



## **Ecological Impact Assessment (EclA)**

### **Proposed Eastern Extension, Wivenhoe Quarry, Alresford Road, Wivenhoe**



**Produced by Crestwood Environmental Ltd.**

**Document Reference: CE-WQ-0992-RP09a - Final**

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**APPENDICES:**

- APPENDIX A      Extended Phase 1 Habitat Survey Report (CE-WQ-0992-RP01)  
Update Preliminary Ecological Appraisal Report  
(PEAR) (CE-WQ-0092-RP12a)
- APPENDIX B      Habitat Suitability Index (HSI) Letter Report (Report ref: CE-WQ-0992-LT01)
- APPENDIX C      Great Crested Newt Survey Report (CE-WQ-0992-RP02)
- APPENDIX D      Reptile Survey Report (CE-WQ-0992-RP03)
- APPENDIX E      Breeding Bird Survey Report (CE-WQ-0992-RP04)
- APPENDIX F      Winter Bird Survey Report (CE-WQ-0992-RP05)
- APPENDIX G      Bat Activity Survey Report (CE-WQ-0992-RP06)
- APPENDIX H      Water Vole Survey Report (CE-WQ-0992-RP07)
- APPENDIX I      Hazel Dormouse Survey Report (CE-WQ-0992-RP08)
- APPENDIX J      Essex Biodiversity Checklist
- APPENDIX K      Biodiversity Enhancement Plan
- APPENDIX L      Construction and Environment Management Plan
- APPENDIX M      Arboricultural Survey (CE-WQ-0992-RP15)
- APPENDIX N      Policy Details

# 1 SUMMARY OF UPDATES

1.1.1 Table 1 summarises the amendments made to the Ecological Impact Assessment (EclA) submitted to Essex County Council in support of planning application ESS/17/18/TEN submitted in 2018. Amendments have been made following comments from Essex County Council in August 2018.

**Table 1 Summary Table of Amendments to Doc. Ref. CE-WQ-0992-RP09**

Aspect	Section in Report CE-WQ-0992-RP09a	Amendment to Text?	Addition to Text?	
<b>Preamble</b>	Plate 1 Section 2.1.3	No	No	
	Section 3.1.9	Yes	No	
<b>Zone of Influence</b>	Section 2.1.9	No	Yes	
<b>Update Records and Survey Dates</b>	Section 3.3.4; 3.3.5; 3.4.2; 3.4.4; 3.4.5; 3.4.6; 3.4.10; 3.4.12; and 3.6.1.	Yes	No	
<b>Policy</b>	Section 4.1.5, 4.2.1 and 4.2.4.	Yes	Yes	
<b>Designated Sites</b>	Table 8 in Section 4.3.4, Table 9 in Section 4.3.6 and Table 10 in Section 4.3.11.	Yes	Yes	
<b>Habitats</b>	Section 4.5.1, 4.5.3 and Hedgerow numbers.	Yes	Yes	
<b>Hedgerow Regulation Assessment</b>	Section 4.5.8 to 4.5.10.	No	Yes	
<b>Arboricultural Survey</b>	Section 4.5.11 to 4.5.13.	No	Yes	
<b>Invertebrates</b>	Section 4.5.17.	No	Yes	
<b>Bats</b>	Section 4.5.65, Table 22 and 4.5.66, 4.5.67 and 4.5.73.	Yes	No	
<b>Badger</b>	Section 4.5.77.	No	No	
<b>Assessment of Effects and Mitigation Measures</b>	<b>Habitats</b>	Table 28 in Section 5.2.26.	Yes	No
	<b>Invertebrates</b>	Section 5.3.6 and 5.3.12.	No	Yes
	<b>Bats</b>	Section 5.3.52.	No	Yes
	<b>Dormouse</b>	Section 5.3.66.	No	Yes
	<b>Water Vole</b>	Section 5.3.67.	No	Yes
	<b>Pre-Commencement Phased Surveys</b>	Section 5.4.	No	Yes
	<b>Summary</b>	Table 30 at Section 5.5.	Yes	Yes

1.1.2 Where applicable, the Site boundary within the species reports has also been updated accordingly to reflect the most recent Site boundary.

## 2 INTRODUCTION

### 2.1 PREAMBLE

- 2.1.1 This Chapter assesses the ecological effects of a proposed eastern extension of an existing sand and gravel quarry (Wivenhoe Quarry) (**'the Proposed Development'**), at land to the east of the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 056 223 (**'the Site'**).
- 2.1.2 The primary subject of the survey area is referred to as **'the Site'**. The Client is applying for planning permission for a proposed eastern extension of mineral extraction operations from the existing sand and gravel quarry (**'the Existing Quarry Site'**) into land to the east of the Existing Quarry Site.
- 2.1.3 The red line shown in Plate 1 below shows the extent of the Site boundary.

**Plate 1 Site Location Plan**



- 2.1.4 The ecological surveys focussed primarily on habitats within the Proposed Extension Area, although, where necessary, assessment within and surrounding the Existing Quarry Site was undertaken.
- 2.1.5 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).
- 2.1.6 The full planning application title reads:

*'Extraction of 3.8 million tonnes of sand and gravel as an easterly extension to the existing Wivenhoe*

*Quarry, erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material.'*

2.1.7 It is proposed that a total of 3.8 million tonnes of sand and gravel are extracted as part of the Proposed Development. This comprises c.19 years of extraction and progressive restoration, with a further 2 years to complete the restoration of the Site.

2.1.8 In summary, the Proposed Development consists of:

- Extension of the Existing Quarry Area to the southwest, to extract sand and gravel at a rate of 3.8 million tonnes per annum over a 19 year period;
- Clearance of existing habitats prior to mineral extraction;
- Extraction of the mineral reserve across the Site will assume at least a 10m standoff from all field boundaries, with the exception of access points for haul routes and a 30m stand off from Cockaynes Wood;
- The importation and use of 1.2 million cubic tonnes of restoration materials to facilitate the Sites restoration; and
- Long term management of the nature conservation habitats.

2.1.9 The assessment has been carried out in line with Schedule 4 of the Environmental Impact Assessment (EIA) Regulations 2017 (HMSO, 2017) which states that an EIA should:

*"The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors—*

*(a) population and human health;*

*(b) **biodiversity, with particular attention to species and habitats** protected under Directive 92/43/EEC(1) and Directive 2009/147/EC(2);*

*(c) land, soil, water, air and climate;*

*(d) material assets, cultural heritage and the landscape;*

*(e) the interaction between the factors referred to in sub-paragraphs (a) to (d).*

*(3) The effects referred to in paragraph (2) on the factors set out in that paragraph must include the operational effects of the proposed development, where the proposed development will have operational effects.*

*(4) The significant effects to be identified, described and assessed under paragraph (2) include the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development."*

2.1.10 This assessment also includes details required by Essex County Council in their consideration of planning applications for minerals development including:

- The completed biodiversity validation checklist;

- A Biodiversity Enhancement Management Plan; and
- A Construction Environmental Management Plan.

2.1.11 Crestwood Environmental Ltd. ('CEL') was appointed by David L Walker Limited on behalf of Tarmac Ltd. ('the Client' and 'Applicant') to undertake this assessment. This Chapter has been prepared by Lucy Cash, Associate Director at CEL. Lucy is a Chartered Ecologist and full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has been a consultant ecologist for 20 years.

## 2.2 REPORT STRUCTURE

2.2.1 The Chapter will follow the structure below:

- **Section 3 - Methodology and Methods of Assessment:** A description of the basis for the survey techniques used and of how the desk study, surveys and impact assessment has been undertaken, clarifying criteria, where appropriate;
- **Section 4 - The Baseline Situation and Evaluation:** Details the results of the desk study and field surveys and sets the basis against which the assessment is undertaken. Provides an evaluation of the existing habitats and species present at the Site and in the Zone of Influence (Zoi), against criteria set out in Section 3;
- **Section 5 - Assessment of Effects and Mitigation Measures:** Details the potential direct impacts of the Proposed Development, assesses the effects of these impacts on the ecological receptors at the Site and off-Site, describes the additional incorporated effect avoidance and minimisation measures (mitigation) and identifies any residual effects after mitigation has been applied;
- **Section 6 - Statement of Residual and Cumulative Effects:** Summarises any residual effects of the Proposed Development and the details of any Cumulative effects with other relevant Developments;
- **Section 7 - Compensation, Enhancement and Monitoring:** Identifies need for any additional measures to address residual effects, over and above mitigation; and
- **Section 8 - Conclusion:** An overall statement of the significant effects, relating this to policy and legislation, as applicable.

2.2.2 References are listed, and Appendices (containing the additional information and Figures) are located at the end of the Chapter.



## 2.3 TERMINOLOGY

2.3.1 The key fundamental terms used in this assessment follow the definitions given below:

<b>Impacts and Effects</b>	'Impact' refers to an action being taken and an 'effect' is the change resulting from that action. The process of assessing effects arising from development is commonly referred to as 'impact assessment'.
<b>Significant Effect</b>	Directive 2011/92/EU (The assessment of the effects of certain public and private projects on the environment) requires member states to assess the <b>likely significant effects</b> of a project (e.g. development) on the environment before determining whether consent should be given. This requirement has been transposed via Environmental Impact Assessment (EIA) Regulations. This assessment refers to significance (or level) of effects in the wider sense, to mean positive (beneficial) or negative (adverse) environmental effects that are important (material) considerations in the decision-making process, whether assessed as part of an EIA or otherwise. This is directly related to set criteria and terminology as set out within the assessment process. Significant effects may, on balance with other considerations, be acceptable or unacceptable in overall planning terms.
<b>Ecological Receptor</b>	A feature which could be a habitat or species that is present at the Site or surrounding area which has the potential to be significantly affected by the Proposed Development.
<b>Ecological Importance</b>	The (non-monetary) value of an ecological receptor in terms of its value in its own right, based on certain criteria detailed in Section 3.

2.3.2 Site area references are provided in Section 2.1.

2.3.3 Other general definitions are provided at the end of this Chapter.

2.3.4 Abbreviations are at the end of this Chapter.

### 3 METHODOLOGY AND METHODS OF ASSESSMENT

#### 3.1 SCOPE OF THE ASSESSMENT

3.1.1 This assessment has been undertaken in accordance with **The Guidelines for Ecological Impact Assessment in the United Kingdom**, ('the Guidelines') published September 2018 by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

3.1.2 The assessment process aims to:

- Provide a clear and understandable assessment of the potential ecological effect(s) of the Proposed Works for stakeholders;
- Determine the potential impact(s) of the Proposed Works in relation to: international, national, regional and local nature conservation and biodiversity policies; and
- Outline the processes the Proposed Works must undertake, in relation to designated sites and controlled species, in order to comply with legal requirements.

3.1.3 The main sources of information for this assessment are:

- Biological Records (obtained from the relevant Local Biological Records Centre and online);
- Review of legislation and land-use policies including local supplementary planning guidance issued by Essex County Council; and
- Field Survey.

#### **Zone of Influence**

3.1.4 The potential impact of a development is not always limited to the boundaries of the site concerned. The development may also have the potential to impact on ecologically valuable sites, habitats or species beyond the Site boundaries. The area over which a development may impact ecologically valuable receptors is known as the Zone of Influence (Zoi).

3.1.5 The Zoi is determined by the source/type of impact, a potential pathway for that impact and the location and sensitivity of the ecologically valuable receptor beyond the boundary. For the majority of (unmitigated) impacts identified as part of the Proposed Development, the Zoi is generally considered to be the application site and immediately adjacent areas.

3.1.6 In ecological terms, the Zoi can also vary considerably depending upon the species potentially affected by the proposed development. For example, some species may be confined to a specific location whilst others, such as Birds and Bats, are more mobile and can occupy larger territories or home ranges. The Zoi is also likely to be influenced by the presence of dispersal barriers, such as roads and hardstanding, which either stop or reduce the likelihood of animals crossing it. As a consequence this could isolate areas of potentially suitable habitat within the application site due to fragmentation.

3.1.7 The Zoi for species or species groups has been determined by research and the professional judgement of the ecologist. For example, Common Lizard (*Zootoca vivipara*) has restricted mobility and generally occupies smaller home ranges (up to 700m<sup>2</sup>) (Langton & Beckett, 1995).

3.1.8 The ZoI for each species or species-group is identified in the relevant sections. Table 2 details the ZoI for the ecological features at the Site.

**Table 2 ZoI of Ecological Features**

Ecological Feature	ZoI
Statutory Sites	10km
Non- Statutory Sites	2km
Plants	Site and immediately adjacent habitats
Great Crested Newts and Other Amphibians	500m
Reptiles	1km
Badger	30m
Bats	2km
Water Vole	50m
Dormouse	30m
Other Mammals	30m
Birds	2km
Aquatic and Terrestrial Invertebrates	Site and immediately adjacent habitats

### **Zone of Influence of Potential Physical Elements of Development**

3.1.9 In addition to the ZoI for specific ecological features, the physical effects of a Proposed Development also has a ZoI that is considered during the assessment. Specifically for this assessment the following are considered:

- ZoI of Dust;
- ZoI for Hydrology; and
- ZoI for Noise.

3.1.10 The unmitigated impacts of Dust are expected to reach a maximum of 250m in accordance with IAQM guidance (IAQM, 2016) for mineral extraction, from the Site therefore the ZoI for sensitive ecological receptors for Dust is set at 250m.

3.1.11 There are watercourses at the Site connecting to other habitats; therefore the ZoI has the potential to extend outside the Site boundary with regard to impacts from Hydrology.

3.1.12 Currently there is no specific guidance with regards to the Zone of Influence and the effects of noise on ecological features. For the purpose of this assessment the ZoI for effects of increased noise is generally considered to be the application Site and immediately adjacent areas.

## **3.2 BASELINE CONDITIONS**

3.2.1 Using a combination of desk study and field survey work the ‘**Baseline Situation**’ of the Proposed Development has been established. This provides a transparent basis from which assessment results have been determined and against which professional judgements have been made.

3.2.2 During the field survey, the flora, fauna and other notable ecological features of the Site were recorded.

3.2.3 As recommended in the Guidelines (CIEEM, 2018) the value of features, habitats and species (flora and fauna), both within and surrounding the Proposed Works, will be considered from international to Site value scales.

### **3.3 DESK STUDY**

3.3.1 Prior to the field survey visit; a desktop data-gathering exercise was undertaken using available online resources (DEFRA, 2016) (updated (DEFRA, 2018) as well as information from Essex Field Club Biological Records and Essex Bird Watching Society.

3.3.2 The desk study was undertaken to search for statutory and non-statutory designated sites within the following ranges of the red line boundary based on the estimated ZOI for the particular ecological feature:

- 10km for sites of International/European nature conservation importance, which comprise: Special Areas of Conservation (SAC); Special Protection Areas (SPA); and Ramsar sites, as well as all sites proposed for designation as such (candidate sites);
- 2km for sites of national nature conservation importance, which comprise: Sites of Special Scientific Interest (SSSI); and National Nature Reserves (NNR);
- 2km for other statutory and non-statutory designated sites of nature conservation importance, comprising: Local Nature Reserves (LNR); Local Wildlife Sites (LWS); Wildlife Trust Reserves (WTR); and Biodiversity Opportunity Areas; and
- 250m for Habitats of Principal Importance (HPI) and Ancient Woodland.

3.3.3 Using a combination of aerial imagery (Google Earth) and OS mapping, the surrounding 500m was investigated for any presence of ponds, or other water bodies, which may be suitable for Great Crested Newts and connected to the Site by suitable habitat.

3.3.4 Essex Field Club Recorders (Essex Field Club, 2015) and updated records (Essex Wildlife Trust, 2018) provided desk study reports with the following information:

- Legally protected and notable species records within 2km (excluding Birds);
- Designated wildlife sites within 2km; and
- Schedule 9 species within 2km.

3.3.5 Bird records were requested from the Essex County Recorder for Birds, however no response was received. The Essex Birdwatching Society website was reviewed for Bird records within 2km of the Site. These were then updated and collated for update survey in 2018 (Essex Birdwatching Society, 2018).

3.3.6 Further desk top data is also available for the existing quarry but does not cover the entirety of the search area for this application and is therefore not provided at this time.

### **3.4 FIELD SURVEYS**

- 3.4.1 The 'Survey Area' for each of the surveys listed below varies and is shown on the associated Figures within the Extended Phase 1 Habitat Survey Report Appendices.

#### **Extended Phase 1 Habitat Survey**

- 3.4.2 An Extended Phase 1 Habitat Survey was undertaken on 20<sup>th</sup> October 2015 (Appendix A) and updated on 20<sup>th</sup> September 2018 (Appendix A). 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, any vegetation types or signs of protected species or fauna were recorded and mapped using specific standard mapping colours, where possible.
- 3.4.3 The protected species surveys and assessments below were also carried out during the Phase 1 surveys, although observation on the habitat and species assemblages on Site have been maintained through all the subsequent protected species survey work.
- 3.4.4 The Extended Phase 1 Habitat Survey report can be found in Appendix A (Report ref: CE-WQ-0992-RP01) and updated PEA report (CE-WQ-0992-RP12a).

#### **Badger Survey**

- 3.4.5 A survey for Badgers was carried out during the Phase 1 Survey on the 20<sup>th</sup> September 2015, updated on 20<sup>th</sup> September 2018 (Appendix A), following guidelines set out by Harris et al 1989, (Harris et al, 1989). All potential habitats within the Site plus 30m (where accessible) were surveyed for evidence of Badger activity, and specifically for the presence of setts. Field signs searched for included active or inactive setts, Badger pathways, latrines, hair, discolouring of and damage to fencing, signs of foraging and feeding remains.

#### **Preliminary Assessment for Roosting Bats**

- 3.4.6 The survey undertaken on the 20<sup>th</sup> September 2015 and updated on 20<sup>th</sup> September 2018 (Appendix A) included a survey of any suitable trees at the Site from ground level, recording any evidence of Bat roosts, droppings, staining, scratch marks and feeding remains, or any potential roost sites within the trees themselves in accordance with best practice methodology (Collins, 2016).

#### **Invasive Plant Species**

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

#### **Pond Assessment**

- 3.4.8 A Habitat Suitability Index (HSI) Assessment was conducted in January 2016 on any ponds within 500m of the Site (as determined by the desk study) to assess their suitability for Great Crested Newts (Oldham, et al., 2000). The HSI assesses factors such as pond area, water quality and macrophyte coverage. Each factor is then assigned a value between 0.01 and 1 (1 indicating an optimum habitat).
- 3.4.9 Following calculation of the HSI score, each pond is then given a 'Pond Suitability' rating based on the following categories in Table 3.

**Table 3** *Categorisation of Pond Suitability*

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

## Phase 2 Surveys

3.4.10 To further inform the Baseline, the following Phase 2 surveys have been undertaken at the Site after recommendations from the Phase 1 Habitat Survey and previous survey work already undertaken:

- Habitat Suitability Index (HSI) Letter Report (Report ref: CE-WQ-0992-LT01);
- Great Crested Newt Population Assessment (Report ref: CE-WQ-0992-RP02);
- Reptile Population Assessment (Report ref: CE-WQ-0992-RP03);
- Breeding Bird Survey (Report ref: CE-WQ-0992-RP04);
- Wintering Bird Survey (Report ref: CE-WQ-0992-RP05);
- Bat activity survey (Report ref: CE-WQ-0992-RP06);
- Water Vole Survey (Report ref: CE-WQ-0992-RP07);
- Hazel Dormouse Survey (Report ref: CE-WQ-0992-RP08); and
- Arboricultural Survey (Report ref: CE-WQ-0992-RP15).

3.4.11 The survey reports for each of these surveys can be found in the appendices of this report. Each report details the purpose and scope of the survey, the methodologies used and the results only. Each survey was based on standard best practice guidance available at the time of the surveys, with any deviations justified in the relevant survey report.

3.4.12 The Appendices containing survey reports are set out as follows:

- **Appendix A:** Extended Phase 1 Habitat Survey (with updated survey 2018) including;
  - Badger Survey; and
  - Preliminary Roost Assessment for Bats.
- **Appendix B:** Habitat Suitability Index Letter Report;
- **Appendix C:** Great Crested Newt Population Size Class Assessment;
- **Appendix D:** Reptile Population Size Class Assessment;
- **Appendix E:** Breeding Bird Survey;
- **Appendix F:** Wintering Bird Survey;

- **Appendix G:** Bat Activity Survey;
- **Appendix H:** Water Vole Survey;
- **Appendix I:** Hazel Dormouse Survey; and
- **Appendix M:** Arboricultural Survey.

### **3.5 SCOPING OPINION CONSULTEE RESPONSES ON ECOLOGICAL MATTERS**

3.5.1 A Scoping Opinion request was submitted to Essex County Council. The response July 2017 from this has been used as guidance for this assessment (Scoping Opinion ref: ESS2817Tenspo).

3.5.2 General advice regarding ecology included the following:

- Protected species surveys at the appropriate time of year, as well as surveys for Species of Principal Importance;
- The buffer in relation to Cockaynes Wood should be at least 15m. This should be taken as an absolute minimum and may be required to be a greater distance dependent on the extent of canopy, root protection zones-or condition of hedgerows, trees or woodland trees;
- Full consideration of the effect of the Proposed Development on statutory and non-statutory designated sites within the area. EclA should be fully considered in accordance with the advice from the ECC Ecologist. Essex County Council as the competent authority needs to be satisfied that the development will meet the three tests of the Habitats Directive in relation to European Protected Species;
- The extent of habitats lost and gained should be clearly set out, distinguishing between mitigation, compensation and enhancements. Existing Biodiversity features should be retained wherever possible;
- The proposed 50 hectares of Priority Habitat should be in addition to any mitigation/compensation provided as a result of the development of the Site; and
- Include recommendations for opportunities for habitat creation/enhancement at the Site as part of the restoration.

3.5.3 After submission of survey reports to the council in June 2018, further comments were received back from Place Services, by Emma Simmonds the County Ecologist in August 2018. These comments placed a holding objection with regards to Ecology, for the following reasons:

- *Insufficient consideration regarding aged and veteran trees (irreplaceable habitat)*
- *Lack of information regarding bats and their roosts (European protected species)*

3.5.4 The additional information that is now included within this EclA is based on further survey work and desk study undertaken to address any insufficient information.

### **3.6 LIMITATIONS TO THE BASELINE SURVEYS**

3.6.1 The limitations to the surveys were as follows:

- Extended Phase 1 Habitat Survey:

- The Extended Phase 1 Habitat Survey was undertaken outside of the optimum survey months, generally taken to be between April and September inclusive. An update survey was then undertaken in September 2018.
- The presence of ponds within 500m was determined using OS mapping and aerial imagery therefore the presence of recently created or very small waterbodies (e.g. within a garden) may not have been detected.
- Not all areas within 30m outside of the Site boundary could be accessed to check for Badgers due to some of the areas falling within private residential areas. This is not considered to be a significant limitation as the boundaries adjoining these areas showed no evidence of Badger activity, and areas were able to be observed remotely from the boundaries.
- Habitat Suitability Index Assessment:
  - HSI assessment is used as a tool to evaluate the suitability of a pond to support Great Crested Newts and is not a substitute for amphibian surveys. Some indices can only be calculated at certain times of the year (Oldham, et al., 2000).
  - The HSI for Great Crested Newts is a measure of habitat suitability. It is not a substitute for newt surveys. In general, ponds with high HSI scores are more likely to support Great Crested Newts than those with low scores. However, the system is not sufficiently precise to allow the conclusion that any particular pond with a high score will support newts, or that any pond with a low score will not do so.
- Great Crested Newt Population Assessment:
  - A number of ponds that were surveyed as part of the presence/likely absence survey (initial four visits) and the subsequent ponds that were assessed for GCN population had less than the recommended three survey techniques. Limiting factors included thick vegetation cover, high turbidity and unsuitable substrate. However, all ponds surveyed had a minimum of two survey techniques.
- Reptile Population Assessment:
  - Due to sections of the Site being open to access by the public, some refugia mats were moved which is likely to have resulted in increased disturbance and affected the survey.
  - A number of mats were mowed during July, decreasing the number of refugia available for surveying.
- Bat Activity Survey:
  - Walked transect surveys: Walked transects were not undertaken during April, due to poor weather conditions (heavy rain, cold and snow) during the month.
  - Automated surveys: A number days of data were discovered to be missing from the static detectors following certain month's surveys, which could be due to a fault in the recording equipment. A number of dates returned no data, with the exception of noise files.
- Water Vole Survey:
  - Some areas of the bankside of the Sixpenny Brook were densely vegetated with



Common Nettle and therefore these areas were limited in survey coverage.

- Hazel Dormouse Survey:
  - The Site was open to the public and was frequented by dog walkers which may have increased disturbance of the nest tubes over the survey period.

### **3.7 EVALUATION METHODOLOGY**

#### **Criteria**

- 3.7.1 The wildlife value of the existing habitats at the Site was evaluated following established principles as set out in Guidelines for Ecological Impact Assessment in the United Kingdom (CIEEM, 2018).
- 3.7.2 In assessing the value of a receptor, consideration has been given to the criteria adapted from Ratcliffe (1977), namely naturalness, size, rarity, diversity and fragility as well as position within the ecological unit, potential value and intrinsic appeal. The evaluation of the importance of individual species groups also considers lists of County and nationally prepared Red Data Books where available.
- 3.7.3 All species and populations of species, including those with statutory protection, are evaluated on the same basis. An example of this would be a small population of a protected species at the Site, where the species is widespread, will not rank highly. Table 4 details the Criteria for Evaluation.

**Table 4 Criteria for Evaluation**

Level of Importance	Species	Habitat
<b>International</b>	A regularly occurring population of an internationally important species, which is threatened or rare in the UK, where the population is a critical part of a wider population or where a species is at a critical phase in its life cycle at this scale.	An internationally designated site, i.e. SAC, SPA, Ramsar, or one proposed for designation. Sites supporting areas of priority habitats which are scarce at an international level or where it is needed to maintain the viability of a larger area at that level.
<b>National</b>	A regularly occurring population/number of a nationally important species which is threatened or rare, where the population is a critical part of a wider population or where a species is at a critical phase in its life cycle at this scale. A regularly occurring population of a nationally important species on the edge of its natural range. A species assemblage of national significance.	A nationally designated site, i.e. SSSI or one that meets the published criteria. Sites supporting areas of priority habitats which are scarce at a national level or where it is needed to maintain the viability of a larger area at that level.
<b>Regional</b>	A regularly occurring, locally significant population of a species listed as being nationally scarce. A regularly occurring, locally significant number of a regionally important species or where the population is a critical part of a wider population or where a species is at a critical phase in its life cycle at this scale. A species assemblage of regional significance.	Sites supporting a viable area of a priority habitat which is scarce at a regional level or where it is needed to maintain the viability of a larger area at that level.
<b>County</b>	Any regularly occurring, locally significant population of a species which is listed in a county Red Data Book or BAP on account of its rarity. A regularly occurring, locally significant number of a county important species or where the population is a critical part of a wider population or where a species is at a critical phase in its life cycle at this scale. A species assemblage of county significance.	A County designated site or one that meets published criteria. Sites supporting a viable area of a priority habitat which is scarce at a county level or where it is needed to maintain the viability of a larger area. Local Wildlife Sites/potential Local Wildlife Sites.
<b>District</b>	A population of a species that is listed in a district BAP because of its rarity in the locality. A species assemblage of district significance. A regularly occurring, locally significant number of district importance or where the population is a critical part of a wider population or where a species is at a critical phase in its life cycle at this scale.	Sites/features that are scarce within the district. Areas of Semi Natural Ancient Woodland.
<b>Local</b>	Populations or species assemblages considered to enhance the local ecological resource, e.g. a breeding Bird assemblage.	Areas of habitat considered to enrich appreciably the habitat resource within the context of the locality or which buffer those of a more important nature.
<b>Site</b>	Populations or species assemblages insufficient to be considered in the wider context.	Habitats or areas of habitat insufficient to be considered in the wider context.
<b>Negligible</b>	Not applicable.	Habitat or areas of habitat of insignificant ecological value.

### 3.8 ECOLOGICAL IMPACT ASSESSMENT METHODOLOGY

3.8.1 In line with recognised assessment guidance (CIEEM, 2018), the ecological impacts and effects are assessed using surveys and research to identify ecological receptors which will be affected as a result

of the Proposed Development as follows:

- Determine the severity of the impact and effect without specific mitigation measures;
- Outline a potential mitigation strategy which would be implemented to avoid or reduce undesirable impacts and effects;
- Assess the likelihood that the mitigation strategy will be successful;
- Establish areas of potential environmental improvement; and
- Assess the Significance of the residual impact of the Proposed Development, assuming the mitigation strategy has been fully implemented and that suggested areas of potential environmental improvement have been acted upon.

### 3.9 CLASSIFYING IMPACTS AND EFFECTS

3.9.1 A description of parameters that are considered when assessing the degree and type of change are provided in Table 5. Criteria to assess, on a scale of Low to High, the degree and type of change are provided in Table 6, and an overall level of effect determined.

3.9.2 In conjunction with consideration of the evaluation of the ecological receptor, an assessment of the Significance of the residual effect (for the type/nature of change), is provided in accordance with the criteria in Table 7 and described together.

**Table 5 Impact/Effect Parameters**

Parameters	Definition
<b>Nature of Change</b>	'Direction' of change. <b>Positive</b> changes are given equal merit to <b>Negative</b> changes in relation to the overall biodiversity outcome. No overall change would be <b>Neutral</b> .
<b>Magnitude</b>	The 'size', 'scale' or 'amount' of change, determined on a quantitative basis where possible. Includes consideration of:  The <b>geographical extent</b> (area) over which change occurs.  The <b>Duration</b> of time over which the assessed change is expected to last. This is based on ecological characteristics not human timeframes and may be <b>Temporary, Short Term, Medium Term or Long-Term</b> .  The <b>Frequency</b> of a Negative impact must also be considered; A single impact may have no effect but a number of repeating same impacts may create a Negative effect.
<b>Reversibility</b>	<b>Irreversible</b> changes are negative changes from which recovery is not possible within a reasonable timescale or for which there is no reasonable change of action being taken to reverse it.  <b>Reversible</b> changes are negative changes from which spontaneous recovery is possible or for which effective mitigation are both possible and an enforceable commitment is proffered.
<b>Timing</b>	<b>Timing</b> of a Negative impact may be important in understanding the effect of that impact, e.g. if it coincides with critical life-stages or seasons.

**Table 6 Classification of Impact/Effect Parameters**

Parameter	Degree of Impact Aspect		
	LOW	MEDIUM	HIGH
<b>Magnitude</b>	Minimal Change	<----->	Substantial Change
<b>Extent</b>	Limited / Small Area	<----->	Widespread Change
<b>Duration</b>	<18 months (Temporary)	<----->	>8 years (Long-term)
<b>Frequency</b>	Single or seldom occurring event	<----->	Numerous, regular occurring events
<b>Timing</b>	Non-Critical Timing	<----->	Critical Timing

**Table 7 Classification of Significance and Nature of Effect**

Classification	Criteria
<b>Negative (Significant)</b>	Likely to create a Significant negative effect, including loss, or long-term or irreversible damage on the integrity / status of a valued ecological receptor.
<b>Negative (Not Significant)</b>	Likely to create a negative effect without causing long-term or irreversible damage to the integrity / status of an ecological receptor.
<b>Neutral (Not Significant)</b>	Effects are either absent or such that no overall net change to the ecological receptor occurs.
<b>Positive (Not Significant)</b>	Likely to create a beneficial effect on an ecological receptor, or providing a new (lower value) ecological feature, without improving its conservation status markedly.
<b>Positive (Significant)</b>	Activity is likely to create a Significant beneficial effect, including long-term enhancement and favourable condition of an existing valued ecological receptor, or creation of a new valued ecological feature.

3.9.3 Residual effects are then considered alongside legal requirements, nature conservation policies and overall effects on biodiversity.

## 4 THE BASELINE SITUATION AND EVALUATION

### 4.1 HABITATS AND FLORA

#### International Legislation

4.1.1 Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('the Habitats Directive') and Council Directive 2009/147/EC on the Conservation of Wild Birds ('the Birds Directive'). These Directives provide protection to flora and fauna which are considered to be of European importance, as well as providing protection to the habitats which support them through establishing a network of protected sites (the Natura 2000 network) such as Special Areas for Conservation (SACs) or Special Protection Areas (SPAs).

### EU Regulation 1143/2014 on Invasive Alien Species

- 4.1.2 The Regulation 1143/2014 on invasive alien species entered into force on 1 January 2015. This Regulation seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimize and mitigate the human health or economic impacts that these species can have.
- 4.1.3 The Regulation foresees three types of interventions: prevention; early detection and rapid eradication; and management.
- 4.1.4 A list of invasive alien species of Union concern will be drawn up and managed with Member States using risk assessments and scientific evidence.

### National Legislation

#### The Conservation of Habitats & Species Regulations 2017 ('the Habitat Regulations')

- 4.1.5 The Conservation of Habitats and Species Regulations 2017 consolidates the Conservation of Habitats and Species Regulations 2010 with subsequent amendments.
- 4.1.6 This piece of legislation transposes into UK law the Habitats and Birds Directives. The Habitat Regulations protect numerous wild plants and animals (European Protected Species (EPS) (as well as the habitats which support them) from activities such as destruction, disturbance, killing, collection (for private use or sale) and several other activities. The Regulations also sets out measures to control operations which could potentially damage the Natura 2000 network.

#### The Natural Environment and Rural Communities Act 2006 ('the NERC Act')

- 4.1.7 Section 40 of the NERC Act places a duty on public authorities (such as planning authorities) to have regard to the purpose of conserving biodiversity which includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat.
- 4.1.8 Section 41 of the NERC Act requires the Secretary of State to publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of 'principal importance' for the purpose of conserving biodiversity – the list was drawn up in consultation with Natural England.

#### The Protection of Badgers Act 1992

- 4.1.9 This act sets out offences relating to Badgers, these offences involve taking, injuring or killing Badgers, cruelty, interfering with Badger setts and other offences.

#### The Wildlife and Countryside Act (WCA) 1981

- 4.1.10 This legislation implements the Birds Directive, providing protection for wild Birds, their nests and eggs, as well as certain mammals. It also sets out the protection of UK designated sites such as Sites of Species Scientific Interest (SSSIs).
- 4.1.11 The WCA lists additional flora and fauna which are not protected under The Conservation of Habitats and Species Regulations 2010, but are afforded protection under the WCA. The WCA also includes provision for preventing the spread of invasive plant and animal species.

## The Countryside and Rights of Way (CRoW) Act 2000

- 4.1.12 The Countryside and Rights of Way (CRoW) Act amended the WCA by increasing the maximum penalty from a fine to imprisonment, as well as adding 'reckless' acts to offences as opposed to solely 'intentional' acts.
- 4.1.13 Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable', create a new offence of reckless disturbance, confer greater powers to police and wildlife inspectors for entering premises and obtaining wildlife tissue samples for DNA analysis, and enable heavier penalties on conviction of wildlife offences.

## 4.2 DESK STUDY - POLICY CONTEXT

### National Planning Policy

- 4.2.1 National Planning Policy Framework ('NPPF') (HMSO, 2019), NPPF: 15. Conserving and Enhancing the Natural Environment - Paragraphs 170 – 183.
- 4.2.2 The Government's objective, as stated in the NPPF is that planning should help to deliver a healthy natural environment for the benefit of everyone and safe places which promote wellbeing. To achieve this objective, the NPPF states that the planning system should aim to conserve and enhance the natural and local environment by protecting valued landscapes, minimise impacts on biodiversity and provide net gains where possible. The NPPF also makes the statement that planning permission should be refused if significant harm resulting from a development cannot be avoided, adequately mitigated, or as a last resort, compensated for.
- 4.2.3 The NPPF goes on to support the Lawton Review (Lawton, 2010) and the White Paper (HMSO, 2011) with its goals to minimise impacts on biodiversity by stating that planning policy should take into account the need to plan for biodiversity at a landscape-scale as well as identify and map components of the local ecological networks, including international, national and local sites. In line with EU targets, the NPPF states that planning will promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species populations.

### Local Planning Policy

- 4.2.4 The local planning policies which relate to the Proposed Development are detailed below (Exact wording of these policies can be found in Appendix N):

Essex County Council – Essex Minerals Local Plan (Essex County Council, 2014):

- Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County Council, 2016);
- Essex Minerals Local Plan 2014 (Essex County Council, 2014)
- Policy S3 – Climate Change;
- Policy S10 – Protecting and Enhancing the Environment and Local Amenity; and
- Policy S12 – Mineral Site Restoration and Aftercare and the Supplementary Planning

Guidance on Mineral Site Restoration adopted by the County Council.

Colchester Borough Council – Colchester Borough Core Strategy (Colchester Borough Council, 2008):

- Policy ENV 1 – Environment.

### **UK Biodiversity Action Plan**

- 4.2.5 The UK BAP was originally published in 1994 as a response to the Convention on Biological Diversity, which the UK signed up to in Rio de Janeiro in 1992. The UK BAP set out plans to conserve biological resources within the UK, and also devised action plans for priority species (1,150 listed) and habitats (65 listed) which were considered to be most threatened.
- 4.2.6 The UK BAP listed 59 broad targets for the Government and nature conservation agencies to conserve and where possible, enhance wild species and habitats over a 20 year period.
- 4.2.7 In 2012 the UK Post-2010 Biodiversity Framework was published, this framework contains priorities specific to the UK for the Convention on Biological Diversity, which were agreed upon by the Environment Departments of all UK governments.
- 4.2.8 The UK Post-2010 Biodiversity Framework ‘Biodiversity 2020’ - Strategy for England’s Wildlife and Ecosystems Services encompasses the period from 2011-2020 and is now supported by Local Biodiversity Action Plans (LBAPs) which are usually devised by county councils. The guidance now concentrates on Species and Habitats of Principal Importance which are listed under Schedule 41 of the NERC Act. Whilst the overlap from the former UK BAP and Local BAP is not fully completed, for the purpose of this document and ecological assessment, both Species and Habitats of Principal Importance (SPI and HPI respectively) listed within Schedule 41 will be referred to only.

### **Local Biodiversity Information**

- 4.2.9 Information on the Local Biodiversity Action Plan was obtained from the ‘Essex Biodiversity Project’ website (Essex Biodiversity Project, 2010) which provided information on HPI and SPI within the county.

### **Birds of Conservation Concern (BoCC)**

- 4.2.10 Produced in 2015 by a number of Bird conservation organisations, *Birds of Conservation Concern 4* (Eaton, et al., 2015) updated previous quantitative reviews of the status of 246 Bird species that occur regularly in the UK, Channel Islands and Isle of Man.
- 4.2.11 Birds are placed into one of three lists - red, amber or green and although these listings offer no legal protection, they are meant to guide conservation action for the individual species. The listings reflect an individual species’ global and European conservation status as well as that within the UK and additionally measure the importance of the UK population in international terms.
- 4.2.12 In addition to the BoCC, an annual report on numerous surveys and monitoring by leading governmental and non-governmental conservation organisations in the UK is produced. This report is called ‘*The state of the UK’s Birds*’ (Hayhow, et al., 2015) and identifies trends for species grouped into four main habitats: farmland, woodland, wetland and coastal/marine. Where relevant to this

assessment the results of the report are referenced.

### 4.3 DESIGNATED SITES

4.3.1 Designated Sites are areas that are considered to be of high value for nature conservation (on either international, national, regional, county or local scales), which have been protected to varying extents by international conventions or local planning authority controls:

4.3.2 Generally, the priority for the protection of statutorily designated sites is as follows:

- International/European/National/Local statutory designated sites (such as SACs/SSSIs/Local Nature Reserves); and
- County or Local non-statutory designated sites – includes Local Wildlife Sites (LoWS) and other sites of conservation interest.

#### Statutory Designated Sites

4.3.3 There are eight statutory designated sites within 10km of the Site boundary, detailed in 4.3.4 below.

4.3.4 There are a number of statutory wildlife sites within 2km of the Site and internationally designated sites within 10km of the Site; these are outlined in Table 8. The statutory wildlife sites include:

- Sites of Special Scientific Interest (**SSSI's**);
- Local Nature Reserves (**LNR**);
- Special Areas of Conservation (**SAC**);
- Special Protection Areas (**SPA**);
- Marine Conservation Zone (**MCZ**); and
- Ramsar sites.

**Table 8 Statutory Wildlife Sites within the Study Area**

Site Name	Designation	Distance	Direction	Description
<b>International Sites within 10km</b>				
Colne Estuary	SPA/Ramsar (also SSSI)	1.2km	S	The estuary is of international importance for two wintering bird species, and of national importance for seven others. Habitats include: mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reed beds. Supports an outstanding assemblage of Invertebrates and plants.
Essex Estuaries	SAC (also SSSI)	1.2km	S	The Essex Estuaries SAC contains either fully and/or partially: five distinct SPAs, seven SSSIs and one MCZ. Features a diverse range of marine habitats and supports numerous marine species.



Table 8 Cont'd...

Site Name	Designation	Distance	Direction	Description
<b>International Sites within 10km</b>				
Abberton Reservoir	SPA/Ramsar	6.4km	SW	Largest body of freshwater in Essex. One of the most important reservoirs in the UK for waterfowl. 30,000 Birds visit annually, including one internationally important species and twelve nationally important species.
Blackwater Estuary	RAMSAR/SPA (also SSSI)	7.9km	SW	This site is the largest estuary in Essex birth of the Thames and is designated because its wetlands habitats are of international importance for birds.
Stour and Orwell Estuaries	SPA/Ramsar	10km	NE	The Stour and Orwell estuaries straddle the eastern part of the Essex/Suffolk border in eastern England. The estuaries include extensive mud-flats, low cliffs, saltmarsh and small areas of vegetated shingle on the lower reaches. The site also includes an area of low-lying grazing marsh at Shotley Marshes on the south side of the Orwell. In summer, the site supports important numbers of breeding Avocet, while in winter they hold major concentrations of water Birds, especially geese, ducks and waders. The geese also feed, and waders roost, in surrounding areas of agricultural land outside the SPA.
<b>National Sites within 2km (not mentioned above)</b>				
Upper Colne Marshes	SSSI	835m	S	Considered to be of special interest as it supports an outstanding assemblage of nationally scarce plants and an unusual diversity of brackish ditch-types. Additional interest is provided by scarce invertebrate species and the use of the site by breeding Birds. Some of which are listed as Schedule 1 species, including Barn Owl ( <i>Tyto alba</i> ).
Blackwater, Crouch, Roach and Colne Estuaries	MCZ	1.1km	S	Designated for its cliffs, foreshores, intertidal mixed sediment, native oyster ( <i>Ostrea edulis</i> ) and native oyster beds.
<b>Other Sites within 2km</b>				
Colne	LNR	1.5km	W	Features secondary and mixed coppiced woodlands, marshland and farmland, comprising mainly scrub and grassland. A receptor site for the translocation of Common Lizard.

4.3.5 There are no designated sites within the Site boundary. Several sites were identified within the wider search area. These sites vary from **International to County Importance**.

### Non-Statutory Wildlife Sites

4.3.6 There are 12 non-statutory Local Wildlife Sites (LoWS) within 2km of the Site boundary. These sites are summarised in Table 9.

**Table 9 Local Wildlife Sites within 2km of the Site boundary**

Site Name	Distance	Direction	Description
Villa Farm Quarry	Adjacent	S	Disused sand and gravel pit now comprising a mosaic of habitats. An area of ancient woodland (Cockaynes Wood) is also present. Site supports a variety of important plant, Invertebrate and breeding Bird populations.
Alresford Lodge Pits	1.3km	S	Disused gravel pit comprising a mosaic of ponds, reeds, woodland, scrub and grassland.
St. Peter's Church	1.4km	S	Small derelict church surrounded by grassland with trees and shrubs around the boundaries.
Crestland Wood Meadow	1.1km	SE	Rectangular grassland site adjacent to Crestland Wood supporting notable population of Glow-worm beetles.
Crestland Wood	1km	SE	Ancient woodland containing mixed deciduous and coniferous species.
Tenpenny Farm Wood	1.4km	W	Piece of woodland with attached hedge designated for its population of Dormice.
Fratinghall/Captains Woods	1.2km	W	Two contiguous ancient woodlands supporting Dormice.
Hockley Farm Woods	1.4km	W	Woodland and hedges supporting Dormice and as a potential Dormouse corridor.
Palegate Wood	0.4km	NE	Area of ancient woodland.
Park Wood	0.4km	NE	Small fragment of ancient woodland.
Wivenhoe Cross Pit	0.5km	NW	Brownfield tall ruderal grassland and scattered scrub, supporting nationally rare and scarce Invertebrate populations.
Arlesford Grange	0.9km	S	Broadleaved woodland supporting a population of Dormice.

4.3.7 There is one non-statutory designated site (Villa Farm Quarry LoWS) that borders the Site and four other LWS within 1km. LWS are of County Importance.

4.3.8 The closest wildlife corridor is the Sixpenny Brook partially within the Site and immediately adjacent to the west of the Site. Other wildlife corridors within the area include hedgerows and arable field margins. Any wildlife corridors are assessed as being of **Local Importance** in accordance with Table 4.

### **Habitats of Principal Importance and Ancient Woodland**

4.3.9 According to Essex Biodiversity Project, there are 11 HPI categories within Essex (Essex Biodiversity Project, 2010).

4.3.10 Based on the Priority Habitats Inventory provided by MAGIC (Natural England, 2016), there are two HPIs within 250m of the Site boundary and two within the Site boundary. The HPI within the Site boundary are: Arable Field Margins and Hedgerows.

4.3.11 Based on information provided by MAGIC, within 250m of the Site boundary there are a number of Habitats of Principal Importance (HPI) as shown in Table 10.

**Table 10 Habitats of Principal Importance (UK BAP and LBAP)**

Habitat Type	Distance and Direction
Deciduous woodland	Several areas adjacent to Site boundary to south and southwest.
Traditional Orchard	Within the Site boundary to the north of the Site and 100m east.
Arable Field Margins	Within the Site boundary (classified as Poor Semi-Improved Grassland for the purposes of this report).
Hedgerows	17 Hedgerows present within the Site of varying species diversity.

4.3.12 An area of Ancient Woodland called Cockaynes Wood exists directly adjacent to the southern boundary of the Site. The woodland has been subject to survey and review as part of the field surveys and reports undertaken in support of this EclA.

#### 4.4 OTHER SITES

4.4.1 Adjoining the southern boundary of the Site is Cockaynes Wood Nature Reserve, which is managed by Essex Wildlife Trust. This area is also within the Site designated as Villa Farm Quarry LoWS.

#### Protected Species and Species of Principal Importance

4.4.2 Essex Field Club and Essex Wildlife Trust provided records of several protected species and SPI within 2km of the Site. Where relevant to the Site and Proposed Development, these records are summarised within the species accounts in Section 5.

4.4.3 It should be noted that the dates of some of these records are more than 10 years old. The ecology of a Site can change rapidly and although a historical record indicates the presence of a protected species within 2km, these records cannot be relied upon wholly in the evaluation of a Site.

#### 4.5 EXTENDED PHASE 1 HABITAT SURVEY AND SPECIES SPECIFIC SURVEYS

4.5.1 All descriptions of habitats below have been taken from the updated Preliminary Ecological Appraisal (see Appendix A) (Crestwood Environmental Ltd., 2018).

#### Habitats

4.5.2 The Proposed Development area comprises the following habitat and vegetation types:

- Arable;
- Hedgerows;
- Improved Grassland;
- Orchard;
- Poor Semi-Improved Grassland; and
- Tall Ruderal.

4.5.3 The descriptions and location of these habitat types are shown on the Phase 1 Habitat Plan (Figure

E1) of the updated PEAR Report (Crestwood Environmental Ltd., 2018) in Appendix A of this report.

- 4.5.4 The habitats at the Site are typical of the surrounding rural landscape and are common and widespread. However, the hedgerows and arable field margins at the Site are considered to have a higher importance given their designation as a HPI. The habitats at the Site are therefore considered to be of **Local Importance**.

### **Plants**

- 4.5.5 The ZOI for plants was determined to be the habitats within and adjacent to the red line boundary of the Site. This was determined based on the presence of similar habitats bordering/surrounding the Site, an assessment of the potential effects of the Proposed Development on flora, along with information from the desk study and field surveys.
- 4.5.6 No notable or rare floral species were found at the Site and floral diversity was low for the Site overall. The habitats present and the likely management of the habitats mean they are unlikely to support rare or notable plant species. The Site is therefore of **Negligible Importance** for notable or rare plant species.
- 4.5.7 No Invasive plant species were recorded within the red line boundary during the survey.

### **Hedgerow Regulations Assessment**

- 4.5.8 All Hedgerows at the Site were subject to an assessment based on the Hedgerow Regulations 1997 criteria.

4.5.9 Table 11 details the results of the assessment, including the woody species present in each 30m stretch of surveyed Hedgerow (rounded to the nearest whole number where necessary).

**Table 11 Hedgerow Regulations Assessment**

Hedge No.	Length (m)	No of 30m Survey Sections	Number of Woody Species*	Features present as specified in Sub-paragraph 4 <sup>+</sup>	Species Rich <sup>#</sup>	Important
H1	147m	2	6	b) and d)	Yes	No
H2	235m	3	6	a)		
H3	180m	2	2	-	No	
H4	181m	2	5	b), e), h) and g)	Yes	Yes
H5	213m	3	4	-	No	No
H6	225m	3	4			
H7	200m	2	5	d) and g)	Yes	No
H8	340m	3	4	-	No	
H9	281m	3	3			
H10	327m	3	4			
H11	121m	2	4			
H12	130m	2	4			
H13	100m	1	1			
H14	197m	2	4			
H15	130m	2	4			
H16	365m	3	3			
H17	237m	3	4			

Note: \*where more than a single 30m stretch of Hedgerow was surveyed, the number of species per 30m survey section was added together and divided by the number of survey sections.  
<sup>+</sup>Sub-paragraph 4 of the Hedgerow Regulations 1997  
<sup>#</sup>Where more than a single 30m stretch of Hedgerow was surveyed the number of species per 30m survey section was added together and divided by the number of survey sections

4.5.10 A single Hedgerow (H4) is considered to be Important under the Hedgerow Regulations 1997. Four Hedgerows (including H4) are considered to be species rich (H1, H2, H4 and H7).

### Arboricultural Survey

4.5.11 An arboricultural survey was undertaken during August 2016 and was updated in January 2019 and assessed the importance of the trees within the Site and immediately adjacent to the Site boundary, with the Proposed Extension Area only.

4.5.12 A total of 110 trees, 21 groups of trees, 4 woodland areas and 13 hedgerows present within the Site and immediately adjacent to the Site boundary. On this Site T10, 11, 28, 37, 38, 39, 44, 54, 55, 56, 59, 60, 61, 63, 100, 102, 105 and 110 exhibit veteran features or pertain to having significant conservation, historical, commemorative A3 category in accordance with BS5837:2012.

4.5.13 Tree T105, classified as a recent veteran tree (A3), is to be removed as part of the Proposed Development. Considering the retention of all other veteran trees at the Site and the isolated nature

of this tree, removal is not considered to significantly affect the overall status of the Site. Additional tree planting, including those of a more mature nature, will be replanted as part of the restoration proposals, helping to mitigate the effects of loss of a recently categorised veteran tree.

### **Invertebrates**

- 4.5.14 Using a combination of information from the desk study and field surveys and an assessment of the potential effects of the Proposed Development on invertebrates, the ZoI for Invertebrates was determined to be the Site and bordering habitats.
- 4.5.15 Over 500 records for Priority and Notable Invertebrate species were returned by Essex Field Club as part of the desk study, three species of which are listed under Schedule 5 of the Wildlife and Countryside Act 1989 (as amended); Stag Beetle (*Lucanus cervus*), Large Tortoiseshell Butterfly (*Nymphalis polychloros*) and White-Letter Hairstreak Butterfly (*Satyrium w-album*).
- 4.5.16 No specific survey has been undertaken at the Site for terrestrial Invertebrates as the habitats at the Site suitable for Terrestrial Invertebrates were considered to be limited after assessment to the Habitat Suitability of the Site for Invertebrates.
- 4.5.17 It is considered the most suitable habitat for Invertebrates at the Site is the field margins, hedgerows and mature trees offering opportunities for common and widespread Invertebrate species. The flowering and fruiting plant species within the hedgerows, as well as the nectar-rich species within the grassland areas and areas set aside for Birds provide habitat for foraging Invertebrates. The mature trees within the hedgerows and along the boundaries of the Site are considered to be more suitable for invertebrate specialists of dead or decaying wood such as Saproxyllic Beetles. Based on this information, the Site is considered to provide habitat of **Site Importance** only.

### **Amphibians**

- 4.5.18 The ZoI for Great Crested Newts and other amphibians was determined using a combination of information from the desk study and field surveys, an assessment of the potential effects of the Proposed Development on amphibians plus information of the dispersal abilities of Great Crested Newts (Cresswell & Whitworth, 2004) and other amphibians (Langton & Beckett, 1995). The ZoI for Great Crested Newts was determined to be the Site and ecologically connected habitats within 500m. The ZoI for other amphibians was determined to be the Site and surrounding habitats within 500m.
- 4.5.19 Two records for Great Crested Newt were returned by Essex Field Club (EFC) (Essex Wildlife Trust, 2018) dated from 1985 within 4km of the Site boundary, located approximately 4km to the southwest of the centre of the Site and 2.4km southeast of the Site boundary. Essex Wildlife Trust provided undated records for Great Crested Newts near Elmstead Market, circa 1km to the north of the Site.
- 4.5.20 There are **33 ponds** at, and within 500m, of the Site; these are shown on the Pond Location Plan (Figure E1 in Appendix E2 of report CE-WQ-0992-RP01), which were subject to Habitat Suitability Index (HSI) assessment.
- 4.5.21 At the time of HSI survey, 1 pond was not accessible (28), whilst 5 ponds were recorded to be dry or no longer extant (1, 17, 23, 30, and 33).
- 4.5.22 Ponds that were assessed as being of 'Average', 'Good', or 'Excellent' suitability for Great Crested Newts were recommended for further survey for Great Crested Newts (see report reference CE-WQ-

0992-RP02 reproduced at Appendix B and C). Ponds which were assessed as being of 'Below Average' or 'Poor' were scoped out of recommended further survey, unless otherwise stated, following discussions with the Local Planning Officer.

#### Pond Assessment for Great Crested Newts

4.5.23 The desk study identified 33 waterbodies at, and within 500m of, the Site, all of which were surveyed using HSI assessment, unless dry and where accessible. A summary of results is detailed in Table 12.

**Table 12 Pond HSI Assessment scores.**

HSI score	Number of ponds within the site	Number of ponds within 500m of the Site	Total number of ponds scored using HSI	No longer extant or inaccessible	
				Within the Site	Within 500m of the Site
Excellent	0	4	4	0	6
Good	0	8	8		
Average	0	6	6		
Below Average	0	2	2		
Poor	0	7	7		

#### Presence/Likely Absence Survey

4.5.24 Table 13 summarises the presence/likely absence survey results. Detailed survey results can be found in Appendix B and C of report CE-WQ-0992-RP02.

**Table 13 Summary of Presence/Likely Absence Survey Results**

Pond Number	2	3	4	5	8	9	10	11	13	14	15	21	22	27	29	31
GCN Recorded													✓		✓	✓
Smooth Newt Recorded		✓		✓	✓	✓				✓	✓	✓	✓		✓	

4.5.25 **Great Crested Newt was found to be present** within three Ponds within 500m of the Site; Pond 22, 29 and 31. These ponds were then subject to an additional two surveys to determine an estimated population size.

#### Population Size Class Assessment

4.5.26 Great Crested Newt were recorded within Pond 22 (NGR TM 0573 2187), Pond 29 (NGR TM 05552165) and Pond 31 (NGR TM0557 2162) (see report reference CE-WQ-0992-RP02 reproduced at Appendix C).

4.5.27 Two additional neighbouring ponds were also subject to a Population Size Class Assessment (Pond 21

and 27), however no Great Crested Newt were recorded during these additional surveys indicating that **Great Crested Newt are likely absent from these ponds.**

- 4.5.28 The peak count for Great Crested Newts pond 29 within 500m of the Site is **15**, this indicates a **'medium' sized population** within this pond.
- 4.5.29 Ponds 22 and 31 were found to support **'small' sized populations** of Great Crested Newt.
- 4.5.30 Given the proximity of the population in pond 29 in particular it is intended that survey works will be maintained for this species.

### Reptiles

- 4.5.31 Using a combination of information from the desk study and field surveys, an assessment of the potential effects of the Proposed Development on Reptiles plus information on the dispersal abilities of common UK Reptile species (Langton & Beckett, 1995), the ZOI for Reptiles was determined to be the Site and ecologically connected habitats within 1km.
- 4.5.32 Essex Field Club (Essex Field Club, 2015) returned several records of Reptiles within a 4km search radius from the centre of the Site, species include: Slow Worm (*Anguis fragilis*), Common Lizard (*Zootoca vivipara*), Grass Snake (*Natrix helvetica*) and Adder (*Vipera berus*).
- 4.5.33 The closest record for Slow Worms was at a distance of 1.4km from the centre of the Site dated from 2011, the most recent was dated from 2014 at a distance of 4km. The closest and most recent record for Common Lizard was at a distance of 3.2km dated from 2012. The closest record for Grass Snake was at a distance of 2.1km dated from 2000, the most recent record was dated from 2012 at a distance of 2.9km. The closest record for Adder was at a distance of 2.9km dated from 1998, the most record is dated from 2004 at a distance of 3.3km.
- 4.5.34 A number of the Arable Field margins at the Site were considered to be suitable for Reptile species and were subsequently subject to a Population Size Class Assessment between April and September 2016 inclusive. Table 14 summarises Reptiles recorded at the Site. Full results can be found in report CE-WQ-0992-RP03 reproduced at Appendix D.

**Table 14 Reptile Population Size Class Assessment Summary**

Species	Total	Peak Count
<b>Slow-Worm (<i>Anguis fragilis</i>)</b>	0	0
<b>Common Lizard (<i>Zootoca vivipara</i>)</b>	6	3
<b>Grass Snake (<i>Natrix helvetica</i>)</b>	4	2

- 4.5.35 The peak count for Grass Snake at the Site was **2** indicating a **Low** population according to published guidance (Froglife, 1999).
- 4.5.36 The peak count for Common Lizard at the Site was **3** indicating a **Low** population according to published guidance (Froglife, 1999).

### Birds

- 4.5.37 Using a combination of information from the desk study and field surveys, and an assessment of the



potential effects of the Proposed Development on Birds, the ZoI for Birds was determined to be the Site and surrounding area within 2km. Information was obtained from the Essex Birdwatching Society website, using data from nine 1km squares, encompassing and surrounding the Site (Essex Birdwatching Society, 2013).

4.5.38 Records for Bird species were obtained from the Essex Birdwatching Society website (Essex Birdwatching Society, 2018).

4.5.39 Records for protected and notable Bird species within the 1km grid squares of the Site are shown in Table 15.

**Table 15 Protected and Notable Bird Species**

Schedule 1		Red List		Amber List	
Common Name	Latin Name	Common Name	Latin Name	Common Name	Latin Name
Brambling	<i>Fringilla montifringilla</i>	Pochard	<i>Aythya ferina</i>	Brent Goose	<i>Branta bernicla</i>
Fieldfare	<i>Turdus pilaris</i>	Grey Partridge	<i>Perdix perdix</i>	Shelduck	<i>Tadorna tadorna</i>
Black-Tailed Godwit	<i>Limosa limosa</i>	Ringed Plover	<i>Charadrius hiaticula</i>	Teal	<i>Anas crecca</i>
Greenshank	<i>Tringa nebularia</i>	Curlew	<i>Numenius arquata</i>	Mallard	<i>Anas platyrhynchos</i>
Hen Harrier	<i>Circus cyaneus</i>	Woodcock	<i>Scolopax rusticula</i>	Goldeneye	<i>Bucephala clangula</i>
Marsh Harrier	<i>Circus aeruginosus</i>	Herring Gull	<i>Larus argentatus</i>	Oystercatcher	<i>Haematopus ostralegus</i>
Hobby	<i>Falco subbuteo</i>	Turtle Dove	<i>Streptopelia turtur</i>	Bar-Tailed Godwit	<i>Limosa lapponica</i>
Kingfisher	<i>Alcedo atthis</i>	Cuckoo	<i>Cuculus canorus</i>	Turnstone	<i>Arenaria interpres</i>
Red Kite	<i>Milvus milvus</i>	Skylark	<i>Alauda arvensis</i>	Knot	<i>Calidris canutus</i>
Merlin	<i>Falco columbarius</i>	Grasshopper Warbler	<i>Locustella naevia</i>	Dunlin	<i>Calidris alpina</i>
Barn Owl	<i>Tyto alba</i>	Starling	<i>Sturnus vulgaris</i>	Common Sandpiper	<i>Actitis hypoleucos</i>
Peregrine	<i>Falco peregrinus</i>	Ring Ouzel	<i>Turdus torquatus</i>	Redshank	<i>Tringa totanus</i>
Little Ringed Plover	<i>Charadrius dubius</i>	Song Thrush	<i>Turdus philomelos</i>	Snipe	<i>Gallinago gallinago</i>
Redwing	<i>Turdus iliacus</i>	Mistle Thrush	<i>Turdus viscivorus</i>	Common Tern	<i>Sterna hirundo</i>
Green Sandpiper	<i>Tringa ochropus</i>	Spotted Flycatcher	<i>Muscicapa striata</i>	Black-Headed Gull	<i>Chroicocephalus ridibundus</i>
Scaup	<i>Aythya marila</i>	Whinchat	<i>Saxicola rubetra</i>	Yellow Legged Gull	<i>Larus michahellis</i>
Cetti's Warbler	<i>Cettia cetti</i>	Yellow Wagtail	<i>Motacilla flava</i>	Great Black-	<i>Larus marinus</i>

Schedule 1		Red List		Amber List	
Common Name	Latin Name	Common Name	Latin Name	Common Name	Latin Name
				Backed Gull	
Whimbrel	<i>Numenius phaeopus</i>	Grey Wagtail	<i>Motacilla cinerea</i>	Stock Dove	<i>Columba oenas</i>
Greylag Goose	<i>Anser anser</i>	Linnet	<i>Carduelis cannabina</i>	Tawny Owl	<i>Strix aluco</i>
Common Scoter	<i>Melanitta nigra</i>	Lesser Redpoll	<i>Acanthis cabaret</i>	Swift	<i>Apus apus</i>
Mediterranean Gull	<i>Ichthyaeus melanocephalus</i>	Yellowhammer	<i>Emberiza citrinella</i>	Kestrel	<i>Falco tinnunculus</i>
Osprey	<i>Pandion haliaetus</i>	Corn Bunting	<i>Emberiza calandra</i>	House Martin	<i>Delichon urbicum</i>
Avocet	<i>Recurvirostra avosetta</i>	Red-Necked Grebe	<i>Podiceps grisegena</i>	Willow Warbler	<i>Phylloscopus trochilus</i>
Little Tern	<i>Sternula albifrons</i>	Tree Pipit	<i>Anthus trivialis</i>	Dunnock	<i>Prunella modularis</i>
Firecrest	<i>Regulus ignicapilla</i>	Nightingale	<i>Luscinia megarhynchos</i>	Meadow Pipit	<i>Anthus pratensis</i>
Crossbill	<i>Loxia curvirostra</i>	-	-	Bullfinch	<i>Pyrrhula pyrrhula</i>
Black Redstart	<i>Phoenicurus ochruros</i>	-	-	Reed Bunting	<i>Emberiza schoeniclus</i>
-	-	-	-	Grey Plover	<i>Pluvialis squatarola</i>
-	-	-	-	Curlew Sandpiper	<i>Calidris ferruginea</i>
-	-	-	-	Spotted Redshank	<i>Tringa erythropus</i>
-	-	-	-	Sandwich Tern	<i>Thalasseus sandvicensis</i>
-	-	-	-	Short-Eared Owl	<i>Asio flammeus</i>
-	-	-	-	Redstart	<i>Phoenicurus phoenicurus</i>

**\*Note: Species have not repeated within the table, some red and amber listed species have been omitted as they have already been mentioned in the Schedule 1 column.**

### Breeding Bird Survey

4.5.40 Breeding bird surveys were completed during spring 2016 and consisted of three surveys between April and June. Each of the survey visits were separated by at least two weeks and surveys started within 1 hour of sunrise (see report reference CE-WQ-0992-RP04 reproduced at Appendix E).

4.5.41 A total of 50 species of bird were recorded over the three survey visits at the Site and a further 18 species in the adjacent land (Cockaynes Wood, Essex Wildlife Trust). Of these:

- 8 were **confirmed to be breeding** on or immediately adjacent to the Proposed Development

area;

- 19 were **probable breeding species**; and
- 11 were **possible breeding species**.

#### Schedule 1 Species

4.5.42 No Schedule 1 species were recorded within the Site boundary, with the exception of Greylag Goose (*Anser anser*) where only feral birds would have been recorded that is not protected.

#### Birds of Conservation Concern

4.5.43 Red and Amber species of Birds of Conservation Concern are listed below and the locations of those with Confirmed Breeding status are shown on Figures E1, E2 and E3.

#### Red Species

4.5.44 10 Red Listed Birds of Conservation Concern (BoCC) species were recorded within the Site boundary during the surveys.

**Table 16 Red Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	EOAC Status	SPI	Notes
Grey Partridge	<i>Perdix perdix</i>	Possible breeding	Y	A single male seen in April.
Curlew	<i>Numenius arquata</i>	Non breeding	Y	Flew over only.
Cuckoo	<i>Cuculus canorus</i>	Possible breeding	Y	Up to males singing on or adjacent to Site.
Skylark	<i>Alauda arvensis</i>	Probable breeding	Y	Recorded on every survey. Up to eight territories or pairs.
Starling	<i>Sturnus vulgaris</i>	Possible breeding	Y	Recorded flying over only but there is suitable habitat on Site.
Song Thrush	<i>Turdus philomelos</i>	Probable breeding	Y	Recorded on all surveys. Up to three territories or pairs.
Linnet	<i>Linaria cannabina</i>	Probable breeding	Y	Recorded on all surveys. Up to three territories or pairs.
Corn Bunting	<i>Emberiza calandra</i>	Possible breeding	Y	One singing male recorded in June.
Yellowhammer	<i>Emberiza citrinella</i>	Probable breeding	Y	Recorded on all surveys. Up to four territories or pairs.
Herring Gull	<i>Larus argentatus</i>	Non breeding	Y	Flew over only.

## Amber Species

4.5.45 11 Amber Listed BoCC species were recorded within the Site boundary during the surveys as listed in Table 17.

**Table 17 Amber Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	EOAC Status	SPI	Notes
Greylag Goose	<i>Anser anser</i>	Non breeding	N	Up to 31 feeding and loafing on the fields.
Shelduck	<i>Tadorna tadorna</i>	Non breeding	N	Flew over only. Up to four.
Mallard	<i>Anas platyrhynchos</i>	Possible breeding	N	Birds seen in April and May but no indication of nesting.
Oystercatcher	<i>Haematopus ostralegus</i>	Non breeding	N	Flew over only. Breeding on adjacent land.
Common Tern	<i>Sterna hirundo</i>	Non breeding	N	Flew over only.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Non breeding	N	Flew over only.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Non breeding	N	Flew over only.
Stock Dove	<i>Columba oenas</i>	Probable breeding	N	Pair seen in April and May.
Swift	<i>Apus apus</i>	Non breeding	N	Flew over only.
Kestrel	<i>Falco tinnunculus</i>	Possible breeding	N	Single bird recorded hunting over Site in April.
Dunnock	<i>Prunella modularis</i>	Probable breeding	Y	Recorded on all surveys. Up to four territories or pairs.

4.5.46 The results of the breeding bird survey (see report reference CE-WQ-0992-RP04 reproduced at Appendix E) indicate that the habitats within the Survey Area support typical assemblages for the habitat types with widespread and ubiquitous bird species distributed across the Site.

4.5.47 The majority of bird registrations were from the edge habitats (particularly near the woodlands) along the Site's hedgerows. Birds were recorded feeding within the arable field and breeding activity included up to eight Skylark territories and single registrations of Grey Partridge and Corn Bunting.

4.5.48 The Site is considered to be of **Local importance for lowland farmland birds** due to the high number of BoCC amber and red list species as well as three Local BAP species (Grey Partridge, Skylark and Song Thrush) present on the Site.

4.5.49 Full results of the Breeding Bird Survey can be found in the Breeding Bird Survey report (ref: CE-WQ-0992-RP04).

## Winter Bird Survey

4.5.50 Winter bird surveys were completed during winter 2015/2016 and consisted of six surveys undertaken over two days between October 2015 and March 2016 (see report reference CE-WQ-0992-RP05 reproduced at Appendix F). The survey on the first day was in the afternoon and evening, with the possibility of recording crepuscular species. The survey on the second day was from or near to dawn through to early afternoon to record general activity on Site.

- 4.5.51 A total of **56 species** have been recorded during the wintering bird surveys at the Site with a further 16 at the pools in adjacent land (Cockaynes Wood).
- 4.5.52 The winter bird assemblage within the boundaries of the Site consists mainly of species typically associated with lowland farmland, including 13 Red and 12 Amber list species as well as two species listed on the Essex Biodiversity Action Plan: Skylark and Grey Partridge.

### Schedule 1 Species

- 4.5.53 A total of 5 bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 have been recorded during the surveys within the boundaries of the Site, as shown in Table 18.

**Table 18 Schedule 1 Birds Recorded**

Common Name	Scientific Name	SPI	BOCC	Notes
Peregrine	<i>Falco peregrinus</i>	N	Green list	One bird flew over in December
Firecrest	<i>Regulus ignicapilla</i>	N	Green list	One bird recorded on three occasions in the woodlands (two birds recorded in the area)
Cetti's Warbler	<i>Cettia cetti</i>	N	Green list	Up to two birds recorded singing in the Cockaynes Wood reserve
Fieldfare	<i>Turdus pilaris</i>	N	Red list	Flocks of up to 35 birds present most months
Redwing	<i>Turdus iliacus</i>	N	Red list	Flocks of up to 45 birds present most months

### Birds of Conservation Concern

- 4.5.54 Red and Amber species of Birds of Conservation Concern are listed below.

### Red Species

- 4.5.55 13 Red Listed Birds of Conservation Concern (BoCC) species were recorded within the Site boundary (see Table 19).

**Table 19 Red Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	SPI	Notes
Grey Partridge	<i>Perdix perdix</i>	Y	Two birds present in December and January
Lapwing	<i>Vanellus vanellus</i>	Y	Recorded in November and December. Peak of 142 and some birds flying over
Woodcock	<i>Scolopax rusticola</i>	N	Up to two birds recorded
Herring Gull	<i>Larus argentatus</i>	Y	Thirty in November feeding in arable field and small numbers flying over
Skylark	<i>Alauda arvensis</i>	Y	Small numbers on most surveys. Up to eight singing/displaying over the fields
Starling	<i>Sturnus vulgaris</i>	Y	Up to 145 birds feeding in the arable fields
Song Thrush	<i>Turdus philomelos</i>	Y	Small numbers present throughout Site. Several birds singing
Mistle Thrush	<i>Turdus viscivorus</i>	N	Small numbers present. Recorded singing
Linnet	<i>Carduelis cannabina</i>	Y	Winter flocks of up to 200 birds
Lesser Redpoll	<i>Acanthis cabaret</i>	Y	Small numbers present throughout the Site. Mainly associated with the woodlands
Yellowhammer	<i>Emberiza citrinella</i>	Y	Winter flocks of up to 20 birds. Several recorded singing
Redwing	<i>Turdus iliacus</i>	N	Flocks of up to 45 birds present most months
Fieldfare	<i>Turdus pilaris</i>	N	Flocks of up to 35 birds present most months

### Amber Species

4.5.56 12 Amber Listed BoCC species were recorded within the Site boundary (see Table 20).

**Table 20 Amber Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	SPI	Notes
Greylag Goose	<i>Anser anser</i>	N	Small numbers flying over occasionally
Gadwall	<i>Anas strepera</i>	N	Small numbers flying over occasionally
Mallard	<i>Anas platyrhynchos</i>	N	Small numbers associated with Sixpenny Brook to the west of the Site
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	N	Varying numbers feeding in arable field or flying over. Peak of 360 in November
Common Gull	<i>Larus canus</i>	N	Small numbers feeding on fields or flying over
Lesser Black-backed Gull	<i>Larus fuscus</i>	N	One in November and small numbers flying over
Stock Dove	<i>Columba oenas</i>	N	Small numbers present
Tawny Owl	<i>Strix aluco</i>	N	One bird heard in March in Cockaynes Wood
Kestrel	<i>Falco tinnunculus</i>	N	Pair displaying in the west of the Site
Dunnock	<i>Prunella modularis</i>	Y	Small numbers present throughout the Site
Meadow Pipit	<i>Anthus pratensis</i>	N	Small numbers present throughout the Site
Reed Bunting	<i>Emberiza schoeniclus</i>	Y	Single and two birds recorded in wild bird strips

- 4.5.57 The Site is considered to be of importance at Site level only for Golden Plover and Lapwing however due to the high number of BoCC amber and red list species as well as two Local BAP species present on the Site it is considered to be of **County importance for lowland farmland birds**.
- 4.5.58 Full results of the Winter Bird Survey can be found in the Winter Bird Survey report (ref: CE-WQ-0992-RP05) in Appendix F.

**Bats**

- 4.5.59 Using a combination of information from the desk study and field surveys, and an assessment of the potential effects of the Proposed Development on Bats, the ZoI for Bats was determined to be the Site and habitats within 2km.
- 4.5.60 Numerous Bat records were returned within 4km from the centre of the Site by the local biological records centre (Essex Field Club, 2015). The records are scattered around the Site, with the closest record of a Daubenton’s Bat (*Myotis daubentonii*) at a distance of approximately 80m southwest of the Site in 2006.
- 4.5.61 Records of 9 Bat species were returned within 2km of the Site boundary including: Daubenton’s Bat, Common Pipistrelle Bat (*Pipistrellus pipistrellus*), Noctule Bat (*Nyctalus noctula*), Soprano Pipistrelle Bat (*Pipistrellus pygmaeus*), Brown Long-Eared Bat (*Plecotus auritus*), Serotine Bat (*Myotis serotinus*), Leisler’s Bat (*Nyctalus leisleri*), Kuhl’s Pipistrelle (*Pipistrellus kuhlii*) and Natterer’s Bat (*Myotis nattereri*).
- 4.5.62 Several records of unidentified *Myotis* species were also recorded within 4km of the centre of the Site.
- 4.5.63 Specific records of roosts were not provided by the local biological records centre.
- 4.5.64 The results of the 2016 Bat Surveys are detailed in Table 21. A plan of the survey Site and transect route can be found in CE-WQ-0992- RP06 (Appendix G).

**Table 21 Summary of Bat Activity Survey Results May to October 2016**

Date	Dusk/Dawn	Transect Reference	Species recorded	Activity
10.05.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Brown Long-Eared	Heard not seen
11.05.16	Dawn	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Commuting
20.05.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Noctule	Commuting
			Myotis Sp.	Heard not seen
15.06.16	Dawn	Transect A	Soprano Pipistrelle	Foraging and Commuting
			Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting

Table 21 Cont'd...

Date	Dusk/Dawn	Transect Reference	Species recorded	Activity
15.06.16	Dusk	Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
16.06.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
19.07.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
20.07.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
16.08.16	Dusk	Transect A	Common Pipistrelle	Commuting
			Myotis Sp.	Commuting
			Brown Long-Eared	Commuting
			Natterers Bat	Commuting
17.08.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Noctule	Heard not seen
21.09.16	Dusk	Transect A	Common Pipistrelle	Foraging, commuting and social calling
			Myotis Sp.	Foraging and commuting
		Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Commuting
			Noctule	Commuting
19.10.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
			Myotis Sp.	Foraging and commuting
		Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
<b>Total number of species recorded</b>	Transect A	<b>5</b>		
	Transect B	<b>4</b>		

4.5.65 Further emergence/re-entry Bat surveys are to be undertaken on trees likely to be removed/disturbed as part of the Proposed Development, undertaken in advance of the relevant phase. Table 22 details the trees which are considered to be affected as part of the Proposed Development and the number of surveys required.



**Table 22 Bat Trees for Further Survey**

Tree Reference	Hedgerow Location	Bat Roost Suitability	Survey Requirements
T1	H4	Moderate	2 separate surveys (1 dusk and 1 separate dawn) between May and August inclusive.
T13			
T16	H7	Low*	1 survey (either dusk or dawn) between May and August inclusive.
T21	H8		
T4	H6		1 emergence survey undertaken during September 2018. No emergences recorded.
T12			

Note: \*Trees of Low roost suitability are usually not surveyed (as per standard survey guidance), however as these trees are to be removed/disturbed, it is recommended further survey is undertaken.

4.5.66 An emergence/re-entry Bat survey was undertaken on two trees during September 2018 (T4 and T12).

4.5.67 All trees will be surveyed immediately prior to each relevant phase.

#### Automated Surveys

4.5.68 The majority of activity was Common Pipistrelle Bat and Soprano Pipistrelle Bat, including Brown Long-Eared, Noctule and Unidentified Myotis species. Other less common species included Serotine, Nathusius Pipistrelle Bat and Barbastelle Bat.

4.5.69 Table 23 summarises the Bat species that were recorded by the automatic Bat detectors during May to October 2016 inclusive. Locations of the automated survey equipment can be found on Figure E13 found in report CE-WQ-0992-RP06, Appendix G.

**Table 23 Summary of Automated Survey Results (May – October 2016)**

Month	Date	Transect	Location	Species Recorded	Number of Passes
May	20 <sup>th</sup> -24 <sup>th</sup>	A	SA1	Brown Long-Eared	15
				Common Pipistrelle	84
				Soprano Pipistrelle	197
				<i>Myotis</i> sp.	16
				Noctule	26
				Serotine	69
	25 <sup>th</sup> -29 <sup>th</sup>	SA2	Common Pipistrelle	21	
			Soprano Pipistrelle	80	
			Brown Long-Eared	2	
			Noctule	1	
12 <sup>th</sup> -16 <sup>th</sup>	B	SB1	Common Pipistrelle	45	
			Soprano Pipistrelle	18	

Table 23 Cont'd...

Month	Date	Transect	Location	Species Recorded	Number of Passes	
June	-	A	SA1	-	-	
	16 <sup>th</sup> -20 <sup>th</sup>		SA2	Common Pipistrelle	23	
				Soprano Pipistrelle	86	
				Brown Long-Eared	2	
				Noctule	1	
<i>Myotis</i> sp.	1					
June	16 <sup>th</sup> -20 <sup>th</sup>	B	SB1	Common Pipistrelle	17	
				Soprano Pipistrelle	62	
				Noctule	1	
July	20 <sup>th</sup> -24 <sup>th</sup>	A	SA1	Common Pipistrelle	75	
				Soprano Pipistrelle	104	
				<i>Myotis</i> sp	3	
				Noctule	2	
	-	-	B	SB1	Brown Long-Eared	6
					-	-
August	-	A	SA1	-	-	
	17 <sup>th</sup> -21 <sup>st</sup>		SA2	Common Pipistrelle	369	
				Brown Long-Eared	4	
				<i>Myotis</i> sp.	1	
	17 <sup>th</sup> -21 <sup>st</sup>	B	SB1	Soprano Pipistrelle	997	
				Brown Long-Eared	6	
				Common Pipistrelle	508	
				<i>Myotis</i> sp.	3	
				Noctule	32	
				Soprano Pipistrelle	1261	
Barbastelle	32					
Serotine	2					
September	-	A	SA1	-	-	
	-		SA2	NO DATA	-	
	21 <sup>st</sup> -25 <sup>th</sup>	B	SB1	Common Pipistrelle	801	
				<i>Myotis</i> sp.	3	
				Noctule	5	
				Nathusius Pipistrelle	18	
Brown Long-Eared	3					
Soprano Pipistrelle	420					

October	-	A	SA1	-	-
	-		SA2	NO DATA	-
	29 <sup>th</sup> Sept – 3 <sup>rd</sup> Oct	B	SB1	Brown Long-Eared.	4
				Common Pipistrelle	50
				Nathusius Pipistrelle	2
				Soprano Pipistrelle	96
				Barbastelle	2
<i>Myotis</i> sp.	1				

4.5.70 Table 24 provides the conservation status of each confirmed Bat species recorded at the Site.

**Table 24 National status and population trends of Bat species**

Species name	Population estimate (Harris, et al., 1995)	Current trend (Bat Conservation Trust, 2014)	IUCN status (IUCN, 2010)	UK Status (Bat Conservation Trust, 2014)	Survey method
Common pipistrelle <i>Pipistrellus pipistrellus</i>	2,430,000	Significant upward trend*	Least concern (2008)	Common	NBMP Field Survey *
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	1,300,000	Increasing*	Least concern (2008)	Common	NBMP Field Survey *
Noctule <i>Nyctalus noctula</i>	50,000	No significant overall change, stable	Least concern (2008)	Uncommon	NBMP Field Survey*
Brown Long-Eared <i>Plecotus auritus</i>	245,000	Stable	Least concern (2008)	Common	NBMP Field Survey*
Natterer's Bat <i>Myotis Natereri</i>	148,000	No significant overall change, stable	Least concern (2008)	Uncommon	NBMP Field Survey*
Nathusius Pipistrelle <i>Pipistrellus nathusii</i>	16,000	-	-	-	-
Barbastelle Bat <i>Barbastella barbastellus</i>	5,000	-	-	-	-

\* = NBMP Field Survey count provides a better reflection of population change (BCT, 2011)

4.5.71 There is insufficient data on the Barbastelle Bat and Nathusius Pipistrelle Bat to allow for calculation of population trends. The majority of *Myotis* species have been grouped together due to overlap in call characteristics when identifying individual species.

4.5.72 Based on the type of Bat activity recorded at the Site, the species assemblage and habitat quality, the Site is assessed as being of **County Importance** for Bats, given the small number of Barbastelle Bat and Nathusius Pipistrelle Bat recorded at the Site.

4.5.73 Further survey will detail the use of the Site by Barbastelle (and other species). Following these appropriate mitigation will be provided prior to the commencement of each Phase, where necessary.

### Badger

4.5.74 Using a combination of information from the desk study and field surveys and an assessment of the

potential effects of the Proposed Development on Badger, the ZoI for Badger was determined to be the Site and bordering habitats within a 30m radius.

- 4.5.75 Numerous records for Badger, within 2km, were identified during the desk study, with the closest record in recent years at a distance of 100m to the west of the Eastern Extension Site boundary at TM 054 230 in 2011.
- 4.5.76 The Site supports suitable foraging habitat for Badgers, however no evidence of foraging was found at the Site and no evidence was found of any Badger setts at or within 30m of the Site. There is abundant foraging habitat for Badgers in the local area as the wider landscape is dominated by Arable fields and areas of scattered woodland.
- 4.5.77 This survey was updated in September 2018 and no evidence of foraging was found at the Site and no evidence was found of any Badger setts at or within 30m of the Site.

### **Other Mammals**

#### **Water Vole**

- 4.5.78 Using a combination of information from the desk study and field surveys, information on the dispersal abilities of Dormice (Bright, et al., 2006) and an assessment of the potential effects of the Proposed Development on Water Vole (*Arvicola amphibius*), the ZoI was determined to be the Site and ecologically connected habitats within 50m.
- 4.5.79 Essex Field Club (EFC) returned numerous records of Water Vole within 4km of the Site boundary. Two records are from 1995 and are located within the Site boundary, approximately 160m east of the Sixpenny Brook at TM 071 201.
- 4.5.80 Essex Wildlife Trust (EWT) also provided several recent records for Water Vole along the Sixpenny Brook, the closest of which is located approximately 700m south of the Site and dated 2002.
- 4.5.81 The most recent record of Water Vole was returned by EWT dated 2014, located approximately 1.7km south of the Site along the Sixpenny Brook.
- 4.5.82 The Water Vole survey was carried out in accordance with guidance in the Water Vole Conservation Handbook (Rob Strachan, 2011) on 25<sup>th</sup> May 2016. The survey was undertaken on all ditches within the immediate vicinity of the Site, as well as those within the wider area which were well connected to the Site (no further than a distance of 400m from the approximate centre of the Site) (see report reference CE-WQ-0992-RP07 reproduced at Appendix H).
- 4.5.83 Three sections of the Sixpenny Brook were surveyed for Water Vole; Northern section; Southern Section; and Central Section all of which are within 50m of the Site boundary. Figure E1 in Appendix E2 of report CE-WQ-0992-RP01 details the Brook location.

4.5.84 Table 25 summarises the results of the surveys of the Sixpenny Brook.

**Table 25 Summary of Water Vole Survey Results (25.05.2016)**

Area Surveyed	Water Vole Presence Confirmed?	Description of Field Signs Found
Northern Section	No	N/A
Central Section	No	N/A
Southern Section	No	N/A

4.5.85 No evidence of Water Vole was recorded within the Sixpenny Brook at the time of survey. The habitat along the Sixpenny Brook that was surveyed was considered to be of Low Suitability for Water Vole.

#### Dormouse

4.5.86 Using a combination of information from the desk study and field surveys, information on the dispersal abilities of Dormice (Bright, et al., 2006) and an assessment of the potential effects of the Proposed Development on Dormice (*Muscardinus avellanarius*), the ZOI was determined to be the Site and ecologically connected habitats within 30m.

4.5.87 Essex Field Club (Essex Field Club, 2015) returned several records of Dormice within a 4km search radius from the centre of the Site, the most recent of which are two records dated from 2010 located approximately 180m west of the Site at TM 05299 22004.

4.5.88 The Dormouse records were predominantly associated with the areas of broadleaved woodland in the local area, one area of woodland located adjacent to the southwest boundary and another area of woodland approximately 1.1km from the eastern boundary of the Site.

4.5.89 Dormouse surveys were undertaken within the hedgerows at the Site. The nest tubes were placed at the Site in early April 2016 and were subsequently checked for Dormouse occupancy on a monthly basis for 6 months until October 2016 (see report reference CE-WQ-0992-RP084 reproduced at Appendix I).

4.5.90 Table 26 below states the results of the Dormouse nest tube surveys at the Site.

**Table 26 Dormouse Survey Results Summary**

Survey Date	Survey Number	Results	Other Species
26/05/2016	1	No Dormice	None
15/06/2016	2	No Dormice	None
19/07/2016	3	No Dormice	None
16/08/2016	4	No Dormice	None
22/09/2016	5	No Dormice	None
19/10/2016	6	No Dormice	None

4.5.91 Dormice were not found to be present at the Site during the surveys undertaken between May and October 2016. There have been no habitat changes on Site since the survey.

### Mammal Species of Principal Importance

- 4.5.92 Using a combination of information from the desk study and field surveys and an assessment of the potential effects of the Proposed Development on mammal SPI's recorded within 2km, the ZoI was determined to be the Site and ecologically connected habitats within 30m.
- 4.5.93 Several Otter (*Lutra lutra*) records were provided, with the nearest being a 2010 record along Tenpenny Brook circa 1.5km to the east.
- 4.5.94 Several Priority mammal species have been recorded within 2km, including: Polecat (*Mustela putorius*); Harvest Mouse (*Micromys minutus*); Brown Hare (*Lepus europaeus*); and Hedgehog (*Erinaceus europaeus*).
- 4.5.95 Although no specific surveys for these species were carried out, no evidence of activity by any of these species was found during the Phase 1, or other surveys. The habitats at the Site are considered suitable for other mammal species, including Brown Hare, Hedgehog and Rabbit (*Oryctolagus cuniculus*).

## 4.6 SUMMARY OF EVALUATION

- 4.6.1 Table 27 summarises the Baseline Conditions and Value of each receptor within the potential Zone of Influence of the Proposed Development:

**Table 27 Summary of Baseline Conditions and Evaluation**

Ecological Receptor	Within Site boundary	Within Zone of Influence*	Level of Importance
International/European Statutory Designated Sites	No	Yes	International
National Statutory Designated Sites	No	Yes	Regional
Non-Statutory Designated Sites	No	Yes	County
Other Sites and CTA	No	No	Local - District
Habitats of Principal Importance	Yes	Yes	Local
Veteran Trees	Yes	Yes	District
<b>Protected/Rare/Notable Species &amp; Species Groups</b>			
Plants	No	No	Negligible
Invertebrate assemblage	Yes	Yes	Site
Great Crested Newts	No	Yes	Site
Other Amphibians	No	No	Negligible
Reptiles	Yes	Yes	Site
Birds	Yes	Yes	Local - County
Bats	Yes	Yes	County
Badgers	No	Yes	Site
Water Vole	No	Yes	Site
Hazel Dormouse	No	Yes	Site
Other Species of Principal Importance	No	Yes	Site

\* = Presence within ZoI determined by desk study and/or field survey.

