

ECOLOGICAL SURVEY
BURGHFIELD ROAD, READING, BERKSHIRE

carried out by



commissioned by

ENSO ENERGY LIMITED

JANUARY 2018



ECOLOGICAL SURVEY

BURGHFIELD ROAD, READING, BERKSHIRE

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EXECUTIVE SUMMARY

- Clarkson and Woods Ltd. was commissioned by Enso Energy Ltd. to carry out an ecological survey of Land off of Burghfield Rd, Reading.
- The purpose of this report is to inform a planning application for containerised gas power generators, and associated infrastructure, running on natural gas in order to supply power to the local region at periods of peak demand.
- An Extended Phase 1 habitat survey of the site was conducted on the 4th of December 2017 by Henry Sturgess an experienced ecologist.
- The site contained extents of neutral grassland, tall ruderal vegetation, limited extents of scrub, broadleaf trees and a large volume of farmyard waste including tyres. The site has been mapped as possible coastal and floodplain grazing marsh priority habitat under the NERC Act (2006) but shares few characteristics with this habitat type lacking visible ditches, signs of regular inundation or indicative vegetation.
- The survey identified the potential for bats and birds to use the site to forage within and surrounding habitats provide opportunities for commuting individuals moving through the wider landscape. Limited bird nesting opportunities were identified in patches of low growing scrub and mature trees outside of the site. Two mature trees located outside the site contained features with bat roost potential.
- Species such as dormice, amphibians and reptiles are considered likely to be absent within the site due to the recent habitat removal within the development boundary and the suboptimal habitat types within the red line boundary. Furthermore the isolation of the land parcel from adjoining habitats is pronounced due to Holy Brook, the road network and the railway which would hamper colonisation by these species.
- The distance of the site from Holy Brook introduces the potential for disturbance to species such as otter and water vole which are likely to use the brook to commute through the wider landscape.



- There is potential for badger to forage within the site but the site lacked optimal features for sett creation and no signs attributed to badger were identified.
- The development will remove habitats of primarily low ecological value. Mitigation will be provided in the form of diverse wildflower planting, establishment of a species rich hedgerow surrounding the site to the south and west along with the planting of three native trees.
- To ensure bats are not adversely effected by the operation of the site, acoustic fencing will be installed to attenuate noise and reduce disturbance. No artificial lighting will be included in the scheme and any emergency lighting will be subject to strict controls. As a result potential roost features outside of the site will not be impacted.
- Any nesting bird habitat will be cleared outside of the bird nesting season or clearance proceeded by a nesting bird check undertaken by a suitably qualified ecologist.
- To ensure water vole and otter associated with Holy Brook are not disturbed by the works and the brook is protected from pollution resulting from construction of the site Heras fencing will be installed creating a 15m buffer from the brook. Silt fencing should also be considered to ensure runoff and dust from the site does not pollute the watercourse.
- A Construction Environmental Management Plan will be produced to detail the protective measures that will be put in place during the construction process to safeguard retained habitats and protected species. A Landscape Ecological Management Plan will also be produced detailing the ongoing maintenance requirements of retained and created habitats so that they provide the maximum benefit to local wildlife.
- A number of ecological enhancements are proposed. These include the erection of 2x Schwegler 2FN bat boxes and a hibernaculum for a range of species. Inclusion of a Schwegler wren roundhouse and 2 x Schwegler 1b bird boxes will also enhance the site for a range of birdlife. A Schwegler insect nesting aid is also recommended as an enhancement for solitary invertebrates.



1 INTRODUCTION

- 1.1.1 Clarkson and Woods Ltd. was commissioned by Enso energy limited to carry out an ecological survey of Land off of Burghfield Rd, Reading.
- 1.1.2 The survey was carried out on the 21st April 2017 by Henry Sturgess, an experienced ecologist, who is a member of the Chartered Institute of Ecology and Environmental Management. At the time of survey, the weather conditions were initially cloudy, clearing to become sunny, with cold temperatures at approximately 10°C and still.
- 1.1.3 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.

1.2 Site Description Summary

- 1.2.1 The site itself contained extents of neutral semi improved grassland with large extents of tall ruderal vegetation, discrete patches of scrub and a small number of mature broadleaf trees. To the north of the site was an electrical substation and yard beyond which was the railway; to the west of the site was a mobile phone mast beyond which was Burghfield Rd and arable fields. To the south were larger extents of neutral grassland with farmyard manure and large patches of tall ruderal vegetation. Farm buildings comprising 4 large barns and various smaller structures were present beyond this to the south. Directly to the west of the site was Holy Brook which was lined with mature trees and scrub beyond which was grassland with a high proportion of developing scrub.
- 1.2.2 The development site is approximately 0.3 hectares (ha) in size with additional extents indicated for temporary works to allow the connection of services. The approximate centre of the site was at OS Grid Ref. SU 6820 7127. An Ordnance Survey map of the site is shown in **Figure 1** and aerial photograph in **Figure 2**.

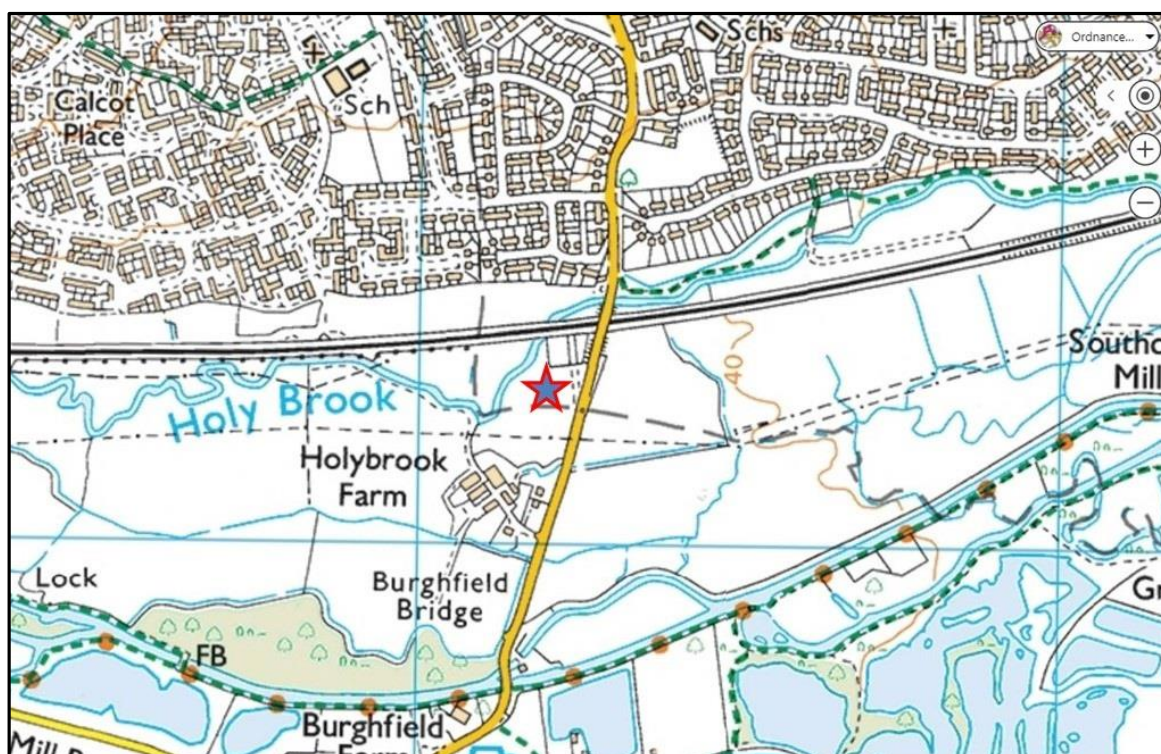


Figure 1: Ordnance Survey Map Showing Location of Site denoted by the star (OS Licence 100050456)

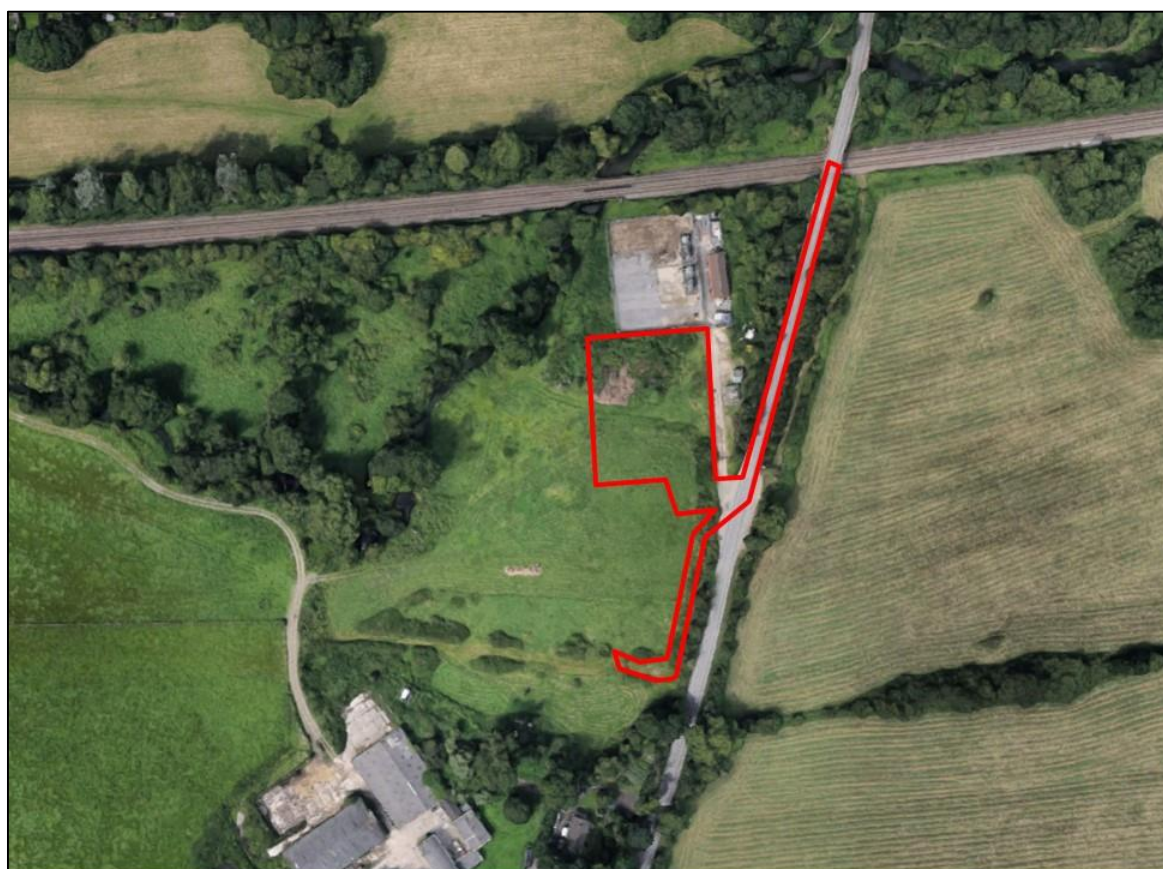


Figure 2: Aerial photograph of Site boundary (©2018 Google)



1.3 Development Proposals

- 1.3.1 The development proposals consist of the creation of a natural gas powered containerised generator along with associated infrastructure including transformers, switchgear, inverters and cooling systems. Acoustic and security fencing will be erected, a short access track will also be created along with the installation of CCTV equipment. Connection to the national grid will also be undertaken to the south via the interior of the field avoiding the hedgerows. Connection of a buried connection to the gas network along Burghfield Rd heading to a connection point in the area of the railway line will also be undertaken. **Figure 3** below provides the proposed layout for the scheme.
- 1.3.2 Any significant changes to the building design and layout and landscaping prior to submitting for planning should be issued to Clarkson and Woods Ltd. for review. Ecological impacts and mitigation opportunities may be affected by these changes.

