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**TECHNICAL APPENDIX 2: ECOLOGICAL IMPACT ASSESSMENT FOR
 LAND NORTH OF TETBURY, GLOUCESTERSHIRE**

CLIENT: FAY & SON

OUR REF: FAYSON-TETBUR-2632-TAII



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FAYSON-TETBUR-2632-TAII**TECHNICAL APPENDIX 2: ECOLOGICAL IMPACT ASSESSMENT FOR LAND NORTH OF TETBURY, GLOUCESTERSHIRE****EXECUTIVE SUMMARY**

This Ecological Impact Assessment has been prepared in support of a planning application for the proposed development of land north of Tetbury, Gloucestershire. It is based on the findings of Phase 1 and Phase 2 ecological surveys and desk studies that have been carried out at the site during 2009 and 2010 (refer to Technical Appendix 7.1 for full details of the surveys undertaken). The objectives of these surveys were to provide a detailed assessment of the ecological status of the site, to inform the proposed development layout in order to avoid features identified as having ecological interest and to inform an impact assessment and proposed mitigation where impacts are unavoidable.

This report summarises the baseline conditions at the site and subsequent evaluation of features. The predicted impacts on these features in relation to the informed masterplan are identified, characterised and assessed, and mitigation measures then provided. The residual impacts of the development (mitigated) are then assessed against a number of criteria, which aim to meet national, regional and local biodiversity targets.

The assessment methodology and terminology is based on current guidelines for assessing ecological impacts to determine significance issued by the Institute of Ecology and Environmental Management (IEM) in 2006. Consideration has been given to National, Regional and Local planning policies throughout the assessment and mitigation process.

A summary of the residual impacts (mitigated) on the features is provided below:

Feature	Residual Impacts	
	<u>Post-Development Medium-Term</u>	<u>Post-Development Long-Term</u>
<i>Grassland</i>	Significant Positive (Minor)	Significant Positive (Minor)
<i>Woodland</i>	Not Significant (Negligible)	Significant Positive (Minor)
<i>Hedgerows and standard trees</i>	Not Significant (Negligible)	Significant Positive (Moderate)
<i>Ponds</i>	Not Significant (Negligible)	Significant Positive (Minor)
<i>Badgers</i>	Not Significant (Negligible)	Not Significant (Negligible)
<i>Bats</i>	Not Significant (Negligible)	Significant Positive (Minor)

Feature	Residual Impacts	
	<u>Post-Development Medium-Term</u>	<u>Post-Development Long-Term</u>
<i>Breeding birds</i>	Significant Negative (Minor)	Significant Positive (Minor)
<i>Reptiles</i>	Significant Negative (Minor)	Not significant (Negligible)
<i>Amphibians</i>	Significant Positive (Minor)	Significant Positive (Minor)
<i>Invertebrates</i>	Not Significant (Negligible)	Significant Positive (Minor)

Based on this assessment, the residual impact of the development is minor significant beneficial. The adoption of best practice principles during construction with appropriate habitat enhancement and management in the longer-term aim to mitigate the major proportion of ecological impacts associated with the proposed development. The predicted result is a small net gain in overall biodiversity.

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INTRODUCTION

1. This Ecological Impact Assessment has been prepared by ecosulis ltd in support of a planning application for the proposed development of land north of Tetbury, Gloucestershire. It is based on the findings of Phase 1 and Phase 2 ecological surveys and desk studies that have been carried out at the site during 2009 and 2010 (refer to Technical Appendix 7.1 for full details of the surveys undertaken). The objectives of these surveys were to provide a detailed assessment of the ecological status of the site, to inform the proposed development layout in order to avoid features identified as having ecological interest and to inform an impact assessment and proposed mitigation where impacts are unavoidable.
2. This report summarises the baseline conditions at the site and subsequent evaluation of features. The predicted impacts on these features in relation to the informed masterplan are identified, characterised and assessed, and mitigation measures then provided. The residual impacts of the development (mitigated) are then assessed against a number of criteria, which aim to meet national, regional and local biodiversity targets.

Nomenclature

3. The common name only of flora and fauna species is given in this report; however, Latin names are used for species where no common name is available. All plant names follow the nomenclature of Stace (1997). A full list of species recorded on site during the surveys and their Latin names, is provided within Technical Appendix 7.1.

BASELINE CONDITIONS – SUMMARY

General Description of Site

4. The site (shown on Figure 1) is situated on the northern fringes of Tetbury (centred on OS grid reference ST 895 941), with residential areas to the south, arable and grazed farmland to the north, east and west and the A4135 (London Road), with industrial and commercial premises beyond, to the south east. The site is currently managed as farmland and comprises poor semi-improved grassland, ponds, hedgerows, trees and woodland copses. Stone walls are present throughout the site. In total the site covers approximately 10.25ha.
5. The site is adjacent to Highfield Farm and Sir William Romney's School. Highfield Farm comprises a farmhouse and outbuildings to the north of the site including a stable yard, gravel parking, several further cottages and the Cherish Salon. Sir William Romney's School comprises hedgerows, amenity grassland and a gravel parking area, and is located west of the site.

6. The site has been divided into four habitat categories for the purpose of this assessment, as follows: Poor semi-improved grassland, mixed plantation woodland, hedgerows and trees, and ponds.

Adjacent Habitats

7. The site is set on the edge of Tetbury within a rural farmland landscape. Farmland lies immediately north of the site, comprising a mixture of pasture and arable fields, with an associated hedgerow network and numerous small copses and ponds. London Road forms the eastern boundary and industrial and commercial land beyond. Sir William Romney's School forms the western boundary of the site. To the south lies a residential area with associated gardens and infrastructure.
8. Highfield Farm is located just beyond the northern boundary of the site and comprises buildings, hard-standing and gravel, and amenity grassland. Five buildings are present on the farm; the farmhouse, stable yard, storage shed, terraced cottages, and the Cherish Salon and adjoining cottage. The majority of buildings appear to be barn conversions and are now in residential or commercial use. Gardens at the rear and front of the main farmhouse and cottages comprise amenity grassland with ornamental planting.

Designated Sites

9. The site falls within the boundary of the Cotswolds Area of Outstanding Natural Beauty (AONB), however this is primarily a landscape designation and not for nature conservation. The site is also located within 2km of a Site of Special Scientific Interest (SSSI), Veizey's Quarry SSSI, however this is designated purely for geological reasons. The site also falls within 2km of a Key (County) Wildlife Site: Newton Hill Banks KWS, which lies approximately 1km south-east of the site. This site was designated for semi-natural calcareous grassland and as a result is listed on the Grassland Inventory. Given the distance between these sites it is not considered that the proposed development would directly or indirectly impact the KWS.

Habitats and Species

10. Based on the surveys undertaken between 2009 and 2010 the following table summarises the key findings (species where direct evidence for their presence has been found) and provides an evaluation of habitats/species (features) on site (for full results of the surveys and assessment guidelines and criteria, refer to Technical Appendix I).

Table I: Summary of Survey Results and Evaluation of Ecological Features

Feature (Habitat/Species) (refer to Technical Appendix I for the locations of features)	Habitat Description/Status of Species on Site	Value (based on a scale between International value and Site value)
Habitats		
Improved grassland	Three fields comprise occasional horse and cattle grazed improved grassland with an impoverished herb flora. Common and widespread in the local area	Local value
Mixed plantation woodland	Two small areas of woodland occur on site comprising European larch, Scots pine and cypress species with scattered holly, cherry cultivars, hawthorn, beech and elder. A defunct hedgerow and dry-stone wall run through the more northerly woodland plantation area. Ground flora is limited with occasional ivy and common nettle with some bramble scrub	Local Value
Hedgerows and standard trees	<p>There are five native hedgerows, both intact and defunct on site as well as a non-native hedgerow in the south of the site, and one along part of the northern boundary. Two of the hedgerows are species rich. The hedgerows on site are generally single width hedgerows with standard mature trees and are often associated with a bank and wall. All native hedgerows on site fall under the UK BAP Priority Action Plan for hedgerows</p> <p>Standard trees are present across the site within the hedgerows, along the boundaries and within the pastures. Species present include ash, lime, pedunculate oak, and walnut</p>	Local Value
Ponds	Two ponds are present on site, and a further off-site pond just outside the boundary at the	District Value

Feature (Habitat/Species) (refer to Technical Appendix I for the locations of features)		Habitat Description/Status of Species on Site	Value (based on a scale between International value and Site value)
Habitats			
		northern corner. Both ponds on site are located within grazed pasture and are partially shaded by over-hanging vegetation, and show some evidence of cattle poaching. One of the ponds appears to be ephemeral and dry for part of the year	
Species			
Badger		One badger latrine was noted on site, indicating that the site is likely to form part of a wider territory, up to approximately 20% of the overall territory based on a national average. The grassland, hedgerow and woodland habitats on site provide suitable foraging habitat for badger in combination with an abundance of suitable habitat in the local area. No setts have been recorded on site	Site Value
Bats	Trees as roost sites	Four trees on site were assessed as low suitability for roosting bats and six trees were assessed as medium suitability for roosting bats (refer to Technical Appendix I for context of this assessment). Adjacent buildings may provide suitable roosting habitat	Local Value
	Foraging/commuting habitats	The site provides suitable foraging opportunities for bats in the form of pasture, woodland and hedgerows. Linear features in the surrounding countryside provide commuting corridors between foraging sites and roosts. The built-up area comprising the town of Tetbury, well lit	Local Value

Feature (Habitat/Species) (refer to Technical Appendix I for the locations of features)	Habitat Description/Status of Species on Site	Value (based on a scale between International value and Site value)
Habitats		
	<p>roads and industrial and commercial sites to the south and east, however, are likely to limit commuting bats in those directions, especially for species more sensitive to disturbance.</p> <p>GCER and the NBN Gateway hold records of six species of bat within 4km of the site: lesser and greater horseshoe, common and soprano pipistrelle, brown long-eared and noctule. The site provides suitable foraging opportunities for bats in the form of pasture, woodland and hedgerows. However, the built-up area comprising the town of Tetbury combined with well lit roads and industrial and commercial sites to the south and east are likely to restrict the use of the site by commuting and foraging bats, especially those species more sensitive to disturbance, such as lesser and greater horseshoe bats. The habitats present are common and widespread in the local area and the site is likely to be used in combination with the surrounding habitats</p>	
Breeding birds	Bird nesting opportunities are present within the hedgerows, and trees on and surrounding the site. The site is likely to provide habitat for a range of common bird species and potentially some declining species associated with the farmland setting	Local Value
Reptiles	<p>The site has some suitability for reptiles, but grazing across the site reduces the site's potential.</p> <p>The field margins, hedgerows and ponds are support a low population of common species</p>	Local Value

Feature (Habitat/Species) (refer to Technical Appendix I for the locations of features)	Habitat Description/Status of Species on Site	Value (based on a scale between International value and Site value)
Habitats		
Amphibians	Both ponds on site score as 'good' on the Habitat Suitability Index (HSI), and are considered to be suitable to support medium populations of great crested newt. Only one is suitable for breeding, as the other appears to be ephemeral and dry for much of the year	Local Value
Invertebrates	The majority of the site has low invertebrate interest, but the hedgerows and trees provide good habitat, whilst the ponds provide habitat for aquatic species. Historical habitat management and improvement lowers the suitability of the site to support rare or notable species, but it is likely to support good numbers and diversity of more common species	Site Value

11. Referring to Table I above, habitats on site have been assigned values ranging from District value to Local value, as follows: Ponds have been assigned District value; and poor semi-improved grassland, mixed plantation woodland and hedgerows and standard trees have been assigned Local value.
12. Referring to Table I above, species and species groups on site have all been assigned values ranging from Local to Site value, as follows: Bats, breeding birds, reptiles and amphibians have been assigned Local value; and, badger and invertebrates have been assigned Site value (the assessment considers their conservation status, population size/numbers, levels of activity and their permanent or transient use of the site, however some of these value are preliminary, pending further survey; refer to Technical Appendix I for full assessment criteria and rationale).

IMPACT ASSESSMENT

Methodology

13. Identification of the impacts of the development proposals is based on the informed Landscape Design and Masterplan (Development Strategy Key Landscape Element, Dwg 96903E, LanDesign Associates, May 2009 and Illustrative Masterplan, DWG: 2440-18B, Ashley Design Associates, December 2009) and is in accordance with the current IEEM Guidelines for Ecological Impact Assessment (2006). The impacts have been assessed both for the habitats and species groups (features; refer to Table I above) recorded on and adjacent to the site. Both positive and negative impacts of the development have been considered, for example, habitats can be gained as well as lost.
14. For the assessment methods and criteria refer to Appendix I of this report.

Proposal

15. The site is subject to an outline application and land use masterplan for a mixed use scheme consisting of the following:
 - Approximately 250 residential units of two and three storeys
 - Construction of a new road network
 - Creation of community open space areas with both formal areas containing play areas and informal areas. Allotments will also be provided
16. The intended land uses and layout are shown in the Illustrative Masterplan (DWG: 2440-18B, Ashley Design Associates, December 2009). This is an informed masterplan, which takes into account recommendations based on current survey data for the site.

Retained and additional/enhanced (ecological) features included within the masterplan are:

- Retention of all native boundary hedgerows and some central hedgerows with associated buffer zones, and provision of additional boundary tree and shrub planting
- Retention of one of the ponds on site and creation of an additional pond within a wildlife area of wildflower grassland planting
- Retention of all stone walls on site, and enhancement of these features
- Creation of a large area of community open space with native planting and allotment gardens, to include some provision for wildlife
- Sustainable drainage for the site, which will include a balancing pond, reedbed areas and swales, which provide an opportunity for ecological benefit, if designed appropriately

Impacts Prior to Mitigation

Construction Phase

Poor Semi-improved Grassland

17. All of the semi-improved grassland habitat will be either lost to development or retained as amenity grassland within areas of community open space, or wildflower grassland within the retained wildlife areas. Approximately 80% of the semi-improved grassland on site will be lost to development. The remaining 20% will be retained within community open space or wildlife areas and buffers.
18. In total approximately 7.8ha of grassland will be permanently lost to development. Indirect impacts of the construction phase could affect some of the retained grassland habitats, through trampling and damage from construction workers and machinery, elevated levels of dust deposition due to construction traffic around the site, and alterations to groundwater flow, which could over time, alter grassland community composition and abundance.