## 5 ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

### 5.1 INTRODUCTION AND GENERAL APPROACH

- 5.1.1 This section considers the direct and indirect effects of the Proposed Development on ecological receptors. For each receptor included in the assessment, the likely significant effects are identified and appropriate mitigation described. Where no significant effect is likely this is stated and justified.
- 5.1.2 The operational and restoration design for the Site has taken into account the requirement to mitigate against any effects of any of the Proposed Development as far as possible – aiming to avoid them in the first instance and, if this is not possible, to minimise the adverse effects and then off-setting/compensating for any residual effects during the operational period, with opportunities considered to provide enhancement where practical/applicable.
- 5.1.3 A key decision in this regard is the retention of several important hedgerows at the Site not only for their value in their own capacity but also as a Green Infrastructure Asset.
- 5.1.4 With any mineral developments, avoidance of all impacts is often difficult to achieve, as existing habitat is always likely to temporarily removed, wherever extraction occurs. Peripheral features and habitats can be retained and the soil resource can be retained for use in on-Site and off-Site habitat recreation. However at Wivenhoe the vast majority of the proposed extension comprises productive arable land that is mainly of limited ecological value.
- 5.1.5 A phased programme of operations (extraction), coupled with progressive restoration, will minimise the net habitat losses at any one moment in time. This mitigation will help to maximise retention of ecological value during the operational period. All operations will be subject to appropriate controls via a Construction Environmental Management Plan (refer Appendix L) which will be secured via an appropriately worded planning condition.
- 5.1.6 Valued habitats, lost during the operational period, will be incorporated into the restoration scheme like-for-like, to demonstrate a status quo of ecological value on a comparable basis. Where this is not possible, different habitats and features of at least equal ecological value will be provided. Where the provision of these provides ecological value over and above that already present (or part of the baseline), it would be considered to be enhancement (benefit), but may off-set other unavoidable negative effects (e.g. temporal effects) that may be present from operational working.
- 5.1.7 The restoration scheme envisaged as part of this application will deliver over 50 hectares of Priority Habitat, and therefore has the potential to generate a long term beneficial effect. All establishment and management regimes for the habitats will be subject to appropriate controls via a Biodiversity Enhancement Management Plan (refer Appendix K) which will be secured via an appropriately worded planning condition and/or Planning Obligation; with a supporting Habitat Management Group.
- 5.1.8 When considering the mitigation for the likely loss of ecological value present within the Site, local and national policies and legislation have been considered.

#### **Project Design Targets**

- 5.1.9 The following is a list of proposed achievable targets used in the design of the Proposed Development in respect of mitigation, restoration and enhancement:

- No net loss in biodiversity;
- Positive improvement of retained habitats;
- Maintain (in the short term) and enhance (in the longer term) the local wildlife corridors and other Green Infrastructure;
- Use opportunities on-Site to restore habitats where possible; and
- Continued monitoring programme.

### **Assumptions**

5.1.10 The 'Do Nothing' Scenario at the Site would be that the existing fields continue to be managed for agricultural purposes and that the Existing Quarry is worked and restored as per the existing approved scheme.

5.1.11 There are a number of assumptions made prior to this assessment, which are as follows:

- The overall extension in terms of time to complete the works within the Proposed Extension Area will be 19 years for extraction with a further 2 years to complete restoration;
- Initial preparation works prior to mineral extraction in the Proposed Eastern Extension area will take no more than 6 months- 12 months;
- Phased restoration is progressive and the final restoration being completed within 24 months of the completion of the operations at the Site; and
- Aftercare for the nature conservation habitats would last a period of 25 years after the completion of restoration consistent with Local Policy Objectives

### **Likely Biophysical Changes**

5.1.12 The biophysical changes likely to occur (in an absence of mitigation) as a result of the Proposed Development are as follows:

- Loss of arable fields and grassland, some hedgerows,
- Creation of new Site infrastructure, including new Site access, plant Site , lagoons and haul road network;
- Increase in human activity and vehicle movements relative to the current situation;
- Increase in noise, vibrations and dust from extraction activities relative to the current situation ; and
- Change in hydrological and hydrogeological systems during extraction and subsequent restoration.



## 5.2 DESIGNATED SITES AND OTHER SITES OF CONSERVATION INTEREST

### Designated Sites

#### Assessment of Effects

- 5.2.1 There are a number of Statutory Sites within 10km of the Site, designated for their ecological interest. The Sixpenny Brook at the western boundary of the Proposed Extension Area links to the Colne Estuary SPA/Ramsar and SSSI, the Essex Estuaries SAC and SSSI at approximately 4.5km south of the Proposed Sixpenny Brook Crossing area.
- 5.2.2 There are four International Statutory Sites within 10km of the Site designated for their ecological interest, including the Colne Estuary SPA/Ramsar and SSSI, Essex Estuaries SAC and SSSI which are linked to the Site via the Sixpenny Brook. One SSSI, not also listed under an international designation, is located within 1km of the Site.
- 5.2.3 It is considered there will be no significant direct effects on statutory sites as a result of the Proposed Development and the need for Appropriate Assessment as a result of the Proposed Development is considered unnecessary.
- 5.2.4 However, as requested by Essex County Council (August 2018 comments) a document has been produced detailing Habitat Regulation Assessment Screening Information (CE-WQ-0992-RP13 – Final) as additional information for the competent authority.

### Effects of Dust

- 5.2.5 The Zone of Influence for Dust is considered to be 250m. The IAQM Guidance on Mineral Dust Impact for Planning states that adverse impacts from sand and gravel extraction are uncommon beyond 250m measured from the nearest dust gathering activities. The greatest impacts can be within 100m of a source and can include both large and small particles. The greatest rate for dust deposition and PM<sub>10</sub> concentrations occurs within this distance. The nearest statutory (the Upper Colne Marshes) is 800m to the south of the Site. The application is supported by an Air Quality Assessment, and in view of the findings of the same it is considered that there will be no significant effect from dust upon this or other of the Statutory Sites listed in Table 7 above.

### Effects of Hydrological Changes

- 5.2.6 The hydrological assessment has concluded that there will be a reduction in the groundwater as a result of the operational phase of the Proposed Development and an increased risk to the change of water quality from spills etc.
- 5.2.7 The nearest statutory (the Upper Colne Marshes) is 800m to the south of the Site. Indirect effects from unmitigated hydrological and hydrogeological changes are not expected to extend to this distance, and therefore no impacts on the condition of the SSSI is anticipated.

### Effects of Noise

- 5.2.8 The Noise Assessment for the Proposed Development has concluded that the noise from the Proposed Development will not have a significant impact upon ecological features. It is considered

that there will be no direct or indirect effects upon Statutory Sites as a result of the Proposed Development.

## Other Sites

### Assessment of Effects

- 5.2.9 5 LWS are situated within 2km of the Site with the closest being Villa Farm Quarry, which is located immediately adjacent to the Site. Villa Farm Quarry contains Cockaynes Woodland which is an area of designated Ancient Woodland and it also connected to the Site by the Sixpenny Brook at the western extent.

### Effects of Dust

- 5.2.10 The unmitigated effects of dust are expected to have a **Negative (Not Significant) effect** on the non-statutory body located immediately adjacent to the Site's southern boundary. The Site is located within 100m of Phases 3 and 7 of the operational phases where dust deposition is likely to occur.

### Effects of Hydrology

- 5.2.11 The hydrological assessment has concluded that there will be a reduction in the groundwater as a result of the operational phase of the Proposed Development and an increased risk to the change of water quality from spills etc.
- 5.2.12 Within this established woodland it is considered unlikely that any of the significant mature trees have a tap-root that persists as a major woody root, as the dominance of the tap root diminishes very early in the development of the root system (Sutton, 1980).
- 5.2.13 Only in a few tree species (Oak, Pine & Fir) is there an increased tendency to retain the tap root form in older trees (Bugsen and Munch 1929). The diameter of any tap roots diminishes rapidly as secondary roots grow out from it (Perry, 1982), and at 0.5m depth it tends to be less than 50mm diameter.
- 5.2.14 It is unproven that tree roots can be found in significant quantities at substantial depths (greater than 3m). Numerous studies have indicated that typically, as much as 90% of roots will be found in the upper 1m of soil. The trees rely upon percolating rainfall for water uptake rather than groundwater.
- 5.2.15 The hydrological assessment has established a current groundwater depth of 3m below soil level, it is therefore considered that the effects of reduction in groundwater, to be **Negligible**.

## Habitats of Principal Importance and Ancient Woodland

### Assessment of Effects

- 5.2.16 There is one area of Ancient Woodland within 250m of the Site boundary; Cockaynes Wood, immediately adjacent to the southern Site boundary.
- 5.2.17 Indirect effects of dust deposition on the Ancient Woodland immediately adjacent to the southern Site boundary would be **Negative (Not Significant)**. Effects would be long-term but potentially reversible.

- 5.2.18 The effects of hydrological change have been detailed above in 5.2.11 to 5.2.15.
- 5.2.19 The Site has been designed to maintain a 30m standoff of all forms of development from Cockaynes Wood secured by a perimeter fence, which when combined with a Construction Environmental Management Plan so no direct impact from machinery or habitat loss is anticipated.

### Mitigation Measures

#### Dust

- 5.2.20 The effects of dust that would be potentially created during the operational period will be mitigated by the adoption of a Dust Management Plan under a suitably worded planning condition. This plan is expected to minimise any impact of dust on sensitive receptors within the Site and within the Zol of the Proposed Development.
- 5.2.21 A buffer of at least 15m should be implemented along the boundary adjacent to the Villa Farm Quarry LoWS / Cockaynes Wood Ancient Woodland to avoid impacts of Dust on the Sites. Any mitigation measures specifically related to this habitat will be detailed within the dust management plan.

#### Direct damage by machinery/vehicle movements

- 5.2.22 All hedgerows and other vegetative habitats to be retained as part of the proposals, along with a minimum of a 10m buffer outside the working area will be retained and protected throughout the working period by the installation of temporary protection measures.
- 5.2.23 Mature trees identified within the Arboricultural Survey Report should be protected using a buffer zone, to avoid accidental damage.

#### Significance of Residual Effects

- 5.2.24 If the Dust Management Plan and protective protection measures are implemented and monitored throughout the key periods during the operational period, the residual effect on the non-statutory designation Site and within the Zol will be **Neutral (Not Significant)**.

### Habitats

#### Assessment of Effects

- 5.2.25 The Site is approximately **61 hectares**. Only the Proposed Extension Area will incur habitat change as a result of the Proposed Development.
- 5.2.26 The Proposed Development includes a phased scheme of working and progressive restoration over 7 Phases. Restoration proposals for the extraction area will use on Site materials supplemented by imported inert material to establish mixed uses and habitats. There will be changes in habitat, as shown in Table 28.

**Table 28 Habitat Quantity Change**

Habitat	Importance	Existing	Removed	Retained	Re-instated	Created	Total (post-restoration)	Change	Significance of Effect
<b>EXISTING BASLINE HABITATS</b>									
Arable	Local	51.59ha	51.59ha	0	0	0	0	-51.59ha	Negative (Significant)
Tall Ruderal	-	1.77ha	1.77ha	0	0	0	0	-1.77ha	Negative (Not Significant)
Improved Grassland	-	0.18ha	0.18ha	0	0	1.48ha	1.48ha	+1.3ha	Positive (Not Significant)
Hedgerow (intact and defunct)	Local	3,409.2m	188.2m	3221m	188.2m	224.4m	3,633.6m	+224.4m	Positive (Significant)
Semi-Improved Grassland	-	7.27ha	7.27ha	0	0	7.4ha	7.4ha	+0.13ha	Positive (Not Significant)
Orchard	Local	0.10ha	0.01ha	0.09ha	0	0	0.09ha	-0.01ha	Negative (Not Significant)
<b>HABITATS TO BE CREATED</b>									
Woodland	Local	0	0	0	0	4.74ha	4.74ha	+4.74ha	Positive (Not Significant)
Lowland Meadows	Local	0	0	0	0	11.83ha	11.83ha	+11.83ha	Positive (Significant)
Lowland Acid Grassland	Local	0	0	0	0	20.92ha	20.92ha	+20.92ha	
Exposed Sand and Gravel Cliffs	-	0	0	0	0	0.06ha	0.06ha	+0.06ha	Positive (Not Significant)
Exposed Margins and Mudflats	-	0	0	0	0	0.47ha	0.47ha	+0.47ha	
Standing Water	Local	0	0	0	0	10.60ha	10.60ha	+10.60ha	Positive (Significant)
Open Mosaic Habitat and Reedbed	Local	0	0	0	0	3.30ha	3.30ha	+3.30ha	

5.2.28 The embedded mitigation incorporated into the restoration plan overall would result in **Positive (Significant)** effect on a number of habitats all of which are of **Local-County Importance**. The loss of the Arable is only assessed as Negative (Significant) due to its HPI status, however the restoration of the Site to Lowland Meadow and a number of other habitats is considered to mitigate for this loss and provide a positive effect overall.

- 5.2.29 The loss of a single recently categorised veteran tree within a defunct hedgerow is considered to be Negative (Significant) however, all other 17 better quality veteran tree are to be retained at the Site, along with embedded mitigation measures for the plantation of more mature trees within woodland areas.
- 5.2.30 Dust deposition on retained habitats is likely to be minimised through the continuing application of the Dust Management Plan and residual effects are assessed as being **Negative (Not Significant)** due to the common and widespread nature of the habitats present. Any effects from dust are expected to be short-term and reversible.

### Mitigation Measures

#### Habitat Loss

- 5.2.31 Embedded mitigation measures have ensured that the extension area is kept to the smallest practical area and affect habitats of lower importance.
- 5.2.32 To mitigate for the initial temporary loss of any Hedgerow as a result of the extraction activities, the Hedgerows being retained are to be enhanced and advance planting on the eastern boundary of the Site. Mature trees will be planted within woodland areas to provide additional mitigation for the loss of a recently categorised veteran tree.

#### Significance of Residual Effects

- 5.2.33 The new planting and any infilling of hedgerows will ensure the residual effect on Hedgerows at the Site will be **Neutral. Overall, the revised restoration scheme provides a Positive (Significant) effect.**

## 5.3 SPECIES AND SPECIES-GROUPS

### Plants

#### Assessment of Effects

- 5.3.1 There are no rare, notable or invasive plant species at the Site therefore No likely significant effects are expected.

### Invertebrates

#### Assessment of Effects

- 5.3.2 No specific Invertebrate assessment was undertaken. No records of protected Invertebrate species were returned as part of the desk study, whilst over 500 records of notable species were returned by the local records centre.
- 5.3.3 The Site largely comprises of arable fields, with negligible value for Invertebrates, as well as field margins and hedgerows which are considered to provide some suitability for common and widespread Invertebrates.
- 5.3.4 The majority of hedgerows and field margins are to be retained as part of the Proposed Development and therefore it is considered the Proposed Development will not result in any significant direct loss

of Invertebrate habitat at the Site.

- 5.3.5 A number of notable Invertebrate species have been recorded within the Ancient Woodland immediately adjacent to the Site boundary and therefore the Proposed Development has the potential to affect the Invertebrates present within this habitat.
- 5.3.6 It is recognised that the mature and veteran trees across the Site are suitable and important habitat for dead/decaying wood specialists such as saproxylic beetles. The majority of this habitat is to be retained.
- 5.3.7 The provision of an adequate standoffs to the woodland; maintained hedgerows which act as Green Infrastructure assets; and maintained connectivity to the Villa Quarry LoWS to the south mean that the effects would be **Neutral**.
- 5.3.8 In an absence of mitigation, the effects of dust deposition have the potential to indirectly affect Invertebrate populations by causing damage to vegetation used by Invertebrates for foraging and shelter. Since the majority of Invertebrate species present are widespread and common at the Site, the indirect effects of dust deposition on Invertebrates at the Site would be **Negative (Not Significant)**. Effects would be long-term but potentially reversible.
- 5.3.9 In the absence of mitigation, the effects of dust deposition have the potential to indirectly affect Invertebrates present within the Ancient Woodland and LWS adjacent to the south of the Site. Due to the recorded notable species present within this habitat, it is considered the effects of dust deposition on Invertebrates at the Site would be **Negative (Not Significant)**. Effects would be long-term but potentially reversible.

#### Mitigation Measures

- 5.3.10 **Dust** - The implementation of the Dust Management Plan previously will minimise the effect of dust deposition on retained vegetation at the Site, as well as the designated habitats adjacent to the Site.
- 5.3.11 **Habitat Loss** – The 10m buffer zone surrounding the retained hedgerows at the Site will ensure any habitat damage is minimised, with no significant loss of habitats of value for Invertebrates.
- 5.3.12 Any mature trees that are to be removed as part of the proposed works will be used to create deadwood piles to provide continuity of this habitat for saproxylic invertebrates.

#### Significance of Residual Effects.

- 5.3.13 The Proposed Restoration includes the creation of hedgerows and other habitats that are considered suitable for Terrestrial Invertebrates.
- 5.3.14 Retention of habitat and creation of new types of habitat and implementation of a Dust Management Plan will mean any residual effect will be **Positive (Not Significant)**.

### Great Crested Newts and Other Amphibians

#### Assessment of Effects

- 5.3.15 Two records of Great Crested Newt were returned by Essex Field Club within 2km of the Site boundary, both south of the Site. A single record of Great Crested Newt was returned by Essex

Wildlife Trust approximately 1km north of the Site boundary.

- 5.3.16 One pond within 500m of the Site was recorded to have a 'medium population' of Great Crested Newt and two ponds within 500m of the Site was recorded to have a 'small population'.
- 5.3.17 The ponds will not be directly effected by the Proposed Development, however the decrease in ground water levels may indirectly effect the existing ponds. This is assessed as being **Negative (Not Significant)**. The ponds have been installed with gauge boards by Tarmac and will be monitored on a monthly basis for the duration of the scheme under suitably worded conditions.
- 5.3.18 In the absence of mitigation, the effects of habitat loss and disturbance would potentially affect wildlife corridors and dispersal means for Great Crested Newt located south of the Site, which is assessed as being **Negative (Not Significant)**.

#### Mitigation Measures

- 5.3.19 **Habitat Loss** – It is recommended that at least a 10m buffer is kept between the working area and the inner edge field margins (10m from the Hedgerows) where these are to be retained, to avoid accidental disturbance to potential terrestrial Great Crested Newt.
- 5.3.20 It is considered that, with the inclusion of buffer zones from the field margins, the loss of habitat at the Site is minimal, as all the fields are arable. The retention of the field margins will also support the wildlife corridors between the ponds south of the Site and areas of terrestrial habitat north of the Site.
- 5.3.21 Field margins and hedgerows to be lost as part of the Proposed Development should be minimised, and where necessary, removed using a method statement (refer to CEMP reproduced at Appendix L), under supervision of a Suitably Qualified Ecologist.
- 5.3.22 The effects of the change on ground water levels are considered to be temporary in nature and upon restoration will return to existing levels.

#### Significance of Residual Effects

- 5.3.23 It is considered that the field margins and hedgerows at the Site are suitable for terrestrial Great Crested Newt.
- 5.3.24 Following mitigation measures, it is considered that the Proposed Development will have a **Neutral (Not Significant)** effect on the population of Great Crested Newt present to the south of the Site boundary. Effects are assessed as long-term and reversible following habitat recommendations as part of the proposed restoration scheme and long term management plans (refer Appendix L).

#### Reptiles

##### Assessment of Effects

- 5.3.25 The Site supports a low population of Common Lizard and a low population of Grass Snake, found within the arable field margins across the Proposed Extension Area. In an absence of mitigation, there is the potential for direct effects of habitat loss/damage and injury/killing of Reptiles.
- 5.3.26 Suitable controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L). There is also potential for indirect effects on the Reptile population

caused by dust deposition on vegetative habitats used by Reptiles for foraging and shelter.

- 5.3.27 In an absence of mitigation there is potential for Reptile habitat at the Site to be directly affected by the Proposed Development by accidental damage from machinery/vehicles during the Site preparation and extraction phases. This could also result in the killing/injury of Reptiles, which is an offence under the legislation protecting Reptiles.
- 5.3.28 However, considering the low population of Reptiles recorded at the Site and the extent of suitable habitat within the surrounds of the Site, non-mitigated effects are assessed as being **Negative (Not Significant)**, long-term and potentially reversible.
- 5.3.29 In an absence of mitigation, the effects of dust deposition have the potential to indirectly affect the reptile population by causing damage to vegetation used by Invertebrates, which in turn may affect the ability of reptiles to forage. The indirect effects of dust deposition on reptiles at the Site would be **Negative (Not Significant)** however such effects may combine with habitat loss/damage. Effects would be long-term but potentially reversible.

#### Mitigation Measures

- 5.3.30 **Habitat Loss/damage and Injury/killing** – the creation of 10m buffers between extraction works and arable field margins and hedgerows will safeguard the Reptile population at the Site from accidental damage and disturbance which may result in injury/killing of individuals.
- 5.3.31 As a precautionary measure, habitats which are considered to be suitable for Reptile to be removed as part of the proposals will be supervised by an Ecological Clerk of Works (ECOW). Suitable controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L). This will minimise any risks to Reptiles and other species that may be present (such as nesting birds).
- 5.3.32 Works should be carried out during the Reptile active period (April to September/October depending on weather conditions) to avoid any risk of encountering hibernating Reptiles but will also need to take account of timing constraints relating to nesting birds. The ideal time for such works would be September/early October.
- 5.3.33 Embedded mitigation has resulted in the avoidance of large scale reptile habitat loss, by retaining all habitats of value for reptiles along the northern boundaries of the Site. This will also ensure the suitable habitats present at the Site remain connected to the wider area.
- 5.3.34 The northern boundary habitats used by reptiles will be retained and protected throughout the working period. A fence may be required to achieve this to protect the area from damage or exclude reptiles. Any fencing will be checked periodically by the Site Manager to ensure it is installed and maintained effectively.
- 5.3.35 The use of specific reptile exclusion fencing is not required unless the arable field is left unmanaged and allowed to vegetate thereby becoming suitable for reptiles. If this occurs exclusion fencing will be installed along the boundary of the extraction area and left in place until works have ceased. If there is a risk of reptiles being injured/killed during fence installation or other associated works, a reptile translocation programme will be implemented.
- 5.3.36 The creation of the new Site access in the north west corner of the Site is not expected to directly affect reptiles since the survey did not record them in this area. In the unlikely event reptiles are



found during these works, a translocation programme will be implemented if required.

- 5.3.37 **Dust** - The implementation of a Dust Management Plan as detailed above will minimise any negative effects on reptiles from dust.

#### Significance of Residual Effects

- 5.3.38 Retention and protection of reptile habitat, maintenance of ecological connectivity, supervised habitat clearance works and implementation of a Dust Management Plan will mean any residual effect will be **Neutral (Not Significant)**.

### **Birds**

#### Assessment of Effects

- 5.3.39 The Extended Phase 1 habitat survey recorded several Bird species of conservation concern at the Site.

- 5.3.40 In an absence of mitigation, there is potential for the following effects:

- Direct effects on nesting Birds, their nests, eggs and chicks from damage/destruction of habitat;
- Indirect effects of dust deposition on vegetation, resulting in a reduction in food availability (invertebrates and fruit/seeds); and
- Indirect effect of disturbance on Bird activity from increased human activity, noise and vibrations.

- 5.3.41 In an absence of mitigation, the combined direct and indirect effects on Birds are assessed as being **Negative (Not Significant)** due to the availability of alternative habitat within the surrounding area and the high mobility of Birds. Effects are assessed as being short-term and reversible.

#### Mitigation Measures

- 5.3.42 **Nesting Birds** - Embedded mitigation has minimised the amount of potential nesting habitat to be removed, by retaining trees, shrubs and hedgerows where possible.

- 5.3.43 To reduce any impact upon nesting Birds, avoid any breach in wildlife legislation and maintain the local breeding populations, any vegetation suitable for nesting should be removed outside the Bird breeding season (March - September inclusive for most species). If this is not possible then vegetation should be checked by a suitably qualified ecologist and a suitable buffer maintained until the nest is no longer in use. Suitable controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L).

- 5.3.44 Dust** - The implementation of a Dust Management Plan will minimise the indirect effects of dust deposition on habitat features for foraging Birds.

#### Artificial Lighting

- 5.3.45 Controls on artificial lighting at the Site will minimise any potential disturbance effect. These controls will include the following measures:

- Use of artificial lighting only where required for security, health and safety purposes, within the vicinity of the Site access;
- Lighting to be used only where the hours of darkness coincide with operating hours, specifically early mornings and late afternoons during the winter period and will be turned off when the Site is not operating; and
- Light spill to be controlled and minimised by the use of hoods, cowls, timers and luminaire design.

### Noise

- 5.3.46 The effects of increased levels of noise upon birds is not considered to have a significant effect upon the species. Breeding bird species are known to use sites where mineral activities are undertaken, taking advantage of the different habitats that develop at mineral workings.

### Significance of Residual Effects

- 5.3.47 The implementation of mitigation measures outlined above are expected to reduce any negative effect to **Neutral (Not Significant)**.

## Bats

### Assessment of Effects

- 5.3.48 In an absence of mitigation, the Proposed Development may affect Bats in the following ways:
- Fragmentation effect of foraging habitat by the removal of limited lengths of hedgerows;
  - Disturbance effect from artificial lighting; and
  - Indirect effects of dust deposition on vegetation, resulting in reduction of prey availability (Invertebrates).

### Mitigation Measures

- 5.3.49 The proposed new access and extraction activities will create a temporary loss in hedgerow/arable across the Site. Bat species recorded foraging along this boundary are Common Pipistrelle and Soprano Pipistrelle. The effect of loss of this foraging habitat in the absence of any mitigation is considered to have a **Negative (Significant) but reversible**.
- 5.3.50 There is potential for artificial light spill at the Site to temporarily disturb foraging Bats flying within the Site. In the absence of any mitigation, effects are assessed as being **Negative (Not Significant)** due to the availability of alternative foraging habitat in the vicinity of the Site and the high mobility of the Bat species recorded at the Site. Effects are considered to be Temporary in Nature and reversible.
- 5.3.51 The potential indirect effect of dust in the availability of prey for foraging Bats is assessed as being **Neutral (Not Significant)** due to the availability of alternative foraging habitat in the vicinity of the Site and the high mobility of the Bat species recorded at the Site.

### Mitigation Measures

5.3.52 **Fragmentation/Loss of Foraging and Artificial Lighting** – the combination of habitat loss and fragmentation will be mitigated by:

- Appropriate Bat Bridges across access tracks to retain connectivity during operational activities (specifications of which are detailed within the Construction Environment Management Plan (CEMP) CE-WQ-0992-RP11b) (Crestwood Environmental Ltd., 2019);
- Emergence/Re-entry Bat Surveys on trees identified as supporting Bat potential prior to each relevant Phase;
- Gap fill planting of the retained hedgerows;
- Retention and protection of trees to retain connectivity to woodland across the Site and the main foraging corridor for bats; and
- Lighting will only be used when necessary and out of the main Bat activity season.

5.3.53 Additional mitigation will be based on results of further Bat survey prior to each relevant Phase. Should any additional mitigation measures be considered necessary, these will be detailed within an updated Construction Environment Management Plan: Biodiversity (CEMP) (Crestwood Environmental Ltd., 2019).

5.3.54 **Dust** - The implementation of a Dust Management Plan will minimise any potential negative effect on prey availability for foraging Bats.

### Significance of Residual Effects

5.3.55 The implementation of mitigation measures for the effects of light spill, dust, fragmentation and disturbance are expected to reduce residual effects to **Neutral (Not Significant)**.

### Badger

#### Assessment of Effects

5.3.56 No evidence of Badger was recorded at the Site, however it is considered suitable for foraging. In the absence of mitigation the likely Significant effects of the Proposed Development are:

- Loss of foraging habitat and disturbance to current Badger paths.

5.3.57 The effects of the Proposed Development are considered to be **Neutral (Not Significant)**

### Mitigation Measures

5.3.58 As a precautionary measure an updated Site walkover for Badger is carried out by an ecologist prior to commencement of works to identify any Badger activity that may have occurred since the ecology surveys at the Site. The walkover should include all habitats within the Site boundary as well as a 30m buffer around. Suitable controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L).

5.3.59 Any works with 30m of an active sett will require a Natural England Development Licence for Badger.

- 5.3.60 Any setts may require closure and a replacement sett may have to be provided. The closure of any sett can only take place between July 1<sup>st</sup> and November 31<sup>st</sup> in any year.
- 5.3.61 The timing of vegetation removal and extraction activities should be timed to create the least disturbance to Badgers as possible.
- 5.3.62 A corridor of woodland and habitat should be retained to the south of the Site for foraging Badgers.

#### Significance of Residual Effects

- 5.3.63 The implementation of mitigation measures outlined above are expected to reduce any negative effect to **Neutral (Not Significant)**.

### Other Mammals

#### Assessment of Effects

- 5.3.64 No evidence of Otter, Water Vole, Dormouse or other notable mammals was recorded at the Site. It is considered likely that they are absent from the Site and therefore no Likely Significant Effects are anticipated.

#### Species of Principal Importance

- 5.3.65 The boundary habitats at the Site are suitable for a number of mammal Species of Principal Importance (not including those species already detailed in relevant sections above) however no evidence of activity was recorded during any of the field surveys conducted at the Site. No likely significant effects are expected.

#### Mitigation Measures

- 5.3.66 All Hedgerows considered suitable for Dormouse will be removed (where required for access) under the supervision of a suitably experienced ecologist, using hand tools in a methodical manner to allow the ECoW to search for nests. Approximately 1m of vegetation will be removed at a time to allow this search. Hedgerow removal will be undertaken during the active period for Dormice (excluding June to September inclusive when young are typically born and raised) which is typically March – May inclusive and October – November inclusive.
- 5.3.67 A single survey will be undertaken between April and September prior to the commencement of Phase 3 of the Proposed Development. Phase 3 is approximately 5m east of the Sixpenny Brook at its closest point and therefore a survey to determine the presence/likely absence of Otter and Water Vole within 50m of this point are considered to be required.
- 5.3.68 Should any evidence of Otter or Water Vole be found during this survey, measures will be put in place accordingly prior to the commencement of Phase 3.

### 5.4 PRE-COMMENCEMENT PHASED SURVEYS

- 5.4.1 Appropriate species-specific further survey will be undertaken prior to the commencement of each phase. Further surveys will be dependent on the location of the phase and are summarised in Table 29 below.

5.4.2 Pre-Commencement Phased Surveys will be undertaken in the year prior to the commencement of the anticipated start date of each phase (For example: Phase 2 starting 2021, surveys undertaken in 2020).

**Table 29 Pre-Commencement Phased Surveys**

Phase	Further Surveys Required				
	Bat		Great Crested Newt	Otter & Water Vole	Badger
	Transect <sup>^</sup>	Roost			
1	✓	✓	See Section 5.4.3		✓
2	✓	✓			✓
3	✓	✓		✓	✓
4	✓				✓
5	✓				✓
6	✓				✓
7	✓				✓

<sup>^</sup> Transect surveys to be undertaken based on Low habitat suitability, given the retention of linear features at the Site and implementation of sensitive working measures. This will require one survey per season (spring, summer and autumn).

### Great Crested Newt

5.4.3 Great Crested Newt surveys (either eDNA or population survey where a known GCN population is present – Pond 22, 29 and 31) will be undertaken on a 5 yearly basis (i.e. year 5, year 10 and year 15 of the Proposed Development) on all ponds within 500m of the Site boundary with an Average, Good and Excellent Habitat Suitability Index (HSI) score. Other ponds within 500m of the Site will be reviewed at the time of survey to ensure monitoring is comprehensive. Should further ponds be considered to require monitoring, these will be surveyed in addition to those previously highlighted.

5.4.4 Sensitive working measures will be incorporated across the Site for Great Crested Newt over all phases of the Proposed Development. Given the minimal removal of habitat considered suitable for Great Crested Newt and the lack of suitable aquatic habitat within the Site, monitoring surveys are considered sufficient at this stage.

5.4.5 Details of further surveys are set out within the Construction Environment Management Plan: Biodiversity (CEMP) (Crestwood Environmental Ltd., 2019).

## 5.5 SUMMARY OF ASSESSMENT AND MITIGATION MEASURES

5.5.1 A summary of the assessment of effects, mitigation measures and residual effects is provided in Table 30. For ease of reference, ecological receptors are only included Table 30 where an effect has been identified; where no effect is anticipated the receptor has not been included.

**Table 30 Summary of Assessment and Mitigation Measures**

Ecological Receptor	Level of Importance	Effect	Likelihood, Significance and Nature of Effect Prior to Mitigation	Mitigation/ Precautionary Measures	Significance of Residual Effect
Non-statutory Designated Sites: (Cockaynes Wood LWS)	Local/County	Effects of changes to Hydrology / Dust	Certain, Negative (Not Significant)	30m Buffer from operations, Dust Management Plan.	<b>Neutral (Not Significant)</b>
Habitats of Principal Importance within Site: Hedgerows / Arable / Orchard	Local	Loss of Habitat / Effects of Dust	Certain, Negative (Significant)	Hedgerows to be retained, reinstated and created. Resulting in 248m of additional hedgerow. Arable to be restored to Acid Grassland of higher quality. Majority of Orchard to be retained. 10m buffer from all retained hedgerows.	<b>Positive (Not Significant)</b>
Important Hedgerow	Local	Partial Loss of Habitat		Majority of Hedgerow to be retained. Infilled upon restoration and new species rich hedgerows to be created.	
Veteran Tree	District	Loss of a single recently categorised veteran tree within a defunct hedgerow		Retention of better quality veteran trees within the Site. Planting of mature trees within woodland areas to mitigate the loss of a single recently categorised veteran tree within a defunct hedgerow.	
Habitats of Principal Importance within Zol: Deciduous Woodland (Ancient Woodland)	Local	Dust / Accidental Damage	Certain, Negative (Not Significant)	30m Buffer from operations, Dust Management Plan.	<b>Neutral (Not Significant)</b>
Habitats within the Site: Semi Improved Grassland, Tall Ruderal, Improved Grassland	Site	Loss of Habitat	Certain, Negative (Not Significant)	Proposed restoration to create a range of high quality HPI Habitats.	<b>Positive (Significant)</b>
Invertebrates	Site	Loss of Habitat/Dust	Probable, Negative (Not Significant)	10m buffer from Arable field margins and 30m from Ancient Woodland. Proposed restoration to create a range of high quality HPI Habitats. Dust Management Plan.	<b>Positive (Not Significant)</b>

Ecological Receptor	Level of Importance	Effect	Likelihood, Significance and Nature of Effect Prior to Mitigation	Mitigation/ Precautionary Measures	Significance of Residual Effect
Birds	Local/County	Loss of Habitat / Dust / Noise / Direct Killing, Harming or Injuring		Avoidance/embedded mitigation, retained habitats where possible and dust management plan.	<b>Neutral (Not Significant)</b>
Bats	County	Loss of Foraging and Commuting Habitat / Dust / Lighting	Certain, Negative (Not Significant)	Retained majority of linear feature habitats, appropriate Bat bridges, artificial lighting controls and Dust Management Plan. Bat boxes upon restoration. Increased foraging and commuting habitats upon restoration.	<b>Positive (Not Significant)</b>
Badger	Site	Loss of Foraging Habitat	Certain, Neutral (Not Significant)	Precautionary update survey for Badger, prior to construction.	<b>Neutral (Not Significant)</b>
Reptiles	Local	Loss of Sheltering and Foraging Habitat / Disturbance / Dust	Certain, Negative (Not Significant)	Precautionary working measures for areas of suitable habitat where these are to be lost. Increased habitats of higher quality post restoration.	<b>Positive (Not Significant)</b>
Dormouse*	County	Loss of potential Foraging and Nesting habitat		Precautionary working measures on the hedgerows considered suitable for Dormouse.	<b>Neutral (Not Significant)</b>
Water Vole*	Local	Effects of changes to Hydrology / Dust	Probable, Negative (Not Significant)	Drainage plan and dust management plan.	

\* No evidence of these species was recorded during any survey undertaken at the Site, precautionary working measures or further survey required to update prior to the commencement of each relevant phase.

- 5.5.2 Overall, the restoration scheme provides a Positive (Significant) effect through increased contribution of habitats of principal importance, with a decrease in Arable habitat. Additional habitat, in the form of retained inland cliffs have been incorporated to provide additional benefit over the baseline situation.
- 5.5.3 The restoration scheme envisaged as part of this application will deliver over 50 hectares of Priority Habitat, and therefore has the potential to generate a long term beneficial effect. All establishment and management regimes for the habitats will be subject to appropriate controls via a Biodiversity Enhancement Management Plan (refer to Appendix K) which will be secured via an appropriately worded planning condition and/or Planning Obligation; with a supporting Habitat Management Group.

## **6 STATEMENT OF RESIDUAL AND CUMULATIVE EFFECTS**

### **6.1 RESIDUAL EFFECTS OF PROPOSED DEVELOPMENT**

- 6.1.1 The measures proposed above have mitigated all significant negative effects to a level that is not considered to be significant in terms of Environmental Impact Assessment. Upon restoration there should be no adverse residual effects.

### **6.2 CUMULATIVE EFFECTS**

- 6.2.1 The mitigation and impact avoidance measures in particular the BEMP and CEMP reproduced at Appendices K and L respectively proposed should be secured using planning condition or obligation. If these measures are implemented successfully there will be no significant adverse effects that could combine with effects from other consented developments to create significant cumulative effects.
- 6.2.2 There are areas of land to the north and west of Alresford allocated for housing development that are mainly situated on arable land, and therefore like the Proposed Development will exhibit some habitat loss but mainly of limited value.

## **7 COMPENSATION, ENHANCEMENT AND MONITORING**

### **7.1 COMPENSATION**

- 7.1.1 Since no likely significant residual or cumulative effects are anticipated, compensatory measures are not required.

### **7.2 ENHANCEMENT**

- 7.2.1 The details of enhancement are detailed within Appendix K in the Biodiversity Enhancement Plan for the Proposed Development.
- 7.2.2 In general additional planting will be undertaken on the retained central hedgerow and the western boundary, to strengthen the wildlife corridors and habitat connectivity.
- 7.2.3 The final restoration will deliver 50ha of a number of different Priority Habitats. In addition to this species specific enhancements include:



- 8 No. Standard Bat Boxes;
- 2 No. Vincent Pro Bat Boxes;
- 10 No. Bird Boxes of suitable for a number of species; and
- 4 hibernacula suitable for Great Crested Newt, Reptiles and Invertebrates.

### 7.3 MONITORING

- 7.3.1 If works have not begun within two years of the date of the ecological surveys it is recommended that update surveys be carried out to assess whether baseline conditions have changed.
- 7.3.2 Monitoring of mitigation measures should be carried out at the beginning of each new phase of extraction and throughout the course of the Proposed Development. The responsibility of monitoring and rectifying of issues will lie with the Site Manager. Suitable controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L).

## 8 CONCLUSIONS

### 8.1 OVERALL ECOLOGICAL EFFECTS OF THE SCHEME

- 8.1.1 The Site has been subject to a series of habitat surveys and species-specific surveys. The surveys identified a number of different habitats at the Site, which were identified as **Site-Local Level** of Ecological Importance.
- 8.1.2 The faunal surveys identified suitable habitat for a range of protected species and confirmed Reptiles, Breeding and Wintering Birds, foraging Bats and Great Crested Newt and identified Bats a using the Site.
- 8.1.3 No other protected species were identified at the Site and, overall the protected species recorded and the suitability of the habitat present indicates that the Proposed Development Site is of **Local Level** of ecological Importance.
- 8.1.4 Habitat change was considered to be the largest direct impact of the Proposed Development. This impact was considered to be **Negative (Significant) for Arable and single veteran tree and Negative (Not Significant) for other habitats** in nature prior to any mitigation, but after completion of restoration will result in a **Positive (Significant) effect**.
- 8.1.5 The extraction activities will be undertaken over a period up to 20 years. The impact of habitat change will be gradual, due to be phased in progress and restoration will also be progressive.
- 8.1.6 The proposed restoration scheme is to replace the arable habitat with Lowland Meadows and more species rich conservation grassland and will provide additional woodland and hedgerow planting. These are all designated Priority Habitats under Local Planning and Biodiversity Guidance.
- 8.1.7 To avoid direct impact to protected species, species-specific mitigation measures with regards to the Proposed Development will be implemented including:
- Checks of vegetation by and ecologist for breeding Birds' nests prior to removal; or timing constraints on vegetation removal to avoid breeding season;

- Update Badger Surveys if necessary;
- Precautionary working measures for Dormice;
- Update surveys and precautionary working measures for Bats and Water Vole; and
- Reasonable Avoidance measures for both Reptile and Great Crested Newt.

8.1.8 Such controls will be available at the Site consistent with Local Policy Guidance (refer to CEMP reproduced at Appendix L) under suitably worded planning conditions.

## **8.2 COMPLIANCE WITH LEGISLATION AND POLICY**

8.2.1 The mitigation proposals detailed within this EclA have addressed the potential impacts from the Proposed Development to comply with both wildlife legislation and Policy.

8.2.2 After all mitigation proposals and species-specific precautionary measures are implemented, the effects of the Proposed Development are not considered to trigger any wildlife legislation.

8.2.3 After all mitigation proposals, species-specific precautionary measures and enhancement measures are implemented, the effects of the proposed development are considered to comply with National and Local Policy detailed in Appendix N.

## **8.3 MECHANISMS TO SECURE DELIVERY**

8.3.1 The proposed Site design, operating procedures, precautionary and mitigation measures are all key to ensuring no significant residual effects are expected from the Proposed Development. All measures associated with the operation and restoration of the Site could be secured using planning obligation or conditions.

## REFERENCES:

- Bat Conservation Trust, 2014. *The National Bat Monitoring Programme. Annual Report 2014*, London: Bat Conservation Trust.
- Bat Conservation Trust, 2014. *The State of the UK's Bats*, London: Bat Conservation Trust.
- Bright, P., Morris, P. & Mitchell-Jones, T., 2006. *The Dormouse Conservation Handbook*. 2nd ed. Peterborough: English Nature.
- CIEEM, 2016. *CIEEM Glossary*. [Online]  
Available at: <http://www.cieem.net/glossary>  
[Accessed February 2016].
- CIEEM, 2017. *Guide to Ecological Surveys and their Purpose*, Winchester: CIEEM.
- CIEEM, 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, Winchester: Chartered Institute for Ecology and Environmental Management.
- CIEEM, 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, Winchester: Chartered Institute for Ecology and Environmental Management.
- Colchester Borough Council, 2008. *Colchester Borough Core Strategy*, s.l.: Colchester Borough Council.
- Collins English Dictionary, 2016. *Collins English Dictionary*. [Online]  
Available at: <http://www.collinsdictionary.com/dictionary/english/protected-species>  
[Accessed 19 February 2016].
- Collins, J., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition*, London: Bat Conservation Trust.
- Cresswell, W. & Whitworth, R., 2004. *An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt Triturus cristatus* English Nature Research Reports No. 576, Peterborough: English Nature.
- Crestwood Environmental Ltd., 2018. *Update Preliminary Ecological Appraisal*, Wolverhampton: Crestwood Environmental Ltd..
- Crestwood Environmental Ltd., 2019. *Construction Environment Management Plan: Biodiversity (CEMP)*, 2019: Crestwood Environmental Ltd..
- DEFRA, 2016. *MAGIC*. [Online]  
Available at: <http://magic.defra.gov.uk/website/magic/>  
[Accessed 9 January 2016].
- DEFRA, 2018. *MAGIC*. [Online]  
Available at: <http://magic.defra.gov.uk/website/magic/>  
[Accessed 2018].
- Eaton, M. et al., 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds*, Volume 108, pp. 708-746.
- Encyclopaedia Britannica, 2016. *Encyclopaedia Britannica*. [Online]  
Available at: <http://www.britannica.com/>  
[Accessed 19 February 2016].
- English Nature, 1993. *Linear features: linear habitats and wildlife corridors*, London: English Nature.
- Essex Biodiversity Project, 2010. *Essex biodiversity Action Plan 2010-2020*. [Online]  
Available at: <http://www.essexbiodiversity.org.uk/biodiversity-action-plan>  
[Accessed 23 November 2016].
- Essex Birdwatching Society, 2013. *Essex Birdwatching Society Records*. [Online]  
Available at: [http://www.ebws.org.uk/ebs/List\\_Records.asp](http://www.ebws.org.uk/ebs/List_Records.asp)  
[Accessed 24 November 2016].
- Essex Birdwatching Society, 2018. *Essex Birdwatching Society*. [Online]  
Available at: <http://www.ebws.org.uk/ebs/default.asp>  
[Accessed 12 December 2018].

- Essex County Council, 2014. *Essex Minerals Local Plan*, s.l.: Essex County Council.
- Essex County Council, 2014. *The Essex Minerals Local Plan*, s.l.: Essex County Council.
- Essex County Council, 2016. *Mineral Site Restoration for Biodiversity - Supplementary Planning Guidance*, Essex: Essex County Council.
- Essex Field Club, 2015. *Biological Records*, s.l.: Essex Field Club.
- Essex Field Club, 2015. *Biological Records*, s.l.: Essex Field Club.
- Essex Field Club, 2015. *Biological Records*, s.l.: Essex Field Club.
- Essex Field Club, 2015. *Biological Records*, Essex: Essex Field Club.
- Essex Wildlife Trust, 2018. *Ecological Records*, Essex: Essex Wildlife Trust.
- Froglife, 1999. *Froglife Advice Sheet 10 - Reptile Survey: An Introduction to planning, conducting and interpreting surveys for snake and lizard conservation*, Halesworth: Froglife.
- Harris et al, 1989. *Surveying Badgers*, s.l.: Mammal Society.
- Harris et al, 1989. *Surveying Badgers*, London: Mammal Society.
- Harris, S., Morris, P., Wray, S. & Yalden, D., 1995. *A review of British mammals: population estimates and conservation status of British mammals other than cetaceans*, Peterborough: JNCC.
- Hayhow, D. et al., 2015. *The state of the UK's birds 2015*, Sandy, Bedfordshire: RSPB, BTO, WWT, JNCC, NE, NIEA, NRW and SNH.
- HMO, 1992. *Protection of Badgers Act*, London: HMO.
- HMO, 2010. *The Conservation of Habitats and Species Regulations*, London: HMO.
- HMO, 2011. *UK National Ecosystem Assessment*, London: HMO.
- HMO, 2016. *European protected species: apply for a mitigation licence*. [Online]  
Available at: <https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence>  
[Accessed 19 February 2016].
- HMO, 2018. *National Planning Policy Framework*, s.l.: HMO.
- HMSO, 2011. *The Natural Choice: Securing the Value of Nature*, s.l.: HMSO.
- HMSO, 2017. *Town and Country Planning (Environmental Impact Assessment) Regulations 2011*, s.l.: HMSO.
- IAQM, 2016. *Guidance on the Assessment of Mineral Dust Impacts for Planning*, s.l.: IAQM.
- IUCN, 2010. *The IUCN Red List of Threatened Species*. [Online]  
Available at: <http://www.iucnredlist.org/>  
[Accessed 27 January 2016].
- JNCC, 2010. *Handbook for Phase 1 habitat survey - a technique for environmental audit*. s.l.:s.n.
- JNCC, 2016. *UK BAP Priority Habitats*. [Online]  
Available at: <http://jncc.defra.gov.uk/page-5718>  
[Accessed 19 February 2016].
- Langton, T. & Beckett, C., 1995. Home range size of Scottish amphibians and reptiles. *Scottish Natural Heritage Review*, Volume 53.
- Lawton, J., 2010. *Making Space for Nature: a review of England's wildlife sites and ecological network*, s.l.: DEFRA.
- Natural England, 2016. *Priority Habitat Inventory (England)*, s.l.: Natural England.
- Natural England, 2016. *Standing Advice Species Sheet: Great crested newts*. [Online]  
Available at:  
[https://www.youtube.com/watch?v=Ce7IHJirqEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212\\_natural\\_england\\_s\\_standing\\_advice](https://www.youtube.com/watch?v=Ce7IHJirqEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212_natural_england_s_standing_advice)  
[Accessed 19 February 2016].
- Oldham, R. S., Keeble, J., Swan, M. & Jeffcote, M., 2000. Evaluating the suitability of habitat for Great Crested Newt (*Triturus cristatus*). *Herpetological Journal*, Volume 10, pp. 143-155.

- Oxford Dictionary, 2016. *Oxford Dictionary*. [Online]  
Available at: <http://www.oxforddictionaries.com/>  
[Accessed 19 February 2016].
- Rob Strachan, M. T. & G., 2011. *Wolverine Conservation Handbook*, s.l.: WCRU.
- Stone, 2013. *Bats and lighting: Overview of current evidence and mitigation guidance*, London: Bat Conservation Trust.

## ABBREVIATIONS / ACRONYMS:

*For the avoidance of confusion, abbreviations used have the meanings given below:*

<b>AONB</b>	Area of Outstanding Natural Beauty	<b>NPPF</b>	National Planning Policy Framework
<b>AoSP</b>	Area of Special Protection	<b>NVC</b>	National Vegetation Classification
<b>BAP</b>	Biodiversity Action Plan	<b>PPG</b>	Planning Policy Guidance
<b>BBS</b>	Breeding Bird Survey	<b>PRA</b>	Preliminary Roost Assessment
<b>BRC</b>	Biological Records Centre	<b>PSI</b>	Potential Site of Importance
<b>BoCC</b>	Birds of Conservation Concern	<b>RIGS</b>	Regionally Important Geological and Geomorphological Sites
<b>DAFOR</b>	The DAFOR Scale: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare	<b>RSPB</b>	Royal Society for the Protection of Birds
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs	<b>SAC</b>	Special Areas of Conservation
<b>EclA</b>	Ecological Impact Assessment	<b>SINC</b>	Site of Importance for Nature Conservation
<b>EIA</b>	Environmental Impact Assessment	<b>SLINC</b>	Site of Local Importance for Nature Conservation
<b>EMP</b>	Environmental Management Plan	<b>SNCI</b>	Site of Nature Conservation Interest
<b>EPS</b>	European Protected Species	<b>sp.</b>	Species (Singular)
<b>Ha</b>	Hectare	<b>spp.</b>	Species (Multiple)
<b>HAP</b>	Habitat Action Plan	<b>SPA</b>	Special Protection Area
<b>HSI</b>	Habitat Suitability Index	<b>SSSI</b>	Site of Special Scientific Interest
<b>IUCN</b>	International Union for the Conservation of Nature	<b>SuDS</b>	Sustainable Drainage Systems
<b>JNCC</b>	Joint Nature Conservation Committee	<b>TPO</b>	Tree Protection Order
<b>LBAP</b>	Local Biodiversity Action Plan	<b>WBS</b>	Wintering Bird Survey
<b>LDF</b>	Local Development Framework	<b>WCA (Act)</b>	Wildlife and Countryside Act
<b>LNR</b>	Local Nature Reserve	<b>WFD</b>	Water Framework Directive
<b>LWS</b>	Local Wildlife Site		
<b>MCZ</b>	Marine Conservation Zone		
<b>MS</b>	Method Statement		
<b>MNR</b>	Marine Nature Reserve		
<b>MPA</b>	Marine Protected Area		
<b>NBN</b>	National Biodiversity Network		
<b>NCC</b>	Nature Conservancy Council		
<b>NERC (Act)</b>	Natural Environment and Rural Communities Act		
<b>NGO</b>	Non-Governmental Organisation		
<b>NGR</b>	National Grid Reference		
<b>NNR</b>	National Nature Reserve		

## GLOSSARY:

*For the avoidance of confusion, the terms used in this report follow the definitions given below:*

<b>Assemblage</b>	A group of species found in the same location (CIEEM, 2016).
<b>BAP Habitat</b>	Biodiversity Action Plan Habitat: Natural and semi-natural priority habitats identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (JNCC, 2016).
<b>BAP Species</b>	A Biodiversity Action Plan Species identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (JNCC, 2016).
<b>Biodiversity</b>	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).
<b>Buffer Zone</b>	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).
<b>Compensation</b>	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).
<b>Commuting</b>	The activity of flying between the roost and foraging area (Stone, 2013).
<b>Connectivity</b>	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).
<b>Conservation</b>	The protection, preservation, management or restoration of the natural environment and wildlife (Oxford Dictionary, 2016).
<b>Dispersal</b>	The dissemination, or scattering, of organisms over periods within a given area or over the Earth (Encyclopaedia Britannica, 2016).
<b>Dominant (Habitat/Species)</b>	Denoting the predominant species in a plant (or animal) community (Oxford Dictionary, 2016).
<b>Ecological Impact Assessment (EclA)</b>	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).
<b>Ecological Stepping Stones</b>	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).
<b>Ecosystem</b>	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).
<b>Effect</b>	This report uses the word impact rather than effect when referring to how ecological resources might be affected by a project (CIEEM, 2016).
<b>European Protected Species</b>	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, 2010).

<b>Enhancement</b>	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).
<b>Environmental Impact Assessment (EIA)</b>	This is an assessment carried out under the EIA Regulations (CIEEM, 2016).
<b>European Protected Species (EPS) License</b>	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).
<b>Fauna</b>	The animals of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Flora</b>	The plants of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Foraging</b>	The activity of searching for food (Oxford Dictionary, 2016).
<b>Fragmentation</b>	The breaking up of a habitat, ecosystem or biotope into smaller parcels with a consequent impairment of functioning (CIEEM, 2016).
<b>Habitat</b>	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).
<b>Hibernation</b>	The condition or period of an animal or plant spending the winter in a dormant state (Oxford Dictionary, 2016).
<b>Impact</b>	The way in which an ecological resource/receptor is affected by a project (see effect) (CIEEM, 2016).
<b>Invasive Species</b>	Species introduced outside its normal distribution (HMO, 2011).
<b>Keystone Species</b>	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 Britannica, 2016).
<b>Latrine</b>	Dung pit (Harris et al, 1989).
<b>LBAP Habitat</b>	Local Biodiversity Action Plan Habitat: Priority habitats identified as being the most threatened, within a local area, and require conservation action under Local Biodiversity Action Plan (JNCC, 2016).
<b>LBAP Species</b>	Local Biodiversity Action Plan Species: Priority species identified as being the most threatened, within a local area, and require conservation action under Local Biodiversity Action Plan (JNCC, 2016).
<b>Meta-population</b>	A regional group of connected populations of a species (Encyclopaedia Britannica, 2016).
<b>Mitigation</b>	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).
<b>Native Species</b>	An animal or plant species indigenous to a place (Oxford Dictionary, 2016).
<b>Net Ecological Gain</b>	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).
<b>No Net Loss</b>	The point at which habitat or biodiversity losses equal their gains, both quantitatively and qualitatively (CIEEM, 2016).
<b>Non-Statutory Sites</b>	'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).
<b>Population</b>	A collection of individuals (plants or animals), all of the same species and in a defined geographical area (CIEEM, 2016).
<b>Protected Species</b>	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'.
<b>Receptor</b>	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).
<b>Restoration</b>	The active re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition (CIEEM, 2016).
<b>Riparian</b>	Something related to, living on, or located at the banks of a watercourse, usually a river or stream (HMO, 2011).
<b>Roost</b>	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 2010 'The Habitat Regulations' (HMO, 2010).
<b>Sett</b>	Any structure or place which displays signs indicating current use by a Badger (HMO, 1992). Protected under the Protection of Badgers Act 1992.
<b>Significant Barrier</b>	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).
<b>Species</b>	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding (Oxford Dictionary, 2016).
<b>Statutory Sites</b>	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).
<b>Wildlife Corridor</b>	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).
<b>Zone of Influence</b>	The areas/resources that may be affected by the biophysical changes caused by activities associated with a project (CIEEM, 2016).

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**APPENDIX A:**

**Extended Phase 1 Habitat Survey Report**

**Update Preliminary Ecological Appraisal Report (PEAR)**



**Wivenhoe Quarry Eastern Extension  
Alresford Road, Wivenhoe**

**Extended Phase 1 Habitat Survey**

Report Reference: CE-WQ-0992-RP01- Final



Produced by Crestwood Environmental Ltd.

16 May 2018

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Final	15/05/2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Extended Phase 1 Habitat Survey detailed in this report was commissioned by DL Walker Ltd. on behalf of Tarmac Ltd. to support a planning application for mineral extraction at land to the east of Wivenhoe, Alresford Road, Wivenhoe in Essex.




An Extended Phase 1 Habitat Survey was carried out at the Site, in addition to this the following surveys were also carried out:

- Desk study to locate the presence of any designated wildlife sites and protected species that could be potentially affected by the Proposed Development within 2km of the Site;
- A Preliminary Bat Roost Assessment of trees at the Site; and
- A survey 30m outside of the Site boundary, where accessible, specifically for Badger setts.

The Extended Phase 1 Habitat Survey identified that the habitats at the Site were of **Very Low to Moderate ecological Importance**.









The tables below 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 – Key to Table 2*

Code	Situation Rating
	Requires urgent attention / action
	Requires attention / action, but not urgently
	Currently no further action required – future action may be required



**Table 2 Summary Table of Survey Results and Recommendations**

Receptor	Survey Results	Potential Implications of Impact	Recommendations* <sup>1</sup>	Situation Rating
<b>Great Crested Newt</b>	<p>Terrestrial habitat is of <b>low suitability for Great Crested Newts (GCN)</b>.</p> <p>The ponds at the Site are of <b>limited suitability for GCN</b>.</p> <p>Several ponds have been identified within 500m of the Proposed Development which are not separated from the Site by significant barriers.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct killing/injuring/disturbing of Great Crested Newts if present - <b>Potential breach of the law.</b></p>	<p><b>Further Great Crested Newt surveys required prior to works.</b></p>	
<b>Bats</b>	<p>Hedgerows and ponds provide <b>suitable foraging habitat for Bats</b>.</p> <p>Several mature trees were identified as <b>potential roosting habitat for Bats</b>.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct injury/killing/disturbance of Bats – <b>Potential breach of the law.</b></p>	<p><b>Bat activity surveys</b> required to assess the use of the Site by Bats prior to works.</p> <p><b>Roost surveys</b> of the potential roost trees required, <i>if trees to be lost</i>.</p>	
<b>Breeding and Wintering Birds</b>	<p>Hedgerows and Scrub are <b>suitable for nesting Birds</b>.</p> <p>Grassland and Arable fields are <b>suitable for breeding and wintering Birds</b>.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct loss of active nests - <b>Potential breach of the law.</b></p>	<p><b>Further wintering and breeding Bird surveys required prior to works.</b></p>	
<b>Water Voles</b>	<p>Six Penny Brook at the Site has <b>low suitability for Water Voles</b>.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct injury/killing/disturbance of Water Voles (if present) - <b>Potential breach of the law.</b></p>	<p><b>Surveys required</b> for area around proposed Brook crossing point prior to works.</p>	
<b>Hazel Dormice</b>	<p>Hedgerows at the Site are <b>suitable for Hazel Dormice</b>.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct injury/killing/disturbance of Hazel Dormice (if present) - <b>Potential breach of the law.</b></p>	<p><b>Presence/likely absence surveys required</b> for Hedgerows proposed for removal prior to works.</p>	
<b>Reptiles</b>	<p>The Site has habitat <b>suitable for Reptiles</b>.</p>	<p><b>Further surveys required to determine effect.</b></p> <p>Direct injury/killing of Reptiles – <b>Potential breach of the law.</b></p>	<p><b>Presence/likely absence surveys required</b> for Reptiles prior to works.</p>	
<b>Designated Sites</b>	<p>Statutory and non-statutory sites present within 2km, including <b>sites of international importance</b>.</p>	<p><b>Potential for negative effect.</b></p>	<p><b>Further assessment required</b> prior to works.</p>	
<b>Habitats of Principal Importance</b>	<p><b>Priority &amp; LBAP Habitat types are present:</b> Hedgerows; Standing Water.</p>	<p>Loss of Hedgerows – <b>minor negative effect of Local importance</b></p>	<p><b>Minimise area of habitat to be lost during design stage; include lost habitats in restoration proposals.</b></p>	

Receptor	Survey Results	Potential Implications of Impact	Recommendations* <sup>1</sup>	Situation Rating
<b>Badgers</b>	<b>Suitable foraging habitat</b> at the Site. <b>No evidence of Badger setts</b> at or within 30m of the Site.	No important negative effect.	<b>Update survey required</b> if Proposed Development has not commenced within 2 years.	
<b>Flora</b>	<b>No rare/Priority plant species.</b> <b>No invasive plant species.</b>	No importance negative effect.	No further surveys required.	
<b>Invertebrates</b>	The Site has <b>habitat which is suitable for terrestrial and aquatic Invertebrates.</b>	Loss of habitat of low suitability – <b>Negligible negative effect.</b>	No further surveys required.	
<b>Other (e.g. Fish, Lower Plants etc.)</b>	The Site supports no opportunities for Fish. Sixpenny Brook located approximately 5m west at closest point. No notable Lower Plant Species were recorded at the time of survey	Potential run-off into the Sixpenny Brook.	Implement an appropriate dust management plan and run-off strategy	

Should the works not commence within two years, then it is recommended that update surveys be undertaken (if required) to ensure that the recommendations made in this report are still relevant.

# **1 INTRODUCTION**

## **1.1 INSTRUCTION AND BRIEF**

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to undertake the following surveys at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 056 223 (**'the Site'**).

## **1.2 SITE LOCATION AND CONTEXT**

1.2.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees, Improved Grassland and Poor Semi-Improved Grassland.

1.2.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and a railway line bordered by trees and woodland running east-west to the south of the Site.

1.2.3 Areas of woodland, Hedgerows, scattered trees and water bodies within the local area may act as ecological "stepping stones" to provide connectivity within the wider landscape.

1.2.4 The red line shown on Plate 1 indicates the extent of the Proposed Development Site.

**Plate 1 Site Location Plan**



**1.3 PURPOSE AND SCOPE**

- 1.3.1 The purpose of the survey, assessment and report is to provide ecological advice in respect of the design of, and associated planning application for, the Proposed Development.
- 1.3.2 The scope of the survey included within the brief are detailed in Table 3.

**Table 3 Survey Purpose and Scope**

Survey	Purpose and Scope
<b>Desk Study</b>	To locate the presence of any designated wildlife sites and protected species within 2km which could be potentially affected by the Proposed Development.
<b>Extended Phase 1 Habitat Survey</b>	To record the presence and extent of habitats and the likelihood of protected species being present within the Site.
<b>Preliminary Roost Assessment</b>	To determine the suitability of mature trees at the Site for roosting Bats.
<b>Habitat Suitability Index Assessment</b>	To determine the suitability of ponds at and within 500m of the Site (where accessible) to support Great Crested Newts.
<b>Initial Badger Survey</b>	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 relate to the findings at the time of the field

survey only: 20<sup>th</sup> October 2015 and 27<sup>th</sup> January 2016 (Habitat Suitability Index Assessment). Subsequent visits have been made to the Site following this survey during 2016, which has updated the results within this report.

## 1.4 SUMMARY OF PROPOSALS

1.4.1 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.4.2 The full planning application title reads:

*'Planning application for the extraction of 4.0 million tonnes of sand and gravel as an eastern extension to the existing Wivenhoe Quarry, together with relocation of the existing primary processing plant and ancillary facilities, a proposed new vehicular access onto the B1027 Brightlingsea Road, totalling a 61 hectare area with restoration to EITHER agriculture or low-level water-based nature conservation habitats, heathland, woodland planting and hedgerow enhancement, including the importation of approximately 1.2 million cubic metres of inert restoration materials.'*

1.4.3 The Extended Phase 1 Habitat Survey focussed on habitats within the Proposed Extension Area and did not include an assessment of the Existing Quarry Site. The land comprising the Proposed Extension Area is shown on Figure E1 (see Appendix E2) and is referred to as **'the Site'** within this report.

1.4.4 Information provided by the client at the time of survey included:

- Topographic survey of the Site;
- Site Boundary (received November 2017).

## 1.5 OTHER RELEVANT INFORMATION

1.5.1 The following documents are referred to within this report:

- Planning policies in the Development Plan NPPF (HMO, 2012);
- Essex Minerals Local Plan 2014 (Essex County Council, 2014);
- Colchester Borough Core Strategy 2008 (Colchester Borough Council, 2008);
- Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County Council, 2016);
- Biological Records Report (Essex Field Club, 2015); and
- Essex Biodiversity Action Plan (Essex Wildlife Trust, 2011).

### Definitions

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

## General Limitations

- 1.5.3 Site Boundary plans were provided by Tarmac Ltd. during 2015. Subsequent amendments have been made during 2017 and as such the report details results in relation to this updated boundary, which still currently stands.
- 1.5.4 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 impacts arising from other developments in the local area.
- 1.5.5 Limitations regarding species specific surveys are detailed under the relevant methodologies.

## 2 METHODOLOGY AND APPROACH

### 2.1 DEFINING THE ZONE OF INFLUENCE ('ZOI')

- 2.1.1 The potential impact of a development is not always limited to the boundaries of the site concerned. The development may also have the potential to impact on ecologically valuable sites, habitats or species beyond the site boundaries. The area over which a development may impact ecologically valuable receptors is known as the Zone of Influence (Zoi).
- 2.1.2 The Zoi is determined by the source/type of impact, a potential pathway for that impact and the location and sensitivity of the ecologically valuable receptor beyond the boundary. For the majority of (unmitigated) impacts identified as part of the Proposed Development, the Zoi is generally considered to be the application site and immediately adjacent areas.
- 2.1.3 In ecological terms, the Zoi can also vary considerably depending upon the species potentially affected by the proposed development. For example, some species may be confined to a specific location whilst others, such as Birds and Bats, are more mobile and can occupy larger territories or home ranges. The Zoi is also likely to be influenced by the presence of dispersal barriers, such as roads and hardstanding, which either stop or reduce the likelihood of animals crossing it. As a consequence this could isolate areas of potentially suitable habitat within the application site due to fragmentation.
- 2.1.4 The Zoi for species or species groups has been determined by research and the professional judgement of the ecologist. For example, Common Lizards (*Zootoca vivipara*) have restricted mobility and generally occupy smaller home ranges (up to 700m<sup>2</sup>) (Langton & Beckett, 1995). The Zoi for each species or species-group is identified in the relevant sections of this report.
- 2.1.5 Specific to the Site, the Sixpenny Brook flows through a section of the centre of the Site which connects to the River Colne c.1km south of the Site which may act as a potential pathway to extend the Zoi from the boundaries of the Site.
- 2.1.6 The Zoi is discussed in more detail in the EclA chapter (Report Reference: CE-WQ-0992-RP09).

## 2.2 DETERMINING THE LEVEL OF ECOLOGICAL IMPORTANCE

- 2.2.1 Certain species (flora or fauna) and habitats present 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 Table 4 details the criteria for assessment of ecological importance used within this assessment.
- 2.2.3 It should be noted that ecological importance is assessed on a Site by Site basis and includes a variety of factors (i.e. species abundance); therefore the criteria for assessment may change (i.e. the presence of a rare declining species in relation to a rare stable species).
- 2.2.4 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 (i.e. poor quality habitat supporting protected species); therefore the criteria for assessment detailed below should be used as a general guide only.

**Table 4 Criteria of Assessment for Assigning a Level of Ecological Importance**

Level of Ecological Importance	Criteria for Assessment	
	Species	Habitats
<b>Negligible</b>	<ul style="list-style-type: none"> <li>Species of negligible biodiversity value present.</li> </ul>	<ul style="list-style-type: none"> <li>Very low/no species diversity present.</li> <li>Of little to no biodiversity value.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Species of low biodiversity value present.</li> </ul>	<ul style="list-style-type: none"> <li>Habitat of low biodiversity value.</li> <li>Low floral species diversity.</li> <li>Unlikely to support protected species/supports small numbers of protected species.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>Species of Principal Importance.</li> <li>Species of moderate biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>Habitat of Principal Importance.</li> <li>Features of moderate value for biodiversity. Reasonable floral species diversity.</li> <li>Moderate potential to support protected species.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>Rare species present.</li> <li>Species of high biodiversity value.</li> <li>Abundant species present of moderate biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>Nationally designated Sites.</li> <li>Features rare species.</li> <li>Several features of high value for biodiversity (i.e. numerous features suitable to support protected species).</li> <li>High floral species diversity.</li> </ul>
<b>Very High</b>	<ul style="list-style-type: none"> <li>Very rare/rare species present.</li> <li>Species of very high biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>Internationally designated Sites.</li> <li>Supports very rare/rare species.</li> <li>Habitat of very high biodiversity value.</li> <li>Highly suitable for protected species.</li> <li>Very high floral diversity.</li> </ul>

- 2.2.5 Reasons for the assessment of the level ecological importance of certain features are detailed in the relevant sections of this report.

## 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 5 details the outline criteria for assessment of habitat suitability used within this assessment.
- 2.3.3 It should be noted that habitat suitability is assessed on a site-by-site basis and includes a variety of factors (i.e. species abundance); therefore the criteria for assessment may change (i.e. the presence of a rare declining species in relation to a rare stable species).
- 2.3.4 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 5 Outline Basis for the Assessment for Assigning a Level of Habitat Suitability**

Level of Habitat Suitability	Relevant Criteria for Assessment
<b>Negligible</b>	<ul style="list-style-type: none"> <li>No <u>important</u> habitat characteristics present suitable for protected/notable species within the Site or being of important to sustain the known presence of protected/notable species in adjacent off-site habitats.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>A higher degree of recognised <u>important</u> habitat characteristics absent than present for the particular protected/notable species.</li> <li>Largely isolated habitat not well-connected by other suitable habitats (e.g. habitat corridors) or with largely impermeable 'barriers' present restricting the movement of the protected/notable species in the wider area.</li> <li>Provides the potential for protected/notable species to be present in limited numbers, but may be lacking one or more recognised key habitat requirements.</li> <li>Level of habitat suitability applies to majority of protected/notable species.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>A higher degree of recognised <u>important</u> habitat characteristics present than absent, but with some deficiencies.</li> <li>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.</li> <li>Suitable for protected/notable species in borderline noteworthy numbers but with some vulnerability to decline.</li> <li>Level of habitat suitability applies to majority of protected/notable species.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>All the recognised <u>important</u> habitat characteristics present suitable to support a particular protected/notable species in a largely self-sustaining population with good resilience.</li> <li>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).</li> <li>Level of habitat suitability applies to majority of protected/notable species.</li> </ul>



## 2.4 DESK STUDY

2.4.1 Table 6 below identifies sources of information for the desk study, as well as detailing any third parties who were contacted for information.

**Table 6 Desk Study Information**

Source of Information	Information Sought		Search Distance from the Site boundary	Use of Information
Essex Field Club (Essex Field Club, 2015)	Protected species		4km from centre of the Site	To inform the field survey and report recommendations.
	Notable/Species of Principal Importance			
	Statutory sites			
	Local Wildlife/Non-Statutory Wildlife Sites			
	Schedule 9 Invasive Species			
Essex Bird Watching Society (Essex Birdwatching Society, 2016)	Protected and Notable Bird species		1km	
MAGIC Map	Statutory sites	International Importance	10km	
		National and Local Importance	2km	
	Habitats of Principal Importance (HPI) (NERC Act)		250m	
	Granted European Protected Species Licences		1km	
	Ponds		500m	To determine whether any ponds within 500m of the Site boundary require surveys for Great Crested Newts.
Google Earth (Google Earth, 2016)				
Essex Biodiversity Action Plan (Essex Wildlife Trust, 2011)	Local Priority Species and Habitats		N/A	To inform the field survey and report recommendations.

2.4.2 The Essex Biodiversity Validation Checklist (Place Services, 2015) was also completed as required by the Local Planning Authority.

2.4.3 Records for Bird species were obtained from the Essex Birdwatching Society website (Essex Birdwatching Society, 2016) and the Site landowner who engages in Bird ringing. Bird records were obtained for the 1km grid square surrounding the Site.

## 2.5 FIELD SURVEY

### Extended Phase 1 Habitat Survey

2.5.1 The method used for the Extended Phase 1 Habitat Survey is based on guidelines provided by JNCC (JNCC, 2010) and CIEEM (CIEEM, 2013). During the survey visit, any vegetation types or signs of protected species or fauna were recorded and mapped using specific standard mapping colours, where possible.

#### Limitations

2.5.2 The survey was undertaken outside of the optimal botanical survey season, which is usually taken to be April to September, inclusive. Given the common and widespread nature of habitats at the Site, this is not considered to affect the recommendations of this report.

### Hedgerows

2.5.3 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"*.

### Habitat Suitability Index (HSI) Assessment for Great Crested Newt

2.5.4 An initial Great Crested Newt Habitat Suitability Index (HSI) assessment of ponds at and within 500m of the Site was carried out according to methodologies developed by Oldham *et al* (Oldham, et al., 2000).

2.5.5 A HSI is a measure of habitat suitability for Great Crested Newts. It is important to note that it is not a substitute for newt surveys. Factors such as pond area, water quality and macrophyte coverage are assessed and assigned a value between 0.01 and 1 (0.01 indicating an unsuitable habitat and 1 indicating an optimum habitat).

2.5.6 Each pond will be categorised using the scores outlined in Table 7.

**Table 7** *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

### Tree Assessment for Roosting Bats

2.5.7 The survey included a survey of mature trees at the Site from ground level, recording any evidence of Bat roosts, droppings, staining, scratch marks and feeding remains, or any potential roost sites within the trees themselves in accordance with Natural England's Bat Mitigation Guidelines

(Natural England, 2004) and the Bat Survey Good Practice Guidelines 2nd Edition (Hundt, 2012). Following the 2015 Extended Phase 1 Habitat survey, updated Bat survey guidelines (Collins, 2016) were published and the remaining survey results are based on these guidelines. Based on the results of the survey, trees were categorised for their potential suitability for roosting Bats as follows in Table 8 (Collins, 2016).

**Table 8 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.
Moderate	Contains 1+ PRFs that could be used by Bats but unlikely to support a roost of high conservation status*.
High	A tree containing one or more PRFs that is 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

- 2.5.8 An assessment of the habitats at the Site was undertaken to determine the suitability of the Site for foraging and commuting Bats.
- 2.5.9 Table 9 details the levels of suitability for Bat activity at a Site, including relevant features of particular importance.

**Table 9 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 by 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.

### **Badger Survey**

- 2.5.10 A survey for Badgers was carried out following recognised guidance (Harris et al, 1989). All potential habitats within the Site, plus 30m outside of the Site boundary (where accessible), were surveyed for evidence of badger activity, and specifically for the presence of setts. Field signs searched for included active or inactive setts, badger pathways, latrines, hair, discolouring of and damage to fencing, signs of foraging and feeding remains.

#### **Limitations**

- 2.5.11 Not all areas within 30m outside of the Site boundary could be accessed to check for Badgers due to some of the areas falling within private residential grounds. This is not considered to be a significant limitation as the boundaries adjoining these areas showed no evidence of Badger activity, and were able to be observed remotely from the boundaries.

### **Invasive Plant Species**

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

## **3 RESULTS AND EVALUATION**

### **3.1 PLANNING POLICY**

- 3.1.1 National and Local planning policies which are relevant to the Proposed Development are detailed below.

#### **National Planning Policy Context**

- 3.1.2 National Planning Policy Framework (NPPF) Section 11 - Conserving and enhancing the Natural Environment, contains relevant policy in Paragraphs 109-125.
- 3.1.3 The Government's objective, as stated in the NPPF is that planning should help to deliver a healthy natural environment for the benefit of everyone and safe places which promote wellbeing. To achieve this objective, the NPPF states that the planning system should aim to conserve and enhance the natural and local environment by protecting valued landscapes, minimise impacts on biodiversity and provide net gains where possible. The NPPF also makes the statement that planning permission should be refused if significant harm resulting from a development cannot be avoided, adequately mitigated, or as a last resort, compensated for.
- 3.1.4 The NPPF goes on to support the Lawton Review (Lawton, 2010) and the White Paper (HMSO, 2011) with its goals to minimise impacts on biodiversity by stating that planning policy should take into account the need to plan for biodiversity at a landscape-scale as well as identify and map components of the local ecological networks, including international, national and local sites. In line with EU targets, the NPPF states that planning will promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species populations.

#### **Local Planning Policy Context**

- 3.1.4.1 Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County

Council, 2016), which details the Wivenhoe Site as a flagship site for biodiversity and recommends the habitats that quarry sites should aim for restoration.

3.1.5 Policies relevant to the Proposed Development from the Essex Minerals Local Plan 2014 (Essex County Council, 2014); are detailed below:

- Policy S3 - Climate Change;
- Policy S10 - Protecting and Enhancing the Environment and Local Amenity; and
- Policy S12 - Mineral Site Restoration and After.

3.1.6 Policies relevant to the Proposed Development from the Colchester Borough Core Strategy 2008 (Colchester Borough Council, 2008) are detailed below:

- Policy Env1 – Environment.

## 3.2 DESIGNATIONS

### Statutory Wildlife Sites

3.2.1 There are a number of statutory wildlife sites within 2km of the Site and internationally designated sites within 10km of the Site; these are outlined in Table 10. The statutory wildlife sites include:

- Sites of Special Scientific Interest (**SSSI's**);
- Local Nature Reserves (**LNR**);
- Special Areas of Conservation (**SAC**);
- Special Protection Areas (**SPA**); and
- Ramsar sites.

**Table 10 Statutory Wildlife Sites within the Study Area**

Site Name	Designation	Distance	Direction	Description
<b>International Sites within 10km</b>				
Colne Estuary	SPA/Ramsar (also SSSI)	1.2km	S	The estuary is of international importance for two wintering bird species, and of national importance for seven others. Habitats include: mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reed beds. Supports an outstanding assemblage of Invertebrates and plants.
Essex Estuaries	SAC (also SSSI)	1.2km	S	The Essex Estuaries SAC contains either fully and/or partially: five distinct SPAs, seven SSSIs and one MCZ. Features a diverse range of marine habitats and supports numerous marine species.
Abberton Reservoir	SPA/Ramsar	6.4km	SW	Largest body of freshwater in Essex. One of the most important reservoirs in the UK for waterfowl. 30,000 Birds visit annually, including one internationally important species and twelve nationally important species.

Table 10 Cont'd...

Site Name	Designation	Distance	Direction	Description
<b>International Sites within 10km</b>				
Stour and Orwell Estuaries	SPA/Ramsar	10km	NE	The Stour and Orwell estuaries straddle the eastern part of the Essex/Suffolk border in eastern England. The estuaries include extensive mud-flats, low cliffs, saltmarsh and small areas of vegetated shingle on the lower reaches. The site also includes an area of low-lying grazing marsh at Shotley Marshes on the south side of the Orwell. In summer, the site supports important numbers of breeding Avocet, while in winter they hold major concentrations of water Birds, especially geese, ducks and waders. The geese also feed, and waders roost, in surrounding areas of agricultural land outside the SPA.
<b>National Sites within 2km (not mentioned above)</b>				
Upper Colne Marshes	SSSI	835m	S	Considered to be of special interest as it supports an outstanding assemblage of nationally scarce plants and an unusual diversity of brackish ditch-types. Additional interest in this complex of coastal habitats is provided by scarce invertebrate species and the use of the site by breeding Birds. Some of which are listed as Schedule 1 species, including Barn Owl ( <i>Tyto alba</i> ).
<b>Other Sites within 2km</b>				
Colne	LNR	1.5km	W	Features secondary and mixed coppiced woodlands, marshland and farmland, comprising mainly scrub and grassland. A receptor site for the translocation of Common Lizard.

3.2.1 There are no designated sites within the Site boundary. Several sites were identified within the wider search area. These sites vary from **International to County Importance**.

3.2.2 Figure E18 in Appendix E4 details Internationally Designated Sites within 10km of the Site, whilst Figure E19 in Appendix E5 details Statutory and Non-Statutory Designated Sites within 2km and 250m (Ancient Woodland) of the Site.

### Non-Statutory Wildlife Sites

3.2.3 There are several non-statutory Local Wildlife Sites (LWS) within 1km of the Site boundary. These sites are summarised in Table 11.

**Table 11 Local Wildlife Sites**

Site Name	Distance	Direction	Description
Villa Farm Quarry	Adjacent	S	Disused sand and gravel pit now comprising a mosaic of habitats. An area of ancient woodland (Cockaynes Wood) is also present. Site supports a variety of important plant, Invertebrate and breeding Bird populations.
Palegate Wood	0.4km	NE	Area of ancient woodland
Park Wood	0.4km	NE	Small fragment of ancient woodland
Wivenhoe Cross Pit	0.5km	NW	Brownfield tall ruderal grassland and scattered scrub, supporting nationally rare and scarce Invertebrate populations
Arlesford Grange	0.9km	S	Broadleaved woodland supporting a population of Dormice

- 3.2.4 There is one non-statutory designated site (Villa Farm Quarry LWS) that borders the Site and four other LWS within 1km. LWS are of **County Importance**.

### Habitats of Principal Importance and Ancient Woodland

- 3.2.5 Eleven Habitats of Principal Importance types (as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006) have been recorded within Essex. Two Local Priority Habitats have also been defined within the Local Biodiversity Action Plan (LBAP) (Essex Wildlife Trust, 2011) and can be found at the Site; these are: Arable Field Margins and Hedgerows.
- 3.2.6 The LBAP also refers to several Local Priority Species, with a focus on the following: Brown Hare (*Lepus europaeus*), Hazel Dormouse (*Muscardinus avellanarius*), Otter (*Lutra lutra*), Water Vole (*Arvicola amphibius*) and all Bat species occurring within the County.
- 3.2.7 Based on information provided by MAGIC, within 250m of the Site boundary there are a number of Habitats of Principal Importance (HPI) as shown in Table 12.

**Table 12 Habitats of Principal Importance**

Habitat Type	Distance and Direction
Deciduous woodland	Several areas adjacent to site boundary to south and southwest
Traditional Orchard	Adjacent to site boundary to north and 100m east

- 3.2.8 An area of Ancient Woodland called Cockaynes Wood exists directly adjacent to the southern boundary of the Site.

### Other Sites

- 3.2.9 Adjoining the southern boundary of the Site is Cockaynes Wood Nature Reserve, which is managed by Essex Wildlife Trust. This covers the area designated as Villa Farm Quarry LWS.

## 3.3 FIELD SURVEY RESULTS

### Survey Conditions

- 3.3.1 The weather conditions at the time of survey (October 2015) are shown in Table 13.

**Table 13 Weather Conditions during the Survey**

Parameter	Recorded Figure
Temperature (°C)	12.5
Cloud Cover (in Octas)	3 / 8
Precipitation	None
Wind Speed (Beaufort Scale)	Light Air (1)

## 3.4 HABITATS AND FLORA

### General

- 3.4.1 The habitat types identified at the Site, as listed below, relate to the guideline habitats listed within the Handbook for Phase 1 Habitat Survey (JNCC, 2010). These habitats are recorded on Figure E1 (Appendix E2) and are described in more detail below.

### Arable

- 3.4.2 Arable is the dominant habitat present at the Site and present throughout the eastern extent of the Site (see Plate 2). At the time of the survey, the fields had been ploughed or planted with winter crops.

**Plate 2**      **Arable**



### Tall Ruderal

- 3.4.3 Around the margins of the Arable fields were areas of Tall Ruderal vegetation (see Plate 3). Species present within this habitat included: Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Broad leaved Dock (*Rumex obtusifolius*), Red Deadnettle (*Lamium purpureum*) and White Deadnettle (*Lamium album*).
- 3.4.4 Grass species were also found, including: Perennial Rye Grass (*Lolium perenne*), Yorkshire Fog (*Holcus lanatus*), Cocks Foot (*Dactylis glomerata*) and Common Bent (*Agrostis capillaris*).
- 3.4.5 Other areas of Tall Ruderal vegetation were present, thought to be managed as game cover. Species present included: Pendulous Sedge (*Carex pendula*) and Common Nettle (*Urtica dioica*).



**Plate 3 Tall Ruderal**



**Improved Grassland**

- 3.4.6 A single area of Improved Grassland was present towards the northern extent of the Site, abutting the B1027 (Tenpenny Hill). At the time of the surveys following the initial Extended Phase 1 Survey undertaken in 2015, sheep were grazing on this habitat.
- 3.4.7 The habitat was dominated by Perennial Rye Grass.

**Dense Scrub**

- 3.4.8 One area of Dense Scrub is present in the northern extent of the Site (see Plate 4).
- 3.4.9 Species present within this habitat included: Bramble (*Rubus fruticosus* agg.), Bracken (*Pteridium aquilinum*), Dog Rose (*Rosa canina*), Cleavers (*Galium aparine*) and Common Nettle.

**Plate 4**      **Dense Scrub**



**Hedgerows**

- 3.4.10      There are 17 Hedgerows present throughout the central and eastern extents of the Site. The locations of the Hedgerows can be found in Figure E1 (Appendix E2). The Hedgerows are all classed as species poor and comprise intact Hedgerow, defunct Hedgerow and hedge with trees. The Hedgerows are described in more detail in Table 14.

**Table 14 Hedgerow Descriptions**

Hedge No.	Hedge Type	Description	Species
H1	Intact	A managed hedge approximately 2m tall.	Hawthorn ( <i>Crataegus monogyna</i> ) and Blackthorn ( <i>Prunus spinosa</i> ).
H2	Hedge with Trees	-	Hawthorn, Blackthorn, Common Oak ( <i>Quercus robur</i> ), Hazel ( <i>Corylus avellana</i> ), Dog Rose ( <i>Rosa canina</i> ), Dogwood ( <i>Cornus sp.</i> ), Broom ( <i>Cytisus scoparius</i> ) and Nettle.
H3	Hedge with Trees / Defunct	Approximately 2.5m tall.	Hawthorn, Ash ( <i>Fraxinus excelsior</i> ), Blackthorn, Common Oak and Bramble.
H4	Hedge with Trees	A managed hedge approximately 2-3m tall.	Common Oak, Holly ( <i>Ilex aquifolium</i> ), Hawthorn, Blackthorn and Willow ( <i>Salix sp.</i> ).
H5	Hedge with Trees	Approximately 3-4m tall.	Hawthorn, Blackthorn, Dog Rose and Common Oak.
H6	Hedge with Trees	Newly planted species in gaps.	Hawthorn, Blackthorn and Common Oak.
H7	<i>No longer part of the 2017 Site Boundary. All other Hedgerow numbers remain the same for ease of reference.</i>		
H8	Hedge with Trees	Approximately 4m tall along the woodland edge.	Hawthorn, Blackthorn, Dog Rose and Common Oak
H9	Hedge with Trees	-	Hawthorn and Bracken.
H10	Hedge with Trees	Along a dry ditch.	Hawthorn, Blackthorn and Oak.
H11	Hedge with Trees	Approximately 4m tall.	Hawthorn, Blackthorn, Oak and Holly.
H12	Intact	Next to the road.	Hawthorn, Blackthorn and Oak.
H13	Hedge with Trees	-	Hawthorn, Blackthorn, Oak and Holly.
H14	Hedge with Trees	-	Oak and Ash.
H15	Hedge with Trees	Approximately 3m tall.	Primarily Oak trees.
H16	Hedge with Trees / Defunct	Numerous gaps.	Hawthorn, Oak and Holly.
H17	Hedge with Trees / Defunct	Numerous gaps.	Hawthorn, Blackthorn, Oak and Holly.
H18	Intact	A managed hedge next to the road.	Hawthorn, Blackthorn and Oak.

### Poor Semi-Improved Grassland

- 3.4.11 Two areas of Poor Semi-Improved Grassland were present at the Site, located in the northern extent (see Plate 5) and the south-eastern extent.
- 3.4.12 Species present within this habitat include: False Oat-grass (*Arrhenatherum elatius*), Crested Dogs Tail (*Cynosurus cristatus*), Soft Rush (*Juncus effusus*), Ribwort Plantain (*Plantago lanceolata*), Field Pansy (*Viola arvensis*), Oxeye Daisy (*Leucanthemum vulgare*), White Champion (*Silene latifolia*), Red Champion (*Silene dioica*), Red Clover (*Trifolium pratense*), White Clover (*Trifolium repens*), Prickly Sow Thistle (*Sonchus asper*), Smooth Sow Thistle (*Sonchus oleraceus*) and Field Poppy (*Papaver rhoeas*).

