

# **Land at Barnham, Eastergate and Westergate (BEW Parcel SC1) Environmental Statement**

## **Chapter F: Ecology**

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## **F1.0 Introduction**

- F1.1 This Chapter forms part of an Environmental Statement ('ES') which sets out the findings of an Environmental Impact Assessment ('EIA') of the proposed residential led mixed use development of land near the villages of Barnham, Eastergate and Westergate ('BEW') in West Sussex. The proposals also include the realignment of the A29 strategic route south of Barnham Road.
- F1.2 The Proposed Development forms a first phase of a wider strategic allocation of land which is known for the purposes of this ES as 'BEW Parcel SC1'. A description of the background to the proposal, including its role as part of the strategic allocation; the relationship of this chapter to the wider ES; and a description of the site and the development is provided at Chapters A to C of this ES.
- F1.3 Chapter N considers cumulative effects including a review of the potential for effects associated with the development of the wider strategic allocation at BEW.
- F1.4 This chapter should be read in conjunction with Chapters A, B, C and N.
- F1.5 This Chapter reports the assessment of the potential for likely significant environmental effects arising from the Proposed Development in relation to ecology, biodiversity and nature conservation.
- F1.6 This Chapter describes: the assessment methodology, the baseline conditions at the application site and surrounding area, the likely significant environmental effects during the construction and operation phases, the mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual effects after these measures have been employed.
- F1.7 The chapter should be read in conjunction with the following technical appendices provided at Volume 2 to this ES:-

**Appendix F1 – Figure F1: Application Site Location and Ecological Designations**

**Appendix F2 – Figure F2.1: Ecological Features (North)**

**Appendix F3 – Figure F2.2: Ecological Features (South)**

**Appendix F4 – Figure F3: Protected Species**

**Appendix F5 – Figure F4: Great Crested Newt Pond Survey Plan**

- F1.8 The following surveys and studies have been carried out as part of the Ecology assessment. Information relating to these and their results are contained within the body of Chapter F.
- Phase 1 Habitat Surveys (June 2018 and May 2020)
  - Badger Surveys (June 2018 and May 2020)
  - Bat Activity Surveys (May, June, July, August, September and October 2018)
  - Water Vole Surveys (May and October 2018 and May 2020)
  - Otter Surveys (May and October 2018 and May 2020)
  - Hazel Dormouse Surveys (July, June, August, September, October and November 2018).
  - Great Crested Newt Surveys on main waterbodies of the site in May and June 2018. Subsequent eDNA surveys undertaken on Fleurie Nursery waterbodies in May 2019.
  - Reptiles Surveys (July to October 2018).
  - Wintering Bird Surveys (December 2019, January and February 2020).

- Breeding Bird Surveys (April, May and June 2020).

## About the Author

- F1.9 Ecology Solutions Limited is a specialist practice offering ecological advice to a wide range of private and public sector clients. The practice has expertise in all aspects of ecological survey and assessment work and has a high profile within the planning bar. The practice is frequently requested by leading counsel to join consultant teams to prepare Environmental Statements and, when necessary, present expert evidence at Appeal. Perhaps the most complex cases are those involving the Habitat Regulations, and in this regard the practice is recognised as market leaders. The practice has over 15 years of experience in producing and collating Ecology and Nature Conservation chapters as part of Environmental Statements.
- F1.10 The wealth of projects which relate to European designated sites account for over 80% of the practice's work, with the majority of those commissions coming via leading Counsel. Many of the projects have been ground-breaking test cases at Appeal and, in some instances, within the High Court and Court of Appeal.
- F1.11 Ecology Solutions represents a wide range of clients from large, blue chip multinationals to government departments, based in the UK and abroad. Our understanding of planning allows us to deliver practical solutions to ecological issues within development sites.
- F1.12 Our project experience is extensive and wide-ranging and includes retail schemes, business parks, residential, new towns and mixed-use schemes, mineral operations, golf courses, leisure developments, canals, new roads, airports and coastal and inland shipping.
- F1.13 The majority of staff are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and hold class survey licences for protected species (including for Great Crested Newts, bats [levels 1 and 2] and Dormice). In addition, Dominic Farmer is one of only a small number of Bat Mitigation Class Licence and Great Crested Newt Low Impact Class Licence holders in England. This Chapter has been authored by professional ecological consultants who are members of CIEEM.

## **F2.0 Policy Context**

F2.1 The planning policy framework that relates to nature conservation at the development site is issued nationally through the Revised National Planning Policy Framework and locally through policies in the Arun Local Plan.

### **Legislative Framework**

F2.2 **Bats** - All bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended) (“the Habitats Regulations”). These include provisions making it an offence to:

- Deliberately kill, injure or take (capture) bats;
- Deliberately disturb bats in such a way as to be likely to significantly affect:
  - the ability of any significant group of bats to survive, breed or rear or nurture their young; or to hibernate; or
  - to affect significantly the local distribution or abundance of the species concerned;
- Damage or destroy any breeding or resting place used by bats;
- Intentionally or recklessly obstruct access to any place used by bats for shelter or protection (even if bats are not in residence).

F2.3 The words ‘deliberately’ and ‘intentionally’ include actions where a court can infer that the defendant knew ‘the action taken would almost inevitably result in an offence, even if that was not the primary purpose of the act.

F2.4 The offence of damaging (making it worse for the bat) or destroying a breeding site or resting place is an absolute offence. Such actions do not have to be deliberate for an offence to be committed.

F2.5 European Protected Species licences are available from Natural England in certain circumstances, and permit activities that would otherwise be considered an offence.

F2.6 **Badger** - The Protection of Badgers Act 1992 consolidates the previous Badgers Acts of 1973 and 1991. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain, with particularly high populations in the south.

F2.7 As well as protecting the animal itself, the 1992 Act also makes the intentional or reckless destruction, damage or obstruction of a Badger sett an offence. A sett is defined as “any structure or place which displays signs indicating current use by a Badger”. ‘Current use’ is defined by Natural England as any use within the preceding 12 months.

F2.8 In addition, the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence by constituting ‘cruel ill treatment’ of a Badger.

F2.9 Previous guidelines were issued by Natural England on the types of activity that it considers should be licensed within certain distances of sett entrances. They stated that works that may require a licence include using heavy machinery within 30m of any entrance to an active sett, using lighter machinery within 20m, and light work such as hand digging within 10m. However, interim guidance issued by Natural England in September 2007 specifically states that:

*“It is not illegal, and therefore a licence is not required, to carry out disturbing activities in the vicinity of a sett if no Badger is disturbed and the sett is not damaged or obstructed.”*

- F2.10 More recent guidance produced by Natural England in 2009 states that Badgers are relatively tolerant of moderate levels of disturbance and that low levels of disturbance at or near to Badger setts do not necessarily disturb the Badgers occupying those setts. However, Natural England’s guidance continues by stating that any activity that will or is likely to cause one of the interferences defined in Section 3 (such as damaging a sett tunnel or chamber or obstructing access to a sett entrance) will continue to be licensed.
- F2.11 This guidance no longer makes reference to any 30m/20m/10m radius as a threshold for whether a licence would be required. Nonetheless, it is stated that tunnels may extend for 20m, so care needs to be taken when implementing excavating operations within the vicinity of a sett and to take appropriate precautions with vibrations and noise, etc. Fires / chemicals within 20m of a sett should specifically be avoided.
- F2.12 This interim guidance allows greater professional judgement as to whether an offence is likely to be committed by a particular development activity and therefore whether a licence is required or not. For example, if a sett clearly orientates southwards into an embankment, it may be somewhat redundant to have a 30m-exclusion zone to the north.
- F2.13 **Water Vole** - The Water Vole is included on Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) but receives only partial protection in respect of Section 9(4) only. This section of the Act protects the Water Voles’ places of shelter or protection, but does not protect the Voles themselves, for example, from deliberate killing. This limited protection is recognition that habitat loss and destruction has played a much greater part in the Water Vole’s decline rather than direct persecution. The Water Vole is fully protected under Section 9 of the Wildlife & Countryside Act 1981 (as amended).
- F2.14 Legal protection makes it an offence to:
- Intentionally kill, injure or take (capture) a Water Vole;
  - Possess or control a live or dead Water Vole, or any part of a Water Vole;
  - Intentionally or recklessly damage, destroy or obstruct access to any structure or place which Water Voles use for shelter or protection or disturb Water Voles while they are using such a place; and
  - Sell, offer for sale or advertise for live or dead Water Voles.
- F2.15 The law only applies to wild animals, so the possession of captive-bred Voles is not an offence.
- F2.16 Water Vole is a UK (BAP) Priority species.
- F2.17 **Reptiles** - All six British reptile species receive a degree of legislative protection that varies depending on their conservation importance.
- F2.18 Rare, endangered or declining species receive 'full protection' under the Wildlife and Countryside Act 1981 (as amended) as well as protection under the Conservation of Habitats and Species Regulations 2010 (“The Habitats Regulations”; as amended). Species that are fully protected include Smooth Snake and Sand Lizard. These receive protection from:
- killing, injuring, taking;
  - possession or control (of live or dead animals, their parts or derivatives);
  - damage to, destruction of, obstruction of access to any structure or place used for shelter or protection;

- disturbance of any animal occupying such a structure or place;
  - selling, offering for sale, possession or transport for purposes of sale (live or dead animal, part or derivative).
- F2.19 By contrast, due to their abundance and more cosmopolitan habitat requirements in Britain, Common Lizard, Slow Worm, Grass Snake and Adder are only 'partially protected' under the Wildlife and Countryside Act 1981 (as amended) and as such only receive protection from
- deliberate killing and injuring;
  - being sold or other forms of trading.
- F2.20 **Birds** - Section 1 of the Wildlife & Countryside Act is concerned with the protection of wild birds. With certain exceptions all wild birds and their eggs are protected from intentional killing, injuring and taking; and their nests, whilst being built or in use, cannot be taken, damaged or destroyed.
- F2.21 Schedule 1 of the Wildlife & Countryside Act 1981 is a list of the nationally rarer and uncommon breeding birds for which all offences carry special (i.e. greater) penalties. These species also enjoy additional protection whilst breeding, as it is also an offence to disturb adults or their dependent young when at the nest. The habitats present within the application site provide suitable but limited foraging opportunities for wintering bird species, with the majority of the site comprising intensively managed arable land. The habitats present within the application site provide suitable nesting and foraging habitat for breeding bird species

## National Policy

### National Planning Policy Framework (July 2021)

- F2.22 Guidance on national policy for biodiversity and geological conservation is provided by the National Planning Policy Framework (NPPF), published in March 2012, revised on 24 July 2018, 19 February 2019 and again on 20 July 2021. It is noted that the NPPF continues to refer to further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system provided by Circular 06/05 (DEFRA / ODPF, 2005) accompanying the now-defunct Planning Policy Statement 9 (PPS9).
- F2.23 The key element of the NPPF is that there should be “a presumption in favour of sustainable development” (paragraphs 10 to 11). It is important to note that this presumption “does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site” (paragraph 182). ‘Habitats site’ has the same meaning as the term ‘European site’ as used in the Habitats Regulations 2017.
- F2.24 Hence, the direction of Government policy is clear. That is, the presumption in favour of sustainable development is to apply in circumstances where there is potential for an effect on a European site, if it has been shown that there will be no adverse effect on that designated site as a result of the development in prospect. A number of policies in the NPPF are comparable to those in PPS9, including reference to minimisation of impacts to biodiversity and provision of net gains to biodiversity where possible (paragraph 174).
- F2.25 The NPPF also considers the strategic approach that Local Authorities should adopt with regard to the protection, maintenance and enhancement of green infrastructure, priority habitats and ecological networks, and the recovery of priority species.

- F2.26 Paragraphs 179 to 181 of the NPPF comprise a number of principles that Local Authorities should apply, including encouraging opportunities to incorporate biodiversity in and around developments; provision for refusal of planning applications if significant harm cannot be avoided, mitigated or compensated for; applying the protection given to European sites to potential Special Protected Areas (SPA), possible Special Areas of Conservation (SAC), listed or proposed Ramsar sites and sites identified (or required) as compensatory measures for adverse effects on European sites; and the provision for the refusal for developments resulting in the loss or deterioration of 'irreplaceable' habitats – unless there are 'wholly exceptional reasons' (for instance, infrastructure projects where the public benefit would clearly outweigh the loss or deterioration of habitat) and a suitable compensation strategy exists.
- F2.27 National policy therefore implicitly recognises the importance of biodiversity and that with sensitive planning and design, development and conservation of the natural heritage can co-exist and benefits can, in certain circumstances, be obtained.

## **Local Policy**

### **Arun Local Plan 2011-2031 (adopted July 2018)**

- F2.28 The Arun Local Plan 2011 – 2031 was adopted on 18<sup>th</sup> July 2018 and sets out the Council's vision for the development of Arun up to 2031. It contains strategic and development management planning policies which will shape the future of the area and should be used in the consideration of planning applications.
- F2.29 Policy ENV SP1 refers to the Natural Environment and states that the District will promote the conservation and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible, the creation of new areas of habitats will also be promoted.
- F2.30 Policy ENV DM1 refers to designated sites of biodiversity or geological importance. It states that a Proposed Development likely to have an adverse effect on any such designated sites will not normally be permitted. Consideration will be given to the designated features present on site and their scarcity, while their protections will be recognised. The policy also states that in determining planning applications affecting sites of biodiversity importance the Council must ensure that the intrinsic value of the sites are safeguarded or enhanced having regard to the following; the European, National or Local status and designation of the site; the nature and quality of the site's features, including rarity value; the extent of any adverse impacts on the notified features of interest; and the need for compensatory measures in order to re-create remaining features of habitats on or off site. The policy states that where appropriate the Council will ensure the effective management of designated sites through the imposition of planning conditions or Section 106 agreements as appropriate.
- F2.31 Policy ENV DM3 refers to Biodiversity Opportunity Areas (BOAs). It states that within BOAs development shall retain and sympathetically incorporate locally valued and important habitats including wildlife corridors and stepping stones. The policy states that development shall also be designed in order to minimise disturbance to habitats, and that development proposals will not be permitted unless they reasonably address opportunities for enhancing BOAs. Where a scheme results in habitat loss, mitigation measures must be included in the proposals. Within BOAs, or where likely to impact the species or habitats within them, the policy states that any planning application must include appropriate surveys of these features.
- F2.32 Policy ENV DM4 refers to the protection of trees. Much of the policy is congruent with that of Policy GEN28 within the Arun District Local Plan 2003, and states that where trees are removed

an equivalent number of similar species and age (where practical) should be provided, at least, and that appropriate protective measures should be adopted during construction.

- F2.33 Policy ENV DM5 refers to development and biodiversity and states that development should seek to achieve a net gain in biodiversity while protecting existing habitats. The policy states that development should incorporate features that would benefit biodiversity such as green walls, green roofs, bat and bird boxes and landscape features. It states that links should also be provided with surrounding habitats where possible to facilitate species movement across the landscape as a whole. Where evidence of protected species within a development site is identified, the policy states that surveys must be undertaken and if impacts identified, mitigation provided.

### **Barnham Eastergate and Westergate (BEW) Framework Masterplan (November 2020)**

- F2.34 The BEW Framework Masterplan was endorsed by the Arun Council's Development Control Committee on 25th November, subject to the submission of a Phasing and Infrastructure Delivery Plan. This Phasing and Infrastructure Delivery Plan was brought before Development Control Committee for formal appending to the endorsed Framework Masterplan throughout Summer 2021.
- F2.35 The Arun District Council Local Plan (2018) has identified that the site is suitable for the new development community including new homes and associated infrastructure, including two new primary schools and two local centres. The Framework Masterplan forms the first stage in the master planning process and provides details including land uses, where each of these will be located and the access points and key routes through the site. Details of the Framework Masterplan are provided at Chapter C.

## F3.0 **Assessment Methodology & Significance Criteria**

### **Assessment Methodology**

#### **Identifying the Zone of Influence**

F3.1 Any likely significant effects of the Proposed Development would largely be confined to the development site itself. However, consideration has been given to the following likely significant effects, which may spread beyond the application site:

- Damage to habitats and disturbance to faunal populations as a result of habitat loss during the construction phase;
- Disturbance to faunal populations within hearing range during the construction phase;
- Fragmentation of 'dispersal corridors' used by adjacent faunal populations;
- Disruption to habitats and faunal populations within receiving range of dust, etc. during the construction phase;
- Disturbance to habitats and faunal populations during the operation phase from recreational pressure;
- Disturbance and disruption to faunal populations from artificial lighting during the operation and construction phase; and
- Pollution to watercourses during the construction and operation phases (most notably the Lidsey Rife and other watercourses which flow through the application site).

#### **Assessing the Impacts**

F3.2 With regards to impacts, the following Standard terminology has been used to assess the impacts to receptors, both beneficial (positive) and adverse (negative):

- Substantial/Major beneficial
- Moderate beneficial
- Minor beneficial
- Neutral/negligible
- Minor adverse
- Substantial/major adverse

F3.3 The following definitions provide a detailed description as to how each effect will be determined:

F3.4 **Major effect:** where the proposed scheme is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This effect is considered to be 'Significant'.

F3.5 **Moderate effect:** where the proposed scheme is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This effect is considered more likely to be 'Significant' but will be subject to professional judgement.

F3.6 **Minor effect:** where the proposed scheme is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the proposed scheme is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This effect is considered less likely to be ‘Significant’ but will be subject to professional judgement.

F3.7 **Negligible:** where the proposed scheme is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change. This effect is ‘Not Significant’.

F3.8 Where impacts are considered to be direct, this includes direct losses and impacts to a habitat and/or machinery from physical actions of the development (e.g. direct removal of habitats). Indirect impacts are those that result from indirect mediums such as light and noise which could have potential to disturb faunal species groups using the site. Short, medium and long term effects will be considered for each potential receptor with professional judgement applied as to the outcome of temporal impacts, as described in section 3 above.

F3.9 Impacts will also be assessed as permanent or temporary depending on the definitive outcomes. For example, losses to habitat will be considered as permanent, however, disturbance impacts to reptiles would be considered temporary following the successful completion of a translocation exercise.

### Survey Methodology

F3.10 The methodology utilised for the survey work can be split into three areas, namely desk study, habitat survey and faunal survey. These are discussed in more detail throughout this section with a summary provided below.

#### Summary

- Phase 1 Habitat Surveys (June 2018 and May 2020)
- Badger Surveys (June 2018 and May 2020)
- Bat Activity Surveys (May, June, July, August, September and October 2018)
- Water Vole Surveys (May and October 2018 and May 2020)
- Otter Surveys (May and October 2018 and May 2020)
- Hazel Dormouse Surveys (July, June, August, September, October and November 2018).
- Great Crested Newt Surveys on main waterbodies of the site in May and June 2018. Subsequent eDNA surveys undertaken on Fleurie Nursery waterbodies in May 2019.
- Reptiles Surveys (July to October 2018).
- Wintering Bird Surveys (December 2019, January and February 2020).
- Breeding Bird Surveys (April, May and June 2020).

#### Desk Study

F3.11 In order to compile background information on the application site and its immediate surroundings, Ecology Solutions contacted Sussex Biodiversity Record Centre (SxBRC) in September 2018. Information was provided by SxBRC; however due to publication conditions the desk study results are not appended to this assessment.

F3.12 Further information on designated sites from a wider search area were obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref 1) database. This information is illustrated where appropriate on Figure F1 (Appendix F1, Volume 2 to this ES).

### **Habitat Survey**

F3.13 A habitat survey was originally completed across the application site (including land beyond the redline boundary, south of the railway line) in June 2018. To ensure a robust baseline, updated Phase 1 surveys were completed in 2020, with survey visits completed in April, May and August 2020.

F3.14 The application site was surveyed based around extended Phase 1 Survey methodology (Ref 2), as recommended by Natural England, whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail.

F3.15 Using the above method, the application site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified.

F3.16 All of the species that occur in each habitat would not necessarily be detected during survey work carried out at any given time of the year, since different species are apparent at different seasons. However, given the nature of the habitats present within the application site, and noting that all survey work was undertaken at an optimal time of year for botanical identification, it is considered that an accurate and robust assessment has been made.

### **Faunal Survey**

F3.17 General faunal activity, such as birds or mammals observed visually or by call during the course of the surveys, was recorded. Specific attention was paid to the potential presence of any protected, rare, notable or Priority species, or other notable species.

F3.18 In addition, specific surveys were undertaken for bats, Badgers *Meles meles*, Water Voles *Arvicola amphibius*, Otters *Lutra lutra*, Hazel Dormice *Muscardinus avellanarius*, reptiles, amphibians, breeding birds and wintering birds.

### **Bats**

F3.19 Field surveys for bats were undertaken within the application site with regard to best practice guidelines issued by Natural England (Ref 3), the Joint Nature Conservation Committee (Ref 4) and the Bat Conservation Trust (Ref 5).

### *Tree and Building Assessments*

F3.20 Specific bat surveys were undertaken across the application site in June 2018 to assess the potential for roosting bats within any buildings, structures and trees present within and in close proximity to the application site. Updated assessment work was subsequently undertaken in April, May and August 2020 to ascertain an up to date baseline. This work was undertaken by an experienced bat worker and aimed to establish the likelihood of presence/absence of bats.

F3.21 The probability of a building being used by bats as a summer roost site increases if it:

- is largely undisturbed;
- dates from pre-20th Century;

- has a large roof void with unobstructed flying spaces;
- has access points for bats (though not too draughty);
- has wooden cladding or hanging tiles; and/or
- is in a rural setting and close to woodland or water.

F3.22 Conversely, the probability decreases if a building is of a modern or pre-fabricated design/construction, is in an urban setting, has small or cluttered roof voids, has few gaps at the eaves or is a heavily disturbed premises.

F3.23 The main requirements for a winter/hibernation roost site are that it maintains a stable (cool) temperature and humidity. Sites commonly utilised by bats as winter roosts include cavities/holes in trees, underground sites and parts of buildings. Whilst different species may show a preference for one of these types of roost site, none are solely dependent on a single type.

F3.24 In addition, all trees within and immediately adjacent to the application site were assessed for their potential to support roosting bats. Features typically favoured by bats were searched for, including:

- obvious holes, e.g. rot holes and old Woodpecker holes;
- dark staining on the tree, below the hole;
- tiny scratch marks around a hole from bat claws;
- cavities, splits and or loose bark from broken or fallen branches, lightning strikes etc; and
- very dense covering of mature Ivy *Hedera helix* over trunk.

#### *Evening Emergence / Dawn Re-entry Surveys*

F3.25 As outlined in Section F4 below, initial survey work identified the presence of an existing building in close proximity to the application site which supported potential opportunities for roosting bats (Building B1, as illustrated on Figure F2.2 (Appendix F3, Volume 2 to this ES)). To ascertain the presence or absence of roosting bats, this building was subject to further survey work in the form of evening emergence and dawn re-entry surveys in June and July 2020.

F3.26 Surveyors were positioned so as to observe all potential access points into the barn. Emergence surveys were undertaken from 15 minutes before sunset until 1½ hours after sunset, with re-entry surveys commenced 1½ hours before sunrise until 15 minutes after sunrise. Surveyors utilised EchoMeter Touch 2 Pro (EMT2 Pro) bat detectors with iPads to aid identification of bats and record data, which was subsequently analysed using Kaleidoscope bat sound analysis software.