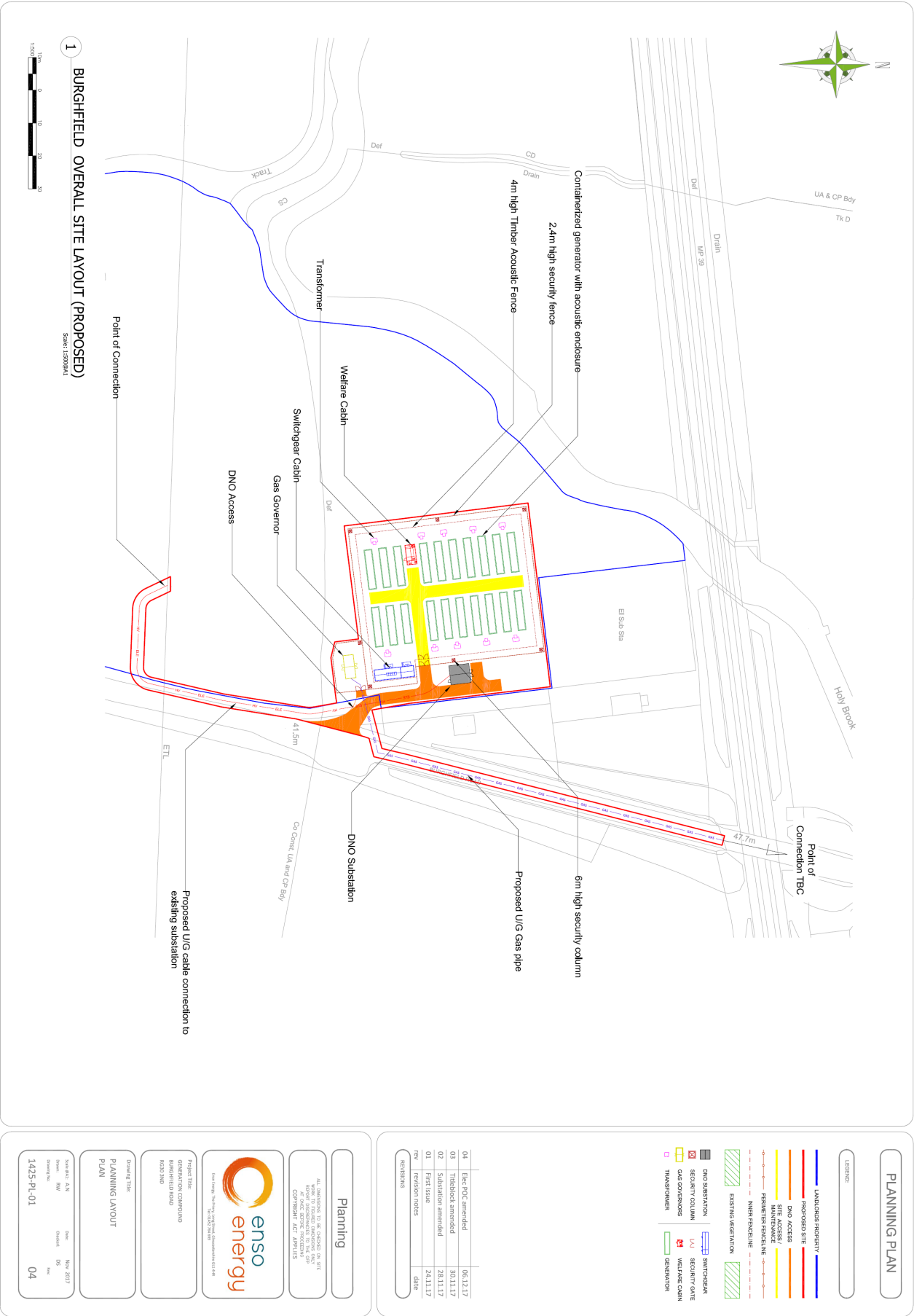


Figure 3: Development proposals



2 SURVEY AND ASSESSMENT METHODOLOGY

2.1 Data Search

- 2.1.1 Statutory designated sites within proximity of the Site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).
- 2.1.2 Ordnance Survey maps (1:25,000) and aerial images of the Site were examined online (bing.com/maps and maps.google.co.uk).
- 2.1.3 The Draft Reading Borough Local Plan (May 2017) was consulted for details of planning policies relevant to designated sites, protected species and habitats, and general ecological and environmental protection.

2.2 Field Survey

Personnel

- 2.2.1 The ecological survey was undertaken by Henry Sturgess, GradCIEEM. Henry has 4 years' experience undertaking ecological surveys and has a BSc in relevant subjects. Henry has been assessed under the Clarkson and Woods QA processes as competent to complete the survey.
- 2.2.2 Henry holds a licence for the survey of great crested newts in England, Natural England WML-CL08 - Level 1 (Class Licence) Reg No: 2016-27145-CLS-CLS. Henry is also an Accredited Agent under Jo Donnelly's Natural England level 2 class licence for survey of bats Reg No: 2015-13642-CLS-CLS.

Habitats

- 2.2.3 A habitat survey was carried out based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2003 edition)¹.
- 2.2.4 Botanical names follow Stace (1997)² for higher plants and Edwards (1999)³ for bryophytes.
- 2.2.5 Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (**Table 5**) are used to describe habitats not readily conforming to recognised types and evidence of or suitability for protected species and species of conservation concern.

2.3 Protected and Notable Species

- 2.3.1 Details of the legislative protection afforded to those protected species which have been identified as occurring or potentially occurring on the site are detailed in Appendix A.

¹ Nature Conservancy Council. (1990 - 2003 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee

² Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press

³ Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff



Badgers

- 2.3.2 A search was made for badger *Meles meles* setts, and sett entrances were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying.
- 2.3.3 Sett entrances are counted and mapped to record tunnel direction and their relative level of usage.
- 2.3.4 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped.

Bats

- 2.3.5 The assessment of the suitability of the site for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust⁴.
- 2.3.6 *Trees*: an inspection of trees on site was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder, powerful torch and a video fibrescope were available. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were inspected and recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.
- 2.3.7 *Habitat*: the habitats within the site were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

Dormice

- 2.3.8 Any hedgerows, scrub and woodlands were assessed during the walkover for their suitability to support dormice *Muscardinus avellanarius*. Particular consideration was paid to the abundance of food sources within them, density for nesting and overnight shelter and the strength of connectivity to other suitable habitats leading off site. In addition, any direct sightings, nests or feeding signs during the site visit were also recorded. Where hazel *Corylus avellana* was recorded on site, a search for gnawed hazelnuts was conducted.

⁴ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.



Water Vole and Otter

- 2.3.9 A search was made along the banks of water courses and water bodies and their adjacent habitats for otter *Lutra lutra* signs including spraints, tracks, castling, and rolling. The banks of any water courses were searched for the presence or potential for holts or other sheltering areas.
- 2.3.10 The banks of the water course were also searched for water vole *Arvicola amphibius* signs including latrines, burrow entrances, feeding stations, 'runways' and footprints.

Amphibians

- 2.3.11 All waterbodies within 250m of the Site were identified using Ordnance Survey maps and aerial imagery. Waterbodies within the site ownership and on publically accessible land were assessed during the field survey for their suitability to support amphibian species where access was possible.
- 2.3.12 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the methodology described by Oldham et al⁵. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.
- 2.3.13 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

Reptiles

- 2.3.14 Features on site were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

Birds

- 2.3.15 Any buildings and vegetation were surveyed for signs of use by nesting birds and any birds seen or heard during the survey were noted. The site's potential to support bird species of particular conservation concern (i.e. Schedule 1, NERC S41 and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

⁵ Oldham, R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.



Invasive Species

- 2.3.16 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* were searched for and recorded.

Other Notable Species and Species of Conservation Concern

- 2.3.17 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus europaeus*, harvest mice *Micromys minutus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.

2.4 Quality Assurance

- 2.4.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct⁶ when undertaking ecological work.
- 2.4.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)⁷.
- 2.4.3 This report has been prepared in accordance with the relevant British Standard: BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development⁸.

2.5 Ecological Evaluation

- 2.5.1 The evaluation of ecological importance builds upon the criteria provided within the CIEEM guidelines for Ecological Impact Assessment (2016)⁹ and the Criteria for Nature Conservation Evaluation described by Ratcliffe (1977)¹⁰. These criteria are described further in Appendix B. With due consideration to the evaluation criteria ecological receptor importance is then classified on a scale between 'International' and 'Site' importance with an additional Negligible category included for those features which are of no intrinsic ecological value. Where further information is required to determine the true importance of a species or habitat present the importance of the receptor is marked as 'unknown'.

⁶ CIEEM (2013). Code of Professional Conduct. www.cieem.net/professional-conduct.

⁷ CIEEM (2013). Competencies for Species Survey (CSS). www.cieem.net/competencies-for-species-survey-css.

⁸ The British Standards Institution (2013). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development. BSI Standards Ltd.

⁹ CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management. www.cieem.net

¹⁰ Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press



3 SURVEY LIMITATIONS

3.1 Desk Study

- 3.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed development site that have not been identified within the desk study.
- 3.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

3.2 Badgers

- 3.2.1 Areas with dense ground cover (hedges, scrub, woodland etc. were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

3.3 Bats

- 3.3.1 Bats are very small creatures, capable of roosting within extremely small spaces and it is possible that these animals, or their signs, might have been missed during the survey if they are normally present opportunistically or in small numbers for a short period of time each year.
- 3.3.2 Not all features in trees or buildings suitable for use by bats are visible from the ground and there may be no external evidence of use of features by bats; consequently it is only possible to make a best effort when carrying out such a survey.