Woodland

19. Two small copses are present on site, comprising a total area of less than 0.2ha. The central copse will be retained in full on site, however the whole of the copse close to the eastern boundary will be lost as part of the proposals to allow the route of the proposed access road, with approximately 40% of the existing 0.2ha of woodland cover being retained on site.

20. The retained copse could be damaged due to root compaction by machinery, and plant stress could temporarily lower fruit production and subsequently the overall food resource. Dust deposition and exhaust emissions from construction traffic could also contaminate foliage and affect photosynthetic rates and plant function; however, it is unlikely that this will have a significant effect on vegetation due to the short-term and temporary nature of this impact. Other indirect impacts are noise pollution from construction activities, which may cause disturbance to woodland wildlife, such as breeding birds; alterations to groundwater flow, which could over time alter ground flora community composition and abundance; and construction lighting, which will lower the quality of the retained woodland edge particularly for nocturnal species such as bats (species impacts considered below).

21. The proposals include 0.1ha of additional woodland planting, along the northern boundary, which will connect to existing hedgerows and provide additional connectivity around the boundaries of the site.

Hedgerows and Standard Trees

22. The masterplan retains both species rich hedgerows on site, in total a length of 484m, although these will be breached to provide access into the site on the eastern boundary and to provide footpath access along the western boundary. This will act to lower habitat connectivity through the site, reducing the value of these hedgerows to wildlife as corridor routes, and their value as permanent habitat. The gaps created will be no more than 5m wide, and whilst these gaps do not present a major barrier to wildlife movement, the road could create physical barriers to dispersal.

23. Two defunct, species poor hedgerows will be lost to the development and another will be partially retained, with the retention of 130m and a loss of 327m of species poor defunct hedgerows. Two non-native hedgerows with a total length of 175m will be lost to development, but will be replanted with native species.

24. The proposed native planting includes replacement of the existing non-native hedgerows, planting along the northern boundary and planting along part of the southern boundary. This will provide a total of 648m, more than compensating for the loss of 502m of defunct species poor and non-native hedgerows.

25. All retained hedgerows will abut the proposed residential development. Direct and indirect impacts associated with construction activities could occur, for example noise and dust pollution, pollution in groundwater and direct damage to hedgerows from machinery, which will temporarily lower their value to wildlife. Dust deposition on flora affects photosynthetic rates and pollution carried in groundwater flow can affect seed

viability and plant productivity. This would lower the value of the hedgerows as a foraging resource for wildlife with a temporary reduction in fruiting bodies.

26. The majority of standard trees will be retained within the hedgerows, on site, however a number will be lost to the development. Approximately 106 standard trees are present on site, outside of the woodland areas, and approximately 30 will be lost to development. 14 of these trees will be removed on arboricultural recommendation, given the current status of the trees and to allow good specimens, such as the row of limes along the eastern boundary to flourish. The remaining trees will be lost to allow for housing and road infrastructure including three limes, which are covered by Tree Protection Orders (TPOs) along the eastern boundary, considered necessary for removal to facilitate access into the site.
27. The masterplan includes the planting of a tree and shrub belt along part of the northern boundary, which will comprise native species, and numerous trees within the development and community open space areas, however until new trees mature, there will be a small loss of mature arboreal habitat on site. Ten trees on site have low – medium suitability for bats, and one of these will be lost to the development; this is considered further in respect to species below.

Ponds

28. One of the two ponds on site will be lost to the development, however a replacement pond is proposed to be created adjacent to the retained pond at the northern boundary of the site.
29. Due to the proximity of the one retained and one adjacent off-site pond to the construction works, these could lead to a reduction in habitat quality during the construction period as a result of disturbance and pollution, particularly from noise and lighting from construction activities. There is also potential for inputs of pollution to directly enter the ponds, or reach them via surface water and/or groundwater flow. This could result from dust and soil from clearance works or chemical spills. These pollutants could reduce the value of the aquatic habitat to wildlife directly by poisoning the fauna and flora or indirectly by changing the abundance of food species or refuges.
30. A balancing pond and reedbed drainage system will be created in the south-east corner of the site. This system will be linked to a drainage swale that will run across the centre of the site to form landscape feature associated with the retained hedgerow, which relates to the existing field pattern. Whilst these features will be designed primarily for drainage and not wildlife benefit, this could enhance onsite resources for wildlife, with appropriate design.

Badgers

31. No badger setts have been recorded on site; however, evidence of badger in the form of latrines shows that they are using the site. The proposals will lead to the loss of the majority of the foraging habitat on site, however the retention of some grassland, the species rich hedgerows and one of the copses will ensure that some of the high quality foraging habitats are maintained, although access to some of these, such as the copse is likely to be limited for periods of the construction. Badgers are likely to use the site in combination with surrounding habitats, and the existing site is well connected to adjacent suitable habitats (farmland). The proposed road network will sever the existing hedgerow network, and during the construction phase, this presents a low risk of injury and death from construction traffic as badgers continue to try to access their traditional foraging grounds; the timing of construction works will generally avoid badger activity as works will be undertaken in the day.
32. Without suitable precautions open trenches and other obstructions could temporarily sever some traditional foraging routes and badgers could become trapped. Extensive use of construction lighting could affect badger behaviour, disrupting foraging activity, and may dissuade badgers from using the site for the duration of construction.
33. Habitat creation, including the provision of buffers associated with retained hedgerows, and a suitable landscape/planting scheme will provide smaller areas of high quality foraging habitat and will help to maintain connectivity across site. Initially, this will have limited benefits to badgers until new habitats and existing enhanced features fully develop.

Bats

34. One tree with medium suitability for roosting bats will be lost to the development, with the retention of the remaining nine trees with low to medium suitability within retained hedgerows and greenspace.
35. The planting of tree and scrub belts may provide suitable roosting opportunities in the future; however, it will be some time before these opportunities develop. The loss the grassland within the development site is not considered to be significant to the bat population, given the sub-optimal nature of this habitat and its extent surrounding the site. The species rich boundary hedgerows will be retained, maintaining commuting and foraging habitat for bats; however, the eastern boundary will be breached with a road crossing and a reduction in habitat quality is predicted during construction works, due to disturbance primarily from light pollution, which will lower their value as a foraging and commuting resource to bats. The site is already subject to light pollution from adjacent

street lighting and as such the species present are likely to have some tolerance to lighting; species more sensitive to light disturbance such as horseshoe species are unlikely to currently use the site.

36. New proposed buildings are likely to provide roosting sites for species of bat such as pipistrelles and brown long-eared bats, which are known to use modern buildings, but these will not be available to bats until a later stage of construction.

Breeding Birds

37. The habitats on site are generally suited to common species of birds associated with the farmland/urban edge location of the site, which comprises relatively common habitats in the form of large grazed fields separated by hedgerows and woodland patches. The highest quality habitats on the site for birds comprise the hedgerows, woodland and trees.
38. The removal of some sections of hedgerow, part of one of the copses and some standard trees will lead to the direct loss of nesting habitat. Given the retention of the two species rich hedgerows on site, one of the copses, and the provision of additional hedgerows, tree and shrub belts, it is not considered that the loss of this habitat would be significant in the long-term, although nesting opportunities may be reduced in the short-term prior to maturation of the new habitats.
39. Although birds on the site are likely to be habituated to some levels of disturbance due to the adjacent residential areas and roads, a low number of the more sensitive bird species, especially those associated with the existing farmland nature of the site, may be displaced to surrounding habitats during construction, increasing pressure on existing resources for foraging and nesting.

Reptiles

40. The loss of some of the central hedgerows and associated field margin across the site will result in the permanent, but partial loss of habitats for grass snake and slow worm, as well as lowering habitat connectivity, although given the defunct and gappy nature of the hedgerows to be lost this impact is likely to be lessened. The majority of the site comprises managed improved grassland fields, which are largely unsuitable for reptiles. The intact and species rich eastern and western boundary hedgerows will be retained within the development, and incorporated into 3m wide hedgerow buffers, and the proposed hedgerow, tree and shrub planting and wildlife area in the north of the site will provide additional high quality habitat for reptiles in addition to the retained pond. Reptile species are known to be sensitive to disturbance, however, and it is considered likely that they will be deterred from the majority of the construction site during the

works. The retention of the boundary hedgerow corridors combined with the presence of large areas of good quality habitats adjacent to the site means that any density dependent impacts due to the loss of habitat on site are unlikely to be significant.

Amphibians

41. The development will lead to the loss of one of the two ponds on site, which although not suitable as a breeding pond, may provide foraging habitat for great crested newt. A replacement pond will be created as part of the proposals, but this will take some time to establish, and unmitigated the loss of the pond and surrounding terrestrial habitat could cause the injury and death of newts and other amphibians. The proposals will lead to the loss of a large area of relatively low quality habitat in the form of semi-improved grassland, as well as some areas of more high quality habitat including the pond, sections of hedgerow, standard trees and one of the woodland copses. Replacement high quality habitat will be provided including areas of wildflower grassland, tree and shrub belts and hedgerow planting, although this will take time to mature and provide full benefit. Retained and created habitats will be subject to high levels of disturbance throughout the construction phase, and although lighting and noise are unlikely to significantly affect amphibians, there is potential for construction dust, runoff and accidental spills to significantly impact water quality, as well as hydrological changes that may affect the long-term viability of the ponds as breeding sites for amphibians. Without mitigation there is potential for amphibians to be injured or killed during the construction works.

Invertebrates

42. The hedgerows, standard trees and copses provide the highest quality habitats on site for invertebrates. Whilst the two intact species rich hedgerows will be retained on site, there will be a loss of one of the copses, a number of standard trees and around 327m of defunct species poor native hedgerows. The semi-improved grassland is of limited value to invertebrates, and its loss is not considered significant given the abundance of this habitat in the surrounding area. Replacement planting will provide additional tree, shrub, hedgerow and wildflower grassland habitat, to ensure that species and structural diversity is maintained on site, however these habitats will take some time to mature, and surrounding new land uses are likely to reduce the suitability of the existing hedgerow habitats for some more sensitive species.

Operational Phase

Grassland

43. Grassland on site will comprise retained areas as well as a mosaic of new habitats in the form of urban greenspaces and gardens. The main grassland areas on site will be

managed for nature conservation and recreation, comprising the wildlife area and hedgerow buffers, and the community open space and buffer zone along the southern boundary. A grassland paddock will also be retained within the north-eastern corner of the site. Whilst the wildlife area will be primarily managed for nature conservation all retained grassland on site will be subject to permanent increased disturbance during the operational phase of the development. This could lead to direct impacts, such as trampling and indirect impacts, such as littering and nutrient enrichment, which may affect the communities present. Given the species poor nature of the existing grassland these impacts are unlikely to be significant.

44. Overall the grassland resource on the site will decrease in area during the construction phase, but will be replaced with smaller areas of higher quality habitat, the majority of which will be subjected to frequent and long-term disturbance. Appropriate management of this grassland resource will minimise disturbance impacts and will aim to maintain resources and even provide benefits to a range of species.

Woodland

45. Approximately two thirds of the woodland extent on site will be lost at the construction stage. The retained woodland will be subject to increased urban pressures such as disturbance, litter and erosion, as well as increased lighting and pollution. Future operational issues relating to insensitive management or health and safety, such as pressure for tree pruning/removal due to, for example, hazardous limbs and shading effects, could potentially result in additional loss of arboreal habitat.
46. Following the completion of the construction works, new and enhancement planting will mature, providing an increase in the overall area of woodland/scrub habitats for local wildlife, with improved structural diversity and linkages to the wider area. Planting will provide additional areas of foraging and refuge, especially for those species present within the local area that are habituated to some levels of disturbance due to the current usage of the site and adjacent habitats. The increase in area of this habitat-type across the development, will aim to provide wildlife with alternative refuges to compensate for the increased disturbance levels. This is particularly important for more sensitive species, such as nesting birds, roosting bats and reptiles.

Hedgerows and Standard Trees

47. The retained and planted hedgerows may be subject to pressure for access (people creating short cuts through them, for example) and from pollution during the operational phase of development such as dust, emissions and lighting, however, this will

be reduced in part by the inclusion of 3m (minimum) wide buffer zones incorporating the new and retained hedgerows.

48. Retained and planted trees will be subjected to permanent increased visual, audio and lighting disturbance and potentially root compaction damage and vibration disturbance from general daily operational traffic and there will be increased risk of pollution; however, the sustainable drainage system (balancing pond) and the 3m buffers along the majority of retained hedgerows (where most trees are present) will reduce these impacts. Approximately 0.1ha of trees, planted at the construction phase along the northern site boundary and occasional trees planted within the community open space, the grassland paddock and throughout the development, will develop and contribute towards the future arboreal habitat on site.