F3.27 Emergence and re-entry surveys were all undertaken during optimal conditions for such surveys, in mild and dry conditions with no more than light winds.

#### *Activity Surveys*

F3.28 Bat activity surveys were undertaken to ascertain the level of use of the application site by foraging and commuting bats. Monthly dusk activity surveys were completed between May and October 2018 inclusive, with surveys including walkover transects and the deployment of static detectors in strategic locations within the application site.

F3.29 For the walked transects, routes were identified to ensure comprehensive coverage of all habitats present within the application site. Surveyors utilised Echo Meter2 (EMT2) bat detectors to aid identification of bats and record data, which was subsequently analysed using specialist software. Activity bat surveys were conducted from 15 minutes before sunset to

approximately 2 hours after sunset. As with the emergence / re-entry survey, walked transect survey work was completed during optimal conditions for bat surveys.

F3.30 For static detector surveys, SM4 bat detectors were deployed each month for a minimum of five consecutive nights in strategic locations within the application site. All data recorded was subsequently analysed using bat sound analysis software, providing long-term data regarding the use of the application site by foraging and commuting bats. Detectors were set to record each night from 20 minutes prior to sunset until 20 minutes after sunrise.

F3.31 All data recorded during the walked transects and static detector surveys were subsequently analysed using Kaleidoscope bat sound analysis software.

### **Badgers**

F3.32 Specific survey work was undertaken in June 2018 and April, May and August 2020 to search for evidence of Badgers within the application site.

F3.33 The survey work entailed two elements, the first of which was a thorough search for evidence of any Badger setts. For any setts encountered, each entrance would be recorded and plotted, even if the entrance appeared disused. The following information was recorded:

- 1 The number and location of well used or very active entrances; these are clear of any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently.
- 2 The number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance, or have plants growing in or around the edge of the entrance.
- 3 The number of disused entrances; these have not been in use for some time, are partly or completely blocked and cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be together with the remains of the spoil heap.

F3.34 Secondly, evidence of Badger activity such as well-worn paths, run-throughs, snagged hair, footprints, latrines, and foraging signs was recorded so as to build up a picture of the use of the application site by Badgers.

### **Water Voles**

F3.35 Specific survey work was undertaken in July and October 2018 in respect of Water Voles. A further updated survey was undertaken in May 2020.

F3.36 The survey involved a comprehensive search for any evidence to ascertain the presence / absence of this species from watercourses flowing through the application site, including the Lidsey Rife. Evidence which was searched for included signs such as feeding stations, latrines, droppings, burrows and potentially sightings of the animals themselves.

F3.37 An assessment of the suitability of the existing habitats present within the application site to support Water Voles was also undertaken.

### **Otters**

F3.38 Specific survey work was undertaken in July and October 2018 in respect of Otters, with a further updated survey undertaken in May 2020.

F3.39 The survey involved a comprehensive search along the banks of streams and ditches looking for any signs of the presence of Otter, including potential holts (places of shelter), spraints (faeces), slides, feeding remains, footprints or other signs.

F3.40 An assessment of the suitability of the existing habitats present within the application site to support Otters was also undertaken.

### **Hazel Dormice**

F3.41 Specific surveys to ascertain the presence or absence of Hazel Dormice were undertaken between July and November 2018.

F3.42 Nest tubes were installed within all suitable habitats present within the application site, including hedgerows, scrub and woodland. Survey work was undertaken with regard to the guidance provided by the Mammal Society and Natural England (Ref 6) and as recommended in the Dormouse Conservation Handbook (Ref 7).

F3.43 Tubes were placed within hedgerows at approximately 10 metre intervals where suitable locations were identified. The nest tubes were attached with wire ties underneath suitably sturdy horizontal branches and positioned on average at approximately 1.5 metres above ground level. Following deployment in July 2018, monitoring surveys were undertaken until November 2018, with one survey check undertaken each month.

F3.44 The survey has been scored for effort according to the method developed from the South West Dormouse Project (Ref 6). The system used provides an overall score that reflects the chances of Dormice being discovered if present, and thus provides an indicator of 'thoroughness' of a survey. This score is calculated based on the number of tubes used and the number of months the tubes were in place.

The months of the year are weighted according to the likelihood of recording dormice as set out below in Table F3.1. Table F3.1 Dormouse Survey, Monthly Score Weighting

| Month     | Weighting |
|-----------|-----------|
| April     | 1         |
| May       | 4         |
| June      | 2         |
| July      | 2         |
| August    | 5         |
| September | 7         |
| October   | 2         |
| November  | 2         |

F3.45 The index of effort is calculated based on the use of 50 nest tubes as a standard minimum, with less tubes used proportionately reducing the overall score and more tubes proportionately increasing the score (i.e. 25 tubes halve the score and 100 tubes double the score).

F3.46 A score of 20 (or above) is deemed a thorough survey, and a score of 15 to 19 may be regarded as adequate where circumstances do not permit more time or more tubes (particularly if other survey methods have also proved negative).

F3.47 The number of tubes used was 360, with these checked on a monthly basis between July and November 2018, with August and September being the most optimal months for Dormouse surveys. As a result, it is apparent that the total score for the survey significantly exceeds the minimum requirement of 20 and is therefore considered appropriate to inform a robust assessment of the presence or absence of Dormice from the application site.

## **Amphibians (Great Crested Newts)**

### *Environmental DNA (eDNA) Surveys*

- F3.48 Environmental DNA (eDNA) surveys were undertaken of two waterbodies within the application site in June 2018, as these could not be accessed at the same time as other waterbodies present within the application site. The survey followed the methodology set out in the technical advice note for field and laboratory sampling of Great Crested Newt environmental DNA (Ref 8).
- F3.49 The eDNA survey involved collecting 20 samples of 40ml of water at equally spaced locations around the perimeter of the waterbody (where access was available). These 20 samples were then mixed in a plastic sample bag to form a single amalgamated sample of the water in the pond. The amalgamated sample was mixed thoroughly to ensure any DNA present does not collect at the base of the sample bag.
- F3.50 15ml of water was taken from the amalgamated sample and added to 35ml of ethanol within a sample tube, to preserve any DNA present. The sample tubes were then shaken vigorously to mix the water sample and ethanol thoroughly and prevent degradation of any DNA. This technique was repeated six times, using water from the amalgamated sample, such that six sample tubes are filled.
- F3.51 The six sample tubes were then sent to Sure Screen Scientifics to be analysed using Polymerase Chain Reaction (PCR) amplification techniques. The analysis involves producing DNA sequences that verify the taxonomic assignment of amplified DNA signals.
- F3.52 Each sample is run in 12 replicates. The results are reported as the proportion of these 12 replicate samples that are successfully amplified, indicating whether Great Crested Newt DNA is present.

### *Aquatic Surveys*

- F3.53 Specific aquatic surveys were undertaken in May 2018 and May and June 2019. The location of the ponds surveyed can be seen on Figure F4 (Appendix F5, Volume 2 to this ES), which includes all suitable waterbodies present within the application site and with 500 metres of the application site boundary.
- F3.54 Surveys were undertaken with regard to the Great Crested Newt Mitigation Guidelines (Ref 9). This states that for presence/absence surveys, at least three survey methodologies should be undertaken. As such, the survey methodology undertaken principally comprised three methods: torch surveys, bottle trapping and netting. Terrestrial and egg searches were also conducted.
- F3.55 Suitable survey weather condition are deemed to be those night where the night-time air temperature is more than 5°C, with little or no wind and no rain. The surveys were conducted during such conditions.
- F3.56 Torch counting involved the use of high-powered torches to find and, if possible, count the number of adults of each amphibian species. As recommended in the guidelines the entire margin of each waterbody was continually walked, slowly checking for Great Crested Newts.
- F3.57 Bottle trapping involves setting traps made from two-litre plastic bottles around the pond margin. The traps were left overnight and checked the following morning. A density of one trap per two metres of shoreline was utilised where possible.
- F3.58 In theory, netting involves sampling for a period dictated by the size of the waterbody, and the guidelines recommend 15 minutes of search time for every 50 metres of shoreline. In practice, the search time significantly exceeded this recommendation.

F3.59 Egg searches are detailed within Natural England's mitigation guidelines as being an effective method for detecting Great Crested Newts. It involves the systematic searching of both live and dead submerged vegetation around ponds for the eggs of Great Crested Newts.

F3.60 Terrestrial habitats were also searched for the presence of Great Crested Newts. This involved searching under logs and rocks, which are favoured hiding places.

### **Reptiles**

F3.61 Specific surveys to ascertain the presence or absence of common reptiles at the application site were undertaken between July and October 2018.

F3.62 A total of 450 artificial refugia or 'tins' (0.5 x 0.5 metre squares of heavy roofing felt which are often used as refuges by reptiles) were distributed throughout all suitable reptile habitat across the application site.

F3.63 These tins were initially left in place to 'bed in' and were subsequently surveyed for reptiles beneath or upon the tins during suitable weather conditions. The tins provide shelter and heat up quicker than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask and raise their body temperature which allows them to forage earlier and later in the day.

F3.64 Suitable weather conditions to carry out surveys are when the air temperature is between 9°C and 18°C. Heavy rain and windy conditions were avoided. A total of seven surveys were undertaken during suitable weather conditions. All surveyors were mindful to record all reptiles present on top of and under the tins, in addition to any observed when walking through the suitable habitats between the tins. All reptiles observed were recorded by the surveyor.

### **Wintering Birds**

F3.65 Specific wintering bird surveys were carried out at the application site in December 2019, January 2020 and February 2020.

F3.66 Given the size of the application site, the survey methodology was based around a transect and vantage point survey, with reference to the Common Bird Census (Ref 10) and BTO/RSPB Guidelines (Ref 11).

F3.67 Transect routes and vantage points were chosen prior to undertaking the survey so as to observe the entire area which was to be surveyed. Transects were chosen in order to ensure adequate coverage of the survey area and in order to reduce the likelihood of disturbing birds when moving through the survey area.

F3.68 The surveyors walked the chosen transects, with occasional stops at suitable vantage points, and recorded the following information using a range of high-quality optics including binoculars and scopes where appropriate:

- Maximum count of each species of bird recorded on the ground;
- Record any notable movements of birds recorded (also identified on a map);
- Details regarding weather conditions, including cloud cover, temperature and wind speed/direction.

F3.69 Surveys were undertaken during suitable weather conditions; specifically good visibility and light winds. Surveys were avoided where light levels are low, visibility is considered to be poor or there were high winds.

### **Breeding Birds**

- F3.70 Specific breeding bird surveys were also carried out at the application site in April, May and June 2020.
- F3.71 All surveys were undertaken according to the methodology based on the Common Bird Census (CBC) technique (Ref 10), which involves walking transects routes through the area being studied and recording and plotting all bird species observed or heard and their behaviour.
- F3.72 The transect route is chosen so that the entire site is covered and all features likely to support breeding birds surveyed. Given the size of the application site, this involved using two surveyors, each covering the north and south of the site respectively. Routes and directions were varied between visits so that there was no tendency to visit a particular part of the development site later or earlier in the day.

### **Significance Criteria**

- F3.73 The evaluation and assessment of effects have been undertaken with due regard to the guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref 12). The guidelines avoid the provision of definitions as to how to assign habitats and species different levels of value and rely on an approach that involves professional judgement and the use of available guidance and information.
- F3.74 Part of this evaluation takes into account the duration of impacts, as this itself can vary depending on the species group in question and therefore requires additional professional judgment. With reference to the CIEEM guidelines (Ref 12) duration should be defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. Where five years might seem short-term within a human context or that of Badgers and larger birds, this would span at least five generations of some invertebrate species and as such would have differing consequences.
- F3.75 Furthermore, it is important to bear in mind that the duration of an activity does not necessarily mirror the duration of the resulting effect caused by the activity. For example, if short-term construction activities cause disturbance to birds during their breeding period, there may be long-term implications from a failure to reproduce that season. Impacts and effects can be described as short, medium or long-term and permanent or temporary, and these will need to be defined in months/years.
- F3.76 The value of each resource should be considered within a defined geographical context:
- International;
  - UK;
  - National (England / Wales / Scotland / Northern Ireland);
  - Regional;
  - County (or Metropolitan – e.g. in London);
  - District (or Unitary Authority, City or Borough);
  - Local or Parish; or
  - Within Zone of Influence / site only.
- F3.77 A number of key considerations include:
- Designated Sites and Features (e.g. Special Protection Areas, Sites of Special Scientific Interest, Important Hedgerows, etc.);

- Biodiversity Value (Use of Biodiversity Action Plans [BAPs], development plans and other published documents);
- Potential Value;
- Secondary or Supporting Value;
- Social or Economic Value; and
- Legal Issues

F3.78 Having identified the ecological important features likely to be affected by the development, the current guidance promotes a transparent approach in which an impact is determined to be significant or not on the basis of a discussion of the factors that categorise it. This includes characterising the nature of the likely impacts on each important feature in terms of ecological structure and function, by considering the following parameters:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Frequency and timing; and
- Reversibility.

F3.79 Where it was concluded that there would be an effect (positive or negative and including cumulative impacts) on a defined site or ecosystem(s) and/or habitats or species within a given geographical area, it was described as significant in the following terms:

- Beneficial, negligible or adverse type of impact; and
- Minor, moderate or major scale of impact.

F3.80 Major, moderate and minor effects are all considered to be 'significant' in EIA terms. Negligible effects are not considered to be significant. Where adverse impacts are identified, measures to avoid such impacts will be incorporated through preventative and mitigative means. The design process of this project has been planned with wildlife benefits in mind and mitigation built in place. The significance of residual effects has been evaluated following mitigation, compensation measures have been put in place and ecological enhancement achieved.

F3.81 Mitigation to habitats and species was given significant consideration at the design stage of the development to ensure that measures were put in place prior to impacts being possible. This primary level of mitigative action included, for example, the buffering and retainment of hedgerows and the Lidsey Rife were key considerations at the early stages of the design layout. This upfront consideration has ensured that there has been minimal losses to those key ecological features and where small losses have occurred secondary levels of mitigation have been proposed to ensure there is no overall impacts to these losses.

## **Consultation**

F3.82 Arun District Council (ADC) provided their formal EIA Scoping Opinion in a letter dated 11 November 2020. The Council identified a number of key issues which should be addressed in the EIA for the Proposed Development.

F3.83 Specific reference was afforded to issues pertaining to ecology and nature conservation in paragraphs 4.61 to 4.71 inclusive, with reference made to detailed comments provided by both the ADC Ecologist and Natural England.

- F3.84 Subsequently, there has been further correspondence with the ADC Ecologist regarding the scope of survey work. It has been confirmed that there is no specific requirement or need to undertake detailed botanical and invertebrate survey work to inform the current ecological baseline.
- F3.85 Particular attention has been afforded to each of the issues highlighted within the Scoping Opinion within this Chapter of the ES. Reference is also made to other chapters, insofar as the individual assessments relate to effects arising on ecological receptors.

## **Assumptions and Limitations**

- F3.86 All of the habitat and protected species surveys were undertaken during suitable weather conditions, during the optimal survey periods, and with regard to relevant guidance and best practice.
- F3.87 During the June bat activity survey, the static detector deployed at location 3 failed to record any data. During the late October bat activity survey, the static detector deployed at location 4 only recorded for two nights before malfunctioning. Despite these issues, given the level of bat data recorded from other static detector surveys across the survey season, and walked transect surveys, it is considered that a robust assessment regarding the use of the application site by bats has been undertaken.
- F3.88 Furthermore, all of the surveys were undertaken from 2018 to present and are therefore considered to be robust for the purposes of this assessment. It is therefore not considered that there are any significant limitations to this assessment.
- F3.89 As outlined above, ecological surveys have been undertaken at the site between 2018 and 2020 to ascertain the current baseline and in turn to inform the emerging development proposals. It is noted that surveys necessarily represent a 'snapshot in time', such that updated work is typically required in due course to ascertain whether there has been any material change to the extent and diversity of habitats present within the site, and in turn the extent to which the site is utilised by faunal species. Whilst a number of surveys were undertaken in 2018, the updated walkover survey(s) undertaken in May 2020 (and December 2021) confirmed that the opportunities that the site provides for these species remain as previously assessed, with no material change in terms of the extent, species-richness or distribution of the habitats present within the site boundary. As a result, the use of the site by faunal species is highly unlikely to have changed since work was previously undertaken, especially in light of the absence of any evidence to indicate the presence of Hazel Dormice and Great Crested Newts, and the limited ability of these species to colonise the site. Although future Reserved Matters applications will necessarily require the completion of updated survey work, it is therefore considered that the findings of the surveys are therefore robust for the purposes of the assessment of effects arising from the Proposed Scheme as outlined in this Chapter.
- F3.90 The completion of detailed calculations in relation to Biodiversity Net Gain (BNG) utilising the latest version of the Defra Metric (v3.0) requires the completion of detailed calculations, which in turn requires fine resolution in terms of the distribution, extent and diversity of post-development habitats, and also clarity in relation to habitat retention, enhancement and loss. Mindful of the scale of the proposals and the nature of the application, details regarding the composition and diversity of key elements of green infrastructure and drainage within the site remain to be confirmed at this stage. As a result, any BNG calculations at this stage would need to place reliance on a significant number of assumptions, given that the detail of the green infrastructure which forms an integral part of the Proposed Scheme is, at the present time, unknown. The completion of indicative calculations on the basis of the information at this stage is not therefore considered to be helpful in determining the ecological effects arising as a result

of the Proposed Scheme. It is anticipated that detailed calculations in relation to BNG will be undertaken to inform future Reserved Matters applications (once the detail is known). Notwithstanding this position, given the paucity of the baseline, and moreover the extent and diversity proposed within the site (particularly the Lidsey Rife corridor), in Ecology Solutions' professional view it is anticipated that the Proposed Scheme will deliver a clear and demonstrable net gain in biodiversity, such that it would meet the minimum 10% requirement as outlined in the Environment Act.

## **F4.0 Baseline Conditions**

F4.1 The objectives of establishing the ecological baseline are twofold:

- 1 To describe aspects of the natural environment and to identify important and protected habitats and species that could be adversely affected by the Proposed Development; and
- 2 To characterise features that could be positively enhanced, created, restored or managed, by establishing the occurrence, distribution and extent of ecological features on site and in the surrounding area; and/or those species that could be positively managed to enhance their conservation status, distribution and abundance.

### **Existing Baseline**

A summary of the key receptors identified within the site are provided below:

- Habitats. The site largely comprises of arable land of negligible (very low) ecological value. Those habitats of some value include the hedgerows, treelines and waterbodies.
- Bats. There are no trees or buildings within the site that support roosting bats. The hedgerows and treelines of the site are used by foraging bats.
- Badgers. An outlier Badger sett exists in the north-west of the site.
- Water Voles. A population of Water Vole exists in the stream that runs along the western boundary of the site (Lidsey Rife).
- Reptiles. Surveys have confirmed the presence of three reptile species within the site. Reptiles are present within discrete parcels throughout the site at the field boundaries.
- Breeding Birds. Cetti's Warbler has been confirmed along the stream corridor at the site's western boundary (Lidsey Rife). Barn Owl has been confirmed to be nesting within the barn located in the centre of the site in 2018 and 2020. Both are schedule 1 species.

### **Context**

F4.2 Natural and semi-natural habitats usually support the greatest diversity of wildlife. Important species are those protected by international or national legislation; those that have been identified in the 'UK Post-2010 Biodiversity Framework' (Ref 13) as priority species, and those identified as locally distinctive in a local BAP.

F4.3 National Character Areas (NCAs) are sub-divisions of England, each with a characteristic association of wildlife and natural features identified by Natural England. Each NCA is defined by a unique combination of landscape, biodiversity, geodiversity, history and cultural and economic activity.

F4.4 The Proposed Development is located within the South Coast Plain NCA (number 126). This NCA is a flat, coastal landscape with an intricately indented shoreline lying between the dip slope of the South Downs and the South Hampshire Lowlands and the waters of the English Channel, Solent and part of Southampton Water. The coastline includes several major inlets which have particularly distinctive local landscapes and intertidal habitats of international environmental importance for wildfowl and waders. The NCA notes that around 3 per cent of the area is designated as Sites of Special Scientific Interest (SSSIs), and that there are four Special Protection Areas (SPAs), two Special Areas of Conservation (SACs) and four Ramsar sites.

## Designated Sites

### Statutory Sites

- F4.5 There are no statutory designated sites of nature conservation interest within or adjoining the application site. The Brooks Local Nature Reserve (LNR), located approximately 0.8km to the south of the application site at its closest point, is the nearest statutory designated site (see Figure F1 (Appendix F1, Volume 2 to this ES)).
- F4.6 The Brooks LNR supports a range of habitats including meadows, reedbeds, ponds and an extensive newly planted floodplain woodland.
- F4.7 The nearest Site of Special Scientific Interest (SSSI) designated on account of its biological interest is Halnaker Chalk Pit SSSI, which is located approximately 4.3km to the north-west of the application site at its closest point. The SSSI was designated primarily on account of the significant population of the nationally rare and vulnerable species Broad-leaved Cudweed *Filago pyramidata* which the designated site supports.
- F4.8 The next nearest SSSI is Bognor Reef SSSI which is located approximately 4.3km to the south-west of the application site at its closest point. This SSSI was designated primarily on account of its geological interest, however the site also supports rare shingle habitat, and a small outlying area of sand dune that remains of a once much more extensive dune system. Both of these habitats support rare and endangered plant species.
- F4.9 Further SSSI's are also located in the surrounds of the site including Felpham SSSI (3.7km south) and Eartham Pit Boxgrove SSSI (4.0km north-west) both of which are designated for their Geological interest.
- F4.10 The nearest European designated site is the Solent and Dorset Coast Special Protection Area (SPA), which is located approximately 3.7km to the south of the application site at its closest point. The SPA was recently classified (in January 2020) on account of the presence of breeding Sandwich Tern *Thalasseus sandvicensis*, Common Tern *Sterna hirundo* and Little Tern *Sterna albifrons*.
- F4.11 The Solent and Dorset Coast SPA has been identified as an area of coastal water which represents important foraging and supporting habitat for these three bird species, which nest on coastal sites. This SPA is entirely maritime and is not underpinned by a SSSI.
- F4.12 The next closest European designated site is Pagham Harbour SPA / Ramsar site / SSSI, which is located approximately 7.5km to the south-west of the application site at its closest point. This SPA is classified on account of the presence of wintering Dark-bellied Brent Geese *Branta bernicla* and Ruff *Philomachus pugnax*, in addition to breeding Little Tern and Common Tern.

### Non-statutory Sites

- F4.13 There are no non-statutory designated sites of nature conservation interest within the application site boundary. The nearest non-statutory designated site is Fontwell Park Racecourse Local Wildlife Site (LWS), situated approximately 1.2km to the north of the application site at its closest point (see Figure F1 (Appendix F1, Volume 2 to this ES)).
- F4.14 Fontwell Park Racecourse LWS is designated on account of the site supporting species-rich calcareous grassland and notable species of flora, including Adder's-tongue *Ophioglossum vulgatum* and Green-winged Orchid *Orchis morio*.
- F4.15 Other non-statutory designated sites are located at distances in excess of 2km of the application site.