3.4 Otters

- 3.4.1 Otters have no defined breeding season and the breeding holt is kept deliberately obscure by the female so locating one can be difficult and time consuming. A through search was conducted but sheltering structures capable of supporting otter may have been missed if present on the far bank.

3.5 Water Voles

- 3.5.1 Where water voles live at low densities or a site is at the edge of their range, field signs can be very limited especially during the winter months or following heavy rain.

3.6 General

- 3.6.1 Although the survey was conducted in January, which is outside the optimal time for a Phase 1 habitat survey (April to October inclusive), it was possible to adequately classify and assess the nature conservation value of the habitats involved. Although particular groups of species such



as flowering herbs and spring ephemerals may have been under-recorded or missed, considering the habitats recorded on the site, any noteworthy species were unlikely to have been missed. An extensive species list was not collected but species characteristic of the recorded habitats were recorded.

- 3.6.2 This survey offers only a single 'snapshot' of the Site and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.
- 3.6.3 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.



4 RESULTS

4.1 Data Search – Designated Sites

International designations within 5km of the Site

4.1.1 No internationally designated sites were noted within 5km of the application area.

National designations within 2km of the Site

4.1.2 No nationally designated sites were noted within 2km of the application area.

Local designations within 1km of the Site

4.1.3 8 Local Wildlife Sites are located within 1km of the application area. These are detailed below.

Table 1: Local Wildlife Sites

Site Name	Description	Location from Application Area
Holy Brook	Connecting to Kennet and Avon Canal chalk river and providing habitat for a number of notable invertebrates and species, including water vole.	20m west
Fobney and Kennet Valley Meadows	Permanent pasture and wetland habitat with small areas of woodland providing habitat for a variety of invertebrate species.	80m east
Burghfield gravel pits	Well-developed wooded areas, islands and marginal vegetation attracting a variety of wildfowl including schedule 1 species.	510m south-east
Burghfield Mill Island	A small nature reserve within the Kennet and Avon canal and containing non-intervention wet woodland.	850m south-west
River Kennet / Kennet and Avon Canal	An example of chalk river, a UK BAP Priority habitat, with records of water vole, freshwater crayfish and bluebell.	900m South
Small copse at Burghfield Mill	A small, damp broad-leaved woodland with a stream containing a selection of invertebrates and bird species including lapwing.	990m south-west
Theale Gravel Pits	Extensive wetland habitat attracting a wide range of overwintering wildfowl.	1km south-west



4.2 Data Search – Protected and Notable Species

Data obtained from Thames Valley Environmental Records Centre

- 4.2.1 The data search returned 46 records relating to protected and notable species found within 1km of the application area, within the last 10 years. Of these, 8 related to bird species, 5 related to fish species, 18 to invertebrates, 4 to bat species, 10 to other terrestrial mammal species and 1 record related to reptiles. Details of these records can be found in **Appendix D** at the end of this report.
- 4.2.2 The closest records (within 250m) to the proposed development site were of an otter approximately 15m north of the site in a slip of land between Holy Brook and the substation directly to the north of the site. Records of a depressed river mussel *Pseudanodonta complanata* were provided approximately 60m to the east in a ditch the other side of Burghfield Rd. Records of Bullhead *Cottus gobio* and barbell *Barbus barbus* were also found within 250 meters in the river Kennet to the north east.
- 4.2.3 The data search returned 21 records relating to invasive species records within 1km of the application area, within the last 10 years. These are detailed in **Appendix D** at the end of this report.
- 4.2.4 The closest records (within 100m) to the proposed development site were Himalayan balsam *Impatiens glandulifera* and least duckweed *Lemna minuta* approximately 60m east.

MAGIC search for EPS Licences

- 4.2.5 3 species licence records relating to bats were recorded within 2km of the application area. Details of these licences are listed below.

Table 2: Granted European Protected Species licences within 2km

Bat Species	Licence Reference	Licence Dates
Common pipistrelle, soprano pipistrelle and brown long-eared.	EPSM2011-3499	14/10/2011 – 01/09/2013
Common pipistrelle, brown long-eared	EPSM2010-2341	04/10/2010 – 31/08/2012
Soprano pipistrelle	EPSM2010-2590	28/10/2011 – 31/08/2014
Common pipistrelle, soprano pipistrelle	2015-15548-EPS-MIT	02/11/2015 – 30/10/2020

Clarkson and Woods In-house records

- 4.2.6 No protected or notable species were noted through in-house records within 2km of the application area.



4.3 Planning Policy

- 4.3.1 The Draft Reading Borough Local Plan (May 2017) was consulted for policies relevant to this development. This is a pre-submission draft plan and it is not anticipated any major changes will affect the policies within it.

EN12: BIODIVERSITY AND THE GREEN NETWORK

- 4.3.2 a) The identified Green Network, the key elements of which are shown on the Proposals Map, shall be maintained, protected, consolidated, extended and enhanced. Permission will not be granted for development that affects the sites with identified interest or fragments the overall network. The Green Network comprises:

- Sites with identified biodiversity interest - Local Wildlife Sites, Local Nature Reserves, Biodiversity Opportunity Areas, protected and priority species and their habitats, Priority and Biodiversity Action Plan habitats, and the River Thames and all its tributaries (including the River Kennet and the Kennet & Avon Canal); and
- Areas with potential for biodiversity value and which stitch the Green Network together – designated Local Green Space and open green spaces, and existing and potential Green Links.

New development shall demonstrate how the location and type of green space, landscaping and water features provided within a scheme have been arranged such that they maintain or link into the existing Green Network and contribute to its consolidation. Such features should be designed to maximise the opportunities for enhancing this network. All new development should maximise opportunities to create new assets and links into areas where opportunities are as yet unidentified on the Proposals Map.

- 4.3.3 b) On all sites, development should not result in a net loss of biodiversity and geodiversity, and should provide a net gain for biodiversity wherever possible. Development should:
- Protect and where possible enhance features of biodiversity interest on and adjacent to the application site, incorporating and integrating them into development proposals where practicable; and
 - Provide new tree planting, wildlife friendly landscaping and ecological enhancements (such as wildlife ponds, bird and bat boxes) where practicable. In exceptional circumstances where the need for development clearly outweighs the need to protect the value of the site, and it is demonstrated that the impacts cannot be: 1) avoided; 2) mitigated or; 3) compensated for on-site; then new development will provide off-site compensation to ensure that there is “no net loss” of biodiversity. Provision of off-site compensation shall be calculated in accordance with nationally or locally recognised guidance and metrics. It should not replace existing alternative habitats, and should be provided prior to development.



EN14: TREES, HEDGES AND WOODLANDS

- Individual trees, groups of trees, hedges and woodlands will be protected from damage or removal where they are of importance, and Reading's vegetation cover will be extended. The quality of waterside vegetation will be maintained or enhanced.
- New development shall make provision for tree retention and planting within the application site, particularly on the street frontage, or off-site in appropriate situations, to improve the level of tree coverage within the Borough, to maintain and enhance the character and appearance of the area in which a site is located, to provide for biodiversity and to contribute to measures to reduce carbon and adapt to climate change. Measures must be in place to ensure that these trees are adequately maintained.

EN16: POLLUTION AND WATER RESOURCES

- Development will only be permitted where it would not be damaging to the environment through land, noise or light pollution; where it would preserve or ideally enhance ground and surface water quality; and where existing water resources, sewerage and wastewater treatment infrastructure are adequate to support the proposed development.
- Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.
- Development will only be permitted on land affected by contamination where it can be demonstrated that the contamination can be satisfactorily remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment.

4.4 Data Search – Local Conservation Priorities

4.4.1 The following relevant species and habitats are listed on the Reading Biodiversity Action Plan (BAP):

Habitats

- Semi-natural Grassland
- Broadleaved Woodland
- Ancient and / or species rich Hedgerows
- Ponds (standing open water) and Reedbeds
- Rivers and other waterways

Species

- Glow Worm
- Stag Beetle
- Bats (all species)



- *Water Vole*
- *Black Redstart*
- *Great Crested Newt*
- *Slow Worm*

4.4.2 These habitats and species have been identified as local conservation priorities and therefore will be given appropriate additional weight within the site ecological evaluation.

4.5 Survey Results

4.5.1 The results of the ecological survey are included in map form on **Figure 4**. Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (**Table 5**) are used to describe habitats not readily conforming to recognised types and evidence of or potential for protected species and species of conservation concern. Photographs of the site are provided in **Appendix C** at the end of this report.

4.6 Habitats

Semi improved neutral grassland

- 4.6.1 Within both the development site and the land to the west and south extents of a coarse neutral grassland were present. This appeared to have been improved historically and was unmanaged within the site. Aerial images from Google Earth show that majority of the site was cleared of vegetation in the last 5 years and this habitat has re-established since.
- 4.6.2 To the north of the site the grassland habitat transitioned into tall ruderal vegetation in large patches. The neutral grassland component contained the following species. Cocks foot grass *Dactylis glomerata*, false oat grass *Arrhenatherum elatius*, timothy grass *Phleum pratense*, tufted hair grass *Deschampsia cespitosa*, red fescue *Festuca rubra*, couch grass *Elymus repens*, perennial rye grass *Lolium perenne*, mugwort *Artemisia vulgaris*, spear thistle *Cirsium vulgare*, annual mercury *Mercurialis annua*, hedge mustard *Sisymbrium officinale*, creeping cinquefoil *Potentilla reptans*, ribwort plantain *Plantago lanceolata*, shepherds purse *Capsella bursa-pastoris*, red clover *Trifolium pratense*, creeping thistle *Cirsium arvense*, Dovefoot cranesbill *Geranium molle*, daisy *Bellis perennis*, scented mayweed *Matricaria chamomilla*, scarlet pimpernel *Anagallis arvensis*, marsh thistle *Cirsium palustre*, creeping buttercup *Ranunculus repens* and common vetch *Vicia sativa*.
- 4.6.3 Some species including the marsh thistle, tufted hair grass and creeping buttercup indicate potentially wet site conditions but these make up a very small component of the sites overall assemblage and indicate the site is not regularly inundated. The site has been flagged as a potential priority habitat under the NERC Act (floodplain grazing marsh), however, this is based on Environment Agency Flood Zones, aerial photographs and OS maps and not on actual survey data (the confidence level of this classification is low). Given the composition of vegetation, the lack of ditches within the site and the adjacent substation, inundation of the site is considered unlikely. As such the site is considered a poor fit for the floodplain grazing marsh habitat type which is by its nature seasonally inundated.



Tall ruderal

- 4.6.4 The development site contained a large proportion of tall ruderal vegetation in large patches to the north of the site. Similar assemblages of tall ruderal vegetation were also present within the field to the south of the development site and to the west between the development site and Holy Brook. Species within the tall ruderal assemblage included nettle *Urtica dioica*, spear thistle, common mugwort, hedge mustard, bristly ox-tongue *Helminthotheca echioides*, coltsfoot *Tussilago farfara*, cleavers *Gallium aparine*, cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium*, white dead-nettle *Lamium album* and thorn apple *Datura stramonium*.

