stream. Semi-improved acid grassland, marshy grassland and poor semi-improved grassland.
Parkhall Country Park		1.35km southwest	A former sand and gravel quarry and tip site which has now been reclaimed to form a County Council Country Park, which has a range of predominantly acidic habitats including a series of pools that are used by several uncommon species of invertebrates.
March Lane/ Windycote Lane		1.40km northeast	A diverse road verge with an associated ditch.
Stansmore Wood and Grassland	LWS	1.45km southeast	Species-rich neutral grassland which is increasingly being taken over by wetland species as it transgresses to marshy grassland. A broadleaved woodland with a species poor ground flora but which has diversity in its boggy ditches.
Dilhorne Wood	Retained BAS	1.55km southeast	An oak/beech woodland with occasional rowan, birch and alder. Horse chestnut and sycamore are also present but rarely noted. The canopy is quite dense in most places but opens out towards the northwest where oak is most frequent.
Heywood Grange Wood		1.15km east	An ancient woodland site, silver birch and creeping soft-grass dominate the woodland throughout reflecting its wet acidic nature. The woodland has an open canopy with no understorey and is grazed by horses.

Habitats of Principal Importance ('HPI') and Ancient Woodland

3.2.3 One HPI is present at the Site: hedgerows.

3.2.4 Deciduous woodland HPI is present adjacent to the eastern Site boundary.

3.2.5 There are no areas of ancient woodland within 250m of the Site boundary and the closest area of ancient woodland is Heywood Grange Wood, located 1.15km east of the Site boundary.

Granted European Protected Species ('EPS') Licences

3.2.6 There are no granted EPS licences located within 1km of the Site boundary (DEFRA, 2020).

3.3 HABITATS AND FLORA

General Description of Habitats within the Site

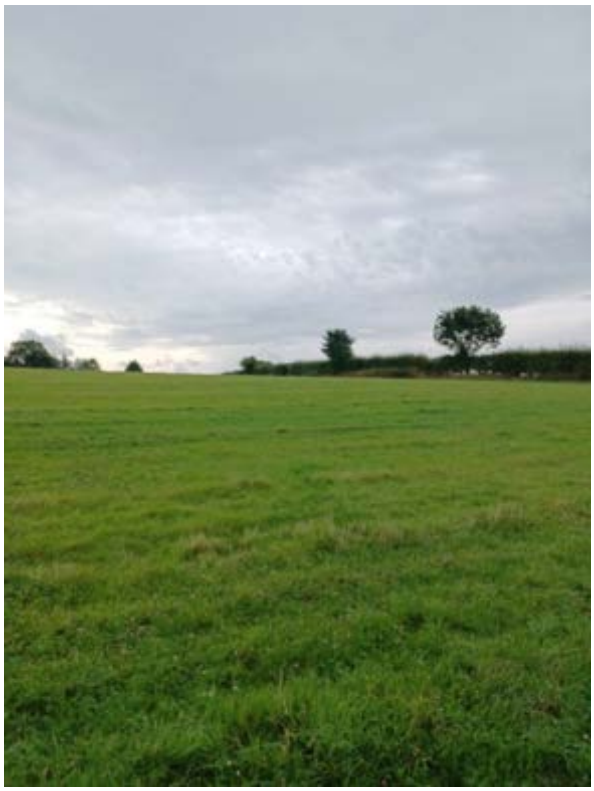
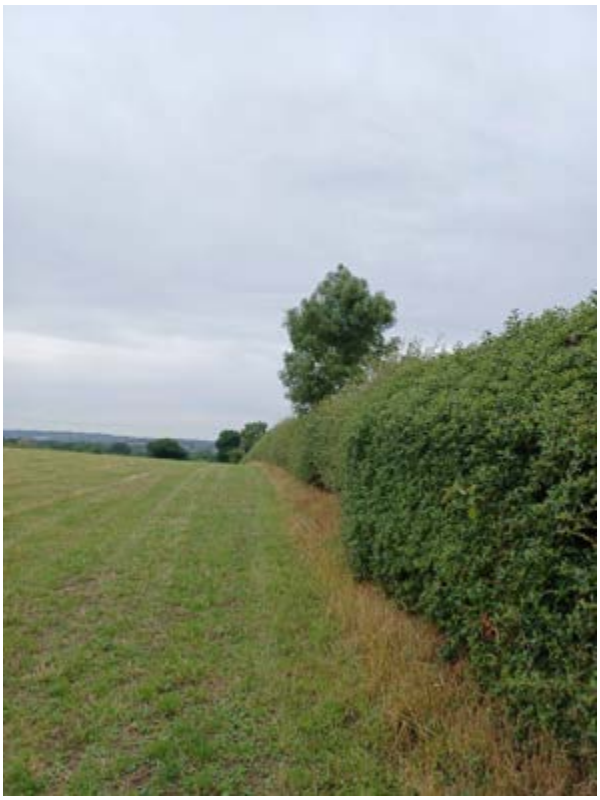
3.3.1 The habitat types identified at the Site, relate to the guideline habitats listed within the Handbook for Phase 1 Habitat Survey (JNCC, 2010) and recorded on Figure E1 in Appendix E3 of this EcIA.

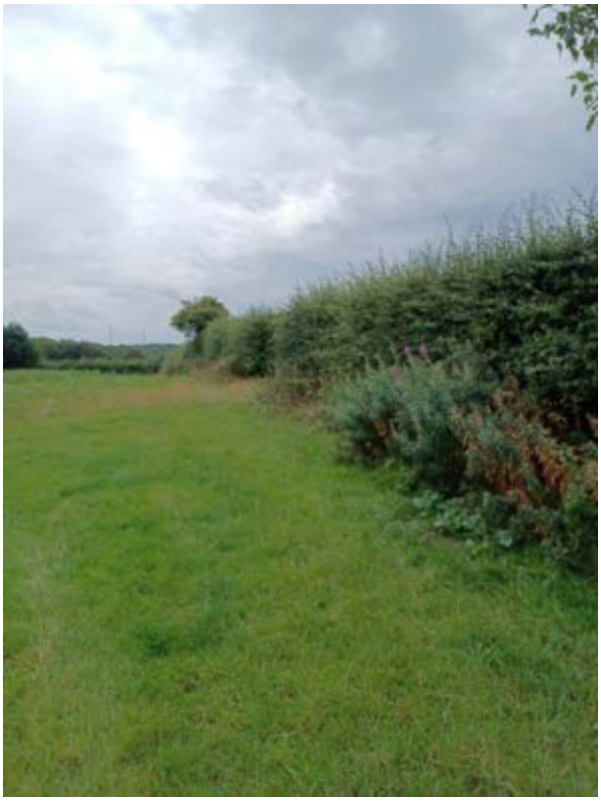
3.3.2 A detailed floral species list for each habitat can be found within Appendix E5 of this EcIA.

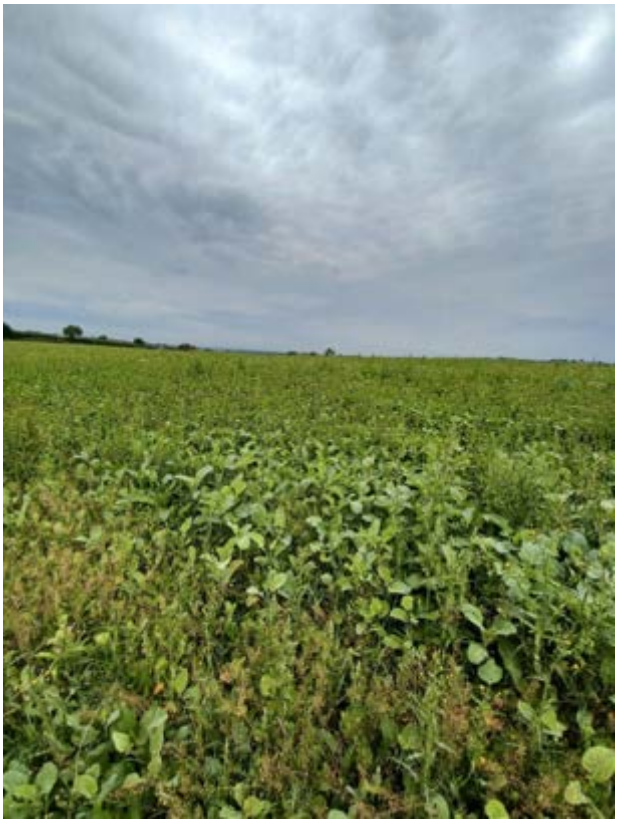
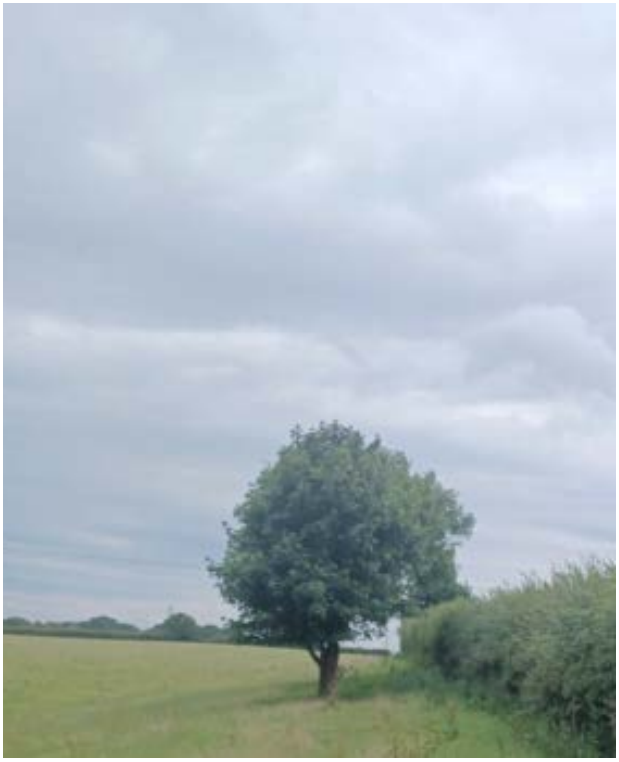
3.3.3 The following habitat types were recorded at the Site, and are described further in Table 14:

- Improved Grassland
- Poor Semi-Improved Grassland;
- Hedgerows (see Table 15);
- Arable; and
- Scattered Trees.

Table 14 Habitat Descriptions

Improved Grassland	
	The southern field was predominantly improved grassland dominated by perennial rye grass (Lolium perenne). The sward length was short due cattle grazing.
Poor-Semi Improved Grassland	
	The field margins of the Site contained small sections of poor-semi improved grassland.
Hedgerows	

	Hedgerows were present along the Site boundary and the central extent of the Site (see Table 15 for hedgerow descriptions).

Arable	
	Arable was the dominant habitat across the Site, comprised of silage crop The sward length was short at the time of survey.
Scattered Trees	
	Two scattered trees were present in the southern extent of the Site. Species were sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*).

Hedgerows

3.3.4 Eight hedgerows are present at the Site and are described in Table 15 and the locations of the hedgerows are shown in Figure E1 within Appendix E3 of this report.

3.3.5 Three hedgerows (H2, H4 and H5) were classed as species-rich in line with current guidance (DEFRA,

2007). Refer to Figure E1 in Appendix E3.

Table 15 Hedgerow Descriptions

Hedge No.	Location	Type	Central Grid Ref.	Length (m)	Species*	Species Richness
1	Western Boundary	*Intact with trees*	SJ 94836 45735	240m	Hawthorn*, Sycamore*, Ash*, Gorse (*Ulex europaeus*)*, Holly (*Ilex aquifolium*)*	Species-Poor
2	Southern Boundary	Defunct with trees	SJ 94808 45591	100m	Hawthorn, Silver Birch	Species-Poor
3	Western Boundary	Intact with trees	SJ 94977 45927	270m	Hawthorn*, Silver Birch*, Oak (*Quercus robur*) *, Holly*, Ash*, Elder*	Species-Poor
4	Northern Boundary		SJ 95134 45992	175m	Holly*, Rowan (Sorbus aucuparia)*, Hawthorn*, Oak*, Gorse*, Alder (Alnus glutinosa) *	**Species-Rich**
5	Eastern Boundary		SJ 95111 45834	285m	Hawthorn, * Ash*, Holly*, Oak*, Elder*, Gorse*, Sycamore*, Silver Birch*, Apple (Malus sp.), Cherry (Prunus sp.), Rowan*	**Species-Rich**
6	Eastern Boundary		SJ 94988 45682	150m	Holly*, Hawthorn*, Gorse*, Rowan*, Ash*, Blackthorn*	**Species-Rich**
7	Eastern Boundary		SJ 94880 45607	135m	Blackthorn, Hawthorn, Sycamore	Species-Poor
8	Centre of Site	Defunct with Trees	SJ 94956 45779	150m	Hawthorn*, Sycamore*, Elder (Sambucus nigra)*, Gorse, Bramble	**Species-Rich**

*Native woody species (5 or more native woody species within 30m stretch of hedgerow to classify as 'species-rich' (DEFRA, 2007).

Plant Species

3.3.6 No notable or protected plant species were present within the survey boundary.

3.3.7 No invasive floral species were recorded at the Site.

3.4 FAUNA

Amphibians and Reptiles

Great Crested Newt and Other Amphibians

3.4.1 Based on OS mapping and aerial photography, there are no ponds at the Site and 5 ponds within 500m of the Site which are not separated by significant barriers to dispersal for amphibians (P1 – P4).

3.4.2 All 5 ponds (P1 – P5) were associated with the existing mineral extraction operations as part of the active quarry in current use as settling lagoons etc.

3.4.3 In summary, the status of the ponds within 500m of the Site is set out below:

- **P1** – No longer present at the time of the survey 2020 and 2022 surveys - **not considered further**;
- **P2** – Settling lagoon that held very little water at the time of the survey (circa <5cm), no submerged or emergent vegetation present for egg laying – **considered unsuitable for great crested newt**;
- **P3** – A settling lagoon that was heavily silted, no submerged or emergent vegetation present for egg laying – **considered unsuitable for great crested newt**;
- **P4** –Settling lagoon that was heavily silted, first pond in the series of settling lagoons for the active quarry, featured a weir which resulted in significant ongoing disturbance to the waterbody, subject to daily input of chemicals (flocculant), one side inaccessible due to

concrete vertical siding and no submerged or emergent vegetation – **considered unsuitable for great crested newt**; and

- **P5** – The second pond in the series of settling lagoons for the active quarry, some silt present, some submerged and emergent vegetation present in the 2020 survey – considered to be of overall Low suitability for great crested newt during the 2022 survey there was no submerged and emergent vegetation present, and the water was silted and turbid – **now considered unsuitable for great crested newt.**

Table 16 HSI Results

Pond ID	Location	Grid Ref.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	HSI Value *	HSI Score*
P1	Circa 160m SE	SJ 9545 0246	No Longer Present											
P2	Circa 215m SE	SJ 9545 0745	1	0.2	0.1	0.33	1	1	1	1	1	0.3	**0.54**	**Below Average**
P3	Circa 190m SE	SJ 9545 0846	1	0.1	0.5	0.01	1	1	1	1	1	0.3	**0.52**	**Below Average**
P4	Circa 175m SE	SJ 9545 0948	1	1	0.9	0.01	1	1	1	1	1	0.3	**0.55**	**Below Average**
P5	Circa 165m SE	SJ 9545 1151	1	0.1	1	0.67	0.7	0.72	0.33	0.5	1	0.4	**0.53**	**Below Average**

3.4.4 A Pond Location Plan can be found in Figure E2 in Appendix E4 of this report.

3.4.5 8 records of great crested newt were returned as part of the desk study, dated 1984 – 2016. The closest record was located 1.4km south of the Site and associated with the Rive Blythe. 3 records of common toad (*Bufo bufo*) were returned within 2km of the Site boundary, with the closest record located 1.5km south west of the Site and dated 2006.

3.4.6 The arable habitat which dominates the Site is considered to be of Low suitability for foraging and sheltering great crested newt, and other amphibians, due to its short sward length. The poor semi-improved grassland field margins provide some suitability for foraging and refuge, and the hedgerows provide ecological connectivity throughout the Site and into the local area.

3.4.7 Environmental DNA (eDNA) survey for P5 was undertaken on 26th June 2020. The survey returned a negative result, and therefore GCN are assessed as being absent from the site. All other ponds were recorded as below average and average for GCN and no surveys were undertaken due to the use of the ponds as silt lagoons for the current quarry, for full results see Crestwood report CE-CB-1734-RP02.

3.4.8 The results of the surveys show that **great crested newt are likely absent** from the ponds within 500m of the Site; therefore, **no further survey or mitigation is considered necessary**.

3.4.9 It is considered that a European Protected Species licence is **not required** for this Site or the Proposed Development.

3.4.10 The site verification check noted the lagoons on Site to be silted and not suitable for GCN and therefore an update survey is not required. If the Proposed Development has not commenced within 18 months an update survey may be required.

Reptiles

3.4.11 One record of adder (*Vipera berus*) was returned as part of the desk study, located 1.4km southwest of the Site and dated 1987.

3.4.12 No evidence of reptiles was recorded at the Site during the survey.

3.4.13 The Site is dominated by arable habitat which is considered to provide limited opportunities for

foraging and shelter. The poor semi-improved grassland field margins provide some opportunities for foraging and sheltering reptiles and the hedgerows provide some ecological connectivity throughout the Site and within the local area.

3.4.14 The site verification check noted that there were no significant changes to the Site since the previous survey was undertaken in 2020

3.4.15 The Site is therefore considered to be of overall **Low suitability for reptiles**.

Mammals

Badger

3.4.16 Multiple records of badger (Meles meles) within 2km of the Site were returned as part of the desk study, dated from 1989 to 2018 The closet record was located circa 100m north of the Site and dated 2008. The closet record of an active sett was circa 600m northeast of the Site and dated 1993.

3.4.17 The arable fields, poor semi-improved grassland field margins and hedgerows provide foraging opportunities for badger. The Site lacked optimum topography and cover for sett-building badger. The habitats present at the Site are considered to be of overall Low suitability for badger.

3.4.18 2 potential badger holes were recorded present (see TN1 on Figure E1). One potential hole was located on the western Site boundary, and one located on the eastern Site boundary.

3.4.19 These setts were monitored and closed in 2020 (see report CE-CB-RP05-Final).

3.4.20 The Site verification check noted that other than the closure of the two potential setts, there were no significant changes to the Site since the previous survey was undertaken in 2020.

Bat Species

3.4.21 13 records of bats were returned within 2km of the Site boundary, with species including:

1. Brown long-eared bat (*Plecotus auritus*);
2. Common pipistrelle (Pipistrellus pipistrellus);
3. Daubenton's bat (*Myotis daubentonii*);
4. Unidentified pipistrelle species; and
5. Unidentified bat species.