## Habitats

F4.16 The application site was subject to an extended Phase 1 habitat survey in June 2018, with updated surveys completed in April, May and August 2020. The vegetation present enabled the habitat types to be identified and an accurate assessment of the ecological interest of the habitats to be undertaken.

F4.17 The following habitats and/or features have been identified within the application site:

- Arable Land;
- Semi-Improved Grassland;
- Hedgerows;
- Treelines;
- Woodland;
- Scattered Trees;
- Ruderal Vegetation;
- Scrub;
- Waterbodies;
- Stream;
- Bare ground; and
- Existing Buildings.

F4.18 The locations of these habitats are shown on Figure F2.1 and Figure F2.2 (Appendices F3 and F4, Volume 2 to this ES).

## Arable Land

F4.19 The application site primarily comprises extensive areas of arable land which is subject to intensive management. Throughout the survey work undertaken, the fields either comprised of bare ground or were used for crop monoculture, with the land typically ploughed to the very edge of the fields.

## Semi-improved Grassland

F4.20 Semi-improved grassland is present within the application site boundary, including grassland associated with the western Nursery site in the northern part of the application site; an area of grassland to the south of Manor Farm (F1); and areas of grassland in the southern part of the application site (F2 and F3). Limited field margins are also present in some locations. The distribution of these habitats within the application site boundary are shown at Figures 2.1 and 2.2 (Appendices F3 and F4, Volume 2 to this ES).

F4.21 Areas of semi-improved grassland are present within the western Nursery site. Most areas of grassland are typically managed on a regular basis, with the sward length at the time of survey no longer than 50mm. The grassland sward is dominated by Creeping Bent *Agrostis stolonifera* and Perennial Rye-grass *Lolium perenne* with Cock's-foot *Dactylis glomerata* and Yorkshire-fog *Holcus lanatus* occasionally recorded. Other species present include Dandelion *Taraxacum officinale* agg., Daisy *Bellis perennis*, Creeping Buttercup *Ranunculus repens*, Red Clover *Trifolium pratense*, Thyme-leaved Speedwell *Veronica serpyllifolia*, Greater Plantain *Plantago major*, Common Mouse-ear *Cerastium fontanum*, Spear Thistle *Cirsium vulgare*, and Common Field Forget-me-not *Myosotis arvensis*.

- F4.22 The grassland in the western part of the western Nursery site appears to be left unmanaged for some time, with the sward height ranging from 30-50cm at the time of the survey. This area supports a greater composition of coarse grass species, in addition to a higher representation of ruderal plant species. This area is dominated by Yorkshire-fog with Cock's-foot and Soft Brome *Bromus hordeaceus subsp. hordeaceus* frequently recorded and Sheep's Fescue *Festuca ovina* occasionally present. Ruderal plant species present include Common Nettle *Urtica dioica*, Broad-leaved Dock *Rumex obtusifolius*, Hogweed *Heracleum sphondylium*, Scentless Mayweed *Tripleurospermum inodorum*, Cleavers *Galium aparine*, Dandelion, Red Dead-nettle *Lamium purpureum*, Germander Speedwell *Veronica chamaedrys*, Common Mallow *Malva sylvestris*, Burdock *Arctium lappa*, Hairy Bittercress *Cardamine hirsuta*, White Dead-nettle *Lamium album* and Red Campion *Silene dioica*.
- F4.23 An area of grassland is present in the application site, located to the south of the church and west of the access track (labelled F1 on Figure F2.1 (Appendices F3 and F4, Volume 2 to this ES)). This area supports a range of rough grassland and ruderal species, including Perennial Rye-grass, Curled Dock *Rumex crispus*, Rough Meadow-grass *Poa trivialis*, False Oat-grass *Arrhenatherum elatius*, Cleavers, Common Nettle, Smooth Sow-thistle *Sonchus oleraceus*, Soft Brome, Cow Parsley *Anthriscus sylvestris*, Ground-ivy *Glechoma hederacea*, Burdock, Mugwort *Artemisia vulgaris*, Cut-leaved Crane's-bill *Geranium dissectum*, Yorkshire-fog, White Dead-nettle, Creeping Buttercup, Cock's-foot, Creeping Thistle *Cirsium arvense*, Pineapple-weed *Matricaria discoidea*, Greater Plantain, Hedge Bindweed *Calystegia sepium*, White Clover *Trifolium repens*, Yarrow *Achillea millefolium*, Dandelion, Scented Mayweed, Hop Trefoil *Trifolium campestre*, Spear Thistle, Mallow, Wheat *Triticum aestivum*, Barley *Hordeum secalinum*, Bristly Ox-tongue *Picris echioides*, Teasel *Dipsacus fullonum*, Herb-Robert *Geranium robertianum*, Ribwort Plantain *Plantago lanceolata*, Field Bindweed *Convolvulus arvensis*, Hogweed, Common Field Speedwell *Veronica persica*, Field Horsetail *Equisetum arvense*, Red Campion, Meadow Foxtail *Alopecurus pratensis*, Hedge Mustard *Sisymbrium officinale* and Scarlet Pimpernel *Anagallis arvensis subsp. arvensis*.
- F4.24 Semi-improved grassland is also present on the banks surrounding the reservoir in the southern part of the application site (labelled F2 on Figure 2.2 (Appendices F3 and F4, Volume 2 to this ES)). At the time of the survey this area remained unmanaged (sward height of approximately 30cm) with a high composition of ruderal plant species and scattered Bramble *Rubus fruticosus* agg. scrub also present throughout. These areas are dominated by Yorkshire Fog and Cock's-foot with other species present including Barren Brome *Anisantha sterilis*, False Oat-grass, Creeping Thistle, Bush Vetch *Vicia sepium*, Common Nettle, Broad-leaved Dock, Hogweed, Cleavers, Hop Trefoil, Red Campion, Mouse-ear, Red Clover, Doves-foot Cranes-bill *Geranium molle*, Prickly Sow-thistle *Sonchus asper* and Rapeseed *Brassica napus*.
- F4.25 A further area of grassland is located to the west of F2, between the reservoir and the Lidsey Rife (labelled F3 on Figure F2.2, Appendix F3). At the time of the survey this field remained unmanaged with a sward height of 30cm. Given its proximity to the stream at the western boundary (Lidsey Rife), the grassland exhibited damper tendencies than other grassland areas in the application site. Species present in F3 include False Oat-grass, Sweet Vernal Grass *Anthoxanthum odoratum*, Meadow Foxtail, Black Grass *Alopecurus myosuroides*, Barren Brome, Hard Rush *Juncus inflexus*, Soft Rush *Juncus effusus*, Cuckoo Flower *Cardamine pratensis*, Broad-leaved Dock, Curled Dock, Mouse-ear, Dandelion, Cow Parsley, Creeping Buttercup and Common Nettle.
- F4.26 Whilst field margins across the application site are very limited, both in terms of width and distribution, where present these supported patches of grassland. Species present include Creeping Bent, Black Bent *Agrostis gigantea*, Annual Meadow Grass *Poa annua*, Black Grass, Perennial Rye Grass, Yorkshire Fog, Barren Brome, Ribwort Plantain, Greater Plantain, Hop

Trefoil, Scarlet Pimpernel, Broad-leaved Dock, Ragwort *Senecio jacobaea*, Creeping Thistle and Scentless Mayweed.

### Hedgerows

- F4.27 There are several hedgerows present within the site as illustrated on Figures F2.1 and F2.2 (Appendices F3 and F4, Volume 2 to this ES). The majority of these hedgerows are associated with the application site boundary; however, some are also present centrally within the application site demarcating the various arable fields (notably to the south of the railway line).
- F4.28 Hedgerow H1 is located in the north of the application site along part of the eastern boundary of the western Nursery site. This is a regularly managed hedgerow with a number of mature Ash *Fraxinus excelsior* tree standards present. This hedgerow is dominated by Hawthorn *Crataegus monogyna* with Blackthorn *Prunus spinosa*, Hazel *Corylus avellana* and Elder *Sambucus nigra* present.
- F4.29 Hedgerow H2 is located on the northern boundary of the western Nursery site. This is a regularly managed Box *Buxus sp.* hedgerow with other species present (mainly at the western end) including Cypress, Bramble and Wild Privet *Ligustrum vulgare*.
- F4.30 Hedgerow H3 is located on the eastern boundary of the western Nursery site, and comprises an unmanaged hedgerow with a number of mature Oak *Quercus robur* and Field Maple *Acer campestre* trees present. This hedgerow is dominated by Hawthorn and Hazel with Blackthorn, Bramble and Elder also present.
- F4.31 Hedgerow H4 is located to the north of the railway line in the eastern part of the application site. This feature comprises a number of mature Oak and Field Maple trees with Leyland Cypress *X Cupressocyparis leylandii*, Hawthorn, Wild Privet and Elder.
- F4.32 Hedgerow H5 is located in the north-western part of the application site and is associated with a ridge. Species recorded were English Elm *Ulmus procera*, Hawthorn, Elder, English Oak, Field Maple, Hazel, Honeysuckle *Lonicera periclymenum* and Bramble.
- F4.33 Hedgerow H6 is a hedgerow passing east-west in the southern part of the application site. This feature is dominated by Hawthorn with other species recorded including Hazel, Blackthorn and Elder. There are also significant amounts of Bramble scrub growing over the hedgerow. There are number of semi-mature trees also present along this hedgerow including Field Maple with Oak and Lime *Tilia x europaea* also occasionally recorded.
- F4.34 Hedgerow H7 is a continuous treeline / hedgerow located in the southern part of the application. This hedgerow is unmanaged and comprises of planted rows of White Poplar *Populus alba* at a height of approximately 10m. Other species present include Hawthorn, Field Maple, Blackthorn, Ash and Oak.
- F4.35 Hedgerows H8 and H9 are present in the western part of the application site adjacent to the A29 Lidsey Road. Both of these features appear to be regularly managed and are dominated by Hawthorn and Blackthorn.
- F4.36 Hedgerow H10 is located along the northern boundary of the eastern Nursery site (adjacent to Barnham Road). This hedgerow appears to be subject to regular management and is dominated by Blackthorn with Field Maple, Hawthorn and Hazel also present.
- F4.37 Hedgerow H11 is a Leyland Cypress hedgerow associated with the western boundary of the eastern Nursery site. This consists of a managed post fence bordered hedgerow with a single immature Ash tree.

- F4.38 Hedgerow H12 is located along the southern boundary of the eastern Nursery site. This hedgerow is dominated by Hazel with Hawthorn, Damson *Prunus domestica*, Blackthorn, Guelder Rose *Viburnum opulus*, Bramble, Rowan *Sorbus aucuparia*, Field Maple and Cherry *Prunus avium*.
- F4.39 Hedgerow H13 is present along the south-eastern boundary of the eastern Nursery site. Species present include Ash, Elder, Italian Alder *Alnus cordata* and Cherry Laurel *Prunus laurocerasus*.
- F4.40 Hedgerow H14 is a Cherry Laurel hedgerow present along the north-eastern boundary of the eastern Nursery site.
- F4.41 The ground layer of hedgerows across the application site support a range of ruderal and grassland species, many of which are present within stands of semi-improved grassland and tall ruderal vegetation with the application site. Additional species recorded include Bracken *Pteridium aquilinum*, Lords-and-Ladies *Arum maculatum*, Green Alkanet *Pentaglottis sempervirens*, Broadleaved Willowherb *Epilobium montanum*, Black Bryony *Tamus communis* and Hemlock *Conium maculatum*.

### Treelines

- F4.42 The application site supports a number of treelines. These are illustrated on Figures F2.1 and F2.2 (Appendices F3 and F4, Volume 2 to this ES) and described below.
- F4.43 Treeline T1 is located in the north of the application site, along the southern boundary of the western Nursery site. Species present include Ash, Goat Willow *Salix caprea*, Oak, Alder *Alnus glutinosa*, Cherry *Prunus cerasifera*, Elder, Field Maple, Hazel, Dogwood *Cornus sanguinea* and Blackthorn.
- F4.44 Treeline T2 extends towards the east from T1 and is located along the southern boundary of the eastern Nursery site. Species present include Hazel, Field Maple, Hawthorn, Blackthorn, Oak, Wych Elm *Ulmus glabra*, Bramble, Elder and Whitebeam *Sorbus aria* agg.
- F4.45 Treeline T3 is located along the north-eastern boundary of the application site. This treeline is dominated by Hybrid Black-Poplar *Populus x canadensis*, with other tree species recorded including Oak, Blackthorn, Hawthorn, Sweet Chestnut *Castanea sativa*, Beech *Fagus sylvatica*, Silver Birch *Betula pendula*, Sycamore *Acer pseudoplatanus* and Leyland Cypress.
- F4.46 Treeline T4 is located in the southern part of the application site. This treeline comprises of a line of mature Hybrid Black-Poplar trees. A single mature Oak tree is also present in this treeline. The understory of this tree line comprises of shrub species including Field Maple, Hawthorn, Blackthorn, Hazel, Elm and Dog Rose *Rosa canina*.
- F4.47 Treeline T5 is located to the north of the reservoir in the southern part of the application site. This treeline comprises an unmanaged shrub belt which appears to have been planted around 20 years ago. Hawthorn is the most abundantly represented species with other species recorded including semi-mature specimens of Poplar *Populus* sp., Oak, Alder, Scots Pine *Pinus sylvestris*, Lime, Hornbeam *Carpinus betulus* and Silver Birch.
- F4.48 Treeline T6 is line of planted shrubs located immediately to the south of T5. Species present have been planted in two equally spaced rows and include Silver Birch, Guelder Rose, Hazel, Hawthorn, Dogwood and Snowberry *Symphoricarpos albus*.
- F4.49 Species present in the ground layer of treelines include a range of grassland and ruderal species recorded elsewhere within the application site. Additional species recorded include Petty Spurge *Euphorbia peplus*, Hart's-tongue Fern *Phyllitis scolopendrium*, Male Fern *Dryopteris filix-ma*, Pendulous Sedge *Carex pendula* and Hemlock Water-dropwort *Oenanthe crocata*.

## Woodland

- F4.50 A small area of woodland (W1) is located in the southern part of the application site, to the south-west of the reservoir (primarily beyond the application site boundary). Species present include Ash, Oak, Scots Pine, Poplar, Silver Birch and Willow *Salix sp.*. The understory of this woodland comprises of Hawthorn, Blackthorn and Dogwood, with Cow Parsley, Common Nettle, Burdock and Ivy present in the ground layer.

## Scattered Trees

- F4.51 A number of scattered trees are located throughout the site as illustrated on Figures F2.1 and F2.2 (Appendices F3 and F4, Volume 2 to this ES). These are typically located in the western part of the application site (to the east of the Lidsey Rife) and are likely to have been associated with former field boundaries. These include a number of very mature trees, primarily Oak, with Ash and Willow also present.
- F4.52 A row of trees is also present along the entrance road of the eastern Nursery site in the northern part of the application site. Species present include Red Maple *Acer rubrum* and Norway Maple *Acer platanoides*.

## Ruderal Vegetation

- F4.53 Areas of tall ruderal vegetation are present throughout the application site, largely associated with boundaries and dry ditches. These areas support a range of rough grassland and tall ruderal species, many of which also occur within the semi-improved grassland within the application site.
- F4.54 Species present include Common Nettle, Creeping Buttercup, Cleavers, Barren Brome, Greater Plantain, Cow Parsley, Dandelion, Curled Dock, Field Bindweed, Creeping Thistle, Cut-leaved Crane's-Bill, Bristly Ox-tongue, Common Field Speedwell, Scented Mayweed, Hedge Bindweed, Ground-ivy, Spear Thistle, Hogweed, Hedge Mustard, Hedge Woundwort *Stachys sylvatica*, Greater Willowherb *Epilobium hirsutum*, White Dead-Nettle, Hemlock Water-dropwort, Bittersweet *Solanum dulcamara*, Broadleaved Dock, Red Campion, Hedge Bedstraw *Galium mollugo*, Common Vetch *Vicia sativa*, Field Horsetail, Garlic Mustard, Dove's-foot Crane's-bill, Smooth Sow-thistle, Prickly Sow-thistle, Mallow, Burdock, Ribwort Plantain, Germander Speedwell, Green Alkanet and Wood Crane's-bill *Geranium sylvaticum*, Good King Henry *Chenopodium bonus-henricus*, Fat Hen *Chenopodium album*, Groundsel *Senecio vulgaris*, Celery-leaved Buttercup *Ranunculus sceleratus*, Hemlock Water-dropwort, Scarlet Pimpernel, Redshank *Persicaria maculosa*, Sun Spurge *Euphorbia helioscopia*, Bush Vetch, Bramble, Smooth Tare *Vicia tetrasperma*, Woodruff *Galium odoratum*, Greater Stitchwort *Stellaria holostea*, Meadow Buttercup *Ranunculus acris* and Rosebay Willowherb *Chamerion angustifolium*.

## Scrub

- F4.55 Scrub with ruderal vegetation surrounds the pond at the eastern Nursery site in the north of the application site. Species present include Bramble, Goat Willow and Ash saplings.
- F4.56 An area of scrub is also located in the southern part of the application site to the immediate west of the reservoir. This area is dominated by Bramble and Willow saplings with other species present including Hazel, Blackthorn, Hawthorn, Dogwood and Silver Birch.

### Waterbodies

- F4.57 There are three ponds located in the north of the application site; these are labelled P1 to P3 on Figure F2.1 (Appendices F3 and F4, Volume 2 to this ES) and described below.
- F4.58 Pond P1 is located in the north-eastern part of the application site and is associated with the eastern Nursery site. This is a rectangular, attenuation pond, supporting a dense stand of Common Reed *Phragmites australis* and Bulrush *Typha latifolia*. This pond is expected to remain wet for large periods; however, it is considered unlikely to hold substantial water levels year-round with an outflow pipe/sluiice leads to offsite fields when water level rises.
- F4.59 Pond P2 is located in the northern part of the application site and is associated with the western Nursery site. This is an oblong shaped attenuation pond with scattered stands of Yellow Flag Iris *Iris pseudocorus*. This pond was approximately 0.5m deep at the time of the survey and devoid of any aquatic vegetation.
- F4.60 Pond P3 is present in the north-western part of the application site and is associated with outflows from the adjoining barns. The pond is a medium sized and is shaded along 60% of its edge. This feature does not support any marginal or aquatic vegetation.

### Stream

- F4.61 A stream (the Lidsey Rife) runs along the western boundary of the application site. In the northern part of the application site this stream is approximately 1.5m wide, 0.5m deep with a silty bed and a steady and slow flow in a southerly direction. As the stream flows toward the south, it gradually widens, reaching approximately 3.5m in width. During the survey a number of fish species were also observed to be present.
- F4.62 Species flanking the stream include Hemlock Water-dropwort, Common Nettle, Reed Canary Grass *Phalaris arundinacea*, Celery-leaved Buttercup, False Oat-grass, Willowherbs, Meadowsweet *Filipendula ulmaria*, Yellow Flag Iris, Fool's Parsley *Aethusa cynapium*, Cleavers, Red Campion, Rough Meadow-grass and Sedges *Carex* spp..

### Bare Ground

- F4.63 Areas of bare ground are present within the northern part of the application site, associated with the eastern Nursery site. These areas consist of 95% bare earth with some ruderal growth present. Species present include Broad-leaved Willowherb, Ragwort, Red Fescue, Redshank, Cleavers, Stonecrop *Sedum* sp., Spear Thistle and Yorkshire-fog.

### Buildings

- F4.64 The application site supports a number of existing buildings. These are labelled on Figures F2.1 and F2.2 (Appendices F3 and F4, Volume 2 to this ES) and described below.
- F4.65 Building B1 is an old stone barn is present in the central part of the application site, located just to the south of the railway line. It is a relatively large building, occupying an area of approximately 20m x 10m. The walls are constructed of flint and brick with ventilation slits. The roof is pitched with the slate tiles located directly on a wooden frame. There are several holes in the roof, created by missing/slipped tiles. Internally the barn is one large room, with no void and at the time of the survey the barn was empty, with the exception of two large Barn Owl nesting boxes (see below). Internally the barn is relatively light but darkened in the corners.
- F4.66 Buildings B2 to B18 inclusive are all located within the Nursery sites, in the northern part of the application site.

- F4.67 Buildings B2 to B8 inclusive are all greenhouse buildings. In all cases these are metal framed glass buildings used to grow a variety of nursery plants.
- F4.68 Building B9 is a single storey brick building with a shallow pitched asbestos sheet roof, a flat roofed extension also exists to the north of this building. The roof has plastic sheeting skylights making the interior well lit.
- F4.69 Buildings B10, B15, B16 and B17 are all porta-cabin style temporary office buildings. These buildings are single storey, well-lit internally with windows, are occupied on a regular basis and have no internal voids.
- F4.70 Building B11 is a very small entrance hut constructed from wooden panel walls, with flat panel roof.
- F4.71 Building B12 is a small substation building with a solid concrete brick walls and a flat concrete roof.
- F4.72 Buildings B13 and B14 are each a collection of metal silo buildings, all of which are constructed from corrugated metal sheeting and used to store water.
- F4.73 Building B18 is a large warehouse building constructed from corrugated asbestos walls and corrugated sheeting pitched roof. Large metal sliding doors exist on the northern and southern aspects. This building is used on a regular basis for storage and has no internal voids.
- F4.74 **Background Records.** The desk study undertaken with SxBRC did not return any records of protected or notable plant species from within the application site. The closest records returned was of Field Pepperwort *Lepidium campestre* from a location approximately 0.1km south-east of the application site, recorded in 2007.
- F4.75 None of the botanical species returned as part of the desk study were recorded within the application site during the Phase 1 survey. Given the habitats present, it is considered that the application site does not support any protected or notable plant species.

## Future Baseline

### Fauna

#### Bats

#### Tree and Building Assessments

- F4.76 All existing buildings and trees present within the application site were subject to an initial assessment to ascertain whether they supported potential features for roosting bats.
- F4.77 With the exception of Building B1, none of the existing buildings present within the application site are considered to have potential to support roosting bats, due to their construction, structure, condition and/or materials present. No evidence to indicate potential use by this group was recorded during the course of any survey work.
- F4.78 Building B1 was identified to have moderate bat roosting potential. Whilst the building does not possess a loft void and roof tiles are installed directly onto wooden batons (with no liner), a number of slipped tiles provide potential opportunities for crevice dwelling species. As such, this building was subject to further survey work (see below).
- F4.79 A limited number of trees within and in close proximity to the application site provide some potential opportunities for roosting bats, in the form of dead wood, cracks and holes. However,

none of these are located within the Proposed Development footprint, and the vast majority of trees present within the application site do not have any potential to support this group.

### Evening Emergence / Dawn Re-entry Surveys

F4.80 As outlined in Section F3 above, evening emergence and dawn re-entry surveys were undertaken of Building B1 to ascertain the presence or absence of a roost. Table F4.1 below clarifies the survey visits completed and associated weather conditions.