Scrub

- 4.6.5 Discreet patches of scrub were present both within the site and bordering Holy Brook. Some small patches of bramble were also present; species included bramble *Rubus fruticosus*, hawthorn *Crataegus monogyna*, goat willow *Salix caprea*, dog rose *Rosa canina* and elder *Sambucus nigra*.

Broadleaf trees

- 4.6.6 A few mature broadleaf trees were present adjacent to the site bordering the brook. Species included Grey willow *Salix cinerea*, goat willow, alder *Alnus glutinosa* and ash *Fraxinus excelsior*. A mature ash was present outside the red line boundary on the western side of the site, this tree was covered in thick ivy growth, A semi mature elder was also present within the centre of the site.

Holy Brook

- 4.6.7 Holy brook was briefly surveyed; this is beyond the western boundary of the development site and was bordered by a number of mature and semi mature trees. The brook was fast flowing at the time of survey with the central channel estimated to be 1-1.75m deep with shallower banks. The bank structure was steep but some small beaches were present. The section of the brook adjoining the site contained a small riffle where the water flowed faster. The bankside vegetation included emergent species previously described as scrub with pendulous sedge *Carex pendula* and reed canary grass *Phalaris arundinacea*. No rooted floating or floating vegetation was observed but submerged vegetation included European bur-reed *Sparganium emersum*.

Hedgerows

- 4.6.8 Two sections of roadside hedgerow were present outside of the development site; these were of varying quality and contained the following species. Hawthorn, blackthorn *Prunus spinosa*, ash, hazel *Corylus avellana*, elm *Ulmus minor* 'Atinia', ivy *Hedera helix* and hedge bindweed *Calystegia sepium*. H1 to the north of the site contained more semi mature trees within its structure, was intact and appeared to be in a good condition. H2 to the south was gappy and defunct. The structure of H2 improved to the south of the site and containing a higher proportion of mature and semi-mature shrubs and trees.



4.7 Protected Species and Species of Conservation Concern

Badgers

- 4.7.1 The site itself contained little suitable habitat for sett creation. Overall the site was quite flat and its close proximity to the river makes it likely that excavations significantly below ground level are likely to be subject to periodic flooding. The site itself contained habitats suitable for foraging badgers including the grassland and tall ruderal vegetation. Several mammal paths to the south of the site may have been created by this species but given the surrounding habitat and lack of other badger signs these may be the result of livestock or deer. No snuffle holes, latrines or prints were recorded and the site is relatively isolated by the brook to the west, railway to the north, road network to the east and the River Kennet beyond the site to the south.

Bats

Roosts

- 4.7.2 The development site and the habitat directly adjacent contained a very limited number of features capable of supporting roosting bats. These were limited to the mature ash trees present outside of the development area bordering Holy Brook. Another mature ash was present directly to the west of the site did not have any roost features visible from the ground and was covered in a thick layer of Ivy.
- 4.7.3 Ivy can be used by roosting bats in some instances but overall the bat roosting potential was evaluated as being low for this tree.
- 4.7.4 To the south another mature ash sits on the south west corner of the development boundary. This tree had a number of features including limb sheers and subsequent rot holes. A hole in the trunk was present at approximately 5m within the first large bow; the cavity appears to slope into the tree and is likely to channel water. A second feature at the same height but present on the southern aspect faces down, the depth of this feature could not be determined from the ground. A small knothole feature was also recorded in the crown, investigation with a torch indicated this feature is most likely shallow and unsuitable.

Foraging and Commuting

- 4.7.5 The site was surrounded by a number of linear habitats including Holy Brook, the treeline surrounding this feature, the railway to the north and hedgerows bounding Burghfield Rd. These are likely to be used by commuting bats navigating through the local landscape. The habitats within the development site itself are likely to provide a fairly diverse range of widespread invertebrates having a mosaic of grassland, tall ruderal vegetation, scrub vegetation and nearby emergent vegetation from Holy Brook. The likely diversity of invertebrates would increase the site suitability for supporting foraging bats but there is a lack of structure and cover within the body of the site along with few linear vegetated features connecting the site with the wider landscape are likely to limit this. Widespread species such as common *Pipistrellus pipistrellus* and soprano pipistrelle *P. pygmaeus*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* have the potential to use the open environments within the development site for foraging. The river, hedgerows and



other dark linear vegetated routes are more likely to be used by species such as *Myotis* sp and brown long-eared bats.

- 4.7.6 The field containing the majority of the development site is currently unmanaged with no cutting or grazing occurring, a small extent of the build footprint lies within a managed field likely subjected to periodic grazing by cows, this habitat to the south may form part of a useful foraging habitat for species such as greater horseshoe *Rhinolophus ferrumequinum* which regularly forage in cattle grazed pasture although this species and lesser horseshoe *Rhinolophus hipposideros* are considered likely to be absent within the site as it is outside their current known range in the UK.

Otter

- 4.7.7 The development site itself was predominantly unsuitable for otter with little shelter available for sheltering, Holy Brook that borders the site in conjunction with the large number of canals, rivers, gravel pits in the vicinity are likely to support a population of otters throughout the year (and the data search revealed that this species has been recorded within this area, close to the site). The bankside vegetation and prominent rocks were searched for signs of otter including spraints and holts. No signs were found but the brook was relatively full at the time of the survey and signs such as otter spraint may have been washed away.

Water Vole

- 4.7.8 The Section of the brook adjoining the site was surveyed for signs of water vole. No signs of water vole presence such as burrows, feeding remains or latrines were recorded. There is potential for burrows to be obscured or flooded during the winter and recent rain may have washed away signs such as latrines and feeding remains.
- 4.7.9 A population of water vole is listed as occurring within the stream according to data returned regarding Holy Brook from the data search. The section surveyed was suboptimal for use by this species due to the high flow of water, broad channel and relatively low levels of marginal vegetation. This section may become more suitable during the summer months when water levels are lower and the marginal vegetation is able to grow up and provide cover. It is also likely to have dispersing individuals move along the brook in the late season in search of breeding territories.

Dormice

- 4.7.10 The site contained very little habitat capable of supporting dormice. The scrub and the hedgerows are the only habitats suitable for this species. Given the site and the suitable features it contains are cut off from other suitable habitat to the north by rail, to the east by road, to the south by a river and to the west by Holy Brook it is considered highly unlikely dormice are present within the site. The generally poor connectivity of linear vegetated features surrounding the site to larger extents of woody vegetation or woodland elsewhere combined with the lack of local records make it unlikely dormice are present in the wider local area. As such dormice are not discussed further in this report.



Amphibians

- 4.7.11 The site contained limited suitable habitat for both great crested newt *Triturus cristatus* and other widespread amphibians such as common toad *Bufo bufo* (a propriety species under the NERC Act). No standing water was present within the site and as such breeding by amphibians is not possible. The coarse grassland and the farmyard rubble mound would provide some terrestrial habitat and shelter for amphibians if present within the site. Local ponds within 500m of the site were visited to assess their potential to support great crested newts; the Habitat Suitability Assessment the scores of which are included in Table 3. Pictures of the waterbodies are included in **Appendix C**.

Table 3: HSI calculations and pond assessments

Pond number	Description	Distance from the site	HSI score.
P1	Small drain within field from overflow of ditch, seasonally wet containing a range of emergent vegetation including floating sweet grass <i>Glyceria fluitans</i> , pendulous sedge and water plantain. The drain appears to dry regularly, water fowl were present, the connection to the ditch network makes fish presence seasonally a possibility.	230m	0.62 (Average)
P2	A large lake created by gravel extraction, lots of fish and water fowl, very little emergence vegetation but surrounded by establishing woodland habitats. Used as a fishing lake and cut off from the site by the canalised section of the River Kennett.	450m	0.20 (poor)

- 4.7.12 The site is isolated from other standing water, with the railway (to the north), road network (to the east), flowing Holy Brook (to the west), River Kennet and the M4 (to the south) making it very difficult for amphibians to reach the site. Recent aerial photographs viewed on GoogleEarth dated 25/03/17 show that the site was predominantly cleared of vegetation. This reduces the likelihood of amphibians persisting within the site and the short amount of time between the recent clearance and the present makes re-colonisation less likely.
- 4.7.13 It is considered unlikely given the distance of ponds from the site, their moderate to low suitability and the high level of isolation of the site from these features, combined with the lack of records locally that great crested newts are present within the site. Some widespread species such as common frog may use the terrestrial habitats of the site occasionally but due to the isolation of the site from suitable ponds and recent clearance is likely to limit the number of amphibians present.



Reptiles

- 4.7.14 The site contained some suitable features for widespread amphibians especially grass snake *Natrix natrix*, common lizard *Lacerta vivipara* and potentially slow worms *Anguis fragilis*. The coarse grassland within the site and the large pile of farmyard waste predominantly comprising old tyres would provide suitable habitat for these species. However several factors make a population of reptiles unlikely to occur within the site. These include the isolation of the site as previously discussed in the amphibians section; the recent clearance of the majority of the development site also limits the likelihood of reptile presence. The railway to the north of the site has the potential to act as a reptile corridor but the change in levels between this feature, the site and the bridge isolates the track from the site to the west. Limited vegetation at track level to the east would act as significant barriers to species such as common lizard or slow worm from reaching the site. Grass snake are the most likely to be present as they are able to cross water features such as Holy Brook or the River Kennett. If grass snake are present they are likely to be in the site intermittently and in low numbers.