**Plate 5      Poor Semi-Improved Grassland**



**Plant Species**

3.4.13 No Priority or rare floral species were found at the Site.

**Invasive Plant Species**

3.4.14 No invasive floral species were found at the Site.

**3.5 FAUNA**

3.5.1 Other than common Breeding Birds (as listed in Section 3.5.14), no evidence of protected species was recorded at the time of the survey, however, other species which have been considered are detailed below.

**Amphibians and Reptiles**

**Great Crested Newt**

3.5.2 There are no ponds within the Site boundary, however there are 33 ponds within 500m of the Site boundary (as amended 2017), which are not separated from the Site by significant barriers to dispersal (see Figure E2 on Appendix E3).

3.5.3 The nearest pond to the Site (Pond 15) is approximately 10m away from the south-western boundary of the Site.

3.5.4 The EFC desk study (Essex Field Club, 2015) identified two records of Great Crested Newt (*Triturus cristatus*) from 1985 within 4km of the Site boundary. These are located approximately 4km to the southwest of the Site and 2.4km southeast of the Site. EWT provided undated records for Great Crested Newts near Elmstead Market, circa 1km to the north.

3.5.5 A Habitat Suitability Index (HSI) Assessment was undertaken on ponds within 500m of the Site during January 2016, results of which are detailed in Table 15. Pond references have been changed accordingly following receipt of the Site boundary change (provided in November 2017) (see Figure E2 in Appendix E3).

**Table 15 HSI Assessment Results Summary**

Pond Number	HSI Value	HSI Score	Pond Number	HSI Value	HSI Score
1	Dry/No longer extant		18	Poor	0.28
2	Average	0.67	19	Average	0.61
3	Good	0.71	20	Below Average	0.54
4	Good	0.76	21	Excellent	0.81
5	Excellent	0.88	22	Good	0.78
6	Poor	0.47	23	Dry/No longer extant	
7	Poor	0.42	24	Poor	0.46
8	Good	0.72	25	Poor	0.44
9	Excellent	0.81	26	Below Average	0.53
10	Average	0.64	27	Average	0.64
11	Average	0.67	28	Unable to access	
12	Average	0.67	29	Excellent	0.95
13	Good	0.76	30	Dry/No longer Extant	
14	Good	0.72	31	Good	0.79
15	Good	0.71	32	Poor	0.48
16	Poor	0.28	33	Dry/No longer extant	
17	Dry/No longer extant				

3.5.6 At the time of HSI survey, 1 pond was not accessible (28), whilst 5 ponds were recorded to be dry or no longer extant (1, 17, 23, 30, and 33).

3.5.7 Ponds that were assessed as being of 'Average', 'Good', or 'Excellent' suitability for Great Crested Newts were recommended for further survey for Great Crested Newts (see report reference CE-WQ-0992-RP02) (Crestwood Environmental Ltd., 2016). Ponds which were assessed as being of 'Below Average' or 'Poor' were scoped out of recommended further survey, unless otherwise stated, following discussions with the Local Planning Officer.

3.5.8 The dominant habitat present at the Site is Arable, which is largely unsuitable for this species; the areas of Poor Semi-Improved Grassland may be more suitable for Great Crested Newt though the extent of this habitat at the Site is limited. The terrestrial habitat at the Site is therefore considered to be of **Low suitability for Great Crested Newt**.

3.5.9 The numerous Hedgerows present at the Site may be used as corridors and provide some connectivity for Great Crested Newts. The habitats in the wider surrounds of the Site are considered to provide better quality habitat to that within the Site itself.

## Other Amphibians

3.5.10 The closest record for an amphibian species was Common Toad (*Bufo bufo*) identified at a distance of 160m to the east of the Site dated 1998.

3.5.11 The habitats at the Site are considered to be **of Low suitability for other Amphibians**.

## Reptiles

3.5.12 Several records of Reptile species were provided by EFC and EWT, including:

- Common Lizard (*Zootoca vivipara*) 2.0km to the southwest dated 2007;
- Slow Worm (*Anguis fragilis*), 600m to the south dated 2011;
- Grass Snake (*Natrix natrix*); 0.2km to the south dated 2007; and
- Adder (*Vipera berus*) 2.1km southeast dated 1998.

3.5.13 No evidence of Reptiles was found at the Site during the survey. The Arable field margins and the Semi-Improved Grassland at the Site were identified as being of **High suitability for Reptiles**.

## Mammals

### Badger

3.5.14 Numerous records for Badger, within 4km, were identified during the desk study, with the closest record located approximately 100m to the west of the Site dated 2011.

3.5.15 The Site supports **Moderate suitability foraging habitat for Badgers**, however no evidence of foraging was found at the Site and no evidence was found of any Badger setts at or within 30m of the Site. There is abundant foraging habitat for Badgers in the local area as the wider landscape is dominated by Arable fields and areas of scattered woodland.

### Bat Species

3.5.16 Numerous records for Bats (*Chiroptera spp.*) were identified during the desk study, including: Serotine Bat (*Eptesicus serotinus*), Daubenton's Bat (*Myotis daubentonii*), Natterer's Bat (*Myotis nattereri*), Leisler's Bat (*Nyctalus leisleri*), Noctule Bat (*Nyctalus noctula*), Kuhl's Pipistrelle Bat (*Pipistrellus kuhlii*), Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Brown Long-eared Bat (*Plecotus auritus*). The closest record is for a Daubenton's Bat approximately 0.1km from the Site in 2007, with records of Common Pipistrelle recorded in the same location dated 1996. The biological records did not provide any information on the location of Bat roosts in the local area.

3.5.17 A Preliminary Roost Assessment was carried out on trees at the Site in line with 2012 guidance (Hundt, 2012). These have been reassessed using 2016 guidance (Collins, 2016) for the purposes of this report.

3.5.18 Several trees scattered throughout the eastern extent of the Site were identified as being of Low potential, which provide several suitable features for roosting Bats according to good practice guidelines (Collins, 2016). Trees with Bat roost potential are shown on Figure E1 in Appendix E2.

3.5.19 **Several trees at the Site are considered to be of Low suitability** for roosting Bats due to the

number of access points through holes and cracks in the bark.

- 3.5.20 The habitats at the Site are considered to be of Moderate suitability for foraging and commuting Bats, including the Hedgerows.

#### Water Vole

- 3.5.21 EFC provided numerous records for Water Vole (*Arvicola amphibius*) within 4km of the Site. Two records are from 1995 and are located within the Site boundary, approximately 160m east of the Sixpenny Brook. EWT also provided several recent records for Water Vole along Sixpenny Brook.
- 3.5.22 The two Water Vole records closest to the Site boundary are situated along Sixpenny Brook; one dated from 2002 approximately 650m to the south of the Site, and one from 2004 approximately 970m north of the Site.
- 3.5.23 There was no evidence of Water Vole at the Site at the time of survey.
- 3.5.24 The Running Water (Sixpenny Brook) that flows north to south at the west of the Site is considered to be of **Low suitability for Water Vole** due to the low water levels and shallow banks. However two biological records from 1995 indicate the former presence of Water Vole within the Site boundary.

#### Hazel Dormouse

- 3.5.25 EFC and EWT provided numerous records for Hazel Dormouse within 4km of the Site. Records within the EWT database included 2009 records for Dormice within woodland adjacent to the Site near Sixpenny Brook. Additional records were provided for woodland to the south of the Site within Cockaynes Wood nature reserve.
- 3.5.26 There was no evidence of Hazel Dormouse at the Site at the time of survey
- 3.5.27 The Site is considered to support **Low to Moderate suitability habitat for Hazel Dormouse** due to the significant number of Hedgerows present at the Site and the abundance of tree species which provide foraging opportunities for Hazel Dormouse. The Hedgerows are also favourable corridors and provide connectivity to several areas of scattered woodland in the local area.

#### Other Mammals

- 3.5.28 Several Otter (*Lutra lutra*) records were provided, with the nearest being a 2010 record along Tenpenny Brook circa 1.5km to the east.
- 3.5.29 Several Priority mammal species have been recorded within 2km, including: Polecat (*Mustela putorius*); Harvest Mouse (*Micromys minutus*); Brown Hare (*Lepus europaeus*); and Hedgehog (*Erinaceus europaeus*).
- 3.5.30 There was no evidence of use of the Site by other protected mammal species (Otter, Polecat etc.).

#### Birds

- 3.5.31 Records for Bird species were obtained from the Essex Birdwatching Society website (Essex Birdwatching Society, 2016).
- 3.5.32 Records for protected and notable Bird species within the 1km grid squares of the Site are shown in

Table 16.

**Table 16 Protected and Notable Bird Species**

Schedule 1		Red List		Amber List	
Common Name	Latin Name	Common Name	Latin Name	Common Name	Latin Name
Brambling	<i>Fringilla montifringilla</i>	Pochard	<i>Aythya ferina</i>	Brent Goose	<i>Branta bernicla</i>
Fieldfare	<i>Turdus pilaris</i>	Grey Partridge	<i>Perdix perdix</i>	Shelduck	<i>Tadorna tadorna</i>
Black-Tailed Godwit	<i>Limosa limosa</i>	Ringed Plover	<i>Charadrius hiaticula</i>	Teal	<i>Anas crecca</i>
Greenshank	<i>Tringa nebularia</i>	Curlew	<i>Numenius arquata</i>	Mallard	<i>Anas platyrhynchos</i>
Hen Harrier	<i>Circus cyaneus</i>	Woodcock	<i>Scolopax rusticula</i>	Goldeneye	<i>Bucephala clangula</i>
Marsh Harrier	<i>Circus aeruginosus</i>	Herring Gull	<i>Larus argentatus</i>	Oystercatcher	<i>Haematopus ostralegus</i>
Hobby	<i>Falco subbuteo</i>	Turtle Dove	<i>Streptopelia turtur</i>	Bar-Tailed Godwit	<i>Limosa lapponica</i>
Kingfisher	<i>Alcedo atthis</i>	Cuckoo	<i>Cuculus canorus</i>	Turnstone	<i>Arenaria interpres</i>
Red Kite	<i>Milvus milvus</i>	Skylark	<i>Alauda arvensis</i>	Knot	<i>Calidris canutus</i>
Merlin	<i>Falco columbarius</i>	Grasshopper Warbler	<i>Locustella naevia</i>	Dunlin	<i>Calidris alpina</i>
Barn Owl	<i>Tyto alba</i>	Starling	<i>Sturnus vulgaris</i>	Common Sandpiper	<i>Actitis hypoleucos</i>
Peregrine	<i>Falco peregrinus</i>	Ring Ouzel	<i>Turdus torquatus</i>	Redshank	<i>Tringa totanus</i>
Little Ringed Plover	<i>Charadrius dubius</i>	Song Thrush	<i>Turdus philomelos</i>	Snipe	<i>Gallinago gallinago</i>
Redwing	<i>Turdus iliacus</i>	Mistle Thrush	<i>Turdus viscivorus</i>	Common Tern	<i>Sterna hirundo</i>
Green Sandpiper	<i>Tringa ochropus</i>	Spotted Flycatcher	<i>Muscicapa striata</i>	Black-Headed Gull	<i>Chroicocephalus ridibundus</i>
Scaup	<i>Aythya marila</i>	Whinchat	<i>Saxicola rubetra</i>	Yellow Legged Gull	<i>Larus michahellis</i>
Cetti's Warbler	<i>Cettia cetti</i>	Yellow Wagtail	<i>Motacilla flava</i>	Great Black-Backed Gull	<i>Larus marinus</i>
Whimbrel	<i>Numenius phaeopus</i>	Grey Wagtail	<i>Motacilla cinerea</i>	Stock Dove	<i>Columba oenas</i>
Greylag Goose	<i>Anser anser</i>	Linnet	<i>Carduelis cannabina</i>	Tawny Owl	<i>Strix aluco</i>
Common Scoter	<i>Melanitta nigra</i>	Lesser Redpoll	<i>Acanthis cabaret</i>	Swift	<i>Apus apus</i>
Mediterranean Gull	<i>Ichthyaetus melanocephalus</i>	Yellowhammer	<i>Emberiza citrinella</i>	Kestrel	<i>Falco tinnunculus</i>



Schedule 1		Red List		Amber List	
Common Name	Latin Name	Common Name	Latin Name	Common Name	Latin Name
Osprey	<i>Pandion haliaetus</i>	Corn Bunting	<i>Emberiza calandra</i>	House Martin	<i>Delichon urbicum</i>
Avocet	<i>Recurvirostra avosetta</i>	Red-Necked Grebe	<i>Podiceps grisegena</i>	Willow Warbler	<i>Phylloscopus trochilus</i>
Little Tern	<i>Sternula albifrons</i>	Tree Pipit	<i>Anthus trivialis</i>	Dunnock	<i>Prunella modularis</i>
Firecrest	<i>Regulus ignicapilla</i>	Nightingale	<i>Luscinia megarhynchos</i>	Meadow Pipit	<i>Anthus pratensis</i>
Crossbill	<i>Loxia curvirostra</i>	-	-	Bullfinch	<i>Pyrrhula pyrrhula</i>
Black Redstart	<i>Phoenicurus ochruros</i>	-	-	Reed Bunting	<i>Emberiza schoeniclus</i>
-	-	-	-	Grey Plover	<i>Pluvialis squatarola</i>
-	-	-	-	Curlew Sandpiper	<i>Calidris ferruginea</i>
-	-	-	-	Spotted Redshank	<i>Tringa erythropus</i>
-	-	-	-	Sandwich Tern	<i>Thalasseus sandvicensis</i>
-	-	-	-	Short-Eared Owl	<i>Asio flammeus</i>
-	-	-	-	Redstart	<i>Phoenicurus phoenicurus</i>

3.5.33 Several common Breeding Bird species were identified at the Site, which were: Robin (*Erithacus rubecula*), Wren (*Troglodytes troglodytes*), Blackbird (*Turdus merula*), Skylark (*Alauda arvensis*), Common Buzzard (*Buteo buteo*), Pheasant (*Phasianus colchicus*), Grey Partridge (*Perdix perdix*), Magpie (*Pica pica*), a Gull sp. (*Laridae sp.*), Mistle Thrush (*Turdus viscivorus*), Goldfinch (*Carduelis carduelis*) and Carrion Crow (*Corvus corone*).

3.5.34 No evidence of 'Schedule 1' Bird species was found at the Site at the time of survey.

3.5.35 The Grassland and Arable fields present at the Site are considered to be of **Moderate suitability for ground nesting Birds and wintering Birds.**

3.5.36 The Dense Scrub and Hedgerows (incl. Hedgerow trees) at the Site are considered to be of **High suitability for nesting Birds.**

### Invertebrates

3.5.37 Over 500 records for Priority and Notable Invertebrate species were provided by Essex Field Club. A small number of records were also provided by EWT for Cockaynes Wood

3.5.38 The Hedgerows and mature Trees at the Site are suitable for a range of common and widespread Invertebrate species. The flowering and fruiting plant species within the Hedgerow habitat, as well

as nectar-rich species which may be present in the grassland provide habitat for foraging Invertebrates.

3.5.39 The stream present to the west of the Site is considered unsuitable for White Clawed Crayfish.

3.5.40 The Site has **Low suitability for terrestrial Invertebrates**. The numerous Hedgerows provide foraging habitat, however the diversity of terrestrial Invertebrates is likely to be reflected in the overall low floral species diversity present at the Site.

### Invasive Animal Species

3.5.41 No evidence of invasive animal species was found at the Site at the time of survey.

### OVERALL HABITAT EVALUATION

3.5.42 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 17. They are also assessed for their suitability to support protected species in order to assess their Ecological Importance, using the criteria in Table 4.

**Table 17 Evaluation of Importance of Habitats at the Site**

Habitat	LBAP Habitat Type	Section 41 Habitat of Principal Importance (NERC Act 2006)	Floral Species Diversity	Suitability for Protected Species	Overall Importance
Arable	Yes (Field margins only)	Yes (Field margins only)	Low	Ground nesting Birds such as Skylark ( <i>Alauda arvensis</i> ) and Lapwing ( <i>Vanellus vanellus</i> ).	Low*
Tall Ruderal	No	No	Low	Unlikely to support protected species	Very Low
Dense Scrub	No	No	Low	Unlikely to support protected species.	Very Low
Hedgerow	Yes	Yes	Low	Bats – foraging and commuting Birds – nesting Dormice	Moderate
Poor Semi-Improved Grassland	No	No	Low	Unlikely to support protected species.	Very Low

\*Level of ecological importance is subject to change should these habitats be found to support protected species.

3.5.1 At a site-specific level, the habitats are of **Very Low – Moderate Ecological Importance**. Floral species diversity is Low for the Site and the overall Importance of the Site is increased only by the presence of Priority Habitats and the suitability of the habitats for protected species (see Section for further details regarding protected species).

3.5.2 The Impact Assessment is detailed within the Ecological Chapter (report ref: CE-WQ-0992-RP09).

### 3.6 SCREENING OF ECOLOGICAL FEATURES

3.6.1 Table 18 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 18 Screening of Ecological Features**

Potential Ecological Receptor	Justification for Exclusion from Further Assessment
Protected Floral Species	No protected floral species were found at the Site.
Veteran Trees	There are no veteran trees at the Site.
White Clawed Crayfish ( <i>Austropotamobius pallipes</i> )	The Site supports no suitable aquatic habitat for the species.
Otter ( <i>Lutra lutra</i> )	The Site is generally unsuitable for Otters and has poor connectivity to suitable water courses.
Invertebrates (other aquatic)	The Site supports no suitable aquatic habitat for the species.
Smooth Snake ( <i>Coronella austriaca</i> ), Sand Lizard ( <i>Lacerta agilis</i> ) and Natterjack Toad ( <i>Bufo calamita</i> )	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 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 HABITATS AND FLORA

- 4.1.1 The majority of habitats at the Site are of **Low - Moderate Ecological Importance**. Those habitats of low ecological Importance (Tall Ruderal, Dense Scrub, and Grassland) are considered to be common and widespread in the local area and unlikely to support populations of protected species.
- 4.1.2 The Scattered Trees are of Moderate ecological Importance overall and where present outside the construction footprint, these habitats should be retained and adequately protected during the operational period of the Proposed Development.
- 4.1.3 Although they are common and widespread habitats within the local area, the Arable field margins and Hedgerows are of Moderate ecological Importance within the context of the Site, as they are LBAP habitats and HPI, as well as providing suitable habitat for protected species. Where these habitats exist outside the construction footprint they should be retained and protected where possible. This will ensure habitat continuity for a variety of species during the Proposed Development.
- 4.1.4 The Site offers very little in the way of floral species diversity and the flora present within the habitats at the Site is typical of what would be expected within those habitats. As such, it is concluded that **the Site does require any further surveys for its botanical interest**.
- 4.1.5 The area of Ancient Woodland directly adjacent to the Site is listed as a Priority habitat in the Essex Biodiversity Action Plan and is of **District level importance**. In line with relevant Standing Advice (Natural England and Forestry Commission, 2014), it is recommended that a buffer is implemented between the Proposed Development and the area of Ancient Woodland in order to minimise impacts on the Woodland. It is recommended the buffer zone should be a minimum of 15m

between the Ancient Woodland and the Proposed Development.

## 4.2 FAUNA

4.2.1 Recommendations regarding protected species are detailed in Table 19.

**Table 19 Recommendations for Protected Species**

Species	Records within 2km	Suitable Habitat Present	Species Evidence in Survey Area	Further Survey/Mitigation Recommended
Great Crested Newt and Other Amphibians	☒	☒	<input type="checkbox"/>	<b>Further survey required on those ponds considered 'Average' and above as part of the HSI assessment.</b> Surveys should be undertaken either by using eDNA sampling or with traditional survey methods (bottle trapping, torch-light surveys/egg-searches/netting) during the optimal survey period of mid-March - mid-May, utilising appropriate survey techniques by a suitably qualified and licensed ecologist according to good practice guidelines
Reptiles	☒	☒	<input type="checkbox"/>	<b>No further survey or mitigation required.</b> Suitable habitat within areas of extension of time only.
Badger	☒	☒	<input type="checkbox"/>	<b>Update walkover survey for Badger required prior to the commencement of works</b> to ensure compliance with wildlife legislation.
Bats	☒	☒	<input type="checkbox"/>	<b>Bat Activity Transect Surveys</b> should be undertaken at the Site. The Site is considered to be of moderate suitability and therefore one survey per transect per month should be undertaken between April and October inclusive.
Dormouse	☒	☒	<input type="checkbox"/>	<b>Dormouse surveys</b> recommended on the suitable Hedgerows at the Site. Surveys should be undertaken between May and November.
Water Vole	☒	<input type="checkbox"/>	<input type="checkbox"/>	<b>Water Vole surveys</b> recommended on the Sixpenny Brook to the west of the Site.
Birds	☒	☒	☒	<b>Breeding and Wintering Bird Surveys</b> should be undertaken at the Site, following appropriate guidance between April and July, and October and March respectively.
Invertebrates (Terrestrial)	☒	☒	<input type="checkbox"/>	<b>No further survey recommended.</b>

## 4.3 CONCLUSION

4.3.1 Further surveys are required at the Site to determine the extent of the impacts and effects (which are set out within the EclA).

4.3.2 **NOTE:** If the Proposed Development does not commence within 2 years of the original survey date, it is recommended that update surveys are undertaken, where required.

## REFERENCES:

- Buckinghamshire & Milton Keynes Biodiversity Partnership, 2014. *Buckinghamshire & Milton Keynes Biodiversity Partnership*. [Online]  
Available at: <http://www.buckinghamshirepartnership.co.uk/media/1022498/Biodiversity%20and%20Planning%20in%20Bucks%20Sector%204.pdf>  
[Accessed 1 January 2017].
- CIEEM, 2013. *Technical Guidance Series: Guidelines for Preliminary Ecological Appraisal*, Winchester: CIEEM.
- CIEEM, 2016. *CIEEM Glossary*. [Online]  
Available at: <http://www.cieem.net/glossary>  
[Accessed February 2016].
- Colchester Borough Council, 2008. *Core Strategy*, s.l.: Colchester Borough Council.
- Collins English Dictionary, 2016. *Collins English Dictionary*. [Online]  
Available at: <http://www.collinsdictionary.com/dictionary/english/protected-species>  
[Accessed 19 February 2016].
- Collins, J. (., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.
- Crestwood Environmental Ltd., 2016. *Great Crested Newt Population Assessment*, Wolverhampton: Crestwood Environmental Ltd..
- DEFRA, 2007. *Hedgerow Survey Handbook 2nd Edition*, s.l.: DEFRA.
- Encyclopaedia Britannica, 2016. *Encyclopaedia Britannica*. [Online]  
Available at: <http://www.britannica.com/>  
[Accessed 19 February 2016].
- English Nature, 1993. *Linear features: linear habitats and wildlife corridors*, London: English Nature.
- Essex Birdwatching Society, 2016. *Essex Birdwatching Society*. [Online]  
Available at: <http://www.ebws.org.uk/ebws/default.asp>  
[Accessed 12 December 2016].
- Essex County Council, 2014. *Essex Minerals Local Plan*, s.l.: Essex County Council.
- Essex County Council, 2016. *Mineral Site Restoration for Biodiversity - Supplementary Planning Guidance*, Essex: Essex County Council.
- Essex Field Club, 2015. *Ecological Records*, Essex: Essex Field Club.
- Essex Wildlife Trust, 2011. *Essex Biodiversity Action Plan*, s.l.: Essex Wildlife Trust.
- Google Earth, 2016. [Online].
- Harris et al, 1989. *Surveying Badgers*, s.l.: Mammal Society.
- Harris et al, 1989. *Surveying Badgers*, London: Mammal Society.
- HMO, 1992. *Protection of Badgers Act*, London: HMO.
- HMO, 2011. *UK National Ecosystem Assessment*, London: HMO.
- HMO, 2012. *National Planning Policy Framework*, s.l.: HMO.
- HMO, 2016. *European protected species: apply for a mitigation licence*. [Online]  
Available at: <https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence>  
[Accessed 19 February 2016].
- HMO, 2017. *The Conservation of Habitats and Species Regulations*, London: HMO.
- HMSO, 2011. *The Natural Choice: Securing the Value of Nature*, s.l.: HMSO.
- HMSO, 2011. *The Natural Choice: Securing the Value of Nature*, s.l.: HMSO.

- Hundt, L., 2012. *Bat Surveys: Good Practice Guidelines 2nd Edition*, s.l.: Bat Conservation Trust.
- JNCC, 2007. *UK BAP Priority Species and Habitats*. [Online]  
Available at: <http://jncc.defra.gov.uk/page-5705>  
[Accessed 2017].
- JNCC, 2010. *Handbook for Phase 1 habitat survey - a technique for environmental audit*. s.l.:s.n.
- JNCC, 2017. *UK BAP Priority Habitats*. [Online]  
Available at: <http://jncc.defra.gov.uk/page-5718>  
[Accessed 2017].
- Langton, T. & Beckett, C., 1995. Home range size of Scottish amphibians and reptiles. *Scottish Natural Heritage Review*, Volume 53.
- Lawton, J., 2010. *Making Space for Nature: a review of England's wildlife sites and ecological network*, s.l.: Report to DEFRA.
- Lawton, J., 2010. *Making Space for Nature: a review of England's wildlife sites and ecological network*, s.l.: DEFRA.
- LRERC, 2015. *Biological records*, s.l.: Leicestershire and Rutland Ecological Records Centre.
- Mitchell-Jones, A. J., 2004. *Bat Mitigation Guidelines*, Peterborough: English Nature.
- Natural England and Forestry Commission, 2014. *Standing Advice for Ancient Woodland and Veteran Trees*, Peterborough: Natural England.
- Natural England, 2015. *Template for Method Statement to support application for licence under Regulation 53(2)e of the Conservation of Habitats and Species Regulations 2010 (as amended) in respect of great crested newts*, s.l.: Natural England.
- Natural England, 2016. *Habitats and Species of Principal Importance*. [Online]  
Available at:  
<http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>  
[Accessed 19 July 2016].
- Natural England, 2016. *Standing Advice Species Sheet: Great crested newts*. [Online]  
Available at:  
[https://www.youtube.com/watch?v=Ce7IHJirqkEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212\\_natural\\_england\\_s\\_standing\\_advice](https://www.youtube.com/watch?v=Ce7IHJirqkEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212_natural_england_s_standing_advice)  
[Accessed 2017].
- Oldham, R. S., Keeble, J., Swan, M. & Jeffcote, M., 2000. Evaluating the suitability of habitat for Great Crested Newt (*Triturus cristatus*). *Herpetological Journal*, Volume 10, pp. 143-155.
- Oxford Dictionary, 2016. *Oxford Dictionary*. [Online]  
Available at: <http://www.oxforddictionaries.com/>  
[Accessed 19 February 2016].
- Place Services, 2015. *Essex Biodiversity Validation Checklist*, Chelmsford: Essex County Council.
- Staffordshire Ecological Record, 2016. *SBI Guideleines Appendix 1: SBI Criteria Definitions*. [Online]  
Available at: [http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI\\_Guidelines:\\_Definitions\\_\(App.\\_1\)](http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI_Guidelines:_Definitions_(App._1))  
[Accessed 2017].
- Staffordshire Ecological Record, 2016. *SBI Guidelines: Introduction*. [Online]  
Available at: [http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI\\_Guidelines:\\_Introduction](http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI_Guidelines:_Introduction)  
[Accessed 2017].
- Stone, 2013. *Bats and lighting: Overview of current evidence and mitigation guidance*, London: Bat Conservation Trust.

**APPENDICES:**

Appendix E1	Definitions, Abbreviations and Glossary
Appendix E2	Figure E1 - Phase 1 Habitat Survey Plan
Appendix E3	Figure E2 - Pond Location Plan and HSI Scores
Appendix E4	Figure E18 – Internationally Designated Sites Plan
Appendix E5	Figure E19 – Statutory and Non-Statutory Designated Sites Plan

## Appendix E1: Abbreviations and Glossary

*For the avoidance of confusion, abbreviations used within the report have the meanings detailed below:*

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



**NCC** Nature Conservancy Council  
**NERC (Act)** Natural Environment & Rural Communities Act

## Glossary:

*For the avoidance of confusion, the terms used in this report follow the definitions given below:*

<b>Assemblage</b>	A group of species found in the same location (CIEEM, 2016).
<b>Biodiversity</b>	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).
<b>Biodiversity Alert Site</b>	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 (Staffordshire Ecological Record, 2016).
<b>Biodiversity Opportunity Areas</b>	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 (Buckinghamshire & Milton Keynes Biodiversity Partnership, 2014).
<b>Buffer Zone</b>	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).
<b>Compensation</b>	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).
<b>Commuting</b>	The activity of flying between the roost and foraging area (Stone, 2013).
<b>Connectivity</b>	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).
<b>Conservation</b>	The protection, preservation, management or restoration of the natural environment and wildlife (Oxford Dictionary, 2016).
<b>Dispersal</b>	The dissemination, or scattering, of organisms over periods within a given area or over the Earth (Encyclopaedia Britannica, 2016).
<b>Dominant (Habitat/Species)</b>	Denoting the predominant species in a plant (or animal) community (Oxford Dictionary, 2016).
<b>Ecological Impact Assessment (EclA)</b>	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).
<b>Ecological Stepping Stones</b>	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).

<b>Ecosystem</b>	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).
<b>eDNA</b>	Genetic material obtained directly from <i>environmental</i> samples (soil, sediment, water, etc.) without any obvious signs of biological source material.
<b>Effect</b>	This report uses the word impact rather than effect when referring to how ecological resources might be affected by a project (CIEEM, 2016).
<b>European Protected Species</b>	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).
<b>Enhancement</b>	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).
<b>Environmental Impact Assessment (EIA)</b>	This is an assessment carried out under the EIA Regulations (CIEEM, 2016).
<b>European Protected Species (EPS) License</b>	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).
<b>Fauna</b>	The animals of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Flora</b>	The plants of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Foraging</b>	The activity of searching for food (Oxford Dictionary, 2016).
<b>Fragmentation</b>	The breaking up of a habitat, ecosystem or biotope into smaller parcels with a consequent impairment of functioning (CIEEM, 2016).
<b>Habitat</b>	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).
<b>Habitat of Principal Importance</b>	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).
<b>Hibernacula</b>	The winter quarters of a hibernating animal.
<b>Hibernation</b>	The condition or period of an animal or plant spending the winter in a dormant state (Oxford Dictionary, 2016).
<b>Impact</b>	The way in which an ecological resource/receptor is affected by a project (see effect) (CIEEM, 2016).
<b>Invasive Species</b>	Species introduced outside its normal distribution (HMO, 2011).
<b>Keystone Species</b>	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 Britannica, 2016).
<b>Latrine</b>	Dung pit (Harris et al, 1989).
<b>LBAP Habitat</b>	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).
<b>LBAP Species</b>	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).

<b>Mitigation</b>	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).
<b>Native Species</b>	An animal or plant species indigenous to a place (Oxford Dictionary, 2016).
<b>Net Ecological Gain</b>	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).
<b>No Net Loss</b>	The point at which habitat or biodiversity losses equal their gains, both quantitatively and qualitatively (CIEEM, 2016).
<b>Non-Statutory Sites</b>	'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).
<b>Population</b>	A collection of individuals (plants or animals), all of the same species and in a defined geographical area (CIEEM, 2016).
<b>Priority Habitats</b>	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).
<b>Priority Species</b>	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).
<b>Protected Species</b>	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'.
<b>Reasonable Avoidance Measures</b>	The use of a non-licensed 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).
<b>Receptor</b>	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).
<b>Restoration</b>	The active re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition (CIEEM, 2016).
<b>Retained Biodiversity Alert Site</b>	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 (Staffordshire Ecological Record, 2016)
<b>Riparian</b>	Something related to, living on, or located at the banks of a watercourse, usually a river or stream (HMO, 2011).
<b>Roost</b>	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).
<b>Sett</b>	Any structure or place which displays signs indicating current use by a Badger (HMO, 1992). Protected under the Protection of Badgers Act 1992.
<b>Significant Barrier</b>	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).
<b>Site of Biological Importance</b>	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


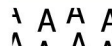
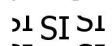
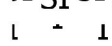





	with associated dependant plant or animal species (Staffordshire Ecological Record, 2016).
<b>Species</b>	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding (Oxford Dictionary, 2016).
<b>Species of Principal Importance</b>	These are the species 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).
<b>Statutory Sites</b>	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).
<b>Stenotopic Species</b>	Species which are only able to tolerate a restricted range of habitats or ecological conditions (Oxford Dictionary, 2016).
<b>Wildlife Corridor</b>	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).
<b>Zone of Influence</b>	The areas/resources that may be affected by the biophysical changes caused by activities associated with a project (CIEEM, 2016).

**Appendix E2:**

**Figure E1 – Phase 1 Habitat Survey Plan**



Legend:

-  Site Boundary
-  Arable
-  Poor Semi-Improved Grassland
-  Improved Grassland
-  Dense Scrub
-  Tall Ruderal
-  Hedgerow - with Trees
-  Intact Hedgerow
-  Bat Tree with Potential Roost Feature(s)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Phase 1 Habitat Plan**

Date:	Scale:	Paper Size:	
15 / 5 / 2018	1:4,500	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW03	Figure E1		

**Appendix E3:**

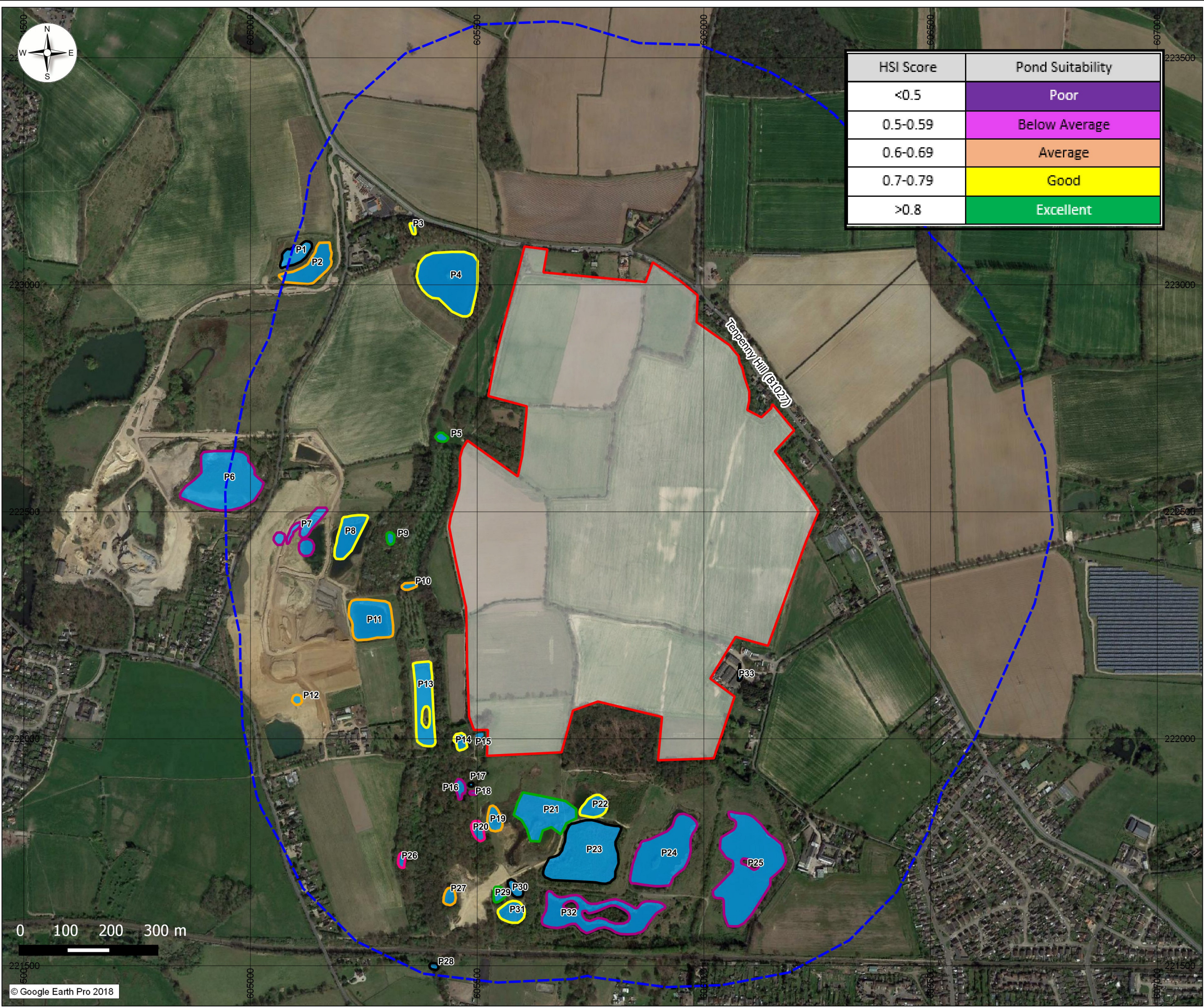
**Figure E2 – Pond Location Plan and HSI Scores**



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

**Legend:**

- Site Boundary
- Ponds - Excellent
- Ponds Yellow
- Ponds Light Orange
- Ponds Pink
- Ponds Purple
- Ponds Dry
- 500m Distance Marker: Great Crested Newt Zone of Influence



Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

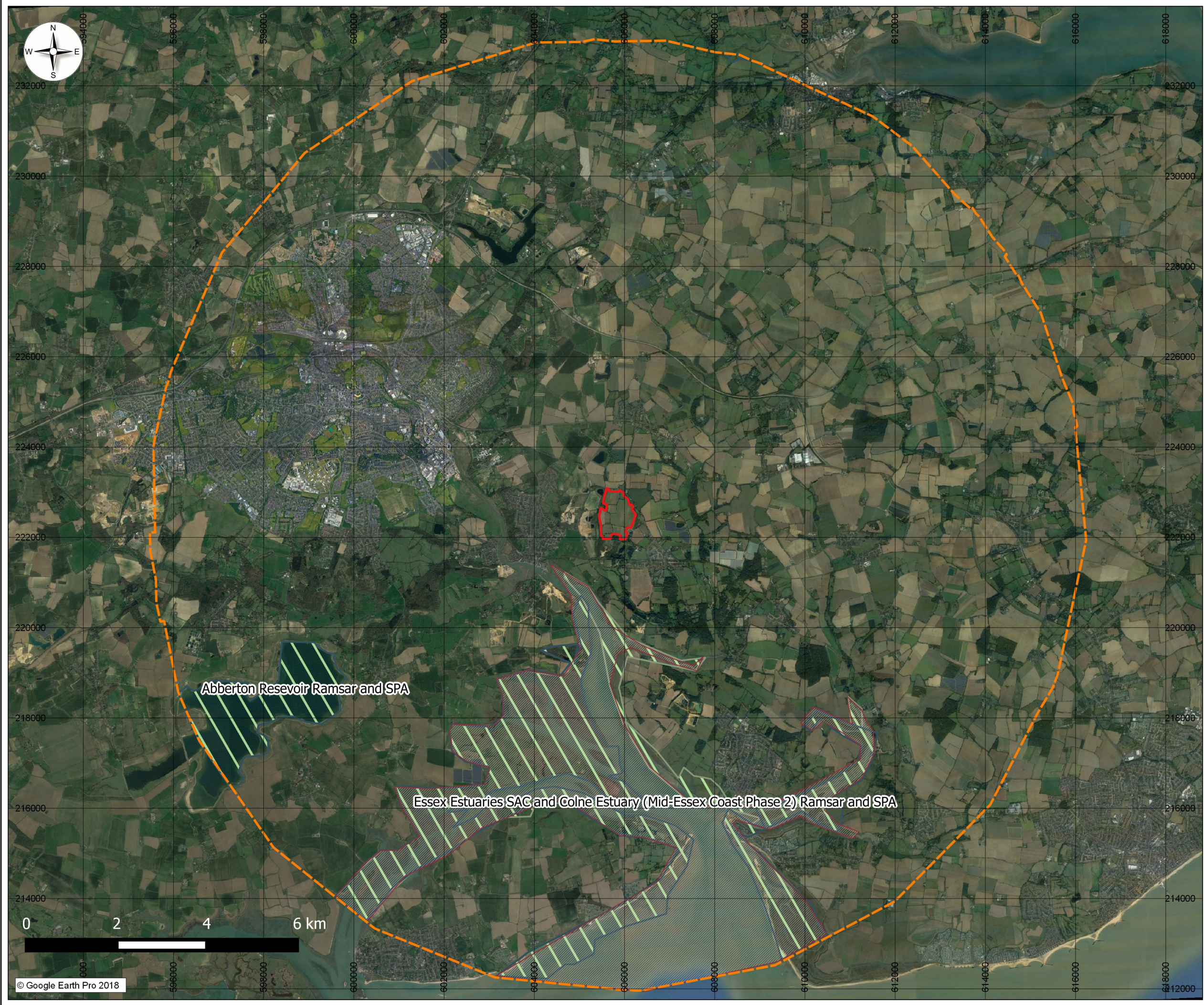
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JG	LC	Final	-
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CE-WQ-0992-DW02	Figure E2		



**Appendix E4:**

**Figure E18 – Internationally Designated Sites Plan**



**Legend:**

- Site Boundary
- 10km buffer
- Special Area of Conservation
- Special Protection Area
- Ramsar

Site locations are indicative only.

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-
-	-	-	-	-

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Client:



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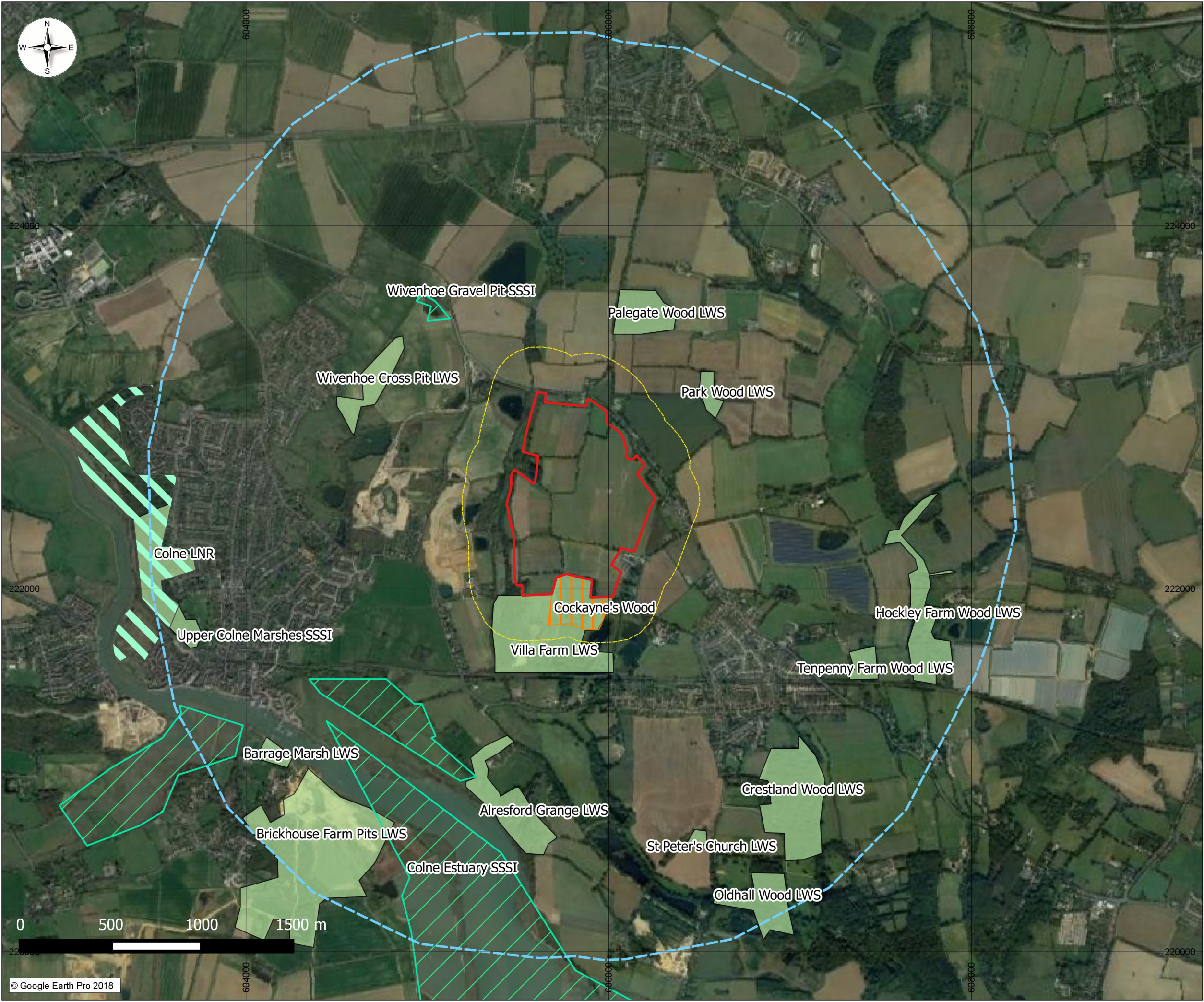
Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Internationally Designated Sites**





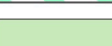


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Drawn By: JG	Checked By: -	Status: Final
CAD Ref: CE-WQ-0992-DW24		Drawing No: Figure E18a

**Appendix E5:**

**Figure E19 – Statutory and Non-Statutory Designated Sites Plan**



**Legend:**

-  Site Boundary
-  2km buffer
-  250m Buffer
-  Site of Special Scientific Interest (SSSI)
-  Local Nature Reserve (LNR)
-  Local Wildlife Site (LWS)
-  Ancient Woodland

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Client:



Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Statutory and Non-Statutory Designated Sites**

Date:	Scale:	Paper Size:	
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Drawn By:	Checked By:	Status:	Final Revision:
JG	-	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW24	Figure E19		



# **Update Preliminary Ecological Appraisal Report (PEAR)**

**Wivenhoe Quarry Eastern Extension  
Alresford Road, Wivenhoe**

**Report Reference: CE-WQ-0992-RP12b - Final**



**Produced by Crestwood Environmental Ltd.**

**29 March 2019**

**Crestwood Report Reference: CE-WQ-0992-RP12b - Final:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	14-12-2018	Jennifer Gatward (Ecologist)	CL18 - 2018-36982-CLS-CLS	Lucy Cash (Associate Director)
Final Rev A	20-12-2018	Jennifer Gatward (Ecologist)	CL18 - 2018-36982-CLS-CLS	Lucy Cash (Associate Director)
Final Rev B	20-12-2018	Jennifer Gatward (Ecologist)	CL18 - 2018-36982-CLS-CLS	Lucy Cash (Associate Director)

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

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors unless otherwise stated in an accompanied ‘letter of reliance’ with an official Crestwood Environmental Limited letterhead. No responsibility is accepted to others.

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## SUMMARY

The Preliminary Ecological Appraisal (PEA) and ecological surveys detailed in this report were commissioned by DL Walker (**‘the Planning Co-ordinators’**) on behalf of Tarmac (**‘the Client’**) in support of a planning application.




An update Preliminary Ecological Appraisal was carried out for the Site, to inform this, the following surveys were carried out:

- Update Desk study to locate the presence of any designated wildlife sites and protected species within 2km, that could be potentially affected by the Proposed Development;
- Extended Phase 1 Habitat Survey;
- A Preliminary Bat Roost Assessment of trees at the Site;
- A Bat Emergence Survey on two of the suitable trees at the Site;
- A survey 30m outside of the Site boundary, where accessible, specifically for Badger setts; and
- A Hedgerow Regulations Assessment.




The Extended Phase 1 Habitat Survey identified that the habitats at the Site were of **Negligible to High Ecological Importance**.

The tables below 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)
	<b>Requires urgent attention / action</b>	To prevent (otherwise likely) breach of legislation from current activities or to prevent delays to the planning submission or project.
	<b>Requires attention / action, but not necessarily urgently</b>	Awareness of potential future issues / considerations such that future action will be required (e.g. pre-commencement surveys).
	<b>Currently no further urgent action required</b>	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	Recommendation	Situation Rating
<b>Habitats (incl. Veteran Trees and Hedgerows)</b>	Habitats of Negligible to High Ecological Importance. H4 classified as an Important Hedgerow.	<b>Minimise area of habitat to be lost during design stage; protect retained trees in line with BS 5837:2012.</b> <b>Submit a Hedgerow Removal Notice to the appropriate authority.</b>	
<b>Roosting Bats</b>	21 trees identified as having low to moderate roost suitability. 6 trees to be removed/disturbed (4 of low suitability and 2 of moderate suitability). Two trees surveyed during 2018, no emergences recorded.	<b>Further emergence/re-entry surveys required.</b>	
<b>Designated Sites</b>	Local Wildlife Site (LWS) and area of Ancient Woodland (AW) immediately adjacent to the south of the Site.	<b>Implementation of a 30m buffer</b> between the Proposed Development and the LWS/AW. Implement appropriate dust management plan.	

\* If the Proposed Development does not commence within two years of the date of survey, then update surveys are recommended.

Species specific surveys (as listed below) have been undertaken prior to this updated PEAR and have therefore not been included in Table 2 above.

- Great Crested Newt;
- Reptile;
- Bat Activity Transect;
- Breeding Bird;
- Wintering Bird;
- Dormouse; and
- Water Vole.

# **1 INTRODUCTION**

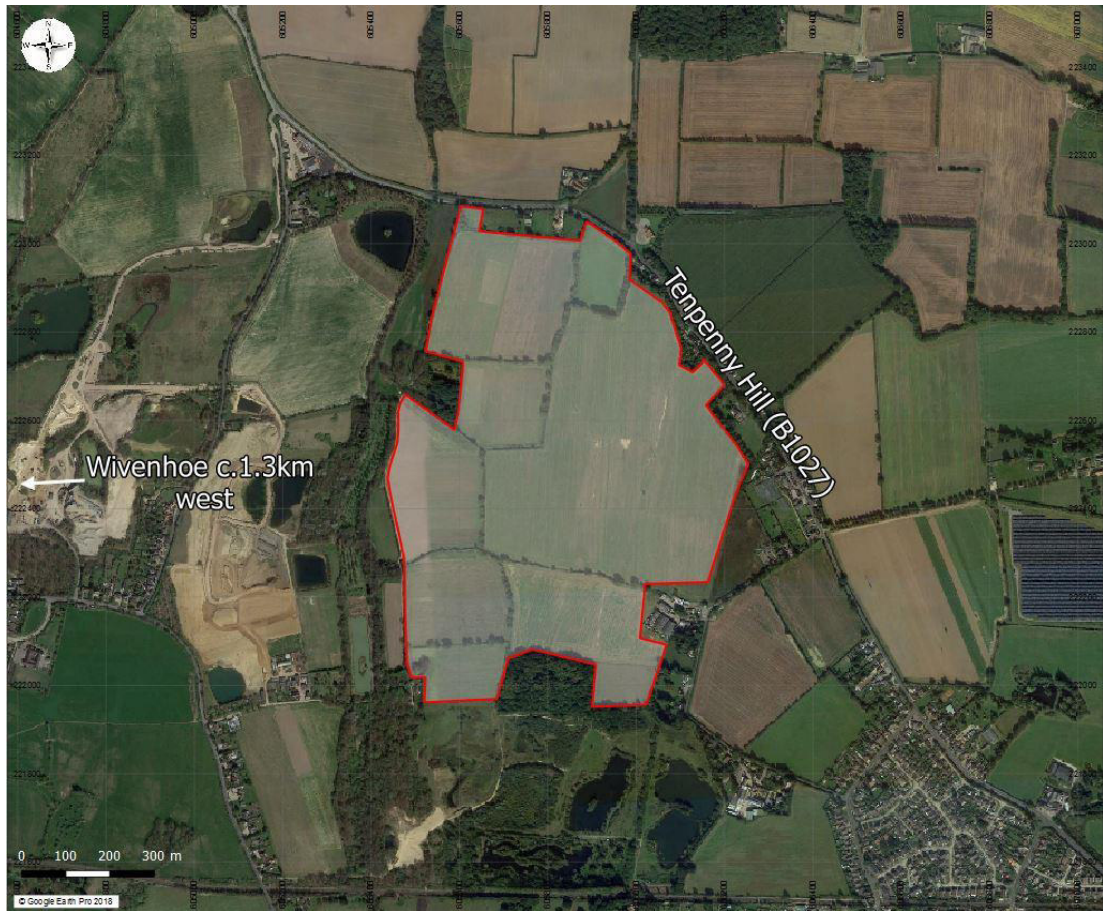
## **1.1 INSTRUCTION AND BRIEF**

- 1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to undertake an update ecological walkover survey at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 056 223 (**'the Site'**).
- 1.1.2 The ecological surveys, as described in Section 1.3, have been used to inform the assessment made within this Preliminary Ecological Appraisal Report (PEAR).

## **1.2 SITE LOCATION AND CONTEXT**

- 1.2.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Hedgerow (Intact, Defunct and with Trees), Improved Grassland, Poor Semi-Improved Grassland, Tall Ruderal and Orchard.
- 1.2.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and a railway line bordered by trees and woodland running east-west to the south of the Site.
- 1.2.3 Areas of woodland, Hedgerows, scattered trees and water bodies within the local area may act as ecological "stepping stones" to provide connectivity within the wider landscape.
- 1.2.4 The red line shown on Plate 1 indicates the extent of the Proposed Development Site.

**Plate 1 Site Location Plan**



**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 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 Update Preliminary Ecological Appraisal (PEA), which assess 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
<b>Desk Study</b>	To provide an update on the presence of any designated wildlife sites and protected species within 2km, which could be potentially affected by the Proposed Development.
<b>Extended Phase 1 Habitat Survey</b>	To make an update record of the presence and extent of habitats and the likelihood of protected species being present within the Site.
<b>Preliminary Roost Assessment</b>	To determine the suitability of trees at the Site for roosting Bats, including an endoscope survey, where necessary.
<b>Bat Emergence Survey</b>	To determine the presence/likely absence of Bat roosts in suitable trees (T4 and T12 in 2018).
<b>Initial Badger Survey</b>	To check the Site and within 30m of the Site boundary (where accessible) for the presence of Badger setts or evidence of Badger.
<b>Hedgerow Regulations Assessment</b>	An assessment of all Hedgerows at the Site to determine Hedgerow importance under the Hedgerow Regulations 1997.

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; 20<sup>th</sup> September 2018.

## 1.4 SUMMARY OF PROPOSALS

1.4.1 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.4.2 The full planning application title reads:

*'Extraction of 3.8 million tonnes of sand and gravel as an easterly extension to the existing Wivenhoe Quarry, erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material.'*

1.4.3 Information provided by the client at the time of survey included:

- Topographic survey of the Site;
- Site Boundary.

## 1.5 SUMMARY OF HISTORIC SURVEY INFORMATION

1.5.1 An Extended Phase 1 Habitat Survey was undertaken in 2015 (Crestwood Environmental Ltd., 2018), whilst the report was finalised in 2018 following a number of species surveys (as detailed below).

1.5.2 This report is intended to update the Extended Phase 1 Habitat Survey information undertaken in 2015.

1.5.3 The following species specific surveys were undertaken and should be read in conjunction with this updated habitat survey information:

- Great Crested Newt – Habitat Suitability Index (HSI) assessment and Presence/Likely Absence and Population Survey (report ref: CE-WQ-0992-RP02) (Crestwood Environmental Ltd., 2018);
- Reptile Population Size Class Assessment (report ref: CE-WQ-0992-RP03) (Crestwood Environmental Ltd., 2018);
- Breeding Bird Survey Report (report ref: CE-WQ-0992-RP04) (Crestwood Environmental Ltd., 2018);
- Wintering Bird Survey Report (report ref: CE-WQ-0992-RP05) (Crestwood Environmental Ltd., 2018);
- Bat Activity Transect Surveys and Automated Surveys (report ref: CE-WQ-0992-RP06) (Crestwood Environmental Ltd., 2018);
- Water Vole Survey (report ref: CE-WQ-0992-RP07) (Crestwood Environmental Ltd., 2018); and
- Hazel Dormouse Presence/Likely Absence Survey (report ref: CE-WQ-0992-RP08) (Crestwood Environmental Ltd., 2018).

1.5.4 All specific species survey reports were updated in 2018, following Site boundary changes in 2017.

## **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 Development Plan NPPF (HMO, 2012);
- Essex Minerals Local Plan 2014 (Essex County Council, 2014);
- Colchester Borough Core Strategy 2008 (Colchester Borough Council, 2008);
- Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County Council, 2016);
- Biological Records Report (Essex Wildlife Trust, 2018); and
- Essex Biodiversity Action Plan (Essex Wildlife Trust, 2011).

### **Definitions**

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

## **1.7 GENERAL LIMITATIONS**

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

1.7.2 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 impacts arising from other

developments in the local area.

- 1.7.3 A Tree Protection Order ('TPO') search has not been undertaken as part of this survey.
- 1.7.4 It should be noted that unless otherwise stated within the brief, no species-specific surveys were carried out as part of the Extended Phase 1 Habitat Survey and the information detailed within this report is based solely on incidental observations.
- 1.7.5 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 The potential impact of a development is not always limited to the boundaries of the site concerned. The development may also have the potential to impact on ecologically valuable sites, habitats or species beyond the site boundaries. The area over which a development may impact ecologically valuable receptors is known as the Zone of Influence ('Zoi').
- 2.1.2 The Zoi is determined by the source/type of impact, a potential pathway for that impact and the location and sensitivity of the ecologically valuable receptor beyond the boundary. For the majority of (unmitigated) impacts identified as part of the Proposed Development, the Zoi is generally considered to be the application site and immediately adjacent areas.
- 2.1.3 In ecological terms, the Zoi can vary considerably depending on the species potentially affected by the Proposed Development. E.g. some species may be confined to a specific location whilst others, such as birds and Bats, are more mobile and can occupy larger territories or home ranges. The Zoi is also likely to be influenced by the presence of dispersal barriers, such as roads and hardstanding, which either stop or reduce the likelihood of animals crossing it. As a consequence this could isolate areas of potentially suitable habitat within the application site due to fragmentation.
- 2.1.4 The Zoi for species or species groups has been determined by research and the professional judgement of the ecologist. For example, Common Lizards (*Zootoca vivipara*) have restricted mobility and generally occupy smaller home ranges (up to 700m<sup>2</sup>) (Langton & Beckett, 1995).
- 2.1.5 The Zoi for ecological features at the Site has been assessed via combination of desk study, current survey guidance, survey results and dispersal capabilities for species present/potentially present within the Zoi of the Proposed Development as shown in Table 4. These are based on professional judgement only and are subject to change depending on type and scale of development.

**Table 4 Zol of Ecological Features**

Ecological Feature	Zol
Plants	Site and immediately adjacent habitats
Great Crested Newts and Other Amphibians	500m
Reptiles	1km
Badger	30m
Bats	2km
Otter and Water Vole	500m
Other Mammals	30m
Birds	2km
Aquatic and Terrestrial Invertebrates	Site and immediately adjacent habitats
Fish	Dependent on species and geographical range.

2.1.6 Site specific Zol is referred to in terms of suitable habitat for protected species within the relevant sections of this report.

## 2.2 DETERMINING THE LEVEL OF ECOLOGICAL IMPORTANCE

2.2.1 Certain species (flora or fauna) and habitats present 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 Table 5 details the criteria for assessment of Ecological Importance used within this assessment.

2.2.3 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).

2.2.4 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.



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

Level of Ecological Importance	Criteria for Assessment	
	Species	Habitats
<b>Negligible</b>	<ul style="list-style-type: none"> <li>Species of Negligible biodiversity value present.</li> </ul>	<ul style="list-style-type: none"> <li>Very low/no species diversity present.</li> <li>Of little to no biodiversity value.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Species of Low biodiversity value present.</li> </ul>	<ul style="list-style-type: none"> <li>Habitat of Low biodiversity value.</li> <li>Low floral species diversity.</li> <li>Unlikely to support protected species/supports small numbers of protected species.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>SPI.</li> <li>Species of Moderate biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>HPI.</li> <li>Features of Moderate value for biodiversity.</li> <li>Moderate floral species diversity.</li> <li>Moderate potential to support protected species.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>Rare species present.</li> <li>Species of High biodiversity value.</li> <li>Abundant species present of moderate biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>Nationally designated Sites.</li> <li>Features rare species.</li> <li>Several features of High value for biodiversity (i.e. numerous features suitable to support protected species).</li> <li>High floral species diversity.</li> </ul>
<b>Very High</b>	<ul style="list-style-type: none"> <li>Very rare/rare species present.</li> <li>Species of Very High biodiversity value.</li> </ul>	<ul style="list-style-type: none"> <li>Internationally designated Sites.</li> <li>Supports very rare/rare species.</li> <li>Habitat of Very High biodiversity value.</li> <li>Highly suitable for protected species.</li> <li>Very high floral diversity.</li> </ul>

2.2.5 Reasons for the assessment of the level Ecological Importance of certain features are detailed in the relevant sections of this report.

## 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 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 the Assessment for Assigning a Level of Habitat Suitability**

Level of Habitat Suitability	Relevant Criteria for Assessment
<b>Negligible</b>	<ul style="list-style-type: none"> <li>• No <u>important</u> habitat characteristics present suitable for protected/notable species within the Site or being of important to sustain the known presence of protected/notable species in adjacent off-site habitats.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• A higher degree of recognised <u>important</u> habitat characteristics absent than present for the particular protected/notable species.</li> <li>• Largely isolated habitat not well-connected by other suitable habitats (e.g. habitat corridors) or with largely impermeable 'barriers' present restricting the movement of the protected/notable species in the wider area.</li> <li>• Provides the potential for protected/notable species to be present in limited numbers, but may be lacking one or more recognised key habitat requirements.</li> <li>• Level of habitat suitability applies to majority of protected/notable species.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>• A higher degree of recognised <u>important</u> habitat characteristics present than absent, but with some deficiencies.</li> <li>• 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.</li> <li>• Suitable for protected/notable species in borderline noteworthy numbers but with some vulnerability to decline.</li> <li>• Level of habitat suitability applies to majority of protected/notable species.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>• All the recognised <u>important</u> habitat characteristics present suitable to support a particular protected/notable species in a largely self-sustaining population with good resilience.</li> <li>• 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).</li> <li>• Level of habitat suitability applies to majority of protected/notable species.</li> </ul>

## 2.4 DESK STUDY

2.4.1 Table 7 below identifies sources of information for the desk study, as well as detailing any third parties who were contacted for information.

**Table 7 Desk Study Information**

Source of Information	Information Sought	Search Distance from the Site boundary	Use of Information
Essex Biodiversity Action Plan (Essex Wildlife Trust, 2011)	Priority Habitats and Priority Species	N/A	To inform the field survey and report recommendations.
Essex Wildlife Trust (Essex Wildlife Trust, 2018)	Protected species	2km	
	Notable/Species of Principal Importance		
	Statutory sites		
	Local Wildlife/Non-Statutory Wildlife Sites		
	Schedule 9 Invasive Species		
Essex Bird Watching Society (Essex Birdwatching Society, 2018)	Protected and Notable Bird species	1km	
MAGIC Map (DEFRA, 2018)	Statutory sites	2km	
	Priority Habitats and Habitats of Principal Importance (NERC Act)	250m	
	Granted European Protected Species Licences	1km	
	Ponds	500m	To determine whether any ponds within 500m of the Site boundary require surveys for Great Crested Newt.
Google Earth (Google Earth, 2018)			

Note\* 'Priority Habitats/Species' within UK BAP or Local BAP documentation (UK Post-2010 Biodiversity Framework) (JNCC & DEFRA, 2012). HPI and SPI are listed under the NERC Act 2006 (HMO, 2006).

2.4.1 The Essex Biodiversity Validation Checklist (Place Services, 2015) was also completed as required by the Local Planning Authority.

2.4.2 Records for Bird species were obtained from the Essex Birdwatching Society website (Essex Birdwatching Society, 2018) and the Site landowner who engages in Bird ringing. Bird records were obtained for the 1km grid square surrounding the Site.

## 2.5 FIELD SURVEY

2.5.1 The field surveys were carried out on 20<sup>th</sup> September 2018. The weather conditions at the time of survey are shown in Table 8.

**Table 8 Weather Conditions during the Survey 20.09.18**

Parameter	Recorded Figure
Temperature (°C)	18
Cloud Cover (in Octas)	4
Precipitation	None
Wind Speed (Beaufort Scale)	5

### Extended Phase 1 Habitat Survey

2.5.2 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.

### Hedgerow Regulations Assessment

2.5.3 A Hedgerow Regulations Assessment was undertaken on all Hedgerows at the Site, using the criteria set out within the Hedgerows Regulations 1997 (HMO, 1997). The following basic criteria were used (as well as other sub-criteria):

- *At least 7 woody species;*
- *At least 6 woody species, and has associated with it at least 3 of the features specified in sub-paragraph (4);*
- *At least 6 woody species, including one of the following:*
  - *Black-poplar tree (populous nigra spp betulifolia);*
  - *Large-leaved lime (Tilia platphyllos);*
  - *Small-leaved lime (Tilia cordata);*
  - *Wild service-tree (Sorbus torminalis); or*
- *At least 5 woody species, and has associated with it at least 4 of the features specified in sub-paragraph (4).*

2.5.4 The method for determining the number of woody species within a Hedgerow is based on the length of Hedgerow, as follows:

- *Where the length of the Hedgerow does not exceed 30 meters, count the number of wood species present in the Hedgerow;*

- *Where the length of the hedgerow exceeds 30 meters, but does not exceed 100 meters, count the number of wood species present in the central stretch of 30 meters;*
- *Where the length of the hedgerow exceeds 100 meters, but does not exceed 200 meters, count the number of woody species present in the central stretch of 30m within each half of the hedgerow and divide the aggregate by two;*
- *Where the length of the hedgerow exceeds 200m, count the number of woody species present in the central stretch of 30 meters within each third of the hedgerow and divide the aggregate by three.*

2.5.5 Features as specified in Sub-paragraph 4 within the Hedgerow Regulations 1997 are set out as follows:

- (a) a bank or wall which supports the hedgerow along at least one half of its length;
- (b) gaps which in aggregate do not exceed 10% of the length of the hedgerow;
- (c) where the length of the hedgerow does not exceed 50 metres, at least one standard tree;
- (d) where the length of the hedgerow exceeds 50 metres but does not exceed 100 metres, at least 2 standard trees;
- (e) where the length of the hedgerow exceeds 100 metres, such number of standard trees (within any part of its length) as would when averaged over its total length amount to at least one for each 50 metres;
- (f) at least 3 woodland species within one metre, in any direction, of the outermost edges of the hedgerow;
- (g) a ditch along at least one half of the length of the hedgerow;
- (h) connections scoring 4 points or more in accordance with sub-paragraph (5);
- (i) a parallel hedge within 15 metres of the hedgerow.

2.5.6 Species richness was also determined for each hedgerow present at the Site 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**

2.5.7 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).

2.5.8 Based on the results of the inspection, trees were categorised for their potential suitability for roosting Bats as follows in Table 9 (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.
Moderate	Contains 1+ PRFs that could be used by Bats but unlikely to support a roost of high conservation status*.
High	A 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.

### Endoscope Inspection

2.5.9 An endoscope inspection was carried out following the PRA which identified suitable PRF's for roosting Bats on several trees at the Site. An endoscope (hand-held camera on a long cable) was used to inspect PRF's (by a suitably trained and licensed ecologist) by inserting the camera into the PRF's (where possible) to check for the presence of roosting Bats.

### Limitations

2.5.10 A number of Potential Roost Features (PRFs) on trees to be removed/disturbed as part of the Proposed Development were not accessible at the time of survey either due to their height and position on the tree or due to dense ground flora. This is not considered to affect the overall evaluation of the trees at the Site given the proposed undertaking of emergence/re-entry Bat surveys at the appropriate time of year.

### Bat Emergence Survey (2018)

2.5.11 Following the updated PRA and associated Endoscope Inspection of the Trees at the Site, 21 Trees were considered to be of Low to Moderate suitability for roosting Bats. Only trees which are to be affected (removed or disturbed) by the Proposed Development were recommended as part of the PEAR (total of 6 Trees).

2.5.12 The Bat Emergence Survey detailed within this report correlate to Tree 4 (T4) and Tree 12 (T12) towards the western extent of the Site.

2.5.13 Two surveyors were positioned in view of the PRF's of the tree (TN3) at the following points:

- One surveyor on T4 (Surveyor 1); and
- One surveyor on T12 (Surveyor 2).

2.5.14 Surveyor locations can be found on Figure E22 in Appendix E5 of this report.

2.5.15 The dusk survey started 15 minutes before sunset and continued for 2 hours after sunset. The equipment used for the survey included:

- Batbox Duet (Frequency Division and Heterodyne Bat detector); and
- Elekon Batscanner (Heterodyne Bat detector).

### **Badger Survey**

- 2.5.16 A survey for Badger was carried out following recognised guidance (Harris et al, 1989). All potential habitats within the Site, plus 30m outside of the Site boundary, where accessible, were surveyed for evidence of Badger activity, and specifically for the presence of setts. Field signs searched for included active or inactive setts, Badger pathways, latrines, hair, discolouring of and damage to fencing, signs of foraging and feeding remains.

### **Invasive Plant Species**

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

## **3 RESULTS AND EVALUATION**

### **3.1 PLANNING POLICY**

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

- National Planning Policy Framework ('**NPPF**') (HMO, 2018);
- Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County Council, 2016);
- Essex Minerals Local Plan 2014 (Essex County Council, 2014); and
- Colchester Borough Core Strategy 2008 (Colchester Borough Council, 2008).

- 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;
- Essex Minerals Plan: Policy S3 - Climate Change;
- Essex Minerals Plan: Policy S10 - Protecting and Enhancing the Environment and Local Amenity;
- Essex Minerals Plan: Policy S12 - Mineral Site Restoration and After; and
- Colchester Borough Core Strategy: Policy Env1 – Environment.

- 3.1.1 There are a number of statutory wildlife sites within 2km of the Site and internationally designated sites within 10km of the Site; these are outlined in Table 10. The statutory wildlife sites include:

- Sites of Special Scientific Interest (**SSSI's**);
- Local Nature Reserves (**LNR**);
- Special Areas of Conservation (**SAC**);
- Special Protection Areas (**SPA**);
- Marine Conservation Zone (**MCZ**); and

- Ramsar sites.

**Table 10 Statutory Wildlife Sites within the Study Area**

Site Name	Designation	Distance	Direction	Description
<b>International Sites within 10km</b>				
Colne Estuary	SPA/Ramsar (also SSSI)	1.2km	S	The estuary is of international importance for two wintering bird species, and of national importance for seven others. Habitats include: mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reed beds. Supports an outstanding assemblage of Invertebrates and plants.
Essex Estuaries	SAC (also SSSI)	1.2km	S	The Essex Estuaries SAC contains either fully and/or partially: five distinct SPAs, seven SSSIs and one MCZ. Features a diverse range of marine habitats and supports numerous marine species.
Abberton Reservoir	SPA/Ramsar	6.4km	SW	Largest body of freshwater in Essex. One of the most important reservoirs in the UK for waterfowl. 30,000 Birds visit annually, including one internationally important species and twelve nationally important species.
Blackwater Estuary	RAMSAR/SPA (also SSSI)	7.9km	SW	This site is the largest estuary in Essex birth of the Thames and is designated because its wetlands habitats are of international importance for birds.
Stour and Orwell Estuaries	SPA/Ramsar	10km	NE	The Stour and Orwell estuaries straddle the eastern part of the Essex/Suffolk border in eastern England. The estuaries include extensive mud-flats, low cliffs, saltmarsh and small areas of vegetated shingle on the lower reaches. The site also includes an area of low-lying grazing marsh at Shotley Marshes on the south side of the Orwell. In summer, the site supports important numbers of breeding Avocet, while in winter they hold major concentrations of water Birds, especially geese, ducks and waders. The geese also feed, and waders roost, in surrounding areas of agricultural land outside the SPA.
<b>National Sites within 2km (not mentioned above)</b>				
Upper Colne Marshes	SSSI	835m	S	Considered to be of special interest as it supports an outstanding assemblage of nationally scarce plants and an unusual diversity of brackish ditch-types. Additional interest is provided by scarce invertebrate species and the use of the site by breeding Birds. Some of which are listed as Schedule 1 species, including Barn Owl ( <i>Tyto alba</i> ).
Blackwater, Crouch, Roach and Colne Estuaries	MCZ	1.1km	S	Designated for its cliffs, foreshores, intertidal mixed sediment, native oyster ( <i>Ostrea edulis</i> ) and native oyster beds.



Table 10 Cont'd...

Site Name	Designation	Distance	Direction	Description
<b>Other Sites within 2km</b>				
Colne	LNR	1.5km	W	Features secondary and mixed coppiced woodlands, marshland and farmland, comprising mainly scrub and grassland. A receptor site for the translocation of Common Lizard.

3.1.2 There are no designated sites within the Site boundary. Several sites were identified within the wider search area. These sites vary from **International to County Importance**.

3.1.3 Figure E18 in Appendix E3 details Internationally Designated Sites within 10km of the Site, whilst Figure E19 in Appendix E4 details Statutory and Non-Statutory Designated Sites within 2km and 250m (Ancient Woodland) of the Site.

### Non-Statutory Wildlife Sites

3.1.4 There are several non-statutory Local Wildlife Sites (LoWS) within 2km of the Site boundary. These sites are summarised in Table 11.

**Table 11 Local Wildlife Sites**

Site Name	Distance	Direction	Description
Villa Farm Quarry	Adjacent	S	Disused sand and gravel pit now comprising a mosaic of habitats. An area of ancient woodland (Cockaynes Wood) is also present. Site supports a variety of important plant, Invertebrate and breeding Bird populations.
Alresford Lodge Pits	1.3km	S	Disused gravel pit comprising a mosaic of ponds, reeds, woodland, scrub and grassland.
St. Peter's Church	1.4km	S	Small derelict church surrounded by grassland with trees and shrubs around the boundaries.
Crestland Wood Meadow	1.1km	SE	Rectangular grassland site adjacent to Crestland Wood supporting notable population of Glow-worm beetles.
Crestland Wood	1km	SE	Ancient woodland containing mixed deciduous and coniferous species.
Tenpenny Farm Wood	1.4km	W	Piece of woodland with attached hedge designated for its population of Dormice.
Fratinghall/Captains Woods	1.2km	W	Two contiguous ancient woodlands supporting Dormice.
Hockley Farm Woods	1.4km	W	Woodland and hedges supporting Dormice and as a potential Dormouse corridor.
Palegate Wood	0.4km	NE	Area of ancient woodland.
Park Wood	0.4km	NE	Small fragment of ancient woodland.
Wivenhoe Cross Pit	0.5km	NW	Brownfield tall ruderal grassland and scattered scrub, supporting nationally rare and scarce Invertebrate populations.
Arlesford Grange	0.9km	S	Broadleaved woodland supporting a population of Dormice.

3.1.5 There is one non-statutory designated site (Villa Farm Quarry LoWS) that borders the Site and four other LWS within 1km. LoWS are of **County Importance**.

## Habitats of Principal Importance and Ancient Woodland

- 3.1.6 Eleven Habitats of Principal Importance (as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006) have been recorded within Essex. Three Local Priority Habitats have also been defined within the Local Biodiversity Action Plan (LBAP) (Essex Wildlife Trust, 2011) and can be found at the Site; these are: Traditional Orchard, Arable Field Margins and Hedgerows.
- 3.1.7 Based on information provided by MAGIC, within 250m of the Site boundary there are a number of Habitats of Principal Importance (HPI) as shown in Table 12.

**Table 12 Habitats of Principal Importance (UK BAP and LBAP)**

Habitat Type	Distance and Direction
Deciduous woodland	Several areas adjacent to Site boundary to south and southwest.
Traditional Orchard	Within the Site boundary to the north of the Site and 100m east.
Arable Field Margins	Within the Site boundary (classified as Poor Semi-Improved Grassland for the purposes of this report).
Hedgerows	17 Hedgerows present within the Site of varying species diversity.

- 3.1.8 An area of Ancient Woodland called Cockaynes Wood exists directly adjacent to the southern boundary of the Site.

### Other Sites

- 3.1.9 Adjoining the southern boundary of the Site is Cockaynes Wood Nature Reserve, which is managed by Essex Wildlife Trust. This covers the area designated as Villa Farm Quarry LoWS.

### Granted European Protected Species ('EPS') Licences

- 3.1.10 There are no granted EPS licences located within 1km of the Site boundary.

## 3.2 HABITATS AND FLORA

### General Description of Habitats within the Site

- 3.2.1 The habitat types identified at the Site, as listed below, relate to the guideline habitats listed within the Handbook for Phase 1 Habitat Survey (JNCC, 2010). These habitats are recorded on Figure E1 in Appendix E2 and are described in more detail below.
- 3.2.2 It should be noted that, unless otherwise stated within the brief, no species-specific fauna, lower plant surveys or NVC surveys were carried out as part of the Extended Phase 1 Habitat Survey and the information provided below is based solely on incidental observations.

### Arable

- 3.2.3 Arable is the dominant habitat present at the Site and present throughout the eastern extent of the Site (see Plate 2). At the time of the survey, the fields had been ploughed.

**Plate 2 Arable**



**Hedgerows**

- 3.2.4 17 Hedgerows are present at the Site. Details regarding the Hedgerows are shown in Table 13 and the locations of the Hedgerows are shown in Figure E1 within Appendix E2 of this report.
- 3.2.5 4 Hedgerows at the Site are classed as Species Rich, whilst the 13 Hedgerows at the Site are classed as Species Poor in line with current guidance (DEFRA, 2007).

**Table 13 Hedgerow Descriptions**

Hedge No.	Location within Site	Type	With Trees	Length (m)	Species	Species Rich
H1	Southwestern Site boundary	Intact	Yes	147m	Hawthorn ( <i>Crataegus monogyna</i> ), Alder ( <i>Alnus glutinosa</i> ), Elder ( <i>Sambucus nigra</i> ), Willow sp. ( <i>Salix sp.</i> ), Blackthorn ( <i>Prunus spinosa</i> ), Hops ( <i>Humulus lupulus</i> ), Ivy ( <i>Hedera helix</i> )	Yes
H2	Southern extent	Intact		235m	Hazel ( <i>Corylus avellana</i> ), Alder, Hawthorn, Rose sp. ( <i>Rosa sp.</i> ), Spindle ( <i>Euonymus europaea</i> ), Pedunculate Oak ( <i>Quercus robur</i> ), Broom ( <i>Cytisus scoparius</i> )	
H3	Western Site boundary	Intact		180m	Hawthorn, Ash ( <i>Fraxinus excelsior</i> ), Pedunculate Oak	No
H4	Southwestern extent	Intact		181m	Pedunculate Oak, Hawthorn, Blackthorn, Rose sp., Elder, Willow sp., Holly ( <i>Ilex aquifolium</i> )	Yes
H5	Western extent	Intact		213m	Pedunculate Oak, Spindle, Hawthorn, Rose sp., Hazel, Blackthorn	No
H6	Western extent	Intact	Yes	225m	Pedunculate Oak, Holly, Blackthorn, Elder, Cherry sp. ( <i>Prunus sp.</i> ), Hawthorn, Alder, Hazel	No

H7	Northwestern extent	Intact		200m	<b>Holly, Rose sp., Pedunculate Oak, Blackthorn, Hawthorn, Elder, Hazel</b>	Yes
H8	Northwestern Site boundary	Intact		340m	Hazel, Hawthorn, Blackthorn, Field Maple ( <i>Acer campastre</i> ), Pedunculate Oak, Spindle, Elder	
H9	Northern Site boundary	Defunct		281m	Elder, Hawthorn, Willow sp., Pedunculate Oak, Ash	No
H10	Northern extent	Intact		327m	Hawthorn, Holly, Hazel, Pedunculate Oak, Blackthorn, Elder, Rose sp.	
H11	Northern Site boundary	Intact		121m	Blackthorn, Rose sp., Hawthorn, Pedunculate Oak, Apple sp. ( <i>Prunus sp.</i> )	
H12	Northeastern extent	Intact		130m	Pedunculate Oak, Holly, Blackthorn, Elder	
H13		Intact		106m	Pedunculate Oak	
H14	Central	Intact		197m	Hawthorn, Blackthorn, Pedunculate Oak, Rose sp., Elder	
H15		Intact		No	130m	
H16	Southeastern extent	Defunct		Yes	365m	
H17	Southern extent	Intact	237m		Blackthorn, Pedunculate Oak, Hawthorn, Elder, Holly, Rose sp., Ash	

### Improved Grassland

3.2.6 An area of Improved Grassland was present to the west of the Orchard habitat, in the northern extent of the Site (see Plate 3). The dominant species present was Perennial Rye Grass.

**Plate 3 Improved Grassland**



## Orchard

- 3.2.7 A single area of recently planted Orchard (see Plate 4) was present towards the northern extent of the Site, abutting the B1027 (Tenpenny Hill). The habitat included planted fruit tree species.
- 3.2.8 The habitat was dominated by Perennial Rye Grass.

**Plate 4 Orchard**



## Poor Semi-Improved Grassland

- 3.2.9 Poor Semi-Improved Grassland was present at the Site in the northern and southern extent, as well as along the margins of the Arable fields (see Plate 5).
- 3.2.10 Species present included False Oat-grass (*Arrhenatherum elatius*), Cock's Foot (*Dactylis glomerata*), Yorkshire Fog (*Holcus lanatus*), Crested Dogs Tail (*Cynosurus cristatus*), Ribwort Plantain (*Plantago lanceolata*), Field Pansy (*Viola arvensis*), Oxeye Daisy (*Leucanthemum vulgare*), White Campion (*Silene latifolia*), Red Campion (*Silene dioica*), Red Clover (*Trifolium pratense*), White Clover (*Trifolium repens*) and Prickly Sow Thistle (*Sonchus asper*).

**Plate 5**      **Poor Semi-Improved Grassland**



**Tall Ruderal**

- 3.2.11      Around the margins of the Arable fields were areas of Tall Ruderal vegetation (see Plate 6). Species present within this habitat included: Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Broad leaved Dock (*Rumex obtusifolius*), Red Deadnettle (*Lamium purpureum*) and White Deadnettle (*Lamium album*).
- 3.2.12      Grass species were also recorded, including: Perennial Rye Grass (*Lolium perenne*), Yorkshire Fog (*Holcus lanatus*), Cocks Foot (*Dactylis glomerata*) and Common Bent (*Agrostis capillaris*).
- 3.2.13      Other areas of Tall Ruderal vegetation were present, thought to be managed as game cover. Species present included: Pendulous Sedge (*Carex pendula*) and Common Nettle.

**Plate 6**      **Tall Ruderal**



### Plant Species

3.2.14 No rare or protected plant species were present within the survey boundary.

### Invasive Plant Species

3.2.15 No invasive floral species were found at the Site.

## 3.3 HEDGEROW REGULATIONS ASSESSMENT

3.3.1 All Hedgerows at the Site were subject to an assessment based on the Hedgerow Regulations 1997 criteria.

3.3.2 Table 14 details the results of the assessment, including the woody species present in each 30m stretch of surveyed Hedgerow (rounded to the nearest whole number where necessary). Raw data can be found in Appendix E5.

**Table 14 Hedgerow Regulations Assessment**

Hedge No.	Length (m)	No of 30m Survey Sections	Number of Woody Species*	Features present as specified in Sub-paragraph 4 <sup>+</sup>	Species Rich <sup>#</sup>	Important
H1	147m	2	6	b) and d)	Yes	No
H2	235m	3	6	a)		
H3	180m	2	2	-	No	
H4	181m	2	5	b), e), h) and g)	Yes	Yes
H5	213m	3	4	-	No	No
H6	225m	3	4			

Table 14 Con't...

Hedge No.	Length (m)	No of 30m Survey Sections	Number of Woody Species*	Features present as specified in Sub-paragraph 4 <sup>+</sup>	Species Rich <sup>#</sup>	Important
H7	200m	2	5	d) and g)	Yes	No
H8	340m	3	4	-	No	
H9	281m	3	3			
H10	327m	3	4			
H11	121m	2	4			
H12	130m	2	4			
H13	100m	1	1			
H14	197m	2	4			
H15	130m	2	4			
H16	365m	3	3			
H17	237m	3	4			

Note: \*where more than a single 30m stretch of Hedgerow was surveyed, the number of species per 30m survey section was added together and divided by the number of survey sections.  
<sup>+</sup>Sub-paragraph 4 of the Hedgerow Regulations 1997  
<sup>#</sup>Where more than a single 30m stretch of Hedgerow was surveyed the number of species per 30m survey section was added together and divided by the number of survey sections

3.3.3 A single Hedgerow (H4) is considered to be Important under the Hedgerow Regulations 1997. Four Hedgerows (including H4) are considered to be species rich (H1, H2, H4 and H7).

### 3.4 FAUNA

#### GENERAL

3.4.1 It should be noted that unless otherwise stated within the brief, no species-specific surveys were carried out as part of the Extended Phase 1 Habitat Survey and the information provided below is based solely on incidental observations.

3.4.2 The following species/species surveys were part of the original scope of works undertaken by Crestwood in 2016 and have therefore not been considered further within this Updated Preliminary Ecological Appraisal:

- Great Crested Newt – Habitat Suitability Index (HSI) Assessment;
- Great Crested Newt – Population Size Class Assessment;
- Reptiles – Populations Assessment;
- Breeding Birds;
- Wintering Birds;
- Bats – Activity Transect Survey;
- Water Vole; and



- Hazel Dormouse – Presence/Likely Absence Survey.

3.4.3 Report references and citations are as Section 1.5. Update desk study information can be found in Section 3.4.4 to Section 3.4.13.

### **Update Desk Study**

3.4.4 An update desk study was requested from Essex Wildlife Trust (Essex Wildlife Trust, 2018) for all species within 2km of the Site. These updates are summarised below where applicable. For previous desk study information, refer to report reference CE-WQ-0992-RP01 (Crestwood Environmental Ltd., 2018).

#### **Great Crested Newt and Other Amphibians**

3.4.5 No updated records were returned by the Essex Wildlife Trust as part of the update desk study.

#### **Reptiles**

3.4.6 No updated records were returned by the Essex Wildlife Trust as part of the update desk study.

#### **Badger**

3.4.7 No updated records were returned by the Essex Wildlife Trust as part of the update desk study.

#### **Bats**

3.4.8 No updated records were returned by the Essex Wildlife Trust as part of the update desk study.

#### **Water Vole**

3.4.9 A single updated record of Water Vole (*Arvicola amphibius*) was returned by the Essex Wildlife Trust as part of the update desk study, located approximately 1.3km south of the Site and dated 2017.

#### **Hazel Dormouse**

3.4.10 Eight updated records of Hazel Dormouse (*Muscardinus avellanarius*) were returned as part of the desk study, all of which are located approximately 1.3km east of the Site and dated 2016 and 2017. All records are for nests of the species.

#### **Other mammals**

3.4.11 A single record of Weasel (*Mustela nivalis*) was returned, located approximately 0.5km west of the Site and dated 2017.

#### **Birds**

3.4.12 A single record of a Mistle Thrush was returned as part of the updated desk study, located approximately 1.5km west of the Site and dated 2016.

**Invertebrates**

3.4.13 Nine update records were returned of Invertebrates (all species of Moth) as part of the desk study, for four species, including Buff Ermine (*Spilosoma lutea*), Cinnabar (*Tyria jacobaeae*), Shoulder-striped Wainscot (*Leucania comma*) and Long-legged Tabby (*Synaphe punctalis*). The closest record relates to Buff Ermine, Cinnabar and Shoulder-striped Wainscot, located approximately 0.2km south of the Site.


**Update Preliminary Bat Roost Assessment**



3.4.14 An update Preliminary Bat Roost Assessment (PRA) was undertaken on all Trees at the Site. Locations of Trees with Potential Roosting Features (PRFs) can be found on Figure E1 in Appendix E2.

3.4.15 No evidence of Bats was recorded at the Site at the time of survey. However, some PRFs were inaccessible at the time of survey.

3.4.16 Table 15 details some of the potential Bat roost features and evidence of Bats found at the Site as part of the PRA.

**Table 15 Some Potential Bat Roost Features**

Tree Reference	Description of Feature/Evidence	Photo
T13	Rot holes, cracked limbs, flaking bark	

Tree Reference	Description of Feature/Evidence	Photo
T1	Rot holes, Woodpecker holes	
T21	Broken limbs	

3.4.17 Table 16 overleaf details the tree recorded at the Site at the time of survey, the location of trees and the level of suitability for Bats. Recommendations for further survey are set out in Section 4.3.