Ponds

49. One pond will be lost at the construction stage, but a replacement pond designed specifically for wildlife will be provided within the wildlife area. An additional balancing pond and reedbed area will also be provided within the south-eastern corner of the site, and although not provided specifically for wildlife it is likely to provide some suitable habitat. The retained and new wildlife ponds will be protected through the provision of a buffer provided by the surrounding wildlife area. This will develop during the operational phase, providing good quality surrounding habitats. These new features will add to the aquatic habitat resource on site, offering permanent and temporary habitats for species.
50. The main impact to the ponds and associated habitats over the operational phase of the development will be due to increased disturbance from recreational activities and from the proximity of development generally. The development will result in elevated levels of disturbance from low-level human activity and the proximity of buildings, new and increased access to the ponds and surroundings, and associated noise and lighting. This could affect the future use of the site by wildlife, particularly amphibians, breeding birds and foraging bats. Whilst shrub planting and fencing will aim to restrict access to certain habitats within the wildlife area, low-level disturbance will increase, and this will permanently lower the amount of undisturbed habitat available to wildlife.
51. Without appropriate measures in place, permanent land use change within the catchment could alter the hydrological status and influence abiotic factors, such as acidity, humic content, carbon and nutrient concentrations and indirectly oxygen concentrations. This could result in a detrimental effect on wildlife. Impacts to the water system could include: Alteration to community composition; a rise in the water

table and altered rates of drainage; leaching of man-made materials, which may alter water chemistry; impermeable surfaces, which may alter the supply of water to aquatic features and; run-off from impermeable surfaces. These effects have been considered in the context of the development and the immediate surroundings, including the cessation of agricultural inputs into the water bodies, but also takes into consideration that the majority of development will take place within existing undeveloped land, and therefore hard surfaces at the site will increase significantly overall.

Badgers

52. The loss of approximately 10ha of existing foraging habitat and increased urban pressures on retained and new habitats are likely to affect the overall potential on site foraging resource for badgers. The badger's wider territory and setts will not be affected. The permanent loss of the majority of existing grassland habitat, sections of hedgerows and woodland within the badger territory will be compensated for, in part, with the provision of high quality habitat especially within the wildlife area and associated northern buffers strip, although retained habitats will be subject to increased disturbance in the form of noise and lighting, which will reduce their suitability for badger.
53. The new development will bring an increased amount of vehicular traffic to the site, which could cause barriers to the movement of badger across the site, however the development will consist only of minor roads within residential areas, and the associated speed restrictions on these roads are likely to limit the risk of injury/mortality.

Bats

54. Nine of the ten trees with medium and low suitability to support roosting bats will remain on site. Should roosts be present in these trees, these could be at risk due to potential for works being required in respect to health and safety (e.g. necessary tree pruning), and from increased lighting. Flight-lines to roosts, if present, could be disrupted due to alterations to the landscape i.e. the reconfiguration of landscape features; although this could be temporary as bats become habituated to the changes.
55. The use of inappropriate permanent lighting and other forms of illumination could affect bat behaviour by disrupting flight paths and foraging activity. There are existing levels of lighting on the site due to adjacent road to the east and the urban area at the south of the site and therefore proposed lighting within the development is unlikely to have a significant impact on these boundaries; however lighting levels will increase significantly within the residential areas of development and the western site boundary (the northern boundary does not currently provide suitable bat foraging/commuting habitat, as no linear feature is present), however, additional buffer planting along the western boundary

will aim to minimise lighting impacts and the planting of a wide hedgerow along the northern boundary will provide additional suitable habitat. Therefore, there are likely to be short-term impacts from lighting to the western boundary initially, which will reduce over time as the buffer planting matures.

56. Suitable lighting such as low-level mercury lighting attracts insects and has been shown to be beneficial to some bat species, including noctule, serotine and pipistrelle; however a number of species including brown long-eared bats are deterred by lighting. Given the presence of adjacent lighting, the site is unlikely to be used by more light sensitive species. Bats currently using the site are likely to be habituated to some light levels; however, it is possible that some species such as brown long-eared may be dissuaded from using the site in the short-term. Buffer planting along the northern boundary and the proposed unlit grassland and pond habitat in the north of the site will provide suitable habitat for more light sensitive species once established.
57. The retention of the eastern and western boundary hedgerows within associated buffers strips, and new proposed planting along the northern and southern boundaries will ensure that connectivity is maintained and enhanced across the site for those species less sensitive to disturbance, and the maturation of these habitats will also provide good quality foraging habitat. In addition the new buildings will also provide roosting opportunities to bat species less sensitive to lighting disturbance such as pipistrelle species.

Breeding Birds

58. The native species rich hedgerows and majority of woodland copses will be retained on site, and new habitats including tree, hedgerow and shrub planting will maintain and potentially enhance opportunities to birds in the long-term. However, high levels of disturbance are likely to restrict the distribution of more sensitive species across some areas of the site, which may increase pressures on retained and surrounding habitats.
59. There is a predicted increase in domestic cats associated with the residential development. In line with research (undertaken by Research by Woods et al (2003)) it is estimated that 23% of households own cats, which would lead to an increase of approximately 58 cats as a result of the proposed development. This could have a significant impact on wild bird populations through predation by domestic pets, although the RSPB has reviewed the impacts of cats on birds and found that despite the large numbers of birds killed, there is no scientific evidence that predation by cats in gardens is having any impact on bird populations UK-wide. The proposed retention and creation of key vegetative features, including hedgerows, woodland and associated buffers, should

provide suitable less disturbed areas within the site. This will aim to maintain, and potentially boost numbers, to withstand any negative effects of predation.

60. The overall change in characteristics of the site from a farmland dominated setting to a residential one is likely to lead to an associated change in species using the site. Red-listed species such as skylark and starling may be impacted by this change, as well as barn owl; however the abundance of similar habitat in the surrounding area means that this is unlikely to have a significant impact on local populations from this development alone. For bird species less sensitive to disturbance and associated with woodland, grassland and residential habitats the retained, enhanced and created habitats are likely to provide good foraging and refuge habitat. Common species such as robin, wren, and blackbird, which are associated with the urban environment, are likely to benefit in the long-term due to the creation of a patchwork of ornamental/amenity habitats, including parks, amenity ponds, gardens and woodland, an increase in nesting opportunities within new buildings, planting and other urban structural features, an increase in potential song perches, additional sources of food from household feeding (bird feeders) and provision of amenity grassland, which provides optimal earthworm foraging.
61. A perceived reduction in the quality of retained areas will lead to a permanent decline in resource availability. Some compensation for this will be provided through targeted landscaping/planting proposals for the site. Native soft and hard fruit-bearing species will be used within the landscaping strategy to create larger areas of this resource than is currently available. The enhanced structural diversity of the landscape, with additional nesting opportunities within new planting and housing, and enhanced foraging will benefit these birds.

Reptiles

62. The new development will increase levels of disturbance across the site. Reptiles are susceptible to disturbance and continually elevated levels associated with the development could affect their general behaviour and reproductive success, and it is possible that they will be deterred from the habitats where increased recreational pressure is anticipated. The majority of good quality reptile habitat will be retained within the development, in particular the field margins and around the retained pond, which will be retained and enhanced with associated buffers and planting along the northern and southern boundaries. In addition, wildflower planting and a less intensive management regime within the wildlife area will also provide high quality habitat for reptiles.

63. Predation by domestic cats could have a significant impact on numbers of reptiles at the site. The enhancement of existing habitats and creation of new habitats will provide areas suitable for reptiles, including links between habitats to allow reptiles a means of escape. Slow worms are commonly associated with gardens and allotments and as such there are opportunities for them to colonise these areas post construction once habitats have matured. New features and habitats within the development will aim to boost numbers to withstand the negative effects of predation.

Amphibians

64. The new development will increase disturbance of the ponds, and associated risks such as littering, pollution and introduction of fish or invasive aquatic plant species, which could significantly impact on the suitability of the ponds to support great crested newt. Long-term impacts from pollution from roads and run-off may also impact on the ponds' suitability to support wildlife.
65. The increase of hard surfaces associated with the development will cause significant habitat fragmentation, as the use of gully pots can trap amphibians, and road mortality can also lead to significant impacts to populations. The retention of hedgerows and planting of tree and shrub belts, and additional hedgerows will provide additional levels of connectivity immediately adjacent to the ponds, and will also ensure that connectivity to off-site habitats is maintained, including the pond immediately adjacent to the site.

Invertebrates

66. Lighting and pollution, in particular dust pollution/particle emission on foliage and flowers, may lower the quality of retained habitats, particularly adjacent to new roads. However, the extensive habitat creation across the development, particularly that adjacent to existing habitats, such as the hedgerow buffers and wildflower planting around the ponds, and new residential gardens with associated flowering plant species (both native and exotic specimens), is likely to outweigh the localised degradation of invertebrate habitats elsewhere on site during the operational phase of development.

Characterisation of Impacts

67. A summary of the characterisation of the construction and operational phase impacts is provided within Appendix II. This considers whether each impact is direct or indirect, permanent or temporary and the magnitude and extent, on features affected by the proposal (habitats and primary species only).
68. Based on the impact descriptions and summary of key characteristics (Appendix II), and in order to inform mitigation for the proposals, the significance of the impacts on

features is summarised in Table 2 below. An ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area.

Table 2. Identification of the Significance of Impacts

Feature and Ecological Value	Construction Phase			Operational Phase		
	Geographical Level of Significance	Positive or Negative	Likelihood of Significant Impact occurring	Geographical Level of Significance	Positive or Negative	Likelihood of Significant Impact occurring
Grassland Local Value	Site	Negative	Certain	Negligible		
Woodland Local Value	Site	Negative	Probable	Site	Positive	Probable
Hedgerows and standard trees Local Value	Site	Negative	Probable	Site	Negative	Probable
Ponds District Value	Site	Negative	Probable	Site	Negative	Probable
Badgers Site Value	Site	Negative	Probable	Site	Negative	Probable
Bats Local Value	Site	Negative	Probable	Site	Negative	Probable
Breeding Birds Local value	Site	Negative	Probable	Site	Negative	Probable
Reptiles Local Value	Site	Negative	Probable	Site	Positive	Probable
Amphibians Local Value	Local	Negative	Probable	Local	Negative	Probable
Invertebrates Site Value	Site	Negative	Probable	Site	Positive	Probable

MITIGATION

69. The key objective of the mitigation measures proposed is to maintain species and habitats (features) in favourable conservation status. This is when the condition of a feature is such that it can be viably maintained in the long-term and without reductions in natural range. Mitigation measures also aim to meet national, regional and local planning policy objectives and aim to work towards additional objectives such as those outlined within the UK and LBAPs.
70. The presence of the identified features on and adjacent to the site has been considered in the design layout, where possible, and the measures given here will further ensure that the impacts on features are negligible wherever possible, or if effects are unavoidable, recovery will follow. Wherever possible and practicable to achieve, mitigation will aim to enhance the features, thus promoting biodiversity gain.
71. Following the mitigation proposals, the overall residual impact upon features is considered.

Inherent Mitigation

72. The informed design layout contains key areas for ecological benefit. These include:
- Provision of a wildlife area in the north-western corner of the development incorporated retained and created ponds, with associated wildflower grassland, shrub and tree planting
 - Planting of a tree and shrub belt to strengthen the northern boundary of the site
 - Retention of all native species rich hedgerows and new hedgerow planting, with incorporation of hedgerows into 3m wide buffers
 - Provision of wildlife features within the community open space and buffer along the southern boundary of the development, including tree and shrub planting and bat and bird boxes
 - Sustainable drainage for the site, which will include a balancing pond, reedbed and swales, providing additional ecological benefit
73. Care has been taken to retain the most important ecological features wherever possible, and to enhance/protect them by providing buffers between the features and development, and with the use of strategic planting. In total, approximately 2ha of green space will be provided within the informed masterplan (not including gardens), amounting to approximately 20% of the total site area. This area will be made up of retained semi-natural habitat, buffers and additional green spaces.

General Mitigation

Pre-Construction and Construction Phases

74. The use of sustainable drainage systems (SuDS) within the development, appropriate design of the buffers and appropriate landscape/planting scheme will minimise the risk of pollution incidences and adverse hydrological impacts to the retained habitats on site. Contractors will be required to draw up method statements to demonstrate how they will manage their activities to avoid causing water and airborne pollution incidents during the construction period. An ecologist will be consulted on the future detailed design of these measures to ensure that there are no conflicts with ecology.
75. Prior to works commencing, protective fencing will be erected around all retained ecological features on and adjacent to the site, namely the standard trees (in accordance with BS5837 (2005)), hedgerows, ponds and retained grassland to ensure minimal disturbance to habitats during works.
76. A Precautionary Method of Works (PMW) will be prepared outlining sensitive site clearance methods, including detail in respect to timing and species including great crested newt, birds and reptiles (detailed below). Where practicable all vegetation removal will take place outside of the bird-breeding season (generally between March and September, inclusive), or vegetation will be checked thoroughly by an ecologist prior to removal. The removal of tree stumps and hedgerow bases will also be undertaken outside of the hibernation season for reptiles and amphibians. The sensitive timing of works, or precautions to be taken should works be unavoidable during sensitive periods, will be detailed within the PMW.
77. All habitat enhancements (planting and pond creation), where practicable, will be undertaken prior to works commencing, or in the early stages of construction works.
78. Method Statements (and licence applications where appropriate) will be prepared for all works that may affect ecologically important features, including tree removal (as appropriate), closure of Pond 2 and planting adjacent to sensitive features such as the new and retained ponds.
79. A general ecological briefing will be given to construction site workers informing them of the ecological value of habitats and species present on site, protection measures put in place, safe working methods relating to ecology, and contingency plans in case of discovery of protected species during works.
80. The PMW and species method statements will be detailed in a Construction Environmental Management Plan prepared prior to works commencing.

Operational Phase*Landscape and Ecology Management Plan*

81. Post-construction it is the intention that the long-term management of the retained and created habitats will be undertaken in order to ensure that the habitats remain in favourable condition for wildlife. A management company is proposed to fund management and monitoring of the site for up to ten years, which will follow detailed Capital and Annual Works Plans to be drawn up following detailed landscaping plans for the site.