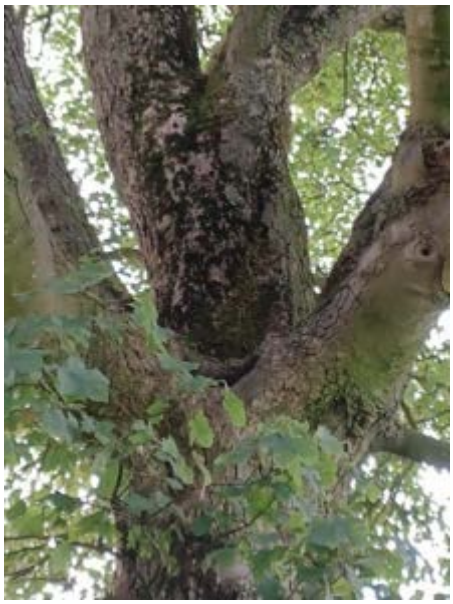
3.4.22 The closest record relates to Daubenton's bat and common pipistrelle, located 265m west of the Site and dated 2008.

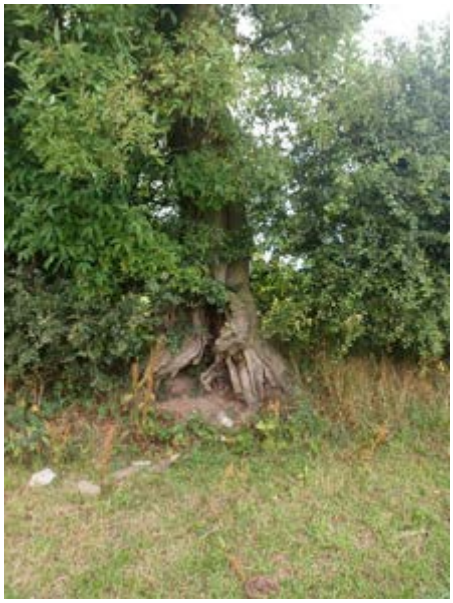
Preliminary Roost Assessment (PRA) for Bats

3.4.23 3 trees at the Site were considered to provide opportunities for roosting bats.

3.4.24 Table 17 details some of the Potential Roost Features (PRFS) found at the Site as part of the PRA.

Table 17 Potential Roost Features (PRFs)

Tree Reference	Description	Location	Photo	Level of Bat Roost Suitability
T1 Sycamore (*Acer pseudoplatanus*) Located on the eastern boundary hedge	Two wounds	Northern elevation		**Moderate**
T2 Sycamore Located on the northern boundary hedge	One large wound	Southern elevation		**Moderate**

Tree Reference	Description	Location	Photo	Level of Bat Roost Suitability
T3 Oak (*Quercus robur*) Located on the western boundary hedge	Multiple PRFs, central upwards cavity, woodpecker hole and gaps under the bark	South-western elevation		**High**

Baseline Conditions (Bats)

3.4.25 The dominant habitat at the Site comprised of arable fields, considered to be of lower suitability for the majority of bat species for commuting and foraging; however, arable fields provide suitable foraging opportunities for larger bat species, particularly noctule (*Nyctalus noctula*). The hedgerows at the Site provide ecological connectivity throughout the Site and into the local area, as well as opportunities for foraging.

3.4.26 Below is a summary of the bat emergence and re-entry surveys and activity surveys conducted in 2020 for full results please see Crestwood report CE-CB-1734-RP04.

3.4.27 Bat roost emergence/re-entry surveys were carried out following the guidelines specified within Bat Mitigation Guidelines (Mitchell-Jones, 2004) and Bat Surveys Good Practice Guidelines (Hundt, 2012).

3.4.28 Following the PRA, 3 trees were recorded to support PRFs and were categorised as having varying levels of suitability for roosting bats including:

1. T1, and T2 presented Moderate suitability; and
2. T3 presented High suitability.

3.4.29 No bats were observed emerging or re-entering any of the trees during the survey. Regular bat activity was recorded around the trees, with species including:

- Common pipistrelle;
- Soprano pipistrelle;
- Noctule; and
- Unidentified myotis species.

3.4.30 T1 presented moderate suitability for roosting bats and was subject to two surveys in 2020. No bats were observed emerging, and the tree was soft felled on 14th April 2021 under the supervision of a bat licenced ecologist, no bats were noted during the works.

3.4.31 All other trees with bat suitability will be retained as part of the proposed development.

3.4.32 The Site verification check noted no other changes from the previous surveys.

Transect/Point Count Surveys

3.4.33 In line with current guidance relating to sites of **Low suitability**, a total of 3 surveys are required comprising of a single walked transect/spot count survey per season (spring: April/May, summer: June/July/August and autumn: September/October). As surveys were instructed after spring, 2 surveys were undertaken in peak season (August) and 1 survey was undertaken in September. Although a survey in spring was not undertaken, two surveys were undertaken during summer; it is considered that sufficient information was gained to assess the likely impacts and effects of the Proposed Development in relation to bats at the Site.

3.4.34 A single transect route was implemented that covered all habitats likely to be impacted by the Proposed Development, with particular focus on the higher quality habitats present, such as woodland edge (adjacent to the Site) and hedgerows within the Site.

3.4.35 During the transect, a number of spot/point counts were carried out within key habitats at the Site. This involved surveyors remaining stationary at 10 points along the walked transect where features of higher habitat quality for bats were found. The locations of the points were determined during the extended Phase 1 habitat survey.

3.4.36 The transect route is detailed Crestwood's report CE-CB-1734-RP04. Weather details encountered are provided in Table 18.

Table 18 Weather Conditions During Activity (Transect) Surveys

Date	Survey type	Sunset / Sunrise time	Temperature (°C)	Precipitation	Cloud Cover (in Octas)	Wind speed (Beaufort scale)
11/08/2020	Dusk	20:42	22	None	1	1
26/08/2020	Dusk	20:10	14		3	
21/09/2020	Dawn	06:54	10		4	

3.4.37 Dusk transect surveys commenced at sunset, continuing for 2 hours after sunset, whilst dawn surveys commenced 2 hours before sunrise and ended at sunrise.

3.4.38 Enhancements for foraging and commuting bats are provided in section …

Automated Surveys

3.4.39 In line with best practice for habitat of **Low suitability**, automated bat detectors (AnaBat Express) were installed at the Site at a single location per transect, which recorded activity on five consecutive nights per season. Automated survey months were twice in August (five consecutive nights separated by 2 weeks) and September 2020; however, no static data was recorded for 2 days during August 2020 and during the 5 days monitoring period in September 2020.

3.4.40 The detector was scheduled to record all bat activity from sunset until sunrise from throughout the monitoring period. The weather conditions during this time can be found in in Table 19 (conditions are recorded for an overnight period).

Table 19 Weather Conditions During Automated Surveys

Month	Date (Day)	Sunset	Sunrise	Overnight Temperature Range (°C)	Precipitation	Wind speed (Beaufort scale)
August (1)	11th	20:42	05:45	23 – 17	Rain in evening	2
	12th	20:39	05:47	22 – 18	Light rain in evening	2
	13th	20:37	05:49	20 – 17	None	1
	14th	20:35	05:50	22 – 15	None	1
	NO DATA					
August (2)	26th	20:09	06:11	16 – 11	None	1
	27th	20:07	06:12	13 – 12	None	2
	28th	20:05	06:14	13 – 11	None	2
	NO DATA					
September	NO DATA					

3.4.41 The site verification check noted no change since the previous surveys conducted in 2020.

Justification for Adequate Survey Data (Automated Surveys)

3.4.42 During the automated surveys, the static detector failed to record on 2 days during the second automated period in August 2020 and during the monitoring period for September 2020. The loss of some of the data during the automated surveys is not deemed a significant limiting factor and it is considered that sufficient data has been gathered to appropriately assess the likely impacts and effects on bats as a result of the Proposed Development for the following reasons:

- Overall, bat activity levels across the Site were low during all bat survey types (automated surveys, transect/point count surveys and bat emergence/re-entry surveys);
- The automated survey data gained was recorded during the peak survey season for bats where bat activity is generally highest, allowing a sufficient assessment of the likely impacts/effects on bats at the Site;
- No rare bat species were recording during any of the surveys and it is considered unlikely that the Site would support rare bat species due to the Site being considered to be of Low suitability only for foraging and commuting bats;
- Only common and/or widespread species were recorded at the Site during the surveys and were returned as part of the desk study within 2km of the Site; and
- Statics serviced in winter 2019/2020 (< 12 months prior to surveys being undertaken), indicating that for at least part of the monitoring period, there may have been no recordings due to there being no bat activity to record.

3.4.43 Furthermore, the habitats of highest ecological importance for bats at the Site (hedgerows) are mostly to be retained as part of the Proposed Development, ensuring habitat connectivity for foraging and commuting bats throughout the life of the Proposed Development. No pole mounted external lighting will be implemented as part of the Proposed Development, only machinery lighting for health and safety; therefore, effects in terms of lighting are considered to be negligible. The restoration of the Site post-development will improve the existing baseline habitats for bats via habitat enhancement. Additional off-Site habitat enhancement for bats has already been implemented by the Client by tree planting adjacent to the western Site boundary.

Otter and Water Vole

3.4.44 2 records of water vole (*Arvicola amphibius*) and 1 record of otter (*Lutra lutra*) were returned within 2km of the Site boundary. The closest record relates to otter, located 1.2km northeast of the Site boundary

and dated 2014.

3.4.45 The Site is dominated by arable habitat and there is no aquatic habitat at the Site or adjacent to the Site for otter and water vole. The Site is considered to be of overall **Negligible suitability for otter and water vole**.

3.4.46 The site verification check noted that no significant changes were present on Site since the previous survey in 2020.

Other Mammals

3.4.47 Numerous records of European hedgehog (*Erinaceus europaeus*) and brown hare (*Lepus europaeus*) were returned as part of the desk study. The closest record relates to European hedgehog, located 190m west of the Site boundary, dated 2006. This record is separated from the Site by the busy A520 road

3.4.48 No evidence of other mammals was recorded at the Site during the survey.

3.4.49 European hedgehogs (*Erinaceus europaeus*) are designated as SPI and are rapidly declining in Britain, partly due to habitat loss

3.4.50 The habitats at the Site provide opportunities for foraging and sheltering common and widespread mammal species, in particular the poor semi-improved grassland field margins and hedgerows. The arable fields provide further opportunities for foraging mammals. The Site is considered to be of overall **Moderate suitability for other mammals.**

3.4.51 The site verification check confirmed that no significant changes had taken place since the previous survey in 2020.

Birds

Breeding Bird Surveys

3.4.52 Breeding bird surveys were completed during spring/summer 2020 and consisted of 3 surveys between May and June. Each of the survey visits started within 1 hour of sunrise.

3.4.53 The survey methodology is based on a combination of the Common Bird Census methodology, devised by the British Trust for Ornithology ('**BTO**'), and national Breeding Bird Survey techniques, jointly devised by the BTO, Royal Society for the Protection of Birds ('**RSPB**') and the Joint Nature Conservation Committee ('**JNCC**').

3.4.54 All birds seen or heard during each visit were recorded on to maps using BTO standardised codes and symbols representing each species present and activity. Special attention was given to identifying the presence of specially protected and nationally declining bird species.

3.4.55 Full weather details of the survey visits are provided in Table 20.

Table 20 Weather Details of Breeding Bird Survey Visits

Visit	Date	Start Time	Weather (Cloud = Octas, Wind = Beaufort Scale)
1	17/05/2020	05:00	Light cloud (2/8 Octas), Light breeze (1), 13°C, Dry
2	15/06/2020	04:50	Overcast (8/8 Octas), Light breeze (1), 14.5°C, Dry
3	26/06/2020	04:50	Overcast (8/8 Octas), Light breeze (2), 18.5°C, Dry

3.4.56 Numerous records of notable bird species were returned within 2km of the Site boundary including 'Red' and 'Amber' Birds of Conservation Concern 4 (Eaton, et al., 2015). Species include skylark (*Alauda arvensis*), barn owl (*Tyto alba*), whimbrel (*Numenius phaeopus*), short-eared owl (*Asio flammeus*) and yellowhammer (*Emberiza citrinella*). The closest records relate to skylark and curlew (*Numenius arquata*) located 80m south of the Site boundary.

3.4.57 Chaffinch (*Fringilla coelebs*), blackbird (*Turdus merula*), swallow (*Hirundo rustica*) and common pheasant (*Phasianus colchicus*) were recorded at the Site during the survey.

3.4.58 The arable fields and poor semi-improved grassland field margins are considered to be suitable for breeding farmland birds,. The hedgerows and scattered trees at the Site are considered to provide opportunities for nesting birds, including those which are common and widespread.

3.4.59 Below is a summary of the three Breeding Bird surveys undertaken in 2020.

3.4.60 A total of **25** species of bird were recorded over the 3 survey visits. Of these:

- **3** were **confirmed** to be breeding on or immediately adjacent to the proposed development area;
- **10** were **probable** breeding species;
- **4** were **possible** breeding species; and
- **8** are considered to be **non-breeding** species.

3.4.61 The results of the survey are presented below.

'Schedule 1' Species

3.4.62 No 'Schedule 1' bird species were recorded during the surveys. The Site is considered to be sub-optimal for foraging barn owl (*Tyto alba*) due to the lack of suitable rough and tussocky field margins for foraging. The faces of the adjacent existing quarry are also considered to be unsuitable for nesting peregrine falcon (*Falco peregrinus*) due to lacking a suitable height and ledges for breeding.

Birds of Conservation Concern (BoCC)

3.4.63 Red and Amber species of BoCC are listed below and the locations of those with confirmed breeding status are shown on Figures E3 – E5 in Appendix E1 – E3.

Red Species

3.4.64 6 Red listed BoCC species were recorded during the surveys (see Table 21).

Table 21 Red Listed Birds of Conservation Concern (BoCC) Species Recorded

Common Name	Scientific Name	EOAC Status	Species of Principal Importance?
Curlew	*Numenius arquata*	NB	**Yes**
Starling	*Sturnus vulgaris*	NB	**Yes**
Song Thrush	*Turdus philomelos*	PO	**Yes**
Mistle Thrush	*Turdus viscivorus*	PR	No
House Sparrow	*Passer domesticus*	C	**Yes**
Linnet	*Carduelis cannabina*	PR	**Yes**

Amber Species

3.4.65 3 Amber listed BoCC species were recorded (see Table 22).

Table 22 Amber Listed Birds of Conservation Concern (BoCC) Species Recorded

Common Name	Scientific Name	EOAC Status	Species of Principal Importance?
Dunnock	*Prunella modularis*	PR	**Yes**
Lesser Black-backed Gull	*Larus fuscus*	NB	No
Willow Warbler	*Phylloscopus trochilus*	NB	No

Species of Principal Importance (NERC Act 2006)

3.4.66 A total of 6 Species of Principal Importance (as listed on the NERC Act 2006) were recorded during the course of the breeding bird surveys, as noted in Table 21 and Table 22.

Sites of County Biological Importance

3.4.67 Taking into consideration the Selection Guidelines for Sites of Biological Importance in Staffordshire, the Site does not meet any of the criteria for breeding birds and is therefore **not considered to be of importance for breeding birds at a County level**.

3.4.68 The results of the breeding bird survey indicate that the habitats within the survey area support typical assemblages for the habitat types with widespread and ubiquitous bird species distributed across the edge habitats of the Proposed Development. In general, bird activity was highest on the Site's eastern boundary and in the south-eastern corner.

3.4.69 The hedgerows on the eastern boundary, where bird activity was highest, and central hedgerow will be temporarily lost to facilitate the Proposed Development. The hedgerows will be replaced upon restoration and it is recommended the retained hedgerows are made to be species-rich. Due to the replacement of lost habitats, and the abundance of similar habitat in the local and wider areas, the temporary loss of habitat is not considered to have a significant negative effect in relation to birds.

3.4.70 The remaining hedgerows and associated poor semi-improved grassland field margins will largely be retained at the Site with a 10m stand-off, which will provide undisturbed nesting and foraging opportunities for various bird species. The exceptions to this include H2, H3 and H4 where soils storage will be required within the 10m stand-off.

3.4.71 Proposed restoration includes a return to agricultural fields and tree planting along woodland edges. Agricultural fields will provide foraging and nesting opportunities for ground-nesting farmland species such as skylark (*Alauda arvensis*), and additional trees will provide an increase in nesting opportunities for common and widespread bird species.

3.4.72 A small colony of 20 nests of sand martin (*Riparia riparia*) were confirmed to be present within the

existing quarry, located east of the Site boundary. Sand martins will use active quarry vertical faces for nesting. The extension of the existing quarry as part of the Proposed Development may provide suitable habitat for this species.

3.4.73 Based on the assessment criteria it is considered that the Site is of **Local value only** for its breeding bird species and numbers. **Any impact will therefore be at the local level only and is not considered significant**.

3.4.74 The site verification check noted that there was no change at the Site since the previous surveys.

Suggested Mitigation

3.4.75 Removal of all areas of vegetated habitat that are being temporarily lost to the proposals, as well as any works to the existing quarry face directly adjacent to the Proposed Development (eastern boundary of the Site) should be undertaken outside of the breeding bird season (March – August inclusive). If this is not possible, areas of habitat could be removed during this period once the area of habitat has been checked for nesting birds by a Suitably Qualified Ecologist (SQE). If any active nests are found then they will have to remain in situ, with a 5m buffer of habitat left for hedgerows and 10m buffer of habitat for ground/quarry face nests, until the nestlings have fledged, or the nesting attempt naturally ceases.

3.4.76 A colony of up to 30 confirmed breeding house sparrows were recorded in the south-east corner of the Site. House sparrow nesting boxes could be erected on to poles within areas of retained hedgerow to mitigate for the temporary loss of breeding habitat (eastern hedgerows).

3.4.77 A colony of sand martin was recorded within the existing quarry located to the east of the Site, predominantly located along the north-eastern boundary quarry face that abuts the woodland. It is recommended that this quarry face is retained in order to retain suitable nesting habitat for this species in perpetuity.

3.4.78 It is recommended that any restoration proposals should include the provision of scrub habitats, including gorse (*Ulex europaeus*) in order to provide suitable foraging and nesting habitat for breeding birds. The restoration of agricultural fields should include associated wide field margins (at least 5m) to increase nesting opportunities and foraging resources for a range of bird species, including Schedule 1 species such as barn owl.

Invertebrates (Aquatic and Terrestrial)

3.4.79 Numerous records of terrestrial invertebrates were returned within 2km of the Site boundary. Species include dingy skipper (*Erynnis tages*), black-headed mining bee (*Andrena nigriceps*), Autumnal rustic (*Eugnorisma glareosa*) and small heath (*Coenonympha pamphilus*). The majority of records were associated with Local Wildlife Sites; Creswell's Piece and Parkhall Country Park.

3.4.80 2 records of white-clawed crayfish (*Austropotamobius pallipes*) were returned as part of the desk study, located 1.45km southwest of the Site boundary and dated 1961.

3.4.81 Cabbage white butterfly (*Pieris rapae*) was recorded at the Site during the survey.

3.4.82 There is no aquatic habitat or free-flowing waterbodies at the Site to support white-clawed crayfish. The Site is considered to be of overall **Negligible suitability for white-clawed crayfish**.

