A2 Dominion

NW Bicester Eco development

Biodiversity Strategy Appendix 6J

Hyder Consulting (UK) Limited
2212959
The Mill
Brimscombe Port
Stroud
Glos GL5 2QG
United Kingdom
Tel: +44 (0)1453 423 100
Fax: +44 (0)1453 887 979
www.hyderconsulting.com

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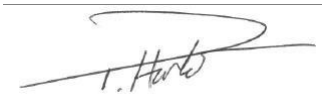
Author	Samantha Walters	
Checker	Jo Pickard	
Approver	Philip Harker	

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1 Summary

1.1.1.1 Local Plan policies and Planning Policy Statement 1: Delivering Sustainable Development requires the NW Bicester eco development on the north-western edge of Bicester to deliver a Net Gain in Biodiversity. This Biodiversity Strategy sets out how a Net Gain in Biodiversity would be achieved through the Masterplan for the NW Bicester eco development. Additional measures that would enhance the biodiversity value of the built development have been suggested, with the detail to come forward with the detailed design.

1.1.1.2 The Masterplan has sought to retain the most valuable habitats and features with appropriate buffer zones, and create ecologically valuable areas of green space. The green spaces across the site would be linked to create a network of green infrastructure across the site. The habitats of value to nature conservation that would be retained with a buffer zone of semi-natural habitat comprise:

- Hedgerows.
- The watercourses (River Bure and its tributaries).
- Semi-natural broad-leaved woodland (also known as lowland mixed deciduous woodland).
- Ponds.

1.1.1.3 In addition, the plantation woodlands and the majority of the shelter belts would also be retained across the site within areas of green space. The bat commuting route would be retained as a dark corridor, i.e. a corridor that would not be illuminated by artificial light. In the northern half of the Masterplan Site, this route follows the stream corridors, and in the southern half of the site, this route follows the stream corridor and retained hedgerows close to the western boundary. The watercourses would be retained within a 60 metre-wide corridor, the hedgerows within a minimum of a 20 metre-wide corridor, the woodlands with 10 metre buffers, the ponds within a 10 metre-wide buffer and the ponds that support great crested newts with a 50 metre-wide buffer. The buffers and corridors would be planted, as appropriate, to support habitats that would be complementary to the retained habitats and enhance the value of these habitats for nature conservation.

1.1.1.4 It is proposed to create significant areas of habitat of value to biodiversity across the Masterplan Site, in particular:

- A Nature Reserve.
- A Country Park.
- Sustainable drainage features.
- A wetland waste water treatment facility.

1.1.1.5 Other large areas of green space that would provide habitats for biodiversity on the Masterplan Site include:

- Parkland for green burial.
- Green (Sedum) roofs for water treatment.
- A woodland fitness trail.

1.1.1.6 Habitats of Principal Importance under the Natural Environment and Rural Communities Act (2006) that would be created in these areas include: mixed broadleaved woodland, lowland meadows, ponds, reed beds and wet woodland. Other habitats that would be created include

species-rich scrub, wildflower-rich grassland, short grassland, damp/marshy grassland and ditches.

1.1.1.7 It is anticipated that habitats and features of value to biodiversity would also be created within other areas of open space. This would include the allotments, play areas, community farm, the school grounds, the school playing fields and the green space associated with the Business Park.

1.1.1.8 Although the outline application does not provide the detailed design for the areas of development, it is anticipated that green areas of value to biodiversity would also be created within these areas. These would include:

- the use of artificial nest and roost boxes, and/or the incorporation of suitable equivalent features into the fabric of the buildings;
- the use of brown/blue roofs;
- street trees;
- fruit trees within gardens;
- green walls;
- planting that has a structure that provides shelter for fauna (comprising a mixture of native and ornamental species);
- linked gardens which would provide significant areas of green space; and
- the incorporation of native planting within areas of open space.

1.1.1.9 The development would lead to the loss of land of value to farmland birds; monies would be provided to a conservation grant-giving organisation (such as the Trust for Oxfordshire's Environment) to provide grants to enhance the value of farmland off-site for farmland birds to mitigate for this impact. There are tried-and-tested techniques, such as those provided for by the Government's Stewardship schemes, which would enhance the value of existing intensively managed farmland for birds. A Section 106 agreement or similar legal agreement would be provided to ensure that the monies are provided. The grant-giving body would ensure that the enhancement works are carried out. This off-site enhancement would ensure that the proposal has no residual impact on farmland birds.