**Table 16 Bat Tree Locations**

Tree Reference	Hedgerow Location	Suitability for Bats	Removed/Disturbed		
T1	H4	Moderate	Yes		
T2	H17	Low	No		
T3	H5		No		
T4	H6		Yes		
T5	Woodland edge (western boundary)		Low	No	
T6					
T7	H17				
T8					
T9					
T10	H2				
T11	Woodland edge (western boundary)				
T12	H6				Yes
T13	H4	Moderate			Yes
T14	H2	Low			No
T15	H14				No
T16	H7		Yes		
T17	H10		Low	No	
T18					
T19	H12				
T20	H9				
T21	H8	Yes			

**2018 BAT EMERGENCE SURVEY RESULTS**

- 3.4.18 Following the PRA and endoscope inspection of Trees at the Site, Tree 4 and Tree 12 was surveyed on 20<sup>th</sup> September 2018.
- 3.4.19 No Bats were recorded emerging from T4 or T12 during the survey, therefore T4 and T12 were not considered to support a Bat roost at the time of the survey. Incidental observations of Bat passes relating to *Pipistrellus* spp. were made during the survey on and adjacent to the Site.
- 3.4.20 Further Bat surveys are recommended as set out in Table 20.

**OVERALL HABITAT EVALUATION**

- 3.4.21 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 17. They are also assessed for their suitability to support protected species in order to assess their Ecological Importance, using the criteria in Table 5. The geographical level of Importance of these habitats is

then related to Site, Local, Regional, National, or International scales to further inform the understanding of their ecological Importance.

**Table 17 Evaluation of Importance of Habitats at the Site**

Habitat	LBAP Priority Habitat	HPI (NERC Act 2006)	Floral Species Diversity	Suitability for Protected Species	Overall Importance
Arable	Yes (Field margins only)	Yes (Field margins only)	Low	Ground nesting Birds such as Skylark ( <i>Alauda arvensis</i> ) and Lapwing ( <i>Vanellus vanellus</i> ) Reptiles	Moderate*
Improved Grassland	No	No	Low	Unlikely to support protected species	Negligible
Tall Ruderal	No	No	Low		
Hedgerow	Yes	Yes	High <sup>+</sup>	Bats – foraging, commuting and potential roosting Birds – nesting Dormice	High
Orchard	Yes	Yes	Low	Birds – nesting Bats – foraging Invertebrates	Moderate <sup>^</sup>
Poor Semi-Improved Grassland	No	No	Low	Reptiles	Moderate*

Notes: \*Arable field margins and Poor Semi-Improved Grassland known to support two species of Reptile.  
<sup>+</sup> Hedgerows range from low to high diversity across the Site.  
<sup>^</sup> Moderate due to immature nature.

- 3.4.22 The habitats at the Site range from Negligible to High overall Ecological Importance (changed from the initial survey undertaken in 2015, following the completion of species specific surveys and update PEAR).
- 3.4.23 The Site is increased by the presence of protected species (see separate reports for details regarding protected species).
- 3.4.24 The Impact Assessment is detailed within the Ecological Chapter (report ref: CE-WQ-0992-RP09a) with amendments and additions set out with the Annex (report ref: CE-WQ-0992-RP14).

### 3.5 SCREENING OF ECOLOGICAL FEATURES

- 3.5.1 Table 18 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 18 Screening of Ecological Features**

Potential Ecological Receptor	Justification for Exclusion from Further Assessment
Protected Floral Species	No protected floral species were found at the Site.
White Clawed Crayfish ( <i>Austropotamobius pallipes</i> )	The Site supports no suitable aquatic habitat for the species.
Otter ( <i>Lutra lutra</i> )	The Site is generally unsuitable for Otter and Water Vole and has poor connectivity to suitable water courses.
Invertebrates (aquatic)	The Site supports no suitable aquatic habitat for the species.
Smooth Snake ( <i>Coronella austriaca</i> ), Sand Lizard ( <i>Lacerta agilis</i> ) and Natterjack Toad ( <i>Bufo calamita</i> )	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 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 DESIGNATED SITES

- 4.1.1 The Site is located adjacent to Villa Farm Quarry Local Wildlife Site to the south, which includes an area of Ancient Woodland (Cockayne's Wood). As part of the Proposed Development, at least a 30m stand-off is to be implemented, and the installation and use of fencing and warning signs to protect the woodland.
- 4.1.2 A Construction Environmental Management Plan (CEMP) has been produced to provide protection measures for the Proposed Works (see report ref CE-WQ-0992-RP11a) (Crestwood Environmental Ltd., 2018). This details additional sensitive working measures for designated sites within the area.

### 4.2 HABITATS AND FLORA

- 4.2.1 The habitat at the Site range from **Negligible to High Ecological Importance**. Those habitats of low Ecological Importance (Tall Ruderal and Improved Grassland) are considered to be common and widespread in the local area and unlikely to support populations of protected species.
- 4.2.2 The Arable Field Margins and Poor Semi-Improved Grassland are considered to be of Moderate Ecological Importance due to the presence of two Reptile species (Common Lizard and Grass Snake). Results of the Reptile surveys can be found in report ref CE-WQ-0992-RP03.
- 4.2.3 The majority of Hedgerows at the Site are considered to be of High Ecological Importance due to species richness. Hedgerow H4 is considered to be Important under the Hedgerow Regulations 1997 and should be retained as part of the Proposed Development, where possible. The submitted scheme plans for the retention of the majority of H4 and widens an existing field access. The partial removal of this Hedgerow should be permitted by the appropriate authority through the submission of a Hedgerow Removal Notice.

- 4.2.4 An arboricultural survey has been undertaken at the Site and should be referred to in conjunction with the recommendations set out within this report.
- 4.2.5 Overall, the Site offers little in the way of floral species diversity and the flora present within the habitats at the Site is typical of what would be expected within those habitats. As such, it is concluded that **the Site does require any further surveys for its botanical interest.**

### 4.3 FAUNA

- 4.3.1 Recommendations regarding protected species are detailed in Table 19. Surveys undertaken during 2016 have not been listed in the below table and all recommendations regarding other protected species remains as previous.

**Table 19 Recommendations for Protected Species**

Species	Records within 2km	Suitable Habitat Present	Species Evidence in Survey Area	Further Survey/Mitigation Recommended
Bats (roosting)	☒	☒	☐	<b>Further Bat surveys required prior to each relevant phase (see Section 4.3.2).</b> Mitigation will be based on the results of the further emergence/re-entry Bat surveys (as detailed below).

- 4.3.2 Further emergence/re-entry Bat surveys are recommended to be undertaken on trees likely to be removed/disturbed as part of the Proposed Development, undertaken in advance of the relevant phase. Table 20 details the trees which are considered to be affected as part of the Proposed Development and the number of surveys required.

**Table 20 Bat Trees for Further Survey**

Tree Reference	Hedgerow Location	Bat Roost Suitability	Survey Requirements
T1	H4	Moderate	2 separate surveys (1 dusk and 1 separate dawn) between May and August inclusive.
T13			
T16	H7	Low*	1 survey (either dusk or dawn) between May and August inclusive.
T21	H8		
T4	H6		Emergence survey undertaken in September 2018.
T12			

Note: \*Trees of Low roost suitability are usually not surveyed (as per standard survey guidance), however as these trees are to be removed/disturbed, it is recommended further survey is undertaken.

- 4.3.3 An emergence Bat survey was undertaken on two trees during September 2018 (T4 and T12) and therefore do not require further survey.
- 4.3.4 All other Trees considered to be suitable for roosting Bats will be protected as part of the Proposed Development through the use of fencing, warning signage, a sensitive lighting scheme and a dust management plan. The CEMP (Crestwood Environmental Ltd., 2018) details the sensitive working

measures in relation to retained trees and should be implemented throughout the life of the Proposed Development. Such measures can be secured through appropriately worded conditions under a grant of consent.

- 4.3.5 Working measures relating to other species are set out within the relevant species specific reports, as well as the CEMP.

#### **4.4 CONCLUSION**

- 4.4.1 Further surveys are required for roosting Bats on the 4 trees as listed within Table 20, prior to each relevant phase. All recommendations for other protected species remains as previous within the separate species specific survey reports (as listed in Section 1.5.3) and within the CEMP.
- 4.4.2 Assessment of effects is detailed within the Ecological Impact Assessment (EclA), report reference CE-WQ-0992-RP09a (Crestwood Environmental Ltd., 2018) with updates set out within the Annex report, report reference CE-WQ-0992-RP14 (Crestwood Environmental Ltd., 2019).
- 4.4.3 If protected species are found to be present within 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.
- 4.4.4 **NOTE:** If the Proposed Development does not commence within 2 years of the original survey date, it is recommended that update surveys are undertaken.



## REFERENCES:

- Buckinghamshire & Milton Keynes Biodiversity Partnership, 2014. *Buckinghamshire & Milton Keynes Biodiversity Partnership*. [Online]  
Available at: <http://www.buckinghamshirepartnership.co.uk/media/1022498/Biodiversity%20and%20Planning%20in%20Bucks%20Sec%20tion%204.pdf>  
[Accessed 2017].
- CIEEM, 2016. *CIEEM Glossary*. [Online]  
Available at: <http://www.cieem.net/glossary>  
[Accessed February 2016].
- CIEEM, 2017. *Guide to Ecological Surveys and their Purpose*, Winchester: CIEEM.
- CIEEM, 2017. *Guidelines for Preliminary Ecological Appraisal*, s.l.: s.n.
- Colchester Borough Council, 2008. *Core Strategy*, s.l.: Colchester Borough Council.
- Collins English Dictionary, 2016. *Collins English Dictionary*. [Online]  
Available at: <http://www.collinsdictionary.com/dictionary/english/protected-species>  
[Accessed 19 February 2016].
- Collins, J., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.
- Crestwood Environmental Ltd., 2018. *Bat Activity Survey*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Breeding Bird Survey Report*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Construction Environment Management Plan (CEMP)*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Ecological Impact Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Extended Phase 1 Habitat Survey*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Great Crested Newt Population Size Class Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Hazel Dormouse Presence/Likely Absence Survey*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Reptile Population Size Class Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Water Vole Survey*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Wintering Bird Survey Report*, s.l.: s.n.
- Crestwood Environmental Ltd., 2019. *2019 Annex - Additional Ecological Information to Support Planning Application*, Wolverhampton: Crestwood Environmental Ltd..
- DEFRA, 2007. *Hedgerow Survey Handbook 2nd Edition*, s.l.: DEFRA.
- DEFRA, 2018. *Magic Map*. [Online]  
Available at: <http://magic.defra.gov.uk/MagicMap.aspx>  
[Accessed 2018].
- Encyclopaedia Britannica, 2016. *Encyclopaedia Britannica*. [Online]  
Available at: <http://www.britannica.com/>  
[Accessed 19 February 2016].
- English Nature, 1993. *Linear features: linear habitats and wildlife corridors*, London: English Nature.
- Essex Birdwatching Society, 2018. *Essex Birdwatching Society*. [Online]  
Available at: <http://www.ebws.org.uk/ebs/default.asp>  
[Accessed 12 December 2018].
- Essex County Council, 2014. *Essex Minerals Local Plan*, s.l.: Essex County Council.
- Essex County Council, 2016. *Mineral Site Restoration for Biodiversity - Supplementary Planning Guidance*, Essex: Essex County Council.

- Essex Wildlife Trust, 2011. *Essex Biodiversity Action Plan*, s.l.: Essex Wildlife Trust.
- Essex Wildlife Trust, 2018. *Ecological Records*, Essex: Essex Wildlife Trust.
- Google Earth, 2018. [Online]  
[Accessed 2018].
- Harris et al, 1989. *Surveying Badgers*, s.l.: Mammal Society.
- Harris et al, 1989. *Surveying Badgers*, London: Mammal Society.
- HMO, 1992. *Protection of Badgers Act*, London: HMO.
- HMO, 1997. *Hedgerow Regulations*, s.l.: s.n.
- HMO, 2006. *Natural Environment and Rural Communities Act*, s.l.: s.n.
- HMO, 2011. *UK National Ecosystem Assessment*, London: HMO.
- HMO, 2012. *National Planning Policy Framework*, s.l.: HMO.
- HMO, 2016. *European protected species: apply for a mitigation licence*. [Online]  
Available at: <https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence>  
[Accessed 19 February 2016].
- HMO, 2017. *The Conservation of Habitats and Species Regulations*, London: HMO.
- HMO, 2018. *National Planning Policy Framework*, s.l.: HMO.
- J. & D., 2012. *UK Post-2010 Biodiversity Framework*, s.l.: s.n.
- JNCC, 2007. *UK BAP Priority Species and Habitats*. [Online]  
Available at: <http://jncc.defra.gov.uk/page-5705>  
[Accessed 2017].
- JNCC, 2010. *Handbook for Phase 1 habitat survey - a technique for environmental audit*. s.l.:s.n.
- JNCC, 2017. *UK BAP Priority Habitats*. [Online]  
Available at: <http://jncc.defra.gov.uk/page-5718>  
[Accessed 2017].
- Langton, T. & Beckett, C., 1995. Home range size of Scottish amphibians and reptiles. *Scottish Natural Heritage Review*, Volume 53.
- LRERC, 2015. *Biological records*, s.l.: Leicestershire and Rutland Ecological Records Centre.
- Mitchell-Jones, A. J., 2004. *Bat Mitigation Guidelines*, Peterborough: English Nature.
- Natural England, 2010. *Nature Nearby*, s.l.: Natural England.
- Natural England, 2015. *Template for Method Statement to support application for licence under Regulation 53(2)e of the Conservation of Habitats and Species Regulations 2010 (as amended) in respect of great crested newts*, s.l.: Natural England.
- Natural England, 2016. *Habitats and Species of Principal Importance*. [Online]  
Available at:  
<http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>  
[Accessed 19 July 2016].
- Natural England, 2016. *Standing Advice Species Sheet: Great crested newts*. [Online]  
Available at:  
[https://www.youtube.com/watch?v=Ce7IHJirqEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212\\_natural\\_england\\_s\\_standing\\_advice](https://www.youtube.com/watch?v=Ce7IHJirqEwww.biodiversityplanningtoolkit.com/stylesheet.asp?file=212_natural_england_s_standing_advice)  
[Accessed 2017].
- Oxford Dictionary, 2016. *Oxford Dictionary*. [Online]  
Available at: <http://www.oxforddictionaries.com/>  
[Accessed 19 February 2016].
- Place Services, 2015. *Essex Biodiversity Validation Checklist*, Chelmsford: Essex County Council.

- Staffordshire Ecological Record, 2016. *SBI Guideleines Appendix 1: SBI Criteria Definitions*. [Online]  
Available at: [http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI\\_Guidelines:\\_Definitions\\_\(App.\\_1\)](http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI_Guidelines:_Definitions_(App._1))  
[Accessed 2017].
- Staffordshire Ecological Record, 2016. *SBI Guidelines: Introduction*. [Online]  
Available at: [http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI\\_Guidelines:\\_Introduction](http://www.staffs-ecology.org.uk/html2015/index.php?title=SBI_Guidelines:_Introduction)  
[Accessed 2017].
- Stone, 2013. *Bats and lighting: Overview of current evidence and mitigation guidance*, London: Bat Conservation Trust.

## **APPENDICES:**

APPENDIX E1	Definitions, Abbreviations and Glossary
APPENDIX E2	Figure E1 – Update Phase 1 Habitat Plan
APPENDIX E3	Figure E18 – Internationally Designated Sites Plan
APPENDIX E4	Figure E19 – Statutory and Non-Statutory Designated Sites Plan
APPENDIX E5	Hedgerow Regulations Assessment Raw Data
APPENDIX E6	Figure E22 – 2018 Bat Emergence Surveyor Location Plan

## Appendix E1: Abbreviations and Glossary

*For the avoidance of confusion, abbreviations used within the report have the meanings detailed below:*

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

**NCC** Nature Conservancy Council

**Zoi** Zone of Influence

**NERC (Act)** Natural Environment & Rural Communities Act

## Glossary:

*For the avoidance of confusion, the terms used in this report follow the definitions given below:*

<b>Assemblage</b>	A group of species found in the same location (CIEEM, 2016).
<b>Biodiversity</b>	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).
<b>Biodiversity Alert Site</b>	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 (Staffordshire Ecological Record, 2016).
<b>Biodiversity Opportunity Areas</b>	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 (Buckinghamshire & Milton Keynes Biodiversity Partnership, 2014).
<b>Buffer Zone</b>	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).
<b>Compensation</b>	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).
<b>Commuting</b>	The activity of flying between the roost and foraging area (Stone, 2013).
<b>Connectivity</b>	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).
<b>Conservation</b>	The protection, preservation, management or restoration of the natural environment and wildlife (Oxford Dictionary, 2016).
<b>Dispersal</b>	The dissemination, or scattering, of organisms over periods within a given area or over the Earth (Encyclopaedia Britannica, 2016).
<b>Dominant (Habitat/Species)</b>	Denoting the predominant species in a plant (or animal) community (Oxford Dictionary, 2016).
<b>Ecological Impact Assessment (EclA)</b>	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).
<b>Ecological Stepping Stones</b>	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).
<b>Ecosystem</b>	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).
<b>eDNA</b>	Genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material.
<b>Effect</b>	This report uses the word impact rather than effect when referring to how ecological resources might be affected by a project (CIEEM, 2016).
<b>European Protected Species</b>	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).
<b>Enhancement</b>	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).
<b>Environmental Impact Assessment (EIA)</b>	This is an assessment carried out under the EIA Regulations (CIEEM, 2016).
<b>European Protected Species (EPS) License</b>	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).
<b>Fauna</b>	The animals of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Flora</b>	The plants of a particular region, habitat, or geological period (Oxford Dictionary, 2016).
<b>Foraging</b>	The activity of searching for food (Oxford Dictionary, 2016).
<b>Fragmentation</b>	The breaking up of a habitat, ecosystem or biotope into smaller parcels with a consequent impairment of functioning (CIEEM, 2016).
<b>Habitat</b>	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).
<b>Habitat of Principal Importance</b>	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).
<b>Hibernacula</b>	The winter quarters of a hibernating animal.
<b>Hibernation</b>	The condition or period of an animal or plant spending the winter in a dormant state (Oxford Dictionary, 2016).
<b>Impact</b>	The way in which an ecological resource/receptor is affected by a project (see effect) (CIEEM, 2016).
<b>Invasive Species</b>	Species introduced outside its normal distribution (HMO, 2011).
<b>Keystone Species</b>	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 Britannica, 2016).
<b>Latrine</b>	Dung pit (Harris et al, 1989).
<b>LBAP Habitat</b>	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).
<b>LBAP Species</b>	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).

<b>Mitigation</b>	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).
<b>Native Species</b>	An animal or plant species indigenous to a place (Oxford Dictionary, 2016).
<b>Net Ecological Gain</b>	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).
<b>No Net Loss</b>	The point at which habitat or biodiversity losses equal their gains, both quantitatively and qualitatively (CIEEM, 2016).
<b>Non-Statutory Sites</b>	'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).
<b>Population</b>	A collection of individuals (plants or animals), all of the same species and in a defined geographical area (CIEEM, 2016).
<b>Priority Habitats</b>	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).
<b>Priority Species</b>	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).
<b>Protected Species</b>	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'.
<b>Reasonable Avoidance Measures</b>	The use of a non-licensed 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).
<b>Receptor</b>	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).
<b>Restoration</b>	The active re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition (CIEEM, 2016).
<b>Retained Biodiversity Alert Site</b>	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 (Staffordshire Ecological Record, 2016)
<b>Riparian</b>	Something related to, living on, or located at the banks of a watercourse, usually a river or stream (HMO, 2011).
<b>Roost</b>	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).
<b>Suitable Alternative Green Space</b>	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).
<b>Sett</b>	Any structure or place which displays signs indicating current use by a Badger (HMO, 1992). Protected under the Protection of Badgers Act 1992.
<b>Significant Barrier</b>	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).

<b>Site of Biological Importance</b>	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 (Staffordshire Ecological Record, 2016).
<b>Species</b>	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding (Oxford Dictionary, 2016).
<b>Species of Principal Importance</b>	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).
<b>Statutory Sites</b>	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).
<b>Stenotopic Species</b>	Species which are only able to tolerate a restricted range of habitats or ecological conditions (Oxford Dictionary, 2016).
<b>Wildlife Corridor</b>	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).
<b>Zone of Influence</b>	The areas/resources that may be affected by the biophysical changes caused by activities associated with a project (CIEEM, 2016).



**Appendix E2:**

**Figure E1 – Phase 1 Habitat Plan**



**Legend:**

- Site Boundary
- Arable
- Poor Semi-Improved Grassland
- Improved Grassland
- Tall Ruderal
- Broadleaved Woodland
- Orchard
- Intact hedge - species poor
- Intact hedge native - species rich
- Defunct hedge - species poor
- Bat Tree with Potential Roost Feature(s)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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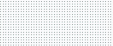

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Drawing Title: Phase 1 Habitat Plan			
Date: 14 / 12 / 2018	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JG	Checked By: LC	Status: Final	Final Revision: A
CAD Ref: CE-WQ-0992-DW03 - Final		Drawing No: Figure E1	

**Appendix E3:**

**Figure E18 – Internationally Designated Sites Plan**



Legend:

-  Site Boundary
-  10km buffer
-  Ramsar
-  Special Area of Conservation (SAC)
-  Special Protection Area (SPA)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-
-	-	-	-	-

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Client:



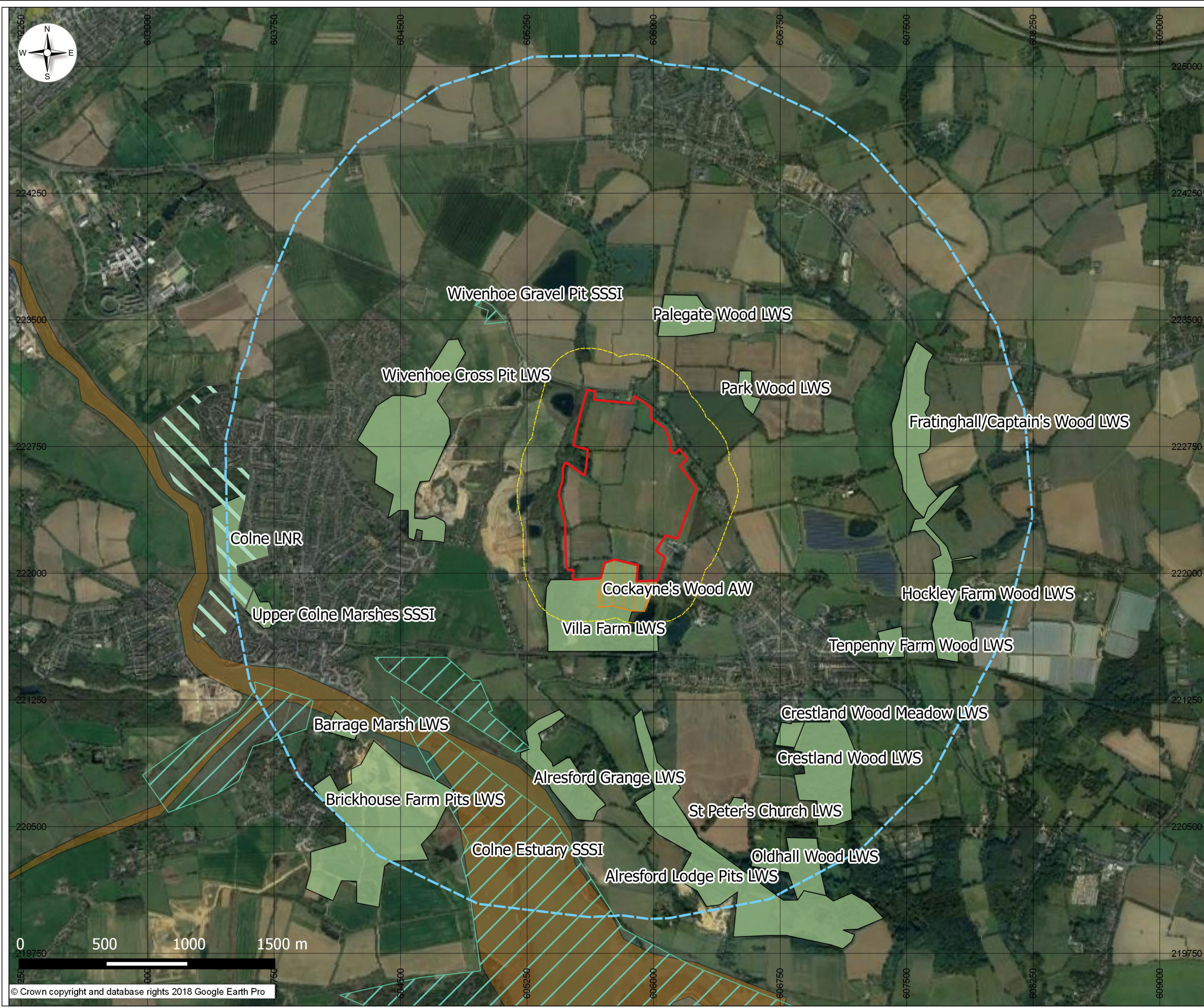
Site: **Wivenhoe Quarry**









Drawing Title: **Internationally Designated Sites**

Date: 13 / 12 / 2018	Scale: 1:80,000	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final Rev B
CAD Ref: CE-WQ-0992-DW26.qgs		Drawing No: Figure E18

**Appendix E4:**

**Figure E19 – Statutory and Non-Statutory Designated Sites Plan**



- Legend:**
-  Site Boundary
  -  2km Distance Marker
  -  250m Distance Marker
  -  Marine Conservation Zone (MCZ)
  -  Site of Special Scientific Interest (SSSI)
  -  Local Nature Reserve (LNR)
  -  Local Wildlife Site (LWS)
  -  Ancient Woodland (AW)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry**

Drawing Title: **Statutory and Non-Statutory Designated Sites**

Date:	Scale:	Paper Size:	
12 / 12 / 2018	1:21,500	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final Rev A	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW26.qgs	Figure E19		

**Appendix E5:**

**Hedgerow Regulations 1997 Assessment Raw Data**

Hedgerow Number	Length	Number of 30m Sections	Woody Species Present per 30m Section			Features present as specified in Sub-paragraph 4 <sup>+</sup>
			1	2	3	
H1	147m	2	Hawthorn, Alder, Ivy, Blackthorn, Holly, Willow sp., Elder	-	-	b)
						d)
H2	235m	3	Hazel, Hawthorn, Rose sp., Spindle, Alder, Oak	Oak, Spindle, Rose sp., Blackthorn, Hazel	Broom, Blackthorn, Spindle, Oak, Alder, Rose sp.	e)
						g)
H3	180m	2	Hawthorn, Ash, Oak	Hawthorn	-	-
H4	181m	2	Oak, Hawthorn, Blackthorn, Rose sp., Elder, Willow sp.	Willow sp., Blackthorn, Oak, Holly	-	b)
						e)
						h)
						g)
H5	213m	3	Oak, Hawthorn, Rose sp., Spindle	Blackthorn, Rose sp., Hawthorn, Hazel	Rose sp., Oak, Blackthorn	-
H6	225m	3	Oak, Holly, Blackthorn	Oak, Blackthorn, Cherry sp., Hawthorn, Elder	Oak, Hawthorn, Hazel, Blackthorn, Alder	-
H7	200m	2	Holly, Rose sp., Blackthorn, Oak	Oak, Hawthorn, Blackthorn, Elder, Holly, Rose sp.	-	d)
						g)
H8	340m	3	Hazel, Hawthorn, Blackthorn, Field Maple	Blackthorn, Oak, Hawthorn, Spindle, Hazel	Hawthorn, Elder, Spindle, Hazel	-
H9	281m	3	Elder, Hawthorn, Willow sp.	Oak, Ash	Willow sp., Oak, Elder, Hawthorn	-
H10	327m	3	Hawthorn, Holly, Hazel, Oak, Blackthorn	Oak, Rose sp., Hawthorn, Blackthorn	Blackthorn, Hawthorn, Oak, Elder	g)
H11	121m	2	Blackthorn, Rose sp., Hawthorn, Oak	Blackthorn, Crab Apple, Oak	-	-
H12	130m	2	Oak, Holly, Blackthorn, Elder	Blackthorn, Oak, Holly, Elder	-	-

Hedgerow Number	Length	Number of 30m Sections	Woody Species Present per 30m Section			Features present as specified in Sub-paragraph 4 <sup>+</sup>
			1	2	3	
H13	100m	1	Oak	-	-	
H14	197m	2	Oak, Holly, Blackthorn, Elder	Blackthorn, Oak, Holly, Elder		
H15	130m	2	Blackthorn, Hazel, Hawthorn, Holly	Holly, Hawthorn, Elder, Blackthorn		
H16	365m	3	Oak, Hawthorn, Blackthorn	Oak, Hawthorn		Oak, Hawthorn, Elder
H17	237m	3	Blackthorn, Oak, Hawthorn	Blackthorn, Elder, Oak, Hawthorn		Oak, Hawthorn, Holly, Blackthorn, Rose sp., Ash

<sup>+</sup>Features present as specified in Sub-paragraph 4

- (a) a bank or wall which supports the hedgerow along at least one half of its length;
- (b) gaps which in aggregate do not exceed 10% of the length of the hedgerow;
- (c) where the length of the hedgerow does not exceed 50 metres, at least one standard tree;
- (d) where the length of the hedgerow exceeds 50 metres but does not exceed 100 metres, at least 2 standard trees;
- (e) where the length of the hedgerow exceeds 100 metres, such number of standard trees (within any part of its length) as would when averaged over its total length amount to at least one for each 50 metres;
- (f) at least 3 woodland species within one metre, in any direction, of the outermost edges of the hedgerow;
- (g) a ditch along at least one half of the length of the hedgerow;
- (h) connections scoring 4 points or more in accordance with sub-paragraph (5);
- (i) a parallel hedge within 15 metres of the hedgerow.






**Appendix E6:**

**Figure E22 – 2018 Bat Emergence Surveyor Location Plan**



Legend:

-  Site Boundary
-  Surveyors
-  Surveyed Trees



0 100 200 300 400 500 m

Inset Map

222600

605600

0 10 20 30 40 50 m

© Google Earth Pro 2018

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

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Client:



Site: Wivenhoe Quarry Eastern Extension

Drawing Title: 2018 Bat Surveyor Emergence Plan

Date: 14 / 12 / 2018	Scale: 1:800	Paper Size: A3 (420x297mm)
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Drawn By: JG	Checked By: LC	Status: Final	Final Revision: A
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CAD Ref: CE-WQ-0992-DW03 - Final	Drawing No: Figure E22
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**APPENDIX B: GCN HSI Letter**

23 May 2018

Email: [lucy@crestwoodenvironmental.co.uk](mailto:lucy@crestwoodenvironmental.co.uk)

Our ref: CE-WQ-0992-LT01 - FINAL

Albion House,  
89 Station Road,  
Eckington,  
Sheffield,  
S21 4FW

*BY EMAIL AND POST*

**FAO: Mr Dan Walker**

Dear Dan,

**Re: Habitat Suitability Index Assessment – Wivenhoe Quarry**

Crestwood Environmental Ltd. has been appointed by DL Walker Ltd on behalf of Tarmac (*'the Client'*) to undertake an initial great crested newt Habitat Suitability Index (HSI) assessment of ponds within 500m of the Site, of which there are a total of 33. There are no ponds present within the Site boundary itself. The survey was undertaken on 27<sup>th</sup> January 2016 by Lucy Cash (Senior Ecologist) and an assistant.

**Methods and Methodologies**

The HSI assessment was undertaken in accordance with methodologies developed by Oldham *et al* (Oldham, *et al.*, 2000). Ponds within 500m of the site were surveyed using factors such as pond area, water quality, and macrophyte coverage. These are assessed and given a value between 0.01 and 1 (0.01 indicating an unsuitable habitat and 1 indicating an optimum habitat), as detailed in Table 1 below.

**Table 1**      ***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

**Results**

Table 2 below summarises the results of the initial HSI assessment on the 33 ponds within 500m of the Site. Full details, including photographs, of the HSI results can be found in Appendix 1.



**Table 2** *Summary of the initial HSI assessment*

HSI score	Number of ponds within 500m of the Site
Excellent	4
Good	8
Average	6
Below Average	2
Poor	7

At the time of survey, one pond was restricted by access and was not surveyed, whilst 5 ponds were found to be dry.

### Limitations

The survey was undertaken outside of the optimum period (May to September inclusive) for HSI assessments, potentially reducing the likelihood of recording all vegetation (shade, macrophytes) as well as variations in water level (reduction in pond area). Judgement on spring and summer conditions were made during the survey, allowing a full assessment to be undertaken.

Limitations set out within the HSI guidelines are that 'the system is not sufficiently precise to allow the conclusion that any particular pond with a high score will support newts, or that any pond with a low score will not do so'. This is not considered to pose a significant constraint to the assessment of the ponds, as professional judgement is used at all times to determine the suitability of a pond for GCN.

### Conclusions and Recommendations

18 ponds 500m of the site were assessed to be of Average and above suitability for GCN, whilst the remaining 15 ponds were either assessed to be of Below Average or Poor suitability for GCN, or survey was not possible.

The site offers suitable terrestrial habitat immediately adjacent to a number of ponds within the area, as well as suitable connecting habitat between ponds within 500m of the Site. It is recommended full surveys are undertaken on all ponds that were assessed to be of Average suitability and above and if GCN are confirmed present then full surveys should also be undertaken on adjacent ponds regardless of their HSI result (if required).

Yours sincerely

Data Protection Act



Lucy Cash

Associate Director of Ecologist

**APPENDIX C: GCN Population Survey Report**



**Wivenhoe Quarry Eastern Extension,  
Alresford Road, Wivenhoe**

**Great Crested Newt Population Size Class Assessment**

Report Reference: CE-WQ-0992-RP02 - Final



Produced by Crestwood Environmental Ltd.

17 April 2018

**Crestwood Report Reference: CE-WQ-0992-RP02 - Final:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	17/04/2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Great Crested Newt (*Triturus cristatus*) presence/likely absence survey and subsequent Population Size Class Assessment ('**the Survey**') detailed in this report was carried out by Crestwood Environmental Ltd as requested by DL Walker on behalf of Tarmac ('**the Client**') to support a planning application for mineral extraction at land to the east of Wivenhoe, Alresford Road, Wivenhoe in Essex.

Four survey visits were undertaken as part of the presence/likely absence survey and two further visits were undertaken on ponds where Great Crested Newt were recorded to establish an estimated population size.

A **Medium sized population** of Great Crested Newt was recorded at one pond (pond 29) within 500m south of the Site.

A **Small sized population** of Great Crested Newt was found to be present in two other ponds within 500m of the Site (pond 22 and 31).

It is recommended Reasonable Avoidance Measures (RAMS) are put in place where works take place within suitable terrestrial habitat for the species.

**No further surveys** are recommended for Great Crested Newts, however, if the Proposed Development does not commence within two years of the survey date, an update survey is recommended to be undertaken at the Site and within 500m of the Site, if required. If further surveys are deemed necessary, these can be provided for as part of the Construction Environmental Management Plan (CEMP).

# 1 INTRODUCTION

## 1.1 BACKGROUND

- 1.1.1 Crestwood Environmental Ltd. has been appointed by DL Walker on behalf of Tarmac Ltd. (**'the Client'**) to undertake a Great Crested Newt (**'GCN'**) Presence/ Likely Absence survey and subsequent Population Size Class assessment at land at and land to the east of Wivenhoe, Alresford Road, Wivenhoe, falling within VC19: Essex centred at National Grid Reference TM 049 224 (**'the Site'**).
- 1.1.2 An Extended Phase 1 Habitat survey was carried out by Crestwood Environmental Ltd on 20<sup>th</sup> October 2015. The survey identified suitable habitat for Great Crested Newt at the Site, as well as within 500m of the Site boundary.
- 1.1.3 The presence of Great Crested Newt at the Site and within 500m of the Site boundary can have a significant effect to the design of a Proposed Development therefore further surveys were recommended to determine any ecological constraints presented by Great Crested Newt.

## 1.2 SITE LOCATION AND CONTEXT

- 1.2.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees and Poor Semi-Improved Grassland.
- 1.2.2 The redline boundary as shown in Plate 1 overleaf shows the extent of the Site.
- 1.2.3 The red line shown on the Pond Location plan (see Figure E2 in Appendix E1) indicates the extent of the Site boundary (updated 2017), whilst the blue dash line buffer shows the 500m of the Site boundary (**'Survey Area'**).
- 1.2.4 Only ponds within 500m of the updated 2017 Site boundary have been included within this report, ponds surveyed that are no longer part of this Survey Area have been omitted.

**Plate 1 Site Location Plan**



**1.3 PURPOSE AND SCOPE**

- 1.3.1 The purpose of the survey, assessment and report is to provide ecological advice in respect of the design of, and associated planning application for, the Proposed Development.
- 1.3.2 The scope of the survey included within the brief are detailed in Table 1.

**Table 1 Survey Purpose and Scope**

Survey	Purpose and Scope
<b>Great Crested Newt Presence/Likely Absence</b>	To record presence/ likely absence of Great Crested Newts in ponds identified using standard methods, in ponds identified during the Habitat Suitability Index (HSI) Assessment.
<b>Great Crested Newt Population Size Class Assessment</b>	To estimate the population size of Great Crested Newts in the ponds recorded to support GCN (as agreed with the county ecologist).

1.3.3 A Habitat Suitability Index (HSI) Assessment was undertaken on 27<sup>th</sup> January 2016, full results of which are detailed in the Extended Phase 1 Habitat Survey report, reference CE-WQ-0992-RP01 (Crestwood Environmental Ltd., 2017).

1.3.4 The description of the Site and the results of the surveys relate to the findings at the time of the field survey visits only between 27<sup>th</sup> January 2016 and 25<sup>th</sup> May 2016.

## 1.4 LEGAL CONTEXT

1.4.1 Great Crested Newt has suffered major declines over the last century in the UK. A combination of factors are thought to have influenced this decline including:

- Loss of Great Crested Newt breeding and terrestrial habitat;
- Inappropriate/intensive/neglected habitat management;
- Habitat fragmentation and isolation;
- Barriers to dispersal; and
- Pollution from agriculture, industry and roads.

1.4.2 Great Crested Newts are considered to be an internationally important species; they are fully protected under the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981) and under Schedule 2 of Conservation of Habitats and Species Regulations 2017 (as amended) (HMSO, 2017), making them a European Protected Species.

1.4.3 It is an offence to knowingly kill, harm, injure or disturb a Great Crested Newt. It is also an offence to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding by the species; or to disturb it while it is occupying such a structure or place.

1.4.4 Where a project or plan has been identified as impacting on Great Crested Newts, the appropriate authority (in England, Natural England) can issue licences which make otherwise illegal actions lawful. Such licences can, however, only be issued if the following tests are met:

- The consented project must be for '*preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*';
- There must be '*no satisfactory alternative*' and;
- The action '*will not be detrimental to the maintenance of the population of the species concerned of a favourable conservation status in their range*'.

## 2 METHODOLOGY AND APPROACH

### 2.1 DESK STUDY

- 2.1.1 As part of the desk study carried out during the Extended Phase 1 Habitat survey, records of Great Crested Newt within 4km from the centre of the site, were requested from the Essex Field Club (Essex Field Club, 2015). A summary of this information is provided where relevant.
- 2.1.2 The desk study also included use of aerial photography and OS mapping to identify other ponds within 500m of the Proposed Development and to establish the location of any landscape features or structures that are considered to be 'significant barriers' (English Nature, 2001) (Langton, et al., 2001) to newt dispersal, e.g. main busy roads, motorways and rivers.

### 2.2 HABITAT SUITABILITY INDEX (HSI) ASSESSMENT

- 2.2.1 A HSI was undertaken on all ponds within 500m of the Site (where accessible), results of which are detailed in report reference CE-WQ-0992-RP01. There are 33 ponds within 500m of the Site boundary. Following discussions with the Local Planning Officer and undertaking the HSI, several ponds within 500m of the Site were scoped out of further survey.
- 2.2.2 Table 2 details the justification for exclusion of ponds from further survey. Any ponds which were scored Poor under the HSI were discussed with the Local Planning Officer and automatically excluded from further survey.

**Table 2** Justification for Exclusion of Ponds from Further survey

Pond Number	Distance (m) and Bearing from Nearest Site Boundary	Justification for Exclusion from Further Survey
1	c. 470m west	No longer extant.
6	c. 396m west	Poor HSI (0.47). Regularly worked silt lagoon.
7	c. 285m west	Poor HSI (0.42).
12	c. 355 west	Dry at time of survey.
13	c. 75m west	Un-surveyed due to health and safety reasons.
16	c. 90m south-west	Poor HSI (0.28). Very shallow woodland pond with no aquatic vegetation.
17	c. 80m south-west	No longer extant.
18	c. 90m south-west	Poor HSI (0.28). Very shallow woodland pond with no aquatic vegetation.
19	c. 100m south	Dense aquatic vegetation ( <i>Crassula helmsii</i> ) and sheep grazing around pond.
20	c. 160m south	Steep banks. Un-surveyed due to health and safety reasons.

Table 2 continued . . .

Pond Number	Distance (m) and Bearing from Nearest Site Boundary	Justification for Exclusion from Further Survey
23	c. 165m south	Successive Alder Carr, completely dry at time of survey.
24	c. 100m south	Poor HSI (0.46). Fishing lake with large fish stock.
25	c. 120m south	Poor HSI (0.44). Fishing lake with large fish stock.
26	c. 280m southwest	Un-surveyed due to health and safety reasons.
28	c. 465m south	Access restrictions.
30	c. 295m south	Infilled and dry at time of survey.
32	c. 315m south	Poor HSI (0.48). Fishing lake with large fish stock.
33	c. 40m east	No longer extant.

## 2.3 GREAT CRESTED NEWT PRESENCE/LIKELY ABSENCE SURVEY

2.3.1 In order to determine the presence or likely absence of Great Crested Newt at the Site, a series of four survey visits (night and morning) were conducted according to current methodologies listed in the Great Crested Newt Mitigation Guidelines (English Nature, 2001). Survey visits were conducted in suitable weather conditions between mid-April and the end of May.

2.3.2 A combination of the following survey methods were employed during each visit:

- **Torch Survey:** walking the perimeter of waterbody after dusk searching marginal areas for adult Great Crested Newt with a powerful torch (e.g. Clulite 1 million candlepower). In clear ponds this can be an effective method for detecting the presence (and relative abundance) of adult newts. This method is limited in turbid/densely vegetated ponds. Bright light may cause newts to disperse under cover thus affecting survey results and potentially breeding activity.
- **Egg Searches:** an examination of living/dead submerged vegetation (especially folded leaves), fallen twigs or other debris (plastic bags) for newt eggs. Great Crested Newt eggs are approximately 5mm long and pale yellow, other newt species are smaller at 3mm long and off-white. This method is effective for detecting the presence of a breeding population of newts but less effective in heavily vegetated ponds with small newt populations or where the margins are inaccessible. Given that this method involves the unwrapping of folded egg laying substrate it has been suggested that the exposed eggs are more susceptible to predation and UV radiation impacts, once the presence of Great Crested Newt eggs have been confirmed the egg search can be terminated.
- **Bottle Trapping:** setting traps made from empty plastic bottles around the margins of ponds in the evening and checking them the following day (before 11am). Bottle trapping is considered the most effective method for determining presence and assessing the population of Great Crested Newt especially in heavily vegetated and/or silted ponds. This method can be used to catch adult newts during the breeding season and larvae later in the summer. Bottle trapping should only be used when the night-time air temperature is >5°C similarly the risk of harm to newts increases during warmer weather (as warmer water holds less oxygen), in small ponds and in areas susceptible to human disturbances.

- 2.3.3 Presence/Likely Absence surveys were carried out on 17 ponds within 500m of the Site, as detailed in Table 3.
- 2.3.4 Survey techniques and the justification for the techniques used are also detailed in Table 3 (where relevant).

**Table 3 Ponds Subject to Presence/Likely Absence Survey**

Pond Number	Distance and Bearing from Nearest Site Boundary	Survey Technique				Justification for survey technique
		Torch Survey	Bottle Trapping	Egg Search	Net	
2	420m west	X	-	X	X	Substrate unsuitable for bottle trapping
3	250m west	-	X	X	X	Pond surface covered in <i>Lemna</i> .
4	80m west	X	-	X	X	Substrate unsuitable for bottle trapping.
5	40m west	X	X	X	-	-
8	170m west	X	-	X	X	Substrate unsuitable for bottle trapping.
9	125m west	X	X	X	-	-
10	100m west	X	-	-	-	Steep sided banks unsafe to bottle trap.
11	170m west	X	-	X	X	Substrate unsuitable for bottle trapping.
14	40m west	X	X	X	-	-
15	15m west	-	X	X	X	Pond surface heavily vegetated.
19	65m south	X	-	X	-	Heavily invaded by <i>Crassula</i> – unsuitable for bottle trapping.
22	80m south	X	X	X	-	-
27	300m south	X	-	-	-	Steep sided banks unsafe to bottle trap.
29	295m south	X	X	X	-	-
31	325m south	X	-	X	X	Substrate unsuitable for bottle trapping

- 2.3.5 It was agreed with the Local Planning Officer, that any Ponds within the immediate vicinity of any Ponds found to contain Great Crested Newt would also be subject to further survey.



## **2.4 POPULATION SIZE CLASS ASSESSMENT**

- 2.4.1 Population Size Class Assessment was carried out on all ponds that were recorded to support Great Crested Newt, as well as those within the immediate surrounds (Ponds 21, 22, 27, 29 and 31).
- 2.4.2 In order to carry out a Population Size Class assessment, the highest count of adult newts obtained in each pond by any one method is calculated for all ponds on one night. The **Peak Total Site Count** is then the highest of these figures. The figure which is obtained then determines whether the population of Great Crested Newt at the Site is Small (<10), Medium (11-100) or Large (>100).

## **2.5 LIMITATIONS**

- 2.5.1 A number of ponds were not subject to the full three survey methods (as recommended in the Great Crested Newt Conservation Handbook (Langton, et al., 2001)) due to environmental restrictions such as substrate type, vegetation cover/turbidity and health and safety reasons.

## **3 RESULTS**

### **3.1 DESK STUDY**

- 3.1.1 Planning policy relevant to the Proposed Development can be found in the Extended Phase 1 Habitat Report (Report ref: CE-WQ-0992-RP01) and assessed within the Ecological Impact Assessment (EIA) (Report ref: CE-WQ-0992-RP09).
- 3.1.2 The EFC desk study (Essex Field Club, 2015) identified two records of Great Crested Newt (*Triturus cristatus*) from 1985 within 4km of the centre of the Site. These are located approximately 4km to the southwest of the Site and 2.4km southeast of the Site. EWT provided undated records for Great Crested Newts near Elmstead Market, circa 1km to the north.
- 3.1.3 A total of 33 ponds were recorded within 500m of the Site. There were no ponds within the Site boundary. A Pond Location Plan (Figure E2) can be found in Appendix E1.
- 3.1.4 There are **no significant barriers** to dispersal which separate the ponds within 500m of the Site from the Site.
- 3.1.5 A description and photos of the ponds surveyed can be found in the Habitat Suitability Index (HSI) report; report reference CE-WQ-0992-LT01 (see Appendix E2).

### **3.2 HABITAT SUITABILITY INDEX RESULTS**

- 3.2.1 The results of the Habitat Suitability Index (HSI) Assessment are detailed in report reference CE-WQ-0992-RP01 (Crestwood Environmental Ltd., 2017).
- 3.2.2 Ponds that were assessed as being of 'Average', 'Good', or 'Excellent' suitability for Great Crested Newt were subject to Great Crested Newt presence/likely absence survey (see report reference CE-WQ-0992-RP02). Ponds which were assessed as being of 'Below Average' or 'Poor' were scoped out of further survey, unless otherwise stated, following discussions with the Local Planning Officer.

### 3.3 PRESENCE/LIKELY ABSENCE SURVEY RESULTS

#### WEATHER CONDITIONS

3.3.1 Table 4 below details the weather conditions under which each survey was undertaken.

**Table 4 Weather Conditions**

Survey Date	Survey number	Weather parameters			
		Temperature (°C)	Cloud cover (in octas)	Precipitation	Wind Speed (Beaufort scale)
05.04.16	1	11	2	None	1
12.04.16	2	13	3	None	1
03.05.16	3	11	2	None	1
11.05.16	4	14	4	None	2

3.3.2 Table 5 summarises the presence/likely absence survey results. Detailed survey results can be found in Appendix E3.

**Table 5 Summary of Presence/Likely Absence Survey Results**

Pond Number	2	3	4	5	8	9	10	11	13	14	15	21	22	27	29	31
GCN Recorded													✓		✓	✓
Smooth Newt Recorded		✓		✓	✓	✓				✓	✓	✓	✓		✓	

3.3.3 **Great Crested Newt was found to be present** within three Ponds within 500m of the Site; Pond 22, 29 and 31. These ponds were then subject to an additional two surveys to determine an estimated population size.

3.3.4 As previously agreed with the Local Planning Officer, ponds within the immediate vicinity of any ponds found to contain Great Crested Newt would also be subject to further survey; therefore an additional two ponds were included within the Population Size Class Assessment; Pond 21 and 27.

### 3.4 POPULATION CLASS SIZE ASSESSMENT RESULTS SUMMARY

3.4.1 Great Crested Newt were found to be present within three ponds within 500m of the Site (pond 22, 29 and 31). These ponds were subject to a Population Size Class Assessment, the results of which are detailed in Table 6.

**Table 6 Great Crested Newt Survey Results Summary**

Date (visit number)	Temp. (°C)	Results			
		Pond no.	Peak number of GCN		Eggs Present (Y/N)
			Torch	Bottle	
05.04.16 (1)	11°C	22	0	0	N
		29	6	15	Y
		31	2	N/A	Y
12.04.16 (2)	13°C	22	0	0	N
		29	2	0	Y
		31	0	N/A	Y
03.05.16 (3)	11°C	22	1	0	N
		29	9	1	Y
		31	0	N/A	Y
11.05.16 (4)	14°C	22	0	0	Y
		29	7	0	Y
		31	0	N/A	Y
19.05.16 (5)	13°C	22	0	0	Y
		29	0	0	Y
		31	0	N/A	Y
25.05.16 (6)	13°C	22	0	0	Y
		29	0	0	Y
		31	0	N/A	Y

3.4.2 Great Crested Newt were recorded within Pond 22 (NGR TM 0573 2187), Pond 29 (NGR TM 05552165) and Pond 31 (NGR TM0557 2162).

3.4.3 Two additional neighbouring ponds were also subject to a Population Size Class Assessment (Pond 21 and 27), however no Great Crested Newt were recorded during these additional surveys indicating that **Great Crested Newt are likely absent from these ponds.**

3.4.4 Using the methodology in 2.4.2 the peak count for Great Crested Newts pond 29 within 500m of the Site is **15**, this indicates a **'medium' sized population** within this pond.

3.4.5 Ponds 22 and 31 were found to support **'small' sized populations** of Great Crested Newt.

## 4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1.1 The Site offers suitable aquatic and some limited terrestrial habitat for Great Crested Newt, including the field margins and hedgerows along the boundaries of the arable fields.
- 4.1.2 The results of the HSI indicated the majority of ponds within 500m of the Site boundary were of poor suitability for Great Crested Newt.
- 4.1.3 The results of the Population Class Size assessment indicated that a Medium size population of Great Crested Newt are present within one pond within 500m of the Site and Small sized populations are present within two ponds within 500m of the Site. No Great Crested Newt were recorded within the Site itself.
- 4.1.4 It is considered that a **European Protected Species licence is not required** for this Site, due to the retention of the majority of field margins at the Site and the extent of suitable habitat surrounding the ponds which is not within the Site boundary.
- 4.1.5 A Method Statement detailing precautionary working measures will be required to undertake works on terrestrial habitats at the Site that are suitable for Great Crested Newt, including arable field margins and hedgerows. Progressive vegetation removal under supervision of a suitably qualified ecologist will need to be undertaken during the period when newts are most active (typically mid-March to September) to avoid accidental disturbance or killing of hibernating individuals.
- 4.1.6 A Method Statement of works for Great Crested Newt within terrestrial habitat at the Site should be produced and implemented before works commence. This would be incorporated into the Biodiversity Enhancements Plan and Construction Environmental Management Plan that would form part of the approved list of documents for any planning consent for the site. A copy of the mitigation strategy will be made available to Natural England if requested.
- 4.1.7 If the Proposed Development does not commence within two years of the survey date, an update survey is recommended to be undertaken at the Site (where required). If further surveys are required, these will be part of the CEMP.
- 4.1.8 Further recommendations and enhancement measures are set out in the Ecological Impact Assessment (EclA) (Report ref: CE-WQ-0992-RP09).

## REFERENCES:

- Crestwood Environmental Ltd., 2017. *Extended Phase 1 Habitat Survey*, Wolverhampton: Crestwood Environmental Ltd..
- English Nature, 2001. *Great Crested Newt Mitigation Guidelines*. 2nd ed. Peterborough: English Nature.
- Essex Field Club, 2015. *Ecological Records*. Essex: Essex Field Club.
- Essex Field Club, 2015. *Ecological Records*, Essex: Essex Field Club.
- HMSO, 1981. *The Wildlife and Countryside Act 1981 (as amended)*. London: HMSO.
- HMSO, 2017. *The Conservation of Habitats and Species Regulations 2010 (as amended)*. London: HMSO.
- Langton, T., Beckett, C. & Foster, J., 2001. *Great Crested Newt Conservation Handbook*. 1st ed. Halesworth: Froglife.

## APPENDICES:

### Appendix E1

Figure E2 - Pond Location Plan

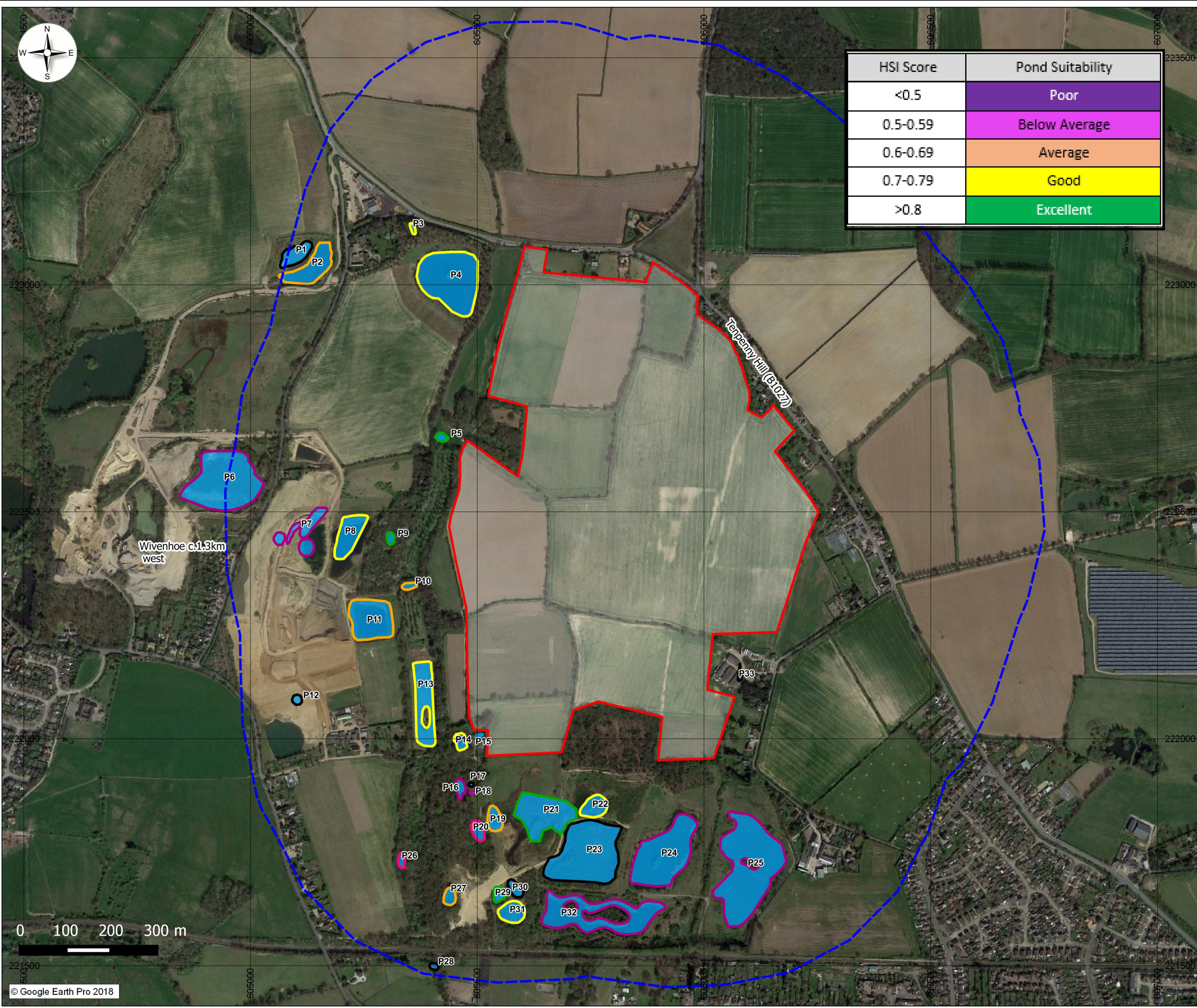
**Appendix E1:**

**Figure E2 - Pond Location Plan**



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

- Legend:
- Site Boundary
  - Ponds - Excellent
  - Ponds Yellow
  - Ponds Light Orange
  - Ponds Pink
  - Ponds Purple
  - Ponds Dry
  - 500m Distance Marker: Great Crested Newt Zone of Influence



Wivenhoe c.1.3km west

Terpenry Hill (B1027)

0 100 200 300 m

© Google Earth Pro 2018

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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Client:



**TARMAC**  
A CRH COMPANY

Site: Wivenhoe Quarry Eastern Extension

Drawing Title: Pond Location Plan and HSI Scores

Date: 3 / 1 / 2019	Scale: 1:8,000	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ-0992-DW02		Final Revision: -
Drawing No: Figure E2 - Rev A		

# APPENDIX D: Reptile Survey Report





**Proposed Eastern Extension to Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Reptile Population Size Class Assessment**

Report Reference: CE-WQ-0992-RP03-Final



Produced by Crestwood Environmental Ltd.

17 April 2018

**Crestwood Report Reference: CE-WQ-0992-RP03-Final:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	17/04/2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Reptile Population Size Class Assessment (**'the Survey'**) detailed in this report was carried out by Crestwood Environmental Ltd. as requested by DL Walker on behalf of Tarmac Ltd. (**'the Client'**), to support a planning application for mineral extraction at land to the east of Wivenhoe, Alresford Road, Wivenhoe in Essex.

Common Lizard and Grass Snake were recorded at the Site in **Low** population densities.

It is recommended that precautionary working methods are implemented in order to minimise the adverse effects of the Proposed Development on the populations of Grass Snake and Common Lizard present at the Site.

Due to Reptiles being present at the Site in a Low population and the limited extent of Reptile suitable habitat present, it is considered that a translocation will not be required.

No further surveys are recommended for Reptiles, however if the Proposed Development does not commence within two years, an update survey is recommended to be undertaken at the Site, where required.

# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker on behalf of Tarmac Ltd. (**'the Client'**) to undertake a Reptile Population Size Class assessment at land to the east of Wivenhoe Quarry, Alresford Road, Wivenhoe, falling within VC19: North Essex, centred at National Grid Reference (NGR) TM 049 224 (**'the Site'**).

1.1.2 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.1.3 The full planning application title reads:

*'Planning application for the extraction of 4.0 million tonnes of sand and gravel as an eastern extension to the existing Wivenhoe Quarry, together with relocation of the existing primary processing plant and ancillary facilities, a proposed new vehicular access onto the B1027 Brightlingsea Road, totalling a 61 hectare area with restoration to EITHER agriculture or low-level water-based nature conservation habitats, lowland grassland woodland planting and hedgerow enhancement, including the importation of approximately 1.2 million cubic metres of inert restoration materials.'*

1.1.4 The need for the survey was identified during an Extended Phase 1 Habitat survey/desk study carried out by Crestwood in October 2015 (Crestwood Environmental, 2016). The survey/desk study recorded the presence of suitable Reptile habitat at the Site and local records exist for Reptiles at the Site.

## 1.2 SITE LOCATION AND CONTEXT

1.2.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees, Improved Grassland and Poor Semi-Improved Grassland.

1.2.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and a railway line bordered by trees and woodland running east-west to the south of the Site.

1.2.3 Areas of woodland, Hedgerows, scattered trees and water bodies within the local area may act as ecological "stepping stones" to provide connectivity within the wider landscape.

1.2.4 The red line shown on Plate 1 indicates the extent of the Proposed Development Site.

**Plate 1 Site Location Plan**



**1.3 PURPOSE AND SCOPE**

1.3.1 The purpose of the survey, assessment and report is to provide ecological advice, specifically with regards to Reptile in respect of the design and construction of the Proposed Development.

1.3.2 The scope of the survey is:

- To assess the suitability of habitat at the Site for Reptile; and
- To determine the population size class of Reptiles at the Site.

1.3.3 The description of the Site and the results of the survey relate to the findings at the time of the field survey visits only between 4<sup>th</sup> April 2016 and 29<sup>th</sup> September 2016.

**2 LEGAL CONTEXT**

2.1.1 All six native UK Reptile species are protected from injury and/or killing by the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981 ). In addition two of these species (Sand Lizard (*Lacerta agilis*) and Smooth Snake (*Coronella austriaca*)) are also protected from injury, killing, capture and disturbance, and damage or destruction of their habitat under The Conservation of Habitats and Species Regulations 2017 (as amended) (HMSO, 2017). All six native Reptile species are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance.

### **3 METHODOLOGY**

#### **3.1 DESK STUDY**

- 3.1.1 As part of the desk study carried out during the Extended Phase 1 Habitat survey (Crestwood Environmental, 2016), records were requested from Essex Field Club (EFC) (Essex Field Club, 2015) and Essex Wildlife Trust (EWT) (Essex Wildlife Trust, 2015). A summary of this information is provided where relevant.
- 3.1.2 The desk study also included use of aerial photography and OS mapping to identify suitable Reptile habitat at the Site (see Section 3.2 below).

#### **3.2 HABITAT SUITABILITY ASSESSMENT**

- 3.2.1 An assessment of the suitability of the habitats present at the Site for Reptile was conducted through the use of the MAGIC map (DEFRA, 2016) and aerial photography prior to the field survey in order to identify potential habitats of high suitability for Reptiles. The results of this desk based assessment were used to inform the field survey only.
- 3.2.2 Prior to the commencement of the field surveys, an Extended Phase 1 Habitat survey was conducted and the habitats were assessed for their suitability for Reptiles.
- 3.2.3 Habitats features which are suitable for Reptiles can vary depending on the species, however general habitat characteristics which are suitable for all Reptiles include:
- Variable vegetation structure;
  - Sufficient size and connectivity;
  - Sheltered areas for refuge;
  - Foraging opportunities; and
  - Basking areas.

### 3.3 FIELD SURVEY

- 3.3.1 The chosen survey methods were based on guidelines provided by Froglife Advice Sheet 10 (Froglife; 1999). 100 0.5m x 0.5m Reptile mats made from roofing felt were initially laid out along suitable Reptile habitat at the Site (as identified by the habitat suitability assessment). During the survey visit the refugia were numbered and their locations were marked on a map (see Figure E5 Appendix E1).
- 3.3.2 After an appropriate 'bedding in' period, typically one week, the refugia were then checked seven times in suitable weather conditions (see Table 1) for Reptiles taking shelter beneath them or basking on/nearby in order to establish the relative abundance of Reptiles at the Site.
- 3.3.3 Good practice guidelines provided by Froglife (Froglife, 1999) recommend if Reptiles are found to be present within the first seven visits, then a total of 20 visits should be conducted to establish an estimated population size.
- 3.3.4 The Reptiles found at the Site were identified to species level, mapped and counted.

### 3.4 WEATHER CONDITIONS

- 3.4.1 Table 1 details the weather conditions at the Site during the Reptile surveys.

**Table 1 Weather Conditions during Reptile Surveys**

Date of Survey	Time of Survey	Weather			
		Temperature (°C)	Cloud Cover (in Octas)	Wind Speed (Beaufort scale)	Precipitation
12/04/2016	13:30pm	15	6	1	None
03/05/2016	14:00pm	15	5	3	None
12/05/2016	09:00am	15	1	1	None
19/05/2016	10:00am	16	5	2	None
26/05/2016	09:00am	16	6	1	None
16/06/2016	09:30am	15	7	1	None
20/07/2016	09:30am	24	0	3	None
08/08/2016	14:30pm	17	2	2	None
16/08/2016	15:30pm	17	4	2	None
17/08/2016	09:00am	18	1	1	None
22/08/2016	09:00am	20	3	1	None
25/08/2016	09:30am	18	3	1	None
31/08/2016	10:00am	17	8	3	None
01/09/2016	09:00am	22	2	1	None
08/09/2016	09:30am	19	5	3	None
15/09/2016	09:00am	17	8	2	None



Table 1 cont'd...

21/09/2016	15:30pm	15	2	2	None
22/09/2016	09:00am	17	1	1	None
27/09/2016	09:30am	19	6	2	None
29/09/2016	14:30pm	16	8	2	None

### 3.5 LIMITATIONS

- 3.5.1 Due to sections of the Site being open to access by the public, some refugia mats were moved which is likely to have resulted in increased disturbance.
- 3.5.2 A number of mats were mowed during July, decreasing the number of refugia available during the surveys.
- 3.5.3 On 5 occasions, the temperatures during the survey were above the recommended temperatures for optimum survey conditions (18°C according to current guidance (Froglife, 1999). This is not considered to be a significant limitation to the survey as temperatures on 3 of the 5 dates were only slightly above the recommended temperature and a Reptile species was recorded on one of these occasions.

## 4 RESULTS

### 4.1 DESK STUDY

- 4.1.1 Several records of Reptile species were provided by EFC and EWT, including:
- Common Lizard (*Zootoca vivipara*) 2.0km to the southwest dated 2007;
  - Slow Worm (*Anguis fragilis*), 600m to the south dated 2011;
  - Grass Snake (*Natrix helvetica*); 0.2km to the south dated 2007; and
  - Adder (*Vipera berus*) 2.1km southeast dated 1998.

### 4.2 HABITAT SUITABILITY ASSESSMENT

- 4.2.1 Reptile suitable habitat was identified at the Site during the desk study through the use of OS maps and aerial photography (DEFRA, 2016). The presence of suitable Reptile habitat was confirmed during the Extended Phase 1 Habitat Survey conducted in 2015 (Crestwood Environmental, 2016).
- 4.2.2 Habitats at the Site suitable for Reptile species were limited to the strips of grassland along several of the field boundary hedgerows. The Reptile refugia mats were placed along all grassland habitats deemed suitable for Reptile (see Figure E3 in Appendix E1).
- 4.2.3 The suitable areas of grassland at the Site provide opportunities for Reptiles to forage and take shelter whilst the south facing areas of grassland provide good opportunities for basking Reptiles.

### 4.3 FIELD SURVEY RESULTS

4.3.1 Table 2 below details the results of the Reptile survey at the Site. The weather conditions were considered suitable for Reptile survey purposes.

**Table 2 Reptile Results Summary**

		Species									Other Species
		Slow Worm			Common Lizard			Grass Snake			
Date of Survey	Time of Survey	M	F	Ju	M	F	Ju	M	F	Ju	
12/04/2016	13:30pm	0	0	0	0	0	0	0	0	0	None
03/05/2016	14:00pm	0	0	0	0	0	1	0	0	0	Wood Mouse ( <i>Apodemus sylvaticus</i> )
12/05/2016	09:00am	0	0	0	0	0	0	0	0	0	None
19/05/2016	10:00am	0	0	0	2	1	0	0	0	0	None
26/05/2016	09:00am	0	0	0	1	0	1	0	0	1	Wood Mouse
16/06/2016	09:30am	0	0	0	0	0	0	0	0	2	None
20/07/2016	09:30am	0	0	0	0	0	0	0	0	0	None
08/08/2016	14:30pm	0	0	0	0	0	0	0	0	0	None
16/08/2016	15:30pm	0	0	0	0	0	0	0	0	0	None
17/08/2016	09:00am	0	0	0	0	0	0	0	0	0	None
22/08/2016	09:00am	0	0	0	0	0	0	0	0	0	None
25/08/2016	09:30am	0	0	0	0	0	0	0	0	0	None
31/08/2016	10:00am	0	0	0	0	0	0	0	0	0	None
01/09/2016	09:00am	0	0	0	0	0	0	1	0	0	None
08/09/2016	09:30am	0	0	0	0	0	0	0	0	0	Grass Snake Slough
15/09/2016	09:00am	0	0	0	0	0	0	0	0	0	None
21/09/2016	15:30pm	0	0	0	0	0	0	0	0	0	None
22/09/2016	09:00am	0	0	0	0	0	0	0	0	0	None
27/09/2016	09:30am	0	0	0	0	0	0	0	0	0	None
29/09/2016	14:30pm	0	0	0	0	0	0	0	0	0	None
Total		0			6			4			
Peak Count		0			3			2			

4.3.2 Common Lizard and Grass Snake were recorded at the Site during the survey visits undertaken between 4<sup>th</sup> April 2016 and 29<sup>th</sup> September 2016. The locations of the occurrences are shown on Figure E3 – Reptile Mat Location Plan reproduced at Appendix E1.

4.3.3 The peak count for Grass Snake at the Site was **2** indicating a **Low** population according to published guidance (Froglife, 1999).

4.3.4 The peak count for Common Lizard at the Site was **3** indicating a **Low** population according to published guidance (Froglife, 1999).

## 5 CONCLUSIONS AND RECOMMENDATIONS

- 5.1.1 The Site offers limited areas of habitat suitable for Reptile species; these are mainly the narrow strips of rough grassland adjacent to the field boundary hedgerows (see Figure E3 in Appendix E1). At present, based on published guidance (Froglife, 1999), a **low** population of Grass Snake and Common Lizard is present at the Site.
- 5.1.2 Due to the presence of low population densities of Reptile species at the Site, it is considered that a translocation strategy is not necessary, and that sensitive vegetation management in order to displace Reptiles towards suitable habitat will prevent any negative impacts on Reptiles at the Site.
- 5.1.3 A Reptile Mitigation Strategy should be devised in agreement with the local council ecologist prior to commencement of any works, in order to ensure that any potential negative effects on Reptiles which may arise as a result of the Proposed Development are avoided, mitigated and/or compensated for appropriately. This would be incorporated into the Biodiversity Enhancement Plan/ Construction Environmental Management Plan that would form part of the approved list of documents for any planning consent for the Site.
- 5.1.4 Any Mitigation Strategy which is devised will have the aim of avoiding, minimising or offsetting the adverse effects of the Proposed Development on the Grass Snake and Common Lizard population at the Site.
- 5.1.5 It is recommended that precautionary working methods are implemented during the construction phases in order to prevent the injury/killing of Grass Snake and Common Lizard present at the Site resulting in a potential breach of the law.

### General Vegetation Management

- 5.1.6 It is recommended that any vegetation to be removed should firstly be strimmed to an approximate height of 150mm under the supervision of an appropriately experienced ecologist. The vegetation will then be hand searched and any Reptiles will be translocated to suitable habitat outside of the construction footprint by the ecologist.
- 5.1.7 After a minimum period of 24 hours, the vegetation can then be strimmed to ground height under the supervision of the appointed ecologist in order to create unsuitable habitat for Reptiles.
- 5.1.8 Vegetation should be cut in such a way so as to encourage Reptiles away from the Proposed Development into suitable habitat. The vegetation will be managed as a short sward so it does not become suitable for Reptiles. The topsoil should then be removed using an excavator with a toothed bucket.
- 5.1.9 Any landscaping designs should take the presence of Reptiles into account and should, wherever possible incorporate appropriate habitat enhancements for Reptiles; as two species of Reptiles have been found at the Site a minimum of two **permanent hibernacula** should be created at the Site (see the Biodiversity Enhancement Plan; Report ref: CE-WQ-0992-RP10).
- 5.1.10 If the Proposed Development does not commence within two years, it is recommended an updated Reptile survey is conducted.

## REFERENCES:

- Crestwood Environmental, 2016. *Extended Phase 1 Habitat Survey Report*, s.l.: Crestwood Environmental.
- DEFRA, 2016. *MAGIC*. [Online]  
Available at: <http://www.magic.gov.uk/magicmap.aspx>  
[Accessed 30 November 2016].
- Essex Field Club, 2015. *Biological Records*, s.l.: Essex Field Club.
- Essex Wildlife Trust, 2015. *Biological Records*, s.l.: Essex Wildlife Trust.
- Froglife, 1999. *Froglife Advice Sheet 10 - Reptile Survey: An Introduction to planning, conducting and interpreting surveys for snake and lizard conservation*, Halesworth: Froglife.
- HMSO, 1981 . *The Wildlife and Countryside Act 1981 (as amended)*. London: HMSO.
- HMSO, 2017. *The Conservation of Habitats and Species Regulations 2017*. London: HMSO.

## APPENDICES:

**Appendix E1**

**Figure E3- Reptile Mat Location Plan**

**Appendix E1:**

**Figure E3 – Reptile Mat Location Plan**



**Legend:**

- Site Boundary
- ↔ (x10) Reptile Mat Locations and Number
- Grass Snake Location
- ▲ Common Lizard Location

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

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Client:



Site: **Wibenhoe Quarry Eastern Extension**

Drawing Title: **Reptile Mat Location Plan**

Date:	Scale:	Paper Size:	
11 / 3 / 2019	1:4,500	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW15	Figure E3		

# APPENDIX E: Breeding Bird Survey Report



**Proposed Eastern Extension, Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Breeding Bird Survey Report**

Report Reference: CE-WQ-0992-RP04 - Final



17 April 2018



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# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. ('Crestwood') has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. ('the Client') to undertake the following surveys at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex centred at National Grid Reference TM 049 224 ('the Site').

1.1.2 The surveys were completed in spring 2016 in relation to a planning application for the proposed eastern extension of the existing sand and gravel quarry.

1.1.3 Surveys were undertaken in April, May and June 2016, using specialist ornithological consultants (Turnstone Ecology), to gain an understanding of the ornithological function and value of the habitats within and immediately adjacent to the Proposed Development Site as well as to identify any bird species or populations at risk from the proposed development.

1.1.4 The Site is dominated by fields of arable crops with winter and spring sown grains, grassland habitats set aside as wild bird strips and associated hedgerows. The Sixpenny Brook runs north to south along the western boundary of the Site. Cockaynes Wood is an area of Ancient Woodland and several ponds designated as Local Wildlife Sites (LWS) is located adjacent to the south of the Site.

## 1.2 OBJECTIVES

1.2.1 The objectives of the breeding bird survey were to:

- Identify the distribution of breeding birds across the Site;
- Locate the presence of birds protected under *Schedule 1 of The Wildlife and Countryside Act 1981*(as amended);
- Locate the presence of species of conservation concern; and
- Identify any species which may require special mitigation during construction and throughout the life of the development.

## 1.3 SURVEY AREA

1.3.1 All birds seen or heard flying or perched within the red-line boundary provided were recorded on to field maps as well as notes on birds seen flying over and adjacent to the Site (see Appendix E2 to E4).

## 1.4 LEGISLATION

1.4.1 All breeding birds are protected under *Section 1 of The Wildlife and Countryside Act 1981* (as amended). This protection extends to intentionally killing and injuring of wild birds, and to the destruction of nests, eggs and dependent young. The only exceptions are with certain game species (listed in *Schedule 2 of the Act*), which can be killed during specific seasons, and to certain species, which can be controlled under licence.

1.4.2 Additional protection is offered to bird species listed on *Schedule 1 of The Wildlife and Countryside Act 1981*, which are protected from disturbance whilst nesting, including from nest construction through to when dependant young have completely left the nest Site. *The Countryside and Rights of Way Act 2000* added reckless disturbance to intentional disturbance of *Schedule 1* species as an offence. The above is a summary of the legislation and the original Acts and Schedules should be referred to for the precise wording.

## 1.5 NOMENCLATURE

1.5.1 The nomenclature for common and scientific names and the taxonomic ordering of species accounts follows that contained in *The British List: A Checklist of Birds of Britain (8th edition)*, Harrop et al. 2013 and any subsequent updates (British Ornithologist Union (BOU), 2013).

## 2 METHODS

### 2.1 BREEDING BIRD SURVEYS

2.1.1 Breeding bird surveys were completed during spring 2016 and consisted of three surveys between April and June. Each of the survey visits were separated by at least two weeks and surveys started within 1 hour of sunrise.

2.1.2 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).

2.1.3 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.

2.1.4 Full details of the survey visits are provided in Table 1.

**Table 1 Details of Breeding Bird Survey Visits**

Visit	Date	Weather (Cloud = Octas, Wind = Beaufort Scale)
1	28/04/16	Cloud – 7/8. Wind – SSW – 3. Overcast with light rain later.
	29/04/16	Cloud – 7/8. Wind – W – 2. Rain overnight, clear and dry. Cloud broke and brighter later.
2	18/05/16	Cloud – 6. Wind – NE – 1. Earlier light rain.
	19/05/16	Cloud – 7. Wind – NW – 1. Rain overnight, but clear morning.
3	23/06/16	Cloud – 6. Wind – SSW – 4. Thunderstorms and very heavy rain earlier. Clearing and brighter.
	24/06/16	Cloud – 2. Wind – SW – 2. Clear and bright.

## 2.2 CRITERIA FOR EVALUATION

2.2.1 A number of criteria are available to determine the conservation status of those bird species recorded as well as attributing a value to the overall breeding bird assemblage. The most appropriate of these are:

- Schedule 1 of the Wildlife and Countryside Act;
- Birds of Conservation Concern 4 (Eaton et al. 2015); and
- Species of Principal Importance (NERC Act 2006).

### **Schedule 1 of the Wildlife and Countryside Act**

2.2.2 The Wildlife and Countryside Act affords greater protection to certain breeding species that are considered appropriately at risk nationally and are as such listed as specially protected under *Schedule 1*.

### **Birds of Conservation Concern 4**

2.2.3 Under this approach, UK bird populations are assessed using quantitative criteria, to determine the population status of each species and then placed on one of three lists; Red, Amber or Green.

2.2.4 Red list species are of high conservation concern, being either globally threatened, having historical UK population declines between 1800 and 1995 or a rapid population decline or breeding range contraction by 50% or more in the last 25 years.

2.2.5 Amber list species are of medium conservation concern due to a number of factors, for example having suffered between 25% and 49% contraction of UK breeding range or a 25-49% reduction in breeding or non-breeding populations over the last 25 years. Species which have a five year mean of 1-300 breeding pairs (bp) in the UK or an unfavourable European conservation status or for which the breeding population in the UK represents 20% or more of the European breeding populations are also listed on the Amber list.

2.2.6 Green list species have a favourable conservation status.

### **Species of Principal Importance**

2.2.7 Species of Principal Importance (SPI) included under Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006 as well as those for which specific Local Biodiversity Action Plans have been prepared.

## 2.3 INTERPRETATION OF SURVEY RESULTS

### General

- 2.3.1 The data is compiled into a summary table (see Appendix E1) giving information on species recorded, conservation status and breeding status. Conservation status is defined with special emphasis on species on *Schedule 1*, Birds of Conservation Concern, species included in Section 41 of the NERC Act 2006 and Local BAP species.
- 2.3.2 Breeding status is defined using criteria devised by the European Ornithological Atlas Committee (EOAC) and is presented below.

### EOAC Criteria for Categorisation of Breeding Status

- 2.3.3 The results of the breeding bird surveys are assessed against the EOAC criteria for breeding bird status, as follows:

#### Confirmed breeding (C)

- Distraction-display or injury feigning;
- Used nest or eggshells found (occupied or laid within period of survey);
- Recently fledged young (nidicolous species) or downy young (nidifugous species);
- Adults entering or leaving nest-Site in circumstances indicating occupied nest (including high nest or nest-holes, the contents of which cannot be seen) or adult seen incubating;
- Adult carrying faecal sac or food for young;
- Nest containing eggs; or
- Nest with young seen or heard.

#### Probable breeding (PR)

- Pair observed in suitable nesting habitat in breeding season;
- Permanent territory presumed through registration of territorial behaviour (e.g. song) on at least two different days a week or more apart at the same place;
- Courtship and display;
- Visiting a probable nest Site;
- Agitated behaviour or anxiety calls from adults;
- Brood patch on adult examined in the hand; or
- Nest building or excavating nest-hole.

#### Possible breeding (PO)

- Species observed in breeding season in possible nesting habitat; or
- Singing male(s) present (or breeding calls heard) in breeding season.

#### Non-breeding (NB)

- A species present during the survey but considered to be not breeding within the survey. Recorded simply as a bird flying over the Site or are present within the Site but considered to be a non-breeding species due to a lack of suitable breeding habitat or lack of behaviour characteristic of breeding.

## 3 RESULTS AND EVALUATION

### 3.1 BREEDING BIRD SURVEY

#### General

3.1.1 A total of 50 species of bird were recorded over the three survey visits at the Site and a further 18 species in the adjacent land (Cockaynes Wood, Essex Wildlife Trust). Of these:

- 8 were **confirmed to be breeding** on or immediately adjacent to the Proposed Development area;
- 19 were **probable breeding species**; and
- 11 were **possible breeding species**.

3.1.2 Detailed results of the survey including breeding and conservation status of the species recorded are presented on Figures E4, E5 and E6 which can be found in Appendix E2, E3 and E4 respectively.

#### Schedule 1 Species

3.1.3 No Schedule 1 species were recorded within the Site boundary, with the exception of Greylag Goose (*Anser anser*) where only feral birds would have been recorded that is not protected.

### Birds of Conservation Concern

3.1.4 Red and Amber species of Birds of Conservation Concern are listed below and the locations of those with Confirmed Breeding status are shown on Figures E1, E2 and E3 in Appendix E2, E3 and E4 respectively.

#### Red Species

3.1.5 10 Red Listed Birds of Conservation Concern (BoCC) species were recorded within the Site boundary during the surveys (see Table 2).

**Table 2 Red Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	EOAC Status	SPI	Notes
Grey Partridge	<i>Perdix perdix</i>	Possible breeding	Y	A single male seen in April.
Curlew	<i>Numenius arquata</i>	Non breeding	Y	Flew over only.
Cuckoo	<i>Cuculus canorus</i>	Possible breeding	Y	Up to males singing on or adjacent to Site.
Skylark	<i>Alauda arvensis</i>	Probable breeding	Y	Recorded on every survey. Up to eight territories or pairs.
Starling	<i>Sturnus vulgaris</i>	Possible breeding	Y	Recorded flying over only but there is suitable habitat on Site.
Song Thrush	<i>Turdus philomelos</i>	Probable breeding	Y	Recorded on all surveys. Up to three territories or pairs.
Linnet	<i>Linaria cannabina</i>	Probable breeding	Y	Recorded on all surveys. Up to three territories or pairs.
Corn Bunting	<i>Emberiza calandra</i>	Possible breeding	Y	One singing male recorded in June.
Yellowhammer	<i>Emberiza citrinella</i>	Probable breeding	Y	Recorded on all surveys. Up to four territories or pairs.
Herring Gull	<i>Larus argentatus</i>	Non breeding	Y	Flew over only.

## Amber Species

3.1.6 11 Amber Listed BoCC species were recorded within the Site boundary during the surveys as listed in Table 3.

**Table 3 Amber Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	EOAC Status	SPI	Notes
Greylag Goose	<i>Anser anser</i>	Non breeding	N	Up to 31 feeding and loafing on the fields.
Shelduck	<i>Tadorna tadorna</i>	Non breeding	N	Flew over only. Up to four.
Mallard	<i>Anas platyrhynchos</i>	Possible breeding	N	Birds seen in April and May but no indication of nesting.
Oystercatcher	<i>Haematopus ostralegus</i>	Non breeding	N	Flew over only. Breeding on adjacent land.
Common Tern	<i>Sterna hirundo</i>	Non breeding	N	Flew over only.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Non breeding	N	Flew over only.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Non breeding	N	Flew over only.
Stock Dove	<i>Columba oenas</i>	Probable breeding	N	Pair seen in April and May.
Swift	<i>Apus apus</i>	Non breeding	N	Flew over only.
Kestrel	<i>Falco tinnunculus</i>	Possible breeding	N	Single bird recorded hunting over Site in April.
Dunnock	<i>Prunella modularis</i>	Probable breeding	Y	Recorded on all surveys. Up to four territories or pairs.

## Species of Principal Importance (NERC Act 2006)

3.1.7 A total of 11 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 2 and Table 3.

## 3.2 SUMMARY OF RESULTS

3.2.1 A comprehensive list of species recorded at and within adjacent habitats at the Site is shown within the tables in Appendix E1.

3.2.2 Cetti's Warbler, Nightingale, Turtle Dove, Reed Warbler, Tawny Owl, Sedge Warbler, Willow Warbler and Sand Martin (nesting colony) were all recorded at Cockaynes Wood EWT. However, they will not be directly affected by the Proposed Development and therefore they do not form part of the Site evaluation.

3.2.3 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 Site.



- 3.2.4 The majority of bird registrations were from the edge habitats (particularly near the woodlands) along the Site's hedgerows. Birds were recorded feeding within the arable field and breeding activity included up to eight Skylark territories and single registrations of Grey Partridge and Corn Bunting.
- 3.2.5 Farmland passerine numbers varied month to month but Dunnock, Linnet and Yellowhammer almost certainly breed on Site in small numbers. Song Thrush also breeds at the edges of the Site. Stock Dove and Starling may breed on or adjacent to the Site but this was not confirmed.
- 3.2.6 Peak overall counts of water birds from the adjacent pools in the quarry and Cockaynes Wood EWT are shown in the table within Appendix E1. None of the species recorded or numbers in which they were recorded are considered to be of significance higher than Site level. There will be no adverse impact on these pools during the proposed works or significant disturbance to the birds using them.

## 4 CONCLUSION

- 4.1.1 The Site is considered to be of **Local importance for lowland farmland birds** due to the high number of BoCC amber and red list species as well as three Local BAP species (Grey Partridge, Skylark and Song Thrush) present on the Site.
- 4.1.2 The majority of the Site supports suitable habitat for Skylark, which is to be lost as part of the Proposed Development. However, this is to be a temporary loss, and suitable habitat will be restored in a phased manner as part of the Proposed Restoration Scheme.

## Appendix E1:

### Full Species List, Designations and Breeding Status

Common Name	Scientific name	BoCC Status	NERC Status	EOAC Status	Notes
Greylag Goose	<i>Anser anser</i>	Amber list	N	Non breeding	Up to 31 feeding and loafing on the fields.
Canada Goose	<i>Branta canadensis</i>	Green list	N	Non breeding	Up to 13 feeding and loafing on the fields.
Shelduck	<i>Tadorna tadorna</i>	Amber list	N	Non breeding	Flew over only. Up to four.
Mallard	<i>Anas platyrhynchos</i>	Amber list	N	Possible breeding	Birds seen in April and May but no indication of nesting.
Red-legged Partridge	<i>Alectoris rufa</i>	Green list	N	Probable breeding	Birds seen and heard in April and May in suitable habitat. One pair.
Grey Partridge	<i>Perdix perdix</i>	Red list	Y	Possible breeding	A single male seen in April.
Pheasant	<i>Phasianus colchicus</i>	Green list	N	Probable breeding	Individual birds seen on all surveys.
Cormorant	<i>Phalacrocorax carbo</i>	Green list	N	Non breeding	Flew over only.
Sparrowhawk	<i>Accipiter nisus</i>	Green list	N	Possible breeding	Flew over only and most likely to breed in adjacent woodland.
Buzzard	<i>Buteo buteo</i>	Green list	N	Possible breeding	Flew over only and most likely to breed in adjacent woodland.
Oystercatcher	<i>Haematopus ostralegus</i>	Amber list	N	Non breeding	Flew over only. Breeding on adjacent land.
Curlew	<i>Numenius arquata</i>	Red list	Y	Non breeding	Flew over only.
Common Tern	<i>Sterna hirundo</i>	Amber list	N	Non breeding	Flew over only.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Amber list	N	Non breeding	Flew over only.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Amber list	N	Non breeding	Flew over only.
Herring Gull	<i>Larus argentatus</i>	Red list	Y	Non breeding	Flew over only.
Stock Dove	<i>Columba oenas</i>	Amber list	N	Probable breeding	Pair seen in April and May.
Woodpigeon	<i>Columba palumbus</i>	Green list	N	Probable breeding	Several pairs. Small congregations in fields and woods too.
Cuckoo	<i>Cuculus canorus</i>	Red list	Y	Possible breeding	Up to males singing on or adjacent to Site.
Little Owl	<i>Athene noctua</i>	Green list	N	Probable breeding	Pair seen in suitable habitat.