3.4.83 The dominant habitat at the Site is arable which provides limited opportunities for invertebrates due to the monoculture and intense management of the habitat. The field margins along the arable fields are considered to provide some opportunities for terrestrial invertebrates; however, the margins are species poor, limited in extent and feature a poor structure. The presence of mature, dead and decaying trees at the Site provide opportunities for saproxylic invertebrates which rely on dead/decaying wood for at least part of their life cycle.

3.4.84 The site verification check noted that no significant changes to the Site since the previous survey in 2020.

3.4.85 The Site is considered to be of overall Low suitability for terrestrial invertebrates.

Invasive Animal Species

3.4.86 No records of invasive animal species were returned as part of the desk study.

3.4.87 No evidence of invasive faunal species was recorded at the Site.

Overall Habitat Evaluation

3.4.88 The habitat types detailed above are evaluated against the Local Biodiversity Action Plan and habitats of Principal Importance according to Section 41 of the NERC Act 2006 in Table 23. They are also assessed for their suitability to support protected species in order to assess their Ecological Importance, using the criteria in Table 5.

Table 23 Evaluation of Importance of Habitats at the Site

Habitat	LBAP Habitat	HPI (NERC Act 2006)	Floral Species Diversity	Suitability for Protected Species	Overall Importance
Arable	No	No	Low	Badger, other mammals and birds (nesting and foraging).	**Low**
Hedgerows	**Yes**	**Yes**	Moderate	Great crested newt, badger, bats (roosting, foraging and commuting), other mammals, birds and terrestrial invertebrates.	**Moderate**
Poor Semi-Improved Grassland	No	No	Low	Great crested newt, reptiles, badger, other mammals, birds and terrestrial invertebrates.	**Low**
Scattered Trees	No	No	Low	Bats (foraging and commuting), other mammals, birds and terrestrial invertebrates.	

3.4.89 At a site-specific level, the habitats range from Low - Moderate. Floral species diversity is Low for the Site.

4. ASSESSMENT OF IMPACTS AND EFFECTS

4.1 ASSUMPTIONS

4.1.1 It is assumed that the Proposed Development will follow good practice environmental guidelines to avoid any breach of wildlife legislation during the construction period and be aware of the potential presence of protected species.

4.1.2 It is assumed that the Proposed Development will commence within 18 months of the date of survey. Should the Proposed Development not commence within this timeframe then update ecological surveys may be required.

4.2 SCREENING OF ECOLOGICAL FEATURES

4.2.1 Table 24 identifies potential ecological receptors or features which will not be considered further in this report and provides justification for their exclusion from the assessment process.

Table 24 Screening of Ecological Features

Potential Ecological Receptor	Justification for Exclusion from Further Assessment
Statutory and Non-Statutory Wildlife Sites	The Proposed Development is confined and specific in nature and the Site does not contain or border any statutory or non-statutory sites, therefore statutory are highly unlikely to be affected by the Proposed Development. Due to the presence of
Protected Floral Species	No protected floral species were found at the Site.
Ancient Woodland and Veteran Trees	The Site does not contain and is not within 250m of any ancient woodland.

Potential Ecological Receptor	Justification for Exclusion from Further Assessment
	There are no veteran trees at the Site.
Great Crested Newt and Other Amphibians	There is no aquatic habitat present at the Site or within 500m of the Site.
White Clawed Crayfish (*Austropotamobius pallipes*)	The Site supports no suitable aquatic habitat for the species.
Hazel Dormouse (*Muscardinus avellanarius*)	The hedgerow at the Site is not connected to any areas of highly suitable habitat, is relatively isolated as a hedgerow and is of low suitability for dormice.
Otter (*Lutra lutra*)	The Site is generally unsuitable for otter and water vole and has poor connectivity to suitable water courses.
Water Vole (*Arvicola amphibius*)	
Smooth Snake (*Coronella austriaca*), Sand Lizard (*Lacerta agilis*) and Natterjack Toad (*Bufo calamita*)	Outside the typical geographic range of the species. No sites known to support the species in the local area based on information from LRERC (LRERC, 2015).

4.3 IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS & LIKELY EFFECTS

POTENTIAL SOURCES OF IMPACTS

4.3.1 The potential implementation impacts of the Proposed Development include:

- Partial removal of hedgerows (replaced upon restoration);
- Temporary removal of arable (replaced upon restoration); and
- Temporary removal of poor semi-improved grassland (where not retained as part of hedgerow 10m stand-off zones).

Operational Impacts

4.3.2 The potential operational impacts of the Proposed Development include:

- A continuation of dust and emissions during mineral extraction; and
- A continuation of noise.

4.3.3 The above impacts are expected to be a continuation of those currently ongoing at the Site as mineral extraction will cease in previous Phases prior to the commencement of mineral extraction within the extension area as part of the Proposed Development.

4.3.4 At a site-specific level, the habitats range from Low - Moderate. Floral species diversity is Low for the Site.

4.3.5 All hedgerows, and associated poor semi-improved grassland field margins, will be retained at the Site with a 10m stand-off (Refer to Appendix E3 for Figure E1), with the exception of:

a. H2 (**retained** – soil storage only within 10m stand-off);
b. H3 (**retained** – soil storage only within 10m stand-off);
c. H4 (**retained** – soil storage only within 10m stand-off);
d. H5 (partially removed (retained adjacent to woodland) - eastern boundary);
e. H6 (removed - eastern boundary); and
f. H8 (removed - central to the Site).

4.3.6 Proposed restoration includes a return to agricultural fields, the replacement of lost hedgerows, and

tree planting along woodland edges.

Noise and Dust

4.3.7 Any impacts and associated effects resulting from noise and dust as part of the Proposed Development in relation to ecological receptors are considered likely to be **Negligible**.

4.3.8 Noise and dust levels are not anticipated to increase from the current baseline, as the progression of mineral extraction operations will not commence at the Site until the cessation of mineral extraction within the preceding Phases. Therefore, any ecological receptors in the area will likely have habituated to the noise/dust levels associated with the existing permitted mineral extraction located directly adjacent to the Site.

4.3.9 Existing mitigation measures in place in relation to noise (e.g. creation of bunds, monitoring etc.) and dust (dust suppression measures, monitoring etc.) for the existing mineral extraction operations will continue to be implemented as part of the Proposed Development.

4.3.10 The Proposed Development is temporary in nature and impacts/effects relating to noise and dust are considered to be temporary for a period of 20 years. Additionally, phasing of mineral extraction followed by progressive restoration will minimise impacts/effects at any one time.

Dewatering

4.3.11 The water table currently sits below the working base of the existing quarry, the depth of extraction associated with the Proposed Development is not anticipated to affect the water table; therefore, there are no effects relating to dewatering as part of the Proposed Development.

4.3.12 Regular water monitoring is ongoing as part of the adjacent existing quarry, and regular monitoring of groundwater levels will continue to be implemented throughout the duration of the Proposed Development. Any remedial actions will be undertaken if applicable.

4.3.13 The Proposed Development is temporary in nature and impacts/effects relating to dewatering are considered to be temporary for a period of 20 years. Additionally, phasing of mineral extraction followed by progressive restoration will minimise impacts/effects at any one time.

Lighting

4.3.14 No external lighting is required as part of the Proposed Development. The only lighting will be limited to the lights on plant machinery (e.g. excavators etc.) which is required for health and safety purposes. Lighting will only be required where working hours coincide with darkness (i.e. during winter), and this is only considered to be required for a couple of hours each day around dusk/dawn.

4.3.15 Any impacts and associated effects resulting from lighting as part of the Proposed Development in relation to ecological receptors are considered likely to be **Negligible**.

DESIGNATED SITES

Creswell's Piece LWS

4.3.16 Creswell's Piece LWS is located immediately adjacent to the eastern Site boundary. There are considered to be no direct effects in relation to the LWS and the Proposed Development, with indirect effects anticipated only.

4.3.17 The long-term potential impacts of the Proposed Development are assessed as being positive based on the restoration proposals, which will buffer and strengthen the designated habitats.

Table 25 Summary of Impacts & Likely Effects (Pre-Mitigation) – Creswell's Piece

Impact	Effects	Scale of Effect	Nature of Effect
Additional tree planting adjacent to LWS as part of restoration.	Increase in suitable habitats directly adjacent to LWS which complement the LWS habitats.	**Moderate**	**Positive**

4.3.18 Recommended mitigation for these LWS specific impacts are detailed in Section 5.

HABITATS

4.3.19 Table 26 below identifies the potential impacts and likely effects on habitats and flora as a result of the Proposed Development. Scale and nature of effect are based on those descriptions set out in 4.3.

Table 26 Summary of Impacts and Likely Effects (Pre-Mitigation) – Habitats / Flora

Habitat	Impacts	Effects	Scale of Effect	Nature of Effect
Arable	Habitat loss (entirety).	Reduction in habitat at the Site and local area (temporary).	**Low**	**Negative**
	Replacement of habitat upon restoration	Reinstatement of habitat to pre-development baseline.	**Negligible**	**Neutral**
Hedgerows	Habitat loss (partial)	**Reduction of HPI habitat** at the Site and in the local area (temporary).	**Moderate**	**Negative**
	Continuation of dust	Minor dust deposits on retained habitats (temporary).	**Low**	
	Replacement of habitat upon restoration	Reinstatement of habitat to pre-development baseline.	**Negligible**	**Neutral**
Poor Semi-Improved Grassland	Habitat loss (partial).	Reduction in habitat at the Site and local area. Some habitat retention as part of stand-off zones from Site boundary/retained hedgerows.	**Low**	**Negative**
Scattered Trees	Additional tree planting upon restoration	Increase in habitat post-restoration.	**Moderate**	**Positive**

FAUNA

4.3.20 Table 27 below summarises the potential impacts and likely effects on fauna as a result of the Proposed Development. Scale and nature of effect are based on those descriptions set out in 4.3.

Table 27 Summary of Impacts and Likely Effects (Pre-Mitigation) - Fauna

Species / Species Group	Impacts	Effects	Scale of Effect	Nature of Effect
Reptiles	Habitat loss.	Likely negligible due to absence or at most presence of low numbers	**Low**	**Negative**
		Potential direct injury/killing/disturbance of reptiles – breach in wildlife legislation.	**High**	
	Additional tree planting upon restoration.	Increase in suitable sheltering and dispersal habitat.	**Moderate**	**Positive**
Badger				
Bats	Additional tree planting upon restoration.	Increase in suitable foraging and commuting habitat.	**Moderate**	**Positive**
Other Mammals	Habitat loss.	Loss of foraging and shelter habitat.	**Low**	**Negative**
		Potential direct injury/killing of other mammals – breach in wildlife legislation.	**High**	
	Additional tree planting upon restoration.	Increase in suitable foraging, sheltering and commuting habitat**.**	**Moderate**	**Positive**
Birds	Habitat loss.	Loss of suitable nesting habitat.	**Low**	**Negative**
		Potential direct injury/killing of birds – breach in wildlife legislation.	**High**	
	Additional tree planting upon restoration.	Increase in suitable foraging and commuting habitat.	**Moderate**	**Positive**
Invertebrates (Terrestrial)	Habitat loss.	Reduction in foraging and shelter habitat.	**Low**	**Negative**
	Additional tree planting upon restoration.	Increase in suitable foraging and sheltering habitat.	**Moderate**	**Positive**

4.3.21 Recommendations for mitigation of any adverse effects (as identified prior to mitigation) are detailed in section 5; opportunities for ecological enhancements have also been considered within Section 6.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 DESIGNATED SITES

5.1.1 Creswell's Piece LWS is located immediately adjacent to the eastern Site boundary. The following mitigation measures are already in place for the existing quarry, and will continue to be implemented throughout the Proposed Development:

- Dust and noise management plans; and
- Water management plan.

5.1.2 There will be a 10m stand-off from the LWS to the Proposed Development, which will ensure the LWS will not be directly impacted by the Proposed Development.

5.1.3 It is considered that where these measures are successfully implemented as part of the Proposed Development, there will be no significant negative effects of the Proposed Development on Creswell's Piece LWS.

5.1.4 The additional tree planting adjacent to the LWS post-development, will provide an increase in similar habitat directly adjacent to the LWS.

5.2 HABITATS AND FLORA

5.2.1 The dominant habitat to be lost as a result of the Proposed Development is arable; this is a common and widespread habitat both at the Site and in the local and wider areas. Arable is considered to be of Low Ecological Importance and of Low floral diversity. Additionally, the loss of this habitat is temporary, as arable will be reinstated upon restoration. Therefore, the loss of this habitat is not considered to have a significant negative effect.

5.2.2 Some poor semi-improved grassland will be temporarily lost to facilitate the Proposed Development; however, the habitat will partially be retained as part of stand-off zones from the Site boundary and retained hedgerows.

5.2.3 To mitigate the temporary loss of arable and poor semi-improved grassland at the Site, it is recommended that an area of the Site is seeded with a species-rich wildflower seed mix, as part of restoration, to create a wildflower meadow. This will increase floral diversity as well as provide benefits for a range of wildlife.

5.2.4 The majority of habitats at the Site are of Low Ecological Importance. The hedgerows are of Moderate Ecological Importance due to their status as HPI, and where present outside the construction footprint, these habitats should be retained and protected during construction in line with BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction – Recommendations*'. (British Standards Institution, 2012).

5.2.5 The hedgerows to be lost to facilitate the Proposed Development will be replaced upon restoration, which will restore the Site to pre-development ecological baseline and reinstate HPI. To mitigate the temporary loss of hedgerows, and the time lag associated with re-planting, it is recommended that all retained hedgerows are made to be species-rich (i.e. 5+ woody species within 30m length of hedgerow) through selective thinning of abundant species and replacement with other native woody species.

5.2.6 In addition to the re-instatement and associated enhancement of habitats as part of proposed restoration, pre-application planting has been undertaken immediately adjacent to the western Site boundary by the Client, comprised of a circa 5m wide corridor of native trees. It is considered that these trees will mature over the course of the Proposed Development and will complement the habitats at the Site post-restoration, as well as the proximal LWS, and increase ecological connectivity.

5.2.7 Overall, the Site offers low floral species diversity and the flora present within the habitats at the Site is considered typical. As such, it is concluded that **the Site does not require any further surveys for its botanical interest**.

5.3 FAUNA

Precautionary Working Measures

5.3.1 Precautionary working measures are required for the following species/species groups:

- Reptiles;
- Mammal SPI, specifically hedgehog; and
- Birds.

5.3.2 A Reasonable Avoidance Measures Method Statemement was prepared by Crestwood CE-CB-1734-RP07 in June 2021. This method statement is intended for the Proposed Development.

Reptiles

5.3.3 The narrow strips of poor semi-improved grassland are suitable for reptile species. The majority of this habitat will be retained as part of the 10m stand-off from retained hedgerows. Where this habitat is to be removed to facilitate the Proposed Development, the following precautionary working measures will be implemented:

1. Removal under the supervision of a Suitably Qualified Ecologist;
2. Sensitive vegetation removal using hand tools (e.g. hand strimmer) in a progressive manner, with vegetation firstly reduced in height to 150mmm, followed by a hand search by the SQE, then finally strimmed to ground level;
3. Vegetation removal will be directional, so as to encourage reptiles (if present) into suitable habitat off-Site;
4. All arisings will be stored/removed off-Site so as not to encourage reptiles (and other wildlife) into working areas; and
5. Removal of this habitat will be undertaken during the reptile active season only (typically March – October inclusive) so as to ensure no potential harm of hibernating reptiles.

Mammal SPI

5.3.4 The habitats at Site are suitable for mammals, including European hedgehog, which is a Species of Principal Importance (SPI).

5.3.5 Contractors should remain vigilant during works for the presence of all wildlife and should any be found they must be moved carefully by hand into an area of suitable habitat outside of the Site boundary. Precautions must be taken during hibernation period (between November to April), particularly for groundworks, in order to avoid harmful disturbance of hibernating wildlife.

5.3.6 Should any mammal holes, warrens, burrows etc. be found at the Site during works, such as rabbit (*Oryctolagus cuniculus*) or red fox (*Vulpes vulpes*), then due diligence is required by all contractors/Site personnel to ensure no wildlife is killed/injured during the construction of the Proposed Development resulting in a breach in wildlife legislation.

5.3.7 If protected species (such as badger, great crested newt etc.) are considered to be potentially present, then all works should cease immediately, and an ecologist consulted for advice.

Birds

5.3.8 Removal of all areas of vegetative habitat that are being temporarily lost to the proposals, as well as any works to the existing quarry face directly adjacent to the Proposed Development (eastern boundary of the Site) should be undertaken outside of the breeding bird season (March – August inclusive). If this is not possible, areas of habitat could be removed during this period once the area of habitat has been checked for nesting birds by a Suitably Qualified Ecologist (SQE). If any active nests are found then they will have to remain in situ, with a 5m buffer of habitat left for hedgerows and 10m buffer of habitat for ground/quarry face nests, until the nestlings have fledged, or the nesting attempt naturally ceases.

5.3.9 A colony of up to 30 confirmed breeding house sparrows were recorded in the south-east corner of the Site. House sparrow nesting boxes could be erected on to poles within areas of retained hedgerow to mitigate for the temporary loss of breeding habitat (eastern hedgerows).

5.3.10 A colony of sand martin was recorded within the existing quarry located to the east of the Site, predominantly located along the north eastern boundary quarry face that abuts the woodland. It is recommended that this quarry face is retained in order to retain suitable nesting habitat for this species in perpetuity.

5.3.11 It is recommended that any restoration proposals should include the provision of scrub habitats, including gorse (*Ulex europaeus*) in order to provide suitable foraging and nesting habitat for breeding birds. The restoration of agricultural fields should include associated wide field margins (at least 5m) to increase nesting opportunities and foraging resources for a range of bird species, including Schedule 1 species such as barn owl.

5.3.12 A variety of open-fronted and hole nesting boxes could be incorporated into the quarry management plan to enhance the opportunities for breeding birds across the Site. These boxes should be erected

onto retained trees along the Site's boundaries.

5.3.13 In addition, any long-term management of the Site should allow breeding bird habitats to naturally regenerate including areas of scrub which would benefit a range of species of conservation concern including song thrush, dunnock, house sparrow and linnet. Restoration includes additional tree planting and replacement of hedgerows, and these areas should be enhanced with (*Crataegus monogyna*) scrub areas.

5.3.14 A wildflower meadow, or field margins, could be seeded with a species-rich wildflower seed mix upon restoration to attract a diversity of invertebrates, which in turn will provide foraging opportunities for birds. Where possible, landscape planting should be made up of native species, prevalent to the local area and to take into consideration Site-specific conditions.

5.3.15 In addition to the re-instatement and associated enhancement of habitats as part of proposed restoration, pre-application planting has been undertaken immediately adjacent to the western Site boundary by the Client, comprised of a circa 5m wide corridor of native trees. It is considered that these trees will mature over the course of the Proposed Development and will complement the habitats at the Site post-restoration, as well as the proximal LWS, and increase ecological connectivity. This planting will benefit bird species in the long term by providing opportunities for nesting and foraging.