Table F4.1 Evening emergence / Dawn Re-entry Survey Dates and Weather Conditions

| Date         | Type of Survey | Timing                     | Weather Conditions                               |
|--------------|----------------|----------------------------|--------------------------------------------------|
| 23 June 2020 | Re-entry       | Start: 03:18<br>End: 05:03 | 14°C, 0% cloud cover, dry and still              |
| 8 July 2020  | Re-entry       | Start: 03:28<br>End: 05:13 | 13°C, 100% cloud cover, light rain, light breeze |
| 9 July 2020  | Emergence      | Start: 21:07<br>End: 22:57 | 17°C, 100% cloud cover, dry, light breeze        |

F4.81 No bats were recorded to emerge from or enter Building B1 during any of the emergence and re-entry surveys completed in 2020. It is therefore considered that this building does not support roosting bats.

### Activity Surveys

F4.82 As outlined above, bat activity surveys were completed at the application site between May and October inclusive 2018, including both walked transect and static detector survey work.

F4.83 Table F4.2 below outlines the date and weather conditions for each transect survey.

Table F4.2 Walked Transect Survey Dates and Weather Conditions

| Date       | Weather Conditions                        |
|------------|-------------------------------------------|
| 31/05/2018 | 16°C, 95% cloud cover, dry and still      |
| 21/06/2018 | 17°C, 5% cloud cover, dry and still       |
| 23/07/2018 | 20°C, 5% cloud cover, dry and still       |
| 22/08/2018 | 16°C, 100% cloud cover, dry, light breeze |
| 02/10/2018 | 17°C, 85% cloud cover, dry, light breeze  |
| 16/10/2018 | 13°C, 100% cloud cover, dry, light breeze |

F4.84 Tables F4.3 to F4.8 inclusive below summarise the overall findings of the walked transect survey work completed at the site, with the total number of registrations of each species identified during the course of each survey.

Table F4.3 Bat registrations during May activity survey

| 31/05/2018                                             |                         |
|--------------------------------------------------------|-------------------------|
| Species                                                | Number of Registrations |
| Common Pipistrelle<br><i>Pipistrellus pipistrellus</i> | 267                     |
| Soprano Pipistrelle<br><i>Pipistrellus pygmaeus</i>    | 60                      |
| <i>Nyctalus</i> sp.                                    | 9                       |
| <i>Myotis</i> sp.                                      | 8                       |

Table F4.4 Bat registrations during June activity survey

| 21/06/2018          |                         |
|---------------------|-------------------------|
| Species             | Number of Registrations |
| Common Pipistrelle  | 373                     |
| Soprano Pipistrelle | 82                      |
| <i>Nyctalus</i> sp. | 49                      |
| <i>Myotis</i> sp.   | 10                      |

Table F4.5 Bat registrations during July activity survey

| 23/07/2018                                              |                         |
|---------------------------------------------------------|-------------------------|
| Species                                                 | Number of Registrations |
| Common Pipistrelle                                      | 178                     |
| Soprano Pipistrelle                                     | 77                      |
| Nathusius's Pipistrelle<br><i>Pipistrellus nathusii</i> | 9                       |
| <i>Nyctalus</i> sp.                                     | 18                      |
| <i>Myotis</i> sp.                                       | 6                       |
| Serotine<br><i>Eptesicus serotinus</i>                  | 6                       |
| Barbastelle<br><i>Barbastella barbastellus</i>          | 1                       |

Table F4.6 Bat registrations during August activity survey

| 22/08/2018          |                         |
|---------------------|-------------------------|
| Species             | Number of Registrations |
| Common Pipistrelle  | 205                     |
| Soprano Pipistrelle | 56                      |
| <i>Nyctalus</i> sp. | 32                      |
| <i>Myotis</i> sp.   | 5                       |
| Serotine            | 2                       |
| Barbastelle         | 1                       |

Table F4.7 Bat registrations during early October activity survey

| 02/10/20                                    |                         |
|---------------------------------------------|-------------------------|
| Species                                     | Number of Registrations |
| Common Pipistrelle                          | 266                     |
| Soprano Pipistrelle                         | 114                     |
| Nathusius's Pipistrelle                     | 6                       |
| <i>Nyctalus</i> sp.                         | 8                       |
| <i>Myotis</i> sp.                           | 5                       |
| Barbastelle                                 | 2                       |
| Brown Long-eared<br><i>Plecotus auritus</i> | 1                       |

Table F4.8 Bat registrations during mid October activity survey

| 16/10/20                |                         |
|-------------------------|-------------------------|
| Species                 | Number of Registrations |
| Common Pipistrelle      | 212                     |
| Soprano Pipistrelle     | 66                      |
| Nathusius's Pipistrelle | 5                       |
| <i>Nyctalus sp.</i>     | 6                       |
| <i>Myotis sp.</i>       | 3                       |
| Barbastelle             | 1                       |

F4.85 The walked transect surveys recorded that the application site is utilised by a number of bat species, although activity levels were generally limited. The highest number of registrations were attributed to Common Pipistrelle and Soprano Pipistrelle bats, with occasional registrations of other species, including *Nyctalus sp.* bats, *Myotis sp.* bats, Nathusius's Pipistrelle, Barbastelle and Brown Long-eared bats.

F4.86 Bat activity was recorded throughout the application site; however, activity was recorded to be primarily associated with the linear features passing across and through the application site, most notably along the Lidsey Rife along the western boundary.

F4.87 As outlined in Section 3 above, static detector surveys were also undertaken on a monthly basis between May and October 2018. The dates of each survey period re outlined in Table F4.9 below.

Table F4.9 Dates of Static Detector Surveys

| Survey             | Dates                   |
|--------------------|-------------------------|
| May 2018           | 31/5/2018 – 05/06/2018  |
| June 2018          | 21/06/2018 – 26/06/2018 |
| July 2018          | 23/07/2018 – 31/07/2018 |
| August 2018        | 22/07/2018 – 27/07/2018 |
| Early October 2018 | 02/10/2018 – 08/10/2018 |
| Mid October 2018   | 16/10/2018 – 23/10/2018 |

F4.88 Detectors were deployed at four strategic locations within and in close proximity to the application site each month (labelled 1 to 4 inclusive on Figure F3 (Appendix F4, Volume 2 to this ES)). The findings of each period of survey are summarised in Tables F4.10 to F4.15 inclusive below.

Table F4.10 Results of May static detector survey (total number of registrations across the survey period per species)

| Species                 | Location 1 | Location 2 | Location 3 | Location 4 |
|-------------------------|------------|------------|------------|------------|
| Common Pipistrelle      | 393        | 5754       | 354        | 1685       |
| Soprano Pipistrelle     | 16         | 651        | 301        | 221        |
| Nathusius's Pipistrelle | -          | 287        | 6          | 2          |
| <i>Nyctalus sp.</i>     | 7          | 135        | 177        | 15         |
| <i>Myotis sp.</i>       | 2          | 148        | 50         | 15         |
| Serotine                | -          | 28         | -          | -          |
| Brown Long-eared        | -          | 48         | 2          | 1          |

Table F4.11 Results of June static detector survey (total number of registrations across the survey period per species)

| Species                 | Location 1 | Location 2 | Location 4 |
|-------------------------|------------|------------|------------|
| Common Pipistrelle      | 8181       | 1509       | 344        |
| Soprano Pipistrelle     | 84         | 544        | 48         |
| Nathusius's Pipistrelle | -          | -          | 5          |
| <i>Nyctalus</i> sp.     | 13         | 147        | 6          |
| <i>Myotis</i> sp.       | 16         | 29         | 1          |
| Serotine                | 1          | 256        | 20         |
| Barbastelle             | -          | 1          | -          |

Table F4.12 Results of July static detector survey (total number of registrations across the survey period per species)

| Species                               | Location 1 | Location 2 | Location 3 | Location 4 |
|---------------------------------------|------------|------------|------------|------------|
| Common Pipistrelle                    | 2173       | 39         | 2704       | 155        |
| Soprano Pipistrelle                   | 1705       | 27         | 2816       | 188        |
| Nathusius's Pipistrelle               | 1          | -          | 7          | 30         |
| Noctule<br><i>Nyctalus noctula</i>    | 1          | 3          | 6          | 9          |
| Leisler's<br><i>Nyctalus leisleri</i> | 15         | 2          | 6          | 9          |
| <i>Myotis</i> sp.                     | 2          | 1          | 4          | 3          |
| Serotine                              | 24         | -          | 9          | 21         |
| Brown Long-eared                      | 1          | -          | 1          | 2          |
| Barbastelle                           | -          | -          | 1          | -          |

Table F4.13 Results of August static detector survey (total number of registrations across the survey period per species)

| Species                 | Location 1 | Location 2 | Location 3 | Location 4 |
|-------------------------|------------|------------|------------|------------|
| Common Pipistrelle      | 546        | 2199       | 1591       | 37         |
| Soprano Pipistrelle     | 25         | 963        | 4306       | 38         |
| Nathusius's Pipistrelle | 7          | 1          | 1          | 7          |
| Noctule                 | 18         | 10         | 1          | 5          |
| Leisler's               | 6          | 1          | -          | 3          |
| <i>Myotis</i> sp.       | 6          | 24         | 10         | 12         |
| Serotine                | 7          | 3          | 2          | 4          |
| Brown Long-eared        | -          | 3          | -          | 2          |
| Barbastelle             | -          | -          | 1          | 1          |

Table F4.14 Results of early October static detector survey (total number of registrations across the survey period per species)

| Species                 | Location 1 | Location 2 | Location 3 | Location 4 |
|-------------------------|------------|------------|------------|------------|
| Common Pipistrelle      | 1050       | 3288       | 404        | 239        |
| Soprano Pipistrelle     | 72         | 1208       | 285        | 55         |
| Nathusius's Pipistrelle | 2          | 5          | 39         | 1          |
| <i>Nyctalus</i> sp.     | 2          | 2          | 3          | 2          |
| <i>Myotis</i> sp.       | 73         | 196        | 61         | 201        |
| Serotine                | -          | 3          | -          | 5          |
| Brown Long-eared        | 2          | 2          | -          | 4          |
| Barbastelle             | 4          | 13         | 2          | 5          |

Table F4.15 Results of mid October static detector survey (total number of registrations across the survey period per species).

| Species                 | Location 1 | Location 2 | Location 3 | Location 4 |
|-------------------------|------------|------------|------------|------------|
| Common Pipistrelle      | 760        | 3348       | 2655       | 39         |
| Soprano Pipistrelle     | 54         | 416        | 2991       | 7          |
| Nathusius's Pipistrelle | 5          | 19         | 18         | 4          |
| <i>Nyctalus</i> sp.     | 1          | -          | -          | -          |
| <i>Myotis</i> sp.       | 12         | 864        | 302        | 2          |
| Serotine                | -          | -          | 2          | -          |
| Brown Long-eared        | 2          | -          | 1          | -          |
| Barbastelle             | 18         | 42         | 37         | -          |

- F4.89 With regards to the static surveys above, there is significant variation in registrations recorded when comparing each location over the seasonal period, with some locations being favoured over others during any given survey period. That said, location 2 consistently has some of the highest registrations relative to the other locations, and as such is considered a more favoured area of foraging and/or commuting. This location exists along the Lidsey Rife which as a dark linear feature, and by virtue of the habitats it supports, is a beneficial feature for foraging and commuting bats.
- F4.90 Other locations used relatively frequently by bats (relative registration counts) include locations 1 and 3. Again both of these locations are situated along the treelines and hedgerows in the north of the site and as such it is considered that bats are using these for foraging and commuting purposes. Location 4 is located in the south of the site in close proximity to a woodland. Whilst the first survey period recorded relatively high bat activity levels at this location, the remaining surveys recorded much lower levels of activity relative to the other locations.
- F4.91 **Background Records.** The desk study undertaken with SxBRC did not return any records of bat species from within the application site. The closest record returned was of Pipistrelle bat returned from a location approximately 50m to the north-west of the application site, recorded in 2014.
- F4.92 Other records of bats returned from within the locality (albeit further afield) include Barbastelle, Serotine, Myotis sp. bat, Common Pipistrelle, Soprano Pipistrelle, Nathusius's Pipistrelle and Brown Long-eared.
- Badgers**
- F4.93 The presence of two Badger setts was confirmed during the update walkover survey in March 2020, associated with hedgerow H5 in the north-western part of the application site. Given the limited number of entrances present, and that some were blocked with debris it is considered that they are likely to constitute outlier setts. During a site visit in August 2020, it was noted that the setts are still active.
- F4.94 Limited evidence to indicate Badger activity was also recorded in the form of mammal pathways in areas of scrub and off-site latrines to the south-east of the application site in 2019.
- F4.95 As such, it is considered that Badgers are in the area and utilise the application site. However, given the intensive management regime across much of the application site, it is considered that opportunities for this species are limited at present.
- F4.96 **Background Records.** No records were identified in the desk study undertaken with SxBRC.

### Water Voles

F4.97 Surveys confirmed the presence of a population of Water Voles in the Lidsey Rife along the western boundary of the application site. Evidence of presence in the form of Water Vole burrows, feeding remains and latrines was recorded in the section of the stream to the south of the railway line, with activity concentrated along the section to the east of the caravan park, although more scattered evidence was also recorded along the stream further towards the south (where the application site boundary crosses this feature).

F4.98 No evidence of Water Voles was recorded along the Lidsey Rife to the north of the railway line.

F4.99 The locations of Water Vole activity along the Lidsey Rife are illustrated on Figure F3 (Appendix F4, Volume 2 to this ES).

F4.100 **Background Records.** The desk study undertaken with SxBRC returned a record of Water Vole from a location immediately adjacent to the east of the southern site boundary, recorded in 2013.

### Otters

F4.101 Following survey work undertaken in 2018, no evidence to indicate the presence of Otters was recorded along the Lidsey Rife. However, the habitats present could potentially support this species in terms of providing a corridor for Otters to move through the local area.

F4.102 **Background records.** The desk study undertaken with SxBRC returned no records of Otters from within the local vicinity.

### Hazel Dormice

F4.103 Whilst the application site does not support any areas of woodland (and in general is poorly connected to habitats in the local area), suitable habitat for Hazel Dormice is present in the form of hedgerows, treelines and scrub. As such specific surveys were undertaken to ascertain the presence or absence of this species.

The dates and weather conditions of the Dormouse nest tube surveys are detailed in Table F4.16 below.

Table F4.16 Dormouse Survey Weather Conditions

| Date       | Weather Conditions                 |
|------------|------------------------------------|
| 23/07/2018 | 28°C, no cloud, dry and still      |
| 23/08/2018 | 18°C, no cloud, dry, slight breeze |
| 20/09/2018 | 20°C, 100% cloud, dry and still    |
| 16/10/2018 | 17°C, 100% cloud, dry and still    |
| 15/11/2018 | 13°C, 100% cloud, dry and still    |

F4.104 During the nest tube surveys undertaken in 2018, no Dormice, potential nests or other evidence to indicate the presence of this species was recorded within the application site. It is therefore considered that the application site does not support Hazel Dormice.

F4.105 **Background records.** The desk study undertaken with SxBRC returned no records of Hazel Dormice from within or immediately adjacent to the application site. The closest record of Hazel Dormice was returned from a location approximately 1.5km north of the application site, recorded in 2008.

### Amphibians (Great Crested Newts)

Environmental DNA (eDNA) Surveys analysis

- F4.106 The eDNA analysis survey undertaken on two waterbodies within Nursery sites in the northern part of the application site in June 2018. The results of the eDNA analysis are detailed in Table F4.17 below. The locations of these waterbodies are illustrated at Figure F4 (Appendix F5, Volume 2 to this ES).

Table F4.17 eDNA analysis

| Pond | Environmental DNA Analysis Result |
|------|-----------------------------------|
| P8   | Positive                          |
| P9   | Negative                          |

### Aquatic Surveys

- F4.107 The dates, weather conditions and results of the aquatic surveys undertaken in 2018 and 2019 can be seen in Table F4.18 and Table F4.19 below. The locations of these waterbodies are illustrated at Figure F4 (Appendix F5, Volume 2 to this ES).

Table F4.18 2018 Aquatic Surveys

| Date       | Weather                              | Results |    |    |    |                 |                          |                     |
|------------|--------------------------------------|---------|----|----|----|-----------------|--------------------------|---------------------|
|            |                                      | P1      | P2 | P3 | P4 | P5              | P6                       | P7                  |
| 16/05/2018 | 11°C, 50% cloud, dry, light breeze   | -       | -  | -  | -  | 1 x Common Toad | -                        | -                   |
| 24/05/2018 | 16°C, 100% cloud, dry, light breeze  | -       | -  | -  | -  | 1 x Tadpole     | 7 x Smooth Newt (4♂, 3♀) | 4 Smooth Newt (4♂)  |
| 29/05/2018 | 17°C, 100% cloud, light rain, breeze | -       | -  | -  | -  | -               | 1 x Smooth Newt (♀)      | 1 x Smooth Newt (♀) |
| 31/05/2018 | 15°C, 50% cloud, dry, light breeze   | -       | -  | -  | -  | -               | -                        | -                   |

- F4.108 Great Crested Newts were not recorded within any waterbody during the aquatic surveys undertaken in 2018. Other amphibian species were recorded in P5, P6 and P7, including Common Toad *Bufo bufo* and Smooth Newt *Lissotriton vulgaris*.
- F4.109 A number of the waterbodies were recorded to dry out during the course of the survey period, supporting very little water which prevented the use of methods such as the deployment of bottle traps and netting.
- F4.110 In addition, no Great Crested Newts were recorded during the reptile survey work, which included the deployment and regular checks of artificial refugia throughout the application site (see below).
- F4.111 In light of the positive eDNA result outlined above, waterbody P8 was subject to specific aquatic survey work in 2019. In addition, an extra waterbody was identified in the south-eastern part of the application site during the course of survey work in 2018 (P10), which was also subject to aquatic surveys in 2019. The dates, weather conditions and results of these surveys are shown in Table F4.19 below. A total of six surveys were completed, in line with the survey guidelines. The locations of these waterbodies are illustrated at Figure F4 (Appendix F5, Volume 2 to this ES).

Table F4.19 2019 Aquatic Surveys

| Date       | Weather Conditions                   | Results                                     |                           |
|------------|--------------------------------------|---------------------------------------------|---------------------------|
|            |                                      | P8                                          | P10                       |
| 13/05/2019 | 12°C, 20% cloud, dry, still          | 8 x Smooth Newt (5♂, 3♀)                    | -                         |
| 15/05/2019 | 13°C, 20% cloud, dry, still          | -                                           | 5 x Palmate Newt (1♂, 4♀) |
| 23/05/2019 | 13°C, 0% cloud, dry, still           | 1 x Smooth Newt (♀)<br>1 x Palmate Newt (♂) | -                         |
| 05/06/2019 | 13°C, 50% cloud, dry, breeze         | 10 x Palmate Newt (9♂, 1♀)                  | -                         |
| 10/06/2019 | 9°C, 60% cloud, light rain, still    | 2 x Palmate Newt (1♂, 1♀)                   | 1 x Palmate Newt (♂)      |
| 14/06/2019 | 12°C, 100% cloud, light rain, breeze | 1 x Smooth Newt (♀)                         | -                         |

F4.112 Great Crested Newts were not recorded during the aquatic surveys of P8 and P10. On the basis that full aquatic survey work was undertaken of this pond, with six survey visits and detailed searches for newts undertaken utilising the recognised methodology, with no newts recorded, it must therefore be concluded that the eDNA result returned for P8 was a 'false positive', and Great Crested Newts are not present within this waterbody.

F4.113 Two other species of newt was recorded in both ponds: Smooth Newt and Palmate Newt *Lissotriton helveticus*.

F4.114 **Background Records.** The desk study undertaken with SBRC in 2018 returned no records of amphibian species from within the application site. The closest record of an amphibian returned is of Common Frog *Rana temporaria* from a location approximately 20m to the north of the application site, recorded in 2010.

F4.115 The closest record of Great Crested Newts returned was from a location approximately 750m north-east of the application site, recorded in 2012.

### Reptiles

F4.116 Although the vast majority of the application site does not provide suitable habitat for reptile species, areas of grassland and tall ruderal vegetation present within the application site provide potential opportunities for this group. The results of specific survey work undertaken to ascertain the present or absence of reptiles, in accordance with the methodology set out in Section F3, are summaries in Table F4.20 below.

Table F4.20 Reptile Survey

| Date       | Survey Number | Weather Conditions         | Reptiles Recorded                                                                                                                              |
|------------|---------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 31/07/2018 | 1             | 16.5°C,<br>50% cloud cover | 6 Unsexed Common Lizard<br>1 Juvenile Common Lizard<br>2 Male Slow-worm<br>1 Female Slow-worm<br>4 Juvenile Slow-worm<br>1 Unsexed Grass Snake |
| 23/08/2018 | 2             | 18°C,<br>100%              | 1 Juvenile Slow-worm                                                                                                                           |

| Date       | Survey Number | Weather Conditions     | Reptiles Recorded                                                                                                                                                     |
|------------|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |               | cloud cover            |                                                                                                                                                                       |
| 27/08/2018 | 3             | 18°C, 100% cloud cover | 4 Unsexed Common Lizard<br>1 Male Common Lizard<br>1 Female Common Lizard<br>4 Male Slow-worm<br>9 Female Slow-worm<br>8 Juvenile Slow-worm<br>2 Juvenile Grass Snake |
| 10/09/2018 | 4             | 18°C, 20% cloud cover  | 2 Unsexed Common Lizard<br>2 Male Slow-worm<br>1 Female Slow-worm                                                                                                     |
| 12/09/2018 | 5             | 15°C, 100% cloud cover | 4 Male Slow-worm<br>5 Juvenile Slow-worm<br>1 Juvenile Grass Snake                                                                                                    |
| 20/09/2018 | 6             | 20°C, 100% cloud cover | 1 Unsexed Common Lizard<br>2 Juvenile Grass Snake                                                                                                                     |
| 02/10/2018 | 7             | 19°C, 95% cloud cover  | 1 Juvenile Common Lizard                                                                                                                                              |

F4.117 In line with the HGBI guidance, the reptile surveys identified low populations of Grass Snake *Natrix natrix*, Slow-worm *Anguis fragilis* and Common Lizard *Zootoca vivipara* within the application site. The locations of the recorded reptiles within the application site are shown on Figure F3 (Appendix F4, Volume 2 to this ES).

F4.118 **Background Records.** The desk study undertaken with SxBRC returned records of Slow-worm, Common Lizard and Grass Snake from within or immediately adjacent to the northern application site boundary, all recorded in 2010. No records of other common reptile species were returned.

### Wintering Birds

F4.119 The habitats present within the application site provide suitable but limited foraging opportunities for wintering bird species., with the majority of the site comprising intensively managed arable land. In accordance with the methodology outlined in Section F3 above, specific survey work was undertaken in Winter 2019 – 2020.

F4.120 The survey dates, start time and weather conditions associated with each visit are outlines in Table F4.21 below.