Birds

- 4.7.15 The site contained a number of habitats of value to farmland, urban and garden birds. A wide variety of species were recorded including common species, as shown in **Table 4** below, which were observed at the fringes of the site foraging or sheltering. A skylark *Alauda arvensis* was observed in a field to the south of the site foraging. It is unlikely given the high proportion of tall ruderal vegetation and lack of open spaces within the development site that skylark would use the site for nesting, there is some potential for less space dependant ground nesting birds such as meadow pipit *Anthus pratensis* to use areas to the south of the site to nest. Four red kite *Milvus milvus* were recorded both perched within a tree bordering the site and flying in circles over the central field.
- 4.7.16 In terms of the sites value to foraging birds the fringe habitats such as the trees, hedgerows and scrub are likely to provide a foraging resource for generalists such as thrushes, tits and wood pigeon *Columba palumbus*. The central grassland and tall ruderal habitats are of more use to insectivorous birds such as pied wagtail *Motacilla alba* or predatory birds such as barn owl *Tyto alba* which may forage within the site for small mammals. Scavenging species such as red kite also have the potential to use the wider area to forage. The brook running in close proximity to the site is also likely to be a key feature for local birds.
- 4.7.17 Species recorded on site during the survey were:

Table 4: Bird Species Recorded During the Field Survey

Species	Latin	Behaviour
Blue tit	<i>Cyanistes caeruleus</i>	Perched in woody vegetation
Great tit	<i>Parus major</i>	Fling beside Holy Brook.
Wren	<i>Troglodytes troglodytes</i>	Calling from within scrub



Dunnock	<i>Prunella modularis</i>	Foraging in H2
Pied wagtail	<i>Motacilla alba</i>	Fling over site north to south.
Gold finch	<i>Carduelis carduelis</i>	Flock flew over the site
Skylark	<i>Alauda arvensis</i>	Calling in the field to the south of the site.
Wood pigeon	<i>Columba palumbus</i>	Calling from a mature tree.
Robin	<i>Erithacus rubecula</i>	Singing from trees by Holy Brook
Blackbird	<i>Turdus merula</i>	Foraging in hedgerows
Redwing	<i>Turdus iliacus</i>	Foraging in H1
Carrion crow	<i>Corvus corone</i>	Flying over the site
Jay	<i>Garrulus glandarius</i>	Call heard
Magpie	<i>Pica pica</i>	Pair perched in mature trees
Red kite	<i>Milvus milvus</i>	Individual perched on mature ash 3 other kites circling site upon arrival.
Greylag geese	<i>Anser anser</i>	5 individuals flying north to south over the site at height.

Invertebrates

- 4.7.18 The heterogeneity of the habitats both within and surrounding the site including the grassland, tall ruderal vegetation, broadleaf trees, scrub and riparian habitats make the potential for a wide range of common invertebrates to be present. Most of these including the grassland, tall ruderals and scrub are not particularly diverse and recent clearance of the site would limit the complexity of the assemblage of invertebrates present. The brook and its fringe of vegetation is likely to increase the overall invertebrate diversity but overall the site is unlikely to support an assemblage of invertebrates of conservation significance.

Other Protected Species, Species of Conservation Concern and Invasive Species

- 4.7.19 No signs of other protected species or invasive species were observed during the survey. Brown hare are likely to be absent due to limited habitat connectivity and the small field size, hedgehog are also likely to be absent due to isolation of the site. Harvest mice have the potential to be present given the large proportion of tall or rank grassland within and surrounding the site.

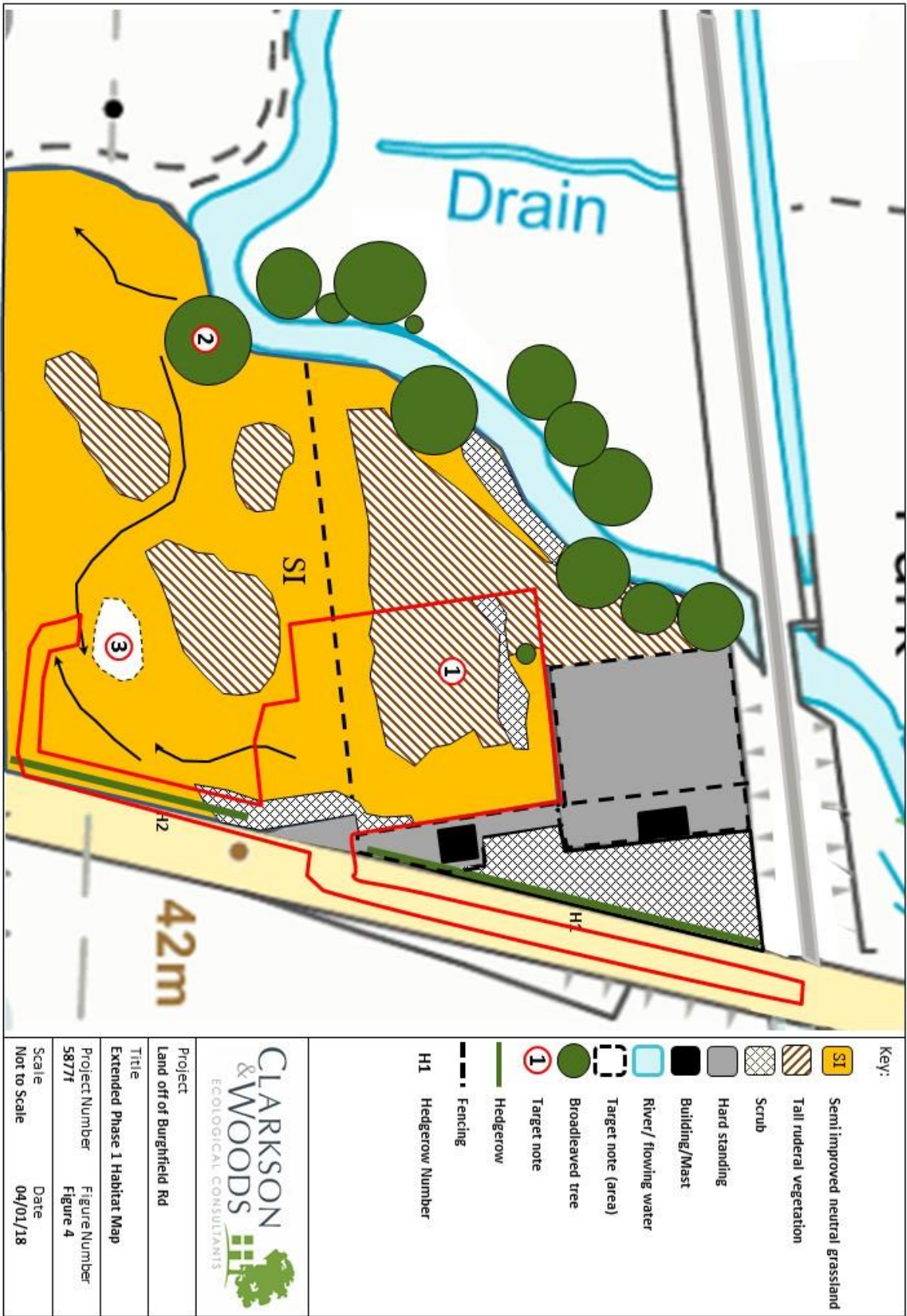




Table 5: Target Notes

No.	Description
TN1	Large pile of farmyard waste covered in tall ruderal vegetation (shelter potential for a range of species)
TN2	Mature ash with a number of potential bat roost features (Moderate potential)
TN3	Large pile of farmyard manure and hay (Grass snake egg laying potential)



5 ECOLOGICAL EVALUATION

5.1.1 This section provides an analysis of the value of ecological receptors (the designated sites, habitats and protected species) identified as actually or potentially occurring within or in proximity of the site. The valuation of the receptor reflects its legal protection, rarity and conservation status as well as its relative abundance on site and whether it is identified as a local or national conservation priority. Where appropriate the social and economic importance of ecological receptors has also been considered.

Table 6: Ecological Evaluation

Ecological Receptor	Description/Comments	Ecological Importance
Designated Sites		
Theale Gravel Pits	This series of large water features dominate the ecology of the area and provide a home to a range of water fowl	District Importance
Fobney and Kennet Valley Meadows	Permanent pasture and wetland habitat with small areas of woodland surrounding Holy Brook providing habitat for a variety of invertebrate species. Close to the site beyond Burghfield Rd cut in half by the railway.	District Importance
Burghfield Gravel Pits	Well-developed wooded areas, islands and marginal vegetation attracting a variety of wildfowl, very similar in function to the Theale gravel pits.	District Importance
Small copse at Burghfield Mill	A small, damp broad-leaved woodland with a stream containing a selection of invertebrates and bird species including lapwing	District Importance
Burghfield Mill Island	A small nature reserve within the Kennet and Avon canal and containing non-intervention wet woodland.	District Importance
Holy Brook	Connecting to Kennet and Avon Canal chalk river providing habitat for a number of notable species, including water vole. In very close proximity to the site.	District Importance
River Kennet/ Kennet and Avon Canal	An example of chalk river, a UK BAP Priority habitat, with records of water vole, freshwater crayfish and bluebell.	District Importance
Habitats		
Semi improved neutral grassland	A small extent of poor quality neutral grassland on clay. Common plant species present, history of improvement recently cleared and re-established, unmanaged and rank in places.	Site importance



Ecological Receptor	Description/Comments	Ecological Importance
Tall ruderal	Large extents of recently established tall ruderal vegetation of limited diversity featuring some novel farmyard escapee species.	Site importance
Scrub	Small extents of common scrub species bordering Holy Brook and scattered developing scrub patches within the site.	Site importance
Broadleaved trees	A number of mature ash and willows that border Holy Brook.	Local Importance
Holy Brook	A key brook connecting into the Kennett and Avon canal. Likely to support dispersing and potentially breeding water vole during the summer months. A key habitat to protect during the construction process.	County Importance
Hedgerows	Two sections of species rich hedgerow, neither are considered important under the hedgerow regulations.	Local Importance
Species		
Badger	Considered likely to be absent within the site as limited opportunities for sett creation, the isolated of the site makes foraging in this area unlikely.	Site Importance (if present)
Bat	The site is likely to support a range of foraging widespread bat species. There is also limited potential for roosting bats to be present within a mature tree with suitable features in close proximity to the development. Some boundary habitats may be useful for commuting bats.	Local Importance
Otter	Holy Brook that runs close to the western site boundary is likely to support otter. It is considered unlikely holts would be present adjacent to the site as there is limited available cover but the river is likely to be used to travel between local gravel pits and fisheries. However the site itself is of negligible importance to otters	Negligible Importance
Water vole	The site itself is of negligible importance for water vole. Holy Brook directly to the west supports a water vole population. Water vole are considered likely to be to the present in the western extent of the brook near its tributaries where the brook is smaller in width and likely to be slower flowing.	Negligible Importance
Amphibians	The site is predominantly unsuitable for great crested newt. It is also considered unlikely to contain amphibians due to the lack of standing water within the site and the relative isolation of the landholding from roads, strongly flowing waterways and the rail network.	Site Importance (If present)



Ecological Receptor	Description/Comments	Ecological Importance
Reptiles	Reptiles are considered likely to be absent due to recent site clearance the isolation of the site by transport infrastructure. There is potential for grass snake to use the site on occasion although the site is of low value to this species.	Local Importance (if present)
Birds	The development site offered foraging and limited nesting opportunities for widespread bird species, the site is unlikely to support ground nesting species.	Site importance
Invertebrates	The site and surrounding habitats such as Holy Brook are likely to support a wide range of common invertebrate species.	Site importance.



6 ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT

6.1 Introduction

- 6.1.1 This section considers the effects of the proposed development upon the ecological receptors identified in Section 5. Avoidance, mitigation and compensatory measures are then described to ensure adverse effects associated with the construction and operation of the proposed development can be eliminated or reduced as far as possible. Recommendations are also provided for any further work that might be required as well as suggestions for ecological enhancement measures that would be appropriate within the development in line with the National Planning Policy Framework.