5.3.16 The Client also intends to create an off-Site biodiversity area including ponds of varying sizes and depths of an area approximately 4.6ha south of the land holding, which will provide additional habitat in the local area to benefit aquatic bird species.

5.3.17 The hedgerows and arable habitats should be removed (where required) outside the bird breeding season (Typically March-August inclusive)**.**

5.3.18 If this is not possible then the vegetation should be checked by a Suitably Qualified Ecologist immediately prior to removal.

Sensitive Lighting Scheme for Bats

5.3.19 A sensitive lighting scheme should be employed at the Site to prevent unnecessary light spill into naturally dark corridors suitable for use by nocturnal species (including bats).

5.3.20 The following guidelines should be used as a reference when designing external lighting in relation to light spill and bats:

- Guidance Note 1 for the Reduction of Obtrusive Light GN01-20 (ILP, 2020);
- Bats and Artificial Lighting in the UK – Bats and the Built Environment Series GN08/18 (ILP / BCT, 2018);
- Artificial Lighting and Wildlife – Interim Guidance: Recommendations to help minimise the impact artificial lighting (BCT, 2014);
- EUROBATS - Guidelines for Consideration of Bats in Lighting Projects (UNEP/EUROBATS, 2018);
- Domestic exterior lighting: getting it right! Guidance Note 9/19 (ILP, 2019);
- Bats and Lighting (Fure, 2006); and
- Impact of Lighting on Bats (Jones, 2000).

5.3.21 To avoid post-construction impacts from increased artificial light levels, the following can be used to minimise adverse impacts from lighting on bats (and other wildlife):

- Type of lamp: using low- or high-pressure sodium instead of mercury or metal halide lamps;
- Use of UV filters/glazing;

- Light levels: Within standards for safety and security, light levels should be at the minimum required;
- Timing: Use of timers and/or movement sensors to ensure lighting is only used when required;
- Minimising light spill by design of luminaire and use of accessories such as hoods, cowls louvres and shields; and
- Use directional lighting to avoid illuminating important commuting corridors and foraging habitat, as well as potential bat roost features within trees.

5.3.22 Of particular importance will be lighting in proximity to any retained habitats as well as along the periphery of the Site boundary, where lighting should avoid illumination of hedgerows, adjacent residential gardens and other vegetative habitats.

General Precautionary Working Measures

5.3.23 The habitats at Site are suitable for mammals, including European hedgehog, which is a Species of Principal Importance (SPI).

5.3.24 Contractors should remain vigilant during works for the presence of all wildlife and should any be found they must be moved carefully by hand into an area of suitable habitat outside of the Site boundary. Precautions must be taken during hibernation period (between November to April), particularly for groundworks, in order to avoid harmful disturbance of hibernating wildlife (particularly hedgehogs).

5.3.25 Should any mammal holes, warrens, burrows etc. be found at the Site during works, such as rabbit (*Oryctolagus cuniculus*) or red fox (*Vulpes vulpes*), then due diligence is required by all contractors/Site personnel to ensure no wildlife is killed/injured during the construction of the Proposed Development resulting in a breach in wildlife legislation.

5.3.26 If protected species (such as badger, great crested newt etc.) are considered to be potentially present, then all works should cease immediately, and an ecologist consulted for advice.

6. ENHANCEMENTS

6.1.1 Any development provides the opportunity for enhancement of the natural environment. In line with the NPPF, enhancements for biodiversity have been recommended below.

6.2 HABITATS AND FLORA

6.2.1 Where possible, landscape planting should be made up of native species, prevalent to the local area and to take into consideration site-specific conditions.

6.2.2 Wildflower mixes can include the species detailed in Table 28. This list is not site specific nor exhaustive.

Table 28 Wildflower Mix Species

Species Common Name	Species Scientific Name
Yarrow	*Achillea millefolium*
Common knapweed	*Centaurea nigra*
Lady's bedstraw	*Galium verum*
Oxeye daisy	*Leucanthemum vulgare*
Birdsfoot trefoil	*Lotus corniculatus*
Ribwort plantain	*Plantago lanceolata*

Species Common Name	Species Scientific Name
Hoary plantain	*Plantago media*
Cowslip	*Primula veris*
Selfheal	*Prunella vulgaris*
Meadow buttercup	*Ranunculus acris*
Yellow rattle	*Rhinanthus minor*
Common sorrel	*Rumex acetosa*

6.2.3 Any gaps within retained hedgerows at the Site can be infilled with a range of native species to improve the integrity of the hedgerow(s) and to improve species richness and biodiversity. Flowering/fruiting

species will provide additional benefits for fauna.

6.2.4 Since all UK bat species are insectivorous, in any soft landscaping proposals the use of plant species that attract a diversity of invertebrates will also benefit a variety of bat species, as well as being of benefit to other wildlife such as birds. Nectar-bearing and fruit-bearing plant species are likely to be of greatest benefit, as well as plant species that provide cover for overwintering invertebrates.

6.3 FAUNA

Foraging and Commuting Bats

6.3.1 The Site offers suitable habitat for foraging and commuting bats, specifically the linear features of the Site such as boundary hedgerows. The arable fields provide some further foraging habitat for bats. Habitat adjacent to the Site considered suitable for foraging and commuting bats includes Creswell's Piece Local Wildlife Site, an area of broadleaved woodland, adjacent to a section of the eastern Site boundary.

6.3.2 4 bat species were recorded during the bat activity surveys (incl. automated surveys): common pipistrelle, soprano pipistrelle, unidentified *Myotis* species and noctule.

6.3.3 Bat activity was recorded along all hedgerows across the Site, with highest levels of activity along the northern and western hedgerows, and the section of eastern hedgerow adjacent to the woodland (northern extent). All hedgerows/sections of hedgerow where the highest levels of bat activity were recorded are to be retained with a minimum 10m buffer (excluding soil storage) providing habitat continuity for foraging and commuting bats.

6.3.4 The highest levels of bat activity related to common pipistrelle equating to > 90% of all bat activity at the Site. The value of the Site for foraging and commuting bats was assessed as being of 'District/Local/Parish' level only and is therefore not to be significant in the wider context.

6.3.5 The hedgerows to be removed to facilitate the Proposed Development (eastern boundary and central hedgerow that splits the two arable fields) will result in the loss of suitable commuting and foraging habitat. However, the hedgerows with the highest levels of activity will be retained and the northern and western hedgerows which connect to the LWS adjacent to the eastern Site boundary will allow bats to commute between the same destinations maintaining ecological connectivity throughout the life of mineral extraction.

6.3.6 The proposed restoration of the Site will restore existing habitats (arable and hedgerows). It is recommended that these areas are enhanced for bats to mitigate the temporary loss of foraging and commuting habitats as a result of the Proposed Development. Any replacement hedgerows should be made to be species-rich (5+ native woody species per 30m of hedgerow) to maximise benefits for invertebrates, and in doing so, for foraging bat species. Additionally, it is recommended that an area within the Site is seeded with a native species-rich wildflower seed mix to provide additional benefits to foraging bats.

6.4 ROOSTING BATS

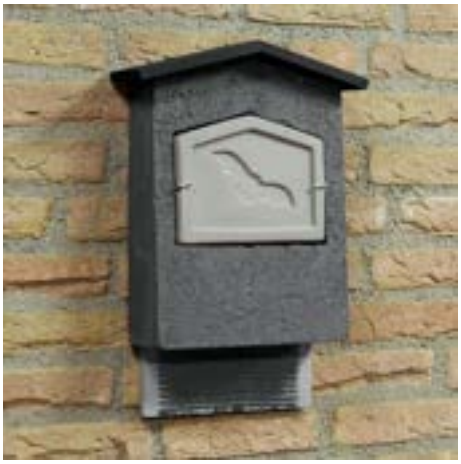
Bat Boxes

6.4.1 It is understood that as part of the Proposed Development, the only tree suitable for roosting bats that is to be removed is T1 which is a sycamore considered to be of Moderate Suitability, located on the eastern Site boundary. It is recommended that bat boxes are implemented at the Site to mitigate the loss of suitable roosting opportunities.

6.4.2 It is recommended that bat boxes be incorporated into the design scheme as this will provide additional roosting opportunities for bats and mitigate for any loss of habitat. These could be attached to mature retained trees under the control of the Client, but if included, should be sited according to best practice (Gunnell, et al., 2012). A minimum of 2 bat boxes would be suitable for the Proposed Development.

6.4.3 Plate 2 below provides an example of a suitable bat box. The boxes should be at a minimum height of 3m from the ground and face south to southwest, to allow heating from the sun and shelter from prevailing winds and close to vegetation. Boxes with an opening at the base will allow droppings to fall out naturally and will not require cleaning. Only a suitably experienced and licensed ecologist can inspect bat boxes internally.

Plate 2 Low Profile WoodStone Bat Box (NHBS, 2020).



6.4.4 Updated surveys are required should the development not be submitted for planning application within 18 months from the date of this report.

6.4.5 A variety of faunal nest/roost boxes could be implemented at the Site as enhancement for protected and notable species such as UKBAP and SPI.

6.4.6 Table 29 details recommended faunal enhancement suitable for the Site.

6.5 BREEDING BIRDS

6.5.1 A variety of open-fronted and hole nesting boxes could be incorporated into the quarry management plan to enhance the opportunities for breeding birds across the Site. These boxes should be erected onto retained trees along the Site's boundaries.

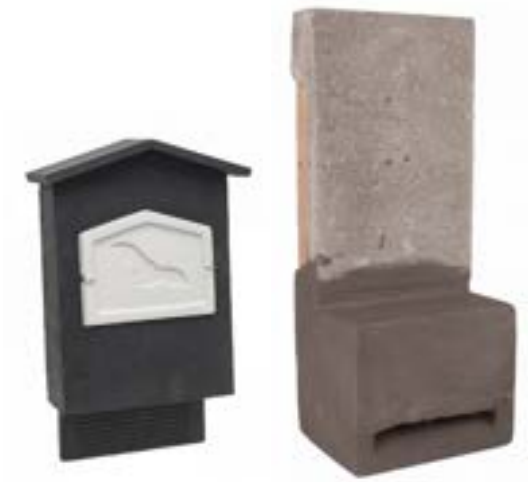
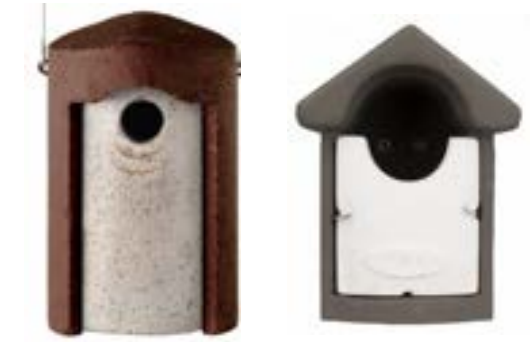
6.5.2 In addition, any long-term management of the Site should allow breeding bird habitats to naturally regenerate including areas of scrub which would benefit a range of species of conservation concern including song thrush, dunnock, house sparrow and linnet. Restoration includes additional tree planting and replacement of hedgerows, and these areas should be enhanced with (*Crataegus monogyna*) scrub areas.

6.5.3 A wildflower meadow, or field margins, could be seeded with a species-rich wildflower seed mix upon restoration to attract a diversity of invertebrates, which in turn will provide foraging opportunities for birds. Where possible, landscape planting should be made up of native species, prevalent to the local area and to take into consideration Site-specific conditions.

6.5.4 In addition to the re-instatement and associated enhancement of habitats as part of proposed restoration, pre-application planting has been undertaken immediately adjacent to the western Site boundary by the Client, comprised of a circa 5m wide corridor of native trees. It is considered that these trees will mature over the course of the Proposed Development and will complement the habitats at the Site post-restoration, as well as the proximal LWS, and increase ecological connectivity. This planting will benefit bird species in the long term by providing opportunities for nesting and foraging.

6.5.5 The Client also intends to create an off-Site pond, south of the land holding, which will provide additional habitat in the local area to benefit aquatic bird species.

Table 29 Recommended Faunal Enhancement

Roosting Bats	
	Bat boxes could be incorporated into the design scheme as this will provide additional roosting opportunities for bats. These could be integrated into the buildings, attached to the buildings' exterior or on retained trees under the control of the Client. Examples of suitable bat boxes are shown to the left (NHBS, 2020). A minimum of 2 bat boxes would be suitable for the Proposed Development. The boxes should be sited according to best practice (Gunnell, et al., 2012), generally installed at a minimum height of 3m, face south to southwest to allow heating from the sun and shelter from prevailing winds and close to vegetation. Boxes with an opening at the base will allow droppings to fall out naturally and will not require cleaning. Only a suitably experienced and licensed ecologist can inspect bat boxes.
Birds	
	Bird boxes could be incorporated into the design scheme as this will provide additional nesting opportunities for birds. These could be integrated into the buildings, attached to the buildings' exterior or on retained trees under the control of the Client. Examples of suitable bird boxes are shown to the left (NHBS, 2020). A minimum of 2 bird boxes would be suitable for the Proposed Development. Bird boxes should be sited in close proximity to vegetative cover, at a minimum height of 3m and on a north – northeast elevation. The RSPB (RSPB, 2014) state that bird boxes should be cleaned from September onwards **once birds have stopped using the bird boxes.**
European hedgehogs	
	The use of hedgehog house at the Site can provide opportunities for hedgehogs to find shelter and encourage them to use the habitats at the Site for foraging. An example of a suitable hedgehog house is shown to the left (NHBS, 2020). A minimum of 1 hedgehog house would be suitable for the Proposed Development. The hedgehog house should be sited in a quiet position out of the prevailing wind in an area with some nearby cover.
Terrestrial Invertebrates	

	The use of an invertebrate hotel at the Site can provide opportunities for a range of terrestrial invertebrates and encourage them to use the habitats at the Site (Honey Bee Suite, 2020). The invertebrate hotel should be sited in a sunny area which is protected from extreme wind and rain. Other ecological enhancements specific to invertebrates include the provision of log piles as many invertebrates use log piles as a source of shelter and food. These can be built using old pieces of wood left in piles within suitable areas of habitat at the Site The provision of log piles using old pieces of wood left in piles within suitable areas of habitat at the Site will also provide foraging and shelter opportunities.

6.6 COMPLIANCE WITH POLICY

6.6.1 The Proposed Development does not infringe on any statutory designations and is adjacent to a non-statutory designation, and providing recommendations are adhered to, no protected species are anticipated to be negatively affected as a result of the proposals.

6.6.2 The following local planning policies, taken from The Minerals Local Plan for Staffordshire (2015 - 2030) (Staffordshire County Council, 2017) are relevant to the Proposed Development:

- Policy 4: Minimising the Impact of Mineral Development; and
- Policy 6: Restoration of Mineral Sites.

6.7 OVERALL CONCLUSION

6.7.1 Providing the recommendations are adhered to and providing that any subsequent surveys do not reveal likely adverse effects on protected species, it is considered that there would be **no important adverse effect** from the Proposed Development on fauna, habitats and designated sites.

6.7.2 If protected species are recorded at the Site during construction of the Proposed Development, then appropriate surveys, mitigation and compensation measures should be devised and implemented prior to any construction work taking place; including the production of European Protected Species licences for submission to Natural England if applicable.

6.7.3 **NOTE:** If the Proposed Development does not commence within 18 months of the updated survey date, it is recommended that update surveys are undertaken due to there being mobile species such as birds and bats.

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APPENDICES:

APPENDIX E1 ABBREVIATIONS AND GLOSSARY

APPENDIX E2 GLOSSARY

APPENDIX E3 FIGURE E1 – PHASE 1 HABITAT PLAN

APPENDIX E4 FIGURE E2 – POND LOCATION PLAN

APPENDIX E5 FULL FLORAL SPECIES LIST

APPENDIX E1 ABBREVIATIONS AND GLOSSARY

AONB	Area of Outstanding Natural Beauty
AoSP	Area of Special Protection
AOD	Above Ordinance Data
BAP	Biodiversity Action Plan
BAS	Biodiversity Alert Site
BBS	Breeding Bird Survey
BNG	Biodiversity Net Gain
BOA	Biodiversity Opportunity Areas
BoCC	Birds of Conservation Concern
BRC	Biological Records Centre
c.	Circa
DAFOR	The DAFOR Scale of Abundance: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare
DEFRA	Dept. for Environment, Food & Rural Affairs
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPS	European Protected Species
ES	Environmental Statement
Ha	Hectare
HAP	Habitat Action Plan
HPI	Habitat of Principal Importance
HRA	Habitat Regulations Assessment
HSI	Habitat Suitability Index
IROPI	Imperative Reasons of Overriding Public Interest
IUCN	International Union for the Conservation of Nature
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LDF	Local Development Framework
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MS	Method Statement
NBN	National Biodiversity Network
NCC	Nature Conservancy Council
NERC	Natural Environment & Rural Communities Act
NGO	Non-Governmental Organisation
NGR	National Grid Reference
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NVC	National Vegetation Classification
PEA(R)	Preliminary Ecological Appraisal (Report)
PPG	Planning Policy Guidance
PRA	Preliminary Roost Assessment
PRF	Potential Roost Feature
PSI	Potential Site of Importance
RAMs	Reasonable Avoidance Measures
RAMSAR	Wetland sites of international importance designated under the Ramsar Convention.
Retained BAS	Retained Biodiversity Alert Site
RIGS	Regionally Important Geological and Geomorphological Sites
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SANG	Suitable Alternative Green Space
SBI	Site of Biological Importance
SEA	Strategic Environmental Assessment
SINC	Site of Importance for Nature Conservation
SLINC	Site of Local Importance for Nature Conservation
SNCI	Site of Nature Conservation Interest
sp.	Species (Singular)
SPI	Species of Principal Importance
spp.	Species (Multiple)
SPA	Special Protection Area
SQE	Suitably Qualified Ecologist
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TPO	Tree Protection Order
WBS	Wintering Bird Survey
WCA (Act)	Wildlife and Countryside Act 1981
WFD	Water Framework Directive
ZoI	Zone of Influence

APPENDIX E2 GLOSSARY

Assemblage	A group of species found in the same location (CIEEM, 2016).
Biodiversity	The biological diversity of the earth's living resources. The total range of variability among systems and organisms at the following levels of organisation: bioregional, landscape, ecosystem, habitat, communities, species, populations, individuals, genes and the structural and functional relationships within and between these different levels (CIEEM, 2016).
Biodiversity Alert Site	These sites are of lesser significance on a County basis due to lower intrinsic quality, smaller size, damage or disturbance. They collectively form a significant part of the County's nature conservation resource and in some cases a valuable 'reserve series' for some of the Sites of Biological Importance
Biodiversity Opportunity Areas	Biodiversity Opportunity Areas are those identify the most important areas for wildlife conservation, where targeted conservation action will have the greatest benefit. The main aim within the BOA's is to restore biodiversity at a landscape scale through the maintenance, restoration and creation of BAP priority habitats
Buffer Zone	An area (human-made or natural) that helps to protect a habitat from damage, disturbance or pollution. It is managed to protect the 'integrity' of the valued habitat and/or the conservation status of species that it supports (CIEEM, 2016).
Compensation	Measures taken to make up for the loss of, or permanent damage to, biological resources through the provision of replacement areas. Any replacement area should be similar to or, with appropriate management, have the ability to reproduce the ecological functions and conditions of those biological resources that have been lost or damaged (CIEEM, 2016).
Commuting	The activity of flying between the roost and foraging area (Stone, 2013).
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include movements of migratory fish from feeding grounds to spawning grounds or linking areas of appropriate habitat needed by some slow colonising species if they are to spread (CIEEM, 2016).
Conservation	The protection, preservation, management or restoration of the natural environment and wildlife (Oxford Dictionary, 2016).
Dispersal	The dissemination, or scattering, of organisms over periods within a given area or over the Earth (Encyclopaedia Brittanica, 2016).
Dominant (Habitat/Species)	Denoting the predominant species in a plant (or animal) community (Oxford Dictionary, 2016).
Ecological Impact Assessment (EcIA)	Ecological Impact Assessment is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. If properly implemented it provides a scientifically defensible approach to ecosystem management (CIEEM, 2016).
Ecological Stepping Stones	Discontinuous patches of habitat and natural features that enable wildlife to disperse and migrate have sometimes been called 'stepping stones', There is a gradation between a series of 'stepping stones' and what might be thought of as a wildlife corridor (English Nature, 1993).
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Systems in which species evolve (CIEEM, 2016).
eDNA	Genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material.
Effect	This report uses the word impact rather than effect when referring to how ecological resources might be affected by a project (CIEEM, 2016).
European Protected Species	Schedule 2 lists those species of animals listed in Annex IV(a) to the Habitats Directive (Habitats Regulations) which have a natural range which includes any area in Great Britain (HMO, 2017).
Enhancement	The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage (CIEEM, 2016).
Environmental Impact Assessment (EIA)	This is an assessment carried out under the EIA Regulations (CIEEM, 2016).
European Protected Species (EPS) License	A license issued by Natural England that allows for the mitigation of impacts on a European Protected Species that would otherwise be illegal. Based on (HMO, 2016).
Fauna	The animals of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
Flora	The plants of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
Foraging	The activity of searching for food (Oxford Dictionary, 2016).