Common Name	Scientific name	BoCC Status	NERC Status	EOAC Status	Notes
Swift	<i>Apus apus</i>	Amber list	N	Non breeding	Flew over only.
Green Woodpecker	<i>Picus viridis</i>	Green list	N	Probable breeding	Birds seen on and adjacent to Site. Breeding most likely off Site in adjacent woodlands.
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Green list	N	Probable breeding	Birds seen on and adjacent to Site. Breeding most likely off Site in adjacent woodlands.
Kestrel	<i>Falco tinnunculus</i>	Amber list	N	Possible breeding	Single bird recorded hunting over Site in April.
Magpie	<i>Pica pica</i>	Green list	N	Probable breeding	Recorded during all survey visits.
Jackdaw	<i>Corvus monedula</i>	Green list	N	Possible breeding	Birds seen on and adjacent to Site. Breeding most likely off Site in adjacent woodlands.
Carrion Crow	<i>Corvus corone</i>	Green list	N	Probable breeding	Pairs seen on all surveys.
Goldcrest	<i>Regulus regulus</i>	Green list	N	Possible breeding	Birds seen and heard in suitable habitat. Breeding most likely off Site in adjacent woodlands.
Blue Tit	<i>Cyanistes caeruleus</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Great Tit	<i>Parus major</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Skylark	<i>Alauda arvensis</i>	Red list	Y	Probable breeding	Recorded on every survey. Up to eight territories or pairs.
Swallow	<i>Hirundo rustica</i>	Green list	N	Non breeding	Flew over only.
Long-tailed Tit	<i>Aegithalos caudatus</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Chiffchaff	<i>Phylloscopus collybita</i>	Green list	N	Confirmed breeding	Recorded during all surveys and seen carrying nesting material.
Blackcap	<i>Sylvia atricapilla</i>	Green list	N	Probable breeding	Recorded on all survey visits in suitable habitat.
Lesser Whitethroat	<i>Sylvia curruca</i>	Green list	N	Probable breeding	Recorded on all survey visits in suitable habitat.
Whitethroat	<i>Sylvia communis</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Treecreeper	<i>Certhia familiaris</i>	Green list	N	Possible breeding	Recorded in June only. Possibly breeding in adjacent woodland.
Wren	<i>Troglodytes troglodytes</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Starling	<i>Sturnus vulgaris</i>	Red list	N	Possible breeding	Recorded flying over only but there is suitable habitat on Site.

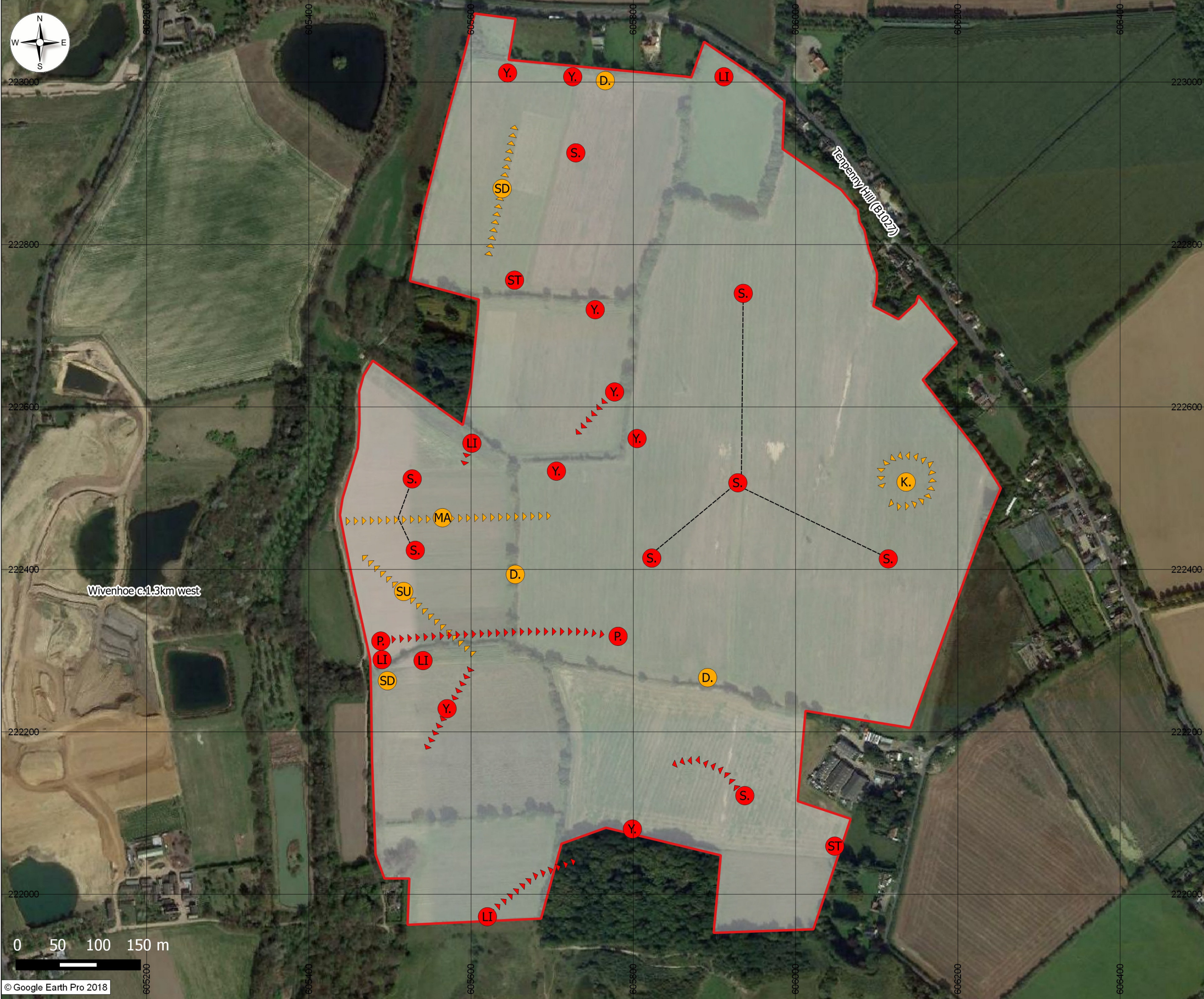
Common Name	Scientific name	BoCC Status	NERC Status	EOAC Status	Notes
Blackbird	<i>Turdus merula</i>	Green list	N	Confirmed breeding	Recorded during all surveys and seen carrying food.
Song Thrush	<i>Turdus philomelos</i>	Red list	Y	Probable breeding	Recorded on all surveys. Up to three territories or pairs.
Robin	<i>Erithacus rubecula</i>	Green list	N	Confirmed breeding	Recorded during all surveys and juveniles seen in June.
Duncock	<i>Prunella modularis</i>	Amber list	Y	Probable breeding	Recorded on all surveys. Up to four territories or pairs.
Chaffinch	<i>Fringilla coelebs</i>	Green list	N	Probable breeding	Recorded on all surveys.
Greenfinch	<i>Chloris chloris</i>	Green list	N	Probable breeding	Recorded on all surveys. Up to four territories or pairs.
Linnet	<i>Linaria cannabina</i>	Red list	Y	Probable breeding	Recorded on all surveys. Up to three territories or pairs.
Goldfinch	<i>Carduelis carduelis</i>	Green list	N	Probable breeding	Recorded on all surveys.
Corn Bunting	<i>Emberiza calandra</i>	Red list	Y	Possible breeding	One singing male recorded in June.
Yellowhammer	<i>Emberiza citrinella</i>	Red list	Y	Probable breeding	Recorded on all surveys. Up to four territories or pairs.

Peak counts of wetland birds seen across all adjacent wetland habitats (includes juveniles)

Common name	Scientific name	Designation / BoCC	Peak Count
Mute Swan	<i>Cygnus olor</i>	Amber list	3
Greylag Goose	<i>Anser anser</i>	Amber list	51
Canada Goose	<i>Branta canadensis</i>	Green list	10
Shelduck	<i>Tadorna tadorna</i>	Amber list	10
Mallard	<i>Anas platyrhynchos</i>	Amber list	26
Tufted Duck	<i>Aythya fuligula</i>	Green list	19
Cormorant	<i>Phalacrocorax carbo</i>	Green list	1
Grey Heron	<i>Ardea cinerea</i>	Green list	1
Little Grebe	<i>Tachybaptus ruficollis</i>	Green list	17
Great Crested Grebe	<i>Podiceps cristatus</i>	Green list	1
Moorhen	<i>Gallinula chloropus</i>	Green list	5
Coot	<i>Fulica atra</i>	Green list	24
Oystercatcher	<i>Haematopus ostralegus</i>	Amber list	3
Lapwing	<i>Vanellus vanellus</i>	Red list	3
Whimbrel	<i>Numenius phaeopus</i>	Schedule 1, Red list	1
Redshank	<i>Tringa totanus</i>	Amber list	4
Common Tern	<i>Sterna hirundo</i>	Amber list	2
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Amber list	3

**Appendix E2:**

**Figure E4 – Breeding Bird Survey Plan – April**



- Legend:
- Site Boundary
  - Red List Species
  - Red List Species Flight Path
  - Amber List Species
  - Amber List Species Flight Path
  - Simultaneous Registrations

BTO Species Codes	
Code	Species Common Name
D.	Dunnock
P.	Grey Partridge
K.	Kestrel
LI	Linnet
MA	Mallard
S.	Skylark
ST	Song Thrush
SD	Stock Dove
Y.	Yellowhammer

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Site: Wivenhoe Quarry Eastern Extension			
Drawing Title: Breeding Bird Survey Plan - April 2016			
Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JW	Checked By: LC	Status: Final	Final Revision: -
CAD Ref: CE-WQ-0992-DW06		Drawing No: Figure E4	

**Appendix E3:**

**Figure E5 – Breeding Bird Survey Plan - May**





Legend:

- Site Boundary
- Red List Species
- - - - - Red List Species Flight Path
- Amber List Species
- - - - - Amber List Species Flight Path
- - - - - Simultaneous Registrations

BTO Species Codes	
Code	Species Common Name
CK	Cuckoo
D.	Dunnock
LI	Linnet
MA	Mallard
SU	Shelduck
S.	Skylark
ST	Song Thrush
Y.	Yellowhammer

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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Site: Wivenhoe Quarry Eastern Extension			
Drawing Title: Breeding Bird Survey Plan - May 2016			
Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JW	Checked By: LC	Status: Final	Final Revision: -
CAD Ref: CE-WQ-0992-DW08		Drawing No: Figure E5	

**Appendix E4:**

**Figure E6 – Breeding Bird Survey Plan - June**



Legend:

- Site Boundary
- Red List Species
- Amber List Species
- ▶▶▶▶▶▶▶▶ Amber List Species Flight Path
- Simultaneous Registrations

BTO Species Codes	
Code	Species Common Name
CB	Corn Bunting
CK	Cuckoo
D.	Dunnock
S.	Skylark
ST	Song Thrush
SD	Stock Dove
Y.	Yellowhammer

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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<http://www.crestwoodenvironmental.co.uk/>



Client:



Site: Wivenhoe Quarry			
Drawing Title: Breeding Bird Survey Plan - June 2016			
Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JW	Checked By: LC	Status: Final	Final Revision: -
CAD Ref: CE-WQ-0992-DW11		Drawing No: Figure E6	

# APPENDIX F: Wintering Bird Survey Report



**Proposed Eastern Extension, Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Wintering Bird Survey Report**

Report Reference: CE-WQ-0992-RP05 - Final



15 May 2018

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# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. ('Crestwood') has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. ('the Client') to undertake the following surveys at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex centred at National Grid Reference TM 049 224 ('the Site').

1.1.2 Wintering Bird Surveys were undertaken in October, November and December 2015 and January, February and March 2016, using specialist ornithological consultants (Turnstone Ecology), to gain an understanding of the ornithological function and value of the habitats within and immediately adjacent to the Proposed Development Site as well as to identify any winter bird species or populations at risk from the Proposed Development.

1.1.3 The Site is dominated by fields of arable crops with stubble, winter grains, wild bird strips and associated hedgerows. The Sixpenny Brook runs north to south along the western Site boundary. Cockaynes Wood is an area of Ancient Woodland and several ponds designated as a Local Wildlife Site (LWS) is located adjacent to the south of the Site.

## 1.2 OBJECTIVES

1.2.1 The objectives of the winter bird surveys were to identify whether the Site is important during the winter months for aggregations of birds which may be feeding, roosting or loafing on the Site.

1.2.2 The objectives of the winter bird survey were to;

- Identify the distribution of winter birds across the Site;
- Locate the presence of birds protected under *Schedule 1 of The Wildlife and Countryside Act 1981*(as amended);
- Locate the presence of species of conservation concern; and
- Identify any species which may require special mitigation during construction and throughout the life of the development.

## 1.3 SURVEY AREA

1.3.1 All birds seen or heard flying or perched within the red-line boundary provided were recorded on to field maps as well as notes on birds seen flying over and adjacent to the Site.

## 1.4 LEGISLATION

1.4.1 All Wintering Birds are protected under Section 1 of The Wildlife and Countryside Act 1981 (as amended) (HMO, 1981). This protection extends to intentionally killing and injuring of wild Birds, and to the destruction of nests, eggs and dependent young. The only exceptions are with certain game species (listed in Schedule 2 of the Act), which can be killed during specific seasons, and to certain species, which can be controlled under licence.

1.4.2 Additional protection is offered to Bird species listed on 'Schedule 1' of The Wildlife and Countryside

Act 1981 (HMO, 1981), which are protected from disturbance whilst nesting, including from nest construction through to when dependant young have completely left the nest Site. The Countryside and Rights of Way Act 2000 (HMO, 2000) added reckless disturbance to intentional disturbance of 'Schedule 1' species as an offence. The above is a summary of the legislation and the original Acts and Schedules should be referred to for the precise wording.

## **1.5 NOMENCLATURE**

- 1.5.1 The nomenclature for common and scientific names and the taxonomic ordering of species accounts follows that contained in *The British List: A Checklist of Birds of Britain (8th edition)*, Harrop et al. 2013 and any subsequent updates (British Ornithologist Union (BOU), 2013) ..

## **2 METHODOLOGY**

### **2.1 WINTER BIRD SURVEYS**

- 2.1.1 Winter bird surveys were completed during winter 2015/2016 and consisted of six surveys undertaken over two days (per month) between October 2015 and March 2016. The survey on the first day was in the afternoon and evening, with the possibility of recording crepuscular species. The survey on the second day was from or near to dawn through to early afternoon to record general activity on Site.
- 2.1.2 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.
- 2.1.3 Surveys consisted of a modified point count transect methodology to allow all areas of the Site to be surveyed.
- 2.1.4 Target species were farmland birds, such and waders and seed eating passerines (finches and buntings), however notes on all species seen and / or heard were also made during the survey.
- 2.1.5 Pools within the active quarry and the pools at Cockaynes Wood were also surveyed for wetland birds to establish if they supported species of populations they may be impacted from the Proposed Development.
- 2.1.6 Full details of the survey visits are provided in Table 1.



**Table 1 Details of Wintering Bird Survey Visits**

Visit	Date	Weather
1	20/10/15	13°C. Cloud – 0 (octas). Wind – 0 (Beaufort scale).
	21/10/15	8°C. Cloud – 8. Wind – 0. Heavy rain to start with light rain at the end.
2	25/11/15	7°C. Cloud – 0. Wind – 2 WSW.
	26/11/15	3.5°C. Cloud – 1. Wind – 0. Changing to; 8°C. Cloud – 4. Wind – 0.
3	17/12/15	13°C. Cloud – 6. Wind – 3 W to SSW. Dry, with no recent precipitation. Good visibility.
	18/12/15	Cloud – 8. Wind – 2 S. Rain overnight but dry during survey. Bright with good visibility.
4	27/01/16	12°C. Cloud – 8. Wind – 5 SW. Intermittent light rain, but recent heavy rain.
	28/01/16	3°C. Cloud – 1. Wind – 1 SW. Heavy rain previous evening, but clear dry and bright.
5	24/02/16	Cloud – 3. Wind – 0. Dry and bright with no precipitation and good visibility.
	25/02/16	Cloud – 6. Wind – 1 NW. Frost overnight. Dry and bright with no precipitation. Changing to; Cloud – 4. Wind -3.
6	21/03/16	Cloud – 8. Wind – 3 NW. Clear, dry and bright with good visibility.
	22/03/16	Cloud – 1. Wind – 1 W to NW. Clear, dry and bright with no precipitation and good visibility.

## 2.2 CRITERIA FOR EVALUATION

2.2.1 A number of criteria are available to determine the conservation status of those bird species recorded as well as attributing a value to the overall breeding bird assemblage. The most appropriate of these are:

- Schedule 1 of the Wildlife and Countryside Act;
- Birds of Conservation Concern 4 (Eaton et al. 2015); and
- Species of Principal Importance (NERC Act 2006).

### Schedule 1 of the Wildlife and Countryside Act

2.2.2 The Wildlife and Countryside Act affords greater protection to certain breeding species that are considered appropriately at risk nationally and are as such listed as specially protected under *Schedule 1*.

#### **Birds of Conservation Concern 4**

- 2.2.3 Under this approach, UK bird populations are assessed using quantitative criteria, to determine the population status of each species and then placed on one of three lists; Red, Amber or Green.
- 2.2.4 Red list species are of high conservation concern, being either globally threatened, having historical UK population declines between 1800 and 1995 or a rapid population decline or breeding range contraction by 50% or more in the last 25 years.
- 2.2.5 Amber list species are of medium conservation concern due to a number of factors, for example having suffered between 25% and 49% contraction of UK breeding range or a 25-49% reduction in breeding or non-breeding populations over the last 25 years. Species which have a five year mean of 1-300 breeding pairs (bp) in the UK or an unfavourable European conservation status or for which the breeding population in the UK represents 20% or more of the European breeding populations are also listed on the Amber list.
- 2.2.6 Green list species have a favourable conservation status.

#### **Species of Principal Importance**

- 2.2.7 Species of Principal Importance (SPI) included under Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006 as well as those for which specific Local Biodiversity Action Plans have been prepared.

### **3 RESULTS**

#### **3.1 GENERAL**

- 3.1.1 All birds seen on Site or in immediately adjacent habitats are shown in the tables in Appendix E1 giving information on species recorded, conservation status and breeding status. Conservation status is defined with special emphasis on species on *Schedule 1*, Birds of Conservation Concern, species included in Section 41 of the NERC.
- 3.1.2 A total of **56 species** have been recorded during the wintering bird surveys at the Site with a further 16 at the pools in adjacent land (Cockaynes Wood).
- 3.1.3 The winter bird assemblage within the boundaries of the Site consists mainly of species typically associated with lowland farmland, including 13 Red and 12 Amber list species as well as two species listed on the Essex Biodiversity Action Plan: Skylark and Grey Partridge.

#### **3.2 BIRDS OF CONSERVATION CONCERN**

- 3.2.1 Red and Amber species of Birds of Conservation Concern are listed below.

##### **Red Species**

- 3.2.2 13 Red Listed Birds of Conservation Concern (BoCC) species were recorded within the Site boundary (see Table 2).

**Table 2 Red Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	SPI	Notes
Grey Partridge	<i>Perdix perdix</i>	Y	Two birds present in December and January
Lapwing	<i>Vanellus vanellus</i>	Y	Recorded in November and December. Peak of 142 and some birds flying over
Woodcock	<i>Scolopax rusticola</i>	N	Up to two birds recorded
Herring Gull	<i>Larus argentatus</i>	Y	Thirty in November feeding in arable field and small numbers flying over
Skylark	<i>Alauda arvensis</i>	Y	Small numbers on most surveys. Up to eight singing/displaying over the fields
Starling	<i>Sturnus vulgaris</i>	Y	Up to 145 birds feeding in the arable fields
Song Thrush	<i>Turdus philomelos</i>	Y	Small numbers present throughout Site. Several birds singing
Mistle Thrush	<i>Turdus viscivorus</i>	N	Small numbers present. Recorded singing
Linnet	<i>Carduelis cannabina</i>	Y	Winter flocks of up to 200 birds
Lesser Redpoll	<i>Acanthis cabaret</i>	Y	Small numbers present throughout the Site. Mainly associated with the woodlands
Yellowhammer	<i>Emberiza citrinella</i>	Y	Winter flocks of up to 20 birds. Several recorded singing
Redwing	<i>Turdus iliacus</i>	N	Flocks of up to 45 birds present most months
Fieldfare	<i>Turdus pilaris</i>	N	Flocks of up to 35 birds present most months

### Amber Species

3.2.3 12 Amber Listed BoCC species were recorded within the Site boundary (see Table 3).

**Table 3 Amber Listed Birds of Conservation Concern (BoCC) Recorded**

Common Name	Scientific Name	SPI	Notes
Greylag Goose	<i>Anser anser</i>	N	Small numbers flying over occasionally
Gadwall	<i>Anas strepera</i>	N	Small numbers flying over occasionally
Mallard	<i>Anas platyrhynchos</i>	N	Small numbers associated with Sixpenny Brook to the west of the site
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	N	Varying numbers feeding in arable field or flying over. Peak of 360 in November
Common Gull	<i>Larus canus</i>	N	Small numbers feeding on fields or flying over
Lesser Black-backed Gull	<i>Larus fuscus</i>	N	One in November and small numbers flying over
Stock Dove	<i>Columba oenas</i>	N	Small numbers present
Tawny Owl	<i>Strix aluco</i>	N	One bird heard in March in Cockaynes Wood
Kestrel	<i>Falco tinnunculus</i>	N	Pair displaying in the west of the site
Dunnock	<i>Prunella modularis</i>	Y	Small numbers present throughout the site
Meadow Pipit	<i>Anthus pratensis</i>	N	Small numbers present throughout the site

Reed Bunting	<i>Emberiza schoeniclus</i>	Y	Single and two birds recorded in wild bird strips
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### Species of Principal Importance (NERC Act 2006)

3.2.4 A total of 11 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 2 and Table 3.

### Schedule 1 Species

3.2.5 A total of 5 bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 have been recorded during the surveys within the boundaries of the Site, as shown in Table 4.

**Table 4 Schedule 1 Birds Recorded**

Common Name	Scientific Name	SPI	BOCC	Notes
Peregrine	<i>Falco peregrinus</i>	N	Green list	One bird flew over in December
Firecrest	<i>Regulus ignicapilla</i>	N	Green list	One bird recorded on three occasions in the woodlands (two birds recorded in the area)
Cetti's Warbler	<i>Cettia cetti</i>	N	Green list	Up to two birds recorded singing in the Cockaynes Wood reserve
Fieldfare	<i>Turdus pilaris</i>	N	Red list	Flocks of up to 35 birds present most months
Redwing	<i>Turdus iliacus</i>	N	Red list	Flocks of up to 45 birds present most months

## 3.3 TARGET SPECIES

### October

3.3.1 During the evening visit, a flock of c.30 Linnet (*Carduelis cannabina*) were at the Site. There was also a flock of six Starlings and a mixed flock of 360 gulls, mostly Black-headed Gulls (*Chroicocephalus ridibundus*).

3.3.2 Early morning there was a flock of 40 Starlings (*Sturnus vulgaris*) at the Site and late morning a flock of ten flew over. During the late morning there was c. 200 Linnet and eight Skylark (*Alauda arvensis*) within the Site. Small numbers of Song Thrush (*Turdus philomelos*) were recorded.

### November

3.3.3 Flocks of plovers and Starlings were at the Site during the evening visit, with 142 Golden Plover (*Pluvialis apricaria*), 142 Lapwing (*Vanellus vanellus*) and 90 Starlings. There were also 30 Linnets in the field in the north west of the Site.

3.3.4 During the early morning visit there was six Golden Plovers in the main extension field and a further 29 flew over south. A Skylark was also singing here. Small numbers of Linnet, Song Thrush and Yellowhammer (*Emberiza citrinella*) were recorded. By late morning there was 276 Golden Plovers in the main extension field with 41 Lapwing there too. A Firecrest (*Regulus ignicapilla*) was recorded in the woodland between the quarry and the extension Site.

## December

- 3.3.5 A flock of seven Lapwing flew over in the afternoon visit and 145 Starlings were foraging in the extension area. There were small numbers of winter thrushes and farmland passerines in the hedgerows and areas of wild bird strips.
- 3.3.6 During the morning survey eight Golden Plover and a Peregrine Falcon (*Falco peregrinnus*) flew over. A Woodcock (*Scolopax rusticola*) was flushed from the wild bird strip in the northwest corner of the Site. In addition, there were winter finches of up to 100 birds (mostly Linnet) in the same location. Two Grey Partridge (*Perdix perdix*) were recorded in the main extension area and several Skylarks were also recorded.

## January

- 3.3.7 Two Grey Partridge were recorded on the afternoon visit and there was a flock of 13 Yellowhammers. During the morning visit several Skylarks were singing over the fields and there were small flocks of winter passerines with one mixed flock of 40 birds.

## February

- 3.3.8 No notable species were recorded during the afternoon / evening visit.
- 3.3.9 In the morning there was a flock of 33 Golden Plovers in the main extension area, increasing to 48 by late morning. A further 24 Golden Plover flew over Site, but may have been some of the same birds recorded previously. There were flocks of winter thrushes and farmland passerines, including a flock of 20 Yellowhammers, but generally flock sizes were reduced from those recorded in previous months. A Firecrest was recorded in Cockaynes Wood at the southern Site boundary.

## March

- 3.3.10 Fifteen Yellowhammers were recorded feeding in a wild bird strip in the afternoon.
- 3.3.11 In the morning there were several Skylarks singing and disputing territories over the fields. There were still small flocks of winter thrushes but most of the winter thrush flocks were broken up and Yellowhammers were singing at the boundary hedges. A Firecrest was recorded again in Cockaynes Wood and a day calling Tawny Owl (*Strix aluco*) was heard there. Two Woodcocks also flushed from Holly scrub at the southern edge of the wood.

# 4 EVALUATION

## 4.1 GENERAL

- 4.1.1 The land is actively managed to support wintering farmland passerines with arable stubble fields, wild bird strips and supplemented feeding. The assemblage is further complimented by species associated with the adjacent woodlands and Wildlife Trust reserve.
- 4.1.2 Golden Plover were recorded on the Site or flying over the Site in November, December and February, with a peak count of 276 birds at the Site in November. 142 Lapwing were recorded in November in the main extension area with a further eight flying over in December.

- 4.1.3 It is likely that these are passage birds in the area or that the Site is used occasionally by birds that are dependent on habitats in the wider area and the Site did not fully support overwintering birds. Peak counts of these species are not of National importance and are unlikely to be of County importance and are not considered to be significant in terms of the value and function of the Site for wintering birds.
- 4.1.4 Farmland passerine numbers varied month to month but peak counts of flocks included 200 Linnets, 145 Starlings, eight Skylarks, 20 Yellowhammers, two Reed Buntings, 35 Fieldfare and 45 Redwing. There was also two Grey Partridge, up to two Woodcock and one Peregrine (flyover) and a Firecrest recorded.
- 4.1.5 The Site is considered to be of importance at Site level only for Golden Plover and Lapwing however due to the high number of BoCC amber and red list species as well as two Local BAP species present on the Site it is considered to be of County importance for lowland farmland birds.
- 4.1.6 The arable land that supports Golden Plover and Lapwing will be permanently lost but it is unlikely that the habitat that supports farmland passerines will be permanently lost due to the quarry extension, but it will be reduced. The land not affected by the quarry extension will continue to be managed for such birds and it is unlikely that the partial loss of an area of agricultural land will have an adverse impact on the Sites bird assemblage.
- 4.1.7 Peak overall counts of water birds from the adjacent pools in the quarry and Cockaynes Wood EWT are shown in the table below. None of the species recorded or numbers recorded are considered to be significant higher than Site level. There will be no adverse impact on these pools during the proposed works or significant disturbance to the birds using them

## Appendix 1:

### Full Species List and Designations

Common Name	Scientific name	BoCC	Notes
Greylag Goose	<i>Anser anser</i>	Amber list	Small numbers flying over occasionally
Gadwall	<i>Anas strepera</i>	Amber list	Small numbers flying over occasionally
Mallard	<i>Anas platyrhynchos</i>	Amber list	Small numbers associated with Sixpenny Brook to the west of the Site
Red-legged Partridge	<i>Alectoris rufa</i>	Introduced	Up to seven birds on Site occasionally
Grey Partridge	<i>Perdix perdix</i>	Red list	Two birds present in December and January
Pheasant	<i>Phasianus colchicus</i>	Introduced	Small numbers present
Sparrowhawk	<i>Accipiter nisus</i>	Green list	Occasional single birds present
Buzzard	<i>Buteo buteo</i>	Green list	Up to three or four birds – mostly flying over
Golden Plover	<i>Pluvialis apricaria</i>	Green list	Birds recorded in November, December and February. Peak of 276 and some birds flying over
Lapwing	<i>Vanellus vanellus</i>	Red list	Recorded in November and December. Peak of 142 and some birds flying over
Woodcock	<i>Scolopax rusticola</i>	Red list	Up to two birds recorded
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Amber list	Varying numbers feeding in arable field or flying over. Peak of 360 in November
Common Gull	<i>Larus canus</i>	Amber list	Small numbers feeding on fields or flying over
Lesser Black-backed Gull	<i>Larus fuscus</i>	Amber list	One in November and small numbers flying over
Herring Gull	<i>Larus argentatus</i>	Red list	Thirty in November feeding in arable field and small numbers flying over
Stock Dove	<i>Columba oenas</i>	Amber list	Small numbers present
Woodpigeon	<i>Columba palumbus</i>	Green list	Flocks present throughout feeding in fields and associated with the woodlands
Little Owl	<i>Athene noctua</i>	Introduced	One bird recorded in February and March in central hedge running north-south
Tawny Owl	<i>Strix aluco</i>	Amber list	One bird heard in March in Cockaynes Wood
Green Woodpecker	<i>Picus viridis</i>	Green list	Small numbers present throughout
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Green list	Small numbers throughout. Mainly associated with the woodlands
Kestrel	<i>Falco tinnunculus</i>	Amber list	Pair displaying in the west of the Site
Peregrine	<i>Falco peregrinus</i>	Schedule 1 / Green list	One bird flew over in December
Magpie	<i>Pica pica</i>	Green list	Small numbers recorded on all surveys
Jay	<i>Garrulus glandarius</i>	Green list	Occasional one or two. Mostly associated with the woodlands
Jackdaw	<i>Corvus monedula</i>	Green list	Small numbers recorded every visit feeding in fields

Common Name	Scientific name	BoCC	Notes
Rook	<i>Corvus frugilegus</i>	Green list	Recorded on all surveys. Probable Rookery in the woodland to the west
Carrion Crow	<i>Corvus corone</i>	Green list	Small numbers recorded on all surveys feeding in the fields
Goldcrest	<i>Regulus regulus</i>	Green list	Small numbers associated with the hedgerows and woodlands
Firecrest	<i>Regulus ignicapilla</i>	Schedule 1 / Green list	One bird recorded on three occasions in the woodlands (two birds recorded in the area)
Blue Tit	<i>Cyanistes caeruleus</i>	Green list	Small numbers on all surveys
Great Tit	<i>Parus major</i>	Green list	Small numbers on all surveys
Coal Tit	<i>Periparus ater</i>	Green list	Recorded in Cockaynes Wood
Skylark	<i>Alauda arvensis</i>	Red list	Small numbers on most surveys. Up to eight singing/displaying over the fields
Cetti's Warbler	<i>Cettia cetti</i>	Schedule 1 / Green list	Up to two birds recorded singing in the Cockaynes Wood reserve
Long-tailed Tit	<i>Aegithalos caudatus</i>	Green list	Small numbers recorded throughout
Chiffchaff	<i>Phylloscopus collybita</i>	Green list	Single overwintering birds in the woodland to the west and up to four spring migrants singing in March
Wren	<i>Troglodytes troglodytes</i>	Green list	Small numbers present throughout Site
Starling	<i>Sturnus vulgaris</i>	Red list	Up to 145 birds feeding in the arable fields
Blackbird	<i>Turdus merula</i>	Green list	Small numbers present throughout the Site
Fieldfare	<i>Turdus pilaris</i>	Schedule 1 / Red list	Flocks of up to 35 birds present most months
Song Thrush	<i>Turdus philomelos</i>	Red list	Small numbers present throughout Site. Several birds singing
Redwing	<i>Turdus iliacus</i>	Schedule 1 / Red list	Flocks of up to 45 birds present most months
Mistle Thrush	<i>Turdus viscivorus</i>	Red list	Small numbers present. Recorded singing
Robin	<i>Erithacus rubecula</i>	Green list	Small numbers present throughout the Site
Dunnock	<i>Prunella modularis</i>	Amber list	Small numbers present throughout the Site
Pied Wagtail	<i>Motacilla alba</i>	Green list	Small numbers present November and December
Meadow Pipit	<i>Anthus pratensis</i>	Amber list	Small numbers present throughout the Site
Chaffinch	<i>Fringilla coelebs</i>	Green list	Winter flocks of up to 20 birds
Greenfinch	<i>Chloris chloris</i>	Green list	Small numbers present throughout the Site
Linnet	<i>Linaria cannabina</i>	Red list	Winter flocks of up to 200 birds
Lesser Redpoll	<i>Acanthis cabaret</i>	Red list	Small numbers present throughout the Site. Mainly associated with the woodlands
Goldfinch	<i>Carduelis carduelis</i>	Green list	Small numbers present throughout the Site
Siskin	<i>Spinus spinus</i>	Green list	Small numbers present throughout the Site. Mainly associated with the woodlands
Yellowhammer	<i>Emberiza citrinella</i>	Red list	Winter flocks of up to 20 birds. Several recorded singing
Reed Bunting	<i>Emberiza schoeniclus</i>	Amber list	Single and two birds recorded in wild bird strips



Peak counts per survey of all birds seen across all adjacent wetland habitats.



Common name	Scientific name	BoCC	Oct	Nov	Dec	Jan	Feb	Mar
Mute Swan	<i>Cygnus olor</i>	Amber list	14	7	5	0	2	4
Greylag Goose	<i>Anser anser</i>	Amber list	0	0	0	87	0	24
Canada Goose	<i>Branta canadensis</i>	Introduced	0	0	0	4	14	9
Wigeon	<i>Anas penelope</i>	Amber list	0	0	1	0	0	0
Gadwall	<i>Anas strepera</i>	Amber list	6	29	29	30	18	4
Teal	<i>Anas crecca</i>	Amber list	0	0	0	0	0	3
Mallard	<i>Anas platyrhynchos</i>	Amber list	18	27	30	21	12	11
Shoveler	<i>Anas clypeata</i>	Amber list	0	0	3	0	2	0
Tufted Duck	<i>Aythya fuligula</i>	Green list	4	39	32	23	22	50
Goosander	<i>Mergus merganser</i>	Green list	0	0	0	0	3	0
Cormorant	<i>Phalacrocorax carbo</i>	Green list	0	1	0	0	0	0
Grey Heron	<i>Ardea cinerea</i>	Green list	0	2	0	0	2	0
Little Grebe	<i>Tachybaptus ruficollis</i>	Green list	2	2	1	3	11	8
Great Crested Grebe	<i>Podiceps cristatus</i>	Green list	4	6	2	6	2	2
Moorhen	<i>Gallinula chloropus</i>	Green list	5	7	12	10	16	11
Coot	<i>Fulica atra</i>	Green list	17	80	83	44	53	51
Oystercatcher	<i>Haematopus ostralegus</i>	Amber list	0	0	0	0	0	2
Lapwing	<i>Vanellus vanellus</i>	Red list	0	0	0	0	0	1
Green Sandpiper	<i>Tringa ochropus</i>	Schedule 1 / Amber list	1	0	0	1	0	0
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Amber list	6	33	13	23	74	46
Kingfisher	<i>Alcedo atthis</i>	Schedule 1 / Amber list	0	1	0	0	0	1

## **Appendix E2**

### **Figure E7 – Wintering Bird Survey Plan – October**



Legend:

-  Site Boundary
-  Red List Species
-  Red List Species Flight Path

BTO Species Codes	
Code	Species Common Name
HG	Herring Gull
LI	Linnet
RE	Redwing
S.	Skylark
SG	Starling

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

Consultant:  
**Crestwood Environmental Ltd**  
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 Wolverhampton WV9 5HF  
 Tel: 01902 229563  
 info@crestwoodenvironmental.co.uk  
 http://www.crestwoodenvironmental.co.uk/



Client:



Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Wintering Bird Survey Plan - October 2015**

Date:	Scale:	Paper Size:
11 / 3 / 2019	1:4,500	A3 (420x297mm)

Drawn By:	Checked By:	Status:	Final Revision:
JW	LC	Final	-








CAD Ref:	Drawing No:
CE-WQ-0992-DW13	Figure E7

## **Appendix E3**

### **Figure E8 – Wintering Bird Survey Plan – November**



Legend:

-  Site Boundary
-  Schedule 1 Species Only
-  Red List Species
-  Red List Species Flight Path
-  Amber List Species
-  Green List Species
-  Green List Species Flight Path

BTO Species Codes	
Code	Species Common Name
FF	Fieldfare
FC	Firecrest
GP	Golden Plover
L.	Lapwing
LI	Linnet
S.	Skylark
ST	Song Thrush
SG	Starling
Y.	Yellowhammer

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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Client:



**TARMAC**  
A CRH COMPANY

Site: Wivenhoe Quarry Eastern Extension			
Drawing Title: Winter Bird Survey Plan - November 2015			
Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JG	Checked By: -	Status: Final	Final Revision: -
CAD Ref: CE-WQ-0992-DW14		Drawing No: Figure E8	

## **Appendix E4**

### **Figure E9 – Wintering Bird Survey Plan – December**



## **Appendix E5**

### **Figure E10 – Wintering Bird Survey Plan – January**





**Legend:**

- Site Boundary
- Schedule 1 Species Only
- Red List Species
- - - - - >>>>>> Red List Species Flight Path
- Amber List Species

BTO Species Codes	
Code	Species Common Name
FF	Fieldfare
FC	Firecrest
P.	Grey Partridge
LI	Linnet
RE	Redwing
RB	Reed Bunting
S.	Skylark
ST	Song Thrush

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

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**Crestwood  
environmental**

**Client:**

**TARMAC**  
A CRH COMPANY

**Site:** Wivenhoe Quarry Eastern Extension

**Drawing Title:** Wintering Bird Survey Plan - January 2016

Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: -	Status: Final
CAD Ref: CE-WQ-0992-DW10		Drawing No: Figure E10

0 50 100 150 m

## **Appendix E6**

### **Figure E11 – Wintering Bird Survey Plan – February**



**Legend:**

- Site Boundary
- Schedule 1 Species Only
- Red List Species
- ▶▶▶▶▶▶▶▶▶▶ Red List Species Flight Path
- Amber List Species
- Green List Species
- ▶▶▶▶▶▶▶▶▶▶ Green List Species Flight Path

BTO Species Codes	
Code	Species Common Name
FF	Fieldfare
FC	Firecrest
GP	Golden Plover
HG	Herring Gull
LI	Linnet
M	Mistle Thrush
RE	Redwing
RB	Reed Bunting
S.	Skylark
ST	Song Thrush
SG	Starling
Y.	Yellowhammer

-	-	-	-
Final Revision:	Date:	Description:	By: Chk:

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**Client:**

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A CRH COMPANY

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Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JG	Checked By: LC	Status: Final	Final Revision: -
CAD Ref: CE-WQ-0992-DW09		Drawing No: Figure E11	

## **Appendix E7**

### **Figure E12 – Wintering Bird Survey Plan – March**



# APPENDIX G: Bat Activity Survey Report



**Proposed Eastern Extension, Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Bat Activity Survey**

Report Reference: CE-WQ-0992-RP06 - Final



Produced by Crestwood Environmental Ltd.

15 May 2018

**Crestwood Report Reference: CE-WQ-0992-RP06 - Final**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Checked &amp; Authorised by:</b>
Final	15/05/2018	Jennifer Gatward (Ecologist)	Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the Applicant.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the Applicant and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Bat activity survey detailed in this report was carried out under instruction from DL Walker on behalf of Tarmac Ltd. (**'the Client'**) to assess the levels of Bat activity in order to inform and support a planning application for the Proposed Eastern Extension at land east of Wivenhoe Quarry, Alresford Road, Essex (**'the Site'**).

An Extended Phase 1 Habitat Survey was carried out by Crestwood Environmental Ltd. (**'Crestwood'**), which identified habitats present at the Site considered to be suitable for use by Bats. Bat activity surveys were recommended based on the potential of the Proposed Development to affect Bats and their habitat.

Two static detectors were deployed at two points along Transect A and one static detector was deployed at one point along Transect B for 5 consecutive days each month (May – September 2016) in order to gain information on species of Bats and the levels of Bat activity at the Site.

The majority of the activity at the Site was Common Pipistrelle Bat and Soprano Pipistrelle Bat, with other species present including Noctule, *Myotis* sp., Nathusius Pipistrelle Bat (*Pipistrellus nathusii*), Barbastelle Bat, Brown Long-Eared, Natterer's Bat and Serotine Bat.

No roosting Bat activity was recorded at the Site. Activity levels around the Site were concentrated along the Hedgerows.

Recommendations and further conclusions are detailed within the EclA (Report ref: CE-WQ-0992-RP09).

# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to undertake the following surveys at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 049 224 (**'the Site'**).

1.1.1 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.1.2 The full planning application title reads:

*'Planning application for the extraction of 4.0 million tonnes of sand and gravel as an eastern extension to the existing Wivenhoe Quarry, together with relocation of the existing primary processing plant and ancillary facilities, a proposed new vehicular access onto the B1027 Brightlingsea Road, totalling a 61 hectare area with restoration to EITHER agriculture or low-level water-based nature conservation habitats, including lowland grassland, woodland planting and hedgerow enhancement, including the importation of approximately 1.2 million cubic metres of inert restoration materials.'*

## 1.2 PURPOSE AND SCOPE

1.2.1 The purpose of this survey, assessment and report was to provide ecological advice specifically relating to Bats in respect of the Proposed Development.

1.2.2 The scope of the survey was to:

- To identify the level of Bat activity at the site; and
- To identify the habitats used by Bats at the Site.

1.2.3 The results of the surveys relate to the findings at the time of the field surveys only (between 10<sup>th</sup> May 2016 and 20<sup>th</sup> October 2016).

## 1.3 THE SITE AND SURROUNDING CONTEXT

1.3.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees, Improved Grassland and Poor Semi-Improved Grassland.

1.3.2 In the local area the main habitat wildlife corridors present are:

- The Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and
- A railway line bordered by trees and woodland running east-west to the south of the Site.

1.3.3 Areas of woodland, Hedgerows, scattered trees and water bodies within the local area may act as ecological "stepping stones" to provide connectivity within the wider landscape.

## 1.4 LEGAL CONTEXT

- 1.4.1 Bats and their roosting sites are strictly protected under the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981), which makes it an offence to disturb a Bat while it is occupying a structure or place which it uses for shelter or protection. The Act also makes it an offence to obstruct access to any structure or place which a Bat uses for shelter or protection.
- 1.4.2 Bats are also protected under The Conservation of Habitats and Species Regulations 2017 (as amended) (HMSO, 2017); these Regulations make it an offence to deliberately capture, injure, kill or disturb a Bat. It is also an offence under the Regulations to damage or destroy a breeding site or resting place of a Bat; and to impair their ability to survive, breed, reproduce, hibernate or migrate.
- 1.4.3 Under Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006), all public authorities have a duty to have regard for conserving biodiversity in the exercise of its functions. Section 41 of the Act provides a list of habitats and species of principal importance for the for the purpose of conserving biodiversity.
- 1.4.4 Of the ten species of Bat regularly recorded in Essex, five are also listed in Section 41 of the NERC Act 2006 as priority species: Noctule Bat (*Nyctalus noctula*); Soprano Pipistrelle Bat (*Pipistrellus pygmaeus*); Brown Long-Eared Bat (*Plecotus auritus*); Lesser Horseshoe Bat (*Rhinolophus hipposideros*) and Barbastelle Bat (*Barbastella barbastellus*).

## 2 METHODOLOGY AND APPROACH

### 2.1 BACKGROUND

- 2.1.1 Based on industry standard best practice, activity surveys were carried out to determine the type and level of Bat activity at the Site. A combination of transect and automated surveys were carried out. An Extended Phase 1 Habitat Survey was conducted at the Site during October 2015 that identified habitats present at the Site that were suitable for Bats.
- 2.1.2 The habitats were assessed as being of **Moderate** suitability for foraging and commuting Bats according to the guidelines set out in Table 1 in Section 0.

### 2.2 DESK STUDY

- 2.2.1 A desk study was carried out as part of the initial Extended Phase 1 Habitat survey, which included a search of existing Bat records for the Site and a 4km radius from the centre of the Site. The results of the desk study are summarised in this report where relevant.

## 2.3 HABITAT SUITABILITY

- 2.3.1 A desk study and assessment of habitats was carried out for their suitability for Bats to classify the Site to a level of Bat suitability following industry-standard survey guidelines (Collins, 2016).
- 2.3.2 All habitats within the Site and ecologically connected habitats in the wider area were assessed in accordance with industry-standard best practice (Collins, 2016). Based on the results of this assessment, the habitats were categorised according to their potential suitability for foraging and commuting Bats as follows in Table 1 below (based on (Collins, 2016)).

**Table 1** *Habitat Suitability for Bats*

Suitability	Commuting and Foraging Habitats
<b>Negligible</b>	Negligible habitat features on Site likely to be used by commuting or foraging Bats.
<b>Low</b>	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 by 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.
<b>Moderate</b>	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.
<b>High</b>	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.

## 2.4 BAT ACTIVITY SURVEYS

### General

- 2.4.1 Since the updated Site boundary provided by the Client in 2017, transects detailed below have been amended for the purposes of this report. Results from Transect B have been partially omitted (see Section 2.4.5)
- 2.4.2 Due to the change in Site boundary, only 3 static detector results are detailed within this report (two on Transect A and one on Transect B).

### Transect/Point Count Surveys

- 2.4.3 In line with current guidance for habitat of moderate suitability one survey visit comprising a walked transect/spot count survey was undertaken each month between April and October 2016. At least one of the surveys should comprise and a dusk and pre-dawn survey within one 24-hour period.

- 2.4.4 The transect routes covered all habitats likely to be impacted by the Proposed Development, with particular focus on the higher quality habitats present, such as hedgerows within the Site.
- 2.4.5 Two transects, Transect A and Transect B, were originally undertaken at the Site and within the existing quarry area to the west of the Site during 2016.
- 2.4.6 Following the Site boundary change in 2017, the results from Transect B have been omitted after Listening point 6 (see Figure E13 in appendix E1 for listening point locations), as listening points 7-11 are all within the existing quarry site to the west of the Site.
- 2.4.7 The locations of the listening points were determined by the Extended Phase 1 Habitat Survey.
- 2.4.8 Transect routes are as detailed on Figure E13 in Appendix E1. Weather details are provided in Table 2 below.

**Table 2 Weather Conditions During Activity (Transect) Surveys**

Date	Survey type	Sunset time	Sunrise time	Temperature (°C)	Precipitation	Cloud Cover (in Octas)	Wind speed (Beaufort scale)
10.05.16	Dusk	20:20	-	13.5°C	None	2	1
11.05.16	Dawn	-	05:07	13°C	None	2	1
20.05.16	Dawn	-	04:54	19°C	None	0	1
15.06.16	Dawn and Dusk	21:17	04:36	13°C	None	3	1
16.06.16	Dawn	-	04:36	12°C	None	1	1
19.07.16	Dusk	21:05	-	19°C	None	0	1
20.07.16	Dawn	-	05:02	19°C	None	0	1
16.08.16	Dusk	20:17	-	12°C	None	0	1
17.08.16	Dawn	-	05:43	16°C	None	5	2
21.09.16	Dusk	18:56	-	15°C	None	4	1
19.10.16	Dusk	17:52	-	11°C	Occasional Light	7	3

- 2.4.9 Dusk transect surveys commenced at sunset, continuing for two to three hours after sunset. Dawn surveys commenced two hours before sunrise and ended at sunrise, or if Bats still active after sunrise, when Bat activity was no longer observed.

## Automated Surveys

- 2.4.10 In line with best practice for habitat of moderate suitability, automated Bat detectors (AnaBat Express) were installed at the Site at two locations on Transect A and one location on Transect B, which recorded activity on five consecutive nights per month between April and October. A single static on Transect B was located within the existing quarry site, results of which have been omitted from this report.
- 2.4.11 Each 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 Appendix E3. The dates for which the automated monitoring was undertaken is detailed in Table 3.

**Table 3 Automated Monitoring Period Dates**

Transect	Location	Monitoring Dates					
		May	June	July	August	September	October
A	S1	20 <sup>th</sup> -24 <sup>th</sup>	-	20 <sup>th</sup> -24 <sup>th</sup>	-	-	-
	S2	25 <sup>th</sup> -29 <sup>th</sup>	16 <sup>th</sup> -20 <sup>th</sup>	-	17 <sup>th</sup> -21 <sup>st</sup>	No Data	No Data
B	S3	12 <sup>th</sup> -16 <sup>th</sup>	16 <sup>th</sup> -20 <sup>th</sup>	-	17 <sup>th</sup> -21 <sup>st</sup>	21 <sup>st</sup> -25 <sup>th</sup>	29 <sup>th</sup> Sept-3 <sup>rd</sup> Oct

## 2.5 LIMITATIONS

- 2.5.1 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 impacts from other developments in the local area.
- 2.5.2 Walked transects were not undertaken during April, due to poor weather conditions (heavy rain, cold and snow) during the month.
- 2.5.3 A number days of data were discovered to be missing from the static detectors following certain months surveys (see Table 3), which could be due to a fault in the recording equipment, poor or unsuitable weather conditions or a lack of Bats passing the detector throughout the survey period. A number of dates returned no Bat data, with the exception of noise files.
- 2.5.4 No statics were placed along the treeline immediately adjacent to the north-eastern Site boundary, given the buffer set out within the Proposed Development to this boundary (as illustrated on the Working Scheme drawing number W328-00062-03).

### 3 RESULTS

#### 3.1 DESK STUDY RESULTS/SUMMARY

3.1.1 Numerous records for Bats (*Chiroptera spp.*) were identified during the desk study, including: Serotine Bat (*Eptesicus serotinus*), Daubenton’s Bat (*Myotis daubentonii*), Natterer’s Bat (*Myotis nattereri*), Leisler’s Bat (*Nyctalus leisleri*), Noctule Bat (*Nyctalus noctula*), Kuhl’s Pipistrelle Bat (*Pipistrellus kuhlii*), Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Brown Long-eared Bat (*Plecotus auritus*). The closest record is for a Daubenton’s Bat approximately 0.1km from the Site in 2007, with records of Common Pipistrelle recorded in the same location dated 1996. The biological records did not provide any information on the location of Bat roosts in the local area.

#### 3.2 HABITAT SUITABILITY ASSESSMENT

3.2.1 The habitats at the Site suitable for foraging and commuting Bats are the linear features, such as the hedgerows and habitats adjacent to the Site boundary including the Sixpenny Brook which runs north to south along the western boundary of the Site. These features are also considered to connect areas of suitable habitat within the wider area of the Site.

3.2.2 It was considered that, given the surrounding habitats of the Site and the suitable linear features within the Site, the Site is of **Moderate suitability for Bats**, in accordance with the guidelines in Table 1.

#### 3.3 BAT ACTIVITY SURVEYS

##### Transect/Point Count Surveys

3.3.1 Overall, the highest levels of activity along Transect A were along the northern and western hedgerows. Other activity was recorded across the transect, including along the central hedgerow.

3.3.2 Overall, the highest levels of activity along Transect B was along the central hedgerow of the Site, as well as around listening points 3, 4, 5 and 6.

3.3.3 The Site is primarily used for foraging and commuting Bats. 3.3.4 summarises activity on each transect walked at the Site per month. Detailed survey results can be found in Appendix E2.

3.3.4 A map of the transect route and location of the point counts, as well as a summary of activity location is shown on Figure E13 in Appendix E1.

**Table 4 Summary Survey Results (May – October 2016)**

Date	Dusk/Dawn	Transect Reference	Species recorded	Activity
10.05.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Brown Long-Eared	Heard not seen
11.05.16	Dawn	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Commuting



Table 4 Cont'd...

Date	Dusk/Dawn	Transect Reference	Species recorded	Activity
20.05.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Noctule	Commuting
			Myotis Sp.	Heard not seen
			Soprano Pipistrelle	Foraging and Commuting
15.06.16	Dawn	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
15.06.16	Dusk	Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
16.06.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
19.07.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
20.07.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
16.08.16	Dusk	Transect A	Common Pipistrelle	Commuting
			Myotis Sp.	Commuting
			Brown Long-Eared	Commuting
			Natterers Bat	Commuting
17.08.16	Dawn	Transect B	Common Pipistrelle	Foraging and commuting
			Noctule	Heard not seen
21.09.16	Dusk	Transect A	Common Pipistrelle	Foraging, commuting and social calling
			Myotis Sp.	Foraging and commuting
		Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Commuting
			Noctule	Commuting
19.10.16	Dusk	Transect A	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
			Myotis Sp.	Foraging and commuting
		Transect B	Common Pipistrelle	Foraging and commuting
			Soprano Pipistrelle	Foraging and commuting
<b>Total number of species recorded</b>		Transect A	<b>5</b>	
		Transect B	<b>4</b>	

### Automated Surveys

- 3.3.5 The majority of activity was Common Pipistrelle Bat and Soprano Pipistrelle Bat, including Brown Long-Eared, Noctule and Unidentified *Myotis* species. Other less common species included Serotine, Nathusius Pipistrelle Bat and Barbastelle Bat.
- 3.3.6 The static detectors were initially placed across the Site during May to provide the recommended two locations per transect. One static detector per transect was then used for the majority of the remaining surveys following initial walked transect surveys recording low Bat activity (i.e. alternating static locations).
- 3.3.7 The static detector installed in the existing quarry has not been included in the results below.
- 3.3.8 The woodland location (SA1) was not used for the majority of surveys given the buffer provided from the Proposed Development.
- 3.3.9 3.3.9 summarises the Bat species that were recorded by the automatic Bat detectors during May to October 2016 inclusive. Locations of the automated survey equipment can be found on Figure E13 in Appendix E1.

**Table 5 Summary of Automated Survey Results (May – October 2016)**

Month	Date	Transect	Location	Species Recorded	Number of Passes
May	20 <sup>th</sup> -24 <sup>th</sup>	A	SA1	Brown Long-Eared	15
				Common Pipistrelle	84
				Soprano Pipistrelle	197
				<i>Myotis</i> sp.	16
				Noctule	26
				Serotine	69
	25 <sup>th</sup> -29 <sup>th</sup>	SA2	Common Pipistrelle	21	
			Soprano Pipistrelle	80	
			Brown Long-Eared	2	
			Noctule	1	
12 <sup>th</sup> -16 <sup>th</sup>	B	SB1	Common Pipistrelle	45	
			Soprano Pipistrelle	18	
June	-	-	SA1	-	-
	16 <sup>th</sup> -20 <sup>th</sup>	A	SA2	Common Pipistrelle	23
				Soprano Pipistrelle	86
				Brown Long-Eared	2
				Noctule	1
<i>Myotis</i> sp.	1				

Table 5 Cont'd...

Month	Date	Transect	Location	Species Recorded	Number of Passes
June	16 <sup>th</sup> -20 <sup>th</sup>	B	SB1	Common Pipistrelle	17
				Soprano Pipistrelle	62
				Noctule	1
July	20 <sup>th</sup> -24 <sup>th</sup>	A	SA1	Common Pipistrelle	75
				Soprano Pipistrelle	104
				<i>Myotis</i> sp	3
				Noctule	2
				Brown Long-Eared	6
	-	-	SA2	-	-
-	-	B	SB1	-	-
August	-	-	SA1	-	-
	17 <sup>th</sup> -21 <sup>st</sup>	A	SA2	Common Pipistrelle	369
				Brown Long-Eared	4
				<i>Myotis</i> sp.	1
				Soprano Pipistrelle	997
	17 <sup>th</sup> -21 <sup>st</sup>	B	SB1	Brown Long-Eared	6
				Common Pipistrelle	508
				<i>Myotis</i> sp.	3
				Noctule	32
				Soprano Pipistrelle	1261
Barbastelle				32	
Serotine	2				
September	-	A	SA1	-	-
	-		SA2	NO DATA	-
	21 <sup>st</sup> -25 <sup>th</sup>	B	SB1	Common Pipistrelle	801
				<i>Myotis</i> sp.	3
				Noctule	5
				Nathusius Pipistrelle	18
				Brown Long-Eared	3
Soprano Pipistrelle	420				

Table 5 Cont'd...

Month	Date	Transect	Location	Species Recorded	Number of Passes
October	-	A	SA1	-	-
	-		SA2	NO DATA	-
	29 <sup>th</sup> Sept – 3 <sup>rd</sup> Oct	B	SB1	Brown Long-Eared.	4
				Common Pipistrelle	50
				Nathusius Pipistrelle	2
				Soprano Pipistrelle	96
				Barbastelle	2
<i>Myotis</i> sp.	1				

## 4 CONCLUSIONS AND RECOMMENDATIONS

4.1.1 Numerous Bat records within 2km of the Site were provided by the local biological records centre, as well as several Bat roosts in the local area.

4.1.2 The Site offers suitable habitat for foraging and commuting Bats, specifically the linear features of the Site such as boundary hedgerows. Habitat adjacent to the Site considered suitable for foraging and commuting Bats includes the Sixpenny Brook and areas of woodland. The arable fields provides some further foraging habitat for Bats.

4.1.3 Several Bat species were recorded during the surveys:

- Common Pipistrelle Bat;
- Soprano Pipistrelle Bat;
- Noctule Bat;
- Brown Long-Eared Bat;
- Natterer's Bat;
- Nathusius Pipistrelle Bat;
- *Myotis* sp; and
- Barbastelle Bat.

4.1.4 Bat activity was recorded along all boundary hedgerows within the Site. The most Bat activity was recorded during July and August, with the maximum number of species recorded on the walked transect being 5.

4.1.5 The automated surveys recorded a higher number of Bat species than the walked transects, including Barbastelle Bat and Nathusius Pipistrelle Bat.

4.1.6 The majority of these species are widespread and common of this area. The Barbastelle Bat and Nathusius Bat are considered rarer in regard to their geographical range in the UK. The number of Bat species and the level of activity recorded throughout the surveys is considered to be typical of the area,

considering the surrounds of the Site (including various brooks and rivers suitable for foraging Bats).

- 4.1.7 It is recommended that, where possible, trees and hedgerows acting as important commuting corridors and foraging habitat are retained under the proposals. Lighting should be directional, avoiding illumination of important features and be installed following best practice guidance.
- 4.1.8 **Updated Bat activity surveys should be carried out if the Proposed Development does not commence within two years of the date of these surveys, where required.**
- 4.1.9 The Impact Assessment is detailed in the EclA report (Report Reference: CE-WQ-0992-RP09).

## REFERENCES:

- Collins, J. (., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.
- HMSO, 1981. *The Wildlife and Countryside Act 1981 (as amended)*. London: HMSO.
- HMSO, 2006. *Natural Environment and Rural Communities Act 2006*. London: HMSO.
- HMSO, 2017. *The Conservation of Habitats and Species Regulations 2017*. London: HMSO.

## APPENDICES:

Appendix E1	Figure E13 – Bat Activity Transect Plan
Appendix E2	Full Bat Activity Survey Results
Appendix E3	Automated Survey Weather Conditions

**APPENDIX E1:**

**Figure E13 – Bat Activity Transect Plan**



Bat Species Recorded on Static Detectors	
Static Reference	Species Recorded
SA1	Common Pipistrelle
	Soprano Pipistrelle
	Brown Long-eared Bat
	Myotis Sp.
	Noctule
	Serotine
SA2	Common Pipistrelle
	Soprano Pipistrelle
	Brown Long-eared Bat
	Myotis Sp.
	Noctule
	Serotine
SB1	Common Pipistrelle
	Soprano Pipistrelle
	Brown Long-eared Bat
	Myotis Sp.
	Noctule
	Barbastelle
	Serotine
	Nathusius Pipistrelle
	Pipistrelle Sp.

**Legend:**

- Site Boundary
- Transect A
- Transect B
- Transect A Listening Points
- Transect B Listening Points
- ▲ Static Locations
- Common Pipistrelle
- Soprano Pipistrelle
- Brown Long-eared Bat
- Noctule
- Myotis Sp.
- Natterers Bat
- Pipistrelle Sp.

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

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Client:

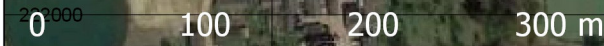


**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Bat Activity Transect Plan**

Date:	Scale:	Paper Size:	
11 / 3 / 2019	1:4,500	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW21	Figure E13		





## Appendix E2:

### Full Bat Activity Survey Results

Date	10.05.16	Survey Type	Dusk	Transect Reference	A
Surveyors	LC/MW	Sunset	20:36		
Time	Species	Location	Activity		
20:24	Common pipistrelle	LP1	Foraging by Cockaynes wood		
20:41	Common Pipistrelle	LP3	Single pass		
21:12	Common Pipistrelle x2	LP7	Commuting along western site boundary		
21:46	Brown Long-Eared	LP8	Heard not seen		
22:03	Common Pipistrelle	LP9	Commuting north to west along hedgerow		
22:14	Common Pipistrelle	LP10	Commuting east to west along hedgerow		

Date	11.05.16	Survey Type	Dawn	Transect Reference	A
Surveyors	LC/MW	Sunrise	05:07		
Time	Species	Location	Activity		
05:30	Common Pipistrelle	LP2	Foraging around Cockaynes wood		
06:22	Soprano Pipistrelle	LP8	Single pass		
06:45	Common Pipistrelle	LP10	Commuting north to south along hedgerow		

Date	20.05.16	Survey Type	Dawn	Transect Reference	B
Surveyors	JG/JW	Sunrise	04:54		
Time	Species	Location	Activity		
03:28	Common Pipistrelle	LP1	Heard not seen		
03:31	Common Pipistrelle	LP2	Faint pass. Heard not seen		
03:33	Common Pipistrelle	LP2	Foraging. Heard not seen		
03:43	Common Pipistrelle	LP3	2 passes		
03:55	Soprano Pipistrelle	LP4	Foraging. Heard not seen		
03:57	Soprano Pipistrelle	LP4	Foraging in trees		

Time	Species	Location	Activity
03:58	Common Pipistrelle	Between LP4 and LP5	1 pass
03:59	Common Pipistrelle	Between LP4 and LP5	Heard not seen
04:00	Common Pipistrelle	LP5	Foraging
04:01	Common Pipistrelle	LP5	Foraging
04:04	Common Pipistrelle	LP5	Foraging
04:05	Common Pipistrelle	LP5	2 passes
04:10	Soprano Pipistrelle	LP6	Heard not seen
04:14	Noctule	LP6	Heard not seen

Results after LP6 have been omitted from this report following Site boundary change 2017

Date	15.06.16	Survey Type	Dawn	Transect Reference	A
Surveyors	JG/JW	Sunrise	04:36		
Time	Species	Location	Activity		
02:45	Common Pipistrelle	LP1	Heard not seen		
02:52	Common Pipistrelle	LP2	Single pass		
02:53	Common Pipistrelle	LP2	Commuting and foraging		
02:56	Common Pipistrelle	between LP2 and LP3	Foraging along hedgerow		
02:56	Common Pipistrelle	between LP2 and LP3	Foraging		
02:58	Common Pipistrelle	between LP2 and LP3	Single pass		
02:58-03:03	Common Pipistrelle	LP3	Foraging along hedgerow		
03:01	Soprano Pipistrelle	LP3	1 pass + feeding		

Time	Species	Location	Activity
03:04	Common Pipistrelle	between LP3 and LP4	Foraging along hedgerow
03:05	Soprano Pipistrelle	between LP3 and LP4	1 pass
03:10	Common Pipistrelle	LP4	Faint pass
03:10	Common Pipistrelle	LP4	1 pass
03:12	Common Pipistrelle	LP4	1 pass
03:23– 03:24	Common Pipistrelle	LP5	Pass + feeding
03:25	Soprano Pipistrelle	LP5	Pass + feeding
03:28- 03:30	Soprano Pipistrelle	Between LP5 and LP6	Multiple passes
03:32	Common Pipistrelle	LP6	Commuting along hedgerow
03:32	Soprano Pipistrelle	LP6	1 pass
03:43	Common Pipistrelle	LP7	Heard not seen
03:43	Common Pipistrelle	LP7	1 pass
03:46	Soprano Pipistrelle	LP7	Several passes
03:54	Soprano Pipistrelle	LP8	Commuting west to east along hedgerow
03:54	Soprano Pipistrelle	LP8	1 pass
04:01	Soprano Pipistrelle	Between LP9 and LP10	1 pass + feeding
04:23	Common Pipistrelle	LP10	1 pass

Date	15.06.16	Survey Type	Dusk	Transect Reference	B
Surveyors	JG/JW	Sunset	21:17		
Time	Species	Location	Activity		
21:37	Common Pipistrelle	LP2	Commuting north to south		
21:40	Common Pipistrelle	LP2	Commuting north to south		
21:45	Common Pipistrelle	Between LP2 and LP3	Commuting along hedgerow edge		
21:48	Common Pipistrelle	LP3	Commuting along hedgerow edge west		
21:50 – 21:52	Common Pipistrelle	LP3	Multiple passes		
21:55	Common Pipistrelle	Between LP3 and LP4	Single pass		
22:01	Common Pipistrelle	LP4	Single pass		
22:03	Common Pipistrelle	LP4	Faint pass		
22:03	Common Pipistrelle	LP4	Multiple passes		
22:10 – 22:12	Soprano Pipistrelle	Between LP4 and LP5	Multiple passes		
22:12	Common Pipistrelle	LP5	Foraging at LP5		
22:16 – 22:18	Soprano Pipistrelle	LP5	Foraging at LP5		
22:20	Common Pipistrelle	Between LP5 and LP6	Foraging over pond		
22:28	Common Pipistrelle	LP6	Single pass		
22:31	Soprano Pipistrelle	LP6	Single pass		

Results after LP6 have been omitted from this report following Site boundary change 2017

Date	16.06.16	Survey Type	Dawn (Reverse)	Transect Reference	B
Surveyors	JG/JW	Sunrise	04:36		
Time	Species	Location	Activity		
Results before LP6 have been omitted from this report following Site boundary change 2017					
03:43	Soprano Pipistrelle	LP6	Foraging at the edge of the woodland		
03:44- 03:46	Soprano Pipistrelle	Between LP6 and LP5	Foraging at the edge of the woodland		
03:50	Common Pipistrelle	LP5	Single pass		
04:00	Pipistrelle sp.	LP4	Seen not heard, commuting east to west		
04:02	Common Pipistrelle	LP3	Commuting east to west		

Date	19.07.16	Survey Type	Dusk (Reverse)	Transect Reference	A
Surveyors	JG/JW	Sunset	21:04		
Time	Species	Location	Activity		
21:00	Common Pipistrelle x3	LP9	Foraging along hedgerow		
21:32	Soprano Pipistrelle	LP7	Foraging along woodland		
21:34	Common Pipistrelle	LP7	Foraging along woodland		
22:05	Soprano Pipistrelle	LP4	Single pass		
22:14	Soprano Pipistrelle	LP3	Single pass		

Date	20.07.16	Survey Type	Dawn	Transect Reference	B
Surveyors	JG/JW	Sunrise	05:02		
Time	Species	Location	Activity		
03:48	Common Pipistrelle	LP5	foraging east		
03:53	Common Pipistrelle	Between LP5 and LP6	Commuting		
03:58	Common Pipistrelle	LP6	Commuting west to east		
03:59	Common Pipistrelle x2	LP6	Foraging		

Time	Species	Location	Activity
04:00	Common Pipistrelle	LP6	Commuting west to east
04:01	Common Pipistrelle	LP6	Commuting west to east
04:02	Common Pipistrelle	LP6	Foraging south
04:02	Common Pipistrelle	LP6	Faint pass
04:03	Common Pipistrelle	LP6	Single pass

Results after LP6 have been omitted from this report following Site boundary change 2017

Date	16.08.16	Survey Type	Dusk	Transect Reference	A
Surveyors	LC	Sunset	20:16		
Time	Species	Location	Activity		
20:54	Common Pipistrelle	Between LP4 and LP5	Single pass		
20:58	Common Pipistrelle	LP5	Single pass		
20:59	Common Pipistrelle	LP5	Single pass		
21:00	Common Pipistrelle	LP5	Single pass		
21:03	Common Pipistrelle	Between LP5 and LP6	Single pass		
21:04	Common Pipistrelle	Between LP5 and LP6	Single pass		
21:06	Myotis sp.	LP6	Single pass		
21:22	Natterers Bat	LP6	Single pass		
21:32	Brown Long-Eared	Between LP6 and LP7	Commuting along hedgerow		
21:50	Brown Long-Eared	Between LP7 and LP8	Single pass		

Date	16.08.16	Survey Type	Dusk	Transect Reference	B
Surveyors	JW/JG	Sunset	20:16		
Time	Species	Location	Activity		
20:41	Pipistrelle sp.	LP3	Commuting west to east		
20:43	Pipistrelle sp.	LP3	Seen not heard		
20:44	Common Pipistrelle	Between LP3 and LP4	Faint pass		
20:44	Common Pipistrelle	Between LP3 and LP4	Commuting west to east		
20:45	Pipistrelle sp.	LP4	Seen not heard		
20:50	Common Pipistrelle	LP4	Faint pass		
20:57	Noctule	LP5	Heard not seen		
20:59	Common Pipistrelle	LP5	Heard not seen		
21:13	Common Pipistrelle	LP6	Single pass		

Results after LP6 have been omitted from this report following Site boundary change 2017

Date	21.09.16	Survey Type	Dusk	Transect Reference	A
Surveyors	LC	Sunset	18:56		
Time	Species	Location	Activity		
19:29	Common Pipistrelle	LP4	Foraging and social calling along hedgerow		
19:34	Common Pipistrelle	LP5	Foraging at LP8		
20:06	Myotis sp.	LP8	Single pass		
20:07	Myotis sp.	LP8	Single pass		
20:11	Myotis sp.	LP8	Foraging		

Date	21.09.16	Survey Type	Dusk	Transect Reference	B
Surveyors	JW/JG	Sunset	18:56		
Time	Species	Location	Activity		
19:24	Common Pipistrelle	LP3	Single pass		
19:43	Common Pipistrelle	LP5	Foraging over woodland		
19:51	Noctule	Between LP5 and LP6	Commuting overhead		
19:52	Common Pipistrelle	Between LP5 and LP6	Single pass		
19:58	Common Pipistrelle	LP6	Faint pass		
19:59	Common Pipistrelle	LP6	Foraging at LP6		
20:03	Soprano Pipistrelle	LP6	Single pass		
Results after LP6 have been omitted from this report following Site boundary change 2017					

Date	19.10.16	Survey Type	Dusk	Transect Reference	A
Surveyors	LC	Sunset	17:52		
Time	Species	Location	Activity		
18:35-18:40	Common Pipistrelle, Soprano Pipistrelle and Myotis sp.	LP7	Foraging at LP7		

Date	19.10.16	Survey Type	Dusk	Transect Reference	B
Surveyors	JW/JG	Sunset	17:52		
Time	Species	Location	Activity		
18:20 – 18:25	Soprano Pipistrelle x2	LP3	Foraging at LP3		
18:24	Common Pipistrelle x2	LP4	Commuting along hedgerow		
18:25	Common Pipistrelle	LP4	Commuting along hedgerow		
18:26	Soprano Pipistrelle	between LP4 and LP5	Foraging along hedgerow		
18:34	Soprano Pipistrelle	between LP5 and LP6	Several passes		
Results after LP6 have been omitted from this report following Site boundary change 2017					



## Appendix E3:

### Automated Survey Weather Conditions

Month	Date	Sunset time	Sunrise time	Overnight temp. range (°C)	Precipitation	Wind speed (Beaufort scale)
May	12 <sup>th</sup>	20:40	05:04	13-16°C	None	2
	13 <sup>th</sup>	20:41	05:02	8-17°C	None	2
	14 <sup>th</sup>	20:43	05:01	3-12°C	None	1
	15 <sup>th</sup>	20:44	04:59	1-13°C	None	1
	16 <sup>th</sup>	20:46	04:58	6-15°C	None	1
	19 <sup>th</sup>	20:50	04:54	11-15°C	Occ. Light	3
	20 <sup>th</sup>	20:52	04:52	11-16°C	None	1
	21 <sup>st</sup>	20:53	04:51	12-15°C	Occ. Light	2
	22 <sup>nd</sup>	20:55	04:50	10-15°C	Occ. Light	3
	23 <sup>rd</sup>	20:56	04:49	7-14°C	None	2
	24 <sup>th</sup>	20:57	04:47	4-12°C	Occ. Light	2
	25 <sup>th</sup>	20:59	04:46	7-10°C	None	1
	26 <sup>th</sup>	21:00	04:45	9-15°C	None	1
	27 <sup>th</sup>	21:01	04:44	7-14°C	None	2
	28 <sup>th</sup>	21:02	04:43	8-13°C	None	2
29 <sup>th</sup>	21:04	04:42	7-14°C	None	3	
June	16 <sup>th</sup>	21:19	04:34	10-14°C	None	1
	17 <sup>th</sup>	21:19	04:34	11-14°C	Occ. Light	1
	18 <sup>th</sup>	21:20	04:34	11-14°C	None	1
	19 <sup>th</sup>	21:20	04:35	9-15°C	Light	3
	20 <sup>th</sup>	21:20	04:35	14-18°C	None	1
July	20 <sup>th</sup>	21:03	05:01	17-23°C	None	1
	21 <sup>st</sup>	21:02	05:03	12-18°C	None	1
	22 <sup>nd</sup>	21:01	05:04	13-18°C	None	1
	23 <sup>rd</sup>	20:59	05:06	12-18°C	None	2
	24 <sup>th</sup>	20:58	05:07	14-20°C	None	2

Month	Date	Sunset time	Sunrise time	Overnight temp. range (°C)	Precipitation	Wind speed (Beaufort scale)
August	17 <sup>th</sup>	20:15	05:45	10-16°C	None	1
	18 <sup>th</sup>	20:13	05:46	12-18°C	None	1
	19 <sup>th</sup>	20:11	05:48	12-16°C	Occ. Light	3
	20 <sup>th</sup>	20:09	05:50	13-17°C	Occ. Light	4
	21 <sup>st</sup>	20:07	05:51	13-18°C	Occ. Light	3
September	21 <sup>st</sup>	18:56	06:42	11-16°C	None	2
	22 <sup>nd</sup>	18:53	06:44	11-17°C	None	1
	23 <sup>rd</sup>	18:51	06:46	6-12°C	None	1
	24 <sup>th</sup>	18:49	06:47	10-16°C	None	2
	25 <sup>th</sup>	18:46	06:49	10-14°C	None	1
October	29 <sup>th</sup> Sept	18:37	06:56	12-16°C	None	2
	30 <sup>th</sup> Sept	18:35	06:57	9-14°C	Occ. Light	1
	1 <sup>st</sup>	18:32	06:59	8-12°C	Occ. Light	1
	2 <sup>nd</sup>	18:30	07:01	7-12°C	None	1
	3 <sup>rd</sup>	18:28	07:02	4-10°C	None	1

# APPENDIX H: Water Vole Survey Report



**Proposed Eastern Extension to Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Water Vole Survey**

Report Reference: CE-WQ-0992-RP07 - Final



Produced by Crestwood Environmental Ltd.

17 April 2018

Crestwood Report Reference: CE-WQ-0992-RP07 - Final:

Version & Status	Date Produced	Written / Updated by:	Survey Licence No. (If applicable)	Checked & Authorised by:
		Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Water Vole survey detailed in this report was carried out by Crestwood Environmental Ltd. as requested by DL Walker on behalf of Tarmac (**'the Client'**), to support a planning application for mineral extraction at land to the east of Wivenhoe, Alresford Road, Wivenhoe in Essex.

No watercourses or waterbodies were present at the Site. The Sixpenny Brook runs north to south immediately adjacent to the western boundary of the Site.

No evidence of Water Vole was recorded within 50m of the Site, within the Sixpenny Brook.

*It is recommended that a dust management and run off plan are implemented at the Site prior to the commencement of works to protect the adjacent watercourse and any watercourses which it runs into.*

*No further surveys are recommended for Water Vole, however if the Proposed Development does not commence within two years, an update survey is recommended to be undertaken at the Site.*

# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to undertake a Water Vole Survey at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 049 224 (**'the Site'**).

1.1.2 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.1.3 The full planning application title reads:

*'Planning application for the extraction of 4.0 million tonnes of sand and gravel as an eastern extension to the existing Wivenhoe Quarry, together with relocation of the existing primary processing plant and ancillary facilities, a proposed new vehicular access onto the B1027 Brightlingsea Road, totalling a 61 hectare area with restoration to EITHER agriculture or low-level water-based nature conservation habitats, lowland grassland, woodland planting and hedgerow enhancement, including the importation of approximately 1.2 million cubic metres of inert restoration materials.'*

1.1.4 The need for the survey was identified during an Extended Phase 1 Habitat survey carried out by Crestwood Environmental in October 2015. The survey recorded the presence of suitable habitat for Water Vole within 50m of the Site, in a stretch of running water known as the Sixpenny Brook. Two biological records from 1995 indicate the former presence of Water Vole within the Site boundary.

## 1.2 PURPOSE AND SCOPE

1.2.1 The purpose of the survey, assessment and report is to provide ecological advice, specifically with regards to Water Vole in respect of the design and construction of the Proposed Development.

1.2.2 The scope of the survey is:

- To assess the suitability of habitat within 50m of the Site for Water Vole; and
- To record any evidence of Water Vole presence at the Site and within 50m of the Site.

1.2.3 The description of the Site and the results of the survey relate to the findings at the time of the field survey only on 25<sup>th</sup> May 2016.

## 1.3 SITE DESCRIPTION

1.3.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees and Poor Semi-Improved Grassland.

1.3.2 In the local area the main habitat wildlife corridors present are:

- The Six Penny Brook which flows north to south approximately 10m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and



- A railway line bordered by trees and woodland running east-west to the south of the Site.

## 1.4 LEGAL CONTEXT

1.4.1 Water Vole are **protected in England and Wales under the Wildlife and Countryside Act 1981** (as amended) (HMSO, 1981 ) and were included under the Act in 1998. Water Vole are listed on Schedule 5 of the Act and are protected under Section 9 which make it an offence to:

- Intentionally kill, injure or take a Water Vole (Section 9 (1));
- Intentionally or recklessly damage or destroy a structure or place used for shelter or protection by a Water Vole (Section 9 (4a));
- Intentionally or recklessly disturb a Water Vole while it is occupying such a place (Section 9 (4b)); or
- Intentionally or recklessly obstruct access to any structure or place a Water Vole uses for shelter or protection (Section 9 (4c)).

1.4.2 There are additional offences in relation to possessing, controlling (Section 9 (2)), as well as buying and selling (Section 9 (5)) any live or dead Water Vole or anything derived from them; however these are largely irrelevant in respect of the potential impacts of the Permitted Scheme.

1.4.3 The Water Vole is also listed as a **Species of Principal Importance in England** under the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006).

1.4.4 Where development requires displacement activities, these must be supervised by a licenced ecologist and net biodiversity gain must be implemented within the site.

## 2 METHODOLOGY AND APPROACH

### 2.1 DESK STUDY

2.1.1 The Essex Field Club (EFC) (Essex Field Club, 2015) and Essex Wildlife Trust (EWT) (Essex Wildlife Trust, 2011) provided records of Water Vole as part of the desk study undertaken during the Extended Phase 1 Survey report in 2015.

### 2.2 HABITAT SUITABILITY ASSESSMENT

2.2.1 An assessment of the suitability of the habitats present at the Site for Water Vole was conducted through the use of the MAGIC map (DEFRA, 2015) and aerial photography prior to the field survey in order to identify potential habitats likely to support Water Vole. The results of the assessment were used to inform the field survey.

2.2.2 During the Extended Phase 1 Habitat Survey habitats considered suitable for Water Vole during the desk study were scoped to assess their potential to support a Water Vole population. The following characteristics were assessed:

- Water depth
- Water flow
- Vegetation cover
- Species and diversity of vegetation; and
- Bank substrate.

## 2.3 FIELD SURVEY

2.3.1 The Water Vole survey was carried out in accordance with guidance in the Water Vole Conservation Handbook (Rob Strachan, 2011) and included searches for:

- Latrines (regularly used places where faeces are deposited, usually on ledges or prominent mud-banks along the waters' edge);
- Tracks/footprints and droppings (individual faeces on pathways or ledges used by the animals);
- Feeding stations (areas where food is cut into short lengths and laid side by side on ledges by the waters' edge), paw-prints, nest holes, tunnels/runways and lawns; and
- Potential burrows (shelter used by Water Vole – often have an entrance below the water/at the water's edge as well as an additional entrance above ground).

2.3.2 The survey was undertaken on all ditches within the immediate vicinity of the Site, as well as those within the wider area which were well connected to the Site (no further than a distance of 400m from the approximate centre of the Site).

2.3.3 The watercourses surveyed for Water Vole are detailed on Figure E14 in Appendix E1.

## 2.4 LIMITATIONS

2.4.1 Several banks of the surveyed watercourse (the Sixpenny Brook) were densely vegetated by Common Nettle (*Urtica dioica*) and therefore not accessible for survey.

### 3 RESULTS

#### 3.1 DESK STUDY

- 3.1.1 EFC provided numerous records for Water Vole (*Arvicola amphibius*) within 4km of the Site. Two records are from 1995 and are located within the Site boundary, approximately 160m east of the Sixpenny Brook. EWT also provided several recent records for Water Vole along Sixpenny Brook.
- 3.1.2 The two Water Vole records closest to the Site boundary are situated along Sixpenny Brook; one dated from 2002 approximately 650m to the south of the Site, and one from 2004 approximately 970m north of the Site.

#### 3.2 FIELD SURVEY RESULTS

##### WEATHER CONDITIONS

- 3.2.1 The weather conditions at the time of survey are shown in Table 1 below.

**Table 1 Weather Conditions during the Survey (25<sup>th</sup> May 2016)**

Date of Survey	Previous Precipitation	Weather			
		Temperature (°C)	Cloud Cover (in Octas)	Wind Speed (Beaufort scale)	Precipitation
25.05.16	Light drizzle within 24 hours	11°C	4/8	BF 2	None

- 3.2.2 The results of the Water Vole survey at the Site are detailed below. The weather conditions were considered suitable for Water Vole survey purposes.

##### Sixpenny Brook

##### Northern Section

- 3.2.3 The northern section of the Sixpenny Brook (immediately adjacent at the north of the Site boundary to approximately 50m north refer to plan reproduced at Appendix E1) was approximately 1.5m in width and 50cm in water depth (see Plate 1). No aquatic vegetation was present within the channel and the water was slow flowing north to south.
- 3.2.4 The bank was heavily vegetated with Common Nettle and heavily shaded with large trees on either side of the bank. The bank profile changed from gently sloped to fairly steep in a number of places (see Plate 2 for an example of a low bank profile).
- 3.2.5 **No evidence of Water Vole** was recorded within the Northern Section of the Sixpenny Brook at the time of survey.
- 3.2.6 This section of the Brook is considered to have **Low suitability for Water Vole**, given the limited vegetation suitable for foraging and the gentle sloping nature of the majority of the banks.

**Plate 1**      **Sixpenny Brook Northern Section**



**Plate 2**      **Sixpenny Brook Northern Section Varied Slope Profile**



### Central Section

- 3.2.7 The section closest to the Site boundary (refer to plan reproduced at Appendix E1) was approximately 0.75m in width with a water depth of approximately 20cm. The channel was clear from aquatic vegetation at the time of survey and had a rocky substrate.
- 3.2.8 The eastern bank of the channel was steep woodland habitat with immature and semi-mature trees, whilst the western bank was densely vegetated with Common Nettle.
- 3.2.9 **No evidence of Water Vole** was recorded within the Central Section of the Sixpenny Brook at the time of survey.
- 3.2.10 This section of the Brook is considered to be of **Low suitability for Water Vole**, due to the lack of suitable foraging vegetation favoured by Water Vole, as well as the shallowness of the water within the channel.

### Southern Section

- 3.2.11 The Southern Section of the Sixpenny Brook (immediately to the south of the Site boundary at the proposed access track, to approximately 50m south refer to plan reproduced at Appendix E1) was approximately 1.5m in width and 50cm in depth and set within woodland habitat. The substrate within the channel was clay and there was no aquatic vegetation within the channel of this section of the brook.
- 3.2.12 The banks on either side of the channel were gently sloping, with dense bank vegetation including Bramble (*Rubus fruticosus agg.*), Common Nettle, Grass species and Bracken (*Pteridium aquilinum*).
- 3.2.13 **No evidence of Water Vole** was recorded within the Southern Section of the Sixpenny Brook at the time of survey.
- 3.2.14 This section of the Brook is considered to be of **Low suitability for Water Vole**, due to the gentle slope of the bank. However, it is considered that this section of the Brook has a slightly increased suitability compared to the Central and Northern Sections of the Brook surveyed.
- 3.2.15 Table 2 summarises the results of the surveys of the Sixpenny Brook.

**Table 2 Summary of Water Vole Survey Results (25.05.2016)**

Area Surveyed	Water Vole Presence Confirmed?	Description of Field Signs Found
Northern Section	No	N/A
Central Section	No	N/A
Southern Section	No	N/A

## 4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1.1 No evidence of Water Vole was recorded within the Sixpenny Brook at the time of survey. The habitats surveyed are considered to be of low suitability for Water Vole given their bank profiles, limited suitable foraging vegetation and the shallowness of the watercourse at the points surveyed.
- 4.1.2 It is recommended a dust management and runoff and emissions plan will be provided through suitable conditions based on the submitted Air Quality and Hydrological Impact Assessments that accompany the application.
- 4.1.3 All works should maintain at least a 10m buffer from the Sixpenny Brook and avoid runoff as much as possible, to avoid pollutants entering the watercourse.
- 4.1.4 **No further surveys** are considered necessary for Water Vole at the Site.
- 4.1.5 If the Proposed Development does not commence within two years, it is recommended an updated Water Vole survey is conducted, where required.

## REFERENCES:

- DEFRA, 2015. *MAGIC*. [Online]  
Available at: <http://www.magic.gov.uk/magicmap.aspx>  
[Accessed 30 November 2015].
- Essex Field Club, 2015. *Ecological Records*. Essex: Essex Field Club.
- Essex Wildlife Trust, 2011. *Essex Biodiversity Action Plan*, s.l.: Essex Wildlife Trust.
- HMSO, 1981 . *The Wildlife and Countryside Act 1981 (as amended)*. London: HMSO.
- HMSO, 2006. *Natural Environment and Rural Communities Act*. London: HMSO.
- Rob Strachan, M. T. & G., 2011. *Wolver Conservation Handbook*, s.l.: WCRU.

## APPENDICES:

**Appendix E1**                      **Figure E14 – Water Vole Survey Location Plan**



**Appendix E1:**

**Figure E14 – Water Vole Survey Location Plan**



**Legend:**

- Site Boundary
- Sixpenny Brook
- Water Vole Survey Sections

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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title:  
**Water Vole Survey Location Plan**

Date:	Scale:	Paper Size:	
11 / 3 / 2019	1:6,000	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW22	Figure E14		

# APPENDIX I: Hazel Dormouse Survey Report



**Proposed Eastern Extension, Wivenhoe Quarry  
Alresford Road, Wivenhoe**

**Hazel Dormouse Presence/Likely Absence Survey**

Report Reference: CE-WQ-0992-RP08-Final



Produced by Crestwood Environmental Ltd.