Capital Works Plan

- A Landscape and Ecology Management Plan (L&EMP) will be compiled detailing the capital and `tive fencing around retained habitats

Annual Works Plan

- Annual monitoring of the habitats and species will be undertaken and triggers for management assessed. Triggers for management could include:
 - 20% scrub cover within the grassland associated with the community open space or wildlife area will trigger clearance
 - 5% loss of grassland cover will trigger re-sowing and temporary exclusion areas
 - 30% aquatic vegetation cover in water bodies will trigger vegetation removal
82. The L&EMP will be updated as required based on annual monitoring and reviews

General Management Principles

83. General management principles will include the following:
- A minimal intervention and organic approach will be used. Weed killer and other chemicals will be used as little as possible on site. Spot removal of weeds will be carried out by hand where removal is necessary. If herbicides need to be used within the site, for example around the base of planted trees and shrubs, then these will be restricted to types approved by Natural England and the Environment Agency as suitable for use near watercourses. Guidelines for the use of herbicides on weeds in or near to watercourses (PB2289) will be followed.
 - Hygiene works will be avoided, for example, fungal fruiting bodies should not be removed nor trees felled because they have bracket fungi on them unless classified as dangerous by an arboriculturalist. Where possible, trees will be allowed to age naturally and dying trees will be allowed to decay in-situ. Where a tree poses a

health and safety hazard, advice will be sought from an arboriculturalist. General tree works will conform to BS3998 (1989). Every effort will be made to avoid altering important ecological features associated with the mature trees. Where tree works are unavoidable, a bat and nesting bird survey and assessment will be undertaken and appropriate mitigation and licences sought if present.

- Where possible, planting within the buffer zones, will use native species and those of specific wildlife value.
 - Litter will be removed from the site as part of on-going general management.
 - Monitoring will be used to determine whether or not objectives for the site and component features (for example great crested newt, bats, badger and reptiles) have been met using focused and efficient data collection.
84. The L&EMP will be reviewed and revised annually following annual monitoring of habitat conditions and species populations. An annual monitoring report will recommend any necessary changes to the L&EMP and identify management requirements for the following year.

Specific On-Site Mitigation

Pre-Construction and Construction Phases – Habitats

Design Mitigation (Avoidance)

85. The main area proposed for redevelopment constitutes species poor semi-improved grassland. The majority of better quality habitats with potential to support protected species and local wildlife have been retained within the development masterplan, such as the species rich hedgerows, the majority of standard trees, one of the woodland copses and the better quality pond. Habitats buffering the ponds, hedgerows and woodland have also been incorporated into the development design. Retained and enhanced habitats amount to approximately 25% of the site area.
86. A sensitive lighting design will form part of the detailed plans for the site. This will be in accordance with current CIE publication I50:2003 – guide on the limitations of the effect of obtrusive lighting from outdoor lighting installation. The lighting design will refer to Bat Conservation Trust Guidelines (2007) and will aim to minimise impacts to retained hedgerow corridors, especially around the boundaries of the site. This is expected to minimise lighting impacts, however, it is unlikely to remove them completely.

Habitat Creation/Enhancement

87. Habitat creation has been considered within the development design in the form of hedgerow buffers, tree and shrub planting, hedgerow planting, wildflower grassland creation, pond creation and a suitable planting scheme within the community open space areas.
88. *Wildlife Area:* Planting will aim to provide a mosaic of habitats to compliment the existing and created pond habitats, and to ensure connectivity to the wider area. Scrub and tree planting will be undertaken within certain areas to deter public access and reduce visual and audio disturbance from the development, and the creation of pathways through the area will aim to further manage access within the area. The existing grassland sward will be retained and enhanced through sowing with wild grasses characteristic of the local area and local hydrology and interspersed with a variety of wildflower species, with the aim of creating a wildflower sward. Wildflower grassland will also be sown within hedgerow buffers to increase species and structural diversity.
89. *Woodland and hedgerow planting:* Planting will take place across the site to strengthen the boundaries and provide additional habitat and connectivity. New planting will replace the existing non-native hedgerows, which are currently of limited ecological value. New hedgerows will provide screening along the boundary with Highfield Farm and will also be planted to provide a feature and structural diversity within the community open space area. A new block of woodland planting will provide a substantial new boundary feature along the northern boundary of the site, which will aim to mitigate the impacts of the loss of one of the copses and some sections of internal hedgerows.
90. Enhancements will be undertaken to some areas of the retained woodland, although minimal intervention will be the underlying management approach for woodlands, in order to avoid disturbance. Where necessary, thick shrub planting will be undertaken to provide a barrier to access and maintain undisturbed areas.
91. *Pond creation:* A new wildlife pond will be created within the wildlife area to complement the retained pond, and with connectivity to the off-site pond. The new pond will be designed for wildlife, with varying depths, scalloped edges and soft steep or stepped banks fringed with native grasses, rushes and sedges, and native floating and marginal plants. The pond will not be stocked with fish so that they provide suitable habitat for amphibians (long-term management will need to take account of the ponds and the undesirable effect of fish with respect to wildlife). The wildflower grassland and shrub planting surrounding the ponds will provide optimum habitat for great crested newt, and other wildlife such as invertebrates and reptiles.

92. An additional pond will be created within the south-eastern corner of the site, alongside a reedbed area and with connectivity to a swale running across the site. These features will be designed primarily for hydrological purposes, but where practicable will include patches of native marginals and other design features to provide benefit to wildlife.

Habitat Retention and Protection

93. Retained features will be protected during the works with the use of barrier fencing and warning signs, where required. Toolbox talks and information boards will be positioned in prominent locations, to warn site workers of the protected status of habitats (and species) and/or the sensitivity of these areas to disturbance. Only the relevant contractors erecting the fencing will be allowed on site until all protective fencing has been installed. All contractors and subcontractors will be issued with a plan showing the alignment of protective fencing across the site, with the areas to be protected clearly marked. The fencing will remain in place until all building work is complete with regular checks undertaken and repairs made as necessary.
94. The alignment of general protective fencing will consider the location of mature trees where they are associated with a hedge or other boundary, or where they occur as an isolated feature (as a minimum, tree protective fencing distances, as specified in Section 7, Table 1 of British Standard BS5837 “Trees in relation to Construction - Recommendations” 2005 will be adhered to).

Pre-construction and Construction Phases – Primary Species

95. The following measures consider the primary species on site, namely badgers, bats, breeding birds, reptiles, amphibians and invertebrates. However, the proposed measures will also provide mitigation and benefit other local species.

Badgers

96. The following measures will help to minimise disturbance to badgers:
- No setts have been recorded on site, but the presence of latrines shows that badgers are using the site. Prior to the submission of detailed development plans a full badger survey will be undertaken of the site. Should this reveal the presence of any heavily used foraging routes or setts then an appropriate mitigation scheme will be incorporated into any proposed plans such as wildlife underpasses, fencing and licence applications.
 - All work trenches left open overnight will include a means of escape for animals, such as a plank angled from the bottom of the trench to the top.

- Noisy machinery and construction lighting will not be used after dark to reduce potential disruption to foraging activity.
- Proposed planting will comprise an appropriate mix of locally and regionally-sourced native species, including fruit-bearing species such as hawthorn, and cultivars such as cherry and a range of other species to provide year-round food and enhance the existing foraging resource on site. The combination of natural and amenity areas with associated wildlife planting will compensate for the loss of foraging territory. Connectivity around the site and into the surrounding land will also be maintained and enhanced through the provision of buffers along hedgerows, and, should heavily used foraging routes be found to conflict with proposed road layouts, then the provision of appropriate mammal tunnels will be included within the design.

Bats

97. The tree with moderate bat potential would be felled following a PMW, which would include a pre-felling climbing inspection (where safe) to further look for evidence of bats, and soft felling techniques. The PMW would set out steps to be taken if evidence of bats is encountered during the climbing inspection or felling works, such as further surveys and licence application. It is not anticipated that additional mitigation would be required as the masterplan includes the provision of alternative roosting habitat in the form of bats boxes, extensive additional planting and a sensitive lighting scheme. All retained trees will be protected throughout the construction phase using the minimum protection guidelines set out under British Standard BS5837 “Trees in relation to Construction - Recommendations” (2005). Should any works to trees be required i.e. for health & safety, then the trees will first be assessed for their suitability as bat roosts, and further actions taken as appropriate prior to the works.
98. New roosting opportunities will be provided throughout the development, with bat roosting features such as bricks or tiles provided within 10% of buildings (especially those close to retained boundary features suitable to provide commuting corridors), and bat boxes on mature trees within the site boundaries and the wildlife area (two boxes on suitable trees, with a minimum of 20 boxes on site). The above mitigation will provide roosting opportunities above that which currently exists.
99. Although foraging areas and commuting routes are not legally protected, the effects of development proposals on these are a material consideration when assessing the impact of the proposal on the maintenance of favourable conservation status (PPS9). Habitat creation and enhancement measures will maintain connectivity to the potential roosts on site and adjacent to the site, and will also provide targeted foraging and commuting areas

for bats. Native species will be planted to enhance opportunities for foraging bats, to include night-scented species such as lavender, dog-rose and honeysuckle (BCT, 2007). A number of bat species are known to avoid well-lit areas and as such lighting levels will be minimised along retained hedgerows boundaries and habitats connecting retained and new bat roosts with suitable foraging habitat. This will be undertaken through the production of a sensitive lighting scheme at the detailed design stage. Any necessary lighting will be directional (i.e. directed towards the ground and away from boundary trees) and consist of low pressure sodium lamps where practicable (Bat Conservation Trust, 2007).

100. Artificial lighting during construction will be avoided wherever possible, and will be mainly restricted to winter months when bats are generally inactive. Where unavoidable, directional and low level lighting will be used wherever practicable during construction works, particularly near to features such as the ponds, hedgerows and mature trees, in order to avoid disturbance to foraging and commuting bats.

Breeding Birds

101. Wherever possible vegetation removal will be undertaken during the winter months. Where this is not practicable, or conflicts with other species such as hibernating great crested newt, a search of the vegetation will be undertaken by an Ecological Clerk of Works prior to removal to check for the presence of nesting birds. Retained trees and hedgerows will be protected during works.
102. Habitat retention and creation with associated protection measures will aim to reduce impacts to breeding bird populations on the site by providing areas of refuge habitat undisturbed by construction works. Habitat retention will include a number of habitats important for breeding birds, including the mature trees and hedgerows. Created habitats will be of benefit to birds, including scrub and tree planting, and wildflower meadow creation. The habitats will aim to provide good structural diversity including trees, low scrub suitable for species such as warblers, and tall ruderals including seed producing species suitable for finches.
103. Additional nesting opportunities will be provided with the erection of bird boxes on suitable trees within the wildlife area and community open space. These will be erected on suitable trees, with a minimum of 10 boxes provided across the site.

Reptiles

104. A reptile mitigation strategy will be produced for the site following a reptile survey in spring 2010. This strategy will outline suitable measures to be undertaken in advance of any habitat or topsoil removal within suitable areas of the site to prevent potential

injury/killing of reptiles during the development. The masterplan design has assumed the presence of a low population of reptiles and includes the retention of the majority of optimum habitat on site as well as habitat creation to maintain habitat connectivity across the site and to provide suitable refuge, foraging and hibernation habitat, and it is therefore considered unlikely that the survey results will require alterations to the proposals, but are planned to inform the detail of the reptile relocation strategy. The majority of habitats to be lost comprise semi-improved grazed grassland, which is sub-optimal for reptiles, and dependent on numbers present a relocation exercise would take place through habitat manipulation or capture and relocation. Reptiles would be relocated to habitats on site away from the construction areas, which will enable them to naturally recolonise gardens and open spaces within the operational phase of the development. The reptile relocation exercise will follow a strategy to be agreed by the Local Planning Authority prior to implementation.

Amphibians

105. If the presence of great crested newt is confirmed a Natural England licence would be obtained prior to any works on site. The licence application would include a detailed method statement outlining the measures to be put in place during the construction and operational phases of the development, to ensure that the population present remains at favourable conservation status. However, the development proposals have assumed that a medium sized population may be present and as such mitigation proposed is considered sufficient to maintain favourable conservation status of this species if present.
106. Assuming the survey confirms the presence of great crested newt the method statement would include a number of measures to safeguard newts at the site, in line with the Great Crested Newt Mitigation Handbook (English Nature, 2001) and these would include:
- Creation of new pond at least six months and ideally one year prior to the loss of Pond 2
 - Enhancements to Pond 1, including management of over-hanging trees and shrubs, and additional native aquatic and marginal planting
 - Surrounding terrestrial habitat enhancements including wildflower grassland seeding, tree and shrub planting and hibernacula creation
 - Fencing of the construction footprint with temporary amphibian fencing (TAF) and implementation of a pit-trapping exercise to clear the site of newts, including a

bottle-trapping and pitfall-trapping exercise to relocate any newts prior to the draining and infilling of Pond 2

- Maintenance of TAF throughout construction period
- Long-term management of retained and created habitats on site, to be informed by annual monitoring of the great crested newt population and surrounding habitat conditions

Invertebrates

107. The creation of new hedgerows, tree and shrub planting, ponds and wildflower areas will provide additional habitats for invertebrates, and a sensitive long-term management plan will encourage a greater species and structural diversity on site to encourage invertebrate populations.

Operational Phase – Habitats

108. Following initial habitat creation/enhancement and protection during the construction phase, a L&EMP for the site will ensure retained and new habitats are protected in the long-term and managed for their conservation value, whilst permitting low level recreation of less sensitive areas. The management of the retained and created features will be sensitive to wildlife, allowing for amenity and safety issues. Management under the L&EMP will be reactive, and updated annually as necessary following monitoring on site, to ensure that management is effectively targeted towards site specific issues. Input from local groups, including the Local Planning Authority and wildlife trust will be sought when producing this document.

Operational Phase – Primary Species

109. The following measures consider the primary species/species groups on site, namely badgers, bats, breeding birds, reptiles, amphibians and invertebrates.