1.1.1.10 The Defra metric developed for measuring Biodiversity Offsetting has been used to demonstrate that the Green Infrastructure provided in the Masterplan would deliver a net gain in biodiversity. The retained and newly created habitats would be managed by a funded Land Management Organisation in accordance with a Landscape and Habitats Management Plan.

2 Introduction

2.1.1.1 It is proposed to construct an eco development on the north-western edge of Bicester. This land is allocated for development in the Local Plan, and it is a requirement in the Cherwell Local Plan for the NW Bicester eco development to deliver:

2.1.1.2 “Development that respects the landscape setting and that demonstrates enhancement, restoration or creation of wildlife corridors to achieve a net gain in biodiversity”.

2.1.1.3 and

2.1.1.4 “Preservation and enhancement of habitats and species on site, particularly protected species and habitats and creation and management of new habitats to achieve an overall net gain in biodiversity, including the creation of a local nature reserve”.

2.1.1.5 A number of key principles have been established in order to deliver a Masterplan that would achieve a net gain in biodiversity.

This Biodiversity Strategy identifies:

1. the habitats and species of nature conservation importance that have been recorded on the site;
2. the potential effects that the eco development would have (with further details provided in the ecological impact assessments submitted with outline planning applications);
3. the requirement for off-site mitigation for farmland birds (to be delivered through a S106 or similar legal agreement);
4. the measures incorporated into the Masterplan layout which would reduce the effects of the development on biodiversity and create opportunities for habitat creation; and
5. the qualitative and quantitative approach to measuring a net gain in biodiversity.

2.1.1.6 This report forms an Eco-Town Biodiversity Strategy (ETBS) for the proposed eco development on the NW Bicester Masterplan Site as a whole. It aims to set out the key elements of the ETBS in relation to the proposed eco development, and details the mechanism by which a positive benefit for biodiversity would be achieved. Planning applications will be submitted for different elements of the Masterplan. The guidelines set in this ETBS have informed the Framework Plans for first three planning applications (Application 1: North of Railway; Application 2: South of Railway and A4095 NW Strategic Link Road). This report has been produced in accordance with guidance provided by the Town and Country Planning Association (TCPA, 2009), and also includes a calculation for biodiversity using the Defra metric devised for Biodiversity Offsetting (Defra 2012), as requested by consultees.

3 Siting, Location and Context

3.1.1.1 The proposed development is located on the north-western edge of Bicester in Oxfordshire. The Masterplan area is 406.5 hectares (ha) and largely comprised arable fields and fields supporting improved grassland; these farmland habitats cover 382 ha of the site.

3.1.1.2 A number of habitats were identified within the Masterplan Site; these included semi-natural broad-leaved woodland, watercourses and ponds. In addition, there were over 100 hedgerows,

the majority of these were of high or very high ecological value and considered to be 'Important' using the Wildlife and Landscape Criteria of the Hedgerows Regulations (1997).

3.1.1.3 A suite of ecological surveys have been undertaken to inform the baseline, the full results of which are presented in the Technical Appendices 6A to 6I of the Environmental Statements for the planning applications known as Application 1 (North of Railway, Application 2 (South of Railway) and A4095 NW Strategic Link Road. The results are summarised below. This information has been used to assess potential impacts on ecological receptors, and to identify measures to ensure a net gain in biodiversity.

3.2 Biodiversity baseline and 'key habitat'

3.2.1.1 There are no statutory or non-statutory designated sites of nature conservation importance within the Masterplan Site. There are five Sites of Special Scientific Interest (SSSI) within 5km of the Masterplan Site and a further nine within 10km of the Masterplan Site. Bure Park Local Nature Reserve (LNR) is situated 25m south of the Masterplan Site and immediately adjacent to the land affected by A4095 NW Strategic Link Road. There are two Conservation Target Areas (CTAs) within 2km of the Masterplan Site boundary and 18 Local Wildlife Sites of County Importance to Nature Conservation within 5 km.