6.2 Designated Sites

- 6.2.1 The proposed development is relatively small in scale in the context of the local landscape. The site will operate generators that run on natural gas, which will inevitably produce some pollutants including mono-nitrogen oxides NO and NO₂, carbon monoxide and volatile organic compounds. The restricted running time of the site along with the relatively low emissions from natural gas generators when compared to diesel or coal especially in terms of particulates, make it unlikely the scheme will have significant impact on air quality. It is possible that emissions will have a very limited yet potentially detrimental effect (the extent of which is currently unknown) on designated sites identified in the data search. Prevailing winds and other weather conditions will also influence the impact of the proposals. It is understood an air quality assessment is being completed within which potential impacts of pollution deposition upon designated sites is being assessed.
- 6.2.2 Holy Brook is the most likely designated wildlife site to be impacted by the development due to its proximity and sensitivity to pollution. Silt fencing should be considered for installation during the construction process to reduce the potential for runoff from entering the watercourse.
- 6.2.3 The scheme has been designed to reduce the likelihood of potential pollution events that could adversely affect the ecology of Holy Brook and the River Kennet/ Kennet and Avon Canal which connects with Holy Brook downstream. These include measures such as fire controls, containerising any plant which poses the potential for fluid leakage and the positioning of plant away from ecologically sensitive features. Other species specific measures are detailed in the following section to ensure protected and notable species associated with the brook are not adversely impacted by the proposals. The Fobney and Kennet Valley Meadows, although within close proximity to the site, is primarily designated for its pasture and woodland habitats which are considered unlikely to be affected by the construction of the facility being separated by the a main road and railway.
- 6.2.4 The operation of the engines will generate some noise which may have potential to cause a nuisance or disturb wildlife. An acoustic fenceline is proposed to reduce the magnitude of such impacts. It is also anticipated that most wildlife will quickly habituate to the noise generated by



the operation of the engines. As such it seems unlikely that the noise generated by the facility will significantly impair the function of Holy Brook or any of the other designated sites.

- 6.2.5 Any artificial lighting required within the compound will be motion activated on a timer. There is no requirement for permanent illumination of the site. Maintenance operations will also take place during daylight hours. Any artificial lighting installed has the potential to impact upon the function of Holy Brook to wildlife potentially limited its use by light sensitive species.
- 6.2.6 Given the measures described above it is considered unlikely that the proposed development will have any significant impacts, either directly or indirectly, on the designated sites identified during the desk study.

6.3 Habitats

- 6.3.1 Approximately 1,100m² of semi improved neutral grassland, 1,550m² of tall ruderal vegetation and 350m² of scrub will be lost as part of the proposals. Semi improved grassland adjacent to H2 will also be temporarily affected where connection to the national grid will require excavation to bury the electric services. Burghfield road will also be subject to excavations in the form of ground work to allow the burying of gas services to the site, this is not anticipated to have any significant ecological impacts and the works affecting this area will be also be temporary.
- 6.3.2 All of the habitats to be affected are generally of low ecological importance being valued at a site level of importance. These have all been recently established after some vegetation clearance in the past few years and each of the habitats is relatively species poor and commonly occur in the local area.
- 6.3.3 To mitigate for the loss of extent of scrub and other low quality habitats and to ensure that the connectivity of the site with the wider landscape is maintained and enhanced, planting of a hedgerow with 5 hedgerow trees is recommended. This hedge should be planted outside of the security fence. The centre of this feature will be 4m beyond the fence line to allow a 2m gap between the fence line and the hedgerow to allow maintenance activities to be undertaken on both sides of the feature. The hedgerow should be maintained to a general height of no less than 2m with at least 5 heavy standard trees used to punctuate the hedge with taller woody specimens, these should be allowed to grow to their natural height and spread.
- 6.3.4 The hedgerow will be planted using a range of native and locally appropriate species including hawthorn, blackthorn, wild privet *Lingustrum vulgare*, hazel, English oak, field maple, dog rose and spindle *Euonymus europaeus*.
- 6.3.5 To mitigate for the loss of grassland extent an area of approximately 100m² will be seeded with a locally appropriate diverse wildflower seed mix. This will be the Emorsgate EM4 Meadow mixture for clay soils (or a locally sourced seed mix, if possible). This mix contains an appropriate assemblage of both grass and wildflower species for the site and is designed to establish well on the soil type present. This will be maintained for the first 10 years of the sites operation to create a diverse range of species to the south of the development and enhance the diversity of species present in the wider area. It is also recommended to avoid unnecessary loss of floral diversity that the access track is formed from cellular grass paving. This will have a number of environmental



benefits, including providing habitat for flora which will establish within the cells of the trackway, this will also reduce the volume of surface water runoff produced by the site.

- 6.3.6 As an additional measure native trees should be planted within the meadow area and allowed to establish to maturity. As the trees develop in size and structure over approximately 10 years they will shade out the meadow planting and this will curtail its ongoing maintenance. The trees should be one of the following species: English oak, field maple, whitebeam *Sorbus aria* hornbeam *Carpinus betulus* or wild service tree *Sorbus torminalis*. These should be supplied as heavy standard specimens with a trunk girth of >8cm. Failures will be replaced and ongoing maintenance provided for the lifetime of the operational development.
- 6.3.7 A Construction Environmental Management Plan (CEMP) should be prepared to detail how the habitats surrounding the site should be protected during the construction phase. This is particularly important with regard to Holy Brook which will need to be appropriately buffered from any construction activities. The CEMP should include details of appropriate fencing to restrict access into key ecological areas, information on any timing restrictions and measures to prevent damage to water bodies and other sensitive ecological habitats. Typically the preparation of a CEMP will be a conditional requirement of the planning permission.
- 6.3.8 A Landscape and Ecological Management Plan (LEMP) should be prepared for the operational site that will cover how the newly planted areas should be managed so as to maximise their biodiversity value and achieve the objectives of ecological mitigation and compensation. The LEMP will also set out any measures necessary to ensure protected species are appropriately accommodated within the operational site.

6.4 Protected Species and Species of Conservation Concern

Badgers

- 6.4.1 The development is highly unlikely to have any significant impacts on local badgers that potentially use the site. The loss of an extent of grassland habitat will have a minor adverse impact on the sites foraging potential for badgers but the large extents of similar habitat to the south and the provision of a diverse wildflower habitat will ensure badgers can continue to forage within and surrounding the site. The planting of native hedgerow will also provide some additional foraging opportunities for badgers using the site in the form of fruits and berries.

Bats

Roosting

- 6.4.2 There are no features capable of supporting roosting bats within the site and as such it is unlikely that roosting bats will be affected by the development. There is potential for a roost to be present in a mature oak to the south west of the site approximately 60m from the closest part of the red line boundary. There is limited potential in the absence of mitigation that a roost in this location could be disturbed by additional noise resulting from the sites operation. In order to ensure this does not occur acoustic fencing is proposed which will dramatically attenuate any noise from the operation of plant. This feature will also help to limit potential light spill, which will be controlled by primarily omitting any night artificial light sources within the scheme. If emergency lighting is



considered essential this should be timed to ensure it is not left on for extended periods. Any proposed lighting must adhere to the principals laid out in the bats lighting section below. No further survey of the potential roost feature identified is considered necessary as avoidance measures put in place will ensure if a roost is present it will not be disturbed.

Foraging

- 6.4.3 The proposals are likely to have a minor adverse impact on the extent of foraging habitat due to the loss of the semi improved grassland, tall ruderal and scrub vegetation. This is likely to be a minor impact as the habitat quality is low and therefore likely to be used by a restricted assemblage of species. The hedgerow, tree and wildflower meadow plantings will compensate for the loss of foraging potential as a result of removal of the grassland, tall ruderals and scrub. The new hedgerow trees and meadow will provide a good source of invertebrates for foraging bats.

Commuting

- 6.4.4 The site itself sits on the edge of some linear vegetated habitats such as the hedgerows bounding Burghfield Rd and Holy Brook which has fringe of mature woody vegetation. Both of these features have the potential to be used as commuting routes by bats moving through the wider landscape. Although neither of these features are being directly affected by the proposals there is some potential for the operational site to disturb or degrade the function of these wildlife corridors. To ensure this doesn't occur measures such as control of lighting and noise will need to be put in place. The acoustic fencing proposed will mitigate for the increased levels of noise. This screening will also help to limit any potential light spill. To ensure lighting on site is not an issue no lighting should be installed with any essential lighting for emergency maintenance being subject to lighting controls. The lighting guidance section below gives parameters for reducing lighting to ensure light sensitive species such as bats are not adversely affected by the operation of the site.
- 6.4.5 Due to the measures put in place which are designed to avoid impacts to bats and the low value of the habitats that will be lost as a result of the scheme no further survey for bat activity is considered necessary as any survey data is unlikely to change the outcome of the mitigation proposed.
- 6.4.6 The following measures will reduce any impacts on bats using the site:
- No unessential artificial lighting will be installed within the site
 - If lighting is essential for emergency purposes this should be limited to illuminating the interior of the site to ensure light spill on to the boundary habitats does not occur. The following principals should also be applied.
 - Emergency lighting will be timed to turn off periodically to avoid illumination of the site for extended periods or when no security or maintenance staff are in attendance.
 - Light height will be carefully considered to ensure minimal light spill is achieved;
 - All lamps will be fitted with UV filters or lack UV elements when manufactured;



- A warm white spectrum (<2700Kelvin) will be adopted as this will reduce impacts of blue light upon wildlife;
- LED lamps will be used where possible;
- The use of bollard or low-level luminaires to retain darkness above will be considered where appropriate;
- No luminaires with an Upward Light Ratio above zero will be used;
- Where required, accessories such as baffles, hoods or louvres will be used on the lamps to reduce light spill.
- The potential for glare to act upon dark corridors must be considered and managed where possible.

6.4.7 To enhance the site for bats the inclusion of 2x Schweger 2FN bat boxes should be affixed to the outside of the acoustic fencing at a height of no less than 3m and facing south.

Otter

6.4.8 The site sits close to Holy Brook and within a landscape dominated by open water features including streams, rivers, canals, gravel pits lakes and ditches. The availability of fish from the large number of fishing lakes, streams and rivers make the wider area very suitable to support a population of otter. It is considered due to the habitat present the development site is unlikely to be used by this species. There is some potential that otters using Holy Brook could be disturbed by the construction or operation of the development. In order to ensure that the brook is not disturbed during construction a buffer of 15m should be maintained from this feature at all times. This is the closest point that the development comes to the brook and erection of barrier fencing such as HERAS fencing will ensure no materials, machinery or personnel are able to access this part of the land. Otter are known to be more active at dusk, during the night and towards the dawn and as such restrictions on working times should be imposed ensuring that the work takes place between the hours of 07:30am and 7:00pm.