Badgers

110. The partial loss of foraging habitat as a result of the development is unavoidable; however, semi-improved grassland, scrub and woodland on site will continue to provide foraging habitat for the badger population. Within the development site, areas of amenity grassland will be managed to maintain a close-cropped sward, providing improved earthworm foraging habitat for badger. Although the overall territory of the badger population will be reduced as a result of development, enhancements aim to provide smaller areas of higher quality habitat to compensate for this loss in area. Speed restrictions will be in place along the residential roads, which will help to minimise road casualties. Connectivity around the site and into the surrounding land will also be

maintained and enhanced through the provision of buffers along hedgerows, and, should heavily used foraging routes be found to conflict with proposed road layouts, then the provision of appropriate mammal tunnels will be included within the design.

Bats

111. A traditional management approach will be taken to the management of grassland, hedgerows and woodland. This will benefit bats with the development of associated long grass verges, tall herbs and shrubs, which provide a gradation of vegetation with varied structure, suitable for supporting a rich and varied insect biomass. A mixed age class of trees will be maintained across the site to ensure future potential roost sites and deadwood will be retained and promoted where it is safe to do so.
112. Bat boxes and other features designed for roosting bats, will be monitored and checked annually at an appropriate time of year.

Breeding Birds

113. Habitat enhancement and a sensitive approach to management, to be detailed in the L&EMP, will benefit a wide range of breeding birds, with a range of habitats for foraging, refuge and nesting. The creation of additional hedgerows and woodland areas will provide habitat for birds typically associated with urban areas. Bird boxes will be installed on boundary trees to provide nesting habitat in the short term whilst planted trees and scrub mature. Nest boxes will be cleaned out regularly within the winter months; included within the L&EMP. Leaflets to new residents of the development will advise on ways to reduce predation by domestic pets, such as keeping pets in at night, providing cat collars with bells on, advice on garden planting to provide wildlife benefit, and during recreational activities keeping to designated Public Open Space and footpaths.

Reptiles

114. Within the buffers, grassland, hedgerows and woodland on site, the provision of open and closed vegetation will provide optimal habitats for reptiles. These areas will offer basking and foraging habitat (amenity grassland and wildflower grassland), cover from predators (tall grassland margins and scrub) and hibernation sites (trees and hedgerows). Marginal planting around the ponds will provide cover for foraging grass snake, and the creation of hibernacula within the wildlife area will ensure refuge and hibernation sites. Long-term objectives for management will be aimed at maintaining undisturbed areas for reptiles, maintaining connectivity and sufficient stepping stone habitats, so that reptiles can move freely about the site. The L&EMP will ensure provision for assessing the quality of habitats, including foraging, refuge and hibernation sites for reptiles.

115. Leaflets to new residents and users of the development will advise on ways to reduce predation by domestic pets, such as keeping pets in at night, providing cat collars with bells on, and during recreational activities keeping to designated POS and footpaths.

Amphibians

116. Habitats within the wildlife area will be designed and managed with amphibians in mind, with the provision of a varied sward within a wider mosaic of trees and scrub to provide good quality terrestrial habitat surrounding the ponds. Connectivity will be maintained with the off-site pond and surrounding habitats. In line with those for reptiles long-term objectives for management will be aimed at maintaining undisturbed areas, maintaining connectivity and sufficient stepping stone habitats. The L&EMP will ensure provision for assessing the quality of habitats, including aquatic and terrestrial habitat areas.

Invertebrates

117. An organic, minimal intervention approach to management will be detailed in the L&EMP, which will benefit invertebrates. Management of aquatic habitats, in particular, will consider invertebrate presence. Any management of water features will be undertaken on a rotational basis and at an appropriate time of year.
118. Vegetation cutting and removal, where required, will be undertaken at a suitable time of year and following the flowering period (except in areas where amenity/recreation is primary function). All arisings from vegetation management will be used to create further log piles, where practical to do so. Not all habitats will be managed at one time, with some areas left for several seasons. Management will aim to maintain a varied structure and gradation of vegetation between habitats to maximise opportunities for invertebrates.

ASSESSMENT OF THE RESIDUAL IMPACTS OF THE DEVELOPMENT

Table 3. Assessment of the Residual Impacts on Grassland

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – Grassland habitat covers the majority of the site</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – Habitat is common and widespread in local area. Current ecological value Local due to extent on site</p>	<p><u>Construction Phase</u></p> <p>Direct loss of approximately 7.8ha of grassland (approx 80% total grassland area) to development. Retention of approx 2ha of grassland</p> <p>Potential pollution from dust, run-off to boundaries of retained areas and potential hydrological changes</p> <p><i>Overall impact is negative, with significance at the Site level</i></p>	<p>Negative (certain)</p> <p>Direct loss of majority of grassland</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> • CEMP • SuDS features to maintain water quality and hydrology • Protection of areas of retained grassland • Creation of grassland and wildflower habitats 	<p>Significant positive (<i>Minor</i>)</p> <p>Appropriate long-term management would contribute to LBAP targets</p>	<p>Significant positive (<i>Minor</i>)</p> <p>Appropriate long-term management of wildflower grassland would contribute to LBAP targets</p>
	<p><u>Operational Phase</u></p> <p>Increased recreational pressures</p> <p>Potential for hydrological changes and littering and dog nutrient enrichment</p> <p>Maturation of habitats</p> <p><i>Impact is negligible</i></p>	<p>Not significant (probable)</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> • Traditional management of retained and created habitat with the aim of benefiting structural and species diversity (L&EMP) • Sensitive management and maturation of habitats 		

Table 4. Assessment of the Residual Impacts on the Woodland

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – Site supports two small copses of mixed plantation woodland covering less than 0.2ha</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – Lowland Mixed Deciduous Woodland is a UK BAP and Woodlands is a LBAP habitat. Provides structural diversity and links to hedgerow network</p>	<p><u>Construction Phase</u></p> <p>Direct habitat loss of approximately 60% of woodland on site</p> <p>Visual, audio and potentially compaction root damage and vibration disturbance from construction machinery/operations and potential for pollution and light spill</p> <p>Creation of 0.1ha of woodland</p> <p>Enhancement planting of trees and scrub within buffer areas</p> <p><i>Impact is negative, with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Fragmentation of the site is likely to reduce its value to the wildlife it supports. Overall increase in woodland area but will take time to mature. Indirect impacts temporary</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> • CEMP and toolbox talk • Protection around all retained habitats • Habitat creation equal to area lost, but all native planting 	Not significant (Negligible)	<p>Significant positive (Minor)</p> <p>Appropriate long-term management would contribute to LBAP targets</p>
	<p><u>Operational Phase</u></p> <p>Maturation of habitats provide larger area of native woodland</p> <p>Increased recreational pressures</p> <p>Increased risk of tree felling on health and safety grounds</p> <p><i>Impact is positive, with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Due to amount of native woodland being created</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> • Appropriate management (L&EMP) • Use of interpretation board and planting • Assessment of trees by arboriculturalist and ecologist and minimalist approach to management • Method statements for tree works 		

Table 5. Assessment of the Residual Impacts on the Hedgerows and Standard Trees

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – Two species rich hedgerows, three species poor native hedgerows and two non-native hedgerows are present on site. Approximately 106 standard trees on site, mainly within hedgerows</p> <p><i>Value</i> – Local</p> <p><i>Status</i> –Consideration under Policy 10 and the LBAP action plan for hedgerows and are a UK BAP habitat. Hedgerows provide shelter, foraging and connectivity for a range of local wildlife. Abundant in local area.</p>	<p><u>Construction Phase</u></p> <p>Loss of some species poor and non-native hedgerows, but retention of both species rich hedgerows and new planting will increase overall hedgerow resource on site</p> <p>Approximately 30 trees will be lost, but 0.1ha of trees will be planted in woodland blocks and buffers along the northern site boundary, with additional trees within the wildlife area, grassland paddocks and community open space of more than 70 standard trees.</p> <p>Visual, audio and potentially compaction root damage and vibration disturbance from construction machinery/operations and potential for pollution</p> <p><i>Permanent negative impact with significance at the Site level</i></p>	<p>Significant (Probable)</p> <p>Small sections of hedgerows and low number of trees lost compared with amount retained and planted, but new planting will take time to mature</p> <p>Fragmentation of hedgerows likely to reduce their value to the wildlife they support. Overall increase in hedgerows due to planting. Indirect impacts temporary</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Retention, protection and enhancement of hedgerows of most ecological interest Protection fencing in appropriate areas close to construction Incorporation of buffer along hedgerows of width 3m Habitat creation Sensitive timing and phasing of works in accordance with CEMP and toolbox talk Sensitive lighting Sensitive timing of removal of hedgerows trees (bats, birds, reptiles and amphibians) 	<p>Not significant (Negligible)</p>	<p>Significant positive (Moderate)</p> <p>Appropriate long-term management would contribute to LBAP targets</p>
	<p><u>Operational Phase</u></p> <p>Increased disturbance and pollution</p> <p>Some retained hedgerows fragmented by roads</p> <p>Maturation of surrounding enhancement planting</p> <p>Indirect impacts of lighting</p> <p><i>Impact will be negative, with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>New planting will increase the length of hedgerows on site. Fragmentation will reduce their value to the wildlife they support</p> <p>Lighting will reduce value to nocturnal species</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> Sensitive management of hedgerow habitat (L&EMP) with the aim of benefiting structural and species diversity and meeting LBAP targets Sensitive lighting Assessment of trees by arboriculturalist and ecologist and minimalist approach to management Method statements for tree works 		

Table 6. Assessment of the Residual Impacts for Ponds

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> –Two ponds are present on site, one of which dries frequently. Both ponds are poached and over-shaded, but suitable to support great crested newt (only one provides breeding opportunities)</p> <p><i>Value</i> – District</p> <p><i>Status</i> – Standing open water is an LBAP habitat and UK BAP habitat. Farm ponds are a declining habitat type nationally, and provide habitat for a wide range of local wildlife.</p>	<p><u>Construction Phase</u></p> <p>Loss of one of the two ponds on site, but replacement wildlife pond to be created, as well as a third pond primarily for drainage reasons</p> <p>Potential for pollution and disturbance from construction machinery/operations could affect water quality and the wildlife its supports.</p> <p>Potential impacts from hydrological changes</p> <p>Creation of wildlife area surrounding two wildlife ponds including shrub planting and wildflower grassland</p> <p><i>Impact is negative, with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Significant amount of habitat creation, however this will take time to mature. Potential pollution and hydrological impacts could affect overall habitat quality</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> • CEMP and toolbox talk • SuDS • Protection fencing in appropriate areas close to construction • Enhancements to ponds and planting within surrounding area 	<p>Not significant (Negligible)</p>	<p>Significant positive (Minor)</p> <p>Appropriate long-term management would contribute to LBAP targets</p>
	<p><u>Operational Phase</u></p> <p>Increased recreational pressures and disturbance to wildlife, including potential for damaging fish and invasive aquatic plant introductions</p> <p>Lighting limits commuting corridor for some species</p> <p>Potential for pollution and disturbance from run-off and low-level recreation could affect water quality and the wildlife its supports.</p> <p>Maturation of habitats improve connectivity and overall wetland habitat area, which will complement existing habitats</p> <p><i>Impact is negligible</i></p>	<p>Not Significant (probable)</p> <p>New surrounding habitat of higher quality will increase in value as it matures. Potential pollution and hydrological impacts could affect overall habitat quality</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> • Long-term, sensitive management of ponds and surrounding terrestrial habitat (L&EMP) • Information boards and strategic planting to manage access • SuDS features and wildflower planting to maintain hydrology and water quality • Sensitive lighting 		

Table 7. Assessment of the Residual Impacts for Badgers

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – No setts on site, and site forms up to approximately 20% of a wider local badger territory. Habitats well connected to foraging habitat on site and wider area.</p> <p><i>Value</i> – Site</p> <p><i>Status</i> – Fully protected in the UK by the Protection of Badgers Act, 1992, and by Schedule 6 of the Wildlife and Countryside Act, 1981. Classified as a species of conservation concern by the UK BAP, although not a priority species</p>	<p><u>Construction Phase</u></p> <p>Up to around 20% of foraging habitat within a badger territory will be lost, although much of the highest quality habitat will be retained</p> <p>New roads severing hedgerows</p> <p>Woodland and buffer zone planting</p> <p>Potential disturbance to foraging behaviour from noise and lighting disturbance</p> <p><i>Impact is negative at the Site level</i></p>	<p>Significant (probable)</p> <p>Severing of foraging corridors and likely disturbance to foraging</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Retention of areas of suitable habitat and habitat creation/enhancement CEMP and toolbox talk Sensitive lighting Trenches that are left open have a means of escape 	Not significant (Negligible)	Not significant (Negligible)
	<p><u>Operational Phase</u></p> <p>Maturation of foraging corridors</p> <p>Elevated levels of disturbance and dog walkers</p> <p>New roads severing potential corridors and posing increased risk of mortality when in operation</p> <p>Areas of high quality foraging due to the enhancements to woodland, hedgerows and grassland</p> <p><i>Impact is negative at the Site level</i></p>	<p>Significant (probable)</p> <p>Maturation of new planting and corridors. Habitat connectivity reduced by road crossings and risk of mortality</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> Provision of tree and scrub planting comprising beneficial species Sensitive lighting Information boards with respect to disturbance from dogs L&EMP - Appropriate management of retained and new features Use of speed restrictions and underpasses where appropriate 		