Fragmentation	The breaking up of a habitat, ecosystem or biotope into smaller parcels with a consequent impairment of functioning (CIEEM, 2016).
Habitat	A place in which a particular plant or animal lives. Often used in the wider sense referring to major assemblages of plants and animals found together (CIEEM, 2016).
Habitat of Principal Importance	Habitats identified as requiring action in the NERC Act 2006 and Local BAP and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework (Natural England, 2016).
Hibernacula	The winter quarters of a hibernating animal.
Hibernation	The condition or period of an animal or plant spending the winter in a dormant state (Oxford Dictionary, 2016).
Impact	The way in which an ecological resource/receptor is affected by a project (see effect) (CIEEM, 2016).
Invasive Species	Species introduced outside its normal distribution (HMO, 2011).
Keystone Species	A species that has a disproportionately large effect on the communities in which it occurs. Such species help to maintain local biodiversity within a community either by controlling populations of other species that would otherwise dominate the community or by providing critical resources for a wide range of species (Encyclopaedia Brittanica, 2016).
Latrine	Dung pit (Harris, et al., 1989).
LBAP Habitat	Local Biodiversity Action Plan Habitat: Habitats of Principal Importance (HPI) identified as being the most threatened, within a local area, and require conservation action under Local Biodiversity Action Plan (JNCC, 2017).
LBAP Species	Local Biodiversity Action Plan Species: Species of Principal Importance (SPI) identified as being the most threatened, within a local area, and require conservation action under Local Biodiversity Action Plan (JNCC, 2017).
Mitigation	Measures taken to avoid or reduce negative impacts. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, or timing works to avoid sensitive periods (CIEEM, 2016).
Native Species	An animal or plant species indigenous to a place (Oxford Dictionary, 2016).
Net Ecological Gain	The point at which the quality and quantity of habitats or species improves compared to their original condition, i.e. improvements over and above those required for mitigation/compensation (CIEEM, 2016).
No Net Loss	The point at which habitat or biodiversity losses equal their gains, both quantitatively and qualitatively (CIEEM, 2016).
Non-Statutory Sites	'Non-statutory' sites of nature conservation value that have been designated 'locally' (i.e. excluding SSSIs, ASSIs, SPAs, SACs, and Ramsar Sites). Local Nature Reserves are included as they are a designation made by the Local Authority not statutory country conservation agencies. These are often called Wildlife Sites, Sites of Importance for Nature Conservation or other similar names (CIEEM, 2016).
Population	A collection of individuals (plants or animals), all of the same species and in a defined geographical area (CIEEM, 2016).
Priority Habitats	Habitats that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP) and continue to be a priority under the UK-Post 2010 Framework (see Priority Species).
Priority Species	Species that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP) and continue to be a priority under the UK-Post 2010 Framework (JNCC, 2007) (see Priority Habitat).
Protected Species	A species of animal or plant which it is forbidden by law to harm or destroy (Collins English Dictionary, 2016). See also 'European Protected Species'.
Reasonable Avoidance Measures	The use of a non-licenced method statement to avoid injury or killing to protected species where an activity or the careful timing of an activity is considered highly unlikely to result in an offence (Natural England, 2015).
Receptor	Any ecological or other defined feature (e.g. human beings) that is sensitive to or has the potential to be affected by an impact (CIEEM, 2016).
Restoration	The active re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition (CIEEM, 2016).
Retained Biodiversity Alert Site	A Site which attained the level of BAS at the time of survey, which was either more than 10 years ago or has not subsequently been surveyed under current guidelines, but is considered likely to pass.
Riparian	Something related to, living on, or located at the banks of a watercourse, usually a river or stream (HMO, 2011).

Roost	A structure (either natural or man-made) where Bats congregate to rest during the day (Oxford Dictionary, 2016). Protected under the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2017 'The Habitat Regulations' (HMO, 2017).
Suitable Alternative Green Space	Places that are available for the general public to use free of charge that are accessible especially to 'target users' and where human control and activities are not intensive so that a feeling of 'naturalness' is allowed to predominate. The objective of these spaces is to reduce pressures on other sensitive designated sites (Natural England, 2010).
Sett	Any structure or place which displays signs indicating current use by a Badger (HMO, 1992). Protected under the Protection of Badgers Act 1992.
Significant Barrier	A natural or man-made obstacle that prevents the dispersal of species e.g. a major road or fast flowing river. Based on (Natural England, 2016).
Site of Biological Importance	Sites representing the best remaining examples of habitats which rate highly on the basis of; naturalness, diversity, or rarity of species or communities within a County. These sites are frequently the remnants of larger areas of semi-natural vegetation, which may not be either sufficiently extensive or undisturbed to warrant SSSI status, but are important examples of characteristic or notable vegetation types or habitat complexes, sometimes with associated dependant plant or animal species.
Species	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding (Oxford Dictionary, 2016).
Species of Principal Importance	These are the species found in England which were identified as requiring action under the NERC Act 2006 and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework (Natural England, 2016).
Statutory Sites	Statutory sites of nature conservation value that have been designated nationally (i.e. SSSI's). Also included are Sites that are designated internationally (i.e. SPA's, SAC's and Ramsar Sites). Based on (CIEEM, 2016).
Stenotopic Species	Species which are only able to tolerate a restricted range of habitats or ecological conditions (Oxford Dictionary, 2016).
Wildlife Corridor	A wildlife corridor is used to refer to linear features that are used for migration and dispersal or otherwise act to link habitats in ways that reduce the isolation of populations (English Nature, 1993).
Zone of Influence	The areas/resources that may be affected by the biophysical changes caused by activities associated with a project (CIEEM, 2016).

APPENDIX E3 FIGURE E1 – PHASE 1 HABITAT PLAN

Google™Earth Pro 2021

Legend:

- Site Boundary
- Hedgerow native species-rich
- Hedgerow species-poor
- Improved grassland
- Arable

Phase 1 Point

- TN - Target Note
- A1.3.2 - Mixed Woodland Plantation
- Low Suitability Bat Tree
- Moderate Suitability Bat Tree
- High Suitability Bat Tree

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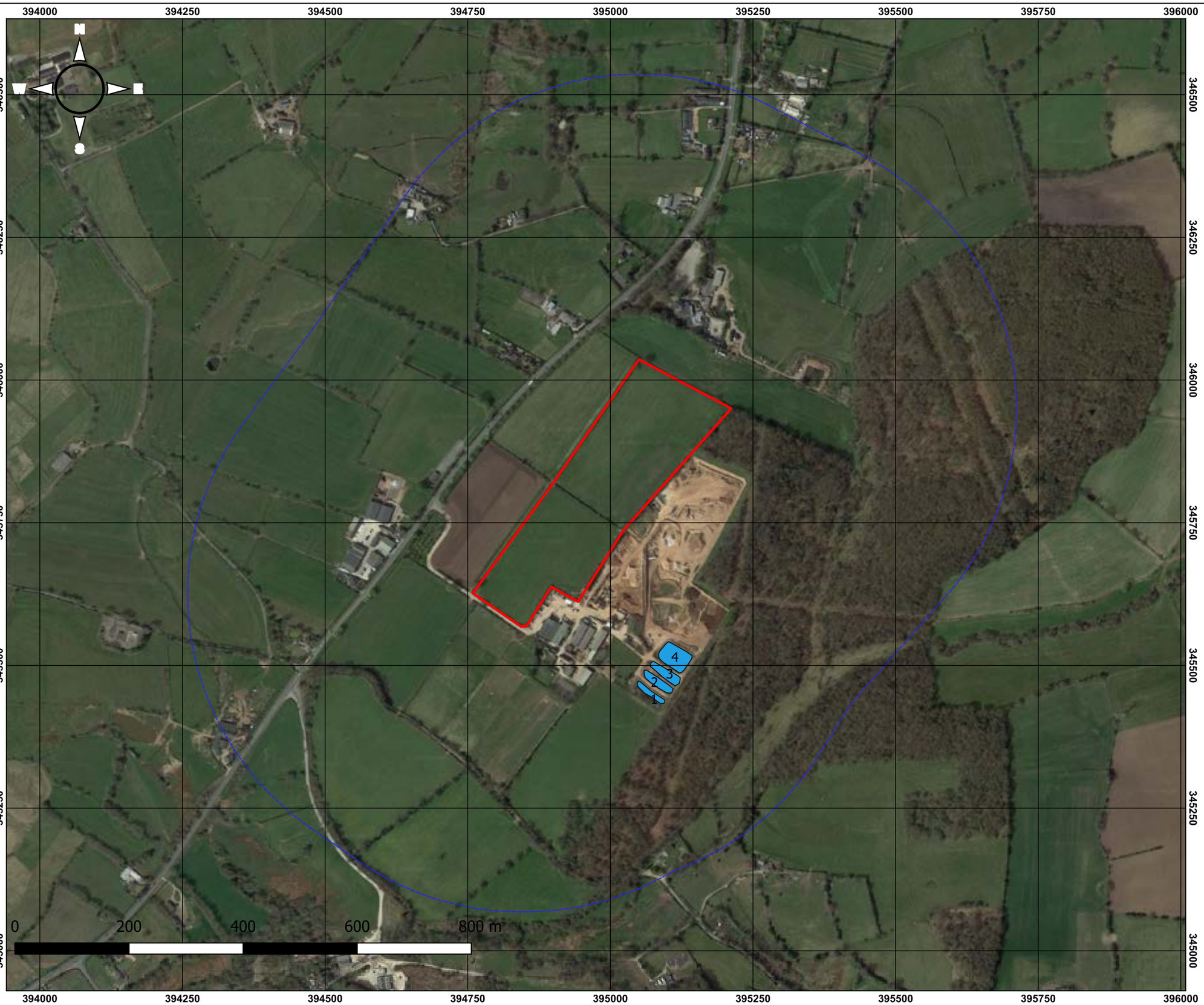
DALECRETE

Site: **The Mount**			
Drawing title: **Phase 1 Habitat Plan**			
Date: 1 / 9 / 2022	Scale: 1:500	Paper Size: A3 (420×297mm)	
Drawn by: ED	Checked by: VS	Status: Final	Final revision: -
Drawing File Ref: CE-TM-1927-QDW01-Final		Drawing No: Figure E1	

APPENDIX E4 FIGURE E2 – POND LOCATION PLAN



Google™Earth Pro 2021

Legend:

- Site Boundary
- 500m Buffer
- Ponds

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DALECRETE

Site:

Captain's Barn Quarry, Leek Road

Drawing title:

Pond Location Plan

Date:	Scale:	Paper Size:
23 / 8 / 2022	1:500	A3 (420×297mm)

Drawn by:	Checked by:	Status:	Final revision:
BM	NM	Final	-

Drawing File Ref:	Drawing No:
CE-TM-1927-QDW01-Final	Figure E2

APPENDIX E5 FULL FLORAL SPECIES LIST

Poor-Semi Improved Grassland	
Common Name	**Scientific Name**
Creeping Buttercup	*Ranunculus repens*
Broad-leaved Dock	*Rumex obtusifolius*
Daisy	*Bellis perennis*
Dandelion sp.	*Taraxacum agg.*
Perennial Rye-grass	*Lolium perenne*
Red Clover	*Trifolium pratense*
Ribwort Plantain	*Plantago lanceolata*
Yorkshire Fog	*Holcus lanatus*

Hedgerow	
Common Name	**Scientific Name**
Alder	*Alnus glutinosa*
Apple	*Malus sp.*
Ash	*Fraxinus excelsior*
Blackthorn	*Prunus spinosa*
Elder	*Sambucus nigra*
Gorse	*Ulex europaeus*
Hawthorn	*Crataegus monogyna*
Holly	*Ilex aquifolium*
Pedunculate Oak	*Quercus robur*
Rowan	*Sorbus aucuparia*
Silver Birch	*Betula bendula*
Sycamore	*Acer pseudoplatanus*

Scattered Trees	
Common Name	**Scientific Name**
Ash	*Fraxinus excelsior*
Sycamore	*Acer pseudoplatanus*

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DALECRETE

Environmental Statement: Appendix 7 Ecological Impact Assessment for

Proposed Quarry Extension at Captains Barn Farm Quarry, Leek Road, Western Coyney, Staffordshire, ST3 5BE

Report Reference: CE-CB-1780-Appendix 7 - FINAL

Produced by Crestwood Environmental Ltd.

21 November 2022

Crestwood Report Reference: CE-CB-1780-Appendix 7 - FINAL:

Version & Status	Date Produced	Written / Updated by:	Checked & Authorised by:
Draft v1.0	24/10/2022	Sarah Cruickshank (Senior Ecologist)	Nick Masters (Associate Director- Ecology)
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Introduction

Outline of the Proposed Development

1.1.1 An Ecological Impact Assessment relating to the Proposed Western Extension area ('the Site') has been prepared by Crestwood Environmental Ltd. The findings of the Ecological Assessment are considered below.

1.1.2 This chapter of the ES sets out an assessment of the potential significant effects on biodiversity (flora and fauna) as a result of the proposed western extension at Captains Barn Farm Quarry, Leek Road, Staffordshire, ST3 5BE – centred at National Grid Reference (NGR) SJ 9497 4579.

Site Location and Development Proposals

1.1.3 The Site is located approximately 6.5km to the east of Stoke on Trent city centre on ground rising centrally on the east side of the A520 Leek Road and comprises one arable field and one improved grassland field. The existing quarry is accessed via a lane which passes the proposed extension area along the southern boundary with Captains Barn Farm, from which the Site takes its name, located on the southern corner of the Site. The Site is bounded by arable fields along the western and northern boundaries with the existing quarry bounding the Site to the east.

1.1.4 The following is understood to form part of the Proposed Development:

- The extension of the existing quarry into the Site will be split into two phases (Phase 4 and Phase 5).
- The Phases will be split vertically, to ensure uptake of both sand and gravel (as a geographic divide of resource across the Site has been identified as part of borehole investigations) over both Phases:
    - *Phase 4: will comprise the eastern extent of the Site; and*
    - *Phase 5: will comprise the western extent of the Site.*

1.1.5 Mineral extraction from the existing quarry (Phase 1 and Phase 2) will cease first, followed by the proposed extension (Phase 4 and then Phase 5) in a westerly direction . The permitted Phase 3 will be worked last for operational reasons, namely the lack of gravel in Phase 3.

1.1.6 The existing plant site area will remain in place and will be utilised for all Phases of the existing mineral extraction operations, as well as the proposed extension area.

1.1.7 Proposed restoration includes a return to agricultural fields and tree planting along woodland edges. The restoration of the Site post-development will improve the existing baseline habitat via habitat enhancement.

1.1.8 In addition to the re-instatement and associated enhancement of habitats as part of proposed restoration, pre-application planting has been undertaken immediately adjacent to the western Site boundary by the Client, comprised of a circa 5m wide corridor of native trees. It is considered that these trees will mature over the course of the Proposed Development and will complement the habitats at the Site post-restoration, as well as the proximal Creswell's Piece LWS, and increase ecological connectivity. In addition, the planned off-site nature conservation area, not part of the application, comprising shallow ponds, tree planting and wildflower meadow will provide an additional corridor to connect Creswell's Piece LWS with the River Blythe.

The Purpose of the ES Chapter

1.1.9 This chapter reports the assessment of the likely significant effects of the development within the Proposed Extension area in Terms of Ecology. It presents an Ecological Impact Assessment (EIA) following the Guidelines for EIA published by the Chartered Institute of Ecology and Environmental Management (CIEEM 2016).

1.1.10 This chapter is supported by the following reports:

- Preliminary Ecological Appraisal Report;
- Great Crested Newt eDNA Survey Report;
- Breeding Bird Survey Report;
- Bat Activity Survey Report;
- Badger Monitoring Report;
- Reasonable Avoidance Measures Method Statement; and
- Ecological Impact Assessment (EcIA).

.2 Policy Context

1.2.1 A brief overview of the planning policies relevant to this EIA chapter in relation to ecology is provided below.

National Planning Policy

1.2.2 The following legislation is considered relevant to the Proposed Works:

- National Planning Policy Framework ('**NPPF**') (HMSO, 2021). NPPF 15. Conserving and Enhancing the Natural Environment, Paragraphs 174-188.

1.2.3 The National Planning Policy Framework ('NPPF') (2021) provides a framework within which local people and their accountable councils can produce their own local and neighbourhood plans, which reflect the needs and priorities of their communities, with the responsibility on planning authorities to ensure that policies and decision making contribute to and enhance the natural and local environment.

1.2.4 Chapter 15 of the NPPF seeks to ensure local planning authorities design and enforce appropriate planning policies to conserve and protect the natural environment from new development.

- UK Biodiversity Action Plan ('**UKBAP**')

1.2.5 The UK Biodiversity Action Plan organised to fulfil the Convention on Biological Diversity in 1992, to which the UK is a signatory, has produced a national priority list of habitats and species for which Habitat and Species Action Plans have been prepared. Regional and local BAPs, in this case the Staffordshire Biodiversity Action Plan have also been organised to develop plans for species of nature conservation importance at regional and local levels.