6.4.9 During the operational stage of the development security and acoustic fencing along with the hedgerow planting will separate the development from the brook and ensure otter are not disturbed by the operation. The acoustic fencing will reduce noise disturbance and no lighting is currently proposed which could potentially deter otters from using the brook.

6.4.10 If the aforementioned measures are put in place it is considered highly unlikely that otters will be adversely affected by the construction or operation of the scheme.

Water vole

6.4.11 Water vole are considered unlikely to use the habitats within the development site as these are primarily unsuitable. Local records show that a population is present within Holy Brook although the stretch of the brook that falls within a short distance of the site is considered suboptimal for this species due to its rate of flow which was strong and may impair this species use of the central channel. Seasonally there is potential for the brook to reduce its rate of flow when water levels drop and this may cause it to become more suitable. There is also potential for individuals to



disperse along the brook past the site. Measures put in place are precautionary as it is considered unlikely water vole will be affected by the development.

- 6.4.12 To ensure no disturbance to the population of water vole in the brook occurs during the construction process a number of measures should be put in place. The first is the creation of a 15m fenced buffer from the river to ensure construction vehicles, materials and the work force cannot enter the buffer and potentially disturb or harm water vole. This will also ensure no harm occurs to water vole burrows which can extend up to 5m into the bank. Silt fencing should also be considered for installation between the development and the brook at approximately 10m from the bank during construction to reduce the likelihood of silt or other runoff flowing into the watercourse. Measures put in place to restrict the hours construction can take place on the site will also be of benefit to water vole which although diurnal are most active in the early morning and the late evening.
- 6.4.13 During the operational stage of the development measures such as the acoustic fencing (attenuating noise pollution), the large offset of over 15 meters to the top of the bankside and the lack of artificial lighting will ensure that the development does not disturb the population of water voles which may be present in the watercourse. Disturbance from operation is likely to be minimal and it is considered likely that water vole would become habituated in a short space of time to a small increase in noise from the site.

Amphibians

- 6.4.14 The site contained habitat of limited suitability for amphibians as it contained no standing water and habitats within the site had recently been cleared and allowed to re-establish. Large numbers of barrier features including flowing watercourses, lakes or gravel pits containing fish and water fowl would reduce breeding success for amphibians in the local landscape and the relative isolation of the site resulting from the presence of infrastructure such as roads, rail and watercourses is likely to limit colonisation. As such it is considered widespread amphibians are likely to be absent or seasonally present in very low numbers. As such no further survey or specific mitigation measures are proposed for these species.
- 6.4.15 As an enhancement for this taxon a hibernaculum should be created within the wildflower meadow area; this should measure 1m in height x 1m in width x 2m in length (minimum dimensions to be created with 2 cubic meters of material at a ratio of 1:2 stone to wood) the hibernacula should be partially buried to a depth of between 30-50cm. The hibernacula should be constructed of a mix of stone rubble, soft and hardwood logs. Turf from the creation of the hole to create this feature should be heaped on top of the hibernacula to provide additional insulation.

Reptiles

- 6.4.16 The site contained habitat of low to moderate suitability for reptiles although the recent clearance of part of the site which appears to have occurred in the last year would reduce the likelihood of reptiles being present. Other factors including the isolation of the site by road, rail and local watercourses makes colonisation of the site by reptiles other than grass snake unlikely. Due to these factors it is considered likely that reptiles are absent within the site with the possible



exception of grass snake which may reach the site on occasion. The likely lack of key prey items for this species within the site makes it likely any grass snakes would use the site as part of a more extensive range and are unlikely to suffer adverse effects as a result of the development. As such no further survey or mitigation work is considered necessary.

- 6.4.17 As an enhancement for reptiles a hibernacula is proposed the details of which are listed in the Amphibian section above.

Birds

- 6.4.18 The development will result in a loss of foraging habitat but due to the large extent of similar habitat in the local area impacts are likely to be low. There is potential for disturbance of nesting birds as a result of site clearance. To safeguard nesting birds present within the site during the breeding bird season site clearance should take place outside of the nesting bird season (September to February Inclusive). If the clearance cannot be undertaken outside of the nesting bird season habitat removal should be preceded by a check of the habitat for nesting birds by a suitable qualified ecologist.
- 6.4.19 Impacts on breeding birds will be limited to species that nest in discreet patches of scrub such as wren, whitethroat, yellowhammer or dunnock. It is considered likely these species will have a small reduction in nesting opportunities as a result of the removal of habitat. To mitigate for the loss of nesting and foraging habitat for farmland and suburban bird species native tree a hedge planting surrounding the site will be established. This will provide additional fruit, flower, invertebrates and shelter opportunities for these species. The provision of a diverse wildflower habitat will also be of benefit to a range of bird species particularly insectivorous species such as pied wagtail, robin and wren.
- 6.4.20 As an enhancement for birds it is recommended that that three bird boxes are provided; these should include a single Schwegler 1ZA wren box and 2x Schwegler 1b bird boxes. The Schwegler 1ZA box should be installed on a 3ft wooden stake within the centre of the hedgerow planting. The hedgerow will grow around this feature and it will form a secluded nest site ideal for wren. The 1B boxes should be hung on the corners of the security fence at 2.4m and facing west or north to avoid overheating.

Invertebrates

- 6.4.21 The habitat within the development site is likely to support a fairly restricted range of widespread invertebrates. The loss of the grassland, tall ruderal and scrub habitats will reduce the extent of suitable habitat in the local area. The large volumes of similar habitat nearby will reduce this impact. To mitigate for the loss of habitat extent hedgerow, wildflower meadow and tree plantings are proposed which will provide compensatory habitat for widespread invertebrates.
- 6.4.22 To enhance the site for invertebrates a Schwegler Insect Nesting Aid should be installed on the outer security fencing. This will require cleaning every two years to avoid solitary insect diseases and predatory species impairing the effectiveness of the habitat enhancement. If the reed model is purchased the reed sections should be changed biennially.



Other Protected Species and Species of Conservation Concern

- 6.4.23 Harvest mice have the potential to be present within the areas of longer rank grassland within the site. The removal of this habitat will be required to construct the facility and there is potential for a moderate loss of suitable nesting habitat for this species. To ensure that harvest mice have available habitat in the future the 2m buffer between the security fencing and the newly planted hedgerow should be allowed to develop into tussocky grassland. This should be maintained around the hedgerow once it has established (after the first three years) throughout the spring and summer months. Grass and tall ruderals present underneath or closely bordering the hedgerow should be removed during its establishment to ensure that they do not outcompete young hedgerow whips.

6.5 Cumulative Impacts

- 6.5.1 A search of the Reading Borough Council planning portal for other planning applications made in the local area since 2012 reveal a number of small extensions such as planning application number: 142033,141092 that have been granted in the last 5 years other planning application including a 3 bedroom detached bungalow in land rear of No. 41 Burghfield Rd. recent applications such as App ref: 171126 and 160309 also look to extend existing residential properties or to raise levels of parapets along with minor applications for the installation of electronic gates. Similar small domestic applications primarily for single garages or rear/side extensions were also proposed on Brunel Road and Lea Close. No major housing or infrastructure work was identified. Given the relatively small scale of developments taking place in recent years and that all that have been identified are located on previously developed plots it is considered unlikely that the cumulative effects of local development would have a significant detrimental effect on local wildlife.

6.6 Ecological Enhancements

- 6.6.1 The National Planning Policy Framework¹¹ (NPPF), issued in March 2012, states that the planning system should contribute to “minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”. It also states that “opportunities to incorporate biodiversity in and around developments should be encouraged”.
- 6.6.2 Enhancements for biodiversity, such as the following, are additional to specific mitigation measures mentioned above and are not expressly required. Any adopted enhancements would however, make a positive, permanent contribution to local biodiversity. These are also listed in the assessment and recommendations section but summarised here.
- To enhance the site for bats the inclusion of 2x Schweger 2FN bat boxes should be affixed to the outside of the acoustic fencing at a height of no less than 3m and facing in a southerly direction.

¹¹ DCLG (2012). *National Planning Policy Framework*. www.communities.gov.uk



- As an enhancement for this species a hibernaculum should be created within the wildflower meadow area this should measure 1m in height x 1m in width x 2m in length (minimum dimensions to be created with 2 cubic meters of material at a ratio of 1:2 stone to wood) the hibernacula should be partially buried to a minimum depth of 30cm, ideally the bottom of the excavation to receive the hibernacula should be between 30-50cm in depth. The hibernacula should be constructed of a mix of stone rubble, soft and hardwood logs. Turf from the creation of the hole to create this feature should be heaped on top of the hibernacula to provide additional insulation.
- As an enhancement for birds it is recommended that that three bird boxes are provided these should include a single Schwegler 1ZA wren box and 2 x Schwegler 1b bird boxes. The Schwegler 1ZA box should be installed on a 3ft wooden stake within the centre of the hedgerow planting. The hedgerow will grow around this feature and it will form a secluded nest site ideal for wren. The 1B boxes should be hung on the corners of the security fence at 2.4m and facing west or north to avoid overheating.
- To enhance the site for invertebrates a Schwegler Insect Nesting Aid should be installed on the outer security fencing. This will require cleaning every two years to avoid solitary insect diseases and predatory species impairing the effectiveness of the habitat enhancement. If the reed model is purchased the reed sections should be changed biennially.

6.7 Summary of Recommended Further Work

6.7.1 Below is a summary of the recommended further work which should be carried out prior to construction of the development.

Habitats/Species	Scope of work	Timescale
CEMP	Production of a brief ecological Construction Environmental Management Plan to put in place measures for the protection of the watercourse, surrounding habitat and associated protected species during the construction phase. This will include buffer distances, fence specifications and site clearance methodology for nestingbirds and other species of concern.	Produced prior to commencement of works on site (As a condition of planning).
LEMP	Production of a brief Landscape and Ecological Management Plan to lay out best practice in the establishment and maintenance of new and retained habitats. This will include specifications for maintenance, monitoring and ensure that the maximum benefit to wildlife can be achieved through the mitigation measures proposed.	Produced prior to commencement of works on site (As a condition of planning).