Table 8. Assessment of the Residual Impacts for Bats

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – Ten trees of low to medium suitability for roosting bats. Hedgerows and woodland provide areas of good quality foraging habitat with connectivity to wider area</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – In Great Britain, all bats are fully protected under Schedule 5 of the Wildlife and Countryside Act (1981) as amended, and by The Conservation (Natural Habitats &c.) Regulations 1994 (as amended). An agreement on the Conservation of Bats in Europe (EUROBATS) under the auspices of the Bonn Convention, also known as the Convention on Migratory Species (CMS) is in force, and all European bats are listed under Appendix II of the CMS</p>	<p><u>Construction Phase</u></p> <p>Loss of one of the ten trees with medium or low suitability for roosting bats. Some additional remedial tree works may be required to retained trees</p> <p>Retention of majority of boundary hedgerows, but loss of some central hedgerows and some fragmentation of retained hedgerows for road crossings</p> <p>Loss of one copse and one pond but extensive planting and creation of additional ponds</p> <p>Light pollution on retained areas during works affecting potential roost sites and foraging</p> <p>Potential for pollution to impact on the quality of foraging habitats</p> <p>Creation of new buildings will provide potential roost habitat for less sensitive species</p> <p><i>Overall impact is negative at the Site level</i></p>	<p>Significant (probable)</p> <p>Bats have high mobility and are likely to use the site in combination with other habitats in the wider area for foraging. Loss of potential tree roosts and disturbance are likely to affect bat activity in the short-term</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Majority of best quality foraging habitats retained within development Trees with bat potential will be felled or pruned in accordance with a PMW and additional trees planted to compensate for loss Planting, pond creation and grassland management (L&EMP) will maintain and enhance connectivity across site and foraging opportunities Provision of roosting features within new builds and retained trees Sensitive lighting SuDS to protect value of foraging habitat Incorporation of buffer around retained boundary hedgerows of at least 3m 	<p>Not significant (Negligible)</p>	<p>Significant positive (Minor)</p> <p>Positive impact on some more light tolerant species, such as pipistrelle; and negligible impact to less tolerant species</p>
	<p><u>Operational Phase</u></p> <p>Inappropriate lighting affecting potential roost sites, foraging and commuting routes</p> <p>Maturation of habitats, enhanced species/structural diversity, yet still fragmented by roads</p> <p>Increased risk of trees needing to be felled on health and safety grounds</p> <p>Potential for pollution, especially lighting, to impact on the quality of foraging habitats</p> <p><i>A negative impact with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Enhanced habitat and structural diversity overall and long-term retention and maturation of better value foraging areas, but new builds will not immediately provide replacement roost potential</p> <p>Severance of and lighting on hedgerows</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> Habitat creation/enhancement works including replacement habitat in the form of roosting opportunities Enhance foraging by sensitive management of woodland edges, scrub, aquatic features and species rich grassland (L&EMP) Sensitive lighting alongside habitats where possible Retain and promote deadwood habitat Maintain mixed age class of trees to ensure future potential roost sites 		

Table 9. Assessment of the Residual Impacts for Breeding Birds

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium -term)	Post development (long-term)
<p><i>On site status</i> – A low diversity of common bird species is anticipated to be using the site, potentially including some less common or declining species such as bullfinch, house sparrow, song thrush and skylark. There is a good range of similar suitable habitat within the district</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – All wild breeding birds protected in the UK by the Wildlife and Countryside Act, 1981</p>	<p><u>Construction Phase</u></p> <p>Loss of some hedgerows and woodland, which provides nesting opportunities for birds. Some farmland species likely to be permanently displaced</p> <p>Increased disturbance may deter more sensitive species from site, but many likely to be habituated to some level of disturbance from adjacent residential area</p> <p>Extensive habitat creation (woodland and hedgerows)</p> <p><i>Impact is negative and significant at the Site level</i></p>	<p>Significant (probable)</p> <p>Retention and protection of areas of suitable habitats during construction</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Planting of wildlife area and community open space with grassland, scrub and trees, wildflower grasslands Creation of new hedgerows Protection of retained features Provision of bird boxes on retained trees CEMP and toolbox talk Sensitive timing of works L&EMP - Appropriate low intensity management and monitoring of habitat quality 	Significant Negative (<i>Minor</i>)	<p>Significant Positive (<i>Minor</i>)</p> <p>Retention of better quality habitats and creation of additional habitats, and species habituation to development will provide a small benefit to the population in the longer-term but loss of more sensitive species</p>
	<p><u>Operational Phase</u></p> <p>Maturation of retained and created features including woodland, hedgerows, new buildings, marginal vegetation and buffer zones. Potential of inappropriate management to reduce value</p> <p>Increased human disturbance and cat predation</p> <p><i>Impact is negative and significant at the Site level</i></p>	<p>Significant (probable)</p> <p>Continued disturbance may dissuade more sensitive species. More tolerant species likely to increase due to additional habitat</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> L&EMP - Sensitive management of retained and created habitats Information board and leaflets to residents 		

Table 10. Assessment of the Residual Impacts on Reptiles

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium - term)	Post development (long-term)
<p><i>On site status</i> – Low population of common species assumed on site. Majority of habitat loss is sub-optimal grassland habitat</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – Protected in the UK by Schedule 5 of the Wildlife and Countryside Act, 1981</p>	<p><u>Construction Phase</u></p> <p>Some hedgerows and woodland will be directly lost or fragmented. Large proportion of highest quality habitat retained</p> <p>Enhancements from planting</p> <p>Risk of injury and death during site clearance works</p> <p>Disturbance from noise and vibrations during works</p> <p>Enhancements from planting and provision of suitable habitat within buffer zones</p> <p><i>Overall impacts are negative with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Large areas of suitable habitat to escape to but residual risk of injury or death</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Retention of best quality habitat Relocation of reptiles to suitable receptor habitat on site under a PMW Habitat creation through hedgerows, woodland, buffer and wildflower grassland planting, hibernacula creation CEMP and toolbox talk Sensitive timing of works 	Significant negative (<i>Minor</i>)	<p>Not significant (<i>Negligible</i>)</p> <p>Habitat creation on site to provide features of greater value to this species. Low populations at risk of extinction from disturbance and predation, but habitat enhancements should buffer this impact</p>
	<p><u>Operational Phase</u></p> <p>Maturation of planting and establishment of grassland margins and wetland habitats will increase area of suitable habitat</p> <p>Permanently elevated levels of disturbance including increase in domestic cats</p> <p><i>A positive impact with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Retention and enhancement of grassland areas will provide additional habitat and will minimise increased levels of disturbance</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> L&EMP - Appropriate low intensity management and monitoring of habitat quality Information board and leaflets for residents Establishment of new habitats 		

Table 11. Assessment of the Residual Impacts on Amphibians

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium - term)	Post development (long-term)
<p><i>On site status</i> – Medium population of great crested newt assumed on site. Two ponds on site and one adjacent to site.</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – In Great Britain, great crested newt are fully protected under Schedule 5 of the Wildlife and Countryside Act (1981) as amended, and by The Conservation (Natural Habitats &c.) Regulations 1994 (as amended). Great crested newt and common toad are both UK BAP priority species</p>	<p><u>Construction Phase</u></p> <p>Loss of one pond (non-breeding), some hedgerows and woodland, and large areas of sub-optimal grassland habitat</p> <p>Creation of wildlife pond and enhancements to retained pond. Hedgerow and woodland planting and hibernacula creation</p> <p>Risk of injury and death during site clearance works</p> <p>Disturbance from noise and vibrations during works</p> <p><i>Overall impacts are negative with significance at the Local level</i></p>	<p>Significant (probable)</p> <p>Significant risk of injury or death from proposed works</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> • Works under licence from Natural England (where great crested newt presence confirmed) • Exclusion fencing and pit-trapping exercise (where great crested newt presence confirmed) • Protection and enhancements of retained habitats • Habitat creation through hedgerows, woodland, buffer and wildflower meadow planting, hibernacula creation • CEMP • Sensitive timing of works 	Significant positive (<i>Minor</i>)	Significant positive (<i>Minor</i>) Existing ponds are generally over-shaded and poached. Extensive habitat creation will provide areas of high quality habitat with good connectivity, but additional risks from increased residential pressures
	<p><u>Operational Phase</u></p> <p>Maturation of planting and establishment of surrounding wildlife area including tree and scrub planting, wildflower grassland and hibernacula will provide high quality habitat with good links to wider area</p> <p>Permanently elevated levels of disturbance, with risk of fish and invasive aquatic plant introductions to ponds</p> <p>Permanently elevated pollution levels, and risk of hydrological changes impacting on water levels and conditions in ponds</p> <p>Risks of road mortality and being trapped in gully pots</p> <p><i>A negative impact with significance at the Local level</i></p>	<p>Significant (probable)</p> <p>Retention and enhancement of ponds and surrounding areas will provide additional high quality habitat with good connectivity, but increased disturbance and risks from pollution and hydrological change</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> • L&EMP - Appropriate low intensity management and monitoring of habitat quality • Monitoring of populations and reactive management as necessary • SuDS • Information board and leaflets for residents • Establishment of new habitats 		

Table 12. Assessment of the Residual Impacts on Invertebrates

Feature, policy and legal framework and factors on which its integrity or conservation status depend	Impacts: Integration of Impact Characteristics	Effect on integrity or conservation status, confidence in this assessment and rationale	Mitigation Proposals	Residual Impacts	
				Post development (medium - term)	Post development (long-term)
<p><i>On site status</i> – Good diversity of common terrestrial species likely on site. Semi-improved grassland of low invertebrate interest, but hedgerows, trees and ponds provide good quality habitats</p> <p><i>Value</i> – Local</p> <p><i>Status</i> – Common invertebrate species not legally protected</p>	<p><u>Construction Phase</u></p> <p>Some hedgerows and woodland lost, but all species rich hedgerows retained</p> <p>Enhancements from planting and creation of wetland habitats</p> <p>Disturbance from noise and vibrations during works, and from pollution such as dust</p> <p><i>Overall impacts are negative with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Dust and disturbance during construction likely to reduce value to invertebrates temporarily. Large areas of the best quality habitat retained</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Retention and protection of better quality habitats Habitat creation through hedgerows, woodland, buffer and wildflower meadow planting, hibernacula creation CEMP and toolbox talk 	Not significant (Negligible)	Significant positive (Minor)
	<p><u>Operational Phase</u></p> <p>Creation of large areas of additional habitat (hedgerows, woodland, buffers, ponds) which will increase in value as they mature.</p> <p>Permanently elevated levels of pollution (emissions) and disturbance</p> <p><i>A positive impact with significance at the Site level</i></p>	<p>Significant (probable)</p> <p>Significant increase in habitat area and quality</p>	<p><u>Operational Phase</u></p> <ul style="list-style-type: none"> L&EMP - Appropriate low intensity management and monitoring of habitat quality Establishment of new habitats 		

SUMMARY OF ASSESSMENT

119. The majority of the area proposed for development constitutes managed pasture land, with a small proportion of other habitats including hedgerows, mixed plantation woodland, and ponds. These habitats are suitable to support notable and protected species, including foraging badger (known) and bats, reptiles, breeding birds and great crested newt. Key mitigation inherent within the design includes: Retention of all species rich hedgerows, the majority of mature trees, one of the copses and one pond; the provision of 3m buffers along hedgerows; creation of a wildlife area with managed public access including pond creation, scrub and tree planting and wildflower grassland creation; creation of new hedgerows across the site; and creation of reedbed area and drainage swales. All of these features provide opportunities for increasing biodiversity on site. Additional mitigation proposals further enhances these inherent design features for wildlife with the aim of minimising the identified impacts on key habitats/species.

Habitats

120. The informed masterplan has been designed to provide a number of opportunities for building-in positive biodiversity features whilst retaining key existing features. Key on site mitigation includes the retention of the majority of the ecologically important features within the redevelopment site, including the species rich hedgerows, majority of the woodland, and the pond. The development layout has been designed to minimise fragmenting and isolating habitats by retaining and creating green corridors across the site, in the form of species rich boundary hedgerows and associated buffers to link new and existing stepping stone features (woodland, ponds, wildflower grassland, for example) with larger habitat patches off site. This will help to promote the migration, dispersal and genetic exchange of species in the wider environment.

Species

121. In terms of the criteria used in this assessment, measures have been proposed to protect from the negative effects of development, the species present that receive statutory protection and other species identified as requiring conservation action. The long-term impacts anticipated for all species are positive or not significant.
122. The development provides the opportunity to contribute to national, regional and local biodiversity targets by enhancing and creating habitat that is valuable to European

protected species, including great crested newts and bats, and to nationally protected species including badger, reptiles and breeding birds.

Assessment of the Development against Local Planning Policies and LBAP Objectives

123. The opportunities provided by the development proposals would work towards a range of objectives set out within local planning policies (Cotswold District Local Plan 2001 - 2011) and Gloucestershire BAP (currently being updated):

Local Plan:

Policy 1 – Natural Resources. Development will only be permitted where:

- Natural resources, such as biodiversity, will be managed efficiently and in the most sustainable manner.

The development includes an informed layout proposed to retain many of the ecologically valuable features on site and includes for a wide range of enhancements and habitat creation to ensure that the biodiversity value of the site is retained in the long term. SuDS will also be incorporated into the development.

Policy 4 – Environmental Impact. Development that is likely to significantly harm the natural or built environment, owing to its nature, size or location, will only be permitted if the benefits outweigh the environmental impact.

The overall residual impacts of the development on habitats and species are positive or not significant, and therefore the development is not considered to significantly harm the biodiversity of the site

Policy 10 - Trees, woodlands and hedgerows. Permission will not be granted for development that would adversely affect ancient semi-natural or ancient replanted woodland or veteran trees. Hedgerows which are visually, ecologically or biologically important, or historically or culturally significant, shall be retained unless there are overriding reasons for their removal. Development that would destroy or adversely affect a tree or woodland protected by a Tree Preservation Order, or is within a conservation area, will not be permitted unless the removal of the tree(s):

- would be of benefit to the character or appearance of the area, or
- is in the interest of good forestry or arboricultural practice

Although the development will require the loss of a number of TPO trees, overall the area of native woodland, and the number of standard trees will increase within the development. All native species rich hedgerows on site will be retained and protected, and significant hedgerow planting will occur to increase this resource across the development site.