Local Planning Policy

1.2.6 The following legislation is considered relevant to the Proposed Works in respect to ecology:

- Staffordshire Moorlands Local Plan (Adopted September 2020) (Staffordshire Moorlands Distrct Council , 2020)

- **Policy NE1:** Biodiversity and Geological Resources; and,
- **Policy NE2**: Trees, Woodland and Hedgerows

- The Minerals Local Plan for Staffordshire (2015- 2030) (Staffordshire County Council, 2017)
  - Policy 4: Minimising the Impact of Mineral Development; and
  - Policy 6: Restoration of Mineral Sites.

Policy NE1: Biodiversity and Geological Resources:
The biodiversity and geological resources of the district and neighbouring areas will be conserved and enhanced by positive management and strict control of development (and having regard to relevant ecological evidence) by:

1. By ensuring all development schemes have regard to the surveys and actions recommended by the Council's Extended Phase 1 Habitat Surveys and Local Wildlife Assessment and include measures for protection and enhancement of site biodiversity and protection of any geodiversity as appropriate.

2. Resisting any proposed development that could have an adverse effect on the integrity of an international site (or successor designation) alone or in combination with other plans or projects unless it can be demonstrated that the legislative provisions to protect such sites can be fully met. Any development with a potential to adversely affect a European site/s through construction activities should ensure that Ciria construction guidelines are followed including environmental good practice on control of dust and water pollution.

3. The Council will not normally permit any development proposal which would directly or indirectly (either individually or in combination with other developments) have an adverse effect on a Site of Special Scientific Interest. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest.

4. Conserving and enhancing regional and locally designated sites. The Council will not permit any development proposal which would directly or indirectly result in

significant harm to geological and biodiversity conservation interests, unless it can be demonstrated that:

a) there is no appropriate alternative site available; and

b) all statutory and regulatory requirements relating to any such proposal have been satisfied; and

c) appropriate conservation and mitigation measures are provided; or if it is demonstrated that this is not possible

d) the need for, and benefit of, the development is demonstrated to clearly outweigh the need to safeguard the intrinsic nature conservation value of the site and compensatory measures are implemented.

5. Expecting all development where possible seeks to deliver a net gain in biodiversity proportionate to the size and scale of the development. In circumstances where adverse impacts are demonstrated to be unavoidable, developers will be required to ensure that impacts are appropriately mitigated, with suitable compensation measures towards loss of habitat used only as a last resort where there is no alternative. Where any mitigation and compensation measures are required, they should be appropriately scheduled and managed according to the nature, size and scale of the development so as to minimise impacts that may disturb protected or important habitats and species.

6. Supporting opportunities to improve site management and increase public access to wildlife sites including supporting the objectives of the Staffordshire County Council Rights of Way Improvement Plan.

7. Ensuring development promotes the appropriate maintenance, enhancement, restoration and/or re-creation of biodiversity through its proposed nature, scale, location and design. The Staffordshire Moorlands Biodiversity Opportunity Map, in conjunction with the Staffordshire Biodiversity Action Plan, will be used to guide biodiversity enhancement measures to be included in development proposals as appropriate to the nature and scale of development proposed and other environmental interest, in particular supporting opportunities to increase grassland and heathland habitats including supporting targets in the UK and Staffordshire Biodiversity Action Plan.

8. Protecting and enhancing habitats and species of principal importance for the conservation of biodiversity as identified in legislation, and recognising and implementing appropriate measures, including landscape-scale conservation management, to take account of the fact that the distribution of habitats and species will be affected by climate change.

9. Recognising the value of the natural environment for sport and leisure activities and the need to manage such activities to ensure there is no conflict.

10. Ensuring the provision and protection of green infrastructure networks in line with Policy C3.

Policy NE2: Trees, Woodland and Hedgerows

The Council will protect existing trees, woodlands and hedgerows, in particular, ancient woodland, veteran trees and ancient or species-rich hedgerows from loss or deterioration. This will be achieved by:

- Requiring that existing woodlands, healthy trees and hedgerows be retained and integrated within a proposed development unless the need for, and benefits of, the development clearly outweigh their loss;

- Requiring new developments to provide tree cover that secures a proficient level of sustainability through tree retention, planting and soft landscaping, including where possible the on-site replacement of any trees that are removed with sufficient tree planting to replace or increase the canopy cover on-site as appropriate. Landscaping schemes will also be required to mitigate against negative landscape impact and complement the design of new development and make provision for future maintenance. Where it is not possible to secure this new or replacement tree planting within the site, the Council will work with applicants to ascertain if a suitable site(s) can be found off-site for replacement planting in the locality;

- Resisting development that would directly or indirectly damage existing ancient woodland, veteran trees and ancient or species-rich hedgerows.

The Council will refer to its adopted Tree Strategy in the consideration of proposals; and will in general seek to retain as many trees and as much hedgerow on site as possible.

Policy 4: Minimising the impact of mineral development: The environmental considerations 4.1 In assessing the impact of proposals for mineral development on people, local communities and the environment, where relevant, the following environmental considerations will be taken in to account:

a) Noise;

b) Air quality;

c) Visual amenity, including the effects of light pollution;

d) Vibration from blasting operations;

e) Traffic on the highway network;

f) Public rights of way and public open space;

g) Green Belt;

h) The countryside;

i) Landscape, having regard to the relative importance of the Cannock Chase Area of Outstanding Natural Beauty, the Peak District National Park together with their settings, and any locally designated areas; and having regard to the County Council's landscape character assessment 'Planning for Landscape Change;' to ensure that proposals protect and enhance valued landscapes and are informed by and sympathetic to landscape character.

j) Natural environment, having regard to maintaining the integrity of international sites and the relative importance of national and locally designated sites, habitats and species of principal importance for biodiversity and features of geodiversity interest; and having regard to the national biodiversity strategy and the Staffordshire Biodiversity Action Plan, ecological networks, green infrastructure and the Staffordshire Geodiversity Action Plan; to ensure that proposals conserve and enhance the natural environment and where possible enhancement of ecological networks and green infrastructure;

k) Historic environment, having regard to the relative importance of designated and non-designated heritage assets and their settings, the potential for previously unrecorded archaeological remains; and having regard to the

Staffordshire Historic Environment Record, the Staffordshire Historic Landscape Characterisation and the Aggregates and Archaeology in Staffordshire to ensure that the proposals protect and conserve the historic environment;

l) Agricultural land, having regard to safeguarding the long-term potential of best and most versatile agricultural land and conserving soil resources as well as preventing soil pollution;

m) Stability of land, including tips, quarry slopes, backfilled land and mining subsidence;

n) Water environment, having regard to the flow and quantity of surface and ground water, managing flood risk and water quality; and having regard to the ability of impacted watercourses to meet the required ecological status under the relevant River Basin Management Plan; to ensure that proposals avoid increasing vulnerability to impacts arising from climate change and prevent contributing to unacceptable risks from water pollution.

o) Land contamination; and,

p) Cumulative effects from a single site, or from a series of sites in a locality.

Where unacceptable adverse effects cannot be avoided, adequate mitigation should be demonstrated. As a last resort, where unacceptable adverse effects cannot be avoided or adequately mitigated, compensatory measures will be considered.

Overall assessment

Having assessed the impacts of the proposals for mineral development and the mitigation and/ or compensatory measures, permission will only be granted where it has been demonstrated that there are no unacceptable adverse impacts on human health, general amenity and the natural and historic environment, or the material planning benefits of the proposals outweigh the material planning objections.

Liaison with the local communities

Mineral operators will be encouraged to liaise with local communities when preparing new proposals and throughout the period of working and restoration of mineral sites. Higher environmental standards

Mineral operators will be encouraged to introduce higher environmental standards of working, restoration and aftercare. Ancillary development

Proposals for ancillary development within or near to a mineral site will be assessed in accordance with this policy and where planning permission is granted, it will be limited to the duration of the mineral site.

Policy 6: Restoration of Mineral Sites

Restoration requirements

Proposals for the restoration of mineral sites will only be supported where it has been demonstrated that they accord with the plan policies, including Policy 4.

Proposals for the restoration of mineral sites, including the review of restoration strategies/ plans will only be supported where it has been demonstrated that the proposals are sufficiently comprehensive, detailed, practicable and achievable within the proposed timescales and where relevant, that:

a) the land affected at any one time would be minimised by including phased working and restoration;

b) the amount of imported backfill would be the minimum necessary to achieve the satisfactory restoration of the site;

c) sufficient backfill materials are likely to be available to restore the site within an acceptable timescale;

d) the long-term potential of best and most versatile agricultural land would be safeguarded, and the soil resources would be conserved;

e) the flood risk would not be increased and opportunities to reduce flooding would be maximised;

f) the restoration enhances the natural environment and net gains in biodiversity would be achieved by contributing to the delivery of local ecological networks; by preserving, restoring, re-creating and joining up habitats of principal importance and enhancing ecological networks; by protecting and supporting populations of species of principal importance; and, by contributing to the national Biodiversity Strategy, the Staffordshire Biodiversity Action Plan and relevant landscape scale initiatives.

g) the restoration enhances valued landscapes, the setting of heritage assets and is informed by and sympathetic to landscape character (including heritage assets and the historic landscape character);

h) the aftercare provision would be sufficient to secure high quality and sustainable restoration of the site; and,

i) opportunities to increase the provision of public access, public open space, recreational and sporting facilities would be maximised, particularly where the

proposals would contribute towards development plan policies and proposals, or other local initiatives;

j) proposals support the Water Framework Directive objectives by improving river geomorphology and wetland habitat complexity.

Regular review of the restoration strategies / plans

Developers will be required to regularly review their restoration strategy / plan at least every 10 years to ensure that it is up to date having regard to Policy 6.2 above.

Financial Guarantees

In exceptional circumstances, developers will be required to demonstrate that adequate financial provision has been made to fulfil the restoration and aftercare requirements when proposals are submitted:

a) for a new mineral site; or,

b) to change the working, restoration and aftercare of an existing site, particularly when the proposals involve a change to the ownership or control of the site, or part thereof.

Adequate financial provision will also include the security of a Restoration Guarantee Bond or other financial guarantee to cover all or part of the restoration and aftercare costs.

Overall assessment

Having assessed the restoration proposals, permission will only be granted where it has been demonstrated that:

a) the restoration proposals are sufficiently comprehensive, detailed, practicable and achievable within the proposed timescales; and,

b) the material planning benefits of the restoration proposals outweigh the material planning objections.

1.2.7 The Minerals Plan for Staffordshire covers the period 2015 to 2030. The plan covers the geographical county of Staffordshire and sets out its strategic priorities for minerals development through its vision and objectives. It includes strategic policies to address those priorities, including policies to enable the supply of important minerals and, where necessary, it identifies specific sites for mineral working. The plan also includes a set of non-strategic development management policies aimed at avoiding, minimising and mitigating the adverse impacts of minerals development.

International Sites

1.2.8 The most important sites for biodiversity are those identified through international conventions and European Directives. Statutory sites are those designated or classified under international conventions or European legislation for biodiversity, for example:

- World Heritage Sites,
- Biosphere Reserves,
- Wetlands of International Importance (Ramsar sites),
- Special Areas of Conservation (SAC),
- Special Protection Areas (SPA),
- Candidate/proposed SAC,
- Proposed SPA,
- Proposed Ramsar sites.

National Sites

1.2.9 Sites recognised for their nature conservation importance receive 'Statutory Protection;' this means that it receives protection by means of national legislation in recognition of its biodiversity and/or geological value, for example:

- Sites of Special Scientific Interest (England, Wales, Scotland),
- Areas of Special Scientific Interest (Northern Ireland),
- Marine Conservation Zones (England, Wales, Northern Ireland), Nature Conservation Marine Protected Areas (Scotland)**,
- Natural Heritage Areas (Ireland),
- National Nature Reserves (UK),
- Nature Reserves (Ireland),
- Refuges for Fauna (Ireland),

- Wildfowl Sanctuaries (Ireland),
- Local Nature Reserves (UK).

Local and Regional Sites

1.2.10 These local and regional Sites are recognised for their importance they hold for wildlife and although may not be granted the same protection as national and international sites and potential impact on these sites will be considered within the assessment. The local and regional Sites include:

- Local Wildlife Sites are sites with 'substantive nature conservation value'. They are defined areas, identified and selected for their nature conservation value, based on important, distinctive and threatened habitats and species with a national, region.
- Potential Local Wildlife Sites, are sites that have been identified as having nature conservation interest but have not been fully assessed against the Wildlife Site Selection Guidelines
- Staffordshire Wildlife Trust nature reserves are sites that are managed and protected by the Staffordshire Wildlife Trust
- Grade 3 sites are those Sites that have some ecological interests however do not warrant inclusion within the Local Wildlife Site system.

Species Protection

1.2.11 Many individual species receive statutory protection under a variety of legislative provisions. Others have been identified as requiring conservation action as UK BAP priority species.

1.2.12 The NPPF states that local plans should promote the protection and recovery of priority species populations and take measures to protect the habitats of these species from further decline through local policies in development documents. Planning authorities should consider the potential effects of development on these species, and prevent adverse impact where possible, by using planning conditions or obligations. Planning authorities should refuse permission where harm to the species or their habitats will result unless there are wholly exceptional reasons.

1.2.13 The Staffordshire Biodiversity Action Plan for Species and Habitats focuses on the following Key species and Habitats:

Habitats

Lowland wood pasture and parkland	Lowland heathland
Native woodland	Lowland wet grassland
Wet woodland	Unimproved neutral grassland
Ancient / diverse hedgerows	Inland saltmarsh
Arable field margins	Mosses
Lowland acid grassland	Ponds, lakes and canals
Lowland calcareous grassland	Reedbeds
Rivers and streams	

Species

Brown hare	Lapwing
Noctule bat	Nightjar
Otter	Skylark
Pipistrelle bat	Snipe
Water vole	Woodlark
Barn owl	Atlantic salmon
Farmland seed-eating birds	Grass snake
Grey partridge	Great crested newt
Natterjack toad	Dyer's greenweed
Bog bush-cricket	Hybrid bilberry
Ground nesting solitary bees and wasps	Floating water-plantain
Small pearl-bordered fritillary	Grass wrack pondweed
White faced darter	Native black poplar
White-clawed crayfish	Pink meadow cap

The Staffordshire Biodiversity Action Plan (SBAP) focuses conservation efforts on the areas within the county that will result in the greatest benefit for ecological networks, habitats and species.

By replacing Habitat and Species Action Plans with 14 "Ecosystem Action Plans" (EAPs) and one Rivers Action Plan, the SBAP aims to prioritise conservation management at a landscape level and contribute to local, regional and national conservation targets. The individual EAP's include

Cannock Chase heaths	Species rich farmland
Central farmland	Urban
Central heaths and woods	Wooded quarter
Churnet woodlands	Rivers, canals and streams
Limestone	Needwood woods and parkland
Meres and mosses	River gravels
Moorland	Southern heaths
Southern Parklands	

The Site falls within the EAP of Species-rich farmland. The primary habitat objectives within the area are the maintenance, restoration and expansion of Species-rich Grasslands, particularly Lowland Meadows and also Upland and Lowland Heathland.

The other objective in the area is to increase connectivity of semi-natural habitats to create larger habitat complexes using priority habitats where-ever possible.

Key Ecological Legislation and Regulations

1.2.14 The ecological assessment has been undertaken within the context of relevant planning policies and guidance documents. The legal protects that applies to relevant bird, mammal, herpetofauna and invertebrate species and nature conservation planning policy includes:

- **Wildlife and Countryside Act 1981 (as amended)**: The primary piece of legislation that protects animals, plants and habitats in the UK;
- **The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ('the Habitat Regulations'):** Regulations to allocate, and safeguard, European designated sites and species;
- **Protection of Badgers Act 1992**: Legislation to protect badgers, and their setts, from injury, killing and disturbance *et al*;
- **Wild Mammals Protection Act 1997**: Legislation which protects the welfare of all species of wild mammal in the UK;
- **Natural Environment and Rural Communities (NERC) Act 2006**: The amalgamation of various environmental governing bodies to form Natural England, giving the importance of protecting biodiversity a legal basis; and
- **Hedgerow Regulations 1997**: Regulations to protect 'Important' hedgerows from removal.

9.2 Methodology

Data Collection Methodology

1.2.15 Crestwood Environmental Ltd. undertook a Preliminary Ecological Appraisal (PEA) including an Extended Phase 1 habitat survey of the area within the Proposed Western Extension to be quarried in May 2020. A site verification check following extended Phase 1 habitat survey methodology was then completed for the Site in July 2022 to assess the habitats and suitability for protected species since the original PEA survey.

1.2.16 The methodology for the Extended Phase 1 Habitat Surveys was based on guidelines provided by JNCC (JNCC 2010,) and CIEEM (CIEEM, 2017). During the survey visits, habitat types and signs of protected or notable species were recorded and mapped using specific standard mapping colours and target notes. The presence of any protected / notable species was also recorded. Due to the absence of botanically important habitats, no phase 2 botanical surveys were undertaken.

Collation of Baseline Data and Biological Records

1.2.17 The following desk-based studies were undertaken as part of the phase 1:

- A search for existing records of protected species, species of conservation concern and non-native / invasive species within a 2km radius of the Proposed Western Extension; alongside information on locally designated sites from The Staffordshire Wildlife Trust (Staffordshire Wildlife Trust, 2020).
- A search of online mapping resources (including ponds, watercourses and connectivity to woodland, scrub, and hedgerow networks) in the wider landscape around the Proposed Western Extension; and
- Search of the Multi-Agency Geographic Information for the Countryside (MAGIC) website for international and nationally designated Sites and notable habitats both within 2km of the Proposed Western Extension.

1.2.18 Based on the findings of these assessments the following protected species surveys were recommended:

- GCN eDNA surveys;

- Bat emergence / re-entry surveys;
- Bat activity surveys, including transect and automatic surveys; and
- Breeding bird surveys;

1.2.19 An overview of survey methods for each protected species are provided below. Further details can be found in the accompanying species survey reports.

Great crested newts

- A HSI was conducted on ponds on site and within 500m of the Proposed Western Extension to assess suitability for great crested newt (*Tritarus cristatus*), in line with published methods (Oldham, et al., 2000). Factors such as pond area, water quality and macrophyte coverage are assessed and assigned a value between 0 and 1 (0 indicating an unsuitable habitat and 1 indicating optimum habitat).
- Six ponds were identified from aerial mapping as being on or within 500 m of the Proposed Western Extension. One of these were dry at the time of survey and four other ponds within Site were scoped out as being unsuitable, leaving one pond (P5) to survey through the use of Environmental DNA Analysis (eDNA).
- In accordance with good practice guidelines (DEFRA, 2014), 20 water samples were taken from the margins of the waterbodies included in the eDNA survey (where accessible) by an appropriately experienced and licensed surveyor using the correct methodology and equipment. The samples were taken during the optimum survey period of 15th April - 30th June (in accordance with recognised protocol (Natural England, 2015)) on the 26th of June 2020,

Badger survey

- A survey for badger (*Meles meles*) was carried out during the PEA following recognised guidance (Harris, et al., 1989). All suitable habitats within the Proposed Western Extension, plus 30m outside of the boundary, where accessible, were surveyed for evidence of badger activity, and specifically for the presence of setts. Field signs searched for included well-used, partially used or disused setts, badger pathways, latrines, hair, discolouring of and damage to fencing, signs of foraging and feeding remains.