Habitats/Species	Scope of work	Timescale
Birds	If any woody vegetation is to be directly affected by construction activities (including site clearance) during the months of March to August inclusive, a check of suitable habitat for nesting birds prior to site activity in that area should be carried out by a suitably qualified ecologist.	Nesting bird checks should take place no more than 48hrs prior to site clearance activities commencing. March to August

7 CONCLUSIONS

- 7.1.1 The proposed development will result in **adverse impacts** upon a number of ecological receptors ranging from **District to Site** level of importance. Avoidance and mitigation measures have been proposed to ensure that these adverse impacts are reduced as far as possible. These include measures such as the inclusion of acoustic fencing to avoid noise pollution from the development on features such as Holy Brook. Other measures such as protective fencing will help to ensure surrounding ecologically sensitive features are protected during the construction process and will be laid out in the Construction Ecological Management Plan. Sensitive site clearance to avoid impacts to nesting birds are also proposed along with a number of mitigation measures for loss of habitat extent. These include provision of approximately 100m of new native hedgerow planting, creation of a wildflower meadow, and planting of three native trees. These plantings will ensure loss of bird nesting habitat is mitigated as well as providing additional habitat for invertebrates and small mammals. The provision of the hedgerow will also maintain and enhance commuting features for local bats providing enhanced foraging opportunities.
- 7.1.2 Management of these newly created and retained habitats will be laid out in a Landscape Ecological Management Plan for the site to ensure the mitigation measures proposed fulfil their intended purpose and are of maximum benefit to wildlife.
- 7.1.3 If the measures outlined in this document are implemented the scheme can be considered to result in a neutral biodiversity outcome with no loss to habitat function or value anticipated. Assuming the successful implementation of the measures described above the proposed development can be considered in line with planning policy EN12, EN14 and EN16 of the Draft Reading Borough Local Plan seeking to conserve biodiversity and green networks, protecting trees, hedgerows and woodland.



APPENDIX A: WILDLIFE LEGISLATION & SPECIES INFORMATION

BATS

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

PLANNING POLICY IN RELATION TO BIODIVERSITY – ENGLAND

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;



- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".



APPENDIX B: ECOLOGICAL EVALUATION CRITERIA

It is important to appreciate that the level of protection given to a particular species or habitat through national or international legislation does not necessarily relate to the evaluated level of importance of that receptor to nature conservation. Whilst species may be widespread or common nationally, but of scarce occurrence in a particular county (for example, it might be at the limit of its geographical range), a species may also be considered to be rare nationally or internationally but be abundant within particular areas.

The Ratcliffe Criteria (Ratcliffe, 1977) provide a long established and widely accepted method of determining the nature conservation value of a particular site and have been used to aid the evaluation of the habitats associated with the Scheme. The attributes of the Ratcliffe Criteria are described below.

Ratcliffe Criteria for Nature Conservation Evaluation	
Criteria	Description
Size	Large, continuous areas of habitat are considered to be of greater importance than small or fragmented areas.
Diversity	Species and habitat diversity, including variations in topography and wetness, increase the wildlife value.
Naturalness	This reflects man's intervention or management of the habitat. Most habitats of this survey are semi-natural. Naturalness indicates the amount of modification of the land by man. Generally a less modified area results in an increase in the nature conservation value.
Rarity	The scarceness of a habitat, and the presence of rare/uncommon species, relates to its importance and priority for nature conservation. Rarity is related to the frequency of occurrence at national or county level.
Fragility	Fragile habitats are those where changes due to man's intervention, environmental factors or natural succession can directly threaten it. Scrub invasion, agricultural improvement, fire and changes in hydrological regime are the most common threats.
Typicalness	This relates to the quality of the habitat in terms of how good an example it is of a recognised type.
Position in an ecological/geographical unit	The relationship of a site to adjacent areas of nature conservation value. It is important to recognise the important and characteristic formations, communities and species of a district.
Recorded history	The extent to which a site has been used for scientific study and research is a factor of some importance.
Potential wildlife value	The likely quality of the habitat for birds, mammals, reptiles, amphibians and invertebrates if it is managed for wildlife. If appropriate habitat management is undertaken, it is possible for an increase in the diversity and nature conservation value of an area.
Intrinsic appeal	The knowledge of the distribution and numbers of popular groups of species such as birds, is greater than for obscure groups. Similarly, colourful wild flowers and rare orchids arouse more enthusiasm than liverworts. It is pragmatic to give more weight to some groups than to others.
Criteria are based on Ratcliffe, D.A. (1977). A Nature Conservation Review, Cambridge University Press	

Following the CIEEM Guidelines for Ecological Impact Assessment in the UK, when determining the biodiversity importance of natural features found on or in proximity to the site the following characteristics will be considered:

- Naturalness;
- animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
- endemic species or locally distinct sub-populations of a species;
- habitat diversity;
- habitat connectivity and/or synergistic associations;
- habitats and species in decline;
- rich assemblages of plants and animals;
- large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and
- species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change. The criteria described by Ratcliffe and CIEEM will then be used to ascribe importance to each feature according to its value in a geographic context. This is described in the table overleaf.



Level of Importance	Ecological Features
International	A habitat or species cited as a reason for the designation or proposed designation of a World Heritage Site, Biosphere Reserve, Biogenetic Reserve, Ramsar Site, Special Protection Area (SPA) or Special Area of Conservation (SAC). A large extent of habitat that is listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive in good condition with typical species diversity. A large and viable population of a regularly occurring species that is rare within an international context.
National	A habitat or species cited as a reason for the designation or proposed designation of a National Nature Reserve (NNR), Marine Nature Reserve (MNR), National Park, Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI). Any area of habitat listed as a Priority Habitat Type in Annex 1 of the EC Habitats Directive that has potential to support typical species diversity. A large extent of habitat listed as a Priority Habitat in the UK BAP in good condition that supports an abundance of typical species. A large and viable population of a regularly occurring species that is scarce within an international context. A very large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A large and viable population of a regularly occurring rare species that occurs in 15 or fewer 10km squares of the National Grid (e.g. a species that is listed in UK Red Data Books). A bird species with a British breeding population of <1,000 pairs.
Regional	A large extent of habitat listed as a Priority Habitat in the UK BAP that supports typical species diversity and is in good condition. A large and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A large and viable population of a regularly occurring plant species that is known to occur in 16 to 100 10km squares of National Grid (Stewart, Preston and Pearman 1994). A large and viable population of a regularly occurring insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid [Ball, 1986]. A bird species with a British breeding population of 1,000 to 10,000 pairs.
County	A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a County Wildlife Site (CWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland. A habitat listed as a Priority Habitat in the UK BAP which is large in extent and supports typical species diversity. A medium and viable population of a regularly occurring species that is listed as a Priority Species in the UK BAP. A viable population of a regularly occurring species listed in a County Red Data Book, County Flora or found in less than 10% of 1km squares of the National Grid within the count. A small population of a plant species that is known to occur in 16 to 100 10km squares of National Grid. A small population of an insect species (Nationally Notable categories Na and Nb) that is known to occur in 16 to 100 10km squares of the National Grid. A bird species with a British breeding population of 10,000 to 100,000 pair
District	A habitat or species cited as a reason for the designation or proposed designation of a Local Site (known locally as a Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC), Ecology Database Site (EDS) etc.), a Local Nature Reserve (LNR), a Nature Reserve (owned or managed by: The Wildlife Trusts, The Woodland Trust or equivalent body etc) or an Ancient Woodland. A habitat listed as a Priority Habitat in the UK BAP which is small in extent, supports typical species diversity or is in an unfavourable condition. A small and viable population of a species that is listed in the UK BAP or LBAP. A bird species with a British breeding population of 100,000 to 500,000 pairs.
Local	A habitat or species cited as a reason for the designation or proposed designation of a site which is officially listed e.g. on a Parish Register. A semi-natural habitat that is listed in the UK BAP or LBAP, which is either small in extent and/or is in an unfavourable condition. A species which occurs occasionally that is listed in the UK BAP or LBAP. A bird species with a British breeding population of >500,000 pairs.
Site	An artificial habitat or habitat that has readily established e.g. amenity grassland. A species which is common and not listed on the UK BAP or LBAP e.g. Badger.
Negligible	A habitat or species common within the Application Site, offering little benefit to British wildlife and biodiversity.



APPENDIX C: PHOTOGRAPHS OF SITE FEATURES



Figure A1: View of the development site including tall ruderal vegetation farmyard waste and substation.



Figure A2: Semi improved neutral grassland



Figure A3: Tall ruderal vegetation with substation beyond.



Figure A4: Holy Brook



Figure A5: Mature ash with low bat potential



Figure A6: Mature ash with moderate bat roost potential



Figure A7: Pond 2 Gravel Pit



Figure A8: Pond 1 Small Drain



APPENDIX D: RESULTS OF DATA SEARCH - PROTECTED, NOTABLE AND INVASIVE SPECIES

Table 1: Protected and Notable Species

Taxon	Species	Latin name	UK Status	Distance from the site
Bird	Mallard	<i>Anas platyrhynchos</i>	BTO Amber list	1 km west
	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	BTO Amber list	1 km west
	Swift	<i>Apus apus</i>	BTO Amber list	420m NW
	Skylark	<i>Alauda arvensis</i>	BTO Red list, UK BAP	420m NW
	Song Thrush	<i>Turdus philomelos</i>	BTO Red list, UK BAP	1 km west
	Reed Bunting	<i>Emberiza schoeniclus</i>	BTO Amber list, UK BAP	500m east
Fish	European Eel	<i>Anguilla anguilla</i>	UK BAP	800m SW
	Barbel	<i>Barbus barbus</i>	Habitat Directive, Annex V	920m SW
	Bullhead	<i>Cottus gobio</i>	Habitat Directive, Annex V	500m east
Reptile	Grass Snake	<i>Natrix natrix</i>	UK BAP	500m east
Invertebrate	Stag beetle	<i>Lucanus cervus</i>	UK BAP, NERC	775m NNE
	Small Heath	<i>Coenonympha pamphilus</i>	-	1.2km SE
	Variable Damselfly	<i>Coenagrion pulchellum</i>	-	600m SE
	Depressed River Mussel	<i>Pseudanodonta complanata</i>	UK BAP species	60m E
Terrestrial Mammals	Daubenton's Bat	<i>Myotis daubentonii</i>		1 km south
	Pipistrelle species	<i>Pipistrellus</i>		1.5km SE
	Eurasian Badger	<i>Meles meles</i>	(Record of a sett)	900m North
	European Otter	<i>Lutra lutra</i>	UK BAP	15m to the north of the development area.
	West European Hedgehog	<i>Erinaceus europaeus</i>	UK BAP	750m west
	European Water Vole	<i>Arvicola amphibius</i>	UK BAP	520m west on Holy Brook

Table 2: Invasive Species

Taxon	Species	Latin Name	Distance from site.
Fish	Goldfish	<i>Carassius auratus</i>	920m south west
Flowering Plant	Least Duckweed	<i>Lemna minuta</i>	60m east in ditch
	Nuttall's Waterweed	<i>Elodea nuttallii</i>	1 km south
	Russian Vine	<i>Fallopia baldschuanica</i>	280m NE in Holy Brook
	Japanese Knotweed	<i>Fallopia japonica</i>	Within 1KM no specific grid ref provided,
	Himalayan Balsam	<i>Impatiens glandulifera</i>	1000m east and 150m east along ditch.
	Butterfly-bush	<i>Buddleja davidii</i>	750m North East
	Italian Alder	<i>Alnus cordata</i>	200m NE

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