Table F4.21 Wintering Bird Survey

| Date       | Start Time | Weather Summary                    |
|------------|------------|------------------------------------|
| 17/12/2019 | 08:00      | 7°C, cloudy, light breeze and rain |
| 24/01/2020 | 07:51      | 6°C, cloudy, light rain            |
| 18/02/2020 | 07:12      | 6°C, cloudy, dry, breezy           |

- F4.121 The surveys for wintering bird species undertaken in Winter 2019 - 2020 identified that the application site supports an assemblage of common and widespread species. Birds recorded within the application site include Blue Tit *Cyanistes caeruleus*, Blackbird *Turdus merula*, Wood Pigeon *Columba palumbus*, Chaffinch *Fringilla coelebs*, Rook *Corvus frugilegus*, Jackdaw *Corvus monedula*, Pied Wagtail *Motacilla alba*, Wren *Troglodytes troglodytes*, Great Tit *Parus major*, Magpie *Pica pica*, Long-tailed Tit *Aegithalos caudatus*, Sparrowhawk *Accipiter nisus*, Meadow Pipit *Anthus pratensis*, Goldfinch *Carduelis carduelis*, Buzzard *Buteo buteo*, Goldcrest *Regulus regulus*, Greenfinch *Chloris chloris*, Starling *Sturnus vulgaris*, Robin *Erithacus rubecula*, Collared Dove *Streptopelia decaocto*, Green Woodpecker *Picus viridis*, Kestrel *Falco tinnunculus*, Black-headed Gull *Chroicocephalus ridibundus*, Coal Tit *Periparus ater*, Moorhen *Gallinula chloropus*, Grey Wagtail *Motacilla cinerea*, Mallard *Anas platyrhynchos*, Tufted Duck *Aythya fuligula*, Little Grebe *Tachybaptus ruficollis*, Teal *Anas crecca*, Coot *Fulica* sp. and Cormorant *Phalacrocorax carbo*.
- F4.122 More notable species observed within the application site include wintering birds present at the site include Herring Gull *Larus argentatus*, Dunnock *Prunella modularis*, Fieldfare *Turdus pilaris*, Song Thrush *Turdus philomelos*, Redwing *Turdus iliacus*, Linnet *Linaria cannabina*, House Sparrow *Passer domesticus* and Skylark *Alauda arvensis*.
- F4.123 None of the birds associated with European designated sites identified above were recorded within the application site during any of the wintering bird surveys.

### Breeding Birds

- F4.124 The habitats present within the application site provide suitable nesting and foraging habitat for breeding bird species. The dates and weather conditions of breeding bird surveys undertaken in 2020 are detailed in Table F4.22 below.

Table F4.22 Breeding Bird Surveys

| Date       | Start Time | Weather Summary                      |
|------------|------------|--------------------------------------|
| 08/04/2020 | 06:18      | 13°C, partly cloudy, dry, light wind |
| 08/05/2020 | 05:34      | 12°C, cloudy, dry, slight breeze     |
| 10/06/2020 | 04:48      | 13°C, partly cloudy, dry, still      |

- F4.125 The vast majority of bird activity was recorded to be associated with the treeline and hedgerow vegetation associated with field boundaries, and the stream corridor, and consists of common and widespread bird species.
- F4.126 Cetti's Warbler *Cettia Cetti*, a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, has been identified along the stream corridor to the west of the application site during all three surveys (Lidsey Rife).
- F4.127 In addition, building B1 was identified to support two large nesting boxes at the time of the Phase 1 survey, with fresh Barn Owl *Tyto alba* pellets on the ground underneath the boxes indicating current use. Additionally, a Barn Owl was observed emerging from the barn during an emergence bat survey in July 2020. Due to restricted access, the barn could not be surveyed internally in 2020, although based on evidence obtained from 2018 it is considered likely that this is utilised by nesting Barn Owls.
- F4.128 Species recorded within the application site during the breeding bird survey include Blackbird, Blackcap *Sylvia atricapilla*, Blue Tit, Chaffinch, Chiffchaff *Phylloscopus collybita*, Linnet, Dunnock, Goldfinch, Great Tit, Greenfinch, Herring Gull, House Sparrow, Reed Warbler *Acrocephalus scirpaceus*, Robin, Skylark, Whitethroat *Sylvia communis*, Song Thrush, Willow

Warbler *Phylloscopus trochilus*, Wood Pigeon, Magpie, Wren and Yellowhammer *Emberiza citronella*.

- F4.129 **Background Records.** The desk study undertaken with SxBRC identified records of Dunnock and Song Thrush recorded within the application site, both recorded in 2012. Furthermore, one record of Barn Owl was returned from within the application site boundary, recorded in 2001.
- F4.130 Records of other notable bird species returned from within the locality include Nightjar *Caprimulgus europaeus*, Garganey *Anas querquedula*, Lesser Spotted Woodpecker *Dendrocopos minor*, Bewick's Swan *Cygnus columbianus*, Osprey *Pandion haliaetus*, Marsh Tit *Poecile palustris*, Woodlark *Lullula arborea*, Little Gull *Hydrocoloeus minutus*, White-fronted Goose *Anser albifrons*, Spoonbill *Platalea leucorodia*, Black-winged Stilt *Himantopus himantopus*, Marlin *Falco columbarius*, Whooper Swan *Cygnus cygnus*, Ring Ouzel *Turdus torquatus*, Common Crossbill *Loxia curvirostra*, Black Redstart *Phoenicurus ochruros*, Lesser Redpoll *Acanthis cabaret*, Mediterranean Gull *Larus melanocephalus*, Honey-buzzard *Pernis apivorus*, Linnet, Corn Bunting *Emberiza calandra*, Hobby *Falco subbuteo*, Kingfisher *Alcedo atthis*, Black Tern *Chlidonias niger*, Spotted Flycatcher *Muscicapa striata*, Turtle Dove *Streptopelia turtur*, Firecrest *Regulus ignicapilla*, Wood Sandpiper *Tringa glareola*, Yellow Wagtail *Motacilla flava*, Greenshank *Tringa nebularia*, Cetti's Warbler, Bullfinch *Pyrrhula pyrrhula*, Dartford Warbler *Sylvia undata*, Herring Gull, Fieldfare, Redwing, Starling, House Sparrow, Green Sandpiper *Tringa ochropus*, Peregrine *Falco peregrinus*, Little Ringed Plover *Charadrius dubius*, Lapwing *Vanellus vanellus*, Curlew *Numenius arquata*, Ruff *Calidris pugnax*, Reed Bunting *Emberiza schoeniclus*, Hen Harrier *Circus cyaneus*, Song Thrush, Whimbrel *Numenius phaeopus*, Black-tailed Godwit *Limosa limosa*, Red Kite *Milvus milvus*, Marsh Harrier *Circus aeruginosus*, Yellowhammer and Skylark.

### Summary of future baseline

- F4.131 The future baseline assessment considers the scenario whereby the site does not undergo development but continues as is. This takes into account the current baseline and onsite activities that take place.
- F4.132 Given that the application site largely comprises arable land and commercial plant nurseries, subject to an intensive management regime, it is anticipated that the ecological value of the habitats is highly unlikely to change to any material degree in the future in the absence of development proposals.
- F4.133 **Bats.** Given the current intensive management regime present at the application site, it is considered that opportunities for roosting, foraging and commuting bats would remain unchanged in the absence of the Proposed Development.
- F4.134 **Badgers.** Given the habitats present within the application site, and the intensive arable management regime, it is considered that opportunities for Badgers are likely to remain limited in the future, in the absence of any change.
- F4.135 **Water Voles.** Given the current management regime present at the application site, it is considered that opportunities for Water Voles would remain unchanged, and that this species is likely to continue to be present along the Lidsey Rife.
- F4.136 **Otter.** Given the current management regime present at the application site, and the lack of suitable habitat, it is considered that opportunities for Otters would remain unchanged.
- F4.137 **Hazel Dormice.** Given the level of agricultural management present at the application site, and the paucity of the habitats, it is considered that opportunities for Hazel Dormice would remain unchanged.

- F4.138      **Great Crested Newt.** Due to the intensive management regime at the application site, it is unlikely that opportunities for amphibian species (either aquatic or terrestrial) would change to any material degree in the future.
- F4.139      **Reptiles.** Due to the limited extent of suitable habitat within the application site, and the current management regime, it is considered that opportunities for reptiles would remain unchanged.
- F4.140      **Birds.** Given the extent of arable land within the application site, in conjunction with the current management regime, it is considered that opportunities for both wintering and breeding birds are likely to remain unchanged in the absence of the Proposed Development.

## **F5.0 Potential Effects**

- F5.1 This section identifies all likely significant effects, both during the construction and post construction phases (positive and negative), such that any required mitigation can be identified where necessary and residual effects calculated.
- F5.2 Such likely significant effects will be considered at various levels, including direct and indirect, whether they are short, medium or long term and whether the resulting impacts will be temporary or permanent. This will evidently be independent for each receptor, depending on the nature of the impacts and the susceptibility of each receptor to said impacts (as detailed in Section 3 above).
- F5.3 The construction period is planned to commence in 2023 with a completion year of 2033. It is expected that the works will be completed in three phases. Phase 1 will include the construction of the A29 Barnham connection, 920 residential units, a primary school and a community centre. Phase 2 will involve the construction of the westerly connection road and 330 residential units with Phase 3 involving the construction of the remainder of the A29 to the south of the railway line and the Hanbury Link.
- F5.4 The Framework Masterplan (Chapter C) has been used to assess the potential effects arising from the development.

### **Built-in Mitigation**

- F5.5 It is important to note that there have been significant levels of mitigative input as part of the design process at the site. This has gone so far as to retain as much of the ecologically valued habitats as possible. For example, large areas of the hedgerow and treeline network within the site will be fully retained, with only small losses met in order to facilitate the construction of roads within the site.
- F5.6 Further to the above, the design layout has incorporated a significant area of open green space, a Country Park to be called the Rife Valley Park. This will incorporate a significant area of land in the west of the site and will include habitats such as species rich grassland, tree and shrub planting. This area of open space will also buffer the stream at the western boundary (one of the most ecologically valued habitats within the site) from the main development site with the planting proposed complementing and enhancing this feature.
- F5.7 Extensive areas of open space will also be provided throughout the site, forming an interconnected network of green infrastructure corridors passing across and through the site. These areas will support a broad range of semi-natural habitats including woodland, grassland and scrub, in addition to wetland features as part of the drainage network. As with the Rife Valley Park, these areas will provide improved opportunities for faunal species and improve connectivity compared to the existing baseline.
- F5.8 The above built-in mitigation has become an integral component of the design process and has ensured that benefits are possible well in advance of any works taking place. The overall outcome is a significant enhancement over the existing situation.

### **Statutory Designated Sites**

- F5.9 The potential significant impacts considered include land-take, increased noise or lighting leading to disturbance effects on faunal species, dust deposition leading to suppression of vegetation growth, degradation of habitats through contamination caused by deposition of chemicals / particulates from construction traffic and pollution / contamination of hydrological systems.

- F5.10 There are no statutory designated sites within the development site boundary. The nearest statutory designated site which is designated for nature conservations reasons, The Brooks LNR, is located approximately 0.8km to the south of the application site at its closest point (see Figure F1, Appendix F1, Volume 2 to this ES). The Brooks LNR is designated on account of it supporting a range of habitats including meadows, reedbeds, ponds and an extensive newly planted floodplain woodland.
- F5.11 The nearest SSSI is Halnaker Chalk Pit SSSI, which is located approximately 4.3km to the north-west of the application site at its closest point. The SSSI was designated primarily on account of the significant population of the nationally rare and vulnerable species Broad-leaved Cudweed *Filago pyramidata* which the designated site supports. The next nearest SSSI is Bognor Reef which is located approximately 4.3km to the south-west of the application site at its closest point. This SSSI was designated primarily on account of its geological interest, however the site also supports rare shingle habitat and endangered plant species.
- F5.12 Other statutory designated sites are located at distances in excess of 4km of the application site.
- F5.13 The Development Proposals will not result in land take at The Brooks LNR. Given the distances involved in conjunction with the screening provided by the village of Shripney and the surrounding arable land, no potential impacts from increased lighting have been identified during the construction phase. In relation to noise and air quality (dust and contaminant deposition) it is considered that given the distances involved there would be no potential adverse impacts on any statutory designated sites.
- F5.14 With regard to pollution and contamination of hydrological systems, whilst both the stream on site and water features within The Brooks LNR both eventually empty into the Lindsay Rife, there is no direct hydrological connections between the site and this LNR. As such no potential significant effects have been identified under the construction phase.
- F5.15 In the absence of mitigation, potential construction impacts on statutory designated sites are considered to be **neutral** at the **national level** and of **negligible significance**.
- F5.16 The nearest European designated site is the Solent and Dorset Coast Special Protection Area (SPA), which is located approximately 3.7km to the south of the application site at its closest point. The SPA was recently classified (in January 2020) on account of it being identified as an area of coastal water which represents important foraging and supporting habitat for breeding Sandwich Tern *Thalasseus sandvicensis*, Common Tern *Sterna hirundo* and Little Tern *Sterna albifrons*.
- F5.17 The Development Proposals will not result in land take at the Solent and Dorset Coast SPA. Given the distances involved in conjunction with the screening provided by Bognor Regis, no potential impacts from increased lighting have been identified during the construction phase. In relation to noise and air quality (dust and contaminant deposition) it is considered that given the distances involved there would be no potential adverse impacts on any statutory designated sites.
- F5.18 Whilst there is a hydrological connection between the site and the Solent and Dorset Coast SPA via the Lidsey Rife available evidence does not identify the potential for likely harm through in-combination pollution impacts as arising through development nearby.
- F5.19 In the absence of mitigation, potential construction impacts on statutory designated sites are considered to be **neutral** at the European level and of **no significance**.

### Non-statutory Designated Sites

- F5.20 The potential significant impacts considered include land-take, increased noise or lighting leading to disturbance effects on faunal species, dust deposition leading to suppression of vegetation growth, degradation of habitats through contamination caused by deposition of chemicals / particulates from construction traffic and pollution / contamination of hydrological systems.
- F5.21 There are no non-statutory designated sites within the development site boundary. The nearest is Fontwell Park Racecourse LWS, situated approximately 1.2km to the north of the application site at its closest point. Fontwell Park Racecourse LWS is designated on account of the site supporting species-rich calcareous grassland and notable species of flora.
- F5.22 Other non-statutory designated sites are located at distances in excess of 2km of the application site.
- F5.23 The Development Proposals will not result in land take at Fontwell Park Racecourse LWS. Given the distances involved in conjunction with the screening provided by the villages of Eastergate and Westergate, no potential impacts from increased lighting have been identified during the construction phase. In relation to noise and air quality (dust and contaminant deposition) it is considered that given the distances involved there would be no potential adverse impacts on any statutory designated sites.
- F5.24 With regard to pollution there are no hydrological connections between the application site and Fontwell Park Racecourse LWS. As such no potential significant effects have been identified under the construction phase.
- F5.25 In the absence of mitigation, potential construction impacts on non-statutory designated sites are considered to be **neutral** at the district level and of **negligible significance**.

### Impacts on Habitats

- F5.26 The potential significant impacts considered include loss, dust deposition (suppression of vegetation), degradation of habitats through contamination caused by deposition of chemicals / particulates from construction traffic and pollution / contamination of hydrological systems.

### Arable Land

- F5.27 The application site primarily comprises extensive areas of arable land which is subject to intensive management with the fields comprising of bare ground or crop monoculture. As such, the arable land on site is of negligible ecological interest.
- F5.28 Under the development proposals this habitat will be lost during the construction phase.
- F5.29 Prior to avoidance/mitigation, impacts on arable land are **minor adverse** at the site level and of **negligible significance**.

### Semi-improved Grassland

- F5.30 Areas of semi-improved grassland are present within the application site, including small areas within the western Nursery site in the northern part of the application site; an area of grassland to the south of Manor Farm (F1); and areas of grassland in the southern part of the application site (F2 and F3). These areas of grassland support an assemblage of common grass and herb species, none of which a botanically remarkable considering the local context of the site and the distribution of the plant species observed.

- F5.31 The majority of the semi-improved grassland areas will be lost in order to facilitate the development.
- F5.32 Impacts would arise during the initial phase of the construction period.
- F5.33 Prior to avoidance/mitigation, impacts on semi-improved grasslands are **moderate adverse** at the site level and of **minor significance**.

### Hedgerows

- F5.34 There are a total of 14 hedgerows present within the application site. The majority of these hedgerows are associated with the site boundary; however, some are also present centrally within the application site demarcating the various arable fields (notably to the south of the railway line). The ground layer of hedgerows across the application site supports a range of common ruderal and grassland species.
- F5.35 The majority of the hedgerows present within the development site are well structured, with minor areas where large gaps exist and moderate levels of species diversity. These hedgerows also provide additional ecological interest in the form of nesting birds and foraging opportunities for bats. None of the hedgerows, however, would be classified as 'important' under the Hedgerow Regulations 1997.
- F5.36 Hedgerows H4, H5, H6, H7 and H12 were shown to be of higher value in the context of the site both in terms of structure, botanical diversity (relative to the other hedgerows). Sections of these hedgerows will be lost to facilitate the development of the new A29 access road (east to west link) (see Chapter C). The aim of the development is to keep as much of the existing hedgerows intact as possible, with losses made to facilitate access roads where possible. The vast majority of the hedgerow network will be retained as part of the proposals (see Framework Masterplan at Chapter C).
- F5.37 In addition to direct losses, there is potential for indirect impacts to the retained hedgerow network during the construction phase. This could be in the form of machinery encroachment on the hedgerows and/or their root systems. Further impacts could also arise through the contamination of soil and suppression of growth through the amalgamation of dust on leaves and/or seepage of nearby spillages of toxic substances.
- F5.38 Potential impacts would arise during the initial phase of the construction period.
- F5.39 Prior to avoidance/mitigation, impacts on hedgerows are **minor adverse** at the site level and of **moderate significance**.

### Treelines

- F5.40 There are a total of 6 treelines present within the application site. The majority of these treelines are associated with the application site boundary; however, some are also present centrally within the application site demarcating the various arable fields (notably to the south of the railway line).
- F5.41 The majority of the treelines present within the development site are well structured with mature specimen's present including large Oak trees and moderate levels of species diversity (presence of eight species or more). As with the hedgerows, these treelines also provide additional ecological interest in the form of nesting birds and foraging opportunities for bats.
- F5.42 The aim of the development is to keep as much of the existing hedgerows intact as possible, with losses made to treelines T2, T5, T6, T7 and T8 to facilitate the development of the A29. The vast majority of the treeline network will be retained as part of the proposals with additional losses made where smaller access roads are proposed (see Framework Masterplan, Chapter C).

- F5.43 In addition to direct losses, there is potential for indirect impacts to the retained treelines on site. This could arise in the form of machinery encroachment on the trees themselves or their root zones as well as through the contamination of soil and suppression of growth through the amalgamation of dust on leaves or ground seepage of nearby toxic spillages.
- F5.44 Potential impacts would arise during the initial phase of the construction period.
- F5.45 Prior to avoidance/mitigation, impacts on treelines are **moderate adverse** at the site level and of **moderate significance**.

### Woodland

- F5.46 A small area of woodland (W1) is located in the southern part of the application site, to the south-west of the reservoir (primarily beyond the application site boundary). This woodland is well structured with a number of mature specimens present, and a well-developed understorey. At the time of the surveys, the ground flora of this woodland was limited given the level of shading observed.
- F5.47 Whilst a small section of this woodland is present within the redline of the site's southern extension, the development of the road at this location will no result in any losses to this woodland and it will be retained in its entirety.
- F5.48 There is however potential for indirect impacts to the woodland in the form of machinery encroachment on the trees or their root zones as well as through the contamination of soil and suppression of growth through the amalgamation of dust on leaves.
- F5.49 Potential impacts would arise during the initial phase of the construction period.
- F5.50 Prior to avoidance/mitigation, impacts on woodland are **minor adverse** at the site level and of **moderate significance**.

### Scattered Trees

- F5.51 A number of scattered trees are located throughout the site as illustrated on Figures F2.1 and F2.2 (Appendices F3 and F4, Volume 2 to this ES). These are typically located in the western part of the application site and include a number of very mature trees of Oak, Ash and Willow.
- F5.52 Given the location of these trees in the west of the site within an area to be made into a Country Park (Rife Valley Park) space, they will be fully retained as part of the proposals. Furthermore, these trees will be buffered from the main development footprints to the east by the open space.
- F5.53 Whilst the potential for indirect impacts to the woodland in the form of machinery encroachment on the trees or their root zones is small, there is the potential for contamination of soil and suppression of growth through the amalgamation of dust on leaves.
- F5.54 Potential impacts would arise during the initial phase of the construction period.
- F5.55 Prior to avoidance/mitigation, impacts on scattered trees are at the site level and of **neutral significance**.

### Ruderal Vegetation

- F5.56 Areas of tall ruderal vegetation are present throughout the application site, largely associated with the boundaries and dry ditches. These areas support a range of rough grassland and tall ruderal species which are relatively botanically diverse in the context of the site, however, none of the species recorded are of particular note. This habitat does provide opportunities for invertebrates, birds and water voles, particularly when considering the cover and habitat structure it provides along the stream at the western boundary.

- F5.57 The vast majority of this habitat will be retained as part of the development proposals within the proposed Country Park (Rife Valley Park) in the west of the site. Small areas of ruderal vegetation including small sections of R1, R4 and areas on either side of the stream to the west of F3 will be lost to the development proposals to facilitate the construction of the new A29 link road.
- F5.58 In addition to these direct losses there is potential for indirect impacts to the retained ruderal vegetation through the encroachment of machinery, through the contamination of soil and suppression of growth through the amalgamation of dust on leaves.
- F5.59 Furthermore, the construction of a bridge over the stream to the west of F3 also has potential to suppress the growth of ruderal vegetation at this location through shading effects.
- F5.60 Potential impacts would arise during the initial phase of the construction period.
- F5.61 Prior to avoidance/mitigation, impacts on ruderal vegetation are minor **adverse** at the site level and of **minor significance**.

### Scrub

- F5.62 Small areas of scrub are present surrounding the pond at the eastern Nursery site in the north of the application site in addition to the immediate west of the reservoir in the south. In all cases these areas are dominated by Bramble and are of limited extent in terms of size and coverage. As such these areas are relatively species poor, however do afford some ecological benefits in the form of nesting birds and providing retreat habitat for reptiles and small mammals.
- F5.63 The vast majority of scrub habitat will be lost as part of the development proposals. There is potential for indirect impacts through the encroachment of machinery, the contamination of soil and the suppression of growth through the amalgamation of dust on leaves.
- F5.64 Potential impacts would arise during the initial phase of the construction period.
- F5.65 Prior to avoidance/mitigation, impacts on scrub are minor **adverse** at the site level and of **minor significance**.

### Waterbodies

- F5.66 There are three ponds located in the north of the application site (P1 to P3) in addition to a reservoir located in the south. Ponds P1 to P3 are all attenuation ponds with no aquatic vegetation and limited marginal vegetation present. The reservoir in the south of the site is well maintained for its purposes of water supply and is devoid of any vegetation. All of these waterbodies provide ecological benefits to wildlife in the form of a water source and provide alternative habitats which in turn boost invertebrate assemblages on site.
- F5.67 All ponds will be retained as part of the development proposals with the exception of the reservoir in the south which will be removed to facilitate the construction of the new A29 link road. Given the relatively low ecological value of this feature, that it is largely devoid of vegetation (in order to complement its function as a water resource), it is not considered that its loss will have significant impacts in the broad scale of botanical and thus habitat diversity it supports.
- F5.68 There is also potential for indirect impacts to these waterbodies. This could arise in the form of contamination of the water through dust deposition and seepage of nearby toxic spillages.
- F5.69 Potential impacts would arise during the initial phase of the construction period.