Bats – natural roost features

- No buildings were present on Site.
- All trees within the Proposed Extension were inspected from ground level, recording any evidence of bat roosts, droppings, staining, scratch marks and feeding remains, or any Potential Roost Features (PRF) within the trees themselves in accordance with industry-standard best practice (Collins, 2016).
- Signs of occupation by bats (including droppings, scratch marks and urine stains) were searched for externally based on the results of the inspection, trees were categorised for their potential suitability for roosting bats.
- Three trees were recorded to support PRFs and were categorised as having varying levels of suitability for roosting bats.
- One tree due to be removed (T1) was considered to have Moderate suitability. and was subject to two surveys in 2020. No bats were observed emerging, and the tree was soft felled on 14th April 2021 under the supervision of a bat licenced ecologist. No bats were noted during the felling works.
- All other trees with bat roosting potential are to be retained as part of the Proposed Works.

Bat activity surveys – walked transects

- In line with current guidance relating to sites of Low suitability, a total of three surveys were undertaken comprising of a single walked transect/spot count survey per season (spring: April/May, summer: June/July/August and autumn: September/October).
- The transect routes covered all habitats likely to be impacted by the Proposed Works, with particular focus on the higher quality habitats present, such as field margins and hedgerows within the Proposed Western Extension.
- During the transect, a number of spot/point counts were carried out within key habitats within the area of the Proposed Extension. These involved surveyors remaining stationary at 10 points along the walked transects where features of higher habitat quality for bats were found. The locations of the points were determined during the extended Phase 1 habitat survey.

Bat activity surveys – automated static bat detecting

- In line with best practice for habitat of Low suitability, automated bat detectors (AnaBat Express) were installed within the area of the Proposed Western Extension at a specific location per transect, which recorded activity on five consecutive nights per season.

Breeding bird surveys

- Breeding bird surveys were completed during Spring/Summer 2020 and consisted of three surveys consisting of walked transects and territory mapping, between and June. Each of the survey visits were separated by at least two weeks and surveys started within 1 hour of sunrise and recorded the number and species of birds present within the Proposed Extension site boundary.

Limitations of the Assessment

1.2.20 The following limitations within the data collection helps to understand an uncertainty within the assessment. The following limitations relate to the survey methods used, data availability and any deviations from standard practise:

- Typical and notable plant and invasive non-native species are recorded for different habitat types and reflect the conditions at the time of survey. This is not intended to be a detailed inventory of the plant species present in the survey area, as this is not required for the purposes of Phase 1 habitat survey.

- The number of ponds present in the local area was found using various mapping information; there is the potential for some ponds (particularly smaller/newly created ponds) to have not been identified during the desk study due to outdated mapping data, ponds being newly created etc. and therefore may not have been assessed for their suitability for great crested newt

<u>Assessment Methodology</u>

Evaluation of Ecological Receptors

1.2.21 When assessing the importance of species and habitats, relevant protection is considered, such as those of national value (i.e., Sites of Species Scientific Importance) and those listed within the Biodiversity Action Plans or identified as species and habitats of Principal Importance. Assessment has also been based on professional experience.

1.2.22 Ecological features are defined as:

- Statutorily protected (Natura 2000 sites, National Nature Reserve, Sites of Special Scientific Interest and Local Nature Reserves) or locally designated (e.g., Sites of Importance for Nature Conservation/County Wildlife Sites) sites and features;
- Sites and features of biodiversity value not designated in this way, e.g., areas listed on published inventories of priority biodiversity habitats (e.g., ancient woodland inventory, lowland grassland inventory) or areas of habitats subject to UK or Local Biodiversity Action Plan targets; and
- Species of biodiversity value or other significance, including those protected and controlled by law.

1.2.23 Various characteristics can contribute to the importance of ecological features. All species and their populations can be given a biodiversity value. This value can be determined from considerations set out by CIEEM Ecological Impact Assessment Guidelines (CIEEM, 2018) which include:

- Naturalness;
- animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- ecosystems and their component parts, which provide the habitats required by important species;
- populations and/or assemblages;
- endemic species or locally distinct sub-populations of a species;

- habitats that are rare or uncommon;
- habitats that are effectively irreplaceable;
- habitat diversity;
- size of habitat or species population;
- habitat connectivity and/or synergistic associations;
- habitats and species in decline;
- rich assemblages of plants and animals;
- large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and,
- species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

1.2.24 Separate evaluations are given to designated sites, non-designated sites, features and species where appropriate

1.2.25 The importance of an ecological feature should be defined within a geographical context such as international and European, National, Regional and local scales.

1.2.26 An evaluation of the above ecological features has been based upon the relevant CIEEM guidelines.

Zone of Influence

1.2.27 The proposed works has the potential to impact upon ecological receptors outside of the Proposed Extension boundary; this area is known as the Zone of Influence ('ZOI'). The ZOI is determined by the source/type of impact, potential pathways for that impact and the location/sensitivity of the ecological receptor. For the majority of (unmitigated) impacts, the ZOI is generally considered to be the Site and immediately adjacent areas.

1.2.28 The ZOI can vary for different ecological receptors. Factors that influence the ZOI include the mobility of the receptor and dispersal barriers (i.e., motorways or rivers) that may affect movement of the receptor.

1.2.29 The ZOI for ecological receptors at the Proposed Western Extension have been assessed and are defined in Table 1 below:

Table 1: ZOI of Ecological Receptors

Ecological Feature	ZOI
Plants (including invasive non-native species)	Site and immediately adjacent habitats
Great crested newts and other amphibians	500m
Reptiles	1km
Badger	30m
Bats	2km
Otter and water vole	50m
Other mammals	30m
Birds	2km
Aquatic and terrestrial invertebrates	Site and immediately adjacent habitats.
Fish	Dependent on species and geographical range.

Impact Assessment

1.2.30 The assessment of ecological impacts follows the process as described by CIEEM guidance, which is summarised as:

- To determine the values of the ecological features and resources affected, by completing surveys and / or research and assess the impacts that affect key features and resources;
- Identify any significant impacts in the absence of any mitigation;
- Identify measures that can be taken to reduce those adverse impacts;
- Demonstrate the likely success of mitigation measures;
- Identify opportunities for enhancement; and,
- Produce a clear summary of the significant residual impacts of the proposal incorporating all of the mitigation and enhancement measures.

Characterising Ecological Impacts

1.2.31 Once the ecological features have been identified and their value defined, a decision is made as to whether the proposed development is likely to result in impacts upon each of the identified features. And, if appropriate, the nature of those impacts. Each potential ecological impact has a number of characteristics that must be described before effect significance is assessed. These include extent, positive or negative impacts, magnitude, duration, timing, frequency, and reversibility. Direct, indirect and cumulative impacts will also be considered. The key considerations when characterising ecological impacts are described further in Table 2 below.

Table 2: Key Considerations when Characterising Impacts

Descriptor	Definition
Positive or negative	A positive or negative impact that either improved or reduces the quality of the environment.
Extent	The spatial or geographical area over which the impact / effect may occur.
Magnitude	Magnitude refers to size, amount, intensity and volume and should be quantified if possible.
Duration	The time something taken in relation to ecological characteristics (such as the lifecycle of a species)
Frequency and timing	The number of times an activity occurs will influence the resulting effect.
Reversibility	Whether or not the effect can be reversed in an appropriate ecological timescale.

Magnitude of Impacts

1.2.32 To fully evaluate the effects of the predicted impacts upon ecological receptors it is necessary to assess the magnitude of those impacted. The magnitude of an impact has been assessed by the following criteria:

Table 3: Criteria for Assessing the Magnitude of Impacts

Magnitude of Impact	Criteria
Major negative	A change that is likely to cause permanent adverse effects upon the ecological receptor and/ or its conservation status.
Negative	A change that impacts adversely on the ecological receptor and / or its conservation status, although this change may not be permanent and may be limited in extent.
Neutral	No effect on the ecology receptor and/ or its conservation status.
Positive	A change likely to benefit the ecological receptor and / or its conservation status its conservation status. Changes may not be immediately noticeable.
Major positive	A change is likely to benefit and restore an ecological receptor.

Significance of Impacts

1.2.33 Within the CIEEM Guidelines a significant effect is considered to be an effect that supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general. Effects can be considered significant at a wide range of scales from international to local.

1.2.34 The significance of ecological impacts has been assessed by the following criteria:

- The number of ecological features affected and their 'value,' which will consider the scale of an effect (i.e., whether it is local or regional);
- The reversibility and duration of the effect;
- The type and sensitivity of the ecological feature affected; and
- The type of effect.

Mitigation Hierarchy

1.2.35 Where possible any significant ecological effects will be avoided through careful design of the proposed development and the following mitigation hierarchy will be applied:

- Avoidance – seek options that will avoid any harm to ecological features
- Mitigation – steps should be taken to avoid or minimise any negative impact on ecological receptors. This can be achieved through careful design and planning or putting in place measure that can be guaranteed.
- Compensation – Where there are significant adverse ecological effects that are unavoidable, these should be offset by appropriate compensation measures.
- Enhancements - The proposed development and design should seek to provide net benefits for biodiversity at the Proposed Western Extension area, over and above requirements for avoidance, mitigation and compensation.

1.2.36 Where the avoidance of impacts or effects is not possible, the proposed development will include suitable not significant. mitigation that will be implemented to ensure that the residual effects from the works are

Cumulative Impacts

1.2.37 Cumulative effects may result from individually insignificant but collectively significant impacts. These effects may occur over an extended period of time or concentrated within a location. Different type or actions can cause cumulative impacts, these have been defined by CIEEM as:

- Additive/incremental - multiple activities/projects (each with potentially insignificant effects) added together to give rise to a significant effect due to their proximity in time and space. The effect may be additive (1+1 = 2) or synergistic (1+1 = 3).
- Associated/connected - a development activity enables another development activity e.g., phased development as part of separate planning applications. Associated developments may include various aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the project as a whole and not ignore impacts that fall under a separate consent process.

Residual Impacts

1.2.38 Where mitigation measures do not address all aspect of the predicted impacts then residual impacts will occur. Therefore, further procedures may be required to provide compensation where impacts cannot be prevented by mitigation.

1.2.39 Following the implementation of all the mitigation and compensation measures if residual impacts occur; the impact of these residual impacts will be assessed as follows:

- The impact on biological resources, such as individual ecological features in terms of both individuals and a population as a whole, these will include cumulative and in-combination impacts.
- Consequences in terms of both national and local nature conservation planning policy; and,
- Any legal requirements relating to protected species and designated Sites.

Baseline Conditions

Designated Sites

1.2.40 The Preliminary Ecological Appraisal completed by Crestwood (2020) contains the findings of the desk study in respect to ecologically designated sites.

1.2.41 There are no statutory sites within 2km radius of the Proposed Extension. There are six non-statutory sites within 2km, detailed in Table 4 below.

Table 4: A Summary of Non-Statutory Sites within a 2km Radius.

Site Name	Designation	Distance from Site	Description / Reason for Designation
Creswell's Piece		Adjacent to eastern Site boundary	Semi-natural broad-leaved woodland with banks, dry heath/acid grassland mosaic and stream. Semi-improved acid grassland, marshy grassland and poor semi-improved grassland.
Parkhall Country Park		1.35km southwest	A former sand and gravel quarry and tip site which has now been reclaimed to form a County Council Country Park, which has a range of predominantly acidic habitats including a series of pools that are used by several uncommon species of invertebrates.

March Lane/ Windycote Lane	Local Wildlife Sites (LWS)	1.40km northeast	A diverse road verge with an associated ditch.
Stansmore Wood and Grassland		1.45km southeast	Species-rich neutral grassland which is increasingly being taken over by wetland species as it transgresses to marshy grassland. A broadleaved woodland with a species poor ground flora but which has diversity in its boggy ditches.
Dilhorne Wood		1.55km southeast	An oak/beech woodland with occasional rowan, birch and alder. Horse chestnut and sycamore are also present but rarely noted. The canopy is quite dense in most places but opens out towards the northwest where oak is most frequent.
Heywood Grange Wood	Retained BAS	1.15km east	An ancient woodland site, silver birch and creeping soft grass dominate the woodland throughout reflecting its wet acidic nature. The woodland has an open canopy with no understorey and is grazed by horses.

1.2.42 There are no areas of ancient woodland within 250m of the Site boundary and the closest area of ancient woodland is Heywood Grange Wood, located 1.15km east of the Site boundary.

1.2.43 A summary of the internationally and nationally protected and priority species that were returned in the desk study is provided in Table 5. Further details of these records can be found within the Preliminary Ecological Appraisal (2020).

Table 5: A Summary of Internationally and Nationally Protected and Priority Species within 2km of the Site.

Group	Species Recorded
Mammals	Otter, water vole, bat species, pipistrelle species, Daubenton's bat, brown long-eared bat, common pipistrelle, , badger, brown hare and hedgehog,
Birds	Skylark (*Alauda arvensis*), barn owl (*Tyto alba*), whimbrel (*Numenius phaeopus*), short-eared owl (*Asio flammeus*) and yellowhammer (*Emberiza citrinella*).

Amphibians	Great crested newt, common toad
Reptiles	Adder
Invertebrates	Dingy skipper (*Erynnis tages*), black-headed mining bee (*Andrena nigriceps*), Autumnal rustic (*Eugnorisma glareosa*) and small heath (*Coenonympha pamphilus*) and white-clawed crayfish (*Austropotamobius pallipes*)

Habitat of Principal Importance

1.2.44 Habitats of Principal Importance within the Proposed Western Extension included hedgerows. Deciduous woodland HPI is present adjacent to the eastern Site boundary.

Habitat Baseline

1.2.45 A map of the habitats present within the Site is available within Appendix E1 of the Preliminary Ecological Appraisal (2020). The mapping was completed using the JNCC methodology.

1.2.46 Table 6 describes the habitats located within the Proposed Western Extension which are to be impacted by the proposed works. Arable/ improved grassland were the dominant habitats across the Site, comprising silage crop and occasionally used for grazing livestock. Poor semi-improved grassland was present in narrow field margins along the boundaries of the arable fields. Scattered trees were noted in the southern extent of the Site. Hedgerows were present along the Site boundary and the central extent of the Site.

Table 6: Habitats Present within the Site to be impacted.

Habitat	Estimated Area (ha)	Description
Poor semi-improved grassland	1.3 ha	Field margins comprised poor semi-improved grassland surrounding the arable and improved grassland fields.
Hedgerows	0.561 ha	Hedgerows were present along the Site boundary and the central extent of the Site
Arable	3.34 ha	Arable was the dominant habitat across the Site, forming the northern field, comprised of silage crop the sward length was short at the time of survey.
Improved grassland	2.25 ha	Improved grassland comprising perennial ryegrass formed the southern field/ extent of the Site. The grass was short at the time of the 2022 survey and likely grazed by cattle.

Scattered Trees	N/A	Scattered trees were present in the southern extent of the Site. Species were sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*).

Table 7: Hedgerows within the Site.

Hedge No.	Location	Type	Central Grid Reference	Length (m)	Species*	Species Richness
1	Western Boundary	Intact with trees	SJ 94836 45735	240m	Hawthorn*, Sycamore*, Ash*, Gorse (Ulex europaeus)*, Holly (Ilex aquifolium)*	Species-Poor
2	Southern Boundary	Defunct with trees	SJ 94808 45591	100m	Hawthorn, Silver Birch	Species-Poor
3	Western Boundary	Intact with trees	SJ 94977 45927	270m	Hawthorn*, Silver Birch*, Oak (Quercus robur) *, Holly*, Ash*, Elder*	Species-Poor
4	Northern Boundary		SJ 95134 45992	175m	Holly*, Rowan (Sorbus aucuparia)*, Hawthorn*, Oak*, Gorse*, Alder (Alnus glutinosa) *	Species Rich
5	Eastern Boundary		SJ 95111 45834	285m	Hawthorn, * Ash*, Holly*, Oak*, Elder*, Gorse*, Sycamore*, Silver Birch*, Apple (Malus sp.), Cherry (Prunus sp.), Rowan*	Species Rich
6	Eastern Boundary		SJ 94988 45682	150m	Holly*, Hawthorn*, Gorse*, Rowan*, Ash*, Blackthorn*	Species Rich
7	Eastern Boundary		SJ 94880 45607	135m	Blackthorn, Hawthorn, Sycamore	Species-Poor
8	Centre of Site	Defunct with Trees	SJ 94956 45779	150m	Hawthorn*, Sycamore*, Elder (Sambucus nigra)*, Gorse, Bramble	Species-Rich

1.2.47 Hedgerow H5, H6 and H8 will be removed to facilitate the Proposed Western Extension. The remaining hedgerows and associated poor semi-improved grassland field margins will largely be retained at the Site with a 10m stand-off comprising the

semi-improved grassland field margins, aside from where soils storage will be required within the 10m stand-off.

Notable Species

Notable Flora

1.2.48 No notable plant species, including those listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended), were recorded during the Phase 1 habitat surveys.

Invasive Flora

1.2.49 During the PEA surveys, no invasive species as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Protected Species (Fauna)

1.2.50 Following on from the initial preliminary ecological appraisals it was recommended that the following protected species surveys were completed to inform this chapter:

- eDNA Great crested newt surveys;
- Bat activity surveys;
- Bat emergence/ re-entry surveys; and
- Breeding bird surveys.

Great crested newts

- The records centre provided records of both great crested newt and common toad within a 2 km radius of the Proposed Western Extension.
- A total of five ponds were identified within the Site (P1- P5) and a further one pond (PA) within 500 m of the Proposed Extension, separated from the Site by Leek Road. During the original PEA, P1 was no longer present and therefore discounted from further surveys and HSIs were carried out on P2-P5 and PA in May 2020 and July 2022. All five ponds (P1 – P5) were associated with the existing mineral extraction operations as part of the active quarry in current use

as settling lagoons etc.

- Ponds P2-P4 were considered unsuitable for great crested newt as they were silted and lacked suitable vegetation. Subsequent eDNA surveys were undertaken on one suitable pond (P5) in April 2020.
- eDNA survey results of P5 were negative. No repeat eDNA was carried out P2-P5 were considered unsuitable for great crested newt during the site verification check in 2022. Management measures have been put in place since 2020 and newt fencing to be erected to deter and keep great crested newt from the site during the proposed extension.
- Due to the absence of great crested newts or large individual populations of amphibians this group is not considered further in this chapter.