3.2.1.2 The Masterplan Site comprised intensively managed arable farmland and improved, grazed grassland of little intrinsic nature conservation value. The majority of the hedgerows within the Masterplan Site were species-rich, supporting five or more woody species. Many of the hedgerows were associated with dry ditches that were shaded by the hedgerow shrubs. The hedgerows provide habitat links across the Masterplan Site, between the woodland and riparian habitat, and provide links to the adjacent countryside. The hedgerows were also found to be of value to invertebrates, foraging and commuting bats, common species of reptile, breeding birds, and were considered likely to be of value to hedgehogs.

3.2.1.3 The River Bure and two tributaries of this watercourse cross the Masterplan Site. The upper reaches of the tributaries were dry for large parts of the year in the first year of survey (2010) with more water present in subsequent years reflecting patterns of rainfall. Where water was present and the water channel less shaded, common wetland plants were recorded. The riparian habitats within the Masterplan Site were found to be of value to commuting and foraging bats, foraging common reptile species such as grass snake, and also amphibians. They were considered to be of limited value to otter due to the scarcity of prey items, and neither water vole nor white-clawed crayfish were found.

3.2.1.4 Within the Masterplan Site, there were two blocks of semi-natural broad-leaved woodland, west of Home Farm. Most of the canopy trees in these areas had been felled and replaced by recently planted Scots Pine and Norway Maple. There was also one block of semi-mature broad-leaved plantation woodland (close to Hawkwell Farm) and several belts of more recently planted broad-leaved plantation woodland (close to Himley Farm, Aldershot Farm and Home Farm).

3.2.1.5 There were four ponds within the Masterplan Site. The largest was next to Crowmarsh Farm, with two small ponds associated with Himley Farm and one recorded to the north-west of Hawkwell Farm. The pond at Crowmarsh Farm had a deep layer of silt at the bottom and supported a diverse wetland flora. The pond to the north-west of Hawkwell Farm was small and supported a small number of wetland plant species. Both the ponds near Himley Farm supported a reasonably diverse wetland flora and were found to support great crested newts. A population of great crested newts was also found to be present within four ponds at Bucknell, 475 metres north-west of the Masterplan Site boundary.

3.2.1.6 Targeted invertebrate surveys revealed brown hairstreak butterfly eggs, and suitable habitat for this species (Blackthorn shrubs for egg-laying within the hedgerows, and mature trees for display and mating) was present across the Masterplan Site. Other notable invertebrates were recorded in the less heavily managed parts of the site, but the Masterplan Site as a whole comprised arable land and improved grassland with limited structural and botanical diversity, that consequently supported a restricted range of common terrestrial invertebrates.

3.2.1.7 The targeted surveys for reptiles revealed the presence of small numbers of common lizards within suitable habitats across the site, including within the north-east area of the Masterplan Site, the railway embankment, the pond at Crowmarsh Farm, Gowell Farm, a strip of ruderal vegetation parallel with Howes Lane, and on a field margin south of Aldershot Farm.

3.2.1.8 Field surveys revealed that the site supported ten farmland specialist bird species, two of which are listed within the 'arable six' species of concern (i.e. grey partridge and yellow wagtail). The 'arable six' species are those specifically targeted by the Higher Level Stewardship (HLS). Yellow wagtail were recorded nesting on the edge of the Masterplan Site close to Crowmarsh Farm, whilst grey partridge were recorded overwintering, but not nesting. The Masterplan Site also supported approximately 28 pairs of skylark and 64 pairs of yellowhammer. With the exception of linnet (where 28 pairs were recorded), the remaining farmland bird species (starling, stock dove, reed bunting, kestrel and common whitethroat) were recorded in low numbers. Barn owl were also recorded nesting in specifically designed barn owl nest boxes located on a tree to the west of Home Farm (this nest box was moved to the edge of the woodland west of Home Farm as part of the mitigation for the NW Bicester Exemplar Site development.

3.2.1.9 The wintering bird surveys revealed moderate numbers of yellowhammer (flocks of up to 150), skylark (flock of up to 24), redwing (flocks up to 50) and fieldfare (flocks of up to 150). The distribution of wintering birds reflected the field and hedgerow management, with stubble fields and the less heavily trimmed hedgerows supporting higher numbers of birds.