17 April 2018

**Crestwood Report Reference: CE-WQ-0992-RP08-Draft v1i:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	17/04/2018	Jaclyn Walker (Ecologist) Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

All of our ecologists are members of the Chartered Institute of Ecology and Environmental Management, and are therefore required to adhere to the Institute's Code of Professional Conduct.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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## SUMMARY

The Hazel Dormouse presence/likely absence survey ('**the Survey**') detailed in this report was carried out by Crestwood Environmental Ltd as requested by DL Walker on behalf of Tarmac Ltd. ('**the Client**'), to support a planning application for mineral extraction at land to the east of Wivenhoe, Alresford Road, Wivenhoe in Essex.

Hazel Dormice are considered to be **likely absent** from the Site.

No further surveys are recommended for Hazel Dormice, however if the Proposed Development does not commence within two years, an update survey is recommended to be undertaken at the Site, if required.

# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) has been appointed by DL Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to undertake a Hazel Dormouse Survey (*Muscardinus avellanarius*) at land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 049 224 (**'the Site'**).

1.1.2 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.1.3 The full planning application title reads:

*'Planning application for the extraction of 4.0 million tonnes of sand and gravel as an eastern extension to the existing Wivenhoe Quarry, together with relocation of the existing primary processing plant and ancillary facilities, a proposed new vehicular access onto the B1027 Brightlingsea Road, totalling a 61 hectare area with restoration to EITHER agriculture or low-level water-based nature conservation habitats, lowland grassland, woodland planting and hedgerow enhancement, including the importation of approximately 1.2 million cubic metres of inert restoration materials.'*

1.1.4 The need for the survey was identified during an Extended Phase 1 habitat survey and desk study carried out by Crestwood in October 2015. The survey and desk study recorded the presence of suitable habitat at the Site and local records of Dormice within 4km of the centre of the Site.

## 1.2 PURPOSE AND SCOPE

1.2.1 The purpose of the survey, assessment and report is to provide ecological advice, specifically with regards to Dormice in respect of the design and construction of the Proposed Development.

1.2.2 The scope of the survey is:

- To assess the suitability of habitat at the Site for Dormice; and
- To record the presence/likely absence of Dormice at the Site.

1.2.3 The description of the Site and the results of the survey relate to the findings at the time of the field surveys only between May and October 2016.

## 1.3 SITE DESCRIPTION

1.3.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable fields, Dense Scrub, Hedgerow (Intact and Defunct), Hedge with Trees and Poor Semi-Improved Grassland.

1.3.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and a railway line bordered by trees and woodland running east-west to the south of the Site.



## 2 STATUS AND RELEVANT LEGISLATION

2.1.1 Hazel Dormice are listed on 'Schedule 5' of the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981 ) and are protected under Section 9 of this legislation which makes it is an offence to:

- Intentionally or recklessly kill, injure or take a Dormouse;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used by a Dormouse for shelter or protection; or
- Disturb a Dormouse while it is occupying such a structure or place.

2.1.2 Hazel Dormice are additionally listed on 'Schedule 2' of the Conservation of Habitats and Species Regulations 2017 (HMSO, 2017) which details those species listed on Annex IV(a) of the Habitats Directive, making the Hazel Dormouse a European protected species. European protected species status provides additional protection by making it an offence to:

- Deliberately capture, injure or kill a European protected species;
- Deliberately disturb a European protected species; or
- Damage or destroy the breeding site or resting place of a European protected species.

Disturbance of Dormice includes in particular any disturbance which is likely:

(i) to impair their ability:

- To survive, breed or reproduce, or to rear or nurture their young;
- To hibernate or migrate: or

(ii) to affect significantly the local distribution or abundance of the species to which they belong.

2.1.3 The Hazel Dormouse is also listed on 'Section 41' as a Species of Principal Importance (SPI) under the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006).

2.1.4 The Dormouse is also listed on the Essex Local Biodiversity Action Plan as a priority species (Essex Biodiversity Partnership, 2016).

## **3 METHODOLOGY**

### **3.1 DESK STUDY**

- 3.1.1 As part of the desk study carried out during the Extended Phase 1 Habitat survey, records were requested from the local biological records centre. A summary of this information is provided where relevant.
- 3.1.2 The desk study also included use of aerial photography and OS mapping to identify suitable Dormice habitat at the Site.

### **3.2 HABITAT SUITABILITY ASSESSMENT**

- 3.2.1 An assessment of the suitability of the habitats present at the Site for Dormice was conducted through the use of the MAGIC map (DEFRA, 2015) and aerial photography prior to the field survey in order to identify potential habitats of high suitability for Dormice. The results of the assessment were used to inform the field survey.
- 3.2.2 Prior to the commencement of the field surveys, an Extended Phase 2 Habitat survey was conducted and the habitats were assessed for their suitability for Dormice. Habitats identified as suitable were used for the placement of the nest tubes which were checked for the presence of Dormice during the subsequent surveys.
- 3.2.3 Dormice are able to colonise a variety of poor quality habitats, however generally this species requires woody habitats that provide ample cover such as deciduous woodlands, hedgerows and scrub.
- 3.2.4 Dormice also require a wide range of food items available throughout the spring, summer and autumn, therefore species rich habitats, in particular containing Hazel (*Corylus avellana*) and Bramble (*Rubus fruticosus*), provide optimum foraging opportunities for Dormice.

### **3.3 FIELD SURVEY**

- 3.3.1 The chosen survey methods were based on guidelines provided by the Dormouse Conservation Handbook 2<sup>nd</sup> Edition (Bright, 2006). 50 nest tubes made from wood and plastic were placed within the suitable hedgerows (as identified by the habitat suitability assessment) at intervals of 20m at the Site. The nest tubes were all numbered and their locations marked accurately on a map (see Figure E15 in Appendix E1).
- 3.3.2 The nest tubes were placed at the Site in early April 2016 and were subsequently checked for Dormouse occupancy on a monthly basis for 6 months until October 2016.
- 3.3.3 Good practice guidelines (Bright, 2006) provide the method for devising a 'score' indicating survey effort by assigning each survey month with an index of probability of Dormice being found. Using 50 nest tubes as a standard and the monthly values displayed in Table 1, a survey score of 25 can be achieved by leaving out the nest tubes for an entire survey season (the sum of the indices for all 8 months), however if only half the number of nest tubes were used (25) the survey effort score would be halved.

3.3.4 Once presence has been established the surveys can terminate, however absence cannot be assumed based on a survey effort valued at less than 20.

**Table 1 Survey Effort - Index of Probability**

Month	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

3.3.5 Nut searches were also conducted in conjunction with the nest tube surveys. Hazel (*Corylus avellana*), if present, provides a valuable food source for Dormice and can confirm the presence of this species within the habitat.

3.3.6 The ground in the vicinity of Hazel trees present at the Site was searched for Hazel nuts during every nest tube check. Dormice are unique in their feeding characteristics with regard to Hazel nuts as they leave a smooth round hole with few tooth marks on the surface of the nut.

### 3.4 WEATHER CONDITIONS

3.4.1 The weather conditions during the Dormice nest tube surveys are detailed in Table 2.

**Table 2 Weather Conditions for the Dormice Surveys**

Date of Survey	Weather			
	Temperature (°C)	Cloud Cover (in Octas)	Wind Speed (Beaufort scale)	Precipitation
26/05/2016	16	6	1	None
15/06/2016	18	4	2	None
19/07/2016	24	1	2	None
16/08/2016	19	3	1	None
22/09/2016	17	3	2	None
19/10/2016	13	5	3	None

### 3.5 LIMITATIONS

3.5.1 The Site was open to the public and was frequented by dog walkers which may have increased disturbance of the nest tubes over the survey period.

## 4 RESULTS

### 4.1 DESK STUDY

4.1.1 EFC and EWT provided numerous records for Hazel Dormouse within 4km of the Site. Records within the EWT database included 2009 records for Dormice within woodland adjacent to the Site near Sixpenny Brook. Additional records were provided for woodland to the south of the Site within Cockaynes Wood nature reserve.

4.1.2 The Dormouse records were predominantly associated with the areas of broadleaved woodland in the local area, one area of woodland located adjacent to the southwest boundary and another area of woodland approximately 1.1km from the eastern boundary of the Site.

### 4.2 FIELD SURVEY RESULTS

4.2.1 Table 3 below states the results of the Dormouse nest tube surveys at the Site.

**Table 3** *Dormouse Survey Results Summary*

Survey Date	Survey Number	Results	Other Species	Index of Probability
26/05/2016	1	No Dormice	None	4
15/06/2016	2	No Dormice	None	2
19/07/2016	3	No Dormice	None	2
16/08/2016	4	No Dormice	None	5
22/09/2016	5	No Dormice	None	7
19/10/2016	6	No Dormice	None	2

4.2.2 The Dormouse nest tube survey at the Site had a survey effort value of 22.

4.2.3 Dormice were not found to be present at the Site during the surveys undertaken between May and October 2016.

4.2.4 No Hazel nuts showing signs of being opened by Hazel Dormouse were found during the nut searches.

## 5 CONCLUSIONS AND RECOMMENDATIONS

5.1.1 The Site offers limited areas of habitat suitable for Dormice; these are mainly the hedgerows at the Site that are connected to the areas of woodland and dense scrub in the local area.

5.1.2 No Hazel Dormice were found throughout the surveys conducted in 2016, therefore Hazel Dormice are considered likely to be absent from the Site.

5.1.3 If the Proposed Development does not commence within two years, it is recommended an updated Hazel Dormouse survey is conducted, if required.

## REFERENCES:

- Bright, P. M. P. a. M.-J. T., 2006. *The Dormouse Conservation Handbook*. 2nd ed. London: Natural England.
- DEFRA, 2015. *MAGIC*. [Online]  
Available at: <http://www.magic.gov.uk/magicmap.aspx>  
[Accessed 30 November 2015].
- Essex Biodiversity Partnership, 2016. *Essex Biodiversity Project*. [Online]  
Available at: <http://www.essexbiodiversity.org.uk/biodiversity-action-plan>  
[Accessed 8 March 2016].
- HMSO, 1981 . *The Wildlife and Countryside Act 1981 (as amended)*. London: HMSO.
- HMSO, 2006. *Natural Environment and Rural Communities Act*, London: HMSO.
- HMSO, 2017. *The Conservation of Habitats and Species Regulations 2017*. London: HMSO.

## APPENDICES:

**Appendix E1**                      **Figure E15 – Nest Tube Location Plan**

**Appendix E1:**

**Figure E15 – Nest Tube Location Plan**



Legend:

- Site Boundary
- x1 Dormouse Tube Location and Number

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Nest Tube Location Plan**

Date: 11 / 3 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ-0992-DW23		Final Revision: -
Drawing No: Figure E15		

**APPENDIX J: Essex CC Biodiversity Checklist**





# Essex Biodiversity Validation Checklist

Prepared by Place Services

Essex County Council

Version 1.3 | June 2015

# Introduction

**This checklist is a requirement for all planning applications to Essex County Council (ECC) considered a major development as defined by [Article 8\(7\) of The Town and Country Planning \(General Development Procedure\) Order 1995](#). ECC is the determining planning authority for mineral, waste and Regulation 3 applications.**

**The assistance of a professional ecologist will be necessary to complete the checklist.**

**For other applications not defined as a major development, applicants are strongly encouraged to use the checklist where there may be adverse effects on the natural environment. It should be noted that applications not considered a major development will still be reviewed by a planning authority ecologist.**

**For some developments an Environmental Impact Assessment (EIA) maybe required. In these cases this checklist must still be completed and used to inform the content of the Ecology Chapter of the Environment Statement subject to any Scoping Opinion issued by the planning authority.**

This checklist aims to provide a clear, transparent process for both applicant and Local Planning Authority (LPA) and ensure conformity with **British Standard 42020:2013 for Biodiversity (Code of practice for planning and development)**. Its correct application will help the applicant and LPA comply with national biodiversity policy and legislation; thereby reducing the likelihood of delays resulting from the submission of inadequate information.

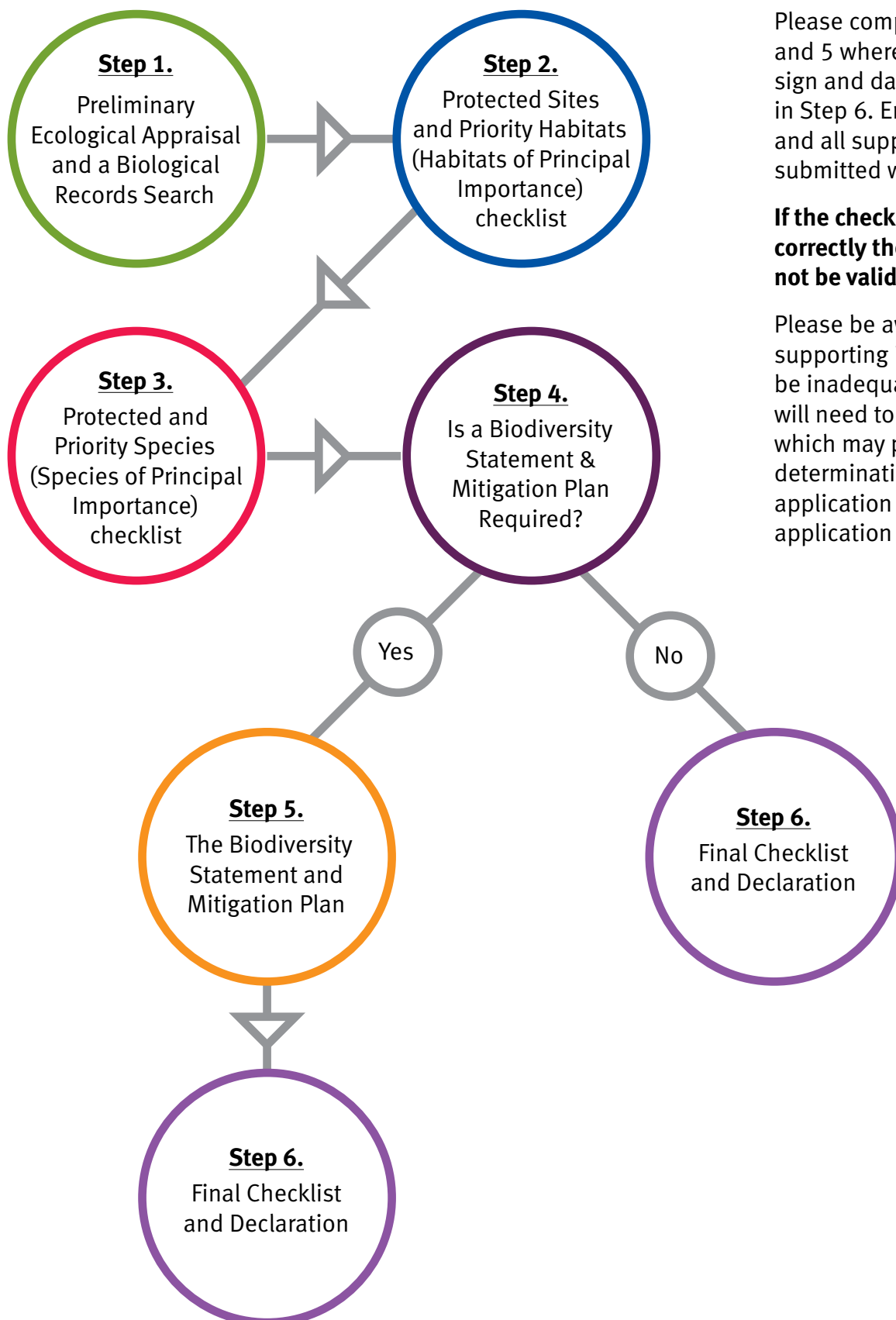
The checklist does not attempt to provide a detailed account of the legislation and policy that underpin biodiversity conservation in England. Further information can be obtained from [Natural England](#) and links have been provided in the text to external sources of information where appropriate. [A glossary](#) is also included at the end of the checklist.

The checklist is supported by Natural England's local Land Use Operations team and endorsed by the [Essex Biodiversity Project](#).

The checklist is a component of Essex County Council's Supplementary Guidance for the Submission of Planning Applications. It has been produced with funding provided by Natural England.

# The Six Steps

The checklist comprises 6 steps:



Please complete steps 1 to 4 - and 5 where necessary - then sign and date the declaration in Step 6. Ensure the checklist and all supporting information is submitted with your application.

**If the checklist is not completed correctly the application may not be valid.**

Please be aware that if the supporting information proves to be inadequate further evidence will need to be provided, which may potentially **delay** determination of the planning application or lead to the application being **refused**.

## Step 1.

# Preliminary Ecological Appraisal and Biological Records Search

A Preliminary Ecological Appraisal (PEA) of the application site must be completed in a format consistent with the '[Guidelines for Preliminary Ecological Appraisal](#)' published by the Chartered Institute of Ecology and Environmental Management (CIEEM).

The PEA and any subsequent Biodiversity Statement & Mitigation Plan should be prepared by a competent and qualified Ecologist. To find a suitable Ecological Consultant please contact [CIEEM](#) in the first instance.

The PEA must include a description of any recent works, such as vegetation clearance, that have been undertaken at the application site prior to the ecological appraisal that may affect its findings.

The PEA must include a biological records search of the application site and a 2 kilometre area extending from the sites boundary. It should encompass the following biodiversity features as a minimum:

### Protected Sites

- Special Areas of Conservation (SAC), Special Protection Areas (SPA) & Ramsar sites
- Sites of Special Scientific Interest (SSSI)
- Local Sites (i.e. Local Wildlife Sites – LoWS and Special Roadside Verges)

### European Protected Species

- Species protected under the Conservation of Habitats and Species Regulations 2010 (as amended)

### National Protected Species

- Species protected under the Wildlife & Countryside Act 1981 (as amended)
- Badgers (The Protection of Badgers Act 1992)

### Priority Habitats and Species

- Habitats of Principal Importance in England (Priority Habitats)
- Species of Principal Importance in England (Priority Species)

### Relevant data can be obtained from the following sources:

- Natural England [www.magic.gov.uk](http://www.magic.gov.uk)  
*Interactive map displaying information about SPA, SAC, Ramsar, SSSI and Ancient Woodland sites*
- Essex Field Club [www.essexfieldclub.org.uk/portal/p/Datasearch](http://www.essexfieldclub.org.uk/portal/p/Datasearch)  
*Main source of species records*
- Essex Wildlife Trust Biological Records Centre [www.essexwtrecords.org.uk](http://www.essexwtrecords.org.uk)  
*Holds site, habitat and species records including information about Local Wildlife Sites*
- Essex Biodiversity Project [www.essexbiodiversity.org.uk](http://www.essexbiodiversity.org.uk)  
*The Essex Biodiversity Action Plan can be viewed at this site*

Using the results of the Preliminary Ecological Appraisal and Biological Records Search please complete **Steps 2 - 5** which will determine whether further survey and assessment work is required.

# Step 2.

## Protected Sites and Priority Habitats (Habitats of Principal Importance) Checklist

Please complete Column 2 of Table 2.1 below. Links to more information have been provided for each site or habitat in column 1.

**Table 2.1 - Sites and Habitats Checklist**

1. Question	2. Please tick as appropriate
Is your development within 10km of a <a href="#">Special Area of Conservation</a> (SAC), <a href="#">Special Protection Area</a> (SPA) or <a href="#">Ramsar Site</a> ?	*Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is your development within 2km of a <a href="#">Site of Special Scientific Interest</a> (SSSI)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is your development within 250m of any <a href="#">Habitats of Principal Importance</a> ; <a href="#">Ancient Woodland</a> and/or <a href="#">Local Site</a> ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

*\*If you answer yes to this question additional detail maybe required by the LPA and Natural England to enable the completion of a Habitat Regulations Assessment (HRA). It is strongly recommended that you seek advice from Natural England prior to submitting your application, and submit details of any relevant correspondence with your checklist and application.*

If you have answered **'yes'** to any of the questions above please complete [Table 2.2 \(Sites and Habitat Evaluation\)](#) before proceeding to [Step 3](#).

If you have answered **'no'** to all of the questions above please proceed directly to [Step 3](#).

Please complete Column 2 of Table 2.2 below, followed by Column 3 as appropriate.

**Table 2.2 – Sites and Habitats Evaluation**

1.	2.	3.
Site/habitat	Is there a ‘reasonable likelihood’ that the development will affect (either directly or indirectly) a site or habitat in column 1 prior to applying mitigation?  (Tick as appropriate)	Where you have answered <b>‘yes’</b> name the site(s) or habitat(s) and summarise any possible direct or indirect effects that may occur during construction or operation. For SPA’s this includes ‘qualifying species’ occurring outside of the designated site boundary.  Where you have answered <b>‘no’</b> please provide a concise statement to support your answer.
SAC/SPA/Ramsar site*	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	The nearest SAC/SPA/Ramsar Site is located approximately 1.2km south-west of the Site. it is considered that the impacts of unmitigated dust and hydrological changes will not reach this far (guidance states 250m).  No direct or indirect effect of noise or air quality on any of these designations due to their distance from the Site.

1.	2.	3.
SSSI*	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<p>The closest SSSI is located approximately 650m north-west of the Site. It is considered that the impacts of unmitigated dust and hydrological changes will not reach this far. No direct or indirect impact to internationally designated sites will result from increase in noise.</p>
Priority Habitats	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<p>Removal of one hedgerow within the Site and partial removal of several hedgerows (including an important hedgerow under the hedgerow regulations 1997) to provide access haul roads. Unmitigated affects on the hedgerows includes loss of priority habitat, partial loss of important hedgerow and dust deposition.</p> <p>The site is adjacent to Cockaynes Wood, which is identified as Woodland Priority Habitat along with the adjacent Villa Woodland. Unmitigated impacts could include the deposition of dust deposition, noise and the scope for draw-down effects on the water bodies therein as a result of de-watering the mineral deposit.</p>

\*If you have answered 'yes' please seek advice from Natural England.

1.	2.	3.
Ancient Woodland	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<p>An area of Ancient Woodland immediately adjacent to the south of the Site in the form of Cockaynes Wood. Unmitigated impacts could include the deposition of dust deposition, noise and the scope for draw-down effects on the water bodies therein as a result of de-watering the mineral deposit.</p>
Local Wildlife Sites	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<p>The closest LWS is immediately adjacent to the Site (Villa Farm) to the south. The unmitigated impacts of the proposed development are dust deposition, noise and the scope for draw-down effects on the water bodies therein as a result of de-watering the mineral deposit.</p>



# Step 3.

## Protected and Priority Species (Species of Principal Importance) Checklist

Please complete Column 2 in Table 3.1 below. Where ‘Yes’ is answered a circle in the corresponding row indicates those species with a ‘reasonable likelihood’ of being present, and for which further surveys may be required. The table has been adapted from the [Natural England Standing Advice for Protected Species](#).

1.	2. (Yes/No)	European Protected Species				Nationally Protected Species (for species groups links to the relevant legislation are provided)							Priority Species ( <a href="#">Link</a> to national List)						
		Bats	Dormouse	Great Crested Newt	Otter	Badger	Barn Owl	Breeding Birds	Invertebrates	Native crayfish	Other Protected Birds	Plants (inc. fungi, ferns and bryophytes)	Reptiles	Water Vole	Birds	Fungi	Invertebrates	Mammals	Plants (inc. ferns and bryophytes)
Does the application involve modification, conversion, demolition or removal of any of the following features or types of building: <ul style="list-style-type: none"> <li>• loft space</li> <li>• any roof with gaps or cracks e.g. through uneven tiling</li> <li>• weather boarding</li> <li>• hanging tiles</li> <li>• gable ends</li> <li>• slate roof</li> <li>• clay-tiled pitched roof</li> <li>• wooden cladding</li> <li>• dense climbing plants</li> <li>• Underground structures including but not limited to cellars, tunnels, mines, kilns, ice-houses, air-raid shelters, all bridge structures, aqueducts and viaducts especially over water and wet ground</li> <li>• Agricultural building particularly but not exclusively those of traditional brick, stone or timber construction?</li> <li>• Buildings of pre-20th or early 20th Century construction</li> </ul>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●					●	●			●			●					

1.	2. (Yes/No)	European Protected Species				Nationally Protected Species (for species groups links to the relevant legislation are provided)							Priority Species ( <a href="#">Link</a> to national List)						
		Bats	Dormouse	Great Crested Newt	Otter	Badger	Barn Owl	Breeding Birds	Invertebrates	Native crayfish	Other Protected Birds	Plants (inc. fungi, ferns and bryophytes)	Reptiles	Water Vole	Birds	Fungi	Invertebrates	Mammals	Plants (inc. ferns and bryophytes)
Does the application site contain or is it adjacent to: a lake; river; canal; stream; ditch; marsh; or reedbed?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	●		●	●				●	●				●		●			
Does the application involve new lighting of a building/ structure with features suitable for bats or barn owl (e.g. described in row 1 above); or lighting of green space within 50m of woodland, water, hedgerows or tree lines?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	●					●												
Does the application site contain or is it within 200m of: semi-natural woodland; scrub thicket; or is it bounded by or adjacent to hedgerows of predominantly native species that are greater than 1m tall and 0.5m wide?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	●	●	●		●		●	●		●		●	●		●		●	●
Does the application site contain or is it adjacent to a tree/woodland plantation, including of conifers?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●	●	●		●		●			●		●	●		●		●	
Does the application site contain trees that are older than 100 years; trees with obvious holes, cracks, cavities, rot, loose bark, woodpecker holes; or trees with a girth greater than 1m at chest height?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	●					●	●	●		●				●	●	●		

1.	2. (Yes/No)	European Protected Species				Nationally Protected Species (for species groups links to the relevant legislation are provided)							Priority Species ( <a href="#">Link</a> to national List)						
		Bats	Dormouse	Great Crested Newt	Otter	Badger	Barn Owl	Breeding Birds	Invertebrates	Native crayfish	Other Protected Birds	Plants (inc. fungi, ferns and bryophytes)	Reptiles	Water Vole	Birds	Fungi	Invertebrates	Mammals	Plants (inc. ferns and bryophytes)
Does the application site involve disturbance, modification, demolition or construction on/in: gravel pits; quarries; natural cliff faces; or rock outcrops?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●		●		●		●	●		●	●	●	●			●	●	●
Does the application site contain or is it within 100m of a pond or other water-body (500m for major developments)? It can be permanent or ephemeral (sometimes dries out)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			●				●							●		●		●
Does the application site contain or is it adjacent to grassland such as meadows, parkland or pasture?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●		●		●			●		●	●				●	●	●	●
Does the application site contain previously-developed, derelict or brownfield land; or railway land?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●		●		●	●	●	●		●		●		●		●		
Does the application involve the modification, disturbance or removal of: mature or over-grown gardens; rough grassland; scrubland or allotments?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●	●	●		●		●			●	●	●		●		●	●	●
Does the application involve disturbance or removal of a compost heap?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>											●							

1.	2. (Yes/No)	European Protected Species				Nationally Protected Species (for species groups links to the relevant legislation are provided)							Priority Species ( <a href="#">Link</a> to national List)						
		Bats	Dormouse	Great Crested Newt	Otter	Badger	Barn Owl	Breeding Birds	Invertebrates	Native crayfish	Other Protected Birds	Plants (inc. fungi, ferns and bryophytes)	Reptiles	Water Vole	Birds	Fungi	Invertebrates	Mammals	Plants (inc. ferns and bryophytes)
Does the application involve the modification, disturbance or removal of arable field(s) with hedgerow and/or grass margin?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							●											●
Does the application site contain or is it within 50m of coastal habitats including estuary, rocky shore, sand dunes and saltmarsh, grazing marsh?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				●			●					●			●			
Does the application site contain or is it adjacent to heathland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●

**If you have answered ‘yes’ to any of the questions above please complete [Table 3.2 \(Species Evaluation\)](#) on the following page.**

**If you have answered ‘no’ to all of the questions above please proceed to [Step 4](#).**

Please complete column 2 of Table 3.2 below followed by column 3 as appropriate.

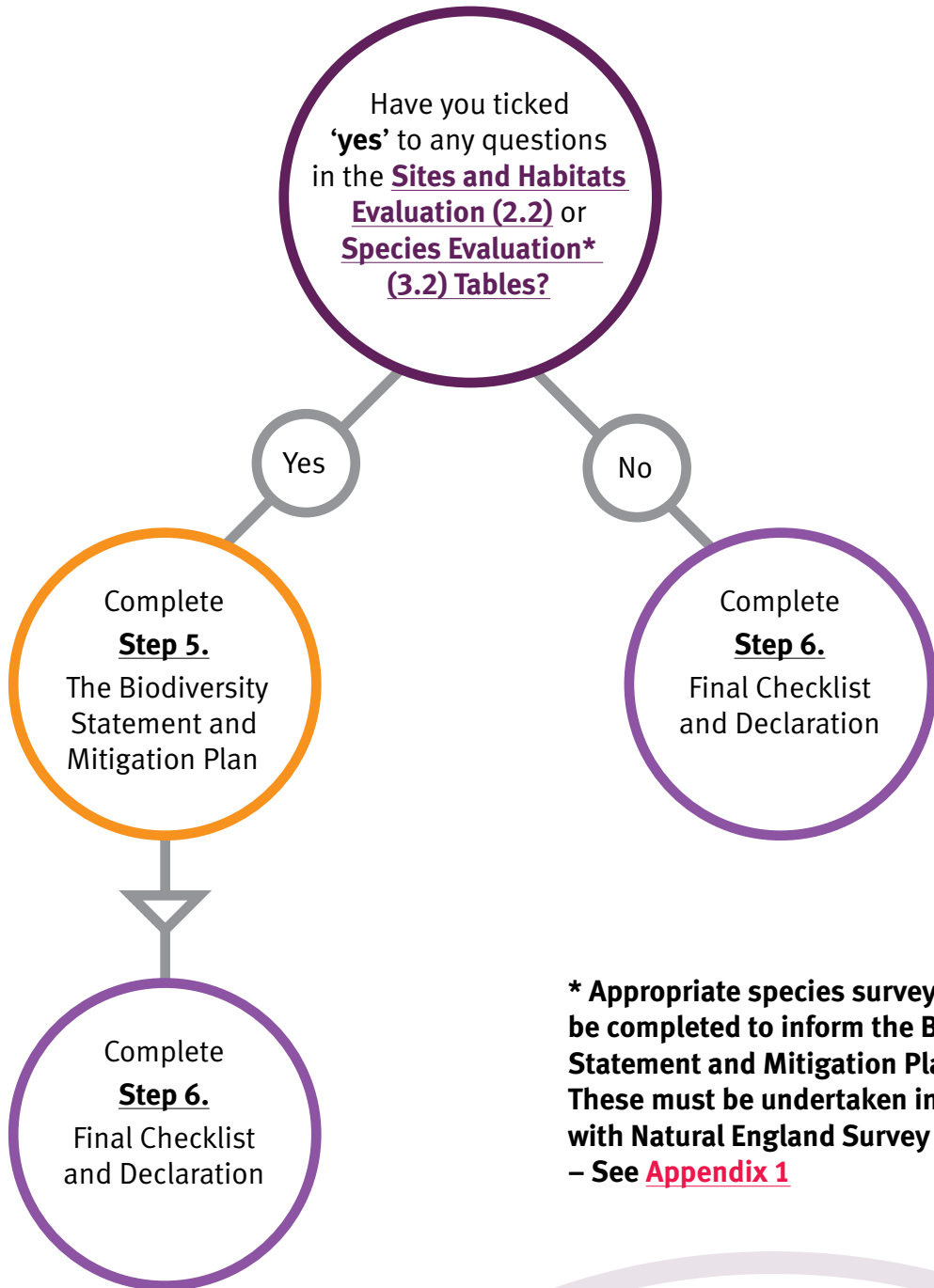
**Table 3.2 – Species Evaluation**

1.	2.	3.
<b>Species</b>	Is there a <b>‘reasonable likelihood’</b> that the development will affect a species in column 1 <b>prior</b> to applying mitigation?	Where you have answered <b>‘yes’</b> name the species and summarise any possible direct or indirect effects that may occur during construction or operation.
<p>(Identified following the completion of Table 3.1)</p>	<p>(Tick as appropriate)</p>	<p><b>Appropriate species surveys will need to be completed to inform the Biodiversity Statement and Mitigation Plan (Step 5). These must be undertaken in accordance with Natural England Survey Requirements – See <a href="#">Appendix 1</a></b></p> <p>Where you have answered <b>‘no’</b> please provide a concise statement to support your answer.</p>
<p>European Protected Species</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Bats - removal of one hedgerow and partial removal of areas of hedgerows for access haul roads may create barriers to commuting and foraging. Lighting post dusk and pre-dawn may impact on commuting routes and foraging areas. Removal and disturbance of certain trees with the potential to affect roosting bats.</p> <p>Great Crested Newt - partial loss of poor semi-improved grassland margins within 500m of breeding ponds to the south of the site. Loss of low suitability terrestrial habitat and potential killing and injury.</p> <p>Appropriate species surveys are provided as part of the ECIA that accompanied this application, supported by suggested site management regimes as part of a Construction Environmental Management Plan.</p>

1.	2.	3.
Nationally Protected Species	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<p>Breeding Birds - loss of arable (ground nesting birds) habitat and some trees and partial loss of hedgerows. Loss of suitable habitat and potential killing and injury of nesting birds.</p> <p>Reptiles - partial loss of poor semi-improved grassland for low populations of Common Lizard and Grass Snake. Potential injury and killing.</p> <p>Appropriate species surveys are provided as part of the ECIA that accompanied this application, supported by suggested site management regimes as part of a Construction Environmental Management Plan.</p>
Priority Species	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<p>Birds - Loss of some trees and partial loss of hedgerows. Loss of suitable habitat and potential killing and injury of nesting birds.</p> <p>No other priority species considered to be affected by the proposed development, due to the similar habitats within the surrounds of the site.</p> <p>Appropriate species surveys are provided as part of the ECIA that accompanied this application, supported by suggested site management regimes as part of a Construction Environmental Management Plan.</p>

# Step 4.

## Is a Biodiversity Statement and Mitigation Plan Required?



**\* Appropriate species surveys will need to be completed to inform the Biodiversity Statement and Mitigation Plan (Step 5). These must be undertaken in accordance with Natural England Survey Requirements – See [Appendix 1](#)**

## Step 5. Biodiversity Statement and Mitigation Plan

If you have answered ‘yes’ to any questions in the [Sites and Habitats Evaluation \(2.2\)](#) or [Species Evaluation \(3.2\) Tables](#) you must submit a Biodiversity Statement and Mitigation Plan incorporating the findings of the Preliminary Ecological Appraisal.

The Biodiversity Statement and Mitigation Plan must include the following:

1. A map showing the location of protected sites on or within 2km of the application site boundary (see [Appendix 2](#)).
2. An Extended [Phase 1 Habitat Survey](#) which shows the location and extent of habitats that could be affected by the proposals; together with the features associated with Protected or Priority species.
3. Relevant Protected and/or Priority Species Surveys including results and methods\* in accordance with Natural England’s Standing Advice for Protected Species Survey Requirements (See [Appendix 1](#)).
4. A qualitative evaluation of the value and likely impacts/effects upon each biodiversity feature (habitat, species or, where appropriate, species assemblage). This should adopt the same approach to the evaluation and identification of impacts as recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM) in their [Ecological Impact Assessment \(EclA\) Guidelines](#).
5. If you have answered ‘yes’ to any questions in **Table 2.2 Sites and Habitats Evaluation** - a quantitative evaluation of the application site’s habitats using Defra’s [Biodiversity Offsetting Metric](#) i.e. a calculation showing the number of Biodiversity Units within the application site boundary before and after development. An **impact calculator** for developers is available on the Environment Bank [website](#).
6. For each biodiversity feature that will be adversely affected a Mitigation Plan detailing:
  - a. How adverse impacts will be avoided\*\*, reduced and/or mitigated\*\*\*.
  - b. How any residual impacts that cannot be avoided and/or mitigated will be compensated\*\*\* for off-site.
  - c. Where appropriate, how mitigation or compensation measures will be managed, resourced and monitored post-permission. Detailed guidance about the format of long-term mitigation and habitat management plans can be provided upon request.
7. Proposals for biodiversity enhancements. This is strongly encouraged for all developments, but especially for applications that occur within recognised local ecological networks such as a [Living Landscape Area](#) or the [Greater Thames Marshes Nature Improvement Area \(NIA\)](#).

All habitat creation or restoration measures should be focused upon local conservation priorities as defined by the [Essex Biodiversity Action Plan](#).

*\*This should clearly describe the survey work undertaken. Simply stating national survey guidelines were followed is not sufficient.*

*\*\*where the final location or design of the development is not necessarily the least harmful to biodiversity, the overriding technical reasons for this choice must be clearly evidenced.*

*\*\*\*Habitat mitigation and/or compensation measures must be expressed in Biodiversity Units (See Defra’s Biodiversity Offsetting Metric).*



# Supporting Notes

## BS 42020 – a code of practice for biodiversity in planning and development

BS 42020 is a standard developed by the British Standards Institution (BSI) in association with biodiversity experts and stakeholders from across all sectors. The standard provides clear recommendations and guidance to ensure that actions and decisions taken at each stage of the planning process are informed by sufficient and appropriate ecological information. The BSI has produced a smart guide that provides an introduction to the benefits of BS 42020 [smart guide](#).

### European Protected Species

Please note that for European Protected Species a mitigation licence may be required – post planning permission - in order to carry out the development should permission be granted. It is important that you refer directly to Natural England the licensing body for further guidance, and submit any relevant correspondence with this checklist.

However, The Conservation of Habitats and Species Regulations 2010 requires the Local Planning Authority (LPA) to consider ‘Three Tests’ when determining a planning application that may affect a European Protected Species. These ‘tests’ can be summarised as follows:

- Is there a genuine need and ‘purpose’ for the proposed development?
- Are there any satisfactory alternatives to delivering and meeting the need in the way proposed?
- Will there be any adverse effect on the conservation status of the species concerned?

If there is a risk of European Protected Species being impacted by the development the applicant must submit sufficient evidence to enable these tests to be satisfactorily addressed by the LPA.

Further guidance is provided in the Natural England publication ‘[European Protected Species and the Planning Process](#)’.

European Protected Species are those animals listed under Schedule 2 or plants listed under Schedule 5 of the Conservation of Habitats and Species Regulations 2010. The term European Protected has **not** been used for ‘Nationally Protected Species’ with no protection under the Regulations, but which are listed under Schedule II and/or V of the European Habitats Directive. For example the native crayfish.

### Wild Birds

Reg 9A(8) of The Conservation of Habitats and Species Regulations 2010 states that “a competent authority in exercising any function in the UK must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds”. Applicants must demonstrate clearly how any such deterioration or pollution of wild bird habitat will be avoided by the proposed development.

### Environmental Impact Assessment (EIA)

Where a formal Environmental Impact Assessment (EIA) is required under the [EIA Regulations](#) the Biodiversity Statement & Mitigation Plan should be incorporated in to the Ecology chapter of the Environmental Statement subject to any Scoping Opinion issued by the Planning Authority.

### Biodiversity Offsetting

The Biodiversity Offsetting Metric provides a standardised and transparent approach to ensuring mitigation and compensation measures are sufficient to secure no-net-loss of biodiversity. The metric is a stand-alone tool – its use does **not** assume a need for off-site compensation. Indeed, it can be used to quantify the positive benefits of onsite mitigation or enhancement measures.

### Natural England Discretionary Advice Service.

Natural England has a Discretionary Advice Service (DAS) which operates to provide advice for applications prior to submission. This service includes a limited amount of free Initial Advice, followed by Charged Advice for more complex requests. It is strongly recommended that you contact them to discuss the advice you require prior to submitting your application.

Further details are available on their [website](#).

Please go to [Step 6](#).

# Step 6.

## Final Checklist and Declaration

This must be submitted along with every application to ECC, if the checklist is not completed correctly the application may not be valid.

		<i>Applicant Only</i>		<i>Office Only</i>	
Step	Item	Tick if Included	Required	Included	
Step 1	Preliminary Ecological Appraisal*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Biological Records Search *	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Step 2	Table 2.1 Sites & Habitats checklist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Table 2.2 Sites & Habitats evaluation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Step 3	Table 3.1 Species checklist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Table 3.2 Species evaluation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Step 5	Biodiversity Statement & Mitigation Plan **	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Correspondence from Natural England/Environment Agency/ Other Conservation Body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

\*Should be incorporated in to the Biodiversity Statement & Mitigation Plan where one is required.

\*\*Must be incorporated in to the Ecology chapter of an ES if an EIA is required.

Signed:	<input type="text"/>	Date:	<input type="text"/>
Applicant/Agent (please delete as appropriate)			
Name:	<input type="text"/>		
Address:	<input type="text"/>		

**Please note that in all circumstances legislation pertaining to protected species still applies and it is the responsibility of the developer to ensure that protected species and sites are not adversely affected as a result of development.**

Thank you for completing this checklist. Please submit it, along with all supporting information, with your application.

# Appendix 1 – Guidelines for Surveys

Links to Natural England’s Standing Advice for Protected Species (Survey Requirements):

- [What should detailed survey reports for protected species include?](#)
- [Great Crested Newt](#)
- [Badger](#)
- [Bats](#)
- [Barn Owl](#)
- [Birds](#)
- [Dormouse](#)
- [Invertebrates](#)

Due to the recognised value of invertebrate assemblages associated with brownfield sites in Essex, Natural England have produced specific local Standard Advice which is available [here](#).

- [Native crayfish](#)
- [Otter](#)
- [Reptiles](#)
- [Water Vole](#)
- [Plants](#)

## Other Guidance:

Natural England has produced [Standing Advice for Ancient Woodland and Veteran Trees](#) and this should be referred to in the preparation of the Biodiversity Statement where Ancient Woodland and/or Veteran Trees are likely to be affected.

The Chartered Institute of Ecology and Environmental Management ‘[Sources of Survey Methods](#)’ (SoSM) should be referred to for survey methodologies for Priority Species not covered by Natural England’s Standing Advice.

## Appendix 2 – Biodiversity features that must be shown on an Ordnance Survey base map at an appropriate scale

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar Site
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Ancient Woodland
- Local Wildlife Site (LoWS)
- Special Roadside Verge

# Glossary

**Ancient or veteran tree:** A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally.

**Ancient woodland:** An area that has been wooded continuously since at least 1600 AD.

**Biodiversity Action Plan (BAP):** Biodiversity Action Plans (BAPs) arose from the signing of the Convention on Biological Diversity in 1992, an international treaty signed by 150 nations including the UK, pledging to conserve biodiversity. BAPS are broken down into Species Action Plans (SAPs) and Habitat Action Plans (HAPs) and cover species and habitats considered threatened. These are known as ‘Priority’ species and habitats. Each Plan contains a definition of the habitat or species, describes the threats they face and the objectives and targets need to be met to conserve them. BAPS currently cover 1149 Priority species and 65 Priority habitats.

**Ecological networks:** These link sites of biodiversity importance.

**Environmental Impact Assessment (EIA):** A procedure to be followed for certain types of project to ensure that decisions are made in full knowledge of any likely significant effects on the environment.

**European Protected Site:** This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and potential Special Protection Areas, and is defined in regulation 8 of the Conservation of Habitats and Species Regulations 2010.

**International, national and locally designated sites of importance for biodiversity:** All international sites (Special Areas of Conservation, Special Protection Areas, and Ramsar sites), national sites (Sites of Special Scientific Interest) and locally designated sites including Local Wildlife Sites.

**Living Landscapes:** Living Landscapes are large landscape-scale areas of the countryside, such as river valleys, estuaries, forested ridges, and grass and heath mosaics, which form ecological networks. The networks allow wildlife to move through them and increase their resilience to threats such as climate change, floods, drought, sea-level rise and development pressure. There are 80 Living Landscapes within Essex.

**Local planning authority:** The public authority whose duty it is to carry out specific planning functions for a particular area. All references to local planning authority apply to the district council, borough council and county council to the extent appropriate to their responsibilities.

**Nature Improvement Area:** Inter-connected network of wildlife habitats intended to re-establish thriving wildlife populations and help species respond to the challenges of climate change.

**NPPF:** National Planning Policy Framework. This document sets out the government’s planning policies for England and how they are expected to be applied. It provides guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.

**Previously developed land:** Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: land that is or has been occupied by agricultural or forestry buildings; land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures; land in built-up areas such as private residential gardens, parks, recreation grounds and allotments; and land that was previously-developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time.

**Priority habitats and species:** Species and Habitats of Principal Importance included in the England Biodiversity List published by the Secretary of State under section 41 of the Natural Environment and Rural Communities Act 2006.

**Qualifying species:** Those plants or animals found on the legal list of qualifying species for which a Special Area of Conservation, Special Protection Area or Ramsar site has been selected and is managed.

**Ramsar sites:** Wetlands of international importance, designated under the 1971 Ramsar Convention.

**Special Areas of Conservation:** Areas given special protection under the European Union's Habitats Directive, which is transposed into UK law by the Habitats and Conservation of Species Regulations 2010.

**Special Protection Areas:** Areas which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within European Union countries. They are European designated sites, classified under the Birds Directive.

**Site of Special Scientific Interest:** Sites designated by Natural England under the Wildlife and Countryside Act 1981.

**Stepping stones:** Pockets of habitat that, while not necessarily connected, facilitate the movement of species across otherwise inhospitable landscapes.

**Wildlife corridor:** Areas of habitat connecting wildlife populations.

This information is issued by

**Essex County Council, Place Services.**

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CDS 133289

# APPENDIX K: Biodiversity Enhancement Plan





## **Biodiversity Enhancement Plan**

# **Proposed Eastern Extension, Wivenhoe Quarry, Alresford Road, Wivenhoe**

Report Reference: CE-WQ-0992-RP10a - Final



Produced by Crestwood Environmental Ltd.

20 December 2018

**Crestwood Report Reference: CE-WQ-0992-RP10a - Final:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	23.05.2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)
Final Rev A	20.12.2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

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

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors unless otherwise stated in an accompanied 'letter of reliance' with an official Crestwood Environmental Limited letterhead. No responsibility is accepted to others.

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# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) have been appointed by D L Walker Ltd. on behalf of Tarmac Ltd. (**'the Client'**) to produce a Biodiversity Enhancement Plan (**'BEP'**) for the Proposed Eastern Extension of Wivenhoe Quarry (Vice County VC 19: North Essex), with restoration to nature conservation habitats and grazing habitat, centred at National Grid Reference (NGR) TM 049 224 (**'the Site'**).

1.1.2 The BEP must be submitted as part of the planning application to Essex County Council (ECC) in line with the Mineral Site Restoration for Biodiversity; Supplementary Planning Guidance (SPG) (Essex County Council, 2016). This supports the Minerals Local Plan to set out target for the creation of Priority Habitat by the Essex Biodiversity Project.

1.1.3 The following reports should be read in conjunction with, and have guided the information within, this BEP:

- *Extended Phase 1 Habitat Survey (Report ref: CE-WQ0992-RP01);*
- *Great Crested Newt Population Survey (Report ref: CE-WQ0992-RP02);*
- *Reptile Population Survey (Report ref: CE-WQ0992-RP03);*
- *Breeding and Wintering Bird Survey (Report ref: CE-WQ0992-RP04 and CE-WQ0992-RP05);*
- *Bat Activity Survey (Report ref: CE-WQ0992-RP06);*
- *Water Vole Survey (Report ref: CE-WQ0992-RP07);*
- *Dormouse Survey (Report ref: CE-WQ0992-RP08);*
- *Ecological Impact Assessment (EclA) (Report ref: CE-WQ0992-RP09a (Crestwood Environmental Ltd., 2018));*
- *Construction Environmental Management Plan ('CEMP') (Report Ref: CE-WQ0992-RP11a (Crestwood Environmental Ltd., 2018)); and*
- *Update Preliminary Ecological Appraisal Report ('PEAR') (Report Ref: CE-WQ0992-RP12a (Crestwood Environmental Ltd., 2018)).*

1.1.4 The BEP should also be read in conjunction with the full Environmental Impact Assessment and Landscape Proposals set out by the Client.

1.1.5 This BEP provides general management for habitats set out within the Proposed Restoration Scheme (drawing number W328-00062-12A) as supplied by the Client on 30<sup>th</sup> November 2018.

## 1.2 PURPOSE AND SCOPE

1.2.1 As stated in the Mineral Site Restoration for Biodiversity Supplementary Planning Guidance (SPG)

(Essex County Council, 2016) '*A long-term Biodiversity Enhancement Plan (BEP) would be provided as part of any planning application for a restoration scheme at a Flagship Site.*'

1.2.2 The Site has been identified by the SPG as a Flagship Scheme that represents a preferred and reserve site considered to offer the greatest opportunity to deliver beneficial biodiversity after-use.

1.2.3 As set out in the SPG, the BEP shall consist of:

- *Aims and objectives of the restoration scheme;*
- *Consistent with the requirements of the Essex Biodiversity Validation Checklist, an appraisal of the site's existing ecological value prior to extraction, and description of any necessary mitigation measures that will be incorporated into the restoration scheme to address unavoidable significant impacts to biodiversity features (such as to legally protected species) arising from the construction or operation of the quarry;*
- *Consistent with the requirements of the Essex Biodiversity Validation Checklist, a Biodiversity Offsetting Metric Calculation that expresses habitat losses and gains in Biodiversity Units);*
- *A description of the Priority Habitats (and associated Priority Species) targeted for enhancement and appropriate to the site with reference to conservation priorities set-out in local spatial plans such as Nature Improvement Areas or Living Landscapes;*
- *A description of the specific techniques and practices for establishing each Priority Habitat;*
- *A description of the sources and provenance of seeds or other plant material to be used;*
- *Plans and tables that clearly show the extent, timing and location of proposed Priority Habitat creation works;*
- *A description of the specific management techniques and practices for maintaining each Priority Habitat;*
- *Plans and tables that clearly show the extent, timing and location of proposed Priority Habitat management operations;*
- *A description of the personnel or management body responsible for carrying out the establishment and maintenance (Inc. monitoring) of the Priority Habitats during the lifetime of the BEP;*
- *A full breakdown of costs for implementing the BEP; and*
- *A monitoring framework that clearly describes the proposed approach to ecological monitoring during the lifetime of the BEP, and allows for the plan to be amended, where necessary, in light of the findings of Ecological Monitoring Reports (Para 9.2) (The monitoring framework may need to include any features E.g. requiring long-term mitigation or compensation measures).*

## 2 BASELINE ECOLOGICAL FEATURES

### 2.1 SITE DESCRIPTION

2.1.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable, Hedgerows (Intact and Defunct), Improved Grassland, Orchard and Poor Semi-Improved Grassland and Tall Ruderal.

2.1.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne circa 1km to the south; and a railway line bordered by trees and woodland running east-west to the south of the Site.

2.1.3 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

2.1.4 The full planning application title reads:

*'Extraction of 3.8 million tonnes of sand and gravel as an easterly extension to the existing Wivenhoe Quarry, erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material.'*

### 2.2 STATUTORY AND NON-STATUTORY DESIGNATED SITES

2.2.1 There are a number of statutory wildlife sites within 2km of the Site. The statutory wildlife sites include:

- Sites of Special Scientific Interest (SSSI's);
- Local Nature Reserves (LNR);
- Special Areas of Conservation (SAC);
- Special Protection Areas (SPA); and
- Ramsar sites.

2.2.2 A number of Non-Statutory wildlife sites, which were all Local Wildlife Sites (LoWS) are located within 1km of the Site boundary, one of which is immediately adjacent to the southern Site boundary.

2.2.3 Based on information provided by MAGIC, within 250m of the Site boundary there are a number of Habitats of Principal Importance (HPI) as shown in Table 1.

**Table 1 Habitats of Principal Importance**

Habitat Type	Distance and Direction
Deciduous woodland	Several areas adjacent to site boundary to south and southwest.
Traditional Orchard	Adjacent to site boundary to north and 100m east.

2.2.4 An area of Ancient Woodland (Cockaynes Wood) exists directly adjacent to the southern boundary of the Site.

## 2.3 HABITATS

2.3.1 An Update Ecological Walkover Survey was undertaken in September 2018 (Crestwood Environmental Ltd., 2018), identifying 6 habitats at the Site:

- Arable;
- Hedgerows (Intact and Defunct);
- Improved Grassland;
- Orchard;
- Poor Semi-Improved Grassland; and
- Tall Ruderal.

2.3.2 Habitats that are to be retained as part of the Proposed Development are:

- The majority of Internal Hedgerows and Trees;
- Some of the Orchard; and
- Some Semi-Improved Grassland Margins.

### Arable

2.3.3 Arable is the dominant habitat present at the Site and present throughout the Eastern Extension Area. At the time of the Phase 1 Survey, the majority of fields had been ploughed.

2.3.4 During subsequent species specific survey visits, some of the Arable fields were used for crops such as Barley.

### Hedgerow (Intact and Defunct)

2.3.5 There are 17 Hedgerows at the Site throughout the central and eastern extents of the Site. The majority of Hedgerows are classed as species poor, with four Hedgerows being classed as species rich and a single Hedgerow classed as Important under the Hedgerow Regulations 1997.

2.3.6 Species present included: Hawthorn, Elder (*Sambucus nigra*), Blackthorn (*Prunus spinosa*), Pedunculate Oak, Hazel, Dog Rose (*Rosa canina*), Dogwood, Broom (*Cytisus scoparius*), Common Nettle, Ash, Willow sp. and Holly (*Ilex aquifolium*).



### Improved Grassland

- 2.3.7 An area of Improved Grassland was present in the northern extent of the Site, adjacent to Tenpenny Hill (B1027). This habitat lies to the west of the Orchard habitat.

### Orchard

- 2.3.8 A single area of recently planted Orchard was present towards the northern extent of the Site, abutting the B1027 (Tenpenny Hill). Species present included fruit tree species and Perennial Rye-grass.

### Poor Semi-Improved Grassland

- 2.3.9 Poor Semi-Improved Grassland was present at the Site in the northern and southern extent, as well as along the margins of the Arable fields.
- 2.3.1 Species present included False Oat-grass (*Arrhenatherum elatius*), Cock's Foot (*Dactylis glomerata*), Yorkshire Fog (*Holcus lanatus*), Crested Dogs Tail (*Cynosurus cristatus*), Ribwort Plantain (*Plantago lanceolata*), Field Pansy (*Viola arvensis*), Oxeye Daisy (*Leucanthemum vulgare*), White Champion (*Silene latifolia*), Red Champion (*Silene dioica*), Red Clover (*Trifolium pratense*), White Clover (*Trifolium repens*) and Prickly Sow Thistle (*Sonchus asper*).

### Tall Ruderal

- 2.3.2 Three areas of Tall Ruderal were present at the Site at the time of the Extended Phase 1 Habitat Survey, which were thought to be managed for game cover. Smaller areas of Tall Ruderal were also present along the Arable field boundaries.
- 2.3.3 Species present within this habitat included: Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Broad leaved Dock (*Rumex obtusifolius*), Red Deadnettle (*Lamium purpureum*) White Deadnettle (*Lamium album*), Perennial Rye Grass (*Lolium perenne*), Yorkshire Fog (*Holcus lanatus*), Cocks Foot (*Dactylis glomerata*) Common Bent (*Agrostis capillaris*), Pendulous Sedge (*Carex pendula*) and Common Nettle (*Urtica dioica*).

## 2.4 FAUNAL SPECIES

- 2.4.1 A number of species specific surveys were undertaken during 2016 (see Section 1.1). Table 2 summarises the species recorded at, and within 500m of, the Site.

**Table 2 Species at, and within 500m of, the Site**

Species Group	Species Common Name	Species Scientific Name	At the Site/Within 500m of the Site
Reptiles	Common Lizard	<i>Zootoca vivipara</i>	At the Site.
	Grass Snake	<i>Natrix Natrix</i>	At the Site.
Amphibians	Great Crested Newt	<i>Triturus cristatus</i>	Closest recorded c. 125m south of the Site.
Birds	Schedule 1 species; 13 Red and 12 Amber List Birds of Conservation Concern (BoCC)	-	Recorded throughout the Site.
Bats	Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Recorded throughout Site.
	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	
	Noctule Bat	<i>Nyctalus noctula</i>	Recorded throughout the Site.
	Brown Long-Eared	<i>Plecotus auritus</i>	
	Myotis sp.	<i>Myotis sp.</i>	
	Serotine Bat	<i>Eptesicus serotinus</i>	
	Natterer's Bat	<i>Myotis nattereri</i>	
	Barbastelle Bat	<i>Barbastella barbastellus</i>	Recorded towards the northern extent of the Site.
Nathusius Pipistrelle	<i>Pipistrellus nathusii</i>		

2.4.2 A number of features at the Site were considered suitable for protected species (including the updated Preliminary Bat Roost Assessment (PRA) undertaken in 2018), including:

- Moderate quality hedgerow habitats for commuting and foraging Bats;
- Low and Moderate suitability for roosting Bats;
- Habitat for nesting Birds (e.g. Hedgerows and Trees); and
- Low quality grassland habitat for Reptiles and Great Crested Newt.

## 2.5 EVALUATION OF ECOLOGICAL FEATURES

2.5.1 A summary of features and their Ecological Value is set out in Table 3. Mitigation measures to be put in place at the Site are also summarised.

**Table 3 Summary of Ecological Features at, or within the ZOI of, the Site**

Feature	Summary Description	Value	Mitigation Measures
Statutory Designated Sites	SPA, SAC, Ramsar, SSSI, NNR, LNR within 10km.	County to International.	Dust management plan, other factors not considered to affect Statutory Designations.
Non-Statutory Designated Sites	Local Wildlife Site (LoWS).	County.	Dust and noise management plan.
HPI	Ancient Woodland, Deciduous Woodland and Traditional Orchard.	Local to District.	Dust management plan; 30m buffer zone from Ancient Woodland with fencing and warning signage.
Reptiles	Common Lizard and Grass Snake at the Site; Low quality Grassland habitat for Reptiles	Site.	Sensitive working methods (as per the CEMP); re-establishment of suitable habitat as part of the restoration proposals; Hibernacula.
Great Crested Newt	Great Crested Newt recorded c.25m south of the Site; Low quality Grassland habitat for Great Crested Newt.	Site.	Sensitive working methods (as per the CEMP); re-establishment of suitable habitat as part of the restoration proposals; wildlife pond creation.
Birds	Small number of Schedule 1 Bird species; Red list and amber list species; Habitat for nesting Birds.	Local to County.	Sensitive working methods (as per the CEMP), faunal enhancements.
Bats	9 species of Bats recorded; Moderate quality habitat for foraging and commuting Bats.	County.	Sensitive working methods (as per the CEMP); Faunal enhancements.

### 3 HABITAT LOSSES AND GAINS

#### 3.1 BIODIVERSITY UNITS

- 3.1.1 The habitat losses and gains within the Site are detailed in Table 7. This includes a calculation of the net change in biodiversity units, based on the Biodiversity Offsetting Pilots; Guidance for Developers document (DEFRA, 2012).
- 3.1.2 This assessment is based on guidance from DEFRA as detailed within *“Technical Paper: the metric for the biodiversity offsetting pilot in England”* and *“Guidance for developers”* documents (DEFRA, 2012).
- 3.1.3 In order to assess the level of biodiversity loss as a result of the Proposed Development, habitats are assigned ‘Biodiversity Units’ using a calculation provided by DEFRA (DEFRA, 2012). The method for obtaining these Biodiversity Units is set out below.
- 3.1.4 Habitats are pre-assigned to one of three habitat type bands, on the basis of their ‘Distinctiveness’. Distinctiveness is a collective measure of biodiversity and includes parameters such as species

richness, diversity, rarity and the degree to which a habitat supports species rarely found in other habitats.

3.1.5 Table 4 below details the score for each band of habitat Distinctiveness (DEFRA, n.d.).

**Table 4 Habitat Distinctiveness**

Habitat Distinctiveness	Score
High	6
Medium	4
Low	2

3.1.6 Each habitat is then assigned a 'Condition' which is based on methodology within Higher Level agri-environment Scheme Farm Environment Plan Handbook (Natural England, 2010).

3.1.7 Table 5 below shows the score associated with the Condition of the habitat.

**Table 5 Habitat Condition**

Habitat Condition	Score
Good	3
Moderate	2
Poor	1

3.1.8 The Condition and Distinctiveness scores are multiplied together to give an overall score expressed in Biodiversity Units per hectare, as set out in Table 6 below.

**Table 6 Habitat Distinctiveness and Condition Matrix**

		Habitat Distinctiveness		
		Low (2)	Medium (4)	High (6)
Habitat Condition	Good (3)	6	12	18
	Moderate (2)	4	8	12
	Poor (1)	2	4	6

3.1.9 Plate 1 below shows an example calculation of Biodiversity Units.

**Plate 1 Biodiversity Unit Calculation Example**

**Example**

A development will result in the loss of 6 hectares of lowland meadow, currently in moderate condition.

Habitat	Distinctiveness	Condition	Hectares	Number of Units
Lowland meadow	6	2	6	(6x2x6) 72 biodiversity units lost

- 3.1.10 The majority of habitat lost at the Site is Arable, with removal of small areas of Poor Semi-Improved Grassland, Tall Ruderal, Dense and Scattered Scrub. All habitats to be created/re-established at the Site as part of the Proposed Restoration Scheme are of high biodiversity conservation and significantly compensate for the temporary loss of habitats at the Site.
- 3.1.11 Table 7 details the biodiversity losses and gains at the Site based on existing habitats prior to development as well as reinstated habitats and created habitats post restoration.
- 3.1.12 All measurements are in hectares, with the exception of Hedgerows, which are in meters (length). To avoid omission of habitats which measure less than 0.5ha from the Biodiversity Offsetting Assessment, all measurements have been taken to 2 decimal places.

**Table 7** *Habitat and Biodiversity Unit Changes*

Habitat	UK Priority Habitat	Essex Priority Habitat	Existing	Removed	Retained	Re-instated	Created	Total (post-restoration)	Change	Distinctiveness	Condition
<b>Existing and Re-instated Habitats</b>											
Arable			51.59ha	51.59ha	0	0	0	0	-51.59ha	2 (low)	2 (moderate)
Tall Ruderal			1.77ha	1.77ha	0	0	0	0	-1.77ha	2 (low)	1 (poor)
Improved grassland			0.18ha	0.18ha	0	0	1.48ha	1.48ha	+1.30ha	2 (Low)	1 (poor)
Hedgerow (intact and defunct)	✓	✓	3,409.20m	188.20m	3221.00m	188.20m	224.40m	3633.60m	+224.40m	6 (high)	3 (good)
Semi-Improved Grassland			7.27ha	7.27ha	0	0	7.40ha	7.40ha	+0.13ha	4 (medium)	2 (moderate)
Orchard	✓	✓	0.10ha	0.01ha	0.09ha	0	0	0.09ha	-0.01ha	6 (high)	3 (good)

Table 7 Cont'd...

Habitat	UK Priority Habitat	Essex Priority Habitat	Existing	Removed	Retained	Re-instated	Created	Total (post-restoration)	Change	Distinctiveness	Condition
<b>Created Habitats</b>											
Woodland	✓		0	0	0	0	4.74ha	4.74ha	+4.74ha	4 (medium)	3 (good)
Lowland Meadows	✓	✓	0	0	0	0	11.83ha	11.83ha	+11.83ha	6 (high)	3 (good)
Lowland Acid Grassland	✓	✓	0	0	0	0	20.92ha	20.92ha	+20.92ha	6 (high)	3 (good)
Exposed Sand and Gravel Cliffs			0	0	0	0	0.06ha	0.06ha	+0.06ha	2 (low)	2 (moderate)
Exposed Margins and Mudflats			0	0	0	0	0.47ha	0.47ha	+0.47ha	6 (high)	2 (moderate)
Standing Water	✓	✓	0	0	0	0	10.60ha	10.60ha	+10.60ha	6 (high)	3 (good)
Open Mosaic Habitat and Reedbed	✓	✓	0	0	0	0	3.30ha	3.30ha	+3.30ha	6 (high)	3 (good)

3.1.13 The calculation and associated Biodiversity Units of each habitat present at the Site (prior to development) are shown in Table 8 below.

**Table 8 Biodiversity Unit Calculation Prior to Development**

Habitat	Distinctiveness Score		Condition Score		Size (Area (ha) / Length (m))		Biodiversity Units
Arable	2	x	2	x	51.59ha	=	206.36
Tall Ruderal	2		1		1.77ha		3.54
Orchard	6		3		0.10ha		1.80
Improved Grassland	2		1		0.18ha		0.36
Hedgerow (intact) and Hedgerow with Trees	6		3		3,409.20m		61365.60
Semi-Improved Grassland	4		2		7.27ha		58.16

3.1.14 Total Biodiversity Units = **61,635.82**.

3.1.15 The calculation and associated Biodiversity Units of each habitat present at the Site (post-restoration) are shown in Table 9 below.

**Table 9 Biodiversity Unit Calculation Post-Restoration**

Habitat	Distinctiveness Score		Condition Score		Size (Area (ha) / Length (m))		Biodiversity Units
Hedgerow	6	x	3	x	3,633.60m	=	65,404.80
Woodland	6		3		4.74ha		85.32
Lowland Meadows	6		3		11.83ha		212.94
Orchard	6		3		0.09ha		1.62
Lowland Acid Grassland	6		3		20.92ha		376.56
Semi-Improved Grassland	4		2		7.40ha		59.20
Improved Grassland	2		1		1.48ha		2.96
Exposed Sand and Gravel Cliffs	2		2		0.06ha		0.24
Exposed Margins and Mudflats	6		2		0.47ha		5.64
Standing Water	6		3		10.60ha		190.80
Open Mosaic Habitat and Reedbed	6		3		3.3ha		59.40

3.1.16 Total Biodiversity Units = **66,399.48**.



- 3.1.17 The current design of the Proposed Restoration Scheme results in a **gain of 4763.66 Biodiversity Units**.

## **4 PRIORITY HABITAT AND SPECIES**

### **4.1 UK BIODIVERSITY ACTION PLAN (UK BAP)**

- 4.1.1 The UK BAP was originally published in 1994 as a response to the Convention on Biological Diversity, which the UK signed up to in Rio de Janeiro in 1992. The UK BAP set out plans to conserve biological resources within the UK, and also devised action plans for priority species (1,150 listed) and habitats (65 listed) which were considered to be most threatened.
- 4.1.2 The UK BAP listed 59 broad targets for the Government and nature conservation agencies to conserve and where possible, enhance wild species and habitats over a 20 year period.
- 4.1.3 In 2012 the UK Post-2010 Biodiversity Framework was published, this framework contains priorities specific to the UK for the Convention on Biological Diversity, which were agreed upon by the Environment Departments of all UK governments.
- 4.1.4 The UK Post-2010 Biodiversity Framework 'Biodiversity 2020' - Strategy for England's Wildlife and Ecosystems Services encompasses the period from 2011-2020 and is now supported by Local Biodiversity Action Plans (LBAPs) which are usually devised by county councils. The guidance now concentrates on Species and Habitats of Principal Importance which are listed under Schedule 41 of the NERC Act. Whilst the overlap from the former UK BAP and Local BAP is not fully completed, for the purpose of this document and ecological assessment, both Species and Habitats of Principal Importance (SPI and HPI respectively) listed within Schedule 41 will be referred to only.

### **4.2 ESSEX BIODIVERSITY ACTION PLAN (ESSEX BAP)**

- 4.2.1 Information on the Local Biodiversity Action Plan was obtained from the 'Essex Biodiversity Project' website (Essex Biodiversity Project, 2010) which provided information on HPI and SPI within the county.

### **4.3 PRIORITY HABITATS**

- 4.3.1 All habitats as part of the Proposed Restoration Scheme (drawing number: W328-00062-12), with the exception of Wet Grassland, are listed as Priority Habitats under the UK BAP.
- 4.3.2 The following habitats as part of the Proposed Restoration Scheme are considered to be Priority Habitats, based on the Essex BAP:
- Woodland;
  - Lowland Meadows;
  - Lowland Acid Grassland;
  - Hedgerows;
  - Waterbodies (Ponds);

- Orchard; and
- Open Mosaic Habitat and Reedbed.

4.3.3 Habitats which are set out within the Proposed Restoration Scheme which are not considered to be Priority Habitats based on the Essex BAP are:

- Wet Woodland (as part of the Woodland);
- Exposed Sand and Gravel Cliffs;
- Improved Grassland; and
- Semi-Improved Grassland (Field Margins).

4.3.4 Habitat Creation and Management proposals for habitats as part of the Proposed Restoration Scheme are detailed below, based on both the UK BAP and the Essex BAP (Essex Biodiversity Project, 2012).

## **5 HABITAT CREATION AND MANAGEMENT OF PRIORITY HABITATS**

### **5.1 INTRODUCTION**

5.1.1 The recommended species lists provided within this section are not exhaustive. All seeds, plugs and whips will be sourced from local provenance where possible. Landscaping of native plant species should be sought from a professional landscaper.

5.1.2 Any invasive species identified at the Site will be removed via approved methods as soon as possible and disposed of as controlled waste.

5.1.3 Guidance for the creation of the following Priority Habitats has been taken from the Mineral Site Restoration for Biodiversity: Supplementary Planning Guidance (Essex County Council, 2016):

- Lowland Meadow;
- Lowland Acid Grassland;
- Open Mosaic Habitats; and
- Reedbeds.

### **5.2 WOODLAND**

5.2.1 There are 12 areas of Deciduous Woodland proposed to be planted throughout the Site as part of the Proposed Restoration Scheme.

5.2.2 Areas of Woodland will be complimentary to those areas of established Woodland in the wider area, such as Cockayne's Wood to the south of the Site.

5.2.3 4.74ha of Woodland will be created as part of the final restoration proposals (with the inclusion of Wet Woodland – see Section 6.3).

## Recommended Planting

- 5.2.4 Table 10 details the recommended native tree and shrub species that will be planted within the areas of Woodland at the Site. These stands will be a mixture of ages to allow for a varied canopy cover and mosaic of open and closed areas within the woodland. A number of open areas will also allow a light to reach the woodland floor in different areas so ground flora can grow.

**Table 10 Recommended Native Tree and Shrub Species**

Species Common Name	Species Scientific Name
<b>Canopy Layer</b>	
Pedunculate Oak	<i>Quercus robur</i>
Hazel	<i>Corylyus avellana</i>
Ash	<i>Fraxinus excelsior</i>
Beech	<i>Fagus sylvatica</i>
Silver Birch	<i>Betula pendula</i>
Elder	<i>Sambucus nigra</i>
<b>Shrub Layer</b>	
Holly	<i>Ilex aquifolium</i>
Dogwood	<i>Cornus sanguinea</i>
Blackthorn	<i>Prunus spinosa</i>
Hawthorn	<i>Crataegus monogyna</i>
Guelder Rose	<i>Viburnum opulus</i>
Gorse	<i>Ulex europaeus</i>

## Habitat Creation and Design

- 5.2.5 Trees will be planted in good weather between October and March and will be approximately 60cm in height at time of planting.
- 5.2.6 Ground flora species will naturally establish providing management of larger tree and shrub species is beneficial. However, seed stock could be taken from adjacent woodlands if necessary.
- 5.2.7 After initial planting, new trees will be protected by plant guards to prevent browsing by Deer and Rabbit. Different ages and species of plants will be mixed within the planting to avoid homogenous stands of both age and species.

## Initial Aftercare Management (Years 1-5)

- 5.2.8 Bramble and Bracken within the woodland areas will be cut on a rotational basis (different areas of scrub cut on, for example, a three-year cycle) to provide structural diversity within the habitat.

## Long Term Management (Years 6-25)

- 5.2.9 Once the woodlands are established (typically 10 years+), a management regime to the inclusion of

rides and glades into the woodland will be devised, to allow the continuation of a mosaic habitat. A coppicing programme will also be implemented.

- 5.2.10 Vegetation removal will always be undertaken outside of the Bird nesting season (typically March-August inclusive).

### 5.3 LOWLAND MEADOW

5.3.1 Lowland Meadow is second largest habitat within the Proposed Restoration Scheme and will be a major habitat for the restoration of the Site. Areas of the Grassland will be used for the light grazing of stock, which will more than likely be sheep.

5.3.2 11.83ha of Lowland Meadow will be created as part of the final restoration proposals.

#### Recommended Planting

5.3.3 Table 11 details generic species which could be incorporated into the Lowland Meadows to provide a mixture of nectar and pollen rich species, as well as tussocky grasses.

5.3.4 More specific seed mixes would be recommended as part of the SPG (dependant on soil type) include:

- EM4 – Meadow mixture for Clay Soils;
- EM5 – Meadow Mixture for Loamy Soils; or
- EM7 – Meadow Mixture for Sandy Soils.

**Table 11 Recommended Lowland Meadow Species**

Species Common Name	Species Scientific Name
<b>Wildflowers</b>	
Yarrow	<i>Achillea millefolium</i>
Agrimony	<i>Agrimonia eupatoria</i>
Lesser Burdock	<i>Arctium minus</i>
Common Knapweed	<i>Centaurea nigra</i>
Greater Knapweed	<i>Centaurea scabiosa</i>
Wild Carrot	<i>Daucus carota</i>
Wild Teasel	<i>Dispacus fullonum</i>
Hedge Bedstraw	<i>Galium album</i>
Meadow Cranesbill	<i>Geranium pratense</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>
Common Fleabane	<i>Pulicaria dysenterica</i>
Red Champion	<i>Silene dioica</i>
Tufted Vetch	<i>Vicia cracca</i>
Field Scabious	<i>Knautia arvensis</i>

Table 11 Cont'd...

Species Common Name	Species Scientific Name
<b>Wildflowers</b>	
Meadow Buttercup	<i>Ranunculus acris</i>
Yellow Rattle	<i>Rhinanthus minor</i>
Cowslip	<i>Primula veris</i>
White Dead-nettle	<i>Lamium album</i>
Lady's Bedstraw	<i>Galium verum</i>
Salad Burnet	<i>Sanguisorba minor</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
<b>Grasses</b>	
Crested Dogstail	<i>Cynosurus cristatus</i>
Cocksfoot	<i>Dactylis glomerata</i>
Tufted Hair-grass	<i>Deschampsia cespitosa</i>
Red Fescue	<i>Festuca rubra</i>
Yorkshire Fog	<i>Holcus lanatus</i>
Tall Fescue	<i>Schedonorus arundinaceus</i>

### Habitat Creation and Design

- 5.3.5 In accordance with the design principles set out in the SPG, when creating Lowland Meadow Priority Habitat, soil phosphorus status is critical. In general, the phosphorous index should be 0 or 1; a score of 2 and above indicates success is likely to be marginal or unlikely.
- 5.3.6 The SPG further states:
- “Soil analysis of restoration soils should be determined using the methods outlined in Natural England’s Technical Information Note ‘TIN035 Soil sampling for habitat recreation and restoration in agri-environment schemes’. Further guidance on interpreting soil analysis results is given in Technical Information Note ‘TIN036 Soils and agrienvironment schemes: interpretation of soil analysis’.”*
- 5.3.7 Topography of this habitat will be set out to allow for hay-meadow cuts. More varied conditions, including sloping ground, small pool and scrapes will be accommodated in peripheral areas.
- 5.3.8 Seed will be spread at the Site during September/October. This can be undertaken using either hand sowing methods or by light machinery.
- 5.3.9 During the first year of establishment, the grassland will be cut three times to allow for a range of species to establish, balancing out the faster and slower growing species and removing annual weed species. Where areas of habitat are grazed

### Initial Aftercare Management (Years 1-5)

- 5.3.10 Following the first year’s cuts, the Lowland Meadow at the Site will cut annually between July and September. Where areas of Lowland Meadow are to be grazed, these can be managed year round if

grazing stocks are low. This should be reviewed regularly to avoid over grazing.

- 5.3.11 Any Year 2 weeds should be topped cutting them to a height of c.15cm during the mid-summer.
- 5.3.12 Any scrub will be removed before being allowed to establish and overrun the grassland areas, outside of the Bird breeding season. Small amounts of scrub will be left in place and managed, to ensure a structural diversity within the Grassland.

#### Long Term Management (Years 6-25)

- 5.3.13 The grassland will be monitored bi-annually to allow for changes in the management regime if necessary.
- 5.3.14 Grazing of the Grassland will be undertaken following the establishment of the habitat. The grazing of Grassland will be undertaken on a rotational basis in autumn/winter with lighter grazing in the spring/summer months. Heavy grazing during the summer months will suppress the growth of flowering plants, therefore heavy grazing should be used during autumn/winter (Buglife, 2012). For year round grazing, Natural England Guidance (Kirkham, et al., 2003) suggests average daily stocking levels of 0.35 Livestock Units per hectare.
- 5.3.15 A grazing management plan must be in place to ensure stock is managed in a way best suited to Lowland Meadow conservation.
- 5.3.16 Priority Habitat status has been achieved when:
- At least two indicator species is frequent and two are occasional (see 0);and
    - Three out of the following criteria are met:
      1. Cover of undesirable species (creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle, marsh ragwort, cow parsley and bracken) less than 5%.
      2. Cover of wildflowers and sedges throughout the sward (excluding the undesirable species listed above and creeping buttercup and white clover) more than 20%.
      3. Cover of bare ground (including localised areas, for example, rabbit warrens) less than 10%.
      4. Cover of invasive trees and shrubs less than 5%, and indicators of water logging (such as large sedges, rushes, reeds) less than 30%.

**Table 12 Lowland Meadow Indicator Species (Essex County Council, 2016)**

Species Common Name	Species Scientific Name	Species Common Name	Species Scientific Name
Agrimony	<i>Agrimonia eupatoria</i>	Marsh Marigold	<i>Caltha palustris</i>
Autumn Hawkbit	<i>Leontodon autumnalis</i>	Meadow Vetchling	<i>Lathyrus pratensis</i>
Betony	<i>Stachys officinalis</i>	Meadowsweet	<i>Filipendula ulmaria</i>
Bird's-foot Trefoil	<i>Lotus corniculatus</i>	Milkworts	<i>Polygala sp.</i>
Black Knapweed	<i>Centaurea nigra</i>	Narrow-leaved Water-dropwort	<i>Oenanthe silaifolia</i>
Bugle	<i>Ajuga reptans</i>	Orchids	<i>Orchideaceae sp.</i>
Burnet Saxifrage	<i>Pimpinella saxifraga</i>	Ox-eye Daisy	<i>Leucanthemum vulgare</i>
Common Bistort	<i>Persicaria bistorta</i>	Pepper Saxifrage	<i>Silaum silaus</i>
Cowslip	<i>Primula veris</i>	Pignut	<i>Conopodium majus</i>
Devil's-bit Scabious	<i>Succisa pratensis</i>	Ragged Robin	<i>Lychnis flos-cuculi</i>
Dropwort	<i>Filipendula vulgaris</i>	Rough Hawkbit	<i>Leontodon hispidus</i>
Dyer's Greenwood	<i>Genista tinctoria</i>	Salad Burnet	<i>Sanguisorba minor</i>
Eyebright	<i>Euphrasia officinalis</i>	Sneezewort	<i>Achillea ptarmica</i>
Field Scabious	<i>Knautia arvensis</i>	Tormentil	<i>Potentilla erecta</i>
Goat's-beard	<i>Tragopogon pratensis</i>	Water Mint	<i>Mentha aquatica</i>
Greater Bird's-foot Trefoil	<i>Lotus pedunculatus</i>	Yellow Rattle	<i>Rhinanthus minor</i>
Lady's Bedstraw	<i>Galium verum</i>	Glaucous Sedge	<i>Carex flacca</i>
Marsh Bedstraw	<i>Galium palustre</i>	Common Sedge	<i>Carex nigra</i>
Fen Bedstraw	<i>Galium uliginosum</i>	Carnation Sedge	<i>Carex panicea</i>

5.3.17 Monitoring should be undertaken in line with the 3-step process set out within the SPGs 'Technical Guidance to help prepare Monitoring Frameworks'.

## 5.4 LOWLAND ACID GRASSLAND

5.4.1 Lowland Acid Grassland accounts for the largest area of the Site on the Proposed Restoration Scheme. Areas of Lowland Acid Grassland habitat will be grazed.

5.4.2 20.92ha of Lowland Acid Grassland will be created as part of the Proposed Restoration Scheme.

### Recommended Planting

5.4.3 Table 13 details the species that could be planted within this habitat that would provide a good mixture of wildflower and grass species.

**Table 13 Recommended Lowland Acid grassland Species**

Species Common Name	Species Scientific Name
<b>Lowland Acid grassland species</b>	
<b>Grasses</b>	
Common Bent	<i>Agrostis capillaris</i>
Wavy Hair-grass	<i>Deschampsia flexuosa</i>
Crested Dogtail	<i>Cynosurus cristatus</i>
Slender-creeping Red-fescue	<i>Festuca rubra</i>
Smaller Cat's-tail	<i>Phleum bertolonii</i>
<b>Wildflowers</b>	
Yarrow	<i>Achillea millefolium</i>
Common Knapweed	<i>Centaurea nigra</i>
Wild Carrot	<i>Daucus carota</i>
Lady's Bedstraw	<i>Galium verum</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>
Birdsfoot Trefoil	<i>Lotus corniculatus</i>
Selfheal	<i>Prunella vulgaris</i>
Cowslip	<i>Primula veris</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Common Sorrel	<i>Rumex acetosa</i>
Wild Red Clover	<i>Trifolium pratense</i>

### Habitat Creation and Design

5.4.4 In accordance with the design principles set out in the SPG, when creating Lowland Acid Grassland Priority Habitat, soil phosphorus status is critical. In general, the phosphorous index should be 0 or 1; a score of 2 and above indicates success is likely to be marginal or unlikely.

5.4.5 A number of physical criteria are important when creating Lowland Acid Grassland:

- Lowland Dry Acid Grassland creation is only viable on acidic soils with a pH 4-5.5;
- It is important to create topography that replicates the natural landform, including variations in slope and aspect as appropriate. Retain some bare ground features where possible;
- Wet varieties of Acid Grassland establish where seasonal waterlogging with base poor water occurs; and
- Mire vegetation develops where waterlogging is permanent.

5.4.6 Natural colonisation is most likely to produce a species-rich habitat. Prevention of rank grass species will allow for quicker colonisation of typical Acid Grassland species, this should be



undertaken by the early introduction of grazing, especially during spring.

5.4.7 If the soil used as part of the restoration scheme does not contain the seed bank suitable for Lowland Acid Grassland, Seed from local provenance should be used. The following method (as set out within the SPG) should be used to establish seeds:

- Use a moderately fine and firm seedbed;
- Fertiliser is not required;
- Control perennial weeds pre-seeding: let them germinate in spring / summer and treat with glyphosate;
- Sow seed in September/October at 10-15 kg per ha depending on fertility and the urgency for green cover; and
- Encourage light at ground level by repeated cutting; this relieves competition for wildflower seedlings. Three cuts may be necessary on fertile soils, less or none at all on the poorest. Remove arisings.

5.4.8 During the first year the grassland should be cut three times to allow for a range of species to flourish as without this only fast growing species would become dominant within the grassland. During these cuts annual weed species should also be removed where possible.

#### Initial Aftercare Management (Years 1-5)

5.4.9 Lowland Acid Grassland is typically managed by grazing, which can be year round if at low stocking rates.

5.4.10 Any weeds that appear after this first year should be topped, cutting them to a height of c.15cm, during the mid to late-summer. All arisings should be removed. Where grazing is not possible, selective rotational cutting should be employed as a management technique at the Site.

5.4.11 Scrub should be managed within the grassland as to not let it become dominant over the grass and wildflower species and inhibit their growth. Removal of large patches of scrub should be timed to miss the Bird breeding season. Smaller patches of scrub could be left within the grassland to create a more diverse structure which is beneficial to many fauna species.

#### Long Term Management (Years 6-25)

5.4.12 The grassland will be monitored bi-annually to allow for changes in the management regime if necessary.

5.4.13 After the grassland has established grazing can be used as a management method. Grazing should be undertaken on a rotational basis and the degree of grazing should be monitored and altered depending on the season. Lighter grazing should be implemented in the spring/summer months so that the flowering plants during this season are not over grazed. Heavy grazing should therefore be utilized in the autumn/winter months (Buglife, 2012).

5.4.14 A grazing management plan must be in place to ensure stock is managed in a way best suited to Grassland conservation.

5.4.15 Priority Habitat status has been achieved when:

- At least two indicator species is frequent and two are occasional (see Table 14);and
  - Three out of the following criteria are met:
    1. Cover of undesirable species (creeping thistle, spear thistle, curled dock, broadleaved dock, common ragwort, common nettle, rosebay willowherb, marsh thistle, musk thistle and greater plantain) less than 5%.
    2. Cover of bare ground (including localised areas, for example, rabbit warrens) less than 10%.
    3. Cover of bracken less than 20% and cover of scrub and bramble less than 5%.
    4. Cover of coarse grass species, such as Yorkshire-fog and cock's-foot, less than 20%.

**Table 14 Lowland Acid Grassland Indicator Species (Essex County Council, 2016)**

Species Common Name	Species Scientific Name
Bell Heather	<i>Erica cinerea</i>
Betony	<i>Stachys officinalis</i>
Bilberry	<i>Vaccinium myrtillus</i>
Bird's-foot Trefoil	<i>Lotus corniculatus</i>
Biting Stonecrop	<i>Sedum acre</i>
Bitter-vetch	<i>Lathyrus linifolius</i>
Blue Fleabane	<i>Erigeron acris</i>
Bucks-horn Plantain	<i>Plantago coronopus</i>
Common Centuary	<i>Centaureum erythraea</i>
Common Rock-rose	<i>Helianthemum nummularius</i>
Common Storks-bill	<i>Erodium cicutarium</i>
Devil's-bit Scabious	<i>Succisa pratensis</i>
Harebell	<i>Campanula rotundifolia</i>
Heath Bedstraw	<i>Galium saxatile</i>
Heath Speedwell	<i>Veronica officinalis</i>
Heather	<i>Calluna vulgaris</i>

Species Common Name	Species Scientific Name
Lady's Bedstraw	<i>Galium verum</i>
Lichens	Lichen species
Lousewort	<i>Pedicularis sp.</i>
Milkworts	<i>Polygala sp.</i>
Mouse-ear Hawkweed	<i>Hieracium pilosella</i>
Parsley Pierts	<i>Aphanes australis</i>
Pignut	<i>Conopodium majus</i>
Rough Hawkbit	<i>Leontodon hispidus</i>
Lesser Hawkbit	<i>Leontodon saxatilis</i>
Sheep's Sorrel	<i>Rumex acetosella</i>
Thymes	<i>Thymus sp.</i> <i>Clinopodium sp.</i>
Tormentil	<i>Potentilla erecta</i>
Violets	<i>Viola sp.</i>
Wild Strawberry	<i>Fragaria vesca</i>
Wood Anemone	<i>Anemone nemorosa</i>
Wood Sage	<i>Tuecrium scorodonia</i>

5.4.16 Monitoring should be undertaken in line with the 3-step process set out within the SPGs 'Technical Guidance to help prepare Monitoring Frameworks'.

## 5.5 HEDGEROW WITH STANDARD TREES

5.5.1 Hedgerows with Standard Trees will be planted in areas where access is required by the Proposed Development and in additional areas as part of the Proposed Restoration Scheme.

- 5.5.2 The new hedgerows will be planted between October and March.
- 5.5.3 Any gappy hedgerows will be infilled with supplementary planting with native species or standard trees where applicable. An appropriate seed mix will be used for the base of existing hedgerows to increase diversity.
- 5.5.4 Improving existing connectivity between hedgerows and woodland within the surrounding area will encourage seed dispersal and longevity.
- 5.5.5 The total of new hedgerow creation is 224.4m. Hedgerow removed as part of the Proposed Development will be re-instated as part of the Proposed Restoration Scheme (total of 3633.6m). All other hedgerow at the Site is to be retained and where practical, buffer zones will be used as part of the protection of retained hedgerows.

### Recommended Planting

- 5.5.6 Table 15 details the species recommended for planting within new Hedgerows. It is considered optimal to allow an associated grassy margin to establish alongside the Hedgerow of at least 1m wide, which benefits invertebrates. This will be made up of perennials and non-weedy herbaceous species. A species rich hedgerow contains a minimum of 5 woody species per 30m.