LBAP Priority Action Plans:

124. The Gloucestershire BAP has a number of priority Habitat Action Plans (HAPs), although the Priority Species list for Gloucestershire is currently under review. Priority Habitats for this area include neutral grassland, hedgerows, woodland and standing open water, however the actions and objectives of these habitats have not yet been updated. The development will provide the following actions for these habitats, which are considered likely to assist in meeting future objectives for the following:

- Neutral Grassland HAP: The development will aim to reseed existing areas of species poor grassland on site to be managed as wildflower grassland
- Woodland HAP: Although a small patch of woodland will be lost on site compensatory planting aims to increase the woodland cover on site overall, to include a variety of native species, which will be sensitively managed in the long-term
- Ancient or Species-rich Hedgerows HAP: The two species rich native hedgerows on site will be retained and protected with grassland buffers, and additional species rich native hedgerows will be created with new planting across the site
- Standing Open Water HAP: On small ephemeral pond will be lost, but two additional ponds will be created on site, and these will be enhanced with marginal native planting and long-term suitable management

125. Previous SAPs for Gloucestershire included those for bats, great crested newt and bullfinch, and the development aims to provide additional habitat for these species on site.

OVERALL EFFECT ON BIODIVERSITY

126. Table 13 summarises the residual impacts (mitigated) on important ecological features.

Table 13: Summary of Residual Impacts

Feature	Residual Impacts	
	Post-Development Medium-Term	Post-Development Long-Term
<i>Grassland</i>	Significant Positive (Minor)	Significant Positive (Minor)
<i>Woodland</i>	Not Significant (Negligible)	Significant Positive (Minor)
<i>Hedgerows and standard trees</i>	Not Significant (Negligible)	Significant Positive (Moderate)
<i>Ponds</i>	Not Significant (Negligible)	Significant Positive (Minor)
<i>Badgers</i>	Not Significant (Negligible)	Not Significant (Negligible)
<i>Bats</i>	Not Significant (Negligible)	Significant Positive (Minor)
<i>Breeding birds</i>	Significant Negative (Minor)	Significant Positive (Minor)
<i>Reptiles</i>	Significant Negative (Minor)	Not significant (Negligible)
<i>Amphibians</i>	Significant Positive (Minor)	Significant Positive (Minor)
<i>Invertebrates</i>	Not Significant (Negligible)	Significant Positive (Minor)

127. Referring to Table 13, and considering the longer-term (i.e. 25 years post construction), all habitats are predicted to benefit as a result of the proposals (with mitigation); of these habitats three are predicted to benefit at a minor level (the grassland, woodland and ponds) and one at a moderate level (hedgerows and standard trees). For species/species groups, four of the six species/species groups are predicted to benefit as a results of the proposals (with mitigation) at a minor level (bats, breeding birds, amphibians and invertebrates) and there is predicted to be no significant impact to two species groups (reptiles and badger).
128. Based on this assessment, the residual impact of the development is minor significant positive. The adoption of best practice principles during construction with appropriate habitat enhancement and management in the longer-term aim to mitigate the major proportion of ecological impacts associated with the proposed development. The predicted result is a small net gain in overall biodiversity.

LIMITATIONS

129. The surveys upon which this assessment has been based, record flora and fauna found on site and any field signs to indicate their presence, as well as anecdotal evidence of sightings. They do not record any plants or animals that may appear at other times of the year and are therefore not evident at the time of the visits. Some species that might use the site or be apparent at other times of the year, or only in certain years, would not have been detected. Areas of dense undergrowth or inaccessible areas precluded a detailed inspection and may have concealed species of note.
130. Due to project timings some Phase 2 surveys are yet to be undertaken and are proposed for spring/summer 2010; therefore the assessment of these components is based on habitat conditions during the Phase 1 survey and knowledge of the ecology of the species.
131. The behaviour of animals can be unpredictable and may not conform to standard patterns recorded in current scientific literature. This report therefore cannot predict with absolute certainty that animal species will occur in apparently suitable locations or habitats or that they will not occur in locations or habitats that appear unsuitable.
132. Data search information can only provide information on species already recorded and cannot be taken to represent a complete overview of all species present in the area.
133. Impact predictions and levels of certainty are based on the existing site conditions and do not take into account biotic and abiotic factors not influential at the time of surveying.
134. Should the level of mitigation proposed change, this will alter the Assessment and overall residual impact.
135. For specific limitations to surveys, refer to Technical Appendix I.

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APPENDIX I: IMPACT ASSESSMENT METHODOLOGY

The Assessment and terminology used in the main body of this report is based on guidelines issued by the Institute of Ecology and Environmental Management (IEEM) in 2006.

The value assigned to habitats and species (features) adopts the recommendations for evaluating habitats given in the IEEM guidelines (2006). The geographical value categories used in this assessment are: *International* (i.e. Europe), *National* (i.e. England), *County* (Gloucestershire), *District* (Cotswolds), *Local* (Tetbury), and *Site* (i.e. within immediate the zone of influence only). Refer to Technical Appendix I for the rationale for values assigned to each feature.

Consideration of Constructional and Operational Phase Impacts

The recommendations for predicting and characterising ecological impacts contained in the Institute of Ecology and Environmental Management (IEEM) guidelines (2006) have been followed as defined below.

Characterising Impacts

The IEEM guidelines recommend that the process of identifying the characteristics of the impacts should be made explicit by referring to the following when describing impacts: confidence in predictions, complexity, magnitude, duration, reversibility, frequency and cumulative effects. These are detailed within the following sections, where appropriate.

Confidence in Predictions

It is important to consider the likelihood that a change/activity will occur as predicted and also the degree of confidence in the assessment of the impact on ecological structure and function. Categories are defined as follows:

- Certain/near-Certain - probability estimated at 95% chance or higher
- Probable - probability estimated above 50% but below 95%
- Unlikely - probability estimated above 5% but less than 50%
- Extremely Unlikely - probability estimated at less than 5%

Extent and Complexity

This refers to the size or amount of the impact, which is determined on a quantitative basis, where possible. For example, a loss of 35ha of arable habitat and the percentage loss of the total area where known. For indirect impacts, which can be more difficult to quantify (i.e. indirect impacts could be localised and only influential on a proportion of

the feature at any one time) the amount of the impact is assessed as large (likely to affect >80% of feature), moderate (likely to affect between 25% and 80% of feature) and small (likely to affect <25% of feature).

Complexity refers to whether the impact is direct or indirect.

Magnitude

Magnitude of impact describes the level of severity of the influence, for example, complete loss of a habitat. Categories are defined as follows:

- Major – total loss or major alteration to one or more key elements, post development situation fundamentally different
- Moderate – Partial loss or alteration to one or more elements, post development situation will be partially changed
- Minor – Minor loss or alteration to one or more key elements, post development changes will be discernible but the underlying situation will remain similar to the baseline
- Negligible – Very minor loss or alteration to one or more key elements, post development situation changes would be barely discernible, approximating to the no change situation

Duration

The size of the impact will also depend on duration. This is the length of time before which the feature is expected to recover. Where possible, duration is considered in ecological terms and relates to the specific species/habitats and their lifecycles.

Reversibility of Impact

A permanent impact is usually one that is irreversible where there are no practical options available for a course of action to lower/remove the impact. A temporary impact is usually one that is reversible. Reversal could occur over time and by natural regeneration, by spontaneous recovery, or through the implementation of mitigation.

Timing

This considers whether the impact will coincide with a critical stage of a life cycle, for example, the bird nesting season, which may be avoided by altering the scheduling of works.

Significance of Impacts (Unmitigated)

In assessing significance the IEEM guidelines suggest making a decision about whether an impact is positive, neutral or negative and significant or not independent of the value of the receptor. An ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area. In the first place significance is determined at the geographical level at which the resource has been valued. If an impact is found not to be significant at this level, it is then considered at progressively lower levels.

The significance of the impacts has been assessed for each ecological receptor in the form of habitats and species from both the construction and the operational phases of the proposed development. The full range of effects from all stages of the development and their impacts on each of the ecological receptors identified at the site are set out within the text. The “significance” column (characterising impacts) summarises such an assessment taking into account the characteristics of the impact.

In order to provide consistency with other disciplines, the following terms are given below, to allow comparison.

If significant, the impact is identified as positive, negligible or negative.

- **Positive** – Advantageous or beneficial impact to an environmental resource
- **Negligible** – An effect that is likely to have a negligible influence, irrespective of other effects
- **Negative** - Detrimental or adverse impacts to an environmental resource or receptor

The Proposals

The following impacts are considered in the assessment methodology:

Construction Phase

- Habitat loss within the construction zone
- Construction of small residential buildings and roads
- Environmental incidents and accidents (e.g. spillages, noise and emissions)
- Habitat creation
- The Operational Phase

- Increased lighting, noise and regular emissions
- Increase in residents and associated pressures (recreational, pets, pollution)
- Traffic on site
- Site operation and management (e.g. maintenance operations)
- Elevated levels of continuous disturbance

The biophysical changes that these activities would be likely to cause are considered below:

Construction Phase

- Permanent and temporary land take and associated habitat loss
- Temporary changes in air quality, noise, vibration, light emissions, dust deposition as a result of construction activities and associated disturbance to flora and fauna
- Changes in human activity and non-specific disturbance resulting from the presence of construction crews and machinery
- Temporary fragmentation or isolation of habitats
- Creation of temporary barriers to the movement of animals
- Creation of temporary pitfall traps
- Temporary hydrological changes to surface or ground waters
- Changes in habitat management
- Changes in soil conditions as a result of degradation or deposition of extraneous soils, littering or accidental pollution

Operational Phase

- Permanent land take (including that for the footprint, layout, access routes, route of utilities and services, and landscaping)
- Increased levels of disturbance from noise, vibration, light emissions, dust deposition
- Changes in human activity and associated disturbances
- Fragmentation or isolation of habitats
- Appearance of new barriers to the movement of plants or animals
- Creation of new pitfall hazards
- Permanent changes in runoff characteristics

- Changes in habitat management regime
- Presence of new developing habitat

Not all of these biophysical changes will be expected to have significant effects on features.

RESIDUAL IMPACTS

The residual impacts of the development have been considered in the medium-term (ten years post-development) and the longer-term (twenty-five years post-development). Impacts have been assessed as significant or not significant and whether positive or negative against the Assessment criteria following the guidelines by IEEM (2006).

APPENDIX II: CHARACTERISATION OF IMPACTS

The table below provides a summary of the characterisation of the construction and operational phase impacts, i.e. whether direct or indirect, permanent or temporary and magnitude and extent, on features affected by the proposal.

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
CONSTRUCTION PHASE IMPACTS										
Grassland Local Value	Habitat loss	Loss of approximately 80% of grassland on site	Direct	Certain	Negative	Major	Moderate	Long-term	Permanent	Continuous
	Pollution	Air and groundwater pollution	Indirect	Probable	Negative	Minor	Minor	Potentially affecting several flowering/fruiting seasons	Temporary	Daily
	Hydrological changes	Potential for hydrological change to impact on vegetation communities in low-lying areas	Indirect	Possible	Negative	Minor	Moderate	Potentially affecting several flowering/fruiting seasons	Permanent	Daily
	Habitat creation	Creation of higher quality green areas: community open space/green infrastructure/buffers, covering 2ha. Additional planting of trees and shrubs	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
Buildings N/A	Habitat creation	Extensive area of new builds	Direct	Certain	Positive	Major	Major	Long-term	Permanent	Continuous
Woodland Local Value	Habitat loss	One copse (approx 60% of cover) will be removed to allow the creation of the	Direct	Certain	Negative	Moderate	Moderate	Long-term	Permanent	Continuous

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
		access road								
	Habitat fragmentation	Roads will partially isolate retained woodland	Direct	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Noise and lighting	Indirect	Probable	Negative	Minor	Major	Potentially affecting several leafing/flowering seasons	Temporary	Daily
	Pollution	Potential for dust, traffic emissions and groundwater pollution	Indirect	Unlikely	Negative	Moderate	Moderate	Potentially affecting several leafing/flowering seasons	Temporary	Daily
	Habitat creation	Approximately 0.1 ha of woodland created within northern tree belt	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
<i>Hedgerows and Standard Trees</i> Local Value	Habitat loss	Loss of species poor and non-native hedgerows totalling 502m (45% of hedgerow network). All species rich native hedgerows retained Loss of approximately 30 mature trees (30% of mature trees on site)	Direct	Certain	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Habitat fragmentation	Retained hedgerows will be severed by road crossings, which will reduce habitat connectivity across the site	Direct/Indirect	Certain	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Noise and lighting	Indirect	Unlikely	Negative	Moderate	Moderate	Potentially	Temporary	Daily over a

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
								affecting several leafing/flowering seasons		number of months
	Habitat creation	Replacement of non-native hedgerows and planting along northern and southern boundary amounting to 648m of hedgerow In addition over 70 trees will be planted across the site	Direct	Certain	Positive	Major	Moderate	Long-term	Permanent	Continuous
Ponds District Value	Habitat loss	Loss of one of the two ponds on site (pond to be lost is ephemeral)	Direct	Certain	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Disturbance	Noise and lighting	Indirect	Probable	Negative	Minor	Moderate	Short-term	Temporary	Daily
	Pollution	Air and groundwater pollution	Indirect	Unlikely	Negative	Moderate	Major	Short-term	Temporary	Daily for a number of weeks/ months or single event (spillage)
	Hydrological changes	Surface run-off and alteration to water table	Indirect	Unlikely	Negative	Major	Major	Long-term	Permanent	Continuous
	Habitat creation	Creation of two ponds	Direct	Certain	Positive	Major	Major	Long-term	Permanent	Continuous