3.2.1.10 Small numbers of common pipistrelle bats were recorded within a mature Ash tree on the edge of the woodland to the west of Home Farm. Surveys also revealed a common pipistrelle bat roosts within a modern farmhouse at Home Farm, and within a barn at Himley Farm. The majority of the bat activity was associated with the stream corridors, and largely comprised foraging and commuting common pipistrelle bats. Other bats recorded include brown long-eared bat, soprano pipistrelle, noctule, serotine, Leisler's bat and *Myotis*

3.2.1.11 The habitats listed below were considered to be the most important features within the Masterplan Site, and are therefore considered to be 'Key habitat' features that would be maintained, managed and enhanced for their biodiversity interest:

- hedgerows;
- watercourses (River Bure and its tributaries);
- semi-mature broad-leaved semi-natural woodland (also known as lowland mixed deciduous woodland);
- mature broad-leaved plantation woodland; and
- ponds.

3.2.1.12 Section 40 of the Act requires all public bodies to have regard to biodiversity conservation when carrying out their functions, in particular those habitats and species listed under Section 41. Of these habitats, hedgerows, rivers, ponds and lowland mixed deciduous woodland are identified

as habitats of Principal Importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) hereafter referred to as 'Section 41 habitats'.

3.2.1.13 In addition, the arable land and improved grassland was identified as an important habitat for supporting populations of breeding and overwintering birds. The majority of the farmland that supports these birds would be lost. It is therefore proposed to mitigate for the adverse effect on farmland birds off-site, through the provision of funds to a grant-giving body to enhance local habitats for farmland birds through appropriate, proven management regimes to increase the carrying capacity of local habitats.

3.2.1.14 Other habitats that have limited value for biodiversity which were recorded across the Masterplan Site include:

- recently planted woodland;
- patches of ruderal herbs (mainly nettles);
- individual trees;
- patches of scrub; and
- amenity grassland.

3.3 Species

3.3.1.1 Species of nature conservation importance that have been recorded within the Masterplan Site are identified below together with their associated habitats.

Species	**Protection**	**Associated habitat**
Brown hairstreak butterfly	Species of Principal Importance under the NERC Act (Section 41 species)	Mature woodland and hedgerows.
Small heath butterfly	Section 41 species	Grassland with fine grasses, Bramble and buttercups.
White letter hairstreak butterfly	Section 41 species	Mature woodland and hedgerows.
Great crested newt	Fully protected under UK and European legislation, and Section 41 species.	Two ponds in the southern half of the Masterplan Site.
Common lizard	Protected from mortality under the Wildlife and Countryside Act 1981 (as amended) (W&CA), and Section 41 species.	Railway embankment, ponds and field margins.
Grass snake	Protected from mortality under the Wildlife and Countryside Act 1981 (as amended) (W&CA), and Section 41 species.	Railway embankment, ponds and field margins.
Woodland birds	Protected whilst nesting under the W&CA.	Woodlands.
Farmland birds	Including bird species of conservation concern and Section 41 species, and	Hedgerows, arable farmland and grassland.

Species	Protection	Associated habitat
	protected whilst nesting under the W&CA.	
Barn owls	Protected from disturbance whilst nesting under the W&CA.	Artificial nest boxes to the west of Home Farm and foraging over tall grass habitat in that part of the Masterplan Site.
Bats (noctule, soprano pipistrelle and brown long-eared bats have been recorded on site)	Fully protected under UK and European legislation, and Section 41 species.	Tree roosts, building roosts, hedgerows, watercourses, ponds and woodlands.
Badgers	Protected under UK legislation.	Setts have been located in the hedgerows and in woodland. Habitats of greatest value to foraging badgers are woodland and grassland habitat; arable fields can be of some seasonal importance dependent on the crop.
Brown hare	Section 41 species	Farmland habitats.
Hedgehogs	Section 41 species	Largely associated with the hedgerows.

3.3.1.2

3.4 Masterplanning and design

3.4.1.1 This section identifies how the masterplanning process has considered the conservation of existing habitats and the opportunities to create new habitats, and how these would be designed and programmed in alongside development. Regular meetings and discussions between the project team have ensured the creation of a Masterplan which features biodiversity as a key element of the design. The detailed design of the green infrastructure would incorporate knowledge of local ecology and Local Biodiversity Action Plan (LBAP) targets, and also include consideration of the nearby Conservation Target Areas (CTAs). The green infrastructure would be designed to support habitats of conservation importance as listed under Section 41 of the NERC Act (2006), hereafter referred to as a 'Section 41 habitats'. It would also provide habitats that would support viable populations of species of conservation concern and those identified as Species of Principal Importance under the NERC Act hereafter referred to as a 'Section 41 species'. This would be targeted at creating habitats that would support the species currently recorded within the Masterplan Site (for example non-farmland specialist birds and bats). Habitat would also be created to support species that were currently absent from the site which would benefit from enhancement measures (such as notable aquatic invertebrates). With these in mind, the Masterplan design seeks to deliver the following principal objectives of an eco-town development:

- protecting and enhancing the existing 'Key habitats' (as identified in Section 3.1);
- mitigating the impact of development and securing net biodiversity gain;

- integrating biodiversity within the built environment; and
- increasing biodiversity's resilience and ability to adapt to climate change.

3.4.1.2 The measures provided to achieve these principles within the Masterplan Site are described in detail within the following sections. The third principal, to integrate biodiversity within the built environment, would be achieved as the detailed design is brought forward. Notwithstanding this, green roofs do form part of the drainage strategy and have been included in this report with further recommendations also provided.

4 Protecting and Enhancing the Existing 'Key Habitat'

4.1.1.1 The Masterplan design has ensured the protection of 'Key habitats' with appropriate buffer zones. The design also protects and provides opportunities to enhance these 'Key habitats' for the valuable species they are known to support, (for example: bats, breeding birds, reptiles), and also species they have the potential to support, such as hedgehogs and invertebrates. These habitats would be managed in the long term under a Landscape and Habitats Management Plan (LHMP) (see Section 9.1).

4.2 Hedgerows

4.2.1.1 The hedgerows within the Masterplan Site would be retained within 20 meter-wide corridors of semi-natural vegetation. This corridor has been extended to 40m in the south-west corner of the Masterplan Site where hedgerows are located within dark corridors maintained for foraging bats or within areas of green space. The buffers would ensure that the retained hedgerows would be protected from encroachment from adjacent land uses. The hedgerows are a feature of the Masterplan and have been incorporated into leisure routes, formal cycle/pedestrian routes and areas of green space. There would be no built development within the hedgerow buffers other than surfaced cycle/pedestrian routes. This will secure their future retention and provides access for management. These buffers could be used for informal play with features provided to facilitate this; care would be taken to ensure that such features do not prohibit access for maintenance or cause damage to the hedgerow species.

4.2.1.2 Care would be taken in the detailed design to reduce the risk that activities detrimental to the maintenance and management of these features would encroach onto the hedgerows. The detailed design would ensure that the hedgerows are retained within areas of open space and do not form curtilage boundaries.

4.2.1.3 The hedgerows would be managed in accordance with a LHMP to ensure that they provide habitat suitable for the fauna that were recorded on site prior to development: in particular, nesting birds (non-farmland specialists), mammals and invertebrates, including the hair-streak butterflies and other notable invertebrates. They would also provide wildlife corridors.

4.2.1.4 Whilst the Masterplan has sought to reduce, as far as possible, hedgerow loss and the fragmentation of the hedgerow network, it would be an inevitable consequence of the development proposal that some hedgerows would be removed and most would be breached by access roads and the pedestrian/ cycle routes. The effect of the crossings has been reduced by minimising their number and ensuring that such crossings would be at right angles wherever possible to minimise their breach. To mitigate for the effects of fragmentation, a network of interconnected green spaces would be created across the Masterplan Site. New planting would take the form of hedgerows and tree belts in green space and this planting would be managed to benefit biodiversity. All sections of hedgerow that need to be removed would be translocated

into areas of green space to create links between the fragmented hedgerows and/or create new hedgerows within areas of green space.

4.3 Watercourses (River Bure and tributaries)

4.3.1.1 The Masterplan proposals retain all existing watercourses within a 60 metre-wide buffer zone of semi-natural habitat. The watercourses and their associated bankside habitats would be managed to benefit nature conservation in the longer term to ensure that these habitats retain their value to biodiversity. It is not proposed to create play areas, allotments or other similar amenity facilities within the stream corridor buffer areas.

4.3.1.2 The Masterplan seeks to minimise impacts on the watercourses, and it is proposed to create two new road crossings and to make use of the existing bridges on Bucknell Road and the main 'A' road (the A4095). The detailed design of the new bridges would ensure that the fauna that currently travel along the stream corridors would continue to use this feature. Principally, provision would need to be made to allow large mammals such as badgers and otters to pass beneath the bridges during times of peak water flows, and lighting would need to be controlled.