F5.70 Prior to avoidance/mitigation, impacts on waterbodies are minor **adverse** at the site level and of **minor significance**.

### Stream

F5.71 A stream (the Lidsey Rife) runs along the western boundary of the application site. The width of this stream varies along its length and is approximately 0.5m deep with a silty bed and a steady flow in a southerly direction. A number of marginal aquatic and ruderal plant species are present along the banks.

F5.72 This stream will be retained and enhanced as part of the development proposals within the proposed Country Park (Rife Valley Park) in the west of the site. A small section of the stream will have a clear span bridge built over in the south of the site. It is proposed that this bridge will be wide spanning, with no columns or pillars located within the stream itself and thus no disruptions to flow. However, the presence of the bridge over the stream could disrupt elements of the riparian wildlife corridor.

F5.73 Given the presence of this bridge, there is potential for indirect impacts to the stream at this location in the form of shading by the bridge itself. Further indirect impacts could arise from the contamination of the water through dust deposition and the potential for silt to be stirred up during works undertaken in close proximity to the stream. It is unlikely that these impacts would affect the integrity of the stream as a whole but could harm the local area.

F5.74 Once the bridge is constructed there will be impacts upon the stream and habitats immediately below it through shading effects, an increase in noise and vibration from bridge construction and passing machinery as well as artificial lighting.

F5.75 In addition, there is potential for polluted run-off, fuel, debris, dust and other contaminants to enter to the watercourse during the construction phase. Such events may have adverse impacts upon wildlife in the vicinity of the bridge and potentially downstream, including birds, fish and invertebrates, and could potentially be long-lasting. It is unlikely that these impacts would affect the integrity of the stream as a whole, but could harm the local area.

F5.76 Potential impacts would arise during the initial phase of the construction period.

F5.77 Prior to avoidance/mitigation, impacts on the stream are minor **adverse** at the site level and of **moderate significance**.

### Bare Ground

F5.78 Areas of bare ground are present within the northern part of the application site, associated with the eastern Nursery site. These areas consist of 95% bare earth with some ruderal growth present. Given the lack of vegetation present these areas are of very limited ecological interest.

F5.79 Areas of bare ground will be lost to the development proposals to facilitate the construction of the A29 link road and residential units in the north of the site.

F5.80 In the absence of mitigation, construction impacts on bare ground are **negligible** at the site level.

### Buildings

F5.81 The application site contains a total of 18 buildings; Building B1 is a stone barn located in the south of the site, whereas buildings B2 to B18 are all associated with the two Nursery sites in the north. Buildings B2 to B8 are greenhouses, whereas buildings B9 to B18 are all buildings associated with the running of the nurseries. These buildings comprise of small single storey porta-cabin style office buildings, or large open warehouses all of which lack an internal loft void

and are used on a regular basis. Given the design, regular use, and well-lit internal conditions of these buildings, none of them are considered to be of any ecological value, in particular none are considered to offer any opportunities for roosting bats.

- F5.82 Building B1 is an old stone barn located just to the south of the railway line. It is a relatively large flint and brick building with a pitched slate tile roof. Internally the barn is one large open room and is relatively light but darkened in the corners. Given the age of the building, that it is in a poor-moderate state of repair (missing roof tiles) and its location, it is considered to offer potential opportunities to faunal groups. The building is used by Barn Owl as a nesting site, however surveys have confirmed that the building is not utilised by roosting bats.
- F5.83 All buildings will be lost to the development proposals. Whilst there are no ecological considerations with regards to the loss of buildings B2-B18, the loss of building B1 will have impacts in the form of loss the nesting Barn Owl habitat.
- F5.84 Potential impacts would arise during the initial phase of the construction period.
- F5.85 Prior to mitigation, construction impacts on the building B1 are **moderate adverse** at the site level and of **moderate significance**.

## Impacts on Protected Species

### Bats

- F5.86 **Site usage** - All of the trees and buildings within the application site were assessed for their potential to support roosting bats. Following assessment of all buildings within the site, only Building B1 was identified to have any bat roosting potential. Following emergence and re-entry survey work on this building, no roosting bats have been recorded. There are no trees within the application site development footprint with potential to support roosting bats.
- F5.87 Activity surveys recorded a number of bat species to be utilising the application site, although activity levels (numbers of registrations) were generally limited. The highest number of registrations were attributed to Common Pipistrelle and Soprano Pipistrelle bats, with occasional registrations of other species. Bat activity was recorded at it highest along the linear features at the boundaries of the site, in particular the tree lines along the northern boundary and the habitats surrounding the reservoir in the south, with activity at its highest at the Lidsay Rife stream along the western boundary.
- F5.88 The development proposals will result in the loss of sections of linear habitat (hedgerows and treelines) which bats utilise. This is particularly evident in the south of the site whereby the habitats surrounding the reservoir will be lost to facilitate the construction of the new A29 link road (see Chapter C). Further losses will be incurred in the north of the site where sections of treeline T2 will be lost, again to facilitate road access. Given that the linear features present are largely confined to the site boundary and that there are no internal linear features (one very large arable field), potential losses are minimised and confined to the extreme boundaries only. That said, losses of sections of hedgerow and treeline have potential to disrupt current foraging routes utilised by bats.
- F5.89 It is important to note that the habitat most frequently utilised by bats, the Lidsay Rife stream, will be fully retained as part of the development proposals, and will be buffered within a large Country Park (Rife Valley Park) proposed at the site's western boundary. As such, this beneficial habitat will remain available to bats and overall connectivity within the site to the north and south will be retained.
- F5.90 With regards to indirect impacts, there is potential for artificial lighting to impact upon foraging bats during the construction phase whereby such lighting will be necessary for operational and

security reasons. Reactions to lighting vary from species to species, with some being more adverse to bright light than others. With reference to the guidance document “Bats and Lighting in the UK” published by the Bat Conservation Trust it is stated that: *‘Studies have revealed that, although Noctules, Leisler’s, Serotine and Pipistrelle bats swarm around white mercury street lights (this would also apply to metal halide) feeding on insects attracted to the light, this behaviour is not true for all bat species. The slower flying broad winged species such as long-eared bats, Myotis species (which include Brandt’s, Whiskered, Daubenton’s, Natterer’s and Bechstein’s), Barbastelle and Greater and Lesser Horseshoe bats generally avoid street lights’* (Ref 14). It is important to note that the vast majority of bat species recorded within the development site are some of the least light-sensitive species.

F5.91 Potential impacts could arise during the initial phase of the construction period.

F5.92 Prior to avoidance/mitigation, construction impacts on bats are minor **adverse** at the European level and are of **minor to moderate significance**.

### Badgers

F5.93 **Site Usage** - There are two Badger outlier setts present within hedgerow H5 in the north-western part of the application site both of which are considered to be currently active. Evidence of Badger activity has also been recorded within the site in the form of mammal pathways in areas of scrub, however given the intensive management regime exhibited across the site, opportunities for this species are very limited.

F5.94 The two outlier Badger setts within the application site will be retained as part of the development proposals within the large Country Park (Rife Valley Park) proposed in the west of the site. As such no Badger setts will be lost to the proposals.

F5.95 Areas of potential Badger foraging grounds will be lost to the development proposals in the form of the extensive land take undertaken across the site. However, given that the vast majority of these areas consist of intensively managed arable land, it is considered that opportunities to Badger are limited at best and confined to the field boundaries and limited areas of semi-improved grassland and ruderal vegetation. A such, vast areas of optimal foraging habitat will not be lost to the proposals.

F5.96 There is potential for indirect impacts to Badger. This could arise in the form of machinery encroachment on the setts themselves, disturbances through vibrations, separation from potential foraging grounds and contamination of the sett through the collection of dust or nearby toxic spillages.

F5.97 Potential impacts would arise during the initial phase of the construction period.

F5.98 In the absence of mitigation, construction impacts on Badger are considered to be minor **adverse** at the site level and of **minor significance**.

### Water Voles

F5.99 **Site usage** - Evidence of Water Voles in the form of burrows, feeding remains and latrines were recorded in the Lidsay Rife stream to the south of the railway line. Activity was concentrated along a section to the east of the caravan park, although more scattered evidence was also recorded where the application site boundary crosses this feature (As illustrated on Figure F3 Appendix F4, Volume 2 to this ES). No evidence of Water Voles was recorded along the Lidsey Rife to the north of the railway line.

F5.100 The Lindsay Rife stream will be fully retained as part of the development proposals and will be buffered from the development within the proposed Country Park (Rife Valley Park). As such this habitat will remain available to water vole during the construction phase.

F5.101 The wide spanning bridge to be built in the south of the site has potential to cause impacts to this species. This bridge is to be built over the stream in such a way that the water flow is not obstructed (no piers/columns in the water) and with habitat connectivity on the banks also retained. This will allow the continued movement of Water Vole throughout the area.

F5.102 There is, however, the potential to cause indirect impacts to this species during construction in the form of over-shading, noise, vibrations, and artificial light. These potential impacts will be particularly evident during the construction of the bridge itself.

F5.103 In the absence of mitigation, construction impacts on Water Vole are considered to be minor **adverse** at the national level and of **moderate significance**.

### Reptiles

F5.104 **Site Usage** –Small areas of suitable reptile habitat exist in localised areas of grassland and tall ruderal vegetation present within the site. Reptile surveys identified low populations of Grass Snake, Slow-worm and Common Lizard within four localised areas within the site (as shown on Figure F3 Appendix F4, Volume 2 to this ES).

F5.105 All areas of reptile habitat will be lost to the development proposals in order to facilitate the development of the new A29 link road. Given the extent of habitats lost, should the development proceed without appropriate mitigation measures, it is likely to result in a high mortality rate amongst the reptile population.

F5.106 In the absence of mitigation, construction impacts on reptiles are considered to be major **adverse** at the national level and of **major significance**.

### Birds

F5.107 **Site Usage** - There are general opportunities for foraging and nesting birds in the trees, hedgerows and to a lesser extent, the grassland habitats within the site. Indeed, a number of species, including the Schedule 1 species Cetti's Warbler and Barn Owl, and those listed as Red List or UK BAP were observed to be breeding within the development site. The vast majority of bird activity was recorded to be associated with the treeline and hedgerow vegetation associated with field boundaries, and the stream corridor of the site.

F5.108 The results of the wintering bird surveys identified that the development site was utilised by a common assemblage of birds for foraging and loafing.

F5.109 Those habitats that have been identified as more valuable to birds will be largely retained as part of the development proposals. Small losses will be made to sections of treeline and/or hedgerow along the northern boundary of the site in addition to within the road footprint proposed in the south. As such, areas of bird nesting and foraging habitat will be lost.

F5.110 There is also potential to cause indirect impacts to birds during construction in the form of noise, vibrations, and artificial light. All of these have potential to displace birds from those habitats that are retained on site.

F5.111 In the absence of mitigation, construction impacts on birds are considered to be **adverse** at the local level and of **moderate significance**.

## During Operation

- F5.112 Consideration will now be given to the potential significant effects arising from the development in its completed form. Potential effects include increased lighting, increased noise and air quality impacts, hydrological impacts and increased recreational pressure.

## Statutory Designated Sites

- F5.113 The potential significant impacts considered include, increased noise or lighting leading to disturbance effects on faunal species, air quality impacts from increased vehicle use leading to suppression of vegetation growth, hydrological impacts from water runoff and increased recreational pressure. In contrast to the impacts on statutory designated sites arising during the construction phase, which would be realised over a short period, impacts after completion would occur more gradually over time.
- F5.114 There are no statutory designated sites within the development site boundary. The nearest statutory designated site which is designated for nature conservation reasons, The Brooks LNR, is located approximately 0.8km to the south of the application site at its closest point. Given the relatively close proximity of The Brooks LNR and the large-scale residential capacity that the site will have in its operational phase, it is considered likely that the development will lead to increased recreational use of The Brooks LNR.
- F5.115 Given the distances involved in conjunction with the screening provided by the village of Shripney and the surrounding arable land, no potential impacts from increased lighting have been identified during the operational phase that will be over and above the existing situation.
- F5.116 In relation to noise and air quality it is considered that given the distances involved there would be no potential adverse impacts on any statutory designated sites above that of the existing levels currently exhibited in the local area.
- F5.117 With regard to pollution and contamination of hydrological systems, given there is no direct hydrological connections between the site and The Brooks LNR there are no potential significant effects identified during the operational phase.
- F5.118 With regards to other statutory designated sites, given the distances involved in excess of 4km it is not considered that there will be any adverse effects imposed as a result of the developments operational phase. There is a significant level of screening (in the form of existing built form in Eastergate, Westergate and Bognor Regis) between these sites and the Proposed Development, in addition to the light, pollution and noise levels already exhibited by those areas.
- F5.119 In the absence of mitigation, potential impacts on statutory designated sites after completion are considered to be negligible at the national level and are of **no significance**.
- F5.120 The nearest European designated site is the Solent and Dorset Coast SPA is located approximately 3.7km to the south of the application site at its closest point. Given the considerable distance between the development site and the SPA and that the SPA is sea based only (wide ranging foraging waters for the three Tern species) it is not possible that the proposals would provoke any recreational pressure on the SPA.
- F5.121 Whilst there is a hydrological connection between the site and the Solent and Dorset Coast SPA via the Lidsey Rife available evidence does not identify the potential for likely harm through in-combination pollution impacts as arising through new residential developments. The considerable distances and high degree of screening exhibited by Bognor Regis also shields this SPA from potential light and noise impacts incurred during the operational phase.

F5.122 Given this SPA is also sea based, there is no potential for increased recreational pressures as a result of the development in its operational phase. The SPA is newly designated for providing foraging grounds for the three tern species, all of which are located far out at sea.

F5.123 In the absence of mitigation, potential impacts on statutory designated sites after completion are considered to be **negligible** at the European level and are of **no significance**.

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

F5.124 The potential significant impacts considered include, increased noise or lighting leading to disturbance effects on faunal species, air quality impacts from increased vehicle use leading to suppression of vegetation growth, hydrological impacts from water runoff and increased recreational pressure. In contrast to the impacts on non-statutory designated sites arising during the construction phase, which would be realised over a short period, impacts after completion would occur more gradually over time.

F5.125 There are no non-statutory designated sites within the development site boundary. The nearest is Fontwell Park Racecourse LWS, situated approximately 1.2km to the north of the application site. Given the considerable distances involved and screening by existing built form, it is not considered that there will be any noise, light or pollution impacts on non-statutory designated sites.

F5.126 There are no hydrological connections between the application site and Fontwell Park Racecourse LWS. As such no potential significant effects have been identified under the operational phase.

F5.127 Other non-statutory designated sites are located at distances in excess of 2km of the application site and as such no adverse impacts have been identified.

F5.128 In the absence of mitigation, potential impacts on non-statutory designated sites after completion are considered to be **negligible** at the district level and are of **no significance**.

### **Impacts on Habitats**

F5.129 All losses to habitats would occur during the construction phase of the development. No further losses would occur once development is in its completed state.

F5.130 In the absence of mitigation, potential adverse impacts towards retained habitat features relate to contamination through dust and water. Such impacts could arise through the regular movement of vehicles through the site which could deposit dust particles onto the vegetation. The use of an inappropriate drainage solution whereby contaminated water (e.g. road waste) is discharged directly into new or retained habitats would also have an impact.

F5.131 The above points relating to air quality, noise and light pollution during operation have potential to impact all of the following retained habitats on site:

- Semi-improved Grassland;
- Hedgerow;
- Treelines;
- Woodland;
- Trees;
- Ruderal Vegetation;
- Scrub;

- Waterbodies; and
- Stream

F5.132 In addition to the above, upon completion of the bridge in the south of the site, there will be impacts upon the stream and habitats immediately below it through shading effects, again of which has potential to suppress the growth of those habitat below.

F5.133 The development proposals include the provision of a large Country Park (Rife Valley Park) in the west of the site. This area will extend through the entire width of the site from the northern to the southern boundary, and will buffer the Lidsay Rife stream located along the site's western boundary. This area of open space will include soft landscaping which will include native planting and a number of ponds throughout. These areas will be established during the initial stages of the construction phase and thus would be present during the initiation of operation.

F5.134 In the absence of mitigation, potential impacts on habitat features within the development in its completed form are considered to be moderate **adverse** at the site level and are of **moderate significance**.

## Impacts on Protected Species

### Bats

F5.135 Areas of bat foraging and navigational habitat in form of small sections of treelines and hedgerows T1, T5, H6, H7 T7, H8 T8 and H9 will be lost to the development proposals, thus ... opportunities for bats to utilise these features. The vast majority of these linear features will however be retained as part of the proposals with only small areas removed to facilitate access. Furthermore, significant opportunities for bats will remain in the form of the retained Lidsay Rife stream and the extensive area of a proposed Country Park (Rife Valley Park) proposed in the west of the site and along the sites eastern boundary. This will provide a range of habitats of known value to bats creating a suitable corridor throughout the site from the southern to northern boundary.

F5.136 Additional impacts to bats during operation is increased lighting. Such lighting would include street lighting and would be necessary for safety and security. Increased lighting can deter bats from existing and newly created foraging areas, no matter the quality of the habitats concerned.

F5.137 In the absence of mitigation, potential impacts on bats after completion are considered to be moderate **adverse** at the European level and are of **moderate significance**.

### Badgers

F5.138 Both Badger setts will be retained as part of the development proposals and will be situated within within the proposed Country Park (Rife Valley Park) during the operational phase.

F5.139 Impacts to Badger during operation relate to a potential for increased recreational pressures (people and dogs using the open space) and also the increase in road networks within the site will likely lead to increased likelihood of mortality via road accidents.

F5.140 Increased levels of artificial lighting also has potential to impact Badger during the operational phase. Such lighting will be necessary on the road networks within the site.

F5.141 In the absence of mitigation, potential impacts on Badger after completion are considered to be minor **adverse** at the local level and are of **minor significance**.

### Water Voles

- F5.142 All water vole habitat (Lidsay Rife stream) will be fully retained as part of the development proposals and will be buffered from the development within the proposed Country Park (Rife Valley Park). Given the discrete nature of the stream habitat, it is not considered that increased recreational use in proximity to the stream will have any adverse impacts on Water Vole.
- F5.143 After completion of the development the only potential significant impact on water voles relates to increase noise and artificial lighting associated with the bridge that will fly over the stream in the south of the development site. Potential water runoff (containing waste and petrochemicals) of the access road could also impact Water Voles by affecting the water environment. The level of shading incurred by the bridge could also potentially inhibit vegetation growth in this area, and in doing so inhibit dispersal of this species through localised habitat fragmentation.
- F5.144 In the absence of mitigation, potential impacts on Water Vole after completion are considered to be minor **adverse** at the national level and are of **minor significance**.

### Reptiles

- F5.145 Large areas of reptile habitat will be lost to the development proposals, rendering the need to translocate reptiles to areas of suitable habitat within the site (within the proposed Rife Valley Park).
- F5.146 Upon completion, impacts to reptiles relate to the potential for death cause by careless human foot traffic and/or cats/dogs within areas of open space. Additional impacts such as noise and vibrations from vehicles and recreational use may also deter reptiles from certain areas of the site.
- F5.147 In the absence of mitigation, potential impacts on reptiles after completion are considered to be minor **adverse** at the national level and are of **moderate significance**.

### Birds

- F5.148 Increased lighting and noise pollution associated with the development could have impacts on birds in the surrounding area, particularly along the Lidsay Rife stream and open public space to the west. This is likely to be greater than the agricultural practices currently exhibited at the site and could have a particular impact by disturbing roosting, loafing and nesting birds in the local area.
- F5.149 An increase in recreational use of the public open space and Rife Valley Park will also have likely impacts to birds. This is particularly true for ground nesting species which will be more prone to predation by cats and dogs.
- F5.150 In the absence of mitigation, potential impacts on birds after completion are considered to be minor **adverse** at the local level and are of **minor significance**.

## F6.0 Mitigation and Monitoring

### During Construction

#### Designated Sites

##### Statutory Sites

- F6.1 No specific mitigation is required with regards to statutory designated sites during the construction phase.
- F6.2 Whilst there is potential for dust and other airborne pollutants to potentially reach these sites from the development, it is considered that, given the distances involved, the levels of effect would be so minute (e.g. soiling of vegetation) as to be negligible relative to the existing situation.
- F6.3 Nonetheless, standard engineering safeguards and best practice protocols will be employed throughout the demolition and construction periods, in order to negate any possibility of airborne and/or waterborne contaminants leaving the site. For airborne particles this would include the use of protective sheeting on earth stockpiles and vehicles, minimising vehicle speed on site and the cleansing of roads and tyres. Measures pertaining to hydrological contaminants would include interceptor fencing and bunds, with and all materials including fuels and oils stored in well contained and secure areas.
- F6.4 With regards to lighting, again given the distances and screening involved there is not any potential for increased lighting at these sites relative to their existing situations. In any event, lighting associated with the construction phase will be directional and avoid the use of white mercury vapour lamps.
- F6.5 With regards to noise and vibrations, again the construction activities at the site will be so far separated from nearby statutory designated sites that the result will be of no change relative to the existing situation. Nonetheless, potential adverse impacts through noise pollution will be mitigated for through standard industry practice, adhering to current guidance and legislation.
- F6.6 Following avoidance and mitigation, effects are **neutral** at the national and European levels.

##### Non-statutory Sites

- F6.7 No specific mitigation is required with regards to statutory designated sites during the construction phase.
- F6.8 It is considered that given the comparative distance involved, all the mitigative procedures of best practice described above will be sufficient to ensure there is no potential for impacts (in a scenario where such impacts would be possible).
- F6.9 Following avoidance and mitigation, effects are **neutral** at the county level.

#### Habitats

- F6.10 In order to deliver the proposals, there will be inevitable losses to habitats within the development site boundary. This primarily involves losses to arable land (which comprise the majority of the development site), although losses will also be required to small areas of semi-improved grassland, small sections of hedgerows and treelines, ruderal vegetation and existing buildings. Most losses of these habitats will occur south of the railway line to facilitate the construction of the new road, those north of the railway line will be largely retained at the site

boundaries as open space and/or within the new Rife Valley Park (large areas of arable land to be lost).

F6.11 As outlined in the framework masterplan, the Proposed Development will deliver significant areas of new landscape planting throughout the development site in the form of a large Country Park (Rife Valley Park). This area will extend all the way through the site from the southern to northern boundaries following the extent of the Lindsay Rife stream, buffering it from the development and maintaining connective links throughout the site. The planting proposed will not only significantly exceed the existing coverage of vegetation within the development site (arable land), but will deliver a broad range of habitat types, including:

- Extensive areas of grassland in the Rife Valley Park, including areas of wildflower grassland managed to have a varied sward height throughout;
- Areas of new native tree planting, including individual trees in a number of locations within the open space and Rife Valley Park;
- A large number of new drainage ponds within areas of the Rife Valley Park and open space of varying sizes, depths and aquatic planting composition.
- Localised areas of new shrub planting, including pockets of scrub creating a habitat mosaic within the grassland areas.