Bats

- The record centre provided 13 records of bat within a 2km radius of the Proposed Extension. Species included brown-long bat, common and soprano pipistrelle and Daubenton's.
- The Preliminary Ecological Appraisal identified three trees that had the potential to support roosting bats, within the Proposed Extension. One of these trees (T1) has been removed as would be directly impacted as part of the proposed works. T1 was of moderate roosting potential and was subject to two surveys in 2020.
- The surveys of T1 identified no evidence of bats or roosting bats.
- Four bat species were recorded during the bat activity surveys in 2020 (incl. automated surveys) comprising common pipistrelle, soprano pipistrelle, unidentified Myotis species and noctule. Bat activity was recorded along all hedgerows across the Site, with highest levels of activity along the northern and western hedgerows, and the section of eastern hedgerow adjacent to the woodland (northern extent).
- The highest levels of bat activity related to common pipistrelle equating to > 90% of all bat activity at the Site. The value of the Site for foraging and commuting bats was assessed as being of 'District/Local/Parish' level only and is therefore not to be significant in the wider context.

- The Proposed Western Extension area is considered to be of Low suitability for commuting and foraging bats as the dominant habitat at the Site comprised of arable and improved grassland fields, considered to be of lower suitability for the majority of bat species for commuting and foraging and the grassland is periodically grazed by cattle. The hedgerows and scattered trees within the Proposed Western Extension provide commuting and foraging corridors for bats in the local area.

- Furthermore, the habitats of highest ecological importance for bats at the Site (hedgerows) are mostly to be retained as part of the Proposed Development, ensuring habitat connectivity for foraging and commuting bats throughout the life of the Proposed Development. No pole mounted external lighting will be implemented as part of the Proposed Development, only machinery lighting for health and safety; therefore, effects in terms of lighting are considered to be negligible. The restoration of the Site post-development will improve the existing baseline habitats for bats via habitat enhancement. Additional off-Site habitat enhancement for bats has already been implemented by the Client by tree planting adjacent to the western Site boundary.

Breeding birds

- The desk study provided a large number of records of bird species within 2 km radius of the Proposed Western Extension. Records included those of Schedule 1 species, and those of the red and amber list of birds of conservation concern. Several species were also recorded during the phase 1 surveys in 2020 and 2022.

- Breeding bird surveys were completed during spring/summer 2020 and consisted of three surveys between May and June. Each of the survey visits started within 1 hour of sunrise. Notable species recorded to date include a curlew, starling, song thrush, house sparrow, linnet and dunnock, which are all Species of Principal Importance.

- The results of the breeding bird survey indicate that the habitats within the survey area support typical assemblages for the habitat types with widespread and ubiquitous bird species distributed across the edge habitats of the Proposed Development. In general, bird activity was highest on the Site's eastern boundary and in the south-eastern corner.

- The hedgerows on the eastern boundary, where bird activity was highest, and central hedgerow will be temporarily lost to facilitate the Proposed Development. The hedgerows will be replaced upon restoration, and it is recommended the retained hedgerows are made to be species rich. Due to the replacement of lost habitats, and the abundance of similar habitat in the local and wider areas, the temporary loss of habitat is not considered to have a significant negative effect in relation to birds.

Ecological Processes and Trends

1.2.51 In the absence of the proposed works, the Proposed Western Extension area would continue to be managed as improved grassland and arable with silage crop with poor semi-improved grassland, and the hedgerows and scattered trees retained.

1.2.52 The poor semi-improved grassland would be subject to regular management through grazing which would expect to continue. However, if this area were left unmanaged, natural succession would likely lead to a dominance of tall ruderal and scrub species.

1.2.53 The likely trends at this site do not suggest that the ecological baseline would significantly change in the near future.

2. EVALUATION AND ASSESSMENT OF IMPACTS

Potential Direct and Indirect Impacts to Statutory and Non-statutory Protected Habitats

2.1 The ongoing works at the Site have pollution and dust prevent strategies in place and these will be implemented across the works in the Proposed Western Extension. The scale and nature of the proposed works will not increase further than the current site operations. Therefore, based on the proposals of the site, it is concluded that the development will not impact on any statutory and non-statutory protected sites including the adjacent LWS.

Potential Direct Impacts to Habitats

2.2 Potential impacts to habitats will take place during the removal of the vegetation to extract both sand and gravel within the Proposed Western Extension. Once extraction of sand and gravel within the western extension has been completed, the Proposed Western Extension will be restored to largely agricultural habitats and tree planting along woodland edges along with bare rock face, wildflower meadow and heathland. In addition, an off-site biodiversity area is proposed with grassland slopes, tree and scrub planting and shallow ponds to provide an enhancement to the surrounding area.

2.3 The proposals would result in the loss of the following habitats and areas

- One scattered tree (T1) (removed in April 2021);
- Arable - c. 3.34 ha
- Improved grassland- c. 2.25 ha
- Poor semi-improved grassland – c. 1.3 ha
- Hedgerow – c. 0.42 ha

Scattered trees

2.4 The development will result in the certain, direct loss of one tree located within the Proposed Western Extension. This tree was removed in April 2021. The loss of this

habitat will be direct, permanent and certain. This impact will not be reversible during the operational lifespan of the quarry, although following operations there will be an increase of trees at the Site in the form of woodland and hedgerow planting providing a net gain in trees following restoration, Therefore, the magnitude of this impact is considered to be positive following the completion of the proposals.

2.5 The retained trees will be protected through adequate root protection measures in line with British Standards and as such no direct impacts are predicted.

2.6 The significance of the effects is considered to be minor adverse in the short to medium term due to the loss of a single tree, however in the long term as the newly planted trees mature it is considered to be an effect of moderate beneficial significance with a net gain in woodland and trees across the site and the additional planting off-site.

Arable and Improved Grassland

2.7 The development will result in the certain, direct loss of 3.34 ha of arable and 2.25ha of improved grassland during the operation phase of the works. However, the loss of these habitats will only be temporary as the proposals include restoration to agricultural fields post operation. Therefore, the magnitude of this impact is considered to be positive following the completion of the proposals.

2.8 The significance of the effects is considered to be minor adverse in the short to medium term due to the loss of the arable and improved grassland habitat, however in the long term it is considered to be an effect of minor beneficial significance due to the increase in habitat quality provided by the net gain in proposed agricultural fields across the Site.

Poor semi-improved grassland

2.9 The development will result in the certain, direct loss of 1.3 ha of poor semi-improved grassland during the operational phase of the works. The loss of this habitat will be partial, and in some places temporary as the majority of the poor semi-improved grassland will be retained aside from small areas alongside H2,H3 and H4 where soils storage will be required. Therefore, the magnitude of this impact is considered to be negative following the completion of the proposals.

2.10 The significance of the effects is considered to be minor adverse in the short to medium term due to the loss of the grassland habitat, however in the long term it is considered to be an effect of minor beneficial significance due to the increase in habitat quality provided by the woodland edge planting and other habitats on Site that are considered to be more beneficial to wildlife.

Hedgerows

2.11 The works will lead to the removal of the central hedgerow (H8) and hedgerow on the eastern boundary (H5). The hedgerows will be temporarily lost to facilitate the Proposed Development and replaced upon restoration.

2.12 All other retained hedgerows will be protected through adequate root protection measures in line with British Standards where appropriate and as such no indirect impacts are predicted. It is recommended the retained hedgerows are made to be species rich.

2.13 The hedgerows will be subject to indirect impacts such as dust as a result of disturbance from the quarry activity in the medium term However, the Site operates under strict dust control measures in accordance with the planning and industry recognised best practise. Therefore, the significance of effect is considered to be negligible.

Potential Indirect Impacts to habitats

Pollution

2.14 During the operational phase, there is a potential increased risk of accidental pollution event from stored materials, plant and vehicles, which could have an effect upon the ecology within the Site or immediate surroundings.

2.15 The site has environmental management systems in place to prevent such occurrences and these systems will be maintained during the life of the Site. Therefore, no significant ecological impacts are predicted as no changes to baseline conditions would take place.

Dust

2.16 The continued working of Captains Barn Farm Quarry would not introduce any additional processes which could generate dust, as extraction, processing and transportation of aggregate from the Site would continue at comparable levels to existing operations. The site operates under strict dust control measures in accordance with the planning and industry recognised best practise.

2.17 As these controls would remain in place, no significant ecological impacts are predicted as no changes to baseline conditions would take place.

Potential impacts on Fauna

Bats

2.18 The Proposed extension area is considered to be of low suitability for foraging and commuting bats. The bat assemblage at the site is representative of similar habitats within the wider area.

2.19 The highest levels of bat activity related to common pipistrelle equating to > 90% of all bat activity at the Site. The value of the Site for foraging and commuting bats was assessed as being of 'District/Local/Parish' level only and is therefore not to be significant in the wider context.

2.20 Removal of T1 on Site will lead to a loss of suitable roosting habitat for bats. All other suitable roosting locations are being retained as part of the proposed development.

2.21 The impacts are as a direct result of habitat loss and noise of the scheme will likely result in indirect disturbance impacts. The impacts on bats are largely temporary, with the exception of the removal of T1, medium term and reversable. Overall, the magnitude of the impacts of the scheme are considered to be negative.

2.22 The loss of suitable commuting and foraging habitats, including scattered trees grassland, hedgerows, improved grassland and arable is temporary and they are to be replaced by higher quality habitats for foraging and commuting bats including off-site woodland, species rich hedgerows and grassland habitats and so there will be a net gain of suitable habitats for this taxon. Therefore, the significance of the effects of the proposed works are considered to be minor beneficial.

Breeding birds

2.23 The site is considered to be of importance at local level only for breeding birds. Removal of the habitats onsite, would lead to a loss of habitat for breeding bird populations at the Site, including Red listed species curlew, song thrush, house sparrow and linnet. The soil stripping and extraction process including removal of some hedgerows will also limit the available habitats for birds over the breeding period. Birds are likely to be displaced into the wider countryside.

2.24 The magnitude of impact is therefore assessed as being negative. However, the site is surrounded by further similar and suitable habitat for these species, and due to the mobile nature of these species, it is considered that breeding bird populations would not be directly impacted as a result of the proposed works.

2.25 Following restoration, the habitats onsite including grassland and retained quarry faces will provide more diverse and higher quality habitats within the Proposed Western Extension for breeding birds and allow for the same assemblages as

recorded on Site. Therefore, the significance of the effects is considered to be minor beneficial.

Mitigation

Proposed Mitigation for Habitats and Residual Impacts

2.26 Where scattered trees and hedgerows are to be retained outside of the construction footprint this shall be done under the standards in line with BS 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations.' (British Standards Institution, 2012).

2.27 A 10 m buffer zone will be implemented between the development and the majority of the retained hedgerow and poor semi-improved grassland field margins during the extraction works (excluding for hedgerows H2, H3 and H4 where soils storage will be required within the 10m stand-off).

2.28 It has been assumed that industry standard working methods will be used for controlling the effects of dust and pollution. And these will be put in place during construction and operational phases of the development. Therefore, it is considered additional impacts for dust and pollution will not occur.

Specific Habitat Mitigation and Compensation

2.29 It is proposed that large area of the site will be reinstated with the creation of arable and grassland setting. The grassland to be removed for quarrying activities will be re-instated.

2.30 The proposed mitigation and compensation for habitats restores the western extension area to agricultural fields and semi-improved grassland field margins with enhancement of hedgerows. In addition, an off-site biodiversity area is proposed with grassland slopes, tree and scrub planting and shallow ponds to provide an enhancement and increased connectivity to the surrounding area.

Proposed Mitigation for Fauna and Residual Impacts

Bats

2.31 There will no lighting associated with the work to minimise impacts on nocturnal species including bats.

2.32 Tree T1 was assessed as having Moderate bat roost potential. The subsequent survey identified no evidence of roosting bats.

2.33 The proposed restoration of the Site will restore existing habitats (arable and hedgerows). Replacement hedgerows should be species-rich to maximise benefits for invertebrates, and thus foraging bat species.

2.34 The restoration habitat enhancement would benefit the local bat populations in the longer term through increased foraging resources, which would ultimately provide for greater diversity and structure of bat friendly habitats than is currently present.

2.35 Residual impacts are considered minor positive as suitable habitat to support the bat assemblage on Site is present in the immediate surrounding area. The hedgerow corridors will also remain unlit and provide a commuting corridor for bats across the Site during the operation phase of the development. These corridors will be enhanced with additional planting during the restoration phase.

Breeding Birds

2.36 Timings of work for habitat removal, including removal of grassland, trees and scrub are suggested to prevent impacts on actively breeding birds. This would include no habitat removal between March and August inclusive and if this is not possible a pre-clearance check should be completed by a suitably qualified ecologist to ensure no breeding birds are present.

2.37 No other works which may cause disturbance to nesting birds will take places unless a suitability qualified ecologist has confirmed the absence of nesting birds.

2.38 No works which may cause disturbance to nesting birds listed on Schedule 1 of the Wildlife and Countryside Act will be undertaken during the main breeding season (March to August inclusive) unless a suitably experienced ecologist has confirmed active nests of to be absent.

2.39 House sparrow nesting boxes could be erected on to poles within areas of retained hedgerow to mitigate for the temporary loss of breeding habitat (eastern hedgerows). A colony of sand martin was recorded within the existing quarry located to the east of the Site, predominantly located along the north eastern boundary quarry face that abuts the woodland. It is recommended that this quarry face is retained in order to retain suitable nesting habitat for this species in perpetuity.

2.40 No other mitigation is proposed as the restoration scheme would replace existing habitats and provide additional habitat types including hedgerow and woodland of which are significant conservation value.

2.41 Residual impacts are negligible as it is considered that suitable habitat is present in the immediate surrounding area of which will support the assemblages of breeding birds.

Residual Impacts

2.42 Table 10 below provides a summary of the potential and residual impacts on the ecological receptors, as described above. The table provides an assessment of the type, significance, magnitude and duration of any residual impacts following mitigation.

Table 8: Summary of Potential Effects on Flora/Fauna

Feature	Predicted Impact	Significance of Effect	Proposed Mitigation	Residual impact significance
Habitats				
Scattered trees	Negative	Minor Adverse	Enhanced through restoration	Minor positive in the long term
Arable/ Improved grassland	Negative	Minor Adverse	Enhanced and re-instated through restoration	Minor positive in the long term
Hedgerows	Negative	Minor Adverse	Enhanced through restoration	Minor positive in the long term
Poor semi-improved grassland	Negative	Minor Adverse	Enhanced and re-instated through restoration	Minor positive in the long term
Species				
Bats (foraging and commuting only)	Negative	Minor Adverse	Habitats for roosting bats enhanced through restoration	Positive in the long term
Bats (roosting)	Negative	Minor Adverse	Habitats for roosting bats enhanced through restoration	Positive in the long term
Breeding birds	Negative	Minor Adverse	Habitats for breeding birds enhanced through restoration	Positive in the long term

Cumulative Impacts

2.43 It is understood from the planning agent associated with the proposed development that no further large-scale planning applications (such as quarries) are currently known within the surrounding area which may contribute cumulatively to the impacts of the proposed development. The remaining areas of Captains Barn Farm quarry have been approved and are currently undergoing various stages of extraction and

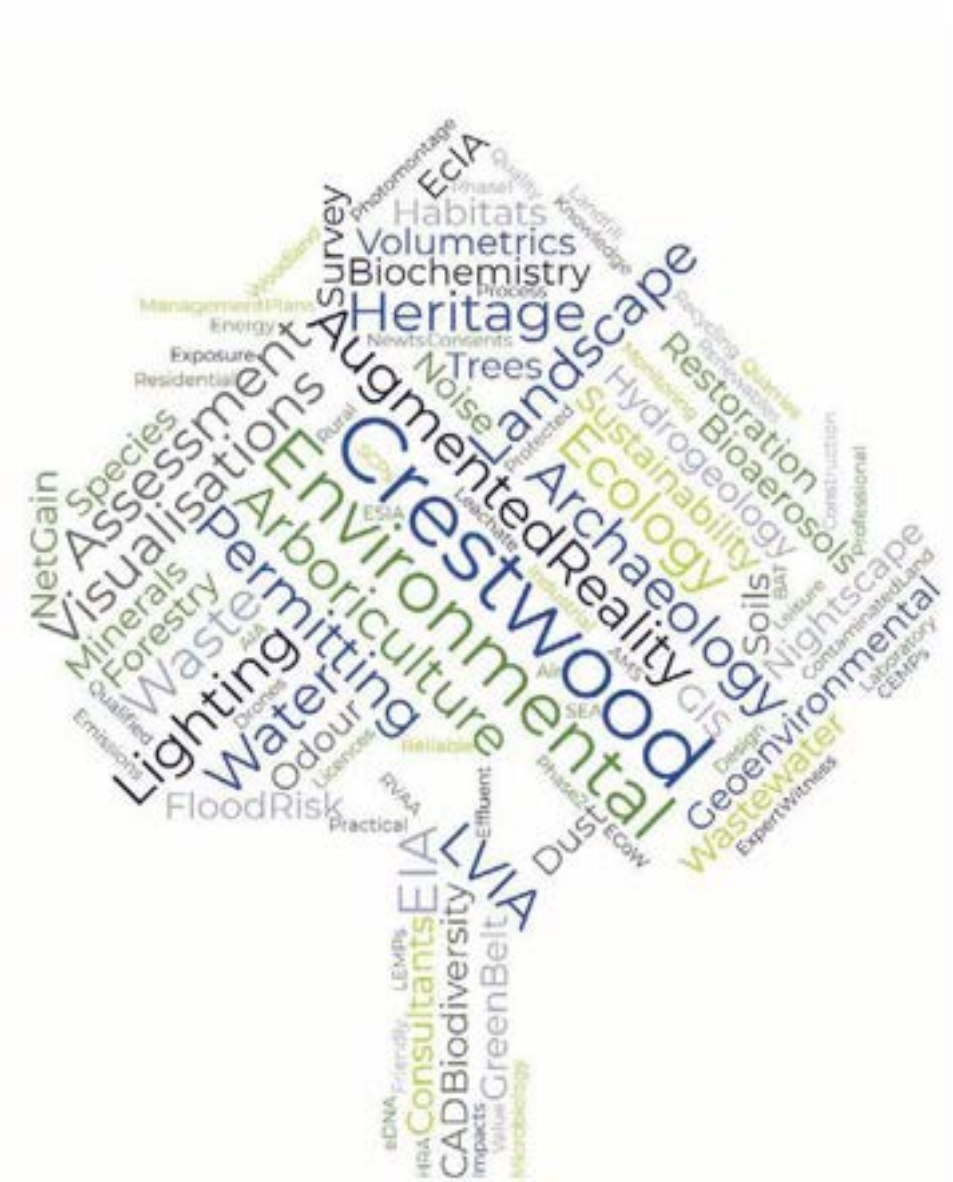
restoration. Therefore, no cumulative effects in need of specific consideration or additional mitigation have been identified.

Climate Change

2.44 It is not considered that the species present on Site would be impacted by climate change in the short to medium term.

Conclusions

2.45 The proposed works and restoration of the Proposed Extension will result in a mosaic of habitats including woodland, hedgerow, arable and grassland habitats, suitable for supporting a range of fauna, with the restored habitats likely to increase in value in the long term.



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