4.3.1.3 Retaining the watercourses within a wide corridor of semi-natural green space, and the detailed design of the path network within this corridor, would ensure that the effects on the retained bankside habitat would be minimal. Although the bridge crossings would be illuminated, it is not proposed to light the stream channel. This would ensure that light-sensitive fauna such as bats and otters (if present in the future) would be able to use the stream corridors. The bridge designs would incorporate the design principles set on the Exemplar Site which involved the use of non-reflective road surfaces and luminaires to ensure that the dark corridor is maintained. (On the Exemplar Site the lighting columns were of normal height but focussed optics were used). Care would be taken to ensure that tree and shrub vegetation is retained and/or the area landscaped to encourage the bats to pass under the new road bridge.

4.3.1.4 The implementation of standard pollution control measures during construction and the detailed design of the Sustainable Drainage System (SuDS) would ensure that water quality within the watercourses is protected at all stages of the development. As part of the detailed design, where appropriate, SuDS features would be specifically designed to create habitats of value to wildlife. This would include planting schemes that support native species.

4.3.1.5 The SuDS features would create a network of wet and dry habitats across the Masterplan Site (see Section 5.3.2). This would involve a combination of gravel-filled channels, swales, open ditches, underground storage facilities and above ground attenuation basins (some of which would support water for most of the year).

4.4 Broad-leaved woodland

4.4.1.1 The Masterplan illustrates that the semi-natural woodlands (together with the mature plantation woodland) would be retained with appropriate buffer zones. These buffer zones would support semi-natural habitats that extend a minimum of 10 metres from the woodland edge and comprise grassland and scrub with a scalloped edge to maximise its value to biodiversity, particularly invertebrates and passerine birds. Whilst the footpath and cycle network would pass through the recent plantation woodlands, it would avoid the semi-natural woodland and the more mature plantation at Hawkwell Farm. These pathways would also avoid the woodland buffers. All areas of woodland would be incorporated into larger expanses of green space which would also support areas of planted trees. Overall there would be no net loss to the area of woodland on the Masterplan Site, and the lowland mixed deciduous woodland (a Section 41 habitat) would be created within the green infrastructure. There would also be an increase the

area of tree cover with new plantings within the green infrastructure and areas of built development.

4.4.1.2 The number of roads within the more recent plantations has been kept to a minimum to maintain these wildlife corridors. These woodland blocks have been retained within wide buffers, with the more substantial woodlands incorporated into open space associated with school grounds and playing fields. The Masterplan provides the opportunity to enhance the nature conservation value of the woodland blocks through appropriate planting, maintenance and management.

4.5 Ponds

4.5.1.1 All ponds within the Masterplan Site would be retained within areas of open space and/or green corridors; with suitable buffers. The development proposals would not lead to the loss of any pond habitat. The retention and management of ponds for biodiversity within green space and the creation of new ponds would also ensure the great crested newt population is safeguarded and enhanced. Such measures would be required as part of the licence application necessary to allow site clearance and construction works to proceed in the vicinity of these ponds.

4.5.1.2 To minimise the impacts of habitat loss and fragmentation, the ponds would be retained within appropriate buffer zones. A link between the two ponds known to support great crested newts would be maintained to allow movement of animals between the ponds. Culverts would be provided beneath the roads that are close to these ponds, in order to enable the great crested newts and other amphibians to travel safely between these ponds and areas of suitable foraging habitat that would be created as part of the SuDS. New ponds would also be created in other areas of green space see Section 5.3.2 for more details.

4.6 Protected species

4.6.1 Invertebrates

4.6.1.1 Buffers of tall and/or flower-rich grassland would be created alongside the hedgerows so that they are suitable for invertebrates, including Roesel's Bush-cricket, and proposed planting would incorporate plants favoured by the Shaded Pug moth, such as Field Scabious, thus retaining habitat for these species. Invertebrate boxes and other structures, designed for use by species such as ladybirds, lacewings and solitary bees, would also be provided within suitable habitat to create shelter for these species within the green infrastructure.