F6.12 The proposed species mixes for each of the habitat types has been carefully selected, based on advice from a suitably qualified ecologist. The planting mixture is based around the use of native and wildlife beneficial species, including those known to be of particular value in terms of nectar or fruiting plants. This will serve to maximise opportunities for a range of faunal species, including in particular foraging Badger, birds and invertebrates.

F6.13 The Proposed Development also provides far greater structural diversity than currently present (very flat areas of arable land), including a varied topography and a number of ponds. The proposed central area of greenspace within Rife Valley Park will also incorporate varied topography associated with banking. As a result, the Proposed Development will provide opportunities for faunal species at a range of different heights, with variation in both microtopography and aspect. This varied topography and waterbodies will greatly benefit groups such as invertebrates which in turn will benefit all other faunal groups.

F6.14 In addition to the above, given the presence of retained habitat features, methods will be put in place to ensure that they are safeguarded from machinery activities during the construction phase.

F6.15 It is considered that the measures described above, and for each individual habitat feature below, will be secured through an appropriately worded planning condition. The details of the methods and prescriptions used during construction will be covered in a Construction Environment Management Plan (CEMP). This will ensure that all measures are confirmed in writing and will provide a base from which the responsible contractors can ensure that all methods are taken place as safely required.

### **Arable Land**

F6.16 Whilst the measures above apply equally to all habitats within the development site, given that the vast majority of the development site comprises arable land of very low ecological interest, all of which is to be lost, this is considered to represent a significant increase in biodiversity value in the long-term.

F6.17 Following avoidance, mitigation and enhancement, effects are major **beneficial** at the local level and are of **major significance**.

### **Semi-improved Grassland**

- F6.18 Areas of semi-improved grassland to the south of the railway line (F2 and F3) will be lost to the development proposals with the large area to the north of the railway line (F1) being retained.
- F6.19 As outlined above, the proposals involve the provision of an extensive areas of grassland within the Rife Valley Park. The size and diversity of the proposed areas of grassland will be significantly greater than the areas which are to be lost in the south to facilitate the construction of the new A29 link.
- F6.20 Native wildflower grassland seed mixtures will be sown, which support a broad range of native grass and herb species. With appropriate management (see below), including the provision of longer areas of grassland, this will establish a species-rich sward of benefit to a range of species including foraging birds and invertebrates.
- F6.21 Where areas of grassland are to be retained, given there is potential for this habitat to be encroached upon by machinery during the construction phase, a visible barrier will be installed surrounding these areas wherever possible, prior to the commencement of the development. Contractors will be made aware of the presence of this habitat and of their responsibilities in this regard. In the event that losses to this habitat are realised during the construction phase (to facilitate access or turn space) this will be controlled wherever possible and will be more than mitigated for through the provision of wildflower grassland habitats as described above.
- F6.22 Further to the above, the adoption of standard engineering safeguards and best practice protocols (e.g. contained storage of hazardous materials and dust prevention methods) during the demolition and construction periods will ensure there are no further implications afforded to retained grassland.
- F6.23 Following avoidance, mitigation and enhancement, effects are major **beneficial** at the local level and are of **major significance**.

### **Hedgerows and Treelines**

- F6.24 As previously explained, small sections of hedgerow and treelines are to be lost to the south of the railway line to facilitate the construction of the new A29 link road. Given the presence of hedgerows and treelines in the north of the site at the boundaries alone, only small sections of these habitats will be lost to facilitate access where necessary.
- F6.25 As outlined above, the proposals involve the provision of extensive areas of new shrub, tree and hedgerow planting both within the Rife Valley Park and the new areas of open space proposed throughout the areas of new built form. Where small sections of these features are to be removed, there is also potential to bolster plant the remaining lengths, thus increasing the species diversity and structural integrity of these habitats.
- F6.26 New areas of hedgerow and tree planting will support a broad range of native species of local provenance. With appropriate management (see below), this will ensure that the habitats have the greatest potential to develop optimal structure and species diversity and provide the necessary benefits to a range of species groups including bats, Badger, birds, and invertebrates.
- F6.27 All retained hedgerows within the development site will be protected during the construction phase through the use of appropriate protective fencing. Contractors will be made aware of the presence of this fencing and of their responsibilities in this regard.
- F6.28 Potential dust impacts would be removed through the adoption of standard engineering safeguards and best practice protocols including damping down techniques and wheel washes where necessary during construction to reduce the level of dust material collecting on the

retained hedgerows and treelines. In any event all dust impacts would be temporary and reversible over time, and with the preventative procedures in place would be negligible in effect.

- F6.29 Following avoidance, mitigation and enhancement, effects are major **beneficial** at the local level and are of **moderate significance**.

### **Woodland**

- F6.30 A small area of woodland (W1) is located in the south of the application site. This area will be retained as part of the proposals.
- F6.31 Following the adoption of standard engineering safeguards and best practice protocols as described above for hedgerows and treelines (e.g. containment of hazardous materials and dust prevention methods), it is considered that this will protect the woodland from all potential construction impacts.
- F6.32 Suitable fencing will also be erected around the northern edge of this woodland to ensure that there is no possibility of encroachment by machinery. This will also take into account any root protection zones (RPZs) of individual trees, such that there is no damage to the ground and/or compaction of the root systems.
- F6.33 Following avoidance, mitigation and enhancement, effects are **neutral** at the **local** level and are of **minor significance**.

### **Scattered Trees**

- F6.34 A number of scattered trees are located throughout the site all of which will be retained within the Rife Valley Park. These trees are considered to be well buffered from the development during the construction period such that no effects are considered. Nonetheless, the adoption of standard engineering safeguards and best practice protocols as described above for hedgerows and treelines will ensure no impacts are met.
- F6.35 Furthermore, large areas of new tree planting are proposed within the Rife Valley Park. This will significantly increase the number of tree present and will be a significant enhancement relative to the existing situation. Planting will utilise a range of native species of local provenance.
- F6.36 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **moderate significance**.

### **Ruderal Vegetation**

- F6.37 Vast areas of ruderal vegetation will be retained as part of the development proposals within the Rife Valley Park to the west of the site. Small areas of ruderal vegetation including small sections of R1, R4 and areas on either side of the stream to the west of F3 will be lost to the development proposals.
- F6.38 As outlined above, the proposals involve the provision of an extensive areas of new plating within the Rife Valley Park, which in addition to the wildflower planting will include for a range of herb species. The size and diversity of the proposed areas of new planting will be significantly greater than the areas of ruderal vegetation to be lost. It is also considered that given the extent of the Rife valley park and other areas of public open space, there will be significant potential for ruderal vegetation to colonise new areas and to naturalise across the site where management allows.
- F6.39 With regards to the areas of ruderal vegetation alongside the Lindsay Rife stream, there is also significant potential to manage this habitat and to plant localised areas with new ruderal and marginal plant species.

F6.40 As with retained areas of grassland above, there is potential for areas of retained ruderal vegetation to be encroached upon by machinery during the construction phase. Using visible barriers and site awareness it is considered that these areas can be fully protected during construction. In addition to this, the adoption of standard engineering safeguards and best practice protocols (e.g. contained storage of hazardous materials and dust prevention methods) as explained above will ensure there are no further implications afforded to retained areas of ruderal vegetation.

F6.41 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **minor significance**.

### **Scrub**

F6.42 Small areas of scrub are present surrounding the pond at the eastern Nursery in the north of the application site in addition to the immediate west of the reservoir in the south. In all cases these areas are dominated by Bramble and are of limited extent.

F6.43 It is likely that areas of scrub will be lost to the development proposals to facilitate the construction of the new road network. In all cases, given the poor species diversity of this habitat, it is considered that these losses will be fully mitigated for through the provision of vast areas of new planting within the site post development.

F6.44 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **minor significance**.

### **Waterbodies**

F6.45 All ponds will be retained as part of the development proposals with the exception of the reservoir which will be removed to facilitate the construction of the new A29 link road. Losses to the reservoir are not considered to be ecologically significant other than the removal of a water resource, there is no aquatic or marginal vegetation present in this feature and as such the extent at which it is able to support a range of faunal groups is limited.

F6.46 A large number (30 plus) of new drainage ponds are proposed at various locations within the new Rife Valley Park. These ponds will vary in size, shape and depth and will be planted with a wide range of aquatic and marginal species. Given the large number of these new features proposed and their spread across the site, it is considered that they will be a significant and reliable ecological resource for wildlife, and a significant enhancement over and above the existing situation.

F6.47 In terms of mitigation against pollution events, the adoption of standard engineering safeguards and best practice protocols across the site will again ensure that the risk of such events is removed. In addition, the Environment Agency pollution prevention guidelines will also be adhered to throughout the construction process. Pollution prevention measures would include the provision of spill kits to mop up oil and diesel spills with staff trained in their use should the need arise. Bales of straw and absorbent booms of appropriate size will also be stored on site in case of accidental spillage of oil. Oil and diesel storage and disposal on site, if applicable, would similarly comply with Environment Agency guidelines.

F6.48 Potential dust impacts would also be removed through the adoption of standard engineering safeguards and best practice protocols including damping down techniques and wheel washes where necessary during construction to reduce the level of dust material falling upon the retained waterbodies.

F6.49 Following avoidance, mitigation and enhancement, effects are major **beneficial** at the local level and are of **major significance**.

### Stream

- F6.50 This Lidsay Rife stream will be retained and enhanced as part of the development proposals within the Rife Valley Park. As such, there will be no losses to this feature as part of the proposals. The use of a clear-span bridge across the stream will minimise habitat loss as well as disruption to the wildlife corridor beneath the bridge, although inevitably there will be some disturbance during construction.
- F6.51 Accidental spillage of oils and chemicals or airborne particles as a result of works (sand and other solids) could have significant impacts upon the stream during the construction phase. Usual precautions will be taken to prevent toxic or waste spillages into the stream during construction, e.g. bunding of fuel tanks and avoiding the use of toxic chemicals where possible. Pollution prevention measures would also include the readily available spill kits to mop up oil and diesel spills with staff trained in their use. As with waterbodies above, oil and diesel storage (and disposal if necessary) would similarly comply with Environment Agency guidelines.
- F6.52 Contractors should be required to provide appropriate Risk Assessments and Method Statements concerning the use of environmentally hazardous materials and operations where this is not possible. The Environment Agency would immediately be contacted in case of any pollution incident involving watercourses on or near the site. It would be the contractor's obligation to have a management plan in place during works near the watercourse.
- F6.53 Overall, noise will be kept to a minimum wherever possible within the realms of the operations required to construct the bridge.
- F6.54 Lighting associated with the construction of the bridge will be directional and avoid the use of white mercury vapour lamps. The use of diffuse lighting that illuminates the water surface or surrounding habitat will be avoided.
- F6.55 Following avoidance, mitigation and enhancement, effects are major **beneficial** at the local level and are of **major significance**.

### Bare Ground

- F6.56 Areas of bare ground are present within the northern part of the application site. These areas are of very limited ecological interest and will be lost to the development proposals. Given the vast areas of habitat to be provided within the Rife Valley Park, it is considered to represent a significant increase in biodiversity value in the long-term.
- F6.57 Following avoidance, mitigation and enhancement, effects are minor **beneficial** at the local level and are of **moderate to major significance**.

### Buildings

- F6.58 No mitigation is required for the loss of buildings B2-B18; however, the provision of significant new areas of planting, as outlined above, will deliver significant benefits with regards to nesting birds.
- F6.59 The loss of building B1 will have potential impacts in the form of loss the nesting bird habitat, in particular Barn Owl, the mitigative measures of which will be covered under birds below. No other ecological impacts are considered as a result of the loss of this building (no roosting bats).
- F6.60 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **moderate significance**.

## Protected Species

### Bats

- F6.61 No evidence of use of any of the buildings was recorded during survey work, and the buildings themselves were considered unlikely to offer significant potential as roost sites with the exception of building B1. Emergence surveys were undertaken on this building with no evidence of bats being present. Nevertheless, given that bats are highly mobile animals, care will be taken during the demolition of the building B1 (particularly the roof areas), with contractors made aware of the potential presence of bats. Should any bats be encountered during demolition, all work on the building would be suspended until such time as a licence has been obtained from Natural England to permit the works to continue. Such an eventuality would necessitate the production of a comprehensive method statement and mitigation strategy to be submitted to Natural England, which would advise on the suitability of the mitigation proposed.
- F6.62 The use of artificial lighting during the construction phase will be minimised with a programme of works to be issued during the winter months to reduce the need for artificial lighting. Where lighting is necessary during construction, any potential light spillage will be reduced, and directed away from features that offer suitable foraging opportunities for bats, such as the retained hedgerows and treelines, and the Lidsay Rife stream to the west. The spillage of the light should be reduced through the use of low-level lights and the employment of lighting 'hoods' which will direct light below the horizontal plane, at an angle less than 70 degrees away from features identified to offer potential opportunities for foraging bats.
- F6.63 The vast majority of these linear features will however be retained as part of the proposals with only small areas removed to facilitate access. Further to this, significant areas of open space and new habitat within the new Rife Valley Park will provide large areas of optimal habitat for foraging bats. This park will be planted with a wide range of habitats including species-rich grassland, trees, shrubs and waterbodies all of which will be provided in close proximity to the Lidsay Rife stream (the most favoured habitat utilised by bats within the site). Not only will these habitats provide optimal foraging grounds for bats, but the extent of the park will ensure that bat commuting corridors are maintained throughout the site (north to south).
- F6.64 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the European level and are of **moderate significance**.

### Badgers

- F6.65 Both Badger setts will be retained as part of the development proposals and will be situated within the proposed Rife Valley Park.
- F6.66 Given the location of the Badger sett, it is sufficiently isolated from the development proposals that no specific mitigation would be necessary during the construction phase (road footprint is in excess of 20m from the sett). In any event, all on site personnel will be made aware of the sett location and a 20m buffer established around all sett entrances. This will include the installation of temporary protective fencing to prevent machinery and personnel from entering this area. Fencing will also be used where necessary to deter Badger from any areas of particular hazard within the construction site.
- F6.67 Further measures will also be adopted to prevent harm to Badgers during the construction phase wherever possible, including the avoidance of new excavations to be left open overnight. Should excavations be required, scaffolding board (or similar) will be left within the feature in order to provide a means of escape for Badger should they become trapped.

- F6.68 Where soil bunds (or similar) cannot be avoided, it is recommended that these features are subject to regular checks (daily where possible) to identify any areas of digging. Any new excavations will be filled in before a full sett is excavated, wherever possible.
- F6.69 The above measures would be secured by way of a CEMP, the production of which would be a condition of a successful planning application.
- F6.70 Given the mobile nature of Badgers, it is recommended that an updated Badger survey is undertaken at the site immediately prior to the initiation of construction. Closure of an active sett would require a licence from Natural England.
- F6.71 Given the vast areas of habitat to be retained during the construction phase (land to be transformed into the Rife Valley Park), it is considered that suitable foraging grounds and connectivity will remain for the local Badger population during the construction phase.
- F6.72 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **minor significance**.

### **Water Voles**

- F6.73 All Water Vole habitat (Lindsay Rife stream) will be fully retained as part of the development proposals and will be buffered from the development within the proposed Country Park (Rife Valley Park).
- F6.74 The use of a clear-span bridge across the stream in south has been designed such that loss of bank habitat will not be necessary. As such there will be no physical barriers imposed to the wildlife corridor the stream provides and as such Water Vole will continue to be able to disperse along the stream network.
- F6.75 Whilst there is likely to be disturbance impacts to the stream during bridge construction, it is considered that the adoption of standard engineering safeguards and best practice protocols as detailed above for the mitigation of the stream overall (pollution, noise and lighting prevention measures) will ensure that there is a collective of mitigative measures employed for all Water Vole habitat.
- F6.76 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the national level and are of **moderate significance**.

### **Reptiles**

- F6.77 Large areas of reptile habitat will be lost to the development proposals, rendering the need to translocate reptiles to areas of suitable habitat within the site (within the proposed Rife Valley Park).
- F6.78 Such a translocation exercise will involve the use of exclusion fencing which will be used to contain the four target reptile populations. Artificial refugia will be deployed at suitable densities and these will be checked at least once daily. Reptiles will be collected by hand and transported in suitable vivaria to a chosen receptor area along the Lindsay Rife stream within the proposed area of the Rife Valley Park. The reptile translocation will be undertaken prior to relevant site clearance and construction works commencing.
- F6.79 Prior to the reptile translocation commencing, any necessary habitat enhancement measures (such as scrub removal) will be undertaken within the designated holding area which will be delineated from the wider application site by herpetofauna fencing. Where necessary, such as adjacent to where the road network is to be built in the south, additional fencing will also be installed to ensure that reptiles within the wider area are excluded from active construction areas, as well as to compartmentalise areas of the site (to improve translocation efficiency).

Given the longer-term ambitions of the site (the development of later phases) it may be necessary to trap out all areas of suitable habitat in which reptiles are located to prevent the possibility of reptiles entering the construction site from source habitats (habitat outside of the current redline) and to prevent double handling in the future.

- F6.80 The reptile translocation exercise itself will given due regard to best practice measures. Reptile 'tins' (refugia) will be deployed at a tin density of 100 per hectare (in suitable habitats). Checks of these tin refugia will be undertaken twice daily, typically in the early morning and again in the evening. The timings of checks will vary to ensure optimal trapping conditions. This exercise will continue for a minimum 30 day period, only ceasing once no reptiles have been recorded (in each trapping compartment) for 5 consecutive days.
- F6.81 Where necessary, the capture exercise will be complemented by a habitat manipulation exercise, with this comprising two phased cuts, under an ecological watching brief, which will gradually reduce the extent of suitable reptile habitat. Any habitat manipulation will be undertaken in a sensitive manner. In the case of habitats to be retained, care will be taken to ensure these are not subject to excessive damage.
- F6.82 Following the completion of the translocation, herpetofauna fencing will be retained and/or installed as required to exclude reptiles from active construction areas until such a time that relevant works are complete. As an alternative exclusion method, construction zones may be maintained in a manner that removes their potential suitability for reptiles (for example through regular mowing / spraying or maintaining unvegetated buffer areas around the construction footprint).
- F6.83 The completion of a suitable reptile translocation exercise and the active exclusion of reptiles from work areas during construction will ensure that reptiles are safeguarded during the construction phase of the proposals.
- F6.84 The delivery of extensive areas of new species rich grassland and habitat mosaics including shrub planting and waterbodies within the new Rife Valley Park, will moreover ensure that opportunities for reptiles are retained and enhanced in the long-term. The long-term management proposals for the Park will moreover ensure that habitat for reptiles is maintained and enhanced in the long-term. The provision of large areas of suitable reptile habitat will be a significant enhancement over the existing situation and will allow for greater population admixture. The current reptile populations are relatively isolated on site within pockets of habitat otherwise separated by large areas of intensive arable land and as such have limited dispersal capabilities.
- F6.85 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the national level and are of **moderate significance**.

### **Birds**

- F6.86 In order to safeguard any nesting birds within the development site, the clearance of suitable nesting habitats (sections of hedgerow and tree lines) will be undertaken outside of the main bird breeding season (March to July inclusive). Should this not be possible, potential nesting habitats will be subject to a check survey immediately prior to their removal by a suitably qualified ecologist to check for the presence of any active nests.
- F6.87 Should any nesting birds be identified, then the nest will be fully safeguarded in situ and subject to a disturbance buffer of at least 5 meters, to be removed once it has been confirmed by the ecologist that all fledglings have left the nest and that it is therefore no longer active.

- F6.88 The same as above applies to the demolition of buildings within the site, again with such works undertaken outside of the bird breeding season where possible and necessary checks made if not. With regards to building B1, given its utilization by breeding Barn Owl (which are known to often breed in winter months also) it is recommended that a full check is undertaken immediately prior to any demolition works taking place, irrespective of the time of year.
- F6.89 Barn Owl and Cetti's Warbler are also listed as Schedule 1 species of The Wildlife and Countryside Act 1981 and as such protection of these species goes further whereby it is an offence to recklessly disturb at, on or near an 'active' nest. As such, in the event Barn Owl is nesting within B1 at initiation of construction, further sensitive methods will need to be employed in the vicinity of this building to ensure disturbance is not incurred. This will likely include a reduction in machinery activity and noise within a certain buffer of the building until such a time as when the young have fully fledged from the area. With regards to Cetti's warbler, given that this species breeds in vegetation along streams and rivers, it is considered that the considerable buffering afforded to the Lidsay Rife by the Rif Valley Park will ensure that this species is buffered from construction related disturbances. However, the construction of the bridge in the south of the site would similarly require similar precautions as those described above for Barn Owl (March to July inclusive).
- F6.90 Increased lighting and noise pollution associated with the development could have impacts on birds in the surrounding area, the lighting utilised during the construction phase for operation and security purposes will avoid direct lighting and light spill onto the unlit perimeter areas of the site, particularly to the east and north. Ensuring that light sources are directed into the development site and away from these areas will minimise adverse effects of installed artificial lighting on species in the vicinity of the development site.
- F6.91 The provision of areas of new habitat within the Rife Valley Park will provide significantly improved opportunities for nesting and foraging birds. This includes the provision of new areas of species-rich grassland, new tree and shrub planting, and a number of waterbodies, all of which will provide a significant enhancement to nesting birds over and above the existing situation.
- F6.92 Following avoidance, mitigation and enhancement, effects are moderate **beneficial** at the local level and are of **moderate significance**.

## During Operation

### Statutory Designated Sites

- F6.93 The nearest statutory designated site which is designated for nature conservations reasons, The Brooks LNR, is located approximately 0.8km to the south of the application site at its closest point. Given the distances involved and the screening provided by the existing built form there are no impacts that have been identified during the operational phase that will be over and above the existing situation. This includes impacts as a result of increased lighting, noise and air quality and contamination of hydrological systems. As such no specific mitigation is required.
- F6.94 Given the relatively close proximity of The Brooks LNR and the large-scale residential capacity of the site, there is potential that the development will lead to increased recreational use of The Brooks LNR during the operational phase. However, given the presence of the Rife Valley Park immediately adjacent to the development, which itself will contain a large number of aesthetically pleasing environments and pathways, it is considered that the close proximity of this park will help to ensure that recreational use is alleviated for in the surrounding areas.

F6.95 Other stator designated sites are further removed from the site such that there are no impacts considered as part of the operational phase.

F6.96 Following avoidance and mitigation, effects are **neutral** at the national and European level.

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

F6.97 No specific mitigation is required with regards to non-statutory designated sites during the operational phase.

F6.98 It is considered that given the comparative distance involved, all the mitigative procedures of best practice described above will be sufficient to ensure there is no potential for impacts. This includes impacts as a result of increased lighting, noise and air quality and contamination of hydrological systems during the operational phase.

F6.99 Following avoidance and mitigation, effects are **neutral** at the county level.

#### **Habitats**

F6.100 The proposals will create a large area of new and retained habitats within the Rife Valley Park. This large area of green space will extend from the northern to the southern boundary and will be planted with a wide range of new species-rich habitats including wildflower grassland, shrub and tree planting, new hedgerows and a large number of ponds. Through the provision of appropriate management of all these habitats it is considered that long-term benefits for biodiversity will be achieved.

F6.101 Compared to the existing situation at the development site – intensively managed arable land - it is considered that long-term management will deliver a range of habitats of greater biodiversity value than currently present.