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
Badger Local Value	Habitat loss	80% of the badger foraging territory on site will be lost. This is 20% of total estimated foraging territory	Direct	Certain	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Habitat fragmentation	Habitat connectivity to some areas of suitable habitat will be severed by road construction and may be temporarily blocked by construction works and materials	Indirect	Certain	Negative	Minor	Minor	Long-term	Temporary	Continuous
	Disturbance	Noise and lighting may impact on foraging behaviour	Indirect	Probable	Negative	Minor	Minor	Short-term	Temporary	Continuous
	Pollution	Potential for pollution incidents to reduce value of retained foraging habitat	Indirect	Unlikely	Negative	Minor	Minor	Short-term	Temporary	Daily
	Habitat creation	Habitat enhancements and creation of good quality foraging habitat including hedgerows and woodland	Direct	Certain	Positive	Minor	Minor	Long-term	Permanent	Continuous
Bats Local Value	Habitat loss	Loss of one tree with medium suitability for roosting bats, and loss of some hedgerows, although mainly species poor and defunct	Direct	Certain	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Habitat fragmentation	Reduction in habitat connectivity anticipated through severance of hedgerows for new roads	Indirect	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
	Disturbance	Noise and lighting may impact on foraging and commuting behaviour	Indirect	Probable	Negative	Moderate	Minor	Potentially affecting several breeding seasons	Temporary	Continuous
	Pollution	Potential for pollution incidents to reduce value of retained foraging habitat	Indirect	Unlikely	Negative	Minor	Minor	Affecting several foraging seasons	Temporary	Continuous
	Hydrological changes	Potential for hydrological changes to reduce value of retained habitat and affect foraging	Indirect	Unlikely	Negative	Moderate	Minor	Affecting several foraging seasons	Permanent	Continuous
	Habitat creation	Habitat creation including residential buildings, tree planting, ponds, hedgerows and buffer planting	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
Breeding birds Local Value	Habitat loss	Loss of 45% of hedgerow (prior to replanting) and large areas of open grassland of low value Species rich hedgerows retained	Direct	Certain	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Habitat fragmentation	None anticipated due to highly mobile nature	N/A							
	Disturbance	Noise and lighting disturbance	Indirect	Probable	Negative	Moderate	Moderate	Over several breeding seasons	Temporary	Continuous throughout construction
	Pollution	Potential for pollution incidents to reduce value of retained foraging habitat	Indirect	Unlikely	Negative	Minor	Minor	Over several years	Temporary	Single event

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
	Habitat creation	Habitat creation including hedgerows, buffer zone planting and trees	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
Reptiles Local Value	Habitat loss	Majority of habitat loss sub-optimal semi-improved grassland	Direct	Certain	Negative	Minor	Minor	Short-term	Permanent	Continuous
	Habitat fragmentation	Potential fragmentation due to new access provision through hedgerows	Indirect	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Disturbance from construction machinery noise and vibration. Potential for injury to individuals	Direct / Indirect	Probable	Negative	Major	Minor	Affecting several active seasons and hibernation	Temporary	Continuous throughout construction
	Pollution	Potential for pollution incidents to reduce value of retained habitats	Indirect	Unlikely	Negative	Minor	Minor	Short-term	Temporary	Single event
	Hydrological changes	Potential for hydrological changes to reduce value of retained habitat	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Permanent	Single event
	Habitat creation	Extensive habitat creation including ponds, hedgerows and buffer zone planting	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
	Amphibians Local Value	Habitat loss	Loss of one of two ponds on site, unsuitable for breeding but forms part of foraging habitat, and loss of wider foraging habitat	Direct	Certain	Negative	Major	Moderate	Long-term	Permanent
Habitat fragmentation		Some hedgerow fragmentation but connectivity with off-site	Indirect	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
		ponds retained								
	Disturbance	Disturbance from construction machinery noise and vibration	Direct / Indirect	Unlikely	Negative	Minor	Minor	Short-term	Temporary	Continuous throughout construction
	Pollution	Potential for pollution incidents to reduce value of retained breeding and foraging habitat	Indirect	Unlikely	Negative	Major	Moderate	Short-term	Temporary	Single event
	Hydrological changes	Potential for hydrological changes to reduce value of retained habitat	Indirect	Unlikely	Negative	Major	Major	Long-term	Permanent	Single event
	Habitat creation	Extensive habitat creation including hedgerows, pond and buffer zone planting	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
<i>Invertebrates</i>	Habitat loss	Majority of better quality habitats to be retained. Some woodland and species poor hedgerows lost	Direct	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
Local Value	Habitat fragmentation	Potential temporary fragmentation due to new access provision through hedgerows	Indirect	Probable	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Disturbance	Disturbance from construction machinery noise and vibration	Direct / Indirect	Unlikely	Negative	Minor	Minor	Short-term	Temporary	Continuous throughout construction
	Pollution	Potential for pollution incidents to reduce value of retained foraging habitat	Indirect	Unlikely	Negative	Moderate	Minor	Short-term	Temporary	Continuous / Single event
	Hydrological changes	Potential for hydrological changes to reduce value of retained habitat	Indirect	Unlikely	Negative	Moderate	Moderate	Long-term	Permanent	Single event

Feature and Ecological Value	Impact Type	Summary of Impact	Complexity	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing
	Habitat creation	Extensive habitat creation including hedgerows, ponds and buffer zone planting	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
OPERATIONAL PHASE IMPACTS										
Grassland Site – Local Value	Habitat loss	Recreation pressure may lead to trampling of vegetation, but extensive areas of habitat will reduce impacts	Negligible							
	Disturbance	Disturbance from increase in recreational use; however grassland is currently disturbed by grazing	Indirect	Probable	Negative	Minor	Major	Long-term	Permanent	Continuous
	Pollution	Pollution from litter and enrichment from dog faeces; however, grassland currently enriched by agricultural inputs	Indirect	Unlikely	Negative	Minor	Moderate	Long-term	Temporary	Continuous
	Hydrological changes	Potential for hydrological changes and inappropriate drainage systems to affect low-lying vegetation communities	Direct/Indirect	Unlikely	Negative	Major	Major	Long-term	Permanent	Continuous
Woodland Local Value	Habitat loss	Potential tree pruning and removal for public health and safety	Direct	Probable	Negative	Minor	Minor	Short-term	Permanent	Single event
	Habitat fragmentation	Road crossing through sections of adjoining hedgerow	Indirect	Certain	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Higher levels of disturbance in the form of recreational use. Lighting and noise associated with adjacent roads and housing	Direct	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Pollution	Litter and enrichment from dog faeces	Direct/Indirect	Probable	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Habitat creation	Maturation of new woodland and other planting. Potential for	Direct	Probable	Positive	Moderate	Moderate	Long-term	Permanent	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
		inappropriate management to limit value								
<i>Hedgerows and Standard Trees</i> Local Value	Habitat loss	Recreation pressure may lead to trampling of vegetation. Tree pruning and removal for public health and safety	Direct	Probable	Negative	Minor	Minor	Short-term	Temporary	Single event
	Habitat fragmentation	Access provision, mainly road crossings will continue to fragment hedgerows. Maturation of additional planting likely to reduce this impact over time	Direct	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Disturbance from adjacent housing and roads	Indirect	Probable	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Pollution	Potential for increased litter and urban pollution such as emissions	Indirect	Probable	Negative	Minor	Minor	Short-term	Temporary	Continuous
	Hydrological changes	Potential for hydrological changes and inappropriate drainage systems to affect hedgerows	Direct/Indirect	Unlikely	Negative	Major	Moderate	Long-term	Permanent	Continuous
	Habitat creation	Maturation of planting would provide additional habitat and connectivity elsewhere on site	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
<i>Ponds</i> District Value	Habitat loss	None anticipated during operation	N/A							
	Habitat fragmentation	Maturation of adjacent buffers and planting, creation of ponds and swales will improve connectivity and stepping stone habitat	Indirect	Certain	Positive	Moderate	Minor	Long-term	Permanent	Continuous
	Disturbance	Disturbance due to proximity of recreational areas	Indirect	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Pollution	Pollution from litter and run-off	Direct	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency	
	Hydrological changes	Potential for hydrological changes and inappropriate drainage systems to affect pond communities	Direct/Indirect	Probable	Negative	Major	Major	Long-term	Permanent	Continuous	
	Habitat creation	Adjacent habitat creation of two ponds, although one is primarily for hydrological benefits	Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous	
Badger Local Value	Habitat loss	Potential for habitat loss through increased recreational pressure and inappropriate management of retained and created habitats	Direct	Unlikely	Negative	Minor	Minor	Long-term	Permanent	Continuous	
	Habitat fragmentation	Maturation of additional planting and gardens likely to increase connectivity over time	Direct	Probable	Positive	Minor	Moderate	Long-term	Permanent	Continuous	
		Roads may provide barriers to movement and increase risk of road deaths, but residential roads subject to speed restrictions	Indirect/Direct	Probable	Negative	Moderate/Major	Minor	Long-term	Permanent	Continuous	
	Disturbance	Disturbance levels increased from residents, traffic and lighting but only part of wider badger territory which minimises impact and buffers will further reduce this	Indirect	Probable	Negative	Minor	Minor	Long-term	Permanent	Continuous.	
	Pollution	Littering may reduce suitability of retained and created habitats	Direct/Indirect	Unlikely	Negative	Minor	Minor	Long-term	Temporary	Continuous	
	Hydrological changes	None anticipated	N/A								
	Habitat creation	Maturation of habitats will increase shelter and foraging potential across the site	Direct	Probable	Positive	Minor	Moderate	Long-term	Permanent	Continuous	
Bats Local Value	Habitat loss	Tree pruning and removal for public health and safety could	Direct	Probable	Negative	Minor	Minor	Short-term	Permanent	Single event	

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
		results in loss of foraging/roosting habitat								
	Habitat fragmentation	Maturation of planting would provide additional levels of connectivity	Direct/Indirect	Probable	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
		Potential for fragmentation through increased lighting	Indirect	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Disturbance	Disturbance to roosting, foraging and commuting habitats from lighting	Direct/Indirect	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Pollution	Potential for pollution to impact foraging habitat, including ponds	Indirect	Unlikely	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Hydrological changes	Potential for hydrological changes and inappropriate drainage systems to affect foraging habitat (ponds)	Indirect	Unlikely	Negative	Moderate	Minor	Long-term	Permanent	Continuous
	Habitat creation	Maturation of habitats will provide significantly more additional foraging and may provide roosting habitat.	Indirect/Direct	Certain	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
		Buildings will provide new roosting opportunities in the long-term	Direct	Probable	Positive	Minor	Major	Long-term	Permanent	Continuous
Breeding Birds	Habitat loss	None anticipated	N/A							
Local Value	Habitat fragmentation	Maturation of planting and gardens would improve links to surrounding habitat	Direct	Probable	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
	Disturbance	Likely continually elevated levels of disturbance from recreation and cats, may dissuade more sensitive species from some areas,	Direct/indirect	Probable	Negative	Minor	Moderate	Long-term	Permanent	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
		but many species likely to be habituated to existing levels of disturbance								
	Pollution	Littering may reduce suitability of retained and created habitats	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Temporary	Continuous
	Hydrological changes	Potential for continued drainage inputs to adversely impact on habitat	Negligible							
	Habitat creation	Maturation of large areas of additional planting will provide good foraging and refuge habitat on site	Direct	Probable	Positive	Moderate	Moderate	Long-term	Permanent	Continuous
	Predation	Increase in number of domestic cats to the area	Direct	Certain	Negative	Minor	Moderate	Long-term	Permanent	Continuous
Reptiles	Habitat loss	None anticipated								
Local Value	Habitat fragmentation	Maturation of planting would provide links to additional suitable habitat. Major roads will continue to sever corridors in a few areas	Direct/Indirect	Probable	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Disturbance	Likely continually elevated levels of disturbance, may dissuade reptiles from some areas	Indirect	Probable	Negative	Moderate	Moderate	Long-term	Permanent	Continuous
	Pollution	Littering may reduce suitability of retained and created habitats and reduce invertebrate prey	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Temporary	Continuous
	Hydrological changes	Potential for inappropriate drainage to adversely impact on habitat	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Habitat creation	Maturation of created habitats will increase area of suitable reptile habitat on site	Direct	Probable	Positive	Moderate	Moderate	Long-term	Permanent	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
	Predation	Increase in number of domestic cats to the area	Direct	Probable	Negative	Major	Major	Long-term	Permanent	Continuous
<i>Amphibians</i> Local Value	Habitat loss	None anticipated								
	Habitat fragmentation	Maturation of planting would provide links to additional suitable habitat and surrounding ponds. Some fragmentation of hedgerows	Direct/Indirect	Probable	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Disturbance	Frequent use of site by residents may lead to introductions of fish or invasive aquatic plants	Indirect	Probable	Negative	Major	Moderate	Long-term	Permanent	Single event
	Pollution	Littering may reduce suitability of retained and created habitats	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Temporary	Continuous
	Hydrological changes	Potential for inappropriate drainage to adversely impact on habitat	Indirect	Unlikely	Negative	Major	Moderate	Long-term	Permanent	Continuous
	Habitat creation	Maturation of created habitats will increase area of suitable amphibian habitat on site	Direct	Probable	Positive	Major	Moderate	Long-term	Permanent	Continuous
<i>Invertebrates</i> Local Value	Habitat loss	None anticipated								
	Habitat fragmentation	Maturation of planting would provide links to additional suitable habitat. Major roads will continue to sever corridors in a few areas but mobile species unlikely to be affected	Direct/Indirect	Probable	Positive	Minor	Minor	Long-term	Permanent	Continuous
	Disturbance	Likely continually elevated levels of disturbance, may dissuade more sensitive species from some areas	Indirect	Unlikely	Negative	Minor	Moderate	Long-term	Permanent	Continuous
	Pollution	Littering may reduce suitability of retained and created habitats	Indirect	Unlikely	Negative	Minor	Moderate	Long-term	Temporary	Continuous

Feature and Preliminary Ecological Value	Impact Type	Summary of Impact	Direct / Indirect	Certainty of prediction	Positive / negative	Magnitude	Extent	Duration	Reversibility	Timing and Frequency
	Hydrological changes	Potential for inappropriate drainage to adversely impact on habitat	Indirect	Unlikely	Negative	Minor	Minor	Long-term	Permanent	Continuous
	Habitat creation	Maturation of created habitats will increase areas of suitable habitats on site	Direct	Probable	Positive	Major	Moderate	Long-term	Permanent	Continuous