**Table 15 Recommended Hedgerow Species**

Species Common Name	Species Scientific Name
<b>Hedgerow Species</b>	
Hawthorn	<i>Crataegus monogyna</i>
Blackthorn	<i>Prunus spinosa</i>
Hazel	<i>Corylus avellana</i>
Beech	<i>Fagus sylvatica</i>
Elder	<i>Sambucus nigra</i>
<b>Standard Trees</b>	
Pedunculate Oak	<i>Quercus robur</i>
Ash	<i>Fraxinus excelsior</i>
Common Lime	<i>Tilia x Europaea</i>
Black Poplar	<i>Populus nigra</i>

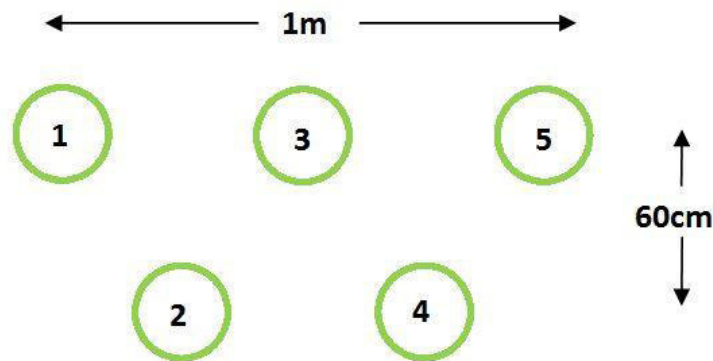
### Habitat Creation and Design

- 5.5.7 Hedgerow species whips will be sourced from local provenance and be at least 40-60cm high prior to planting. Planting is best undertaken during good weather between October and March inclusive, and protected from browsing animals such as Rabbit and Deer.
- 5.5.8 All new hedgerows will comprise a minimum of 3-5 plants staggered over 1m and will consist of 6 species. This would meet the minimum species requirement for HPI/UK BAP 'species rich' hedgerows. Standard trees will be planted every 25- 50m metres at random.
- 5.5.9 New Hedgerows will be planted in a staggered double row in an approximately 60cm strip, which

will produce a dense livestock proof hedge whilst still providing benefits for wildlife, and cut to a chamfered shape to allow for a wide base and an established ground flora.

- 5.5.10 Plate 2 below illustrates 5 plants per meter in a staggered double row, as described in Section 5.5.8 and 5.5.9.

**Plate 2 Hedgerow Plantation Plan showing 5 plants per metre**



#### Initial Aftercare Management (Years 1-5)

- 5.5.11 The health of the woody species within the hedgerow will be monitored annually. Where trees have failed to grow over significant lengths these will be replaced with the species listed in the table above.
- 5.5.12 A light cutting regime will be established following the first year of growth. Cutting or flailing will be undertaken on a two yearly rotational basis, trimming alternate side of the hedgerows every other year, to maintain a stable level of flowering and fruiting every year, providing feeding, sheltering and nesting opportunities for wildlife.
- 5.5.13 Trees to be grown as standards will be tag marked to avoid accidental cutting. These will be allowed to reach semi-maturity before management regimes are set in place, such as coppicing or pollarding.
- 5.5.14 Existing mature trees within retained hedgerows will be tag marked to avoid accidental cutting. Where existing hedgerows become gappy, these will be infilled with native plant species.
- 5.5.15 Hedgerows will be cut outside the Bird breeding season (typically March-August inclusive).

#### Long Term Management (Years 6-25)

- 5.5.16 60% of the Hedgerows will be maintained between 1.5m and 2.5m in height with cutting between December and February on a 5 year rotation. 40% of the hedgerows will be maintained between 2.5m and 4m high, will be cut at the same time of year but on a 2 year rotation.
- 5.5.17 The hedge bases will be maintained which will include tall ruderal and grassland habitats and managed on a 2 year rotation.

## 5.6 WATERBODIES

- 5.6.1 A total of 3 ponds are to be created as part of the Proposed Restoration Scheme. Any ponds which are not to be left as 'quarry ponds' i.e. where they are to be dug once restoration habitats have been established, will be created between March to September inclusive to avoid hibernation season for Great Crested Newt and Reptiles.
- 5.6.2 10.60ha of open water bodies will be created as part of the final restoration proposals.
- 5.6.3 Several areas of open water (e.g. ponds) at the Site will be assessed for requirements to dredge approximately every 10 years (depending on the rate of deposition of silt) to maintain appropriate depth and gradient. Any invasive species which colonise the standing water will be removed immediately upon identification and disposed of as controlled waste. Maintain at least a 50% area of open water on a 2-3 year basis.
- 5.6.4 2 ponds illustrated within the Proposed Restoration Scheme to the south-east of the Site (see Figure E16) will be created as wildlife ponds, to benefit the 'medium' sized Great Crested Newt population recorded to the south of the Site. Further details for these ponds can be found in Section 7.

## 5.7 REEDBED

- 5.7.1 Reedbed areas within the Site, situated around the large lagoon within the eastern extent of the Site, will provide shelter and foraging opportunities for Birds, Invertebrates, Amphibians and Reptiles.
- 5.7.2 3.30ha of Reedbed (including Open-Mosaic Habitat) will be created as part of the final restoration proposals for the Site.

### Recommended Planting

- 5.7.3 Table 16 details the recommended species for planting within both the Reedbed areas at the Site. The Reedbed area will be comprised mainly of *Phragmites* and *Typha* species.

**Table 16 Recommended Reedbed and Wetland Species**

Species Common Name	Species Scientific Name
<b>Reedbed</b>	
Reed Mace	<i>Typha Latifolia</i>
Common Reed	<i>Phragmites australis</i>
Unbranched Burr-reed	<i>Sparganium simplex</i>

### Habitat Creation and Design

- 5.7.4 The areas of Reedbed will be design and managed in accordance with the content of Section 6 of Part IV of the Mineral Site Restoration for Biodiversity SPG (Essex County Council, 2016).
- 5.7.5 As set out in the SPG, the ability to vary the water level with a Reedbed is important, both flooding and drying is required to manage the Reedbed area successfully.

- 5.7.6 Sowing of the Reedbed will be undertaken in still wind conditions, with saturated (not flooded), free of vegetation soils.
- 5.7.7 Sowing will take place between May and June, when daytime temperatures range from 10-25°C and nights are frost free. Fragments of the seed head will be pressed gently into the seedbed to ensure good contact, with the use of compression boards or trampling.

#### Initial Aftercare Management (Years 1-5)

- 5.7.8 Undesirable species will be removed from the habitat as soon as possible.
- 5.7.9 Rhizomes or plants of Common Reed from a reliable source of local provenance will be used.
- 5.7.10 The first year after planting is critical for reed survival from drought and wildfowl survival. It will be necessary to protect the reedbed from any grazing animals in the first year, including geese, coots, deer, rabbits and livestock. Fencing may be necessary, which will also discourage public access.
- 5.7.11 After the first year the reedbed area will be monitored on an annual basis. Reedbed will be managed through cutting and thinning of reeds where required, to prevent the succession of the habitat to woodland carr.
- 5.7.12 The Wetland habitat will be managed with 2-3 year rotational cutting and selective thinning to avoid successional habitats forming.
- 5.7.13 Cut reeds will be used to form habitat piles within the wetland habitat areas.

#### Long-Term Management (Years 6-25)

- 5.7.14 Rotational cutting of the reedbed will be undertaken on a 3 year cycle during the winter months to encourage the diversity of reed age within the habitat.
- 5.7.15 Should other management techniques be used (such as grazing or summer cutting), only a portion of the habitat will be subject to these techniques in any one year.
- 5.7.16 Priority Habitat status has been achieved when all of the following apply:
- Cover of scrub within the reedbed is less than 10%;
  - The vegetation includes at least 60% reeds;
  - Surface water is present over at least part of the reedbed for most of the year; and
  - Cover of undesirable species (common nettle, docks, creeping/spear thistles, common ragwort and Himalayan balsam) is less than 10%.

### **5.8 Orchard**

- 5.8.1 Orchard habitat is currently present within the northern extent of the Site. This will be managed in line with Natural England Technical Information Note TIN014 (Natural England, 2010).
- 5.8.2 0.09ha will be retained as part of the Restoration Scheme. The trees currently within this habitat

are immature in nature and guarded against grazing with the use of tree guards.

#### Initial Management (Years 1-5)

- 5.8.3 Any stakes in place to support immature fruit trees should be monitored every 6 months in the first 2 years and the ties loosened if they start to dig into the tree bark. Following this, trees should have grown enough to anchor themselves into the ground and the stakes can be removed. The resulting hole should be filled with soil, otherwise the stake can be cut off at ground level.
- 5.8.4 Tree guards should be checked as regularly as possible to repair damage done by livestock and wild animals and should be left in place for at least 10 years.

#### Long-Term Management (Years 6-25)

- 5.8.5 Mature trees will be protected from bark stripping using chicken wire wrapped around the trunk, to be adjusted over-time as the tree matures.
- 5.8.6 Once the trees are well established, the sward will be allowed to group up to the trunk. Bramble and Ivy will be removed from around the trees to avoid over competition.
- 5.8.7 Maintenance pruning is necessary to maintain the balance between fruit production and vegetative growth (Natural England, 2010). Pruning should be undertaken in line with Natural England Technical Information Note TIN017.
- 5.8.8 Winter pruning will promote shoot growth over fruit production and should be undertaken between November and March inclusive.
- 5.8.9 Pruning will be undertaken on a rotational basis to avoid over-pruning of the entire tree stock. Flowers will be left to mature to allow food sources for Invertebrates.

### **5.9 Open-Mosaic Habitat**

- 5.9.1 Open-Mosaic Habitat is proposed alongside the Reedbed habitat to the eastern extent of the Site. Re-profiling of this habitat will be undertaken when necessary through the use of light machinery.
- 5.9.2 Open-Mosaic Habitat will be created alongside Reedbed (see Section 5.7.2) as part of the Proposed Restoration Scheme.

#### Recommended Planting

- 5.9.3 It is recommended that no planting is undertaken where Open-Mosaic Habitat is proposed, to allow natural colonisation of species typical of early succession.

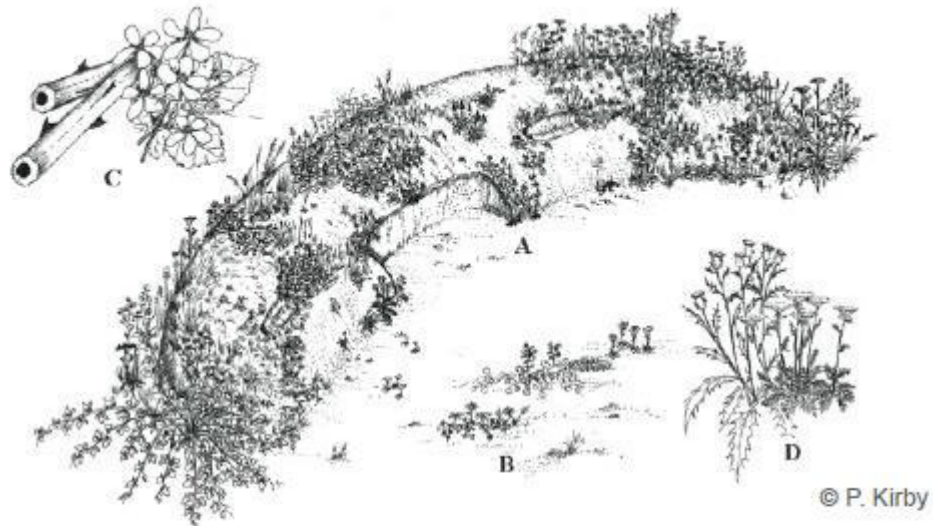
#### Habitat Creation and Design

- 5.9.4 A range of topographical features are best when creating open-Mosaic Habitat, including cliffs, banks, hollows and pools. South facing banks can be of particular importance for warmth-loving invertebrates.
- 5.9.5 In-line with guidance, it is best practice to retain small areas of quarry workings, such as cliffs and

slopes (allowing them to colonise naturally), to retain some topographical diversity. The construction of bee banks should form an integral part of the Open-Mosaic Habitat within the Restoration Scheme, which are usually made from spoil or other waste material.

5.9.6 Plate 3 illustrates an example bee bank design as set out in the SPG.

**Plate 3 Bee Bank Design (Essex County Council, 2016)**

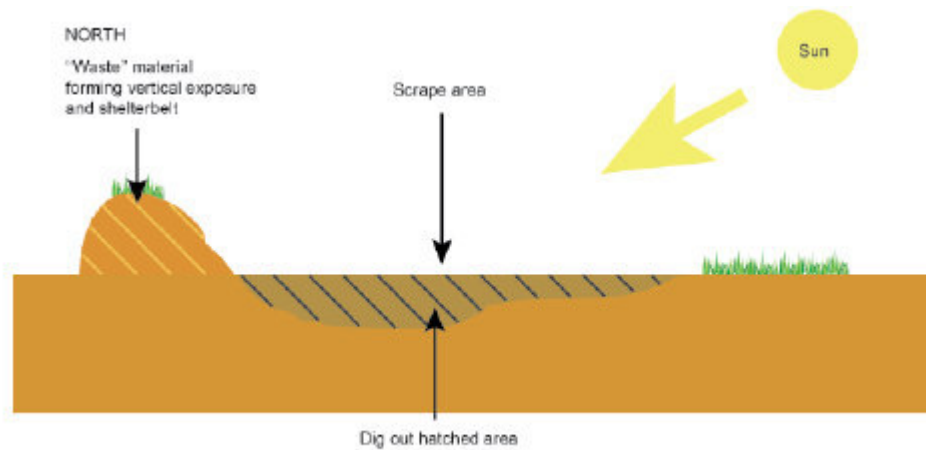


- A. Bare ground and a varied structure provide a wide range of foraging and nesting opportunities.
- B. Open-structured vegetation in front of the bank provides extra habitat and does not shade the bank.
- C. Taller flower-rich vegetation nearby provides important foraging areas.
- D. Bramble and other scrub in the vicinity provides a nectar and foraging resource, broken stems can provide nesting sites for stem nesting species.

5.9.7 Bee scrapes are another feature of Open-Mosaic Habitat which can be incorporated as part of the Restoration Scheme, to provide a wider variety of topographical variation within the habitat and a greater range of invertebrate species. Plate 4 illustrates an example bee scrape as set out in the SPG.



**Plate 4 Bee Scrape (Essex County Council, 2016)**



© Buglife. From 'The value of natural regeneration' report, Summer 2014

- 5.9.8 Topsoil should not be spread over these areas as the soil needs to be low in nutrients to prevent early succession.

**Initial Aftercare Management (Years 1-5)**

- 5.9.9 Re-profiling, clearing banks or scraping back vegetation that has colonised will 'reset' the process of natural colonisation. This should be undertaken on an 'as required' and rotational basis.
- 5.9.10 Less than 15% of scrub and young trees should be maintained within this habitat and should not be allowed to dominate any one area. Once an area becomes heavy invaded by trees and scrub it will require re-profiling or scraping.

**Long Term Management (Years 6-25)**

- 5.9.11 Priority Habitat status has been achieved when the following apply:
- The area of open mosaic habitat is at least 0.25 ha in size.
  - Early successional communities are present, consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of:
    - a) annuals;
    - b) mosses/liverworts;
    - c) lichens;
    - d) ruderals;
    - e) inundation species;
    - f) open grassland;
    - g) flower-rich grassland; or
    - h) heathland.

- The site contains unvegetated, loose bare substrate and pools may be present.
- The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a)–(h) above plus bare substrate, within 0.25 ha.

5.9.12 Monitoring should be undertaken in line with SPG guidance Section 2.2 of Part V (Essex County Council, 2016).

## 6 HABITAT CREATION AND MANAGEMENT OF OTHER HABITATS

### 6.1 IMPROVED GRASSLAND

6.1.1 The Proposed Restoration Scheme highlights this habitat that will be used as a footpath grassland corridor, which will run adjacent to the Lowland Acid Grassland fields that are proposed.

6.1.2 This habitat accounts for 1.48ha of the Site post restoration.

6.1.3 Management of this habitat will be in line with the landscape details set out as part of the Proposed Development.

### 6.2 SEMI-IMPROVED GRASSLAND

6.2.1 The Semi-Improved Grassland will be a prominent feature within the Site after restoration. Strips of this habitat will be incorporated along the boundaries of some of the Lowland Acid Grassland fields acting as grassland field margins.

6.2.2 This habitat accounts for 7.40ha of the Proposed Restoration Scheme.

#### Recommended Planting

6.2.3 Table 17 details the species that could be planted within this habitat that would provide a good mixture of wildflower and grass species.

**Table 17 Recommended Semi-improved grassland Species**

Species Common Name	Species Scientific Name
<b>Semi-improved grassland species</b>	
<b>Grasses</b>	
Common Bent	<i>Agrostis capillaris</i>
Crested Dogstail	<i>Cynosurus cristatus</i>
Slender-creeping Red-fescue	<i>Festuca rubra</i>
Smaller Cat's-tail	<i>Phleum bertolonii</i>
<b>Wildflowers</b>	
Yarrow	<i>Achillea millefolium</i>
Common Knapweed	<i>Centaurea nigra</i>
Wild Carrot	<i>Daucus carota</i>
Lady's Bedstraw	<i>Galium verum</i>

Oxeye Daisy	<i>Leucanthemum vulgare</i>
Selfheal	<i>Prunella vulgaris</i>
Common Sorrel	<i>Rumex acetosa</i>
Red Campion	<i>Silene dioica</i>

### Habitat Creation and Design

- 6.2.4 Seed should be sown between February and May and should be done with light machinery or by using hand sowing methods.
- 6.2.5 During the first year of establishment, the grassland will be cut three times to allow for a range of species to establish, balancing out the faster and slower growing species and removing annual weed species.

### Initial Aftercare Management (Years 1-5)

- 6.2.6 After the first year semi-improved grassland should be cut yearly between mid to late June or early July.
- 6.2.7 Any weeds that arise in year two should be topped cutting them to a height of c15cm during the mid-summer with a final cut in October.
- 6.2.8 Any large patches of scrub should be removed before they are allowed to establish and overrun the habitat inhibiting grassland species. This removal should be timed to miss the Bird breeding season. Small patches of scrub can be left, as long as they are managed, to ensure that there is structural diversity within the grassland habitat.

### Long Term Management (Years 6-25)

- 6.2.9 The grassland should be monitored on an annual basis.
- 6.2.10 Once this grassland has become established grazing could be used as a management method. The grazing should be done on a rotational basis with heavier grazing in autumn/ winter and lighter grazing in the spring/ summer months. Heavier grazing during the summer months could suppress the growth of flowering plants and therefore the heavier grazing periods should be carried out in autumn/ winter (Buglife, 2012).
- 6.2.11 A grazing management plan must be in place to ensure stock is managed in a way best suited to Grassland conservation.

## 6.3 WET WOODLAND (AS PART OF THE WOODLAND)

- 6.3.1 Wet Woodland is proposed within the northern extent of the Site, north of the large quarry pond.
- 6.3.2 This habitat will be created as part of the final restoration proposals, under the Woodland habitat category.

## Recommended Planting

6.3.3 Table 18 details the recommended species for inclusion within the Wet Woodland.

**Table 18 Recommended Wet Woodland Species**

Species Common Name	Species Scientific Name
<b>Wet Woodland Species</b>	
Alder	<i>Alnus glutinosa</i>
Willow Species	<i>Salix sp.</i>

## Habitat Creation and Design

6.3.4 Planting will be undertaken by hand, between October and March inclusive. Other species will naturally establish within these areas and any undesirables will be removed at an early stage.

6.3.5 A stock proof fence may be necessary to prevent over-browsing of saplings.

## Initial Aftercare Management (Years 1-5)

6.3.6 Wet Woodland is generally suited to a low-intervention management regime. Cutting trees on a 3 yearly rotational basis will encourage age diversity and natural regeneration. Cutting should be undertaken outside the Bird breeding season (typically March to August inclusive).

6.3.7 Deadwood will be left standing or fallen to provide habitats for Invertebrate species etc.

6.3.8 Alongside tree cutting, scrub will be cleared periodically to allow tree saplings such as Alder or Willow to establish. Wet Woodland will be managed to avoid it taking over a Site by cutting and treating stumps as necessary.

## Long Term Management (Years 6-25)

6.3.9 Regular Monitoring will inform the long term management of this habitat. Generally this will include the reduction of scrub in specific areas and of certain species.

6.3.10 Water levels will be managed within the Wet Woodland and altered where necessary.

## 6.4 EXPOSED SAND AND GRAVEL CLIFFS

6.4.1 The exposed cliffs will be retained from the proposed mineral extraction activities, around the waterbodies in the eastern extent of the Site.

## Long Term Management (Years 1-25)

6.4.2 Exposed Sand and Gravel Cliffs will be maintained free from vegetation to provide bare earth banks for Invertebrates such as the Five-banded Weevil Wasp (*Cerceris quiquefasciata*) and bird species such as Sand Martins (*Riparia riparia*) (which are known to nest in burrows in bare earth banks approximately 1km west of the Site).

6.4.3 Vegetation management will be reviewed bi-annually to ensure there is no encroachment on to the

habitat.

## 7 HABITAT CREATION AND MANAGEMENT FOR FAUNA

7.1.1 Refer to Figure E16 for faunal enhancement feature locations.

### 7.2 AMPHIBIANS AND REPTILES

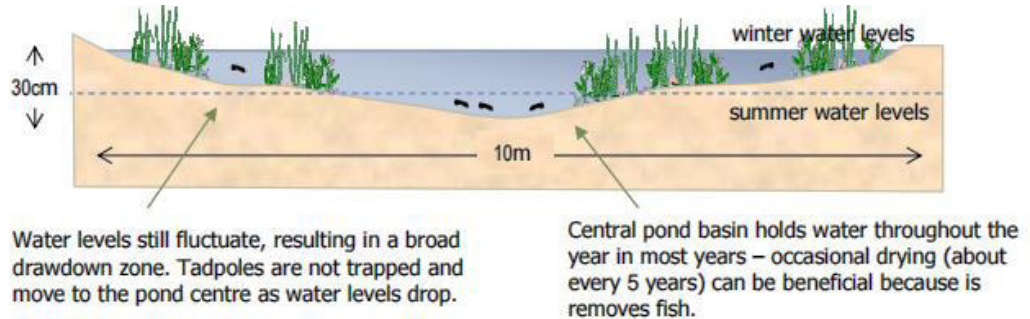
7.2.1 No ponds are currently situated within the Site boundary, however 33 ponds are located within 500m of the site.

7.2.2 As part of the Proposed Restoration Scheme, 3 ponds will be created (2 smaller pond to the south-east of the Site, 1 large quarry pond in the eastern extent of the Site).

7.2.3 Great Crested Newt were recorded within three off-Site ponds to the south of the Site in a 'medium' sized population. Sensitive working methods for areas of suitable habitat to be removed as part of the proposals are set out in Section 7.2.8 to Section 7.2.12.

7.2.4 It is recommended that the ponds to be created in the south eastern corner of the Site (see Figure E16) are created to benefit Great Crested Newt within the wider surrounds of the Site. These ponds will have gradually sloping edges to create an appropriate thermal gradient for amphibians, the varying water depths will also promote floral diversity (see Plate 5).

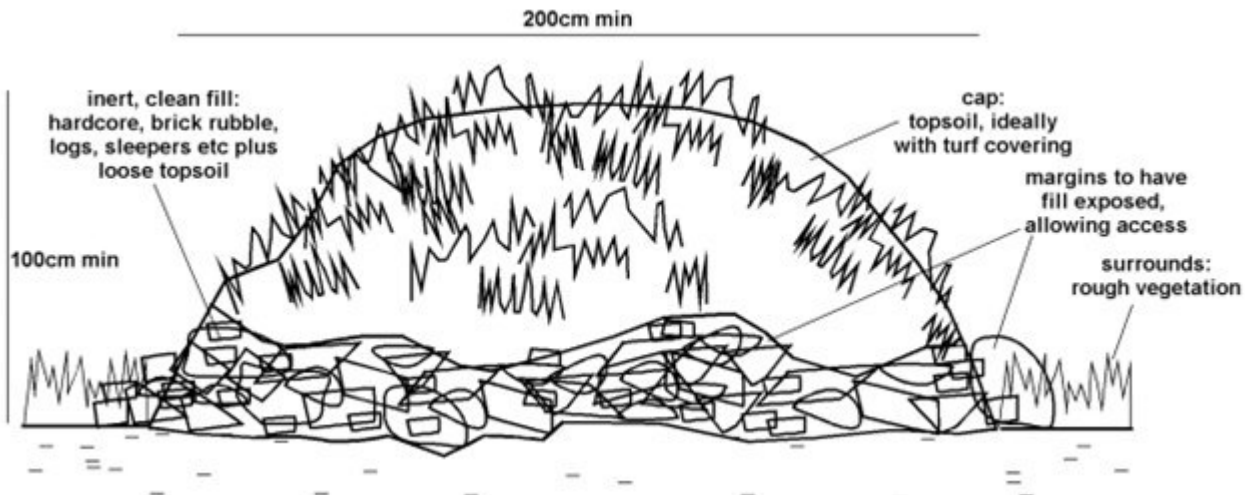
**Plate 5 Recommended Pond Structure (Freshwater Habitats Trust, n.d.)**



7.2.5 Management of new ponds will allow for the removal of overgrown vegetation that newly colonises the ponds, such as Reed Mace (*Typha* sp.), where required.

7.2.6 At least 4 hibernacula designed for Amphibians will be created at the Site, 2 of which will be within 5m of the each targeted pond, as part of the restoration scheme. These will be above ground structures, at least 2m in width and 1m in height, containing a variety of inert waste material and wood, covered with turf to maintain humidity within (see Plate 6).

**Plate 6 Recommended Hibernacula Design (English Nature, 2001)**



7.2.7 The hibernacula created for Amphibians will also be suitable for hibernating reptiles.

**Sensitive Working Methods**

7.2.8 All suitable habitat for Amphibians and Reptiles to be removed as part of the Proposed Development will be undertaken using sensitive working methods under the supervision of a suitably qualified ecologist.

7.2.9 Habitats considered suitable for Amphibians and Reptiles is illustrated on Figure E17 in Appendix E2.

7.2.10 All vegetation will firstly be strimmed to an approximate height of 150mm, under the supervision of an appropriately experienced ecologist. The vegetation will then be hand-searched and any Amphibians or Reptiles translocated to suitable habitat outside of the construction footprint, by the ecologist.

7.2.11 After a minimum period of 24 hours, the vegetation will then be strimmed to ground height under the supervision of the appointed ecologist in order to create habitat unattractive for Amphibians and Reptiles.

7.2.12 Vegetation will be cut in such a way so as to encourage Amphibians and Reptiles away from the Proposed Development into suitable habitat. The vegetation will be managed as a short sward so it does not become suitable for Amphibians or Reptiles until soil stripping commences.

**7.3 BATS**

7.3.1 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.

7.3.2 The habitats within the habitat management plan provide the range of species for optimal foraging and commuting habitat for Bat species recorded at the Site during surveys undertaken in 2016. In particular the retained and newly created Hedgerows with Trees will provide foraging habitat and commuting routes for Bats within the wider surrounds.

- 7.3.3 The restoration will include the erection of at least 10 Bat boxes on Hedgerows and at the edges of the woodland habitats at the Site and will be sited according to best practice (Gunnell, et al., 2012).
- 7.3.4 At least 2 Bat boxes will be targeted for their use by Barbastelle Bats (*Barbastellus barbastella*) which were recorded within the northern extent of the Site. Locations of these boxes can be found on Figure E16. Plate 7 provides an example of the Vincent Pro Bat Box.

**Plate 7 Vincent Pro Bat Box (Wildcare, 2017)**



- 7.3.5 The Vincent Pro Bat Box is also proven to be suitable for a number of other species, including Brown Long-eared Bat (*Plecotus auritus*) and Common Pipistrelle (*Pipistrellus pipistrellus*), which were recorded at the Site during surveys undertaken in 2016.
- 7.3.6 Plate 8 and Plate 9 below provide examples of suitable Bat boxes for the remaining 8 boxes to be erected at the Site.

**Plate 8 Kent Bat Box (multi-chamber) (NHBS, n.d(a))**



**Plate 9**      **1FF Schwegler Bat Box (NHBS, n.d(a))**



- 7.3.7 All Bat boxes at the Site will be at a minimum height of three metres from the ground and face south to southeast, to allow heating from the sun and shelter from prevailing winds.

**Sensitive Working Methods**

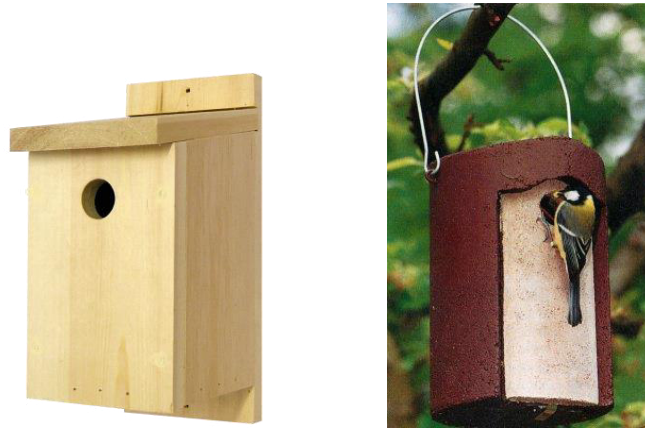
- 7.3.8 All trees considered to be suitable for roosting Bats will be subject to an endoscope survey immediately prior to felling (where required). If a Bat is found to be roosting within any tree that is subject to an endoscope survey, all works must cease within this area (the specified tree and a 5m stand-off zone) and a European Protected Species (EPS) licence from Natural England applied for to continue works within this area legally.
- 7.3.9 Trees will be soft felled in winter (between September and April inclusive), as per the Bat Mitigation Guidelines (English Nature, 2004), if considered not to be a hibernation roost following emergence/re-entry surveys (as recommended in the Updated Preliminary Ecological Appraisal Report (PEAR)) (Crestwood Environmental Ltd., 2018). Further recommendations regarding Bats and sensitive working methods will be detailed for each relevant tree following the appropriate Bat survey prior to commencement of the relevant phase, provided within an addendum.

**7.4 BIRDS**

- 7.4.1 The Exposed Sand and Gravel Cliffs will provide habitat for Sand Martin, which are known to be nesting within exposed quarry margins within the Existing Quarry Area. Control of vegetation growth in this area is detailed in Section 6.4.
- 7.4.2 General Bird boxes can be erected around the Site. At least 10 general Bird boxes will be erected on mature trees, at least 3m metres from ground level, away from direct sunlight and wind exposure, and be within vegetative habitat to provide shelter and food. Plate 10 and Plate 11 are example general Bird boxes which are considered suitable for the Site.



**Plate 10**      **Traditional Bird Box with 25mm Hole (NHBS, 2015)**



**Plate 11**      **Open-fronted Robin Box**



### Sensitive Working Methods

- 7.4.3 Any vegetation to be removed as part of the Proposed Development will be undertaken outside the Bird nesting season (typically March to August inclusive). Where this is not possible, a nesting Bird check will be undertaken by a suitably qualified ecologist immediately prior to works being undertaken. Any nests present will be cordoned off and will remain in place until the nest is no longer in use.

## 7.5 INVERTEBRATES

- 7.5.1 The habitats within the Proposed Restoration Scheme support plant species which are considered to be beneficial for a wide range of Invertebrate species.
- 7.5.2 A number of Invertebrates use hedge banks, field margins, rough grassland and old mouse or vole holes as shelter and to nest in. These can be created through the use of small scale rotational vegetation clearance to create areas of bare earth, creating a mosaic of habitat. Where this is not practicable 'Invertebrate hotels' can be created on Site to supply an artificial nesting habitat (see Plate 12 for example 'Invertebrate hotel').

**Plate 12**     **Example 'Invertebrate Hotel' (The Wildlife Trusts, 2016)**



- 7.5.3     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. To enhance the Site for Invertebrates it is recommended that 4 'Invertebrate hotels' and/or log piles be throughout the Site.

## **8            MANAGEMENT, MONITORING AND DELIVERY**

### **8.1        ECOLOGICAL MANAGEMENT TEAM**

- 8.1.1     A number of roles are required within the construction team to ensure ecological protection measures remain in place for the duration of the construction period. The team will comprise a number of individuals with the appropriate experience and availability. Roles and responsibilities are set out in Table 19.

**Table 19 Ecological Management Team**

Proposed Project Team Member	Role	Experience Required	Time Commitment
<b>Estates (Tarmac)</b>	Management of land use, planning and tenure elements of the scheme, including liaison with scheme stakeholders.	Project management of schemes with ecologically sensitive features, and stakeholder management experience.	Ensures compliance with planning and other regulatory regimes.
<b>Restoration Manager (Tarmac)</b>	Management of restoration proposals and implementation of restoration scheme.	Project management of restoration schemes with ecologically sensitive features.	Ensures works comply with Biodiversity Protection Zones and maintains enhancement measures are met.
<b>Site Foreman Manager (Tarmac)</b>	Manages site personnel and overseas operational phases.	Management of Site staff and ecologically sensitive features.	Regular liaisons with Site staff to maintain protection measures and Biodiversity Protection Zones.
<b>Ecological Clerk of Works (ECoW)</b>	Undertaking specialist ecological surveys/supervision and supervising sensitive working methods.	Experience of project management and organisation of Site staff for sensitive working methods.	As required.

8.1.2 If there are any revisions to the sensitive working methods, the Proposed Restoration Scheme or the BEP, all documents should be updated accordingly. These changes will be approved in writing prior to implementation.

## **8.2 ECOLOGICAL CLERK OF WORKS (ECOW)**

8.2.1 The ECoW will undertake supervisory works where vegetation removal is required as part of the Proposed Development, within habitats suitable for Reptiles, Great Crested Newt and Breeding Birds.

8.2.2 Specific details of the sensitive working methods to be supervised by the ECoW are detailed within Section 7.2.8 to Section 7.2.12 and Section 7.4.3.

8.2.3 A suitably qualified ecologist will perform the responsibilities of the ECoW during the operational phases of the Proposed Development, including the supervision of the sensitive working methods.

8.2.4 The ECoW acts as an independent ecological advisor for the project and will be expected to be responsible for the following:

- Advice on, and monitoring of, construction activities;
- Pre-construction checks for sensitive habitats and protected species as detailed within the CEMP (Crestwood Environmental Ltd., 2018);
- Site inductions, Toolbox Talks and meetings;

- Ecological information required by all site personnel;
- Ecological information relevant to particular tasks; and
- Construction exclusion zones/Biodiversity Protection Zones.

8.2.5 The role of the ECoW will also include any monitoring of ecological features as part of the Proposed Restoration Scheme, where necessary. Habitat management plans will also be monitored and amended accordingly.

8.2.6 If any protected species are found during the operational phases of the Proposed Development, work should cease and a suitably qualified ecologist sought for advice before proceeding.

8.2.7 Toolbox Talks will be given to all Site personnel prior to commencement of works, to make them aware of the Biodiversity Protection Zones, restrictions on timing of activities and reporting systems. Species specific Toolbox Talks will be given as necessary by the ECoW.

### **8.3 MONITORING**

#### Priority Habitats (SPG)

8.3.1 Guidance for monitoring of the following Priority Habitats has been taken from the Mineral Site Restoration for Biodiversity: Supplementary Planning Guidance (Essex County Council, 2016):

- Lowland Meadow;
- Lowland Acid Grassland;
- Open Mosaic Habitats; and
- Reedbeds.

8.3.2 Monitoring will be undertaken at appropriate times of the year as specified in the relevant sections for the Priority Habitats as above.

#### Priority Habitats (non-SPG) and Other Habitats

8.3.3 Monitoring of the establishment of habitats will be carried out after the first year of planting to determine whether remedial works are required. This will be undertaken in the summer months by an ecologist or landscape architect and repeated biennially for the first five years (i.e. years 1, 3 and 5) to ensure all created habitat areas successfully establish. The timing of the management is to provide sufficient timescale for habitats to develop whilst also providing opportunity to intervene and undertake any mitigation identified through the monitoring programme.

8.3.4 At the time of monitoring the ecologist or landscape architect will also identify any individual plants within the habitats which require removal and either remove the plants or inform site staff of the location of plants which require removal. Review of pesticide/fertiliser treatment (if used) will also be carried out by the ecologist or landscape architect to ensure that areas of created habitat are not being affected.

8.3.5 Biennial monitoring and review of management regimes will also be undertaken by a suitably qualified professional to ensure that the management of the habitats is appropriate. Whilst the

management programme provided in Section 9 will be adhered to, it is important to understand that management of any habitat will adapt as the habitat develops, and that not all habitats will develop as typically documented. This makes adoption of additional management regimes or the amendment of current management critically important to maintaining a habitat in the long-term.

- 8.3.6 If any of the restoration measures put in place for faunal use at the Site becomes damaged or broken, these will be repaired or replaced as and when necessary. Bird boxes will be repaired or replaced outside of the Bird breeding season (typically March to September inclusive) to avoid disturbance. Pond management will only be undertaken during the winter months (November to early March) to avoid harm or killing of Great Crested Newt and other protected or notable species. Bat boxes will only ever be checked by a licenced person.

## **8.4 PROJECT COSTS**

- 8.4.1 This document specifies the requirement for management. Consistent with best practice approaches in the minerals industry, funds are set aside for the management of the restoration and aftercare landforms on a site within a restoration fund that receives a percentage of the income from each tonne of mineral sold.
- 8.4.2 Finalisation of funds will be secured through a Section 106 agreement. The Client will accrue funds throughout the duration of the Proposed Development which will be drawn down as and when required during the restoration and 25 year management phase.

# **9 MANAGEMENT PROGRAMME**

## **9.1 INITIAL RESTORATION**

- 9.1.1 Table 20 below details a programme for management of habitats to be retained or to be created at the Site as part of the Proposed Restoration Scheme.

**Table 20 Habitat Management Schedule**

MANAGEMENT ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Years of Management (1-5) following Restoration					
													1	2	3	4	5	As Req.
<b>Woodland</b>																		
Planting	X	X	X						X	X	X	X					X	
Rotational Scrub Management	X	X							X	X	X	X		X		X	X	
<b>Lowland Meadow</b>																		
Sowing									X	X							X	
Cutting							X	X	X				X					
Light Rotational Grazing	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
Weed Management						X	X							X	X	X	X	
<b>Lowland Acid Grassland</b>																		
Sowing									X	X							X	
Cutting							X	X	X				X				X	
Light Rotational Grazing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<b>Wet Woodland (as part of the Woodland Habitat)</b>																		
Planting	X	X	X							X	X	X					X	
Cutting	X	X							X	X	X	X			X			
Scrub Clearance	X	X							X	X	X	X					X	
<b>Exposed Sand and Gravel Cliffs</b>																		
Vegetation Clearance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<b>Hedgerows with Trees</b>																		
Planting	X	X	X						X	X	X	X					X	
Alternate Cutting (following establishment)	X	X							X	X	X	X	X	X	X	X		

Table 17 Cont'd...

MANAGEMENT ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Years of Management (1-5) following Restoration					
													1	2	3	4	5	As Req.
<b>Waterbodies</b>																		
Dredging (if necessary)											X	X					X	
Invasive Species Removal	X	X									X	X	X	X	X	X		
<b>Orchard</b>																		
Stake Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
Rotational Pruning	X	X	X								X	X					X	
<b>Reedbed</b>																		
Sowing			X	X	X												X	
Cutting	X	X								X	X	X					X	
<b>Improved Grassland</b>																		
Sowing		X	X	X	X												X	
Cutting						X		X	X				X	X	X	X	X	
<b>Semi-improved Grassland</b>																		
Sowing		X	X	X	X												X	
Cutting						X		X	X				X	X	X	X	X	
<b>Open-Mosaic Habitat</b>																		
Rotational Re-profiling									X	X							X	
Tree and Scrub Management	X	X								X	X	X					X	

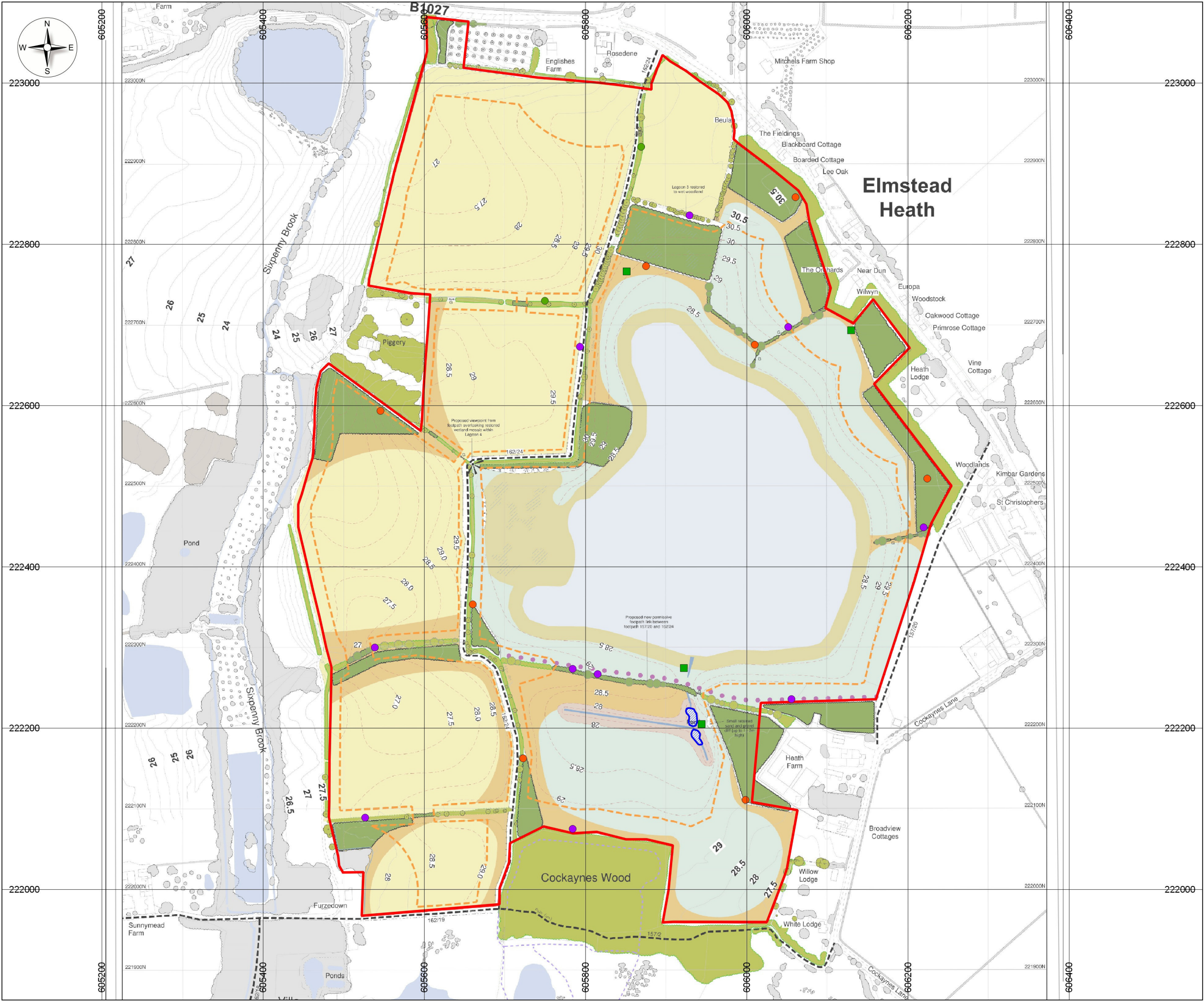
## REFERENCES:

- Buglife, 2012. *B-Lines Fact Sheet 4: Management of Wildflower-rich Grassland habitat for pollinators and other insects*, Peterborough: Buglife.
- Crestwood Environmental Ltd., 2017. *Construction Environmental Management Plan*, s.l.: s.n.
- Crestwood Environmental Ltd., 2017. *Ecological Impact Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Updated Preliminary Ecological Appraisal Report*, Wolverhampton: Crestwood Environmental Ltd..
- DEFRA, 2012. *Biodiversity Offsetting*. [Online]  
Available at: <https://www.gov.uk/government/collections/biodiversity-offsetting>  
[Accessed 13 March 2018].
- DEFRA, 2012. *Biodiversity Offsetting Pilots Guidance for Developers*, s.l.: s.n.
- DEFRA, n.d. *Appendix 1 - Distinctiveness Bands for the Biodiversity Offsetting Pilot*. [Online]  
Available at: <https://www.gov.uk/government/collections/biodiversity-offsetting>  
[Accessed 2018].
- English Nature, 2004. *Bat Mitigation Guidelines*, s.l.: English Nature.
- Essex Biodiversity Project, 2010. *Essex biodiversity Action Plan 2010-2020*. [Online]  
Available at: <http://www.essexbiodiversity.org.uk/biodiversity-action-plan>  
[Accessed 23 November 2016].
- Essex Biodiversity Project, 2012. *Essex Biodiversity Action Plan 2010-2020*. [Online]  
Available at: <http://www.essexbiodiversity.org.uk/biodiversity-action-plan>  
[Accessed June 2017].
- Essex County Council, 2016. *Mineral Site Restoration for Biodiversity Supplementary Planning Guidance*, s.l.: s.n.
- Essex County Council, 2016. *Mineral Site Restoration For Biodiversity; Supplementary Planning Guidance*, s.l.: Essex County Council.
- Freshwater Habitats Trust, n.d. *Creating Ponds for Amphibians and Reptiles*. [Online]  
Available at: <http://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/Amphibians-Common-Toad-Great-Crested-Newt-and-Grass-Snake-new-logo.pdf>  
[Accessed 27 October 2016].
- Gunnell, K., Grant, G. & Williams, C., 2012. *Landscape and urban design for bats and biodiversity*, s.l.: Bat Conservation Trust.
- Kirkham, F., Mole, M., Gardner, S. & Wilson, D., 2003. *Review of Stocking Levels Recommended for Semi-natural Lowland Grasslands*, s.l.: English Nature.
- Natural England, 2010. *HLS Farm Environment Plan handbook*, s.l.: Natural England.
- Natural England, 2010. *Natural England Technical Information Note TIN014*, s.l.: s.n.
- Natural England, 2010. *Natural England Technical Information Note TIN017*, s.l.: s.n.
- Wildcare, 2017. *Vincent Pro Bat Box*. [Online]  
Available at: <https://www.wildcareshop.com/vincent-pro-bat-box-10651.html>  
[Accessed 9 June 2017].



**APPENDIX E1:**

**Figure E16 – Enhancement Measures Plan**



- Legend:**
- Site Boundary
  - Wildlife Ponds
  - Bird Box (x10)
  - Vincent Pro Bat Box (x2)
  - Bat Box (x8)
  - Hibernacula (x4)

Drawing used: Proposed Restoration Scheme W328-00062-12  
Not to Scale

Final Revision:	Date:	Description:	By:	Chk:
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Client:



**TARMAC**  
A CRH COMPANY

Site: **Tarmac**

Drawing Title: **Enhancement Measures Plan**






Date: 20 / 12 / 2018	Scale: 1:4,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ0992-DW17		Final Revision: Rev A
Drawing No: Figure E16		

**APPENDIX E2:**

**Figure E17 – Sensitive Working Measures Plan**



**Legend:**

-  Site Boundary
-  Sensitive Working Area: Great Crested Newt
-  Sensitive Working Area: Reptiles
-  Great Crested Newt Ponds
-  250m Distance Marker

**Note: Areas are indicative only**

Final Revision:	Date:	Description:	By:	Chk:
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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Sensitive Working Areas Plan**

Date: 20 / 12 / 2018	Scale: 1:6,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ-0992-DW25		Final Revision: Rev B
Drawing No: Figure E17		

# APPENDIX L: Construction and Environment Management Plan



# **Construction Environment Management Plan: Biodiversity (CEMP)**

## **Proposed Eastern Extension, Wivenhoe Quarry, Alresford Road, Wivenhoe**

Report Reference: CE-WQ-0992-RP11b - Final



Produced by Crestwood Environmental Ltd.

7 March 2019

**Crestwood Report Reference: CE-WQ-0992-RP11a - Final:**

<b>Version &amp; Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Survey Licence No. (If applicable)</b>	<b>Checked &amp; Authorised by:</b>
Final	23/05/2018	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)
Final Rev A	15/01/2019	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)
Final Rev B	07/03/2019	Jennifer Gatward (Ecologist)		Lucy Cash (Associate Director)

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

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors unless otherwise stated in an accompanied 'letter of reliance' with an official Crestwood Environmental Limited letterhead. No responsibility is accepted to others.

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Appendix E2	Outline Restoration Scheme (W328-0062-12A)
Appendix E3	Figure E20 – Biodiversity Protection Zones
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Appendix E5	Figure E17 – Sensitive Working Measures Plan
Appendix E6	Figure E2 – Pond Location Plan
Appendix E7	Figure E21 – Fencing and Stand-off Zone Plan



# 1 INTRODUCTION

## 1.1 BACKGROUND AND CONTEXT

1.1.1 Crestwood Environmental Ltd. (**'Crestwood'**) have been appointed by D L Walker Ltd. on behalf of Tarmac Aggregates Ltd. (**'the Client'**) to produce a Construction Environment Management Plan for the Proposed Eastern Extension at Wivenhoe Quarry, centred at National Grid Reference (NGR) TM 049 224 (**'the Site'**).

1.1.2 A Construction Environment Management Plan (**'CEMP'**) is required to be submitted as part of the planning application to Essex County Council and should be read in conjunction with the following documents:

- *Ecological Impact Assessment (EclA) (Report ref: CE-WQ-0992-RP09 (Crestwood Environmental Ltd., 2017));*
- *2019 Annex - Additional Ecological Information to Support Planning Application (Report ref: CE-WQ-0992-RP14 (Crestwood Environmental Ltd., 2019));*
- *Biodiversity Enhancement Plan ('BEP') (Report ref: CE-WQ-0992-RP10a (Crestwood Environmental Ltd, 2018)); and*
- *Arboricultural Survey Report (Report ref: CE-WQ-0992-RP15 (Crestwood Environmental Ltd., 2019).*

1.1.3 The following aspects are detailed as part of the CEMP:

- Ecological baseline and assessment of potentially damaging construction and mineral extraction activities (Section 2);
- Identification of Biodiversity Protection Zones (Section 3);
- Practical measures to avoid or reduce impacts (Section 4);
- Sensitive Working Methods for Protected Species (Section 5);
- General Practical Working Methods: Use of protective fences, exclusion barriers and warning signs and EcOW (Section 6);
- Management of Bund habitats during construction (Section 7);
- Timing of sensitive works (Section 8); and
- Responsible persons and lines of communication (Section 9).

## 1.2 SITE DESCRIPTION

1.2.1 The Site is located at land to the east of Wivenhoe, Alresford Road in Wivenhoe, Essex. The habitats at the Site comprise: Arable, Hedgerows (Intact and Defunct), Improved Grassland, Orchard, Poor Semi-Improved Grassland and Tall Ruderal.

1.2.2 In the local area the main habitat wildlife corridors present are: the Six Penny Brook which flows north to south approximately 5m to the west of the Site at its closest point, to join the River Colne

circa 1km to the south and a railway line bordered by trees and woodland running east-west to the south of the Site.

1.2.3 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

1.2.4 The full planning application title reads:

*'Extraction of 3.8 million tonnes of sand and gravel as an easterly extension to the existing Wivenhoe Quarry, erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material.'*

### **1.3 DEVELOPMENT DESCRIPTION**

1.3.1 It is proposed that a total of 3.8 million tonnes of sand and gravel are extracted as part of the Proposed Development, at approximately 200,000 tonnes per annum. This comprises c. 19 years of extraction and progressive restoration, followed by a further 2 years to complete restoration to final levels.

1.3.2 In summary, the Proposed Development consists of:

- Eastern extension of the Wivenhoe Quarry, to extract sand and gravel at a rate of approximately 200,000 tonnes per annum over a 19 year period, including phased restoration.
- Controlled clearance of existing habitats and arable land prior to mineral extraction.
- Extraction of the mineral reserve across the Site will assume at least a 10m standoff from all field boundaries, with the exception of access points for haul routes. A stand-off of at least 30m will be implemented around Cockaynes Wood immediately adjacent to the south of the Site.
- Provision of the Arboricultural survey (Crestwood Environmental Ltd., 2019) has been used to provide adequate standoffs to veteran and near veteran tree specimens, where necessary.
- Inert restoration material to be imported into the site to supplement on site resources to achieve a satisfactory restoration landform.

1.3.3 The phasing plan can be found in Appendix E1, which details the 7 working phases. Phase 1 (which includes the plant site and two settling lagoons) will be worked progressively towards the south, whilst Phase 2 and 3 will be worked progressively northwards. Phase 4 to 6 will be worked north-west to south-east, with Phase 7 being working north to south. Progressive restoration will take place with all Phases being restored after 19 years.

1.3.4 The Outline Restoration Scheme (drawing number: W328-00062-12A (Tarmac Ltd., 2018)) details the habitats to be retained and created as part of the Proposed Development, which can be found in Appendix E2. The restoration scheme will be delivered and managed under the provisions of a Biodiversity Enhancement Plan also submitted in support of this application (Crestwood Environmental Ltd, 2018).

## 2 ECOLOGICAL BASELINE AND RISK ASSESSMENT

### 2.1 DESIGNATED SITES

2.1.1 There are eight statutory designated sites within 10km of the Site, including:

- Special Protection Area (SPA)/Ramsar Site;
- Special Area for Conservation (SAC);
- Site of Special Scientific Interest (SSSI);
- Marine Conservation Zone (MCZ); and
- Local Nature Reserve (LNR).

2.1.2 The closest statutory designated site to the Proposed Development is the Wivenhoe Gravel Pits SSSI located approximately 650m northwest of the Site.

2.1.3 There are five non-statutory Sites within 2km of the Site, the closest of which is located immediately adjacent to the south of the Site. This is designated for its mosaic of habitats, being a disused quarry.

2.1.4 Plate 1 illustrates the Statutory and Non-Statutory designated sites within 2km of the Site.

**Plate 1 Statutory and Non-Statutory Sites within 2km**



## **2.2 HABITATS**

2.2.1 An Update Ecological Walkover Survey was undertaken in September 2018 (Crestwood Environmental Ltd., 2018), identifying 6 habitats at the Site:

- Arable;
- Hedgerows (Intact and Defunct);
- Improved Grassland;
- Orchard;
- Poor Semi-Improved Grassland; and
- Tall Ruderal.

2.2.2 Habitats that are to be retained as part of the Proposed Development are:

- The majority of internal Hedgerows and Trees;
- Some of the Orchard; and
- The majority of the Semi-Improved Grassland margins.

2.2.3 A Hedgerow Regulations Assessment was undertaken in September 2018 (Crestwood Environmental Ltd., 2018) as part of the Update Ecological Walkover Survey. Hedge 4 is considered to be an Important Hedgerow under the Hedgerows Regulations 1997 (HMO, 1997).

2.2.4 The following hedgerows are considered to be species rich (under guidance set out within the Hedgerow Survey Handbook (DEFRA, 2007):

- H1;
- H2;
- H4; and
- H7.

## **2.3 SPECIES**

2.3.1 More detailed presence/absence surveys were carried out during 2016 for a number of different species. Habitat features considered suitable for protected species included:

- Hedgerows suitable for Hazel Dormouse;
- Hedgerows of Moderate suitability for commuting and foraging Bats;
- Trees of Low and Moderate suitability for roosting Bats;
- Habitat for nesting Birds (e.g. Trees, Hedgerows and Arable); and
- Low quality grassland habitat for Reptiles and Great Crested Newt.

2.3.2 Details of habitats suitable for species listed in Section 2.3.1 are set out in the Extended Phase 1

Habitat Survey report (report ref: CE-WQ-0992-RP01 (Crestwood Environmental Ltd., 2015).

## 2.4 POTENTIAL IMPACTS

2.4.1 The potential impacts associated with the Proposed Development are set out as follows:

- Temporary partial loss of Hedgerows;
- Loss of Poor Semi-Improved Grassland and Improved Grassland;
- Loss of Arable Fields;
- Partial loss of Orchard;
- Increased dust dispersal;
- Increased noise disruption; and
- Increased light spill.

2.4.2 Table 1 defines the risk categories.

**Table 1 Risk Categories and Summary of Risk**

Risk Category	Summary of Risk
<b>Negligible</b>	Effects are minor such that no important negative change to the ecological feature occurs.
<b>Low</b>	Likely to create a small change to ecological feature <u>without</u> causing long-term or irreversible damage to the integrity / status of an ecological feature.
<b>Moderate</b>	Likely to create a moderate change to ecological feature, including partial loss, medium-term or reversible damage to the integrity / status of an ecological feature.
<b>High</b>	Likely to create a substantial change to ecological feature, including loss, or long-term or irreversible damage on the integrity / status of a valued ecological feature.

2.4.3 Table 2 details the risk (as defined in Table 2) of construction to the ecological features identified at the Site, as well as designated sites within 10km, before and after mitigation measures.

**Table 2 Risk Assessment for Ecological Features**

Ecological Feature	Summary	Risk without Mitigation	Risk with Mitigation
<b>Designated Sites</b>	Colne Estuary SPA/Ramsar/SSSI	<b>Low:</b> Potential noise and dust disturbance.	<b>Negligible:</b> Suitable working hours and dust management plans.
	Essex Estuaries SAC/SSSI		
	Abberton Reservoir SPA/Ramsar		
	Blackwater Estuary Ramsar/SPA/SSSI		
	Stour and Orwell Estuaries SPA/Ramsar		
	Upper Colne Marshes SSSI		
	Wivenhoe Gravel Pits SSSI		
	Blackwater, Crouch, Roach and Colne Estuaries MCZ		
	Colne LNR		
	Palegate Wood LWS		
	Park Wood LWS		
	Wivenhoe Cross Pit LWS		
	Alresford Grange LWS		
	Alresford Lodge Pits LWS		
	St. Peters Church LWS		
	Crestland Wood Meadow LWS		
	Crestland Wood LWS		
Tenpenny Farm Wood LWS			
Fratinghall/Captains Wood LWS			
Hockley Farm Woods LWS			

Table2 Cont'd...

Ecological Feature	Summary	Risk without Mitigation	Risk with Mitigation
<b>Designated Sites</b>	Villa Farm LWS (includes Cockaynes Wood Ancient Woodland)	<b>Moderate:</b> Potential noise and dust disturbance close to the ancient woodland (adjacent to Site).	<b>Low:</b> Suitable working hours and dust management plan, including a 30m buffer to Cockaynes Wood and sensitive working measures along the border of the LWS.
<b>UK BAP and LBAP Habitats</b>	Orchard	<b>Moderate:</b> Partial removal of immature Orchard habitat. No trees to be removed as part of the Proposed Development. Potential dust and construction disturbance.	<b>Low:</b> Reduction in habitat of 0.01ha. No trees are to be removed as part of the Proposed Development. Dust management plan.
	Arable Field Margins (Poor Semi-Improved Grassland)	<b>Low:</b> Minimum stand-off of 10m from the Hedgerows, which will encompass the Arable Field Margins.	<b>Negligible:</b> Majority of this habitat to be retained as part of the Proposed Development.
	Hedgerows	<b>Moderate:</b> Removal of one Hedgerow, partial removal of Hedgerows to accommodate haul routes. Potential dust and construction disturbance.  <b>High (H4 only):</b> Partial removal of an Important Hedgerow under the Hedgerow Regulations.	<b>Low:</b> Additional species rich Hedgerows created as part of restoration. Minimal removal of Hedgerows for access points, with the central Hedgerow being protected during the life of the development. Dust management plan and 10m Standoff from all retained Hedgerows.
<b>Bats – Foraging and Commuting</b>	Moderate foraging and commuting activity, in particular along Hedgerows	<b>Moderate:</b> Removal of one Hedgerow, partial removal of Hedgerows to accommodate haul routes, removing some commuting and foraging habitat. Potential light spill from dusk/pre-dawn work.	<b>Low:</b> Appropriate update Bat surveys (activity transects) prior to each Phase. Majority of Hedgerows identified for use by Bats to be retained. Sensitive lighting scheme. Bat Bridges over haul roads to provide connectivity.

Table 2 Cont'd...

Ecological Feature	Summary	Risk without Mitigation	Risk with Mitigation
<b>Bats – Roosting</b>	Low and Moderate roosting habitat in trees within the Hedgerows.	<b>Moderate:</b> Removal of trees which are not considered to support bat roosts. Disturbance and potential light spill from dusk/pre-dawn work.	<b>Low:</b> Appropriate Bat surveys (emergence/re-entry) prior to each relevant Phase. Majority of trees to be retained and protected as part of the Proposed Development. Sensitive lighting scheme.
<b>Nesting Birds</b>	Suitable habitat including Trees, Hedgerows and Arable.	<b>Moderate:</b> Partial loss of Hedgerows and loss of Arable. Potential of direct killing and injury to nesting Birds.	<b>Low:</b> Remove habitats outside Bird breeding season. Where not possible, an ECoW will check prior to vegetation removal.
<b>Reptiles and Great Crested Newt</b>	Grassland habitats present suitable.	<b>Moderate:</b> Removal of suitable habitat potential for direct killing and injury. Loss of suitable habitat at the Site.	<b>Low:</b> ECoW to check suitable habitat prior to vegetation removal. Method Statement provided to detail sensitive working measures. Increase in suitable habitat to be created at the Site as part of restoration.
<b>Dormice</b>	Hedgerows with potential (no Dormice recorded during surveys).	<b>Low:</b> Loss of potential nesting habitat.	<b>Negligible:</b> Removal of Hedgerows undertaken in a methodical manner under the supervision of an ECoW.
<b>Water Vole</b>	Sixpenny Brook suitable for Water Vole adjacent to the Site (no evidence of Water Vole recorded during surveys).	<b>Low:</b> Potential dust and noise disturbance.	<b>Negligible:</b> Dust and noise management plan. Update surveys prior to Phase 3 at the Site.
<b>Badger</b>	Habitats suitable at the Site for Badger.	<b>Negligible:</b> Loss of suitable foraging habitat and potential sett building habitat.	<b>Negligible:</b> Update surveys to be undertaken prior to each phase to ensure no new Badger setts on Site. Habitats as part of the restoration scheme suitable for Badger.

2.4.4 Sensitive working methods are detailed within Section 5.

### 3 IDENTIFICATION OF BIODIVERSITY PROTECTION ZONES

#### 3.1 BIODIVERSITY PROTECTION ZONES

3.1.1 A number of ecological features at the Site which are to be retained as part of the Outline Restoration Proposals will be protected for the duration of the Proposed Development.



3.1.2 Other ecological features to be removed at the Site will be removed using Sensitive Working Methods (see Section 5).

3.1.3 Ecological Features which require Biodiversity Protection Zones for habitats and species include:

- Retained Hedgerows and Associated Grassy Margins;
- Trees and their Root Protection Zones;
- Running and Standing Water (off-Site);
- Bats (Hedgerows and Trees);
- Reptiles and Great Crested Newt (Poor Semi-Improved Grassland and Improved Grassland);
- Trees and Hedgerows (Nesting Bird Habitat); and
- Hedgerows (potential Dormouse Habitat).

3.1.4 The proposed Biodiversity Protection Zones are detailed on Figure E20 in Appendix E3. The proposed protection zones for Hedgerows is 10m and where the root protection zones exceed this, protection zones will be extended accordingly (see Figure E21 in Appendix E7). Any habitat to be removed that is within the Biodiversity Protection Zone will be undertaken using Sensitive Working Methods.

## 4 PRACTICAL MEASURES TO AVOID OR REDUCE IMPACTS

4.1.1 A number of practical measures alongside any specific mitigation that will be used through the Proposed Development to enable any potential impacts to be avoided or reduced. These are summarised in Table 3 and species specific mitigation is further detailed in Section 5 to 5.3.

**Table 3 Biodiversity Protection Zones and Species Specific Mitigation**

Habitat/Species	Protection Measure(s)
Retained Hedgerows and associated grassy margins	Protective fencing and warning signage.
Trees and their Root Protection Zones	Protective fencing and warning signage.
Running and Standing Water (off-Site)	An appropriate dust and run-off management plan.
Bats (Hedgerows and Trees)	Appropriate sensitive lighting scheme. Minimise the number of gaps created within Hedgerows to be retained. Create access gaps away from trees with Bat roost potential. Bat Bridges installed over haul roads to retain connectivity to the wider landscape.
Reptiles and Great Crested Newt (Semi-Improved Grassland and Improved Grassland)	Ecological Clerk of Works (ECoW) to hand search habitat suitable for Reptiles and Great Crested Newt prior to vegetation removal, where required.
Nesting Bird Habitat (Trees, Hedgerows and Arable)	Vegetation removal undertaken outside of the Bird breeding season (typically March-August inclusive). Where not possible, an ECoW to check vegetation for nests prior to removal.

Habitat/Species	Protection Measure(s)
Dormice (Hedgerows)	Vegetation removal undertaken in the active season (typically April – November inclusive) using hand tools, undertaken under the supervision of an ECoW.

## 5 SENSITIVE WORKING METHODS FOR PROTECTED SPECIES

### 5.1 BATS (HEDGEROWS AND TREES)

- 5.1.1 The Hedgerows at the Site are considered to be suitable for foraging and commuting Bat species within the area.
- 5.1.2 A sensitive lighting scheme should be implemented at the Site to avoid illuminating dark corridors used by Bats. This should include suitable design features such as cowls, and controls on hours of operation (refer to paragraph 5.1.3 below). In particular, areas where access is to be created should be kept dark to maintain commuting routes.
- 5.1.3 The following guidelines (Fure, 2006) (Jones, 2000) (Bat Conservation Trust/Institute of Lighting Engineers, 2018) 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; and
  - Minimising light spill by design of luminaire and use of accessories such as hoods, cowls louvres and shields.
- 5.1.4 Gaps of no more than 35m will be created as access routes as part of the proposals, to retain connectivity between Hedgerows and Woodland within the surrounding area.
- 5.1.5 21 trees at the Site are considered to be suitable for roosting Bats (varying number of Potential Roosting Features (PRFs) present, see Updated Preliminary Ecological Appraisal (Crestwood Environmental Ltd., 2018) for further details). Figure E1 in Appendix E4 details the location of these trees.
- 5.1.6 8 trees at the Site are to be affected/removed as part of the Proposed Development and are therefore subject to survey prior to the commencement of each relevant phase (see estimated timescales outlined in Table 4).

**Table 4 Estimated Survey Timescales**

Tree Reference	Tree Location	Estimated Survey Year	Phase Location
T21	H8	2019	1
T16	H7		
T1	H4	2021	2/3
T13			
T4	H6	2019/2021	1/3
T12			

5.1.7 T4 and T12 were surveyed during 2018, with no recorded emergences.

5.1.8 All trees (as listed above) will be surveyed prior to commencement of the relevant phase will be endoscope surveyed immediately prior to the start of works, undertaken by a licenced ecologist. Should any Bats be found during the endoscope survey, all works will cease in this area and a licence from Natural England applied for.

5.1.9 This CEMP will be updated following the completion of the recommended further Bat surveys, if required.

5.1.10 Removal of trees will be undertaken as immediately prior to the commencement of works within each phase and on a per-phase basis to minimise the impact of reduction in potential roosting habitat.

#### BAT BRIDGES

5.1.11 Bat Bridges will be erected across each hedgerow gap (where required for access into various Phases). Each Bat Bridge will be monitored and maintained as appropriate across the access haul routes by the Site Manager.

5.1.12 Bat Bridges will be erected at the minimum height required for Site traffic to pass under safely, whilst maintaining connectivity with the adjacent hedgerows.

5.1.13 A total of four Bat Bridges will be installed at the Site (H2, H4, H6 and H7). These will consist of two supporting poles either side of the access haul route and four strings of wire/rope with small plastic balls attached, running tightly in between.

5.1.14 Plate 2 illustrates an example Bat Bridge to be erected at the Site.

**Plate 2 Example Bat Bridge (Avery, 2015)**



**5.2 REPTILES AND GREAT CRESTED NEWT (SEMI-IMPROVED AND IMPROVED GRASSLAND)**

5.2.1 Any habitat within the Site that is to be removed which is considered suitable for Reptiles and Great Crested Newt will be removed under the supervision of an Ecological Clerk of Works (ECoW), to be undertaken under a Method Statement specifically produced for the avoidance of killing and injury of Great Crested Newt and Reptiles.

**Vegetation Removal**

5.2.2 Any suitable vegetation (areas of Poor Semi-Improved Grassland and Improved Grassland, as shown on Figure E17 in Appendix E5) to be removed as part of the proposals must be hand search by the ECoW prior to any vegetation removal. These works will be undertaken during the active period for Great Crested Newt and Reptile, typically between March and October inclusive (weather dependant).

5.2.3 Vegetation must be strimmed to a height of approximately 150mm following the initial hand search, under the supervision of the ECoW. The remaining vegetation will then be hand searched a second time by the ECoW.

5.2.1 Following the initial strimming of vegetation and second hand search of the area, the vegetation will be further strimmed to a height of approximately 50mm. A final hand search will be undertaken by the suitably qualified ecologist.

5.2.2 All vegetation arisings will be removed from Site or stored in an area of suitable habitat that is to be retained and protected, to ensure there are no suitable habitats for Reptiles or Great Crested Newt within the working area at the Site.

5.2.3 Prior to topsoil stripping, the vegetation will be managed at a short sward until topsoil has been stripped, to ensure the habitats remain unsuitable for Reptiles and Great Crested Newt.

## Topsoil Stripping

- 5.2.4 Topsoil stripping will not commence during the Reptile or Great Crested Newt hibernation period (typically between November and February inclusive (weather dependant)).
- 5.2.5 Topsoil will be stripped following vegetation removal and will be undertaken using a small toothed bucket, under the supervision of the ECoW. All soil will be stored off-site or within non-operational areas to ensure there are no suitable areas for Reptiles or Great Crested Newt to take shelter.
- 5.2.6 All trenches will be covered overnight to ensure no Reptiles or Great Crested Newt become trapped.
- 5.2.7 Should any Great Crested Newt be found on the Site during the works, works will cease immediately and advice sought from Natural England. A European Protected Species (EPS) licence may be required for works to continue.
- 5.2.8 Should any Reptiles be found at the Site during the works, works will temporarily cease and individuals placed into suitable habitat areas away from works/off-Site.

## **5.3 NESTING BIRD HABITAT (TREES, HEDGEROWS AND ARABLE)**

- 5.3.1 The internal Hedgerows and Trees at the Site are considered suitable for Nesting Birds.
- 5.3.2 Any vegetation to be removed as part of the Proposed Development will be undertaken outside the Bird breeding season (typically March-August inclusive). Where this is not possible, a suitably qualified ecologist will check vegetation immediately prior to removal for nests or nesting activity. Should any nests be recorded, a 5m buffer will be implemented using cordon tape and works must cease from this area until nesting has ceased.
- 5.3.3 Arable habitat which is considered suitable for ground-nesting Birds, will be checked by a suitably qualified ecologist immediately prior to groundworks being undertaken, if groundworks are to be undertaken during the Bird breeding season.

## **5.4 DORMOUSE (HEDGEROWS)**

- 5.4.1 All Hedgerows considered suitable for Dormouse will be removed (where required for access) under the supervision of a suitably experienced ecologist, using hand tools in a methodical manner to allow the ECoW to search for nests. Approximately 1m of vegetation will be removed at a time to allow this search. Hedgerow removal will be undertaken during the active period for Dormice (excluding June to September inclusive when young are typically born and raised) which is typically March – May inclusive and October – November inclusive.

## **5.5 PRE-COMMENCEMENT PHASED SURVEYS**

- 5.5.1 Appropriate species-specific further survey will be undertaken prior to the commencement of each phase. Further surveys will be dependent on the location of the phase and are summarised in Table 5 below.
- 5.5.2 Pre-Commencement Phased Surveys will be undertaken in the year prior to the commencement of the anticipated start date of each phase (For example: Phase 2 starting 2021, surveys undertaken in 2020).

**Table 5 Pre-Commencement Phased Surveys**

Phase	Further Surveys Required				
	Bat		Great Crested Newt	Otter & Water Vole	Badger
	Transect <sup>^</sup>	Roost <sup>*</sup>			
1	✓	✓	See Section 5.5.6.		✓
2	✓	✓			✓
3	✓	✓		✓	✓
4	✓				✓
5	✓				✓
6	✓				✓
7	✓				✓

<sup>^</sup> Transect surveys to be undertaken based on Low habitat suitability, given the retention of linear features at the Site and implementation of sensitive working measures. This will require one survey per season (spring, summer and autumn).

<sup>\*</sup> Bat roost surveys to be undertaken as specified in Table 4 in Section 5.1.

### Bats

- 5.5.3 Bat Activity Transect surveys undertaken during 2016 (Crestwood Environmental Ltd., 2018) were based on habitat of moderate habitat suitability for Bats. Surveys were undertaken in line with current guidance (Collins, 2016).
- 5.5.4 The Pre-Commencement Phased Bat Activity Transect Surveys will be undertaken to record Bat activity within each Phase and the results will be used to determine additional constraints to working measures and any additional mitigation measures, if required.
- 5.5.5 Table 6 details the timings of Bat Activity Transect surveys to be undertaken within each Phase. The surveys have are to be carried out within the peak Bat activity season (typically between May and August), with the number of surveys dependant on Phase location (survey effort increased for phases in the west due to increased suitable habitat).

**Table 6 Pre-Commencement Phased Bat Activity Transect Surveys**

Phase	Month Surveys Scheduled			
	May	June	July	August
1	✓	✓	✓	✓
2	✓	✓	✓	✓
3	✓	✓	✓	✓
4	✓	✓	✓	
5	✓	✓	✓	
6	✓	✓	✓	
7	✓	✓	✓	

## Great Crested Newt

- 5.5.6 Great Crested Newt surveys (either eDNA or population survey where a known GCN population is present – Pond 22, 29 and 31) will be undertaken on a 5 yearly basis (i.e. year 5, year 10 and year 15 of the Proposed Development) on all ponds within 500m of the Site boundary with an Average, Good and Excellent Habitat Suitability Index (HSI) score. Other ponds within 500m of the Site will be reviewed at the time of survey to ensure monitoring is comprehensive. Should further ponds be considered to require monitoring, these will be surveyed in addition to those previously highlighted. Figure E2 in Appendix E6 illustrates the HSI scores for each pond within 500m of the Site.
- 5.5.7 Sensitive working measures will be incorporated across the Site for Great Crested Newt over all phases of the Proposed Development. Given the minimal removal of habitat considered suitable for Great Crested Newt and the lack of suitable aquatic habitat within the Site, monitoring surveys are considered sufficient at this stage.

## Otter and Water Vole

- 5.5.8 A single survey will be undertaken between April and September prior to the commencement of Phase 3 of the Proposed Development. Phase 3 is approximately 5m east of the Sixpenny Brook at its closest point and therefore a survey to determine the presence/likely absence of Otter and Water Vole within 50m of this point are considered to be required.
- 5.5.9 Should any evidence of Otter or Water Vole be found during this survey, measures will be put in place accordingly prior to the commencement of Phase 3.

## Badger

- 5.5.10 A walkover survey will be undertaken prior to the commencement of all Phases within the Proposed Development to determine the presence of evidence of Badger, including any Badger holes. This will include a search within 30m of the Phase boundary.

# 6 GENERAL PRACTICAL WORKING METHODS

## 6.1 USE OF PROTECTIVE FENCING AND WARNING SIGNAGE

- 6.1.1 Fencing will be erected around the 10m buffer area around the Hedgerows and associated grassy margins (see Figure E21 in Appendix E7 for fencing locations).
- 6.1.2 Protective fencing is required during operational phases of the Proposed Development, to protect retained Hedgerows and Tree Root Protection Zones, as per the Working Plan (drawing ref: W328-00062-03A (Tarmac Ltd., 2018)).
- 6.1.3 It is recommended that semi-permanent fencing is used at the Site, given the duration of the Proposed Development. In this case, Post and Wire fencing (see Plate 3) is recommended for use around the 10m buffer surrounding the retained Hedgerows at the Site, aside from the proposed haul road areas and access routes. Where route protection areas (RPAs) of trees is larger than 10m, this will be reflected in the fence position.

**Plate 3 Post and Wire Fencing (Jacksons Fencing, 2017)**



- 6.1.4 A 30m buffer will be implemented around the Local Wildlife Site (Cockaynes Wood) to the south of the Site for the protection of the woodland during construction (see Figure E21 in Appendix E7 for fencing locations).

## **6.2 WARNING SIGNS**

- 6.2.1 Warning signs will be erected on the protective fencing to ensure there is no breach by construction activities. These will be erected approximately every 10m along the fenceline or where construction activities cross Biodiversity Protection Zones.
- 6.2.2 Warning signs should be comprised of 'no entry' signage and Biodiversity Protection Zone wording.

## **6.3 ECOLOGICAL CLERK OF WORKS (ECOW)**

- 6.3.1 The ECoW will undertake supervisory works where vegetation removal is required as part of the Proposed Development, within habitats suitable for Reptiles, Great Crested Newt, Breeding Birds and Dormice.
- 6.3.2 Specific details of the sensitive working methods to be supervised by the ECoW are detailed within Section 5 to 5.4.
- 6.3.3 A suitably qualified ecologist will perform the responsibilities of the ECoW during the operational phases (Phase 1-7) of the Proposed Development, including the supervision of the sensitive working methods.
- 6.3.4 The ECoW acts as an independent ecological advisor for the project and will be expected to be responsible for the following:
- Advice on, and monitoring of, construction activities, including the preparation of method statements where protected species assemblages are concerned;
  - Pre-construction checks for sensitive habitats and protected species as detailed within



this CEMP;

- Site inductions, Toolbox Talks and meetings;
- Ecological information required by all site personnel;
- Ecological information relevant to particular tasks; and
- Construction exclusion zones/Biodiversity Protection Zones.

6.3.5 The role of the ECoW will also include any monitoring of ecological features as part of the Outline Restoration Proposals, where necessary. Habitat Management Plans will also be monitored and amended accordingly. Habitat and species monitoring will be recorded and documented under the provisions of the Biodiversity Enhancement Plan (BEP), reported to the Tarmac Restoration Manager and then to the Mineral Planning Authority.

6.3.6 If any protected species are found during the operational phases of the Proposed Development, work should cease and a suitably qualified ecologist sought for advice before proceeding.

6.3.7 Toolbox Talks will be given to all Site personnel prior to commencement of works, to make them aware of the Biodiversity Protection Zones, restrictions on timing of activities and reporting systems. Species specific Toolbox Talks will be given as necessary by the ECoW.

## **6.4 PRACTICAL MEASURES AND MITIGATION FOR OTHER POTENTIAL IMPACTS**

### **Storage of Materials and Potential Hazards to Hydrology**

6.4.1 All Site materials should be stored in non-ecologically sensitive areas within the Site. All potential sources of pollution at the Site should be kept in sealed containers away from the Biodiversity Protection Zones.

6.4.2 The Site should have an appropriate surface water and drainage scheme in place prior to the commencement of works to avoid any impacts to the hydrology or water chemistry of the Sixpenny Brook or the existing waterbodies within the Existing Quarry Site.

6.4.3 Water containing silt should be pumped into an on-Site silt lagoon and allowed to settle prior to the discharge of water off-Site, if required. Practical measures in relation to hydrology are detailed within the Hydrological Report (ESI, 2018).

### **Noise**

6.4.4 A Noise Management Plan should be put in place prior to the commencement of works.

6.4.5 Noisiest activities should be undertaken during daylight hours and away from the adjacent designated Wildlife Site to the south of the Site.

### **Dust**

6.4.6 An appropriate Dust Management Plan should be in place prior to the commencement of works.

## Lighting

- 6.4.7 A sensitive lighting scheme, as set out in Section 5, should be in place prior to the commencement of works.
- 6.4.8 Hedgerows and trees to be retained, and those which are to be removed under a phased development, should remain unlit from dusk until dawn to maintain dark corridors which Bat species will use for commuting, as well as foraging.

## 7 MANAGEMENT OF BUND HABITATS DURING CONSTRUCTION

- 7.1.1 A total of 7 bunds (A-G) are to be created as part of the Proposed Development to act as screening measures during construction. Bund locations can be found on the Proposed Working Plan in Appendix E1 of this CEMP.

### Bund A-C

- 7.1.2 3 bunds will be managed as Wildflower Grassland and upon completion of bund construction will be seeded with suitable species (an example seed mix that could be used is Emorsgate EM7 – Meadow Mixtures for Sandy Soils (Emorsgate, 2019)).
- 7.1.3 Species to be used are detailed in Table 7 below. This list is not exhaustive.

**Table 7 Wildflower Mix Species**

Species Common Name	Species Scientific Name
Yarrow	<i>Achillea millefolium</i>
Common Knapweed	<i>Centaurea nigra</i>
Lady's Bedstraw	<i>Galium verum</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>
Birdsfoot Trefoil	<i>Lotus corniculatus</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Bulbous Buttercup	<i>Ranunculus bulbosus</i>
Viper's Bugloss	<i>Echium vulgare</i>
Common Toadflax	<i>Linaria vulgaris</i>
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>
Wavy Hair-grass	<i>Deschampsia flexuosa</i>

Species Common Name	Species Scientific Name
Hoary Plantain	<i>Plantago media</i>
Cowslip	<i>Primula veris</i>
Selfheal	<i>Prunella vulgaris</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Yellow Rattle	<i>Rhinanthus minor</i>
Common Sorrel	<i>Rumex acetosa</i>
Red Clover	<i>Trifolium pratense</i>
Wild Carrot	<i>Daucus carota</i>
Common Bent	<i>Agrostis capillaris</i>
Crested Dogtail	<i>Cynosurus cristatus</i>
Red Fescue	<i>Festuca rubra</i>

- 7.1.4 Control of weeds is particularly important for Wildflower Grassland, with the bunds being sown in autumn or winter. Seeds will not be covered or incorporated into the soil, instead will be rolled firmly into the ground.
- 7.1.5 Mowing of this habitat will be undertaken regularly in the first year with avoidance of spring and summer. Subsequent years mowing will be undertaken between September and March inclusive to allow species to flower.

## Bund D-G

- 7.1.6 Bund D-G will be managed with an easy-care mix (an example seed mix that could be used is Emorsgate EL1 – Flowering Lawn Mix (Emorsgate, 2019)) for the duration of the Proposed Development and will be seeded as and when constructed.
- 7.1.7 Species to be used are detailed in Table 8 overleaf. This list is not exhaustive.

**Table 8 Easy-care Mix Species**

Species Common Name	Species Scientific Name	Species Common Name	Species Scientific Name
Lady's Bedstraw	<i>Galium verum</i>	Birdsfoot Trefoil	<i>Lotus corniculatus</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>	Cowslip	<i>Primula veris</i>
Birdsfoot Trefoil	<i>Lotus corniculatus</i>	Rough Hawkbit	<i>Leontodon hispidus</i>
Selfheal	<i>Prunella vulgaris</i>	Meadow Buttercup	<i>Ranunculus acris</i>
Common Bent	<i>Agrostis capillaris</i>	Crested Dogstail	<i>Cynosurus cristatus</i>
Red Fescue	<i>Festuca rubra</i>	Smaller Cat's-tail	<i>Phleum bertolonii</i>

- 7.1.8 Sowing will be undertaken (upon completion of bund construction) in autumn or spring and will not be incorporated into the soil, instead will be rolled into the ground.
- 7.1.9 Newly sown areas will be mown approximately every 7-10 days through the first year of establishment. Following this, these areas will be mown regularly as lawns but will not be cut to below 25mm.

## 8 TIMING OF SENSITIVE WORKS

- 8.1.1 Table 9 below details the timing restrictions of the sensitive working methods for species at the Site during operational phases of the Proposed Development.

**Table 9 Timing of Sensitive Works during Operational Phases**

Works	Habitat	Species	Timing
Vegetation Removal	Poor Semi-Improved Grassland and Improved Grassland	Reptiles and Great Crested Newt	March-October inclusive (weather dependant) with ECoW
	Hedgerows and Trees	Nesting Birds	September-February inclusive without ECoW <u>OR</u> March-August inclusive with ECoW
	Hedgerows	Dormouse	March to November inclusive with ECoW
Vegetation Removal / Groundworks	Arable	Ground Nesting Birds	September-February inclusive without ECoW <u>OR</u> March-August inclusive with ECoW

## 9 RESPONSIBLE PERSONS AND LINES OF COMMUNICATION

### 9.1 ECOLOGICAL MANAGEMENT TEAM

9.1.1 A number of roles are required within the construction team to ensure ecological protection measures remain in place for the duration of the construction period. The team will comprise a number of individuals with the appropriate experience and availability. Roles and responsibilities are set out in Table 10.

**Table 10 Ecological Management Team**

Proposed Project Team Member	Role	Experience Required	Time Commitment
<b>Estates (Tarmac)</b>	Management of land use, planning and tenure elements of the scheme, including liaison with scheme stakeholders.	Project management of schemes with ecologically sensitive features, and stakeholder management experience.	Ensures compliance with planning and other regulatory regimes.
<b>Restoration Manager (Tarmac)</b>	Management of restoration proposals and implementation of restoration scheme.	Project management of restoration schemes with ecologically sensitive features.	Ensures works comply with Biodiversity Protection Zones and maintains enhancement measures are met.
<b>Site Foreman Manager (Tarmac)</b>	Manages site personnel and overseas operational phases.	Management of Site staff and ecologically sensitive features.	Regular liaisons with Site staff to maintain protection measures and Biodiversity Protection Zones.
<b>Ecological Clerk of Works (ECoW)</b>	Undertaking specialist ecological surveys/supervision and supervising sensitive working methods.	Experience of project management and organisation of Site staff for sensitive working methods.	As required.

9.1.2 If there are any revisions to the sensitive working methods, the Outline Restoration Proposals or the BEP, all documents should be updated accordingly. These changes will be approved in writing prior to implementation.

9.1.3 The various specialist roles required are outlined in Table 10 above, along with the appropriate team members who currently have the experience and availability to commit to the Plan. All roles will be fulfilled either by an 'in house' team or by external consultants appointed by Tarmac.

9.1.4 The project team will be reviewed by Tarmac at the end of each five year management period as defined under the BEP. Any changes to the project team will be communicated to Essex County Council Planning Unit on an annual basis through the Habitat Management Group (HMG). It will be the responsibility of Tarmac to oversee the implementation of the habitat creation works, the long term site management and any monitoring required.