F6.102 It is considered that the measures described for each individual habitat feature below will be secured through an appropriately worded planning condition. The details of the methods and management procedures used during operation will be covered in a Landscape and Habitat Management Plan (LHMP). This will ensure that all measures are confirmed in writing and will provide a base from which the responsible management company (as appointed) can ensure that management of habitats is undertaken accordingly to ensure continued health and long-term gains.

#### **Grassland**

F6.103 Wildflower grassland provided within the Rife Valley Park will be subject to varied management regimes. Whilst some areas will be subject to more intensive management (and will therefore comprise amenity grassland), others will be mown at infrequently, enabling a longer wildflower sward to become established. Through appropriate management (for instance, no more than two cuts per year after plants have set seed, and removal of all arisings from the site), this will ensure that the biodiversity value of this sward will be maximised post-development. The end result will be the transformation of arable land (of negligible ecological value) into large areas of wildflower meadow, offering new opportunities for a variety of wildlife, including bats, Badger birds, reptiles and invertebrates.

F6.104 Following avoidance, mitigation and enhancements, effects are major **beneficial** at the local level and are of **moderate significance**.

### Hedgerows and Trees

- F6.105 The bolster planting of retained hedgerows will increase both the diversity of plant species present and the robustness of the hedgerows which will be of benefit to a wide range of species. The extensive areas of new tree and shrub planting proposed throughout the Rife Valley Park will also be an enhancement over the existing situation, with more specimens planted than those lost in sections of hedgerow. These new areas will provide replacement habitats for a variety of wildlife and will ensure that habitat connectivity is maintained across the Proposed Development.
- F6.106 Newly planted specimens will be managed in the long term to ensure the biodiversity value they provide to wildlife is maximised.
- F6.107 Following avoidance, mitigation and enhancements, effects are moderate **beneficial** at the local level and are of **moderate significance**.

### Ponds

- F6.108 A number of new ponds are proposed throughout the Rife Valley Park, creating a mosaic of wetland and terrestrial habitats. These ponds will vary in size and depth and will be planted with a mix of native emergent and aquatic species that are typical of the surrounding area. All ponds will be subject to appropriate management to ensure that no one species comes to dominate.
- F6.109 Terrestrial habitat in the vicinity of the ponds will be managed so that it remains damp, assisting in the provision of drainage and also providing new habitat in the form of wet grassland.
- F6.110 Overall, these waterbodies will provide significant biodiversity enhancements over the existing situation by providing new opportunities for a variety of wildlife, including birds, reptiles, and invertebrates.
- F6.111 Following avoidance, mitigation and enhancements, effects are moderate **beneficial** at the local level and are of **moderate significance**.

### Protected Species

#### Bats

- F6.112 Whilst areas of bat foraging habitat will be lost to the proposals in the form of small sections of hedgerow and treelines, this will be more than mitigated for by the provision of vast areas of new habitats created within the Rife Valley Park. The grassland, shrub and tree planting, in addition to the large number of ponds, will provide optimal foraging habitats for a range of bat species (both those previously recorded and new species not currently recorded within the site). The Rife Valley Park, which follows the length of the Lidsay Rife stream (the most favoured habitat utilised by bats within the site) will also maintain connectivity for commuting bats from the southern to the northern boundary.
- F6.113 The lighting design utilised within the development site in its completed form will ensure that the direct illumination of the retained hedgerows, the stream and importantly the newly created Rife Valley Park is avoided to ensure these areas can be readily utilised by bats for foraging and navigational purposes post development. A sensitive lighting scheme, which incorporates measures such as bollard lighting, hoods and cowls and LED lamps will be used, with regard to guidance issued by the Institution of Lighting Professionals and the Bat Conservation Trust. It is considered that the full details of the proposed lighting strategy may be secured via an appropriately worded planning condition.

- F6.114 As an enhancement, new bat roosting boxes will be installed in suitable locations within the Rife Valley Park. Boxes will be installed upon (where height allows) or in close proximity to new trees, away from artificial lighting, and at an appropriate height and orientation to maximise the likelihood of colonisation and reduce predation. Installation of these boxes will represent an enhancement over the existing situation, given that there are currently somewhat limited roosting opportunities for bats within the development site, and indeed no roosts were recorded during survey work.
- F6.115 Following avoidance, mitigation and enhancements, effects are major **beneficial** at the European level and are of **moderate significance**.

### **Badger**

- F6.116 The provision of vast areas of new habitats created within the Rife Valley Park will provide improved foraging and sett building habitat for the local Badger group. The transformation of arable land into areas of wildflower grassland, trees and shrubs (including berry bearing species) all of which will be situated immediately surrounding the sett, will be a significant enhancement over the existing situation. The large size of the park and the connectivity it affords with the surrounding landscape also ensures that opportunities for Badger to disperse from the site will remain.
- F6.117 With regards to the potential for an increase in road accident-related Badger mortalities, it is considered that the used of road lighting and speed limits will ensure that the risk of an accident is kept to a minimum.
- F6.118 The lighting design utilised within the development site in its completed form will ensure that the direct illumination of the Rife Valley Park and the Badger sett locations is avoided to ensure that Badger are not deterred from these areas post development.
- F6.119 Following avoidance, mitigation and enhancements, effects are major **beneficial** at the local level and are of **moderate significance**.

### **Water Vole**

- F6.120 As previously explained all Water Vole habitat will be fully retained as part of the proposals and will be buffered within the Rife Valley Park. By means of further enhancement, it is also recommended that the Lidsay Rife stream is monitored post development to ensure that the bank habitats its supports remain favourable for this species. Where necessary, this will include ensuring that the banks of the stream do not become too overly shaded by encroaching vegetation, and may include the provision of Common Reed, Rushes and Sedges along the banks of the stream where necessary.
- F6.121 The location of the stream within the Rife Valley Park will also ensure that the stream remains buffered from the development. The presence of habitats of high quality (wildflower grassland and trees) in the immediate vicinity of the stream will in addition improve the longevity of this feature and its water quality (less leaching from the surrounding arable land). These combined effects will in turn be very beneficial to the local Water Vole population that utilises it.
- F6.122 The lighting design utilised on the clear span bridge in its completed form will ensure that the direct illumination of the stream is avoided.
- F6.123 Following avoidance, mitigation and enhancements, effects are major **beneficial** at the national level and are of **minor to moderate significance**.

## Birds

- F6.124 Whilst areas of bird nesting and foraging habitat will be lost to the proposals in the form of small sections of hedgerow and treelines, this will be more than mitigated for by the provision of vast areas of new habitat created within the Rife Valley Park. The grassland, shrub and tree planting, in addition to the large number of ponds, will provide optimal foraging and nesting habitats for a greater range of bird species, including those yet to be recorded within the site.
- F6.125 To avoid potential harm to nesting birds during vegetation management within Rife Valley Park, works shall be undertaken outside of the main bird nesting season (March to July inclusive), with advice sought from a suitably qualified ecologist as necessary.
- F6.126 As an enhancement, a number of bird nesting boxes will be installed within the Rife Valley Park. This will include the provision of new nesting boxes on suitable trees within the development site, with a variation of box types used to provide opportunities for a range of species. Bird boxes will also be provided on buildings. Details regarding new bird nesting boxes may be secured via an appropriately worded planning condition.
- F6.127 A number of new Barn Owl boxes will also be installed across the site at various suitable locations (mature trees). This will also include a new box to be erected upon a pole (telegraph or similar) within the Rife Valley Park. Given the vast array of habitats to be provided within the Park, including large areas of optimal Barn Owl hunting habitat such as wildflower grassland, this will create a significant enhancement over the existing situation. The input of a sensitive lighting design keeping the Rife Valley Park as a dark corridor will also ensure that there are minimal impacts to this nocturnal species.
- F6.128 Following avoidance, mitigation and enhancements, effects are major **beneficial** at the local level and are of **moderate significance**.

## Reptiles

- F6.129 Whilst all reptile habitat will be lost to the proposals, this will be more than mitigated for by the provision of vast areas of new habitat created within the Rife Valley Park. The grassland and shrub mosaic, in addition to the large number of ponds, will provide optimal foraging and basking habitats for reptiles. This will be a significant improvement over the existing situation both in terms of the quantity and quality of the habitats provided. Given reptiles will be translocated to holding areas within the Park (prior to construction), it is considered that reptiles will recolonise and utilise these new habitats over time.
- F6.130 Furthermore, management of the habitats within the Rife Valley Park will ensure that the long-term longevity of the translocated populations is maintained. This will involve creating a mosaic of grassland and ruderal vegetation habitats of varying heights to create both refuge and open basking areas. This will not only increase the carrying capacity but will be a significant enhancement over the existing situation. Management works will be undertaken sensitively with the presence of reptiles in mind (e.g. cutting grassland no more than 10cm from the ground), the details of which will be provided within a management plan for the site.
- F6.131 As a further enhancement, at least ten artificial hibernacula (mounds of inert brick rubble and logs covered with topsoil) will be constructed at suitable locations within the Rife Valley Park, such that new sites for reptile hibernation are provided. Such sites are currently limited within the site and as such this will provide a significant enhancement for the three species recorded.
- F6.132 Following avoidance, mitigation and enhancements, effects are moderate **beneficial** at the national level and are of **moderate significance**.

F7.0

## Residual Effects

### During Construction

F7.1

Subject to the mitigative measures prescribed being efficiently followed, it is considered that there will be no significant residual effects as a result of construction activities on ecological features within the site. For clarity, these are covered in Table F7.1 below.

Table F7.1 Summary of Residual Effects during Construction

| Receptor                | Residual Effect                                                    |
|-------------------------|--------------------------------------------------------------------|
| Statutory Sites         | None                                                               |
| Non-statutory Sites     | None                                                               |
| Habitats                | Residual Effect                                                    |
| Arable Land             | Beneficial at the local level and of minor significance.           |
| Semi-improved Grassland | Beneficial at the local level and of moderate significance.        |
| Hedgerows and Treelines | Beneficial at the local level and of moderate significance.        |
| Scattered Trees         | Beneficial at the local level and of moderate significance.        |
| Woodland                | Beneficial at the local level and of moderate significance.        |
| Stream                  | Beneficial at the local level and of moderate significance.        |
| Bare Ground             | Beneficial at the local level and of minor significance.           |
| Buildings               | Beneficial at the local level and of minor significance.           |
| Fauna                   | Residual Effect                                                    |
| Bats                    | Beneficial at the European level and are of moderate significance. |
| Badger                  | Beneficial at the local level and are of moderate significance.    |
| Water Vole              | Beneficial at the national level and are of moderate significance. |
| Birds                   | Beneficial at the local level and are of moderate significance.    |
| Reptiles                | Beneficial at the national level and are of moderate significance. |

### During Operation

F7.2

Subject to the mitigative and management procedures being employed, it is considered that there will be no significant residual effects on ecological features during operation. On the contrary significant benefits will be realised. For clarity, these are covered in Table F7.1 below.

Table F7.2 Summary of Residual Effects during Operation

| Receptor            | Residual Effect                                                    |
|---------------------|--------------------------------------------------------------------|
| Statutory Sites     | None                                                               |
| Non-statutory Sites | None                                                               |
| Habitats            | Beneficial at the local level and of moderate significance.        |
| Fauna               | Residual Effect                                                    |
| Bats                | Beneficial at the European level and are of moderate significance. |
| Badger              | Beneficial at the local level and are of moderate significance.    |
| Water Vole          | Beneficial at the national level and are of moderate significance. |
| Birds               | Beneficial at the local level and are of moderate significance.    |
| Reptiles            | Beneficial at the national level and are of moderate significance. |

- F7.3 Consideration has been given to strategic allocation schemes in the local area with the timescales and proximity of the forthcoming applications of other land parcels nearby of vital importance. Information regarding the various other land parcels are provided at Chapter C.
- F7.4 Whilst these additional land parcels are in close proximity to the site, it is considered that given the large scale of the development and the vast array of habitats to be provided, particularly the creation of the New Country Park (Rife Valley), these additional developments will have little influence on the effects already identified and alleviated for within the site. Indeed, these developments form part of the greater network that is BEW. It is considered that these development shave each had their own individual assessments with regards to Ecology and the potential for impacts and given the large scale of green infrastructure to be provided at the site, it is considered that these will be interlinked with those created as part of the greater strategic allocations. As such, whilst these developments will great vast areas of built-form overall, it is considered that each of these developments provide opportunities for Ecology both individually and work together in combination to provide a wide ranging green space collective.

## **F8.0 Summary & Conclusions**

- F8.1 This Chapter covers the assessment methodology and the baseline conditions at the development site. The likely significant effects of the proposals have been considered through both the construction and operational phases along with the mitigation measures required to prevent, reduce or offset any significant adverse effects. The likely residual effects remaining after mitigation have also been considered. For information on cumulative effects please refer to Chapter N.
- F8.2 In order to ascertain the current ecological baseline, the development site was subject to a suite of ecological surveys in 2019 and 2020. This included an extended Phase 1 habitat survey and specific surveys for bats, Badger, Water Vole, birds and reptiles.
- F8.3 There are no statutory designated sites of nature interest within or in close proximity to the development site. The nearest statutory designated site is The Brooks LNR, which is located approximately 0.8km to the south. Other designated sites are located significantly separated from the development site by extensive areas of existing development and roads. It is not considered that the proposals will result in any significant effects upon these sites during the construction or operational phases, either considered alone or in combination with other plans and projects.
- F8.4 There are no non-statutory designated sites of nature interest within or in close proximity to the development site. The nearest statutory designated site is Fontwell Park Racecourse LWS, which is situated approximately 1.2km to the north of the application site at its closest point. Other designated sites are located significantly separated from the development site by extensive areas of existing development and roads. As with statutory designated sites, it is not considered that the proposals will result in any significant effects upon these sites during the construction or operational phases, either considered alone or in combination with other plans and projects.
- F8.5 At present, the vast majority of the development site comprises of habitat of negligible ecological value in the form of arable land. Those habitats that are of greater value in the context of the site, the hedgerows, treelines, woodland, waterbodies and stream will be retained as part of the proposals. The Proposed Development will deliver significant enhancements in terms of habitats, including the provision of the new Rife Valley Park, a large area of open space located in the west of the site. This park will buffer the stream from the remaining development and include habitats such as wildflower grassland, new shrub and tree planting and a large number of new ponds, with the planting mixture of all based around the use of native and wildlife-beneficial species. This will fully offset losses and considered in light of future management, represent a net gain in biodiversity terms relative to the existing situation.
- F8.6 Construction methods of best practice have been proposed throughout this chapter in order to alleviate any potential adverse impacts on retained habitats. This includes appropriate storage and containment of potential hazardous substances, use of protective fencing and awareness of sensitive areas and potential routes of contamination.
- F8.7 Protected, rare or notable fauna identified within the development site include bats Badger, Water Vole, birds and reptiles although opportunities for both groups are at present very much restricted.
- F8.8 Overall, levels of bat activity recorded within the site was generally moderate with a number of species recorded to be foraging along the hedgerows at the boundaries of the site and the Lidsay Rife stream. The proposals will result in minor losses to suitable commuting and foraging habitats in the form of small sections of hedgerow. The most favoured habitat utilised by bats, the Lidsay Rife stream, will be full retained and enhanced as part of the proposals. The

completed development will provide significant enhancements in the form of species-rich wildflower grassland, bolster planting (hedgerows), new tree and shrub planting, and a large number of new ponds. In addition, a large number of bat boxes will also be erected at various locations within the site, providing new roosting opportunities for this group. Where lighting is necessary during construction and operational phases, potential light spillage will be reduced and directed away from features that offer suitable foraging opportunities for bats. Overall, there will be a significant enhancement in the opportunities for bats across the site.

- F8.9 Two Badger setts are present within hedgerow H5 in the north-western part of the application site. The proposals will take into account the presence of these two setts such that there are no impacts during the construction phase, including the absence of machinery and ground works within 20m of the sett and the maintenance of connectivity with the surround landscape. Losses to Badger foraging grounds are not considered to be of significant merit (arable land). The completed development will provide significant enhancements in the form of species-rich wildflower grassland and new planting (including berry bearing species) providing a much greater foraging potential than currently present. Overall, there will be a significant enhancement in the opportunities for Badger across the site.
- F8.10 Water Vole surveys undertaken at the development site confirmed the presence of this species in the Lidsay Rife along the western boundary of the application site. The proposals will not result in any loss of Water Vole habitat, with the Lidsay Rife stream being fully retained as part of the proposals. The construction of the clear-span bridge has some potential to impact this species, albeit given that the bridge will not be invasive on the stream system (no columns or piers within the stream itself) and that it will not disrupt the bank habitat, there will be no overriding impacts. Construction methods of best practice during bridge construction will ensure there are no adverse effects to Water Vole and the provision of vast areas of new habitat and bank planting will more than mitigate for any minor impacts the bridge may have (shading). Overall, there will be a significant enhancement in the opportunities for Water Vole across the site.
- F8.11 The bird surveys undertaken at the development site revealed that the site is largely utilised by a range of common species, in addition to breeding of Red List, UKBAP and Schedule 1 species. Bird activity was largely confined to the hedgerows, treelines and stream habitat within the site, with the arable land affording little in the form of opportunities to this species group. As such, the vast majority of key bird habitat will be retained as part of the development proposals. Measures to protect birds from potential harm and disturbance, both during construction and ongoing vegetation management works, are proposed. The provision of species-rich habitats will deliver improved opportunities for nesting and foraging, with bird nesting boxes provided including those targeting key species such as the Schedule 1 species Barn Owl.
- F8.12 The reptile surveys identified small populations of Common Lizard, Slow-worm and Grass Snake to be present at four different locations across the site. To ensure no reptiles comes to harm, any works to be undertaken in the vicinity of key reptile habitat will be done so under the supervision of an ecologist and the reptile populations will be translocated to a suitable receptor location adjacent to the Lidsay Rife stream (The Rife Valley Park). Habitats in this location will be managed to ensure the longevity of the reptile populations. This will involve management of the vegetation to provide a mosaic of both open and dense areas to ensure both basking, foraging and refuge areas are available. A number of Hibernacula will also be installed within the Rife Valley Park and again will further contribute to the significant enhancement witnessed over the existing situation.
- F8.13 With the implementation of appropriate avoidance, mitigation and enhancement measures as outlined within this Chapter, there are predicted to be net benefits for ecology and nature

conservation as a result of the Proposed Development. On this basis, the Proposed Development complies with all legislation and planning policy relevant to ecology and nature conservation.

F8.14 In conclusion, all relevant ecological issues have been addressed within this chapter. On the evidence of the specific ecological surveys undertaken, and with the implementation of mitigation and enhancement recommended in this chapter, the impact of the Proposed Development upon the natural environment will be an increase in the variety and quality of semi-natural habitat present on site from habitat enhancements, creation and management.

## F8.15 **Summary**

Table F8.1 Ecology Assessment Summary

| Receptor                       | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Statutory Designated Sites     | The proposals will not result in any significant effects upon these sites during the construction or operational phases, either considered alone or in combination with other plans and projects. There are no residual effects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Non-statutory Designated Sites | The proposals will not result in any significant effects upon these sites during the construction or operational phases, either considered alone or in combination with other plans and projects. There are no residual effects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Onsite Habitats                | <p>All significant impacts, both during construction and post development, have been identified for each habitat type. Whilst significant and negative impacts have been identified, relevant protection and mitigative measures have been put in place to ensure that the residual effects are positive and beneficial.</p> <p>The Proposed Development will deliver significant enhancements in terms of habitats, including the provision of the new Rife Valley Park. This Park will include a range of new species-rich habitats with the planting schedule based around the use of native and wildlife-beneficial species.</p> <p>All small losses are considered to be fully offset by the above measures, and in light of future management, represent a significant biodiversity net gain relative to the existing situation.</p> |
| Bats                           | <p>The proposals will result in only very minor losses to suitable commuting and foraging habitats. The most favoured bat habitat, the Lidsay Rife stream and its surrounding habitats, will be full retained and enhanced. The completed development will provide significant enhancements in the form of a variety of new habitats and a large number of bat boxes</p> <p>Sensitive lighting will be employed for all stages of development (construction and operation), with potential for light spillage reduced and directed away from features that offer suitable foraging opportunities for bats.</p> <p>Overall, there will be a significant enhancement in the opportunities for bats across the site. Residual effects will be beneficial at the European level and are of moderate significance.</p>                          |
| Badger                         | <p>The two Badger setts will be fully protected and buffered by existing habitats during all stages of the development. All proposal to be made aware of the sett locations and risks. The completed development will provide significant enhancements for Badger in the form of a vast variety of new habitats providing a much greater foraging potential than the arable land currently present.</p> <p>Overall, there will be a significant enhancement in the opportunities for Badger across the site. Residual effects will be beneficial at the local level and are of moderate significance.</p>                                                                                                                                                                                                                                  |

| Receptor   | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water Vole | <p>Water Vole are present within the Lidsay Rife stream along the western boundary of the site. The proposals will not result in any loss of Water Vole habitat, with the stream being fully retained as part of the proposals.</p> <p>The construction of the clear-span bridge will not result in any overriding impacts as no elements of the bridge will be situated within the stream itself. Construction methods of best practice during bridge construction will ensure there are no adverse effects to Water Vole.</p> <p>The provision of vast areas of new habitat and bank planting along the length of the stream will ensure that any minor impacts the bridge may have (shading) will be fully mitigated for.</p> <p>Overall, there will be a significant enhancement in the opportunities for Water Vole across the site. Residual effects will be beneficial at the national level and are of moderate significance.</p> |
| Birds      | <p>The site is largely utilised by a range of common species, including breeding Red List, UKBAP and Schedule 1 species. Bird activity is largely confined to the hedgerows, treelines and stream habitat within the site.</p> <p>The vast majority of key bird habitat will be retained as part of the development proposals. Measures to protect birds from potential harm and disturbance, both during construction and ongoing vegetation management works have also been proposed. The provision of species-rich habitats will deliver improved opportunities for nesting and foraging, with bird nesting boxes providing additional opportunities.</p> <p>Overall, there will be a significant enhancement in the opportunities for Bird species across the site. Residual effects will be beneficial at the local level and are of moderate significance.</p>                                                                      |
| Reptiles   | <p>The site currently supports small populations of Common Lizard, Slow-worm and Grass Snake.</p> <p>All works in the vicinity of key reptile habitat will be done under the supervision of an ecologist. Reptile populations translocated to a suitable receptor location adjacent to the Lidsay Rife stream.</p> <p>Receptor habitat will be managed to ensure the longevity of the reptile populations, including vegetation management to maintain an open mosaic of both open and dense areas and the provision of Hibernacula.</p> <p>Overall, there will be a significant enhancement in the opportunities for Reptile species across the site. Residual effects will be beneficial at the national level and are of moderate significance.</p>                                                                                                                                                                                    |

**F9.0**

## **Abbreviations & Definitions**

- 1 CIEEM - Chartered Institute of Ecology and Environmental Management
- 2 NPPF - National Planning Policy Framework
- 3 BAP - Biodiversity Action Plan
- 4 SSSI - Site of Special Scientific Interest
- 5 SPA - Special Protection Area
- 6 SAC - Special Area of Conservation
- 7 LNR - Local Nature Reserve
- 8 LWS - Local Wildlife Site

**F10.0**

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