## REFERENCES:

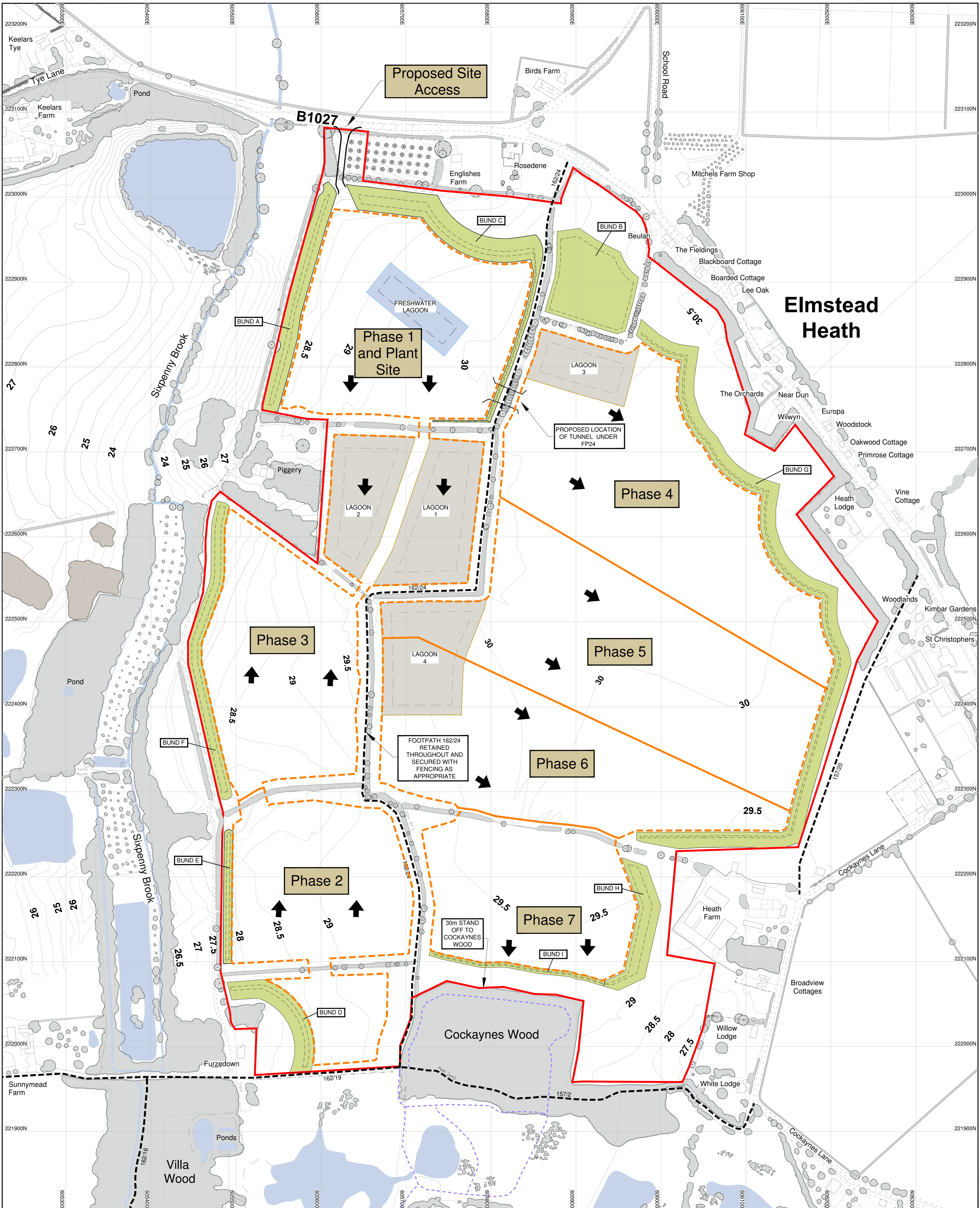
- Bat Conservation Trust/Institute of Lighting Engineers, 2018. *Bats and Lighting in the UK – Bats and the Built Environment Series*, s.l.: s.n.
- Collins, J. (., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.
- Crestwood Environmental Ltd., 2015. *Extended Phase 1 Habitat Survey*, Wolverhampton: Crestwood Environmental Ltd..
- Crestwood Environmental Ltd., 2016. *Pre-Development Tree Survey and Constraints Report*, s.l.: s.n.
- Crestwood Environmental Ltd., 2017. *Ecological Impact Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd., 2018. *Updated Preliminary Ecological Appraisal Report*, Wolverhampton: Crestwood Environmental Ltd..
- Crestwood Environmental Ltd., 2019. *Arboricultural Impact Assessment*, s.l.: s.n.
- Crestwood Environmental Ltd, 2018. *Biodiversity Enhancement Plan*, s.l.: s.n.
- Emorsgate, 2019. *ELI - Flowering Lawn Mix*. [Online]  
Available at: <https://wildseed.co.uk/mixtures/view/56>  
[Accessed 2019].
- Emorsgate, 2019. *EM7 – MEADOW MIXTURE FOR SANDY SOILS*. [Online]  
Available at: <https://wildseed.co.uk/mixtures/view/8>  
[Accessed 2019].
- ESI, 2018. *Wivenhoe Quarry Extension: Hydrogeological Impact Assessment*, s.l.: ESI Consulting; Applied Environmental Insight.
- Fure, A., 2006. Bats and Lighting. *The London Naturalist*, Volume 85.
- Jacksons Fencing, 2017. *Agricultural Fencing - Wire Fencing Stock*. [Online]  
Available at: <https://www.jacksons-fencing.co.uk/fencing/agricultural-fencing/wire-fencing-stock/agricultural-fencing-wire-fencing-stock.aspx>  
[Accessed June 2017].
- Jones, J., 2000. *Impact of Lighting on Bats*, s.l.: s.n.
- Tarmac Ltd., 2018. *Proposed Restoration Scheme*, s.l.: s.n.
- Tarmac Ltd., 2018. *Proposed Working Plan*, s.l.: Tarmac.

**APPENDICES:**

Appendix E1	Proposed Working Plan (W328-00062-03A)
Appendix E2	Outline Restoration Scheme (W328-0062-12A)
Appendix E3	Figure E20 – Biodiversity Protection Zones
Appendix E4	Figure E1 – Phase 1 Habitat Plan
Appendix E5	Figure E17 – Sensitive Working Measures Plan
Appendix E6	Figure E2 – Pond Location Plan
Appendix E7	Figure E21 – Fencing and Stand-off Zone Plan


**APPENDIX E1:**

**Proposed Working Plan (W328-00062-03A)**



**Legend**

- Boundary: Application Site
- Boundary: Proposed Extraction Area
- Phase 1 Proposed Phasing
- Proposed Direction of Working
- 27 Existing Ground Surface Contour at 0.5m interval
- Existing Vegetation
- 157/2 Existing Public Right of Way and Reference
- Permissive Footpath
- Proposed Soil Stores
- Proposed Silt Lagoons



**TARMAC**  
A CRH COMPANY

Site Name:  
W328 - Wivenhoe

Drawing Name:  
Proposed Working Plan

Drawn By: DJA	Scale @ A1: 1:2,000
Date: 27/11/2018	Drawing Number: W328-00062-3A



**DAVID JARVIS ASSOCIATES**



**APPENDIX E2:**

**Outline Restoration Scheme (W328-0062-12A)**



# Elmstead Heath

<b>Legend</b> Boundary: Application Site Boundary: Proposed Extraction Area Existing Ground Surface Contour at 0.5m interval Proposed Restoration Ground Surface Contour at 0.5m interval Existing Vegetation Existing Vegetation (to be retained)		Existing Public Right of Way and Reference Permissive Footpath Proposed New Permissive Footpath Proposed Hedgerow with Standard Trees Proposed Orchard tree Planting Land restored to Lowland Acid Grassland		Land restored to Grassland Field Margins Land restored to Woodland Land restored to Wet Woodland Land Restored to Open Mosaic Habitat and Reedbed Land Restored to Exposed Margins/ Mudflat Land Restored to Lowland Meadow		Open Water Retained Sand and Gravel Cliffs	
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Site Name: W328 - Wivenhoe  
 Drawing Name: Proposed Restoration Scheme  

Drawn By: DJA	Scale @ A1: 1:2,000
Date: 27/11/2018	Drawing Number: W328-00062-12A

**APPENDIX E3:**

**Figure E20 – Biodiversity Protection Zones**



**Legend:**

- Site Boundary
- Biodiversity Protection Zones
- Bat Trees

Drawing is indicative only and is NOT to scale

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
**Crestwood Environmental Ltd**  
 Units 1 and 2  
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 Tel: 01902 229563  
[info@crestwoodenvironmental.co.uk](mailto:info@crestwoodenvironmental.co.uk)  
<http://www.crestwoodenvironmental.co.uk/>

Client:

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Biodiversity Protection Zones**

Date: 15 / 1 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JG	Checked By: LC	Status: Final	Final Revision: Rev A
CAD Ref: CE-WQ-0992-DW19		Drawing No: Figure E20	

**APPENDIX E4:**

**Figure E1 – Phase 1 Habitat Plan**



**Legend:**

- Site Boundary
- Arable
- Poor Semi-Improved Grassland
- Improved Grassland
- Tall Ruderal
- Broadleaved Woodland
- Orchard
- Intact hedge - species poor
- Intact hedge native - species rich
- Defunct hedge - species poor
- Bat Tree with Potential Roost Feature(s)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Client:



Site: Wivenhoe Quarry Eastern Extension			
Drawing Title: Phase 1 Habitat Plan			
Date: 14 / 12 / 2018	Scale: 1:4,500	Paper Size: A3 (420x297mm)	
Drawn By: JG	Checked By: LC	Status: Final	Final Revision: A
CAD Ref: CE-WQ-0992-DW03 - Final		Drawing No: Figure E1	

**APPENDIX E5:**

**Figure E17 – Sensitive Working Measures Plan**



**Legend:**

- Site Boundary
- Sensitive Working Area:  
Great Crested Newt and Reptiles

**Note: Areas are indicative only**

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-
-	-	-	-	-

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 info@crestwoodenvironmental.co.uk  
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Client:



**TARMAC**  
A CRH COMPANY

Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Sensitive Working Areas Plan**

Date: 3 / 1 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ-0992-DW25		Final Revision: C
Drawing No: Figure E17		



**APPENDIX E6:**

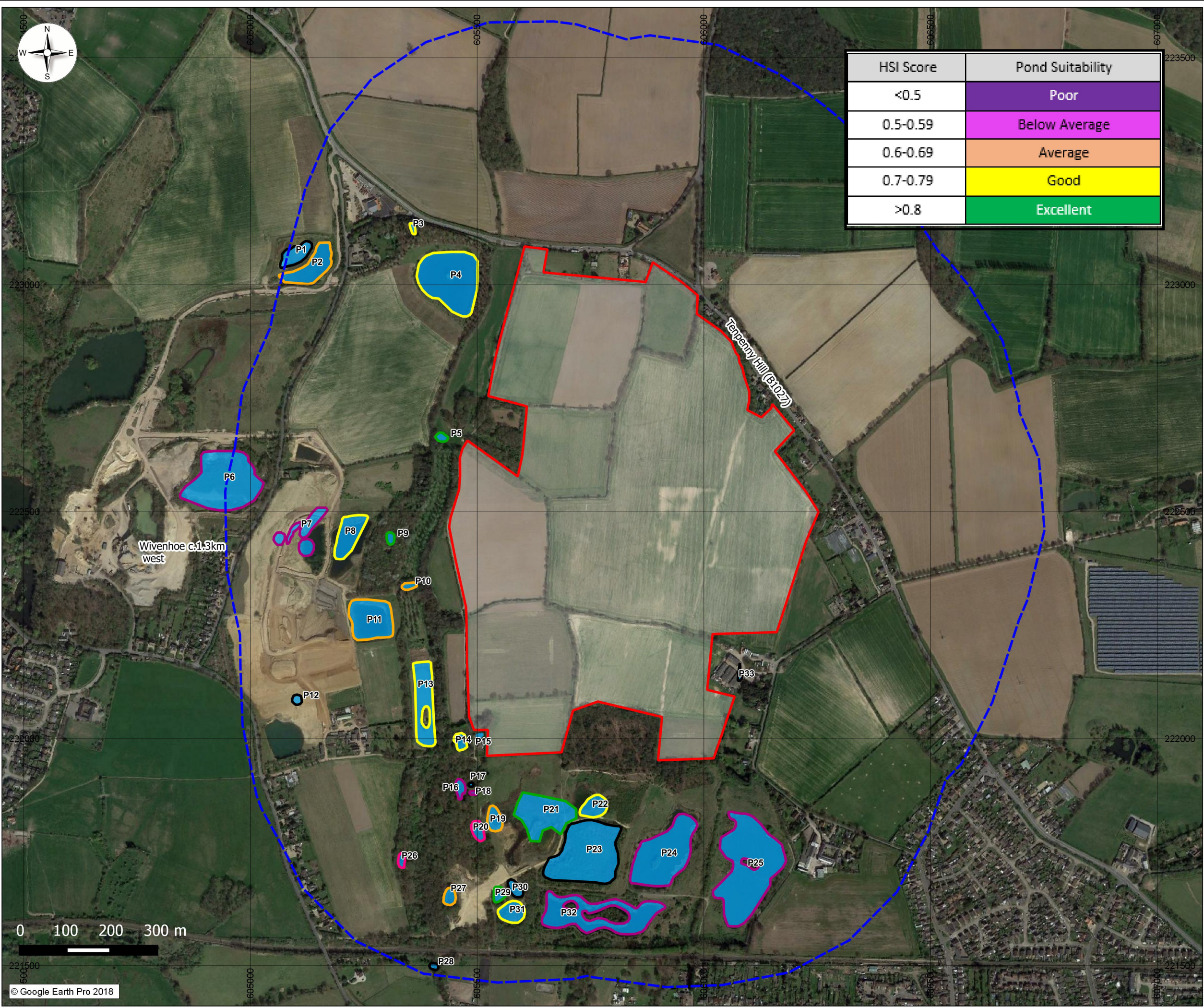
**Figure E2 – Pond Location Plan**



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

**Legend:**

- Site Boundary
- Ponds - Excellent
- Ponds Yellow
- Ponds Light Orange
- Ponds Pink
- Ponds Purple
- Ponds Dry
- 500m Distance Marker: Great Crested Newt Zone of Influence



Wivenhoe c.1.3km west

Terpenry Hill (B1027)

0 100 200 300 m

© Google Earth Pro 2018

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-

Consultant:  
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Client:



**TARMAC**  
A CRH COMPANY

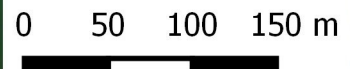
Site: **Wivenhoe Quarry Eastern Extension**

Drawing Title: **Pond Location Plan and HSI Scores**

Date:	Scale:	Paper Size:	
3 / 1 / 2019	1:8,000	A3 (420x297mm)	
Drawn By:	Checked By:	Status:	Final Revision:
JG	LC	Final	-
CAD Ref:	Drawing No:		
CE-WQ-0992-DW02	Figure E2 - Rev A		

**APPENDIX E7:**

**Figure E21 – Fencing and Stand-off Zone Plan**



© Google Earth Pro 2019

Legend:

- Site Boundary
- 10m Stand-off
- 30m Stand-off (Ancient Woodland only)
- Access Route
- Defunct Species-Poor Hedgerow
- Intact Species-Rich Hedgerow
- Intact Species-Poor Hedgerow
- Woodland Edge (Offsite)
- Trees with Root Protection Zones larger than 10m

Notes

The Tree numbers relate to those referenced in the Arboricultural Report ref:- CE-WQ-0992-RP15

-	-	-	-	-
Final Revision:	Date:	Description:	By:	Chk:

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Client:



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A CRH COMPANY

Site: **Wivenhoe Quarry**

Drawing Title: **Fencing and Stand-off Zone Plan**

Date: 7 / 2 / 2019	Scale: 1:4,500	Paper Size: A3 (420x297mm)
Drawn By: JG	Checked By: LC	Status: Final
CAD Ref: CE-WQ-0992-DW18		Final Revision: -
Drawing No: Figure E21		

# APPENDIX M: Arboricultural Survey Report



## **Arboricultural Survey Report**

# **Proposed Eastern Extension, Wivenhoe Quarry, Alresford Road, Wivenhoe**

Report Reference: CE-WQ-0992-RP15 - Final



Produced by Crestwood Environmental Ltd.

29 March 2019

Crestwood Report Reference: CE-WQ-0992-RP15 - Final

<b>Issued Version Status</b>	<b>Date Produced</b>	<b>Written / Updated by:</b>	<b>Checked &amp; Authorised by:</b>
Draft v1i	07-03-2019	Craig Watkins	Jennifer Gatward (Ecologist)
Final	29-03-2019	Craig Watkins	Jennifer Gatward (Ecologist)

This report has been prepared in good faith, with all reasonable skill, care and diligence, based on information provided or known available at the time of its preparation and within the scope of work agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named client and is confidential to them and their professional advisors. No responsibility is accepted to others.

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APPENDIX T4	DRAWINGS

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Figure TPP1: Tree Protection Plan



# 1 INTRODUCTION

## 1.1 INSTRUCTION

1.1.1 Crestwood Environmental Ltd. have been commissioned to produce an arboricultural report by D L Walker ('the Agent') on behalf of Tarmac ('the Client') in relation to land to the east of Wivenhoe, Alresford Road, Wivenhoe, Essex (Vice County: VC 19 North Essex) centred at National Grid Reference TM 056 223 ('the Site'). The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe ('the Proposed Development').

1.1.2 The instruction is to produce a tree survey and Arboricultural Impact Assessment and draft tree protection plan (TPP) that accords to the methodologies and guidance of BS5837:2012 *Trees in Relation to design, demolition and construction: recommendations*, to inform a planning application at the Site.

## 1.2 BRIEF

1.2.1 The purpose of this report is to provide an objective assessment of the impacts imposed by the proposal on trees within and adjacent to the proposed development and vice versa.

1.2.2 To produce a draft Tree Protection Plan that will inform suitable tree protection measures and provide guidance on appropriate methods of working.

## 1.3 DOCUMENTS AND INFORMATION PROVIDED

1.3.1 A copy of the site survey and development proposal plans were provided by the Agent to facilitate the production of this report.

## 1.4 TREE SURVEY

1.4.1 The tree survey was undertaken by Craig Watkins, a suitably qualified Arboriculturist, on 28<sup>th</sup> January 2019.

1.4.2 The survey was used to identify and categorise on-Site trees and trees within 15m of the Site, evaluating those which are most suitable for retention in accordance with the requirements of BS5837:2012 which are as follows:

- a) Sequential tree identification number (T) and trees tagged where appropriate;
- b) Species using common names and scientific names in tree schedules;
- c) Height in Metres measured with a laser distometer A8;
- d) Stem diameter measured in mm at 1.5M above ground measured with a girthing tape in accordance with Annex C (BS5837:2012);
- e) Branch spread to the four cardinal points in Metres measured with a laser distometer A8;
  1. first significant branch and direction of growth (e.g. 2N)
  2. canopy

- f) Informing ground clearances, crown/stem ratio and shading.
- g) Life Stage. Young, Early Mature, Mature, Over Mature. See Table 1 for definitions;
- h) General observations structural and physiological;
- i) Estimated remaining contribution, in years. (<10, 10+, 20+, 40+); and
- j) Grading category as per appendix T2.

1.4.3 Each life stage for each tree was assessed using the criteria in Table 1.

**Table 1 Tree Life Stages**

Stage	Description
Young	Newly planted or self-set trees
Semi-mature	Large nursery stock or self-set trees in their early life stages.
Early-mature	Trees that are in their third life cycle with significant increases in size.
Mature	Trees in their second third life cycle reaching full size potential and slowing growth rates.
Over-mature	Trees in their final third their life cycle showing signs of decline.
Veteran	Trees showing signs of retrenchment and deadwood habitat irrespective of their age.

- 1.4.4 General observations will be recorded for physiological and structural condition of the trees, with preliminary management recommendations in accordance with BS3998:2010.
- 1.4.5 Each individual tree, tree group and woodland will be categorised in accordance with the criteria provided in BS5837:2012, reproduced in APPENDIX T2 .
- 1.4.6 Full details of the results of the tree survey, which informs the quality and value of the trees, can be found in APPENDIX T1 .

## 1.5 SCOPE OF THE REPORT

- 1.5.1 The report aims to provide initial advice on constraints posed by trees and advice to avoid unnecessary impacts.
- 1.5.2 Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a Tree Preservation Order or by their inclusion within Conservation Area) or not, is material consideration that is taken into account in dealing with planning applications.
- 1.5.3 The nature and level of detail of information required for the LPA to properly consider the impacts and effects of development proposals varies between stages and in relation to what is being proposed. Box 1 (below) contains an extract from BS5837:2012 which provides advice to both developers and LPA's on the level of information required at varying stages of planning and development processes. This is the minimum detail that LPA's are expected to seek.

**Box 1 - Extract from BS5837:2012 – Tree Information Detail**

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions) Tree retention/removal plan (finalized) Retained trees and RPAs shown on proposed layout Strategic hard and soft landscape design, including species and location of new tree planting Arboricultural impact assessment	Existing and proposed finished levels Tree protection plan Arboricultural method statement – heads of terms Details for all special engineering within the RPA and other relevant construction details
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using a trenchless method Dimensioned tree protection plan Arboricultural method statement – detailed Schedule of works to retained trees, e.g. access facilitation pruning Detailed hard and soft landscape design	Arboricultural site monitoring schedule Tree and landscape management plan Post-construction remedial works Landscape maintenance schedule

**1.6 LIMITATION AND COPYRIGHT**

- 1.6.1 The report is solely for the purpose of assessment development proposals and not to assess any risk the trees may pose to people and/or property. However, details on the structural and physiological condition of trees will be noted, and should an unacceptable risk be identified then this will be brought to the attention of the client, but the report and its contents is not a tree risk management report and should not be treated as such.
- 1.6.2 The report does not refer to protected species (e.g. Bats, breeding Birds), this being outside the scope of this report, and being covered by separate ecology studies, however, this report should be read in conjunction with related reports provided by others.
- 1.6.3 The survey did not include soil sampling for the assessment of shrinkable soils types. Analysis of this type should be carried out by a specialist to ensure building foundations are adequate and in accordance with current National House Building Council Guidelines NHBC.
- 1.6.4 No samples of any other description were taken from the Site for specialist analysis or any other reason
- 1.6.5 Trees are influenced by a variety of biotic and abiotic activities (e.g. construction activities, pathogens or climatic events) which can affect their biomechanical and physiological condition of trees. The author cannot take responsibility for changes in condition once the fieldwork has been completed. The report considered to be valid for 1 year from date of the fieldwork.

- 1.6.6 Trees can be protected by a Tree Preservation Order under the Town and Country Planning Act 1990 (as amended) or located within a Conservation Area Planning listed buildings and Conservation Area Act 1990 (as amended). For the purpose of this report, the Local Planning Authority was contacted to ascertain any restrictions. Where restrictions are identified it is important that no works are completed to protected trees without first gaining written consent from the LPA. Penalties for non-compliance of a TPO and/ or Conservation Area can be unlimited if tried in a County Court and up to £20,000 if tried in a Magistrates Court.
- 1.6.7 It should be noted that felling of trees prior to receiving full planning permission may require a felling license from the Forestry Commission under the Forestry Act 1967. The felling of trees of more 5m<sup>3</sup> within any three-month period requires a felling license from the Forestry Commission, unless an exemption applies.
- 1.6.8 National Planning Policy Framework (**NPPF**), assumes protection of all ancient woodland and veteran trees unless it can be demonstrated that the need of, or the benefits of, development outweigh the loss. In this respect, ancient woodland is defined as an area which has been wooded continuously since at least 1600 AD and a veteran as a tree of exceptional value for wildlife, in the landscape, or culturally because of its great age, size or condition.
- 1.6.9 In November 2018, the Forestry Commission and Natural England updated their standing advice, Ancient woodland and veteran trees: protecting them from development. This document sets out the principles planning authorities should consider for developments affecting ancient woodland and veteran trees. The standing advice picks up from the National Planning Policy Framework with regards to the importance of veteran trees and the need for their protection. Together these documents state that planning permission should be refused if proposals involve the loss or deterioration of veteran trees, unless the need for, and benefit of, development in that location clearly outweigh the loss.
- 1.6.10 Ancient woodland and veteran trees: protecting them from development, standing advice from the Forestry Commission and Natural England, reads: ‘... leaving a buffer zone at least 15 times larger than the diameter of a veteran tree or 5m from the edge of its canopy, if that’s greater’. In addition to recommending a larger multiplication figure, this advice does not set a maximum radius (BS5837:2012 sets this at 15m).
- 1.6.11 **On this Site T10, 11, 28, 37, 38, 39, 44, 54, 55, 56, 59, 60, 61, 63, 100, 102, 105 and 110 exhibit veteran features or pertain to having significant conservation, historical, commemorative A3 category in accordance with BS5837:2012.**
- 1.6.12 Any management recommendations have been made in accordance with *BS3998: 2010 Tree Works – Recommendations* and industry best practice. Where required, works have been recommended in accordance with any statutory obligations on the landowners or occupiers.
- 1.6.13 Should any part of the report be altered or tampered, with in any way, after being issued to the Client then this will invalidate the entire document.

## 2 THE SITE AND PROPOSALS

### 2.1 DESCRIPTION

2.1.1 The Site is currently agricultural grazing and arable land, surrounded by internal hedgerow boundaries, groups of trees, individual trees and woodland.

### 2.2 THE PROPOSED DEVELOPMENT

2.2.1 The Client is applying for planning permission for mineral extraction operations within land east of Wivenhoe (**'the Proposed Development'**).

2.2.2 The full planning application title reads:

*'Extraction of 3.8 million tonnes of sand and gravel as an easterly extension to the existing Wivenhoe Quarry, erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material.'*

2.2.3 The Proposed Development details provided for use in the production of this report were as per the following drawings:

- Working Scheme (W328-00062-03A);
- Working Plans (W328-00062-08A, W328-00062-09A, W328-00062-10A and W328-00062-11A);  
and
- Outline Restoration (W328-00062-12A).

## 3 RESULTS

### 3.1 TREE SURVEY

3.1.1 There are a total of 110 individual trees, 21 groups of trees, 4 woodland areas and 13 hedgerows present at and immediately adjacent to the Site.

3.1.2 T110, G14, G18, G19, G20, G21, H13, W1, W2, W3, W4 are all off-Site trees, groups or woodland, locations of which can be found in Appendix T4.

**Photo 1** *Linear Boundary Shelter Belt Planting.*



**Photo 2** *Typical Hedgerows with Gaps and Lapsed Pollard Oaks.*



**Photo 3** *Typical Hedgerow Trees.*



3.1.3 All information on tree species can be found in the Tree Schedule (APPENDIX T1 .

3.1.4 None of the surveyed trees are subject to a Tree Preservation Order. The trees are not located within a Conservation Area (CA). Information as detailed from Colchester Council website, interactive plan.

## **3.2 EVALUATION**

3.2.1 Table 2 overleaf details Tree and Group Quality Assessment. The Trees, Groups and Woodland at the Site and immediately adjacent are assessed as the following:

- 18 individual trees, 0 tree groups and 3 woodlands considered to be high quality 'A category';
- 65 individual trees, 16 tree groups, 1 woodland and 2 hedgerows considered as medium quality 'B category';
- 26 individual trees, 5 tree groups and 11 hedgerows considered as low quality 'C category'; with
- 1 individual tree is considered as 'U category', unsuitable for retention.

3.2.2 T110, G14, G18, G19, G20, G21, H13, W1, W2, W3, W4 are all off-Site trees, groups or woodland, locations of which can be found in Appendix T4.

3.2.3 There are 18 trees within the Site that are considered veteran which would also be treated as requiring adequate protection under NPPF, locations of which are detailed on TPP in appendix T4.

3.2.4 There will a loss of 1 Veteran Tree (T105) located at the eastern extent of the Site.

3.2.5 There is scope for new planting and it is suggested that any new planting is used to connect habitats and fill hedgerow gaps with new native trees and hedging plants.

**Table 2 Tree and Group Quality Assessment**

Category:	A	B	C	U
Tree ID Reference:	T10, T11, T28, T37, T38, T39, T44, T54, T55, T56, T59, T60, T61, T63, T100, T102, T105, T110, W1, W2, W4.	T1,T3, T5, T6, T7, T8, T9, T12, T13, T14, T16, T18, T19, T20, T21, T23, T24, T25, T26, T27, T29, T30, T33, T35, T36, T40, T41, T42, T43, T45, T46, T47, T48, T50, T51, T52, T53, T62, T64, T65, T68, T69, T70, T72, T73, T74, T79, T83, T84, T85, T86, T87, T89, T90, T91, T92, T93, T94, T95, T96, T97, T98,T99, T103, T108, G2, G3, G5, G6, G7, G8, G9, G10, G11, G13, G14, G17, G18, G19, G20, G21, W3.H5, H12	T2, T4, T15, T17, T22, T31, T32, T34, T49, T58, T66, T67, T71, T75, T76, T77, T78, T80, T81, T82, T88, T101, T104, T106, T107, T109, G1, G4, G12, G15, G16., H1, H2, H3, H4, H6, H7, H8, H9, H10, H11, H13.	T57.
Total No:	21	84	42	1

## 4 TREE CONSTRAINTS

### 4.1 GENERAL

- 4.1.1 The constraints posed by trees both above and below-ground should be identified and information used to inform an appropriate site layout design, but also recognising the competing needs of the development, and understanding that trees are only one factor to consider during site proposals.
- 4.1.2 The below ground constraints posed by trees are represented by the Root Protection Area (RPA) an area calculated by measurement of tree stem diameter at 1.5m and plotted on a plan as a circle radius. This is the minimum area required to ensure the protection of tree roots and the associated rooting environment and should be used as a tool to guide an appropriate way forward for development.
- 4.1.3 At the design stages of development incompatibilities between the proposed layout and trees identified for retention should be identified, particularly, working space needed for construction, protection of aerial parts of trees, installation of above and below ground services, the proposed end use of the site and potential for mitigation for any tree losses.
- 4.1.4 The RPA should not be affected by site operations and should be protected by Tree Protection Fencing (TPF) located at the edge of the RPA or crown spreads whichever is greatest. Where there is an overriding need to enter within the RPA during site construction activities and providing the trees can be retained, works may need to be completed in accordance with an appropriately qualified engineers design, accompanied with an Arboricultural Method Statement (AMS) and under Arboricultural supervision.
- 4.1.5 Trees rooting environment can be influenced by pre-existing site conditions i.e. the presence of hardstanding, walls and underground apparatus etc. Thus, the morphology and distribution of tree roots when influenced by past land management develop asymmetrically, therefore it is necessary for



a deviation of RPA from a circle radius represented on a plan to a polygon with an equivalent protection area.

- 4.1.6 Consideration should be made to the end use of the site for the current and future growth potential of trees including species characteristics i.e. evergreen or deciduous foliage density particularly leaf loss and shading potential, and issues such as honey dew, branch drop, fruit fall etc.
- 4.1.7 Aerial parts of trees should be protected during development by TPF, or facilitation pruning identified where construction access is required, to provide appropriate clearances from existing and proposed structures. The appropriateness of the works should be assessed by an Arboriculturist and all identified works completed in accordance with BS3998:2010 Tree Works – Recommendations.
- 4.1.8 Consideration should be given to large, mature, over-mature, veteran and ancient trees where they become enclosed by new development. Adequate space should be provided to allow their long-term retention and future maintenance.

## 4.2 OUTLINE EFFECTS ON TREES

- 4.2.1 The Proposed Development will require the partial removal of hedgerows to allow access into each phase. T105 (A category tree), located in the eastern extent of the Site, will be removed as part of the Proposed Development.
- 4.2.2 There are 18 Veteran Oak pollards within the Site which should be managed through a separate management plan secured through an appropriately worded planning condition, particularly where the trees are considered to be in structurally poor condition, but their retention is considered important for biological and cultural reasons in accordance with NPPF for Veteran Trees.

## 5 ARBORICULTURAL IMPACT ASSESSMENT

### 5.1 IMPACTS AND EFFECTS OF DEVELOPMENT ON RETAINED TREES

- 5.1.1 Table 3 details the potential impacts on individual trees, groups of trees, hedgerows and offsite woodland areas, as well as the mitigation measures to be put in place as part of the Proposed Development.

**Table 3    Impacts and Mitigation**

Phase No.	Tree/ Group/ Hedge No. and Category	Impact	Mitigation
Site Access	T110, G2, H13	New access into the site close proximity to T110. Partial removal of G2, H13.	Minor encroachment to the edge of the RPA will not affect the long-term retention of the tree. Partial removal of low quality trees mitigated with increased landscape planting through all years.
Plant Site (P1)	H2	Part removal of hedgerow to allow access from Plant site in to Silt Lagoon Areas.	New increased hedgerow planting of standard trees, gap filling connecting existing tree and hedge features with native species as part of landscape scheme will increase ecological connectivity.
P2	H11	Partial removal of hedgerow	New increased hedgerow planting of standard trees

		to allow access into Phase 2.	and gap filling with native hedgerow species as part of landscape scheme.
P3	H7, T37, T38	Partial removal of H7. Close proximity to T37 and T38.	<p>New increased hedgerow planting of standard trees and gap filling with native hedgerow species as part of landscape scheme. All retained trees and hedgerows will be protected by permanent fencing, type and size to be agreed with the LPA to ensure the phase boundaries are kept to sizes identified on the plan and do not encroach within the RPA of retained trees. All retained trees will be protected with temporary fencing in accordance with BS5837:2012 and NPPF guidance for veteran trees.</p> <p>Tree protection Fencing for veteran trees will be set at 15 x stem Diameter measured at 1.5m in accordance with NPPF requirements for minimum protection for veteran trees. The location of TPF is shown on TPP.</p>
P4, 5, 6 and 7	H9, T75, T76, T77, T104, T105	Partial removal of H9. Removal of T75, T76, T77, T104 and T105. Phase proximity to Ancient woodland.	<p>All retained trees and hedgerows will be protected by permanent fencing, a type and size to be agreed with the LPA to ensure the phase boundaries are kept to sizes identified on the plan and do not encroach within the RPA of retained trees. All retained trees will be protected with temporary fencing in accordance with BS5837:2012. Removal of A category tree, mitigation increased replanting across the Site.</p> <p>Tree Protection Fencing for veteran trees will be set at 15 x stem Diameter measured at 1.5m in accordance with NPPF requirements for minimum protection for veteran trees. The location of TPF is shown on TPP.</p>
All Phases	All retained trees and hedgerows	Extraction boundary, encroachment in to retained trees RPA's.	<p>All retained trees and hedgerows will be protected by permanent fencing, a type and size to be agreed with the LPA to ensure the phase boundaries are kept to sizes identified on the plan and do not encroach within the RPA of retained trees. All retained trees will be protected with temporary fencing in accordance with BS5837:2012 and NPPF guidance for veteran trees.</p> <p>Tree protection Fencing for veteran trees will be set at 15 x stem Diameter measured at 1.5m in accordance with NPPF requirements for minimum protection for veteran trees. The location of TPF is shown on TPP.</p>

Table 3 Cont'd...

Phase No.	Tree/ Group/ Hedge No. and Category	Impact	Mitigation
Potential Lagoons, Plant and Mineral Processing Area	All retained trees and hedgerows	Proximity to structures likely to cause indirect and/or direct damage	All retained trees and hedgerows will be protected by permanent fencing, a type and size to be agreed with the LPA to ensure the phase boundaries are kept to sizes identified on the plan and do not encroach within the RPA of retained trees. All retained trees will be protected with temporary fencing in accordance with BS5837:2012 and NPPF guidance for veteran trees. Tree protection Fencing for veteran trees will be set at 15 x stem Diameter measured at 1.5m in accordance with NPPF requirements for minimum protection for veteran trees. The location of TPF is shown on TPP.
All Phases	All retained trees and hedgerows	Intensity and nature of onsite activities.	All retained trees and hedgerows will be protected by permanent fencing, a type and size to be agreed with the LPA to ensure the phase boundaries are kept to sizes identified on the plan and do not encroach within the RPA of retained trees. All retained trees will be protected with temporary fencing in accordance with BS5837:2012 and NPPF guidance for veteran trees. Tree protection Fencing for veteran trees will be set at 15 x stem Diameter measured at 1.5m in accordance with NPPF requirements for minimum protection for veteran trees. The location of TPF is shown on TPP.

## 6 CONCLUSIONS

- 6.1.1 The proposal will require the partial removal of some hedgerows that are considered as being of material conservation and cultural value. Mitigation planting including the planting of new hedgerows and increased planting within retained hedgerows where gaps are present will mitigate losses and improve habitat connectivity. All to be agreed with the LPA and secured through an appropriately worded planning condition.
- 6.1.2 All retained trees and hedgerows will be protected with Tree Protection Fencing in accordance with a draft Tree Protection Plan. All retained trees and hedgerows will be protected during the life of the quarry with permanent fencing to be agreed with the LPA.
- 6.1.3 A Veteran tree management plan for all retained important trees should be completed to ensure the appropriate long-term management of these important trees
- 6.1.4 Only a single veteran tree (T105) is to be removed to allow the proposed access through to Phase 7.
- 6.1.5 All veteran trees will be protected using TPF and future fixed fencing set at 15 x stem diameter measured at 1.5m as shown on TPP and additional RPA column in tree schedules for veteran trees.

## 7 Arboricultural Method Statement - Heads of Terms

7.1.1 Additional information required through an Arboricultural Method Statement should respectfully secured through an appropriately worded planning condition. The following issues should be covered:

- i. Site access.
- ii. The intensity and nature of activities.
- iii. Phasing of on-site operations.
- iv. Parking, Storage and welfare facilities.
- v. Tree Protection (barriers)
- vi. Tree Protection Plan (final version – if amendment is required)
- vii. Removal of materials, facilities, and protective measures for the final phase.
- viii. Proposed tree works and landscaping.
- ix. Monitoring

### REFERENCES:

- BS5837:2012. Trees In Relation To Design, Demolition, and Construction – Recommendations. British Standards Institute. London, UK.
- BS 3998:2010. Tree work. Recommendations. British Standards Institute. London, UK

## **ABBREVIATIONS:**

*For the avoidance of confusion, abbreviations used have the meanings given below:*

<b>AGL</b>	Above Ground Level
<b>AIA</b>	Arboricultural Implications Assessment
<b>AMS</b>	Arboricultural Method Statement
<b>AOD</b>	Above Ordnance Datum
<b>c.</b>	Circa
<b>CA</b>	Conservation Area
<b>DEM</b>	Digital Elevation Model
<b>DSM</b>	Digital Surface Model
<b>DTM</b>	Digital Terrain Model
<b>GEA</b>	Gross External Area
<b>GIS</b>	Geographical Information System
<b>LPA</b>	Local Planning Authority
<b>NGR</b>	National Grid Reference
<b>NPPF</b>	National Planning Policy Framework
<b>NPPG</b>	National Planning Policy Guidance
<b>OS</b>	Ordnance Survey
<b>POS</b>	Public Open Space
<b>TCP</b>	Tree Constraints Plan
<b>TPO</b>	Tree Preservation Order
<b>TPP</b>	Tree Protection Plan

## GLOSSARY:

*For the avoidance of confusion, the terms used in this report follow the definitions given below:*

<b>Abscission</b>	The shedding of a leaf or other short lived part of a woody plant.
<b>Abiotic</b>	Pertaining to non-living agents e.g. environmental factors.
<b>Absorptive Roots</b>	Non-woody short lived roots, generally having a diameter less than one millimetre, the primary function of which is the uptake of water and nutrients.
<b>Access facilitation pruning</b>	One off pruning operation to provide access for development operation. Pruning that will not be detrimental to trees health or amenity.
<b>Arboricultural Method Statement</b>	A methodology for the implementation of development where encroachment within the RPA has the potential to cause damage or loss of retained trees.
<b>Arboriculturist</b>	Someone who through relevant training and experience has gained knowledge in the expertise of trees.
<b>Adaptive Growth</b>	The process by where wood formation rates increasing in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium.
<b>Adaptive Roots</b>	The adaptation of existing roots; or a production of new roots in response to damage or decay.
<b>Adventitious buds, roots, shoots</b>	Which grow in other than primary apical control.
<b>Anchorage</b>	The process in which a tree uses its roots system to support itself within the soil structure.
<b>Arisings</b>	Parts of the tree that has been removed for disposal, branches, leaves, roots etc.
<b>Bacteria</b>	Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms
<b>Bark</b>	A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem.
<b>Basidiomycotina (Basidiomycetes).</b>	One of the major taxonomic groups of fungi; their spores are borne on microscopic peg-like structures (basidia), which in many types are in turn borne on or within conspicuous fruit bodies, such as brackets or toadstools. Most of the principal decay fungi in standing trees are basidiomycetes.
<b>Boiling</b>	A term sometimes used to describe pollard heads.
<b>Bottle-butt</b>	A broadening of the stem base and buttresses of a tree, in excess of normal and sometimes denoting a growth response to weakening in that region, especially due to decay involving selective delignification.
<b>Bracing</b>	The use of rods or cables to restrain the movement between parts of a tree.
<b>Branch (Primary)</b>	A first order branch arising from a stem
<b>Branch (Lateral)</b>	A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches.
<b>Branch (Sub-lateral)</b>	A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs.
<b>Branch bark ridge</b>	The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem.
<b>Branch collar</b>	A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to

	the pattern of growth of the cells of the parent stem around the branch base.
<b>Brown-rot</b>	A type of wood decay in which cellulose is degraded, while lignin is only modified
<b>Buckling</b>	An irreversible deformation of a structure subjected to a bending load.
<b>Buttress zone</b>	The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions
<b>Canker</b>	Area of dead cambium killed by overlying pathogenic tissues.
<b>Cavity</b>	A hole in the woody structure of the tree; often caused through decay.
<b>Cleaning out</b>	The removal of dead, diseased crossing branches, damaged branches and alien structures.
<b>Competent Person</b>	Person with training and experience in accordance with the proposed matter being addressed, having an understanding of a particular matter being approached.
<b>Condition</b>	An indication of the physiological vitality of a tree, but not the stability of a tree.
<b>Construction</b>	A site based operation that has the potential to affect retained trees.
<b>Construction Exclusion Zone</b>	An area based on the RPA from which construction activity is prohibited.
<b>Coppicing</b>	Removal of all aerial parts of the tree leaving a stump for regeneration of new shoot.
<b>Crown/canopy</b>	The parts of the tree that supports the leaves.
<b>Crown lifting</b>	The removal of limbs and small branches to a specified height above ground level.
<b>Crown thinning</b>	The removal of a proportion of secondary branch growth throughout the crown to produce an even density well balanced crown structure.
<b>Crown reduction</b>	Removal in the height to a specified description to maintain a flowing crown structure.
<b>Deadwood</b>	Non – functional branches which no longer support natural growing conditions of the tree, but may be beneficial for the support of habitats.
<b>Decurrent Growth</b>	Tree growth habit with a rounded or spreading growth in the crown (see excurrent).
<b>Defect</b>	Any area of the tree that longer has an optimal mechanical uniformity of stress, making the tree unsuitable for its location.
<b>Dieback</b>	Death of woody parts of the tree starting at distal ends of the tree.
<b>Disease</b>	Damage occurring to living organisms as a result of pathogenic micro-organisms.
<b>Distal</b>	Furthest distance away from the main body of the tree.
<b>Dysfunction</b>	In woody tissues, the loss of physiological function, especially water conduction, in sapwood.
<b>Epicormical growth</b>	Growth from dormant or adventitious buds, not developing from the first shoot.
<b>Excurrent Growth</b>	Tree growth habit with a pyramid shaped crown and dominant central leader (see decurrent).
<b>Girdling roots</b>	A circling root which constricts the stem or roots, with the potential to cause death and the restriction of flow within the phloem.
<b>Heartwood</b>	Dysfunctional xylem which no longer has conductive properties, but which has become an integral structural part of the tree.
<b>Heave</b>	The swelling of shrinkable clay soils, often when vegetation has been removed allowing soil rehydration to develop, with the potential to affect supported structures, e.g. walls.
<b>Included bark/acute forks</b>	Face to face contact of bark usually at fork unions, or branch unions.
<b>Lopping/Topping</b>	A term used to describe the removal of large sized branches.

<b>Monolith</b>	Description of resultant standing dead/decaying tree upon reduction in height and spread, undertaken to make tree safe and provide habitat for species reliant on decaying wood.
<b>Mulch</b>	Material lay down over the rooting area of trees to suppress weed competition, increase moisture retention and increase some cases organic material and nutrients.
<b>Pathogen</b>	A micro-organism that causes disease within another organism.
<b>Phytotoxic</b>	Toxic to plants
<b>Pollarding</b>	The removal of the tree canopy to produce knuckles where new growth develops and is removed cyclically usually performed on young trees.
<b>Pruning</b>	Selective removal of parts of the tree to achieve a desired outcome.
<b>Root protection area</b>	An area around a tree identified by multiplying the stem diameter at 1.5 by 12 to produce a radial area or rooting volume around a tree to be protected. BS 5837 2012.
<b>Service</b>	Any above and below ground structure or apparatus for utility provision.
<b>Size of part</b>	Relating to risk assessments, identifying the size of the hazard, or parts of a tree which may cause harm if failure occurs.
<b>Stem(s)</b>	The main structure from the ground up supporting the crown
<b>Stress</b>	In plants, the physiological depletion as a result of environmental influences.
<b>Structure</b>	A manufactured object, such as building, roads, path, wall or excavated structures.
<b>Structural roots</b>	The primary larger diameter roots which hold and support the aerial parts of the tree.
<b>Subsidence</b>	The shrinkage of soil through the absorption of water via vegetation and the sinking effects on surrounding architectural structures.
<b>Targets</b>	In risk assessment, persons or property at risk of harm as a result of a hazard (falling tree, branch etc.).
<b>Tree Protection Plan</b>	A scaled drawing informed by descriptive text where necessary, based upon finalised site proposals, showing trees for retention and illustrating the tree and landscape protection measures.
<b>Veteran Tree</b>	Tree that, by recognised criteria, shows features of biological, cultural or aesthetic characteristics of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.
<b>Windthrow</b>	The blowing over a tree at its roots.



## **APPENDICES:**

- APPENDIX T1 TREE SURVEY SCHEDULE
- APPENDIX T2 TREE CATEGORISATION TABLE (EXTRACT FROM BS5837:2012)
- APPENDIX T3 PROTECTIVE FENCING AND WARNING SIGNAGE
- APPENDIX T4 DRAWINGS

## **APPENDIX T1 TREE SURVEY SCHEDULE**

Site:	Wivenhoe, Essex	Surveyor:	Craig Watkins
# = Estimated Measurement		Weather:	Overcast
		Survey Date:	29th January 2019

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition		Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m²)	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.								
T1	English Oak	<i>Quercus robur</i>	12	2	7	7	7	7	1000						M			40+	B3	Alongside public footpath. Old pollard and approaching veteran status. Alongside ditch. Some deadwood and dieback commensurate with age.	Monitor	N	12	452	
T2	Grey Willow	<i>Salix Cinerea</i>	5	0	3	3	3	3	M/S						M			20+	C2	Multi-stemmed shrub like tree. Unable to access to assess closely.	No work	n			
T3	English Oak	<i>Quercus robur</i>	5	1.5	3	3	3	3	400						EM			20+	B2	Small tree in reasonable condition.	No work	n	3.6	41	
T4	Oak		8	1	4	4	4	4	250	250	250		3		EM			20+	C2	Small tree in reasonable condition.	No work	n	5.2	85	
T5	White Willow	<i>Salix Alba</i>	15	2	7	7	7	7	600x3	300x5	250x4				M			20+	B2	Very large, significant tree. Multi-stemmed. Unable to access to assess closely. Could be weak unions. Long, large extended branches.	No work	n	12.2	465	
T6	English Oak	<i>Quercus robur</i>	10	2	5	5	5	5	500	250	200				EM			20+	B2	Reasonable form and condition. Typical boundary tree.	No work	n	6.1	119	
T7	English Oak	<i>Quercus Robur</i>	9	2	4	4	4	4	450						EM			20+	B2	Reasonable form and condition. Some deadwood.	No work	n	5.4	92	
T8	English Oak	<i>Quercus robur</i>	4	3	6	6	6	6	750						M			20+	B2	Reasonable form and condition.	No work	n	9	254	
T9	English Oak	<i>Quercus robur</i>	4	3	6	6	6	6	500						M			20+	B2	Reasonable form and condition. Some dieback and deadwood.	No work	n	4.8	72	
T10	English Oak	<i>Quercus robur</i>	10	2	4	4	4	4	1000						M			20+	A3	Good form and condition. Old pollard.	No work	n	10.8	366	15
T11	English Oak	<i>Quercus robur</i>	6	2	4	4	4	4	900						M			20+	A3	Old pollard. Thin crown but in reasonable condition otherwise.	No work	n	8.4	221	13.5
T12	English Oak	<i>Quercus robur</i>	10	2	8	8	8	8	700	700			2		M			20+	B2	Reasonable form and condition.	No work	n	11.9	443	
T13	English Oak	<i>Quercus robur</i>	6	2	2.5	2.5	2.5	2.5	300	300	250	250	4		M			20+	B3	Multi-stemmed. Thin crown, some dieback and deadwood. Lapsed codominant stem.	No work	n	8.8	242	
T14	English Oak	<i>Quercus robur</i>	10	2	4	4	4	4	400						EM			20+	B2	Reasonable form and condition.	No work	n	4.8	72	
T15	English Oak	<i>Quercus robur</i>	6	2	4	4	4	4	400						EM			20+	C2	Reasonable form and condition.	No work	n	3.6	41	
T16	English Oak	<i>Quercus robur</i>	7	2	3	3	3	3	400						EM			20+	B2	Reasonable form and condition.	No work	n	4.2	55	
T17	English Oak	<i>Quercus robur</i>	8	2	2.5	2.5	2.5	2.5	300						EM			20+	C2	Reasonable form and condition.	No work	n	3.6	41	

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)							No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition			Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BS5837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m²)	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West											Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.									
T18	English Oak	<i>Quercus robur</i>	6	2	4	4	4	4	650							EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Some minor storm damage in crown.	No work	n	6	113				
T19	English Oak	<i>Quercus robur</i>	14	2	3	3	3	3	775							M			10+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Some deadwood.	No work	n	8.4	222				
T20	English Oak	<i>Quercus robur</i>	10	2	4	4	4	4	650							M			20+	B3	Old pollard in decline.	Monitor	n	7.2	163				
T21	English Oak	<i>Quercus robur</i>	10	2	3	3	3	3	300	300	250	250	250	5		EM			20+	B2	Reasonable form and condition.	No work	n	7.3	166				
T22	English Oak	<i>Quercus robur</i>	5	2	2.5	2.5	2.5	2.5	350							EM			10+	C2	In decline, thin crown with dieback.	No work	n	4.2	55				
T23	English Oak	<i>Quercus robur</i>	6	5n	2	2	2	2	600							M				B3	Old pollard.	No work	n						
T24	English Oak	<i>Quercus robur</i>	14	2	7	7	7	7	625							M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	6	113				
T25	English Oak	<i>Quercus robur</i>	10	2	5	5	5	5	450							M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feture. Roadside tree.	No work	n	4.2	55				
T26	English Oak	<i>Quercus robur</i>	10	2	4	4	4	4	1100							M			20+	B3	Roadside tree in good condition. Old pollard. Ivy covered.	No work	n	12	452				
T27	English Oak	<i>Quercus robur</i>	10	2	6	6	6	6	1000							M			20+	B3	Old pollard. Reasonable form and condition. Reasonable landscape and ecology feature. Ivy restricting VTA.	No work	n	10.8	366				
T28	English Oak	<i>Quercus robur</i>	10	2	5	5	5	5	900							M			20+	A3	Old pollard. Reasonable form and condition. Reasonable landscape and ecology feature. Stem cavity. Ivy restricting VTA.	No work	n	10.8	366	13.5			
T29	English Oak	<i>Quercus robur</i>	8	2	6	6	6	6	400	425				2		M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Codominant at 1.4m.	No work	n	5.5	96				
T30	English Oak	<i>Quercus robur</i>	8	2	3	3	3	3	300	400				2		M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	5.1	81				
T31	English Oak	<i>Quercus robur</i>	4	1	4	4	4	4	450							EM			20+	C2	Heavily reduced as below electric cables.	No work	n	3.6	41				
T32	English Oak	<i>Quercus robur</i>	4	1	2	2	2	2	300							EM			20+	C2	Heavily reduced as below electric cables.	No work	n	3.6	41				
T33	English Oak	<i>Quercus robur</i>	9	2	7	7	7	7	400	400	400	400		4		MA			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	7.2	163				

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition		Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m <sup>2</sup> )	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.								
T34	English Oak	<i>Quercus robur</i>	6	2	5	5	5	5	400						EM			20+	C2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	3.6	41	
T35	English Oak	<i>Quercus robur</i>	4	2	5	5	5	5	450						EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.2	55	
T36	English Oak	<i>Quercus robur</i>	4	2	5	5	0	5	450						EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.2	55	
T37	English Oak	<i>Quercus robur</i>	8	2	4	4	4	4	800						M			20+	A3	Old pollard. Reasonable form and condition. Reasonable landscape and ecology feature. Veteran.	No work	n	8.4	222	12
T38	English Oak	<i>Quercus robur</i>	10	2	5	5	5	5	800						M			20+	A3	Reasonable form and condition. Reasonable landscape and ecology feature. Some deadwood. Old pollard.	No work	n	8.4	222	12
T39	English Oak	<i>Quercus robur</i>	8	2	6	6	6	6	900						M			20+	A3	Old pollard. Partly hollow. Approaching veteran status. Stem cavity.	No work	n	9.6	290	13.5
T40	English Oak	<i>Quercus robur</i>	7	2	6	6	6	6	600	450			2		M			20+	B3	Old pollard. Stem divides close to base. Decay between stems.	No work	n	9	254	
T41	English Oak	<i>Quercus robur</i>	7	2	5	5	5	5	400	300	300		3		M			20+	B2	Reasonable form and condition. Multi-stemmed tree.	No work	n	6.2	122	
T42	English Oak	<i>Quercus robur</i>	12	2	6	6	6	6	1100						V			20+	B3	Old pollard in good condition. Approaching veteran status.	No work	n	12	452	
T43	English Oak	<i>Quercus robur</i>	7	2	4	4	4	4	600						M			20+	B3	Reasonable form and condition. Previous failures.	No work	n	7.2	163	
T44	English Oak	<i>Quercus robur</i>	8	2	3	3	3	3	800						OM-V			20+	A3	Old pollard. Small crown.	No work	n	9.6	290	12
T45	English Oak	<i>Quercus robur</i>	9	2	5	5	5	5	700						M			20+	B2	Reasonable form and condition. Past pruning wounds.	No work	n	7.8	191	
T46	English Oak	<i>Quercus robur</i>	8	2	7	7	7	7	500	300	300	300	4		M			20+	B2	Multi-stemmed tree.	No work	n	3.6	41	
T47	English Oak	<i>Quercus robur</i>	10	2	6	6	6	6	900						M			20+	B2	Old pruning wounds.	No work	n	8.4	222	
T48	English Oak	<i>Quercus robur</i>	6	2	2.5	2.5	2.5	2.5	250						EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	3	28	
T49	English Oak	<i>Quercus robur</i>	4	1.5	2	2	2	2	800						M			20+	C2	Mostly dead - ecological value.	No work	n	96	290	
T50	English Oak	<i>Quercus robur</i>	6	2	4	4	4	4	300	300	300	250	4		M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.7	69	
T51	English Oak	<i>Quercus robur</i>	8	2	5	5	5	5	350						EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.2	55	
T52	English Oak	<i>Quercus robur</i>	6	2	5	5	5	5	600	450			2		EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Codominant stem.	No work	n	4.2	55	

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition			Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m²)	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.									
T53	English Oak	<i>Quercus robur</i>	5	2	4	4	4	4	600							M			20+	B2	Reasonable form and condition for a hedgerow tree. Reasonable landscape and ecology feature.	No work	n	7.2	163	
T54	English Oak	<i>Quercus robur</i>	8	2	5	5	5	5	800							V			20+	A3	Old pollard. Some decline and deadwood. Cavity.	No work	n	9.6	290	12
T55	English Oak	<i>Quercus robur</i>	5	2	5	5	5	5	1000							V			20+	A3	Old pollard. Some decline and deadwood.	No work	n	9.6	290	15
T56	English Oak	<i>Quercus robur</i>	8	2	4	4	4	4	700							V			20+	A3	Old veteran pollard. Some decline and deadwood.	No work	n	8.4	222	10.5
T57	English Oak	<i>Quercus robur</i>	5	2	5	5	5	5	800							Dead			<10	U	Dead tree	Fell should target increase	n			
T58	English Oak	<i>Quercus robur</i>	5	1	2	2	2	2	400	300				2		EM			20+	C3	Below electric cables so heavily reduced.	No work	n	5.2	85	
T59	English Oak	<i>Quercus robur</i>	5	2	2.5	2.5	2.5	2.5	1200							V			20+	A3	Old veteran pollard. Hollow, deadwood and declining.	No work	n	10.8	366	18
T60	English Oak	<i>Quercus robur</i>	9	3	5	5	5	5	900							V			20+	A3	Old veteran pollard. Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	9.6	290	13.5
T61	English Oak	<i>Quercus robur</i>	8	2.5	6	6	6	6	1000							V			20+	A3	Old veteran pollard. Hollow.	No work	n	12	452	15
T62	English Oak	<i>Quercus robur</i>	10	2	6	6	6	6	450							EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	5.4	92	
T63	English Oak	<i>Quercus robur</i>	8	3	6	6	6	6	900							V			20+	A3	Old veteran pollard. Appears hollow. Reasonable condition. Reasonable landscape and ecology feature.	No work	n	9.6	290	13.5
T64	English Oak	<i>Quercus robur</i>	6	2	2	2	2	2	650							M			20+	B3	Good condition.	No work	n	7.8	191	
T65	English Oak	<i>Quercus robur</i>	10	3	6	6	6	6	650							M			20+	B2	Very large tree. Stem divides - possible weak unions, no access to assess closely.	No work	n	7.8	191	
T66	White Willow	<i>Salix Alba</i>	16	2	4	4	4	4	800							M			20+	C2	Extensive dieback and deadwood. Fell.	No work	n	9.6	290	
T67	White Willow	<i>Salix Alba</i>	20	4	6	6	6	6	800							M			10+	C2	Very large tree. Decay in main trunk. Fell.	Fell should target increase	n	9.6	290	
T68	White Willow	<i>Salix Alba</i>	20	4	6	6	6	6	800							M			20+	B2	Very large tree. Stem divides - possible weak unions, no access to assess closely. Fell.	Fell should target increase	n	9.6	290	
T69	White Willow	<i>Salix Alba</i>	20	4	6	6	6	6	600							M			20+	B2	Very large tree. Stem divides - possible weak unions, no access to assess closely. Fell.	Fell should target increase	n	7.2	163	
T70	English Oak	<i>Quercus robur</i>	4	2	7	6	7	7	800							M			20+	B2	Very large tree. Stem divides - possible weak unions, no access to assess closely.	No work	n	8.4	222	
T71	English Oak	<i>Quercus robur</i>	6	2	4	4	4	4	500							M			20+	C2	Small tree of reasonable form and condition.	No work	n	6	113	

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition		Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m²)	RPA for Veteran Trees. 15 x 1.5m Radius	
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.									
T72	English Oak	<i>Quercus robur</i>	4	3	6	6	6	6	800	450	450			3		M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	6.6	137	
T73	English Oak	<i>Quercus robur</i>	4	2	8	7	8	8	400	400				2		M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. .	No work	n	6	113	
T74	English Oak	<i>Quercus robur</i>	10	2	6	7	6	4	400							EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	3.6	41	
T75	English Oak	<i>Quercus robur</i>	8	2	4	4	4	4	300							EM			20+	C2	Small tree of reasonable form and condition.	No work	n	3	28	
T76	English Oak	<i>Quercus robur</i>	6	2	2.5	2.5	2.5	2.5	250							EM			20+	C2	Small tree of reasonable form and condition. Multi-stemmed tree.	No work	n	3	28	
T77	English Oak	<i>Quercus robur</i>	4	2	4	4	4	4	600							M			20+	C2	Heavily reduced as below electric condition.	No work	n	7.2	163	
T78	English Oak	<i>Quercus robur</i>	10	2	6	6	6	6	700							M			20+	C2	Old pollard. Reasonable form and condition. Reasonable landscape and ecology feature. Reduced vigour.	No work	n	8.4	222	
T79	English Oak	<i>Quercus robur</i>	8	3	7	7	7	7	650							M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Ivy covered.	No work	n	7.8	191	
T80	English Oak	<i>Quercus robur</i>	10	2	7	7	7	7	300							EM			20+	C2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.2	57	
T81	English Oak	<i>Quercus robur</i>	8	2	2	0	2	3	400							EM			20+	C2	Reasonable form and condition. Reasonable landscape and ecology feature. Some decay at base.	No work	n	3.6	41	
T82	English Oak	<i>Quercus robur</i>	8	2	2	2	2	2	400							EM			20+	C2	Reasonable form and condition. Reasonable landscape and ecology feature. Some decay at base. Growing as one tree with T81.	No work	n	3	28	
T83	English Oak	<i>Quercus robur</i>	12	3	5	5	5	5	700							M			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Some deadwood.	No work	n	7.8	191	
T84	English Oak	<i>Quercus robur</i>		2	6	6	7	6	400	350				2		EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Twin stem.	No work	n	5.9	111	
T85	English Oak	<i>Quercus robur</i>	8	2	5	5	5	5	300	250	250			3		EM			20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Multi-stemmed tree.	No work	n	5.6	97	

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition		Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m²)	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.								
T86	English Oak	<i>Quercus robur</i>	10	2	5	5	5	5	300	300				2				20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	5.1	81	
T87	English Oak	<i>Quercus robur</i>	4	3	8	7	7	7	650									20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Some storm damage. Owl box in tree.		n	7.8	191	
T88	English Oak	<i>Quercus robur</i>	6	2	2.5	2.5	2.5	2.5	300									20+	C2	Reasonable form and condition. Reasonable landscape and ecology feature. Suppressed tree.	No work	n	3	28	
T89	English Oak	<i>Quercus robur</i>	12	3	0	0	0	0	400									20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	3.6	41	
T90	English Oak	<i>Quercus robur</i>	10	2	7	8	7	7	500									20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature.	No work	n	4.8	72	
T91	English Oak	<i>Quercus robur</i>	12	3	7	7	7	7	800									20+	B2	Ivy restricting VTA.	No work	n	9.6	290	
T92	Ash	<i>Fraxinus excelsior</i>	14	2	6	6	6	6	700e									20+	B2	Reasonable form and condition. Reasonable landscpae and ecology feature. Trunk and some of crown covered in ivy. Die back.	Monitor	n	8.4	222	
T93	Ash	<i>Fraxinus excelsior</i>	10	3	5	4	3	7	400	250								20+	B2	Good form and condition. Reasonable landscape and ecology feature.	No work	n	8.4	222	
T94	Ash	<i>Fraxinus excelsior</i>	10	3	4	4	4	4	400									20+	B2	Ivy restricting VTA.	No work	n	7.2	163	
T95	Ash	<i>Fraxinus excelsior</i>	6	3	6	6	6	6	650									20+	B2	Reasonable form and condition. Reasonable landscape and ecology feature. Basal stem decay	No work	n	5.9	111	
T96	Ash	<i>Fraxinus excelsior</i>	7	3	4	4	4	4	200	300				2				20+	B2	Reasonable form and condition. In hedge.	No work	n	3.6	41	
T97	Oak	<i>Quercus robur</i>	14	3n	6	6	6	6	750									40+	B3	Old pollard.	No work	n	9	255	
T98	Oak	<i>Quercus robur</i>	10	3w	5	6	5	5	675									40+	B3	Old pollard. Extensive dieback.	No work	n	8.1	206	
T99	Holly	<i>Ilex aquifolium</i>	4	0	3	3	3	3	200									20+	B2	Old pollard extensive decay	No work	n	2.4	18	
T100	Oak	<i>Quercus robur</i>	10	2w	5	5	5	5	1050									40+	A3	Old pollard.	No work	n	12.6	499	15.75
T101	Oak	<i>Quercus robur</i>	5	2n	4	0	2	2	500									20+	C2	Old hedgerow tree, inspection restricted	No work	n	6	113	
T102	Oak	<i>Quercus robur</i>	10	3n	4	4	3	4	550	900				2				40+	A3	Veteran pollard	No work	n	12.6	499	15.75
T103	Oak	<i>Quercus robur</i>	16	3n	6	6	6	6	800									20+	B2	In hedgerow	No work	n	9.6	290	
T104	Oak	<i>Quercus robur</i>	8	0	4	4	4	4	200	200	225			3				20+	C2	Multi-stemmed tree.	No work	n	4.2	55	
T105	Oak	<i>Quercus robur</i>	8	3s	4	5	3	5	825									40+	A3	Old pollard	No work	n	9.9	308	15.75



Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition			Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BSS837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m <sup>2</sup> )	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.	Estimated Remaining Contribution: (<10, 10+, 20+, 40+)								
T106	Oak	<i>Quercus robur</i>	5	0	3	3	3	3	200						EM			20+	C2	Hedgerow tree.	No work	n	2.4	18	12.375	
T107	Ash	<i>Fraxinus excelsior</i>	16	3s	8	7	8	7	400						M			20+	C2	Hedgerow tree	No work	n	4.8	72		
T108	Oak	<i>Quercus robur</i>	14	2s	5	6	5	5	600						EM			20+	B2	In hedge.	No work	n	7.2	163		
T109	Oak	<i>Quercus robur</i>	6	0	3	3	3	3	300						EM			20+	C1	No obvious defects.	No work	n	3.6	41		
T110	Oak	<i>Quercus robur</i>	15	3s	8	8	8	8	1250						V			40+	A3	Old pollard	No work	n	15	707	18.75	
G1	Cricket Bat Willow and Elder	<i>Salix alba 'Caerulea', Sambucus nigra</i>	10	3	3	3	3	3	300						EM			20+	C1	One dying tree. Dying Willow.	Fell should target increase	n	3.6	41		
G2	English Oak	<i>Quercus Robur</i>	Up to 10		6	6	6	6	Up to 600						EM			20+	B2	Linear, cohesive group. One, oldest tree, is hollow and has been burnt in past but appears ok.	No work	n	7.2	163		
G3	English Oak and Ash x 1	<i>Quercus robur, Fraxinus excelsior</i>	Up to 10		6	6	6	6	Up to 600						EM			20+	B2	Linear, cohesive group. Some older pollards with more recent seedling trees between.	No work	n	7.2	163		
G4	English Oak x 3	<i>Quercus Robur</i>	5		4	4	4	4	300						EM			20+	C2	Small trees in reasonable condition.	No work	n	3.6	41		
G5	English Oak x 5	<i>Quercus Robur</i>	Up to 10		4	4	4	4	Up to 600						M			20+	B2	Roadside group, some lapsed pollards.	No work	n	7.2	163		
G6	English Oak	<i>Quercus Robur</i>	Up to 10		5	7	7	7	Up to 700						M			20+	B3	Linear, cohesive group. Some old pollards with seedlings in between. Offsite.	No work	n	8.4	222		
G7	English Oak and Ash x 2	<i>Quercus robur, Fraxinus excelsior</i>	Up to 9		4	5	5	5	Up to 550						EM			20+	B2	Youngster, linear group. Ash has been coppiced.	No work	n	6.6	137		
G8	Ash x 4 and English Oak x 2	<i>Fraxinus excelsior, Quercus robur</i>	Up to 4		4	4	4	4	Up to 450						EM-M			20+	B2	Ash have all been coppiced in the past.	No work	n	5.4	92		
G9	English Oak x 4	<i>Quercus Robur</i>	Up to 10						Up to 400						EM			20+	B2	Group of seedling oaks in good condition.	No work	n	4.8	72		
G11	Oak and Hawthorn	<i>Quercus robur, Crataegus monogyna</i>	8	0	3	3	3	3	450						EM			20+	B2	Linear group close to footpath.	No work	n	5.4	92		
G10	Oak and Hawthorn	<i>Quercus robur, Crataegus monogyna</i>	8	0	3	3	3	3	450						EM			20+	B2	Linear group close to footpath.	No work	n	5.4	92		
G12	Oak x 3	<i>Quercus robur</i>	8	0	6	6	6	6	675						EM			20+	C2	3 dying trees.	Fell should target increase	n	8.1	206		
G13	Oak, Hawthorn, Holly x 8	<i>Quercus robur, Crataegus monogyna, Ilex aquifolium</i>	8	0	3	3	3	3	800						EM			20+	B2	Hedgerow trees.	No work	n	9.6	290		
G14	Oak, Holly and Willow	<i>Quercus robur, Ilex aquifolium, Salix alba</i>	14	0	6	6	6	6	750						M			20+	B2	Linear group of Oak on edge of woodland.	No work	n	9	255		
G15	Holly and Oak	<i>Ilex aquifolium, Quercus robur</i>	8	0	3	3	3	2	200						M			20+	C2	Small group	No work	n	2.4	18		
G16	Holly and Oak	<i>Ilex aquifolium, Quercus robur</i>	8	0	3	3	3	2	200						M			20+	C2	Small group	No work	n	2.4	18		
G17	Hawthorn	<i>Crataegus monogyna</i>	5	0	2	2	2	2	200						M			20+	B2	Ivy restricting VTA	No work	n	2.4	18		
G18	Oak, Wild Cherry, Hawthorn, Field Maple, Birch, Ash, Hazel	<i>Quercus robur, Prnus avium, Quercus robur, Acer campestre, Betula pendula, Fraxinus excelsior, Corylus avellana</i>	16	0	6	6	6	6	800						EM			20+	B2	Mixed sp. group	No work	n	9.6	290		
G19	Hawthorn	<i>Crataegus monogyna</i>	10	0	3	3	3	3	200						M			20+	B2	Unmanaged hedge	No work	n	2.4	18		

Tree / Group / Hedge Ref. No.	Common Name	Botanical Name	Height (m)	Crown Clearance (m) & compass direction	Crown Spread (m)				Stem Diameter @ 1.5m (mm)				No. of Stems (5+)	Stem Diameter average (@1.5 m (mm) Five Stems or more)	Age Class: Y (Young), SM (Semi-Mature), EM (Early-Mature), M (Mature), LM (Late-mature), V (Veteran)	Condition			Estimated Remaining Contribution: (<10, 10+, 20+, 40+)	BS5837 Categorisation Grading	Comments	Preliminary management recommendations / further works	Tree Preservation Order?	Root Protection Area Radius (m)	Root Protection Area (m <sup>2</sup> )	RPA for Veteran Trees. 15 x 1.5m Radius
					North	East	South	West								Physiological Condition: Good, Fair, Poor, Dead.	Structural Condition: Good, Fair, Poor.	Estimated Remaining Contribution: (<10, 10+, 20+, 40+)								
G20	Field Maple, Hawthorn, Oak, White Poplar, Elder, Ash, Yew, Hazel	<i>Acer campestre, Quercus robur, Populus alba, Sambucus nigra, Taxus baccata, Corylus avellana.</i>	12	0	4	4	4	4	200						EM			20+	B2	Plantation group.	No work	n	2.4	18		
G21	Oak	<i>Quercus robur</i>	14	0	8	8	8	8	750						M			20+	B3	Linear group of old pollards.	No work	n	9	255		
W1	English Oak, Witch Hazel and Birch	<i>Quercus robur, Corylus avellana, Betula pendula</i>	17						450						M-V			40+	A1	Offsite woodland. Some veteran oak pollards on boundary.	No work	n	5.4	92		
W2	English Oak, Sweet Chestnut and Witch Hazel	<i>Quercus robur, Corylus avellana, Castanea sativa</i>		0					650						M			40+	A1	Offsite woodland. Some old Oak pollards around boundary.	No work	n	7.8	191		
W3	Oak, Willow	<i>Quercus robur, Salix alba</i>	15	0	7	7	7	7	600						M			20+	B3	Large Oak within woodland	No work	n	7.2	163		
W4	Ash, Sweet Chestnut, Holly, Oak	<i>Fraxinus excelsior, Castanea sativa, Ilex aquifolium, Quercus robur</i>	14	0	8	8	8	8	600						EM			20+	A1	Offsite trees.	No work	n	7.2	163		
H1	Blackthorn, Hawthorn, Hazel, Field Maple and Elder	<i>Prunus spinosa, Crataegus monogyna, Acer campestre, Sambucus nigra</i>	Up to 5	0					150						M			20+	C2	Good, slightly gappy farm hedgerow.	No work	n	1.8	10		
H2	Holly, Elm and Blackthorn	<i>Ilex aquifolium, Ulmus procera, Prunus spinosa</i>	Up to 4	0					100						M			20+	C2	Gappy farm hedgerow.	No work	n	1.2	3		
H3	Blackthorn and Hawthorn	<i>Prunus spinosa, Crataegus monogyna</i>	3	0					100						M			20+	C2	Roadside farm hedgerow.	No work	n	1.2	3		
H4	Blackthorn and Holly	<i>Prunus spinosa, Ilex aquifolium</i>	Up to 3	0					100						M			20+	C2	Roadside farm hedgerow.	No work	n	1.2	3		
H5	Leyland Cypress	<i>X cupressocyparis lawsoniana</i>	10	0					725				7		M			20+	B1	Boundary row of conifers.	No work	n	8.7	238		
H6	Blackthorn	<i>Prunus spinosa</i>	Up to 2.5	0					100						M			20+	C2	Boundary farm hedgerow.	No work	n	1.2	3		
H7	Blackthorn, Holly and Hawthorn	<i>Prunus spinosa, Ilex aquifolium, Crataegus monogyna.</i>	Up to 5	0					100						M			20+	C2	Boundary farm hedgerow.	No work	n	1.2	3		
H8	Blackthorn	<i>Prunus spinosa</i>	Up to 3	0					100						M			20+	C2	Boundary farm hedgerow.	No work	n	1.2	3		
H9	Holly and Hawthorn	<i>Prunus spinosa, Crataegus monogyna.</i>	Up to 9	0					100						M			20+	C2	Gappy hedgerow.	No work	n	1.2	3		
H10	Hawthorn	<i>Crataegus monogyna</i>	Up to 3	0					100						M			20+	C2	Alongside access drive. Managed hedgerow.	No work	n	1.2	3		
H11	Blackthorn, Hazel, White Willow, Holly	<i>Prunus spinosa, Corylus avellana, Salix alba</i>	Up to 3	0					100				7		M			20+	C2	Farm hedgerow.	No work	n	1.2	3		
H12	English Oak, Hawthorn, Blackthorn	<i>Quercus robur, Crataegus monogyna, Prunus spinosa</i>	c.10	0					100						M-V			40+	B3	Important Oak pollards. Un-surveyed at present.	No work	n	1.2	3		
H13	Hawthorn	<i>Crataegus monogyna</i>	3	0					100						M			40+	C2	Boundary farm hedgerow.	No work	n	1.2	3		

## APPENDIX T2 TREE CATEGORISATION TABLE (EXTRACT FROM BS5837:2012)

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)		
<b>Trees unsuitable for retention</b> (see Note)			
<b>Category U</b> Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> <li>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)</li> <li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li> <li>Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality</li> </ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>		
	<b>1 Mainly arboricultural qualities</b>	<b>2 Mainly landscape qualities</b>	<b>3 Mainly cultural values, including conservation</b>
<b>Trees to be considered for retention</b>			
<b>Category A</b> <b>Trees of high quality</b> with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
<b>Category B</b> <b>Trees of moderate quality</b> with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value
<b>Category C</b> <b>Trees of low quality</b> with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

## APPENDIX T3 PROTECTIVE FENCING AND WARNING SIGNAGE

### USE OF PROTECTIVE FENCING AND WARNING SIGNAGE

Fencing will be erected around the 10m buffer area around the Hedgerows and associated grassy margins.

Protective fencing is required during operational phases of the Proposed Development, to protect retained Hedgerows and Tree Root Protection Zones, as per the Working Plan (drawing ref: W328-00062-03A (Tarmac Ltd., 2018)).

It is recommended that semi-permanent fencing is used at the Site, given the duration of the Proposed Development. In this case, Post and Wire fencing (see Photo 4) is recommended for use around the 10m buffer surrounding the retained Hedgerows at the Site, aside from the proposed haul road areas and access routes. Where route protection areas (RPAs) of trees is larger than 10m, this will be reflected in the fence position.

**Photo 4** *Post and Wire Fencing (Jacksens Fencing, 2017)*



A 30m buffer will be implemented around the Local Wildlife Site (Cockaynes Wood) to the south of the Site for the protection of the woodland during construction.

### WARNING SIGNS

Warning signs will be erected on the protective fencing to ensure there is no breach by construction activities. These will be erected approximately every 10m along the fenceline or where construction activities cross Biodiversity Protection Zones.

Warning signs should be comprised of 'no entry' signage and Biodiversity Protection Zone wording.

## **APPENDIX T4    DRAWINGS**



605500E

606000E

223000N

223000N

222500N

222500N

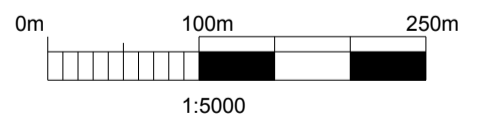
222000N

222000N

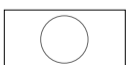
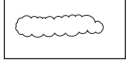

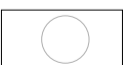
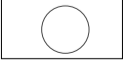
605500E

606000E

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Legend:

-  Root protection area
-  Hedgerow
-  Cat A
-  Cat B
-  Cat C

Consultant:

**Crestwood Environmental Ltd**  
 Units 1 & 2  
 Nightingale Place  
 Pendeford Business Park  
 Wolverhampton WV9 5HF  
 Tel: 01902 229563  
 info@crestwoodenvironmental.co.uk  
 http://www.crestwoodenvironmental.co.uk/



Client:



Site: **Wivenhoe Quarry**

Drawing Title: **Aboricultural Survey Plan**

Drawn By: ACJ	Checked By: JG	Date: 29 Mar 2019	Scale: 1:5,000	Paper Size: A3 (297x420 mm)
Status: Final	Final Revision: -	CAD Ref: CE-WQ-0992-DW27 - FINAL	Drawing No: / Client Ref: <b>Figure 1</b>	

## APPENDIX N: Policy Details

### Mineral Site Restoration for Biodiversity – Supplementary Planning Guidance (SPG) (Essex County Council, 2016)

Nothing specific within this document was referenced and most of it is relevant so I'll just link it for you. → <https://www.essex.gov.uk/Environment%20Planning/Minerals-Waste-Planning-Team/Planning-Policy/minerals-development-document/Documents/Mineral%20Site%20Restoration%20for%20Biodiversity%20SPG.pdf>

### Essex Minerals Local Plan 2014 (Essex County Council, 2014)

#### *Policy S3 - Climate Change*

Applications for minerals development shall demonstrate how they have incorporated effective measures to minimise greenhouse gas emissions and to ensure effective adaptation and resilience to future climatic changes, having regard to:

1. Siting, location, design and transport arrangements,
2. On-site renewable and low carbon energy generation, where feasible and viable,
3. National and local principles/ design standards for Sustainable Drainage Systems, including measures to enhance on-site water efficiency and minimise flood impacts both on-site and in relation to adjacent land and 'downstream' land-uses,
4. On-site resilience to unexpected climatic events,
5. The implications of coastal change, where relevant, and,
6. The potential benefits from site restoration and after-use schemes for biodiversity and habitat creation, flood alleviation, and provision of living carbon sinks.

#### *Policy S10 - Protecting and Enhancing the Environment and Local Amenity*

Applications for minerals development shall demonstrate that:

- a) Appropriate consideration has been given to public health and safety, amenity, quality of life of nearby communities, and the natural, built, and historic environment,
- b) Appropriate mitigation measures shall be included in the proposed scheme of development, and
- c) No unacceptable adverse impacts would arise and;
- d) Opportunities have been taken to improve/ enhance the environment and amenity

#### *Policy S12 - Mineral Site Restoration and After*

Proposals for minerals development will be permitted provided that it can be demonstrated that the land is capable of being restored at the earliest opportunity to an acceptable environmental condition and beneficial after-uses, with positive benefits to the environment, biodiversity and/ or local communities.

Mineral extraction sites shall:

1. Be restored using phased, progressive working and restoration techniques,
2. Provide biodiversity gain following restoration, demonstrating their contribution to priority habitat creation and integration with local ecological networks,
3. Be restored in the following order of preference,
  - (i) At low level with no landfill (including restoration to water bodies),
  - (ii) If (i) above is not feasible then at low level but with no more landfill than is essential and necessary, to achieve satisfactory restoration,
  - (iii) If neither of these are feasible and the site is a Preferred Site as may be determined by the Waste Local Plan, then by means of landfill.
4. Provide a scheme of aftercare and maintenance of the restored land for a period of not less than five years to ensure the land is capable of sustaining an appropriate after-use,
5. Where appropriate, proposals shall demonstrate the best available techniques to ensure that:
  - a) Soil resources are retained, conserved and handled appropriately during operations and restoration,
  - b) In the case of minerals development affecting the best and most versatile agricultural land, the land is capable of being restored back to best and most versatile land,
  - c) Hydrological and hydro-geological conditions are preserved, maintained, and where appropriate, managed to prevent adverse impacts on the adjacent land's groundwater conditions and elsewhere,
  - d) Flood risk is not increased,
  - e) Important geological features are maintained and preserved,
  - f) Adverse effects on the integrity of internationally or nationally important wildlife sites are avoided.

Proposals shall demonstrate that there will not be an unacceptable adverse impact on groundwater conditions, surface water drainage and the capacity of soils for future use. Proposals shall also have regard to any relevant Surface Water or Shoreline Management Plans. Proposals will also demonstrate that the working and restoration scheme is appropriate and the implementation and completion of restoration is feasible.

### **Colchester Borough Core Strategy 2008 (Colchester Borough Council, 2008)**

#### *Policy Env1 – Environment.*

The Borough Council will conserve and enhance Colchester's natural and historic environment, countryside and coastline. The Council will safeguard the Borough's biodiversity, geology, history and archaeology through the protection and enhancement of sites of international, national, regional and local importance. In particular, developments that have an adverse impact on Natura 2000 sites or the Dedham Vale Area of Outstanding Natural Beauty will not be supported.

Within the Coastal Protection Belt development will not be permitted that would adversely affect the open and rural character of the undeveloped coastline, and its historic features, sites of nature conservation importance and wildlife habitats.

The network of strategic green links between the rural hinterland, river corridors, and key green spaces and areas of accessible open space that contribute to the green infrastructure across the Borough will be protected and enhanced.

Development will be supported at appropriate locations to improve public access, visual amenity and rehabilitate the natural environment. Development will need to minimise and mitigate adverse impacts on river, coastal and ground



water quality.

The Council will seek to direct development away from land at risk of fluvial or coastal flooding in accordance with PPS25, including areas where the risk of flooding is likely to increase as a result of climate change.

Unallocated greenfield land outside of settlement boundaries (to be defined/reviewed in the Site Allocations DPD) will be protected and where possible enhanced, in accordance with the Landscape Character Assessment. Within such areas development will be strictly controlled to conserve the environmental assets and open character of the Borough. Where new development needs, or is compatible with, a rural location, it should demonstrably:

- i. be in accord with national, regional and local policies for development within rural areas, including those for European and nationally designated areas; and
- ii. be appropriate in terms of its scale, siting, and design; and
- iii. protect, conserve or enhance landscape and townscape character, including maintaining settlement separation; and
- iv. protect, conserve or enhance the interests of natural and historic assets; and
- v. apply a sequential approach to land at risk of fluvial or coastal flooding in line with the guidance of PPS25; and
- vi. protect habitats and species and conserve and enhance the biodiversity of the Borough; and
- vii. provide for any necessary mitigating or compensatory measures.

#### Essex County Council

Essex County Council provided policies relating to the Proposed Development. The Essex Minerals Local Plan (Essex County Council, 2014) contains policy relevant to the Site and is detailed below.

##### Policy S3 - Climate change

*“Applications for minerals development shall demonstrate how they have incorporated effective measures to minimise greenhouse gas emissions and to ensure effective adaptation and resilience to future climatic changes, having regard to:*

*6. The potential benefits from site restoration and after-use schemes for biodiversity and habitat creation, flood alleviation, and provision of living carbon sinks”.*

##### Policy S10 - Protecting and enhancing the environment and local amenity

*“Applications for minerals development shall demonstrate that:*

*a) Appropriate consideration has been given to public health and safety, amenity, quality of life of nearby communities, and the natural, built, and historic environment,*

*b) Appropriate mitigation measures shall be included in the proposed scheme of development, and*

*c) No unacceptable adverse impacts would arise and;*

*d) Opportunities have been taken to improve/enhance the environment and amenity”.*

#### **Policy S12 - Mineral Site Restoration and After**

*“Use Proposals for minerals development will be permitted provided that it can be demonstrated that the land is capable of being restored at the earliest opportunity to an acceptable environmental condition and beneficial after-uses, with positive benefits to the environment, biodiversity and/or local communities.*

*Mineral extraction sites shall:*

- 1. Be restored using phased, progressive working and restoration techniques,*
- 2. Provide biodiversity gain following restoration, demonstrating their contribution to priority habitat creation and integration with local ecological networks,*
- 3. Be restored in the following order of preference,*
  - (i) At low level with no landfill (including restoration to water bodies),*
  - (ii) If (i) above is not feasible then at low level but with no more landfill than is essential and necessary, to achieve satisfactory restoration,*
  - (iii) If neither of these are feasible and the site is a Preferred Site as may be determined by the Waste Local Plan, then by means of landfill.*
- 4. Provide a scheme of aftercare and maintenance of the restored land for a period of not less than five years to ensure the land is capable of sustaining an appropriate after-use,*
- 5. Where appropriate, proposals shall demonstrate the best available techniques to ensure that:*
  - a) Soil resources are retained, conserved and handled appropriately during operations and restoration,*
  - b) In the case of minerals development affecting the best and most versatile agricultural land, the land is capable of being restored back to best and most versatile land . . .*
  - f) Adverse effects on the integrity of internationally or nationally important wildlife sites are avoided.*

*Proposals will also demonstrate that the working and restoration scheme is appropriate and the implementation and completion of restoration is feasible”.*

#### **Colchester Borough Council**

The Site lies within the borough of Colchester, Colchester Borough Council (Colchester Borough Council, 2008) has adopted the Colchester Borough Core Strategy, and Policy ‘ENV1 - Environment’ relates specifically to biodiversity and is outlined below.

*“The Borough Council will conserve and enhance Colchester’s natural and historic environment, countryside and coastline. The Council will safeguard the Borough’s biodiversity, geology, history and*

*archaeology through the protection and enhancement of sites of international, national, regional and local importance. In particular, developments that have an adverse impact on Natura 2000 sites or the Dedham Vale Area of Outstanding Natural Beauty will not be supported . . .*

*The network of strategic green links between the rural hinterland, river corridors, and key green spaces and areas of accessible open space that contribute to the green infrastructure across the Borough will be protected and enhanced.*

*Development will be supported at appropriate locations to improve public access, visual amenity and rehabilitate the natural environment . . .*

*Unallocated greenfield land outside of settlement boundaries (to be defined/reviewed in the Site Allocations DPD) will be protected and where possible enhanced, in accordance with the Landscape Character Assessment. Within such areas development will be strictly controlled to conserve the environmental assets and open character of the Borough. Where new development needs, or is compatible with, a rural location, it should demonstrably: . . .*

*vi. Protect habitats and species and conserve and enhance the biodiversity of the Borough; and*

*vii. Provide for any necessary mitigating or compensatory measures”.*

## Biodiversity Enhancement and Habitat Creation

3.196 There is much greater encouragement of biodiversity enhancement, including through Government policy and Environmental Stewardship Schemes, and for climate change adaptation through the provision of natural landscape features. This includes biodiversity offsetting for other development schemes being used to incentivise biodiversity after-use at mineral sites. The minerals industry has always taken a leading role in this regard and is encouraged to continue to do so. This is recognised in the Mineral Working and Active Landfill Site Award Scheme.<sup>(5)</sup>

- 
- (5) The primary objective of the award scheme is to encourage the minerals and land fill industries to devote appropriate attention to minimising the impact of operations on the environment and also to acknowledge where a high standard of care is evident- outside of that normally controlled through the planning permission.

3.197 All mineral site restoration should provide a net-gain in biodiversity and contribute towards establishing a coherent and resilient ecological network through the creation of priority habitat, integrating with landscape-scale conservation initiatives where appropriate<sup>(6)</sup> in order for ECC as the MPA to be compliant with the 'duty' placed upon it by the Natural Environment and Rural Communities Act 2006. The Plan proposes an ambitious target for the creation of a minimum of 200ha of priority habitat creation in Essex from the Preferred and Reserve Site allocations. Six UK Biodiversity Framework habitats have been selected reflecting local conservation priorities as well as the geological and hydrological character of the Preferred and Reserve Sites:

- Coastal and Floodplain Grazing Marsh,
- Lowland Dry Acid Grassland,
- Lowland Heathland,
- Lowland Meadows,
- Open Mosaic Habitats on Previously Developed Land,
- Reedbeds,

3.198 The 200ha MLP target will be achieved through:

- The creation of new areas of priority habitats as part of dedicated biodiversity restoration schemes,
- The integration of biodiversity enhancement into all development sites,
- Contributions to support off-site enhancements such as the creation or restoration of priority habitats in proximity to a mineral extraction proposal where positive benefits cannot be secured on site, known as biodiversity offsetting
- The integration of priority habitats into agricultural restoration.

3.199 For instance the Preferred and Reserve Sites in Appendix 1 at Bradwell Quarry (Rivenhall), A9 Broadfield Farm (Rayne), Sunnymead (Alresford), Maldon Road (Birch) and Land at Colemans Farm (Witham) provide particular opportunities for new habitat areas.

3.200 There are also potential opportunities for informal outdoor recreation, public rights of way, landscape enhancement, heritage and geological conservation, improved water management and measures to promote mitigation and adaptation to climate change impacts.

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(6) Priority Habitats are defined in the NPPF as being the Habitats of Principle Importance Included in the England Biodiversity List published by the Secretary of State under section 41 of the Natural Environment and Rural Communities Act 2006. They are habitats identified as requiring action in the UK Biodiversity Framework habitats and continue to be regarded as conservation priorities.