4.6.2 Barn owls

4.6.2.1 The area of broad-leaved semi-natural woodland in the north-east of the Masterplan Site where three barn owl boxes are located would be retained with a 10 metre-wide buffer of semi-natural habitat. Before site clearance works take place in the vicinity of these boxes, they would be moved to suitable locations on the edge of the Masterplan Site where there is no potential for disturbance. Locations would be selected to ensure that the barn owls have access to suitable foraging habitat. Nest boxes would only be moved once it has been confirmed that no owls are currently using them. This check would be undertaken by an experienced, licensed ecologist. This would ensure that there is no net loss in nesting opportunities for barn owls within the local area. In the event that the nest boxes are in poor condition new boxes would be installed instead. These boxes would also provide suitable nesting opportunities for the kestrels that were nesting on the Masterplan Site.

4.6.3 Bats

4.6.3.1 In addition to the protection and enhancement of the 'Key Habitats' above, the design of the Masterplan Site has ensured that the tree which supported roosting bats would be retained within the unlit stream corridor and woodland buffer. In addition, it is not proposed to alter the lighting around the existing farm buildings which support roosting bats (Home Farm and Himley Farm) or have the potential to support roosting bats (Hawkwell Farm, Crowmarsh Farm and Lord's Farm).

4.6.3.2 A dark corridor suitable for foraging and commuting bats also forms part of the Masterplan design. This corridor comprises the River Bure and its tributaries. This dark corridor would continue south following the line of existing hedgerows to provide a link from Crowmarsh Farm across the site to Bignell Park. The stream corridors would be retained within a 60 metres-wide band of semi-natural vegetation and the hedgerows would be retained within a 40 metre-wide band of vegetation. Not only would this ensure that a dark corridor would be maintained when the site is operational, but it would also ensure that if the construction site is lit the dark corridors would be maintained. As well as retaining the most valuable features for bats, ecological corridors would be created across the site, and new habitats of value to foraging bats would also be created. New habitats of value to foraging bats that would be created within the green infrastructure include ponds, reed beds, damp/marshy grassland, wet woodland, species-rich scrub, lowland meadow, lowland mixed deciduous woodland and wildflower-rich grassland. Boxes suitable for roosting bats would also be installed on retained trees and on/within the new buildings.

4.6.3.3 Two minor access roads cross the 40 metre-wide corridor. At the crossing points, the lighting will be controlled to ensure the principal of a dark corridor is maintained.

4.6.4 Badgers

4.6.4.1 All of the badger setts located within the Masterplan Site would be retained within areas of green space to avoid disturbance as far as possible. Where there is the potential for disturbance, works would take place under licence. No works are proposed in the vicinity of the setts that would require sett closures, but this could change if a new sett appears within the Masterplan Site. Pre-construction surveys would be undertaken in advance of site clearance and construction to confirm that no new constraints have appeared within the site, and to confirm the nature and extent of the known constraints. This would include a search for badger setts and an assessment of activity levels at the badger setts.

4.6.4.2 The badger setts are located within the stream corridor which is to be fenced to protect the vegetation in advance of site clearance. The badger setts would be protected from accidental damage and destruction by being clearly marked for the duration of works undertaken within 50 metres of the setts. The landscape planting close to the setts would incorporate a high proportion of fruit-bearing trees and shrubs, to benefit the badgers. Thorny planting would also be used to screen the setts and discourage interference or disturbance of the sett.

5 Mitigating the Impact of Development and Securing a Net gain in Biodiversity

5.1 Mitigation and enhancement measures

5.1.1.1 The following mitigation measures would be included within the proposed development to ensure the residual impacts on habitats and species are minimised.

5.1.2 Arable land and improved grassland

5.1.2.1 The development proposal would lead to the loss of all of the arable land and the majority of the improved grassland within the Masterplan Site. Although of limited intrinsic nature conservation value, the fields were found to be of value to farmland birds. Whilst it would be possible to create habitats of value to nesting and foraging birds within the Masterplan Site, this would not provide the habitats required for farmland specialists, and therefore off-site habitat enhancement would be required to mitigate for the impacts on these particular bird species. The requirement to deliver and monitor this off-site mitigation would be delivered through a Section 106 or similar legal agreement. On the basis that adequate off-site mitigation would be provided, there would be no net loss to biodiversity associated with the loss of the farmland bird assemblage from within the site (see Section 5.2 Off-site mitigation for further details).

5.1.2.2 Given that the development proposal would be phased over several decades, it is envisaged that it would be possible to provide mitigation in a similar timeframe to the impacts that are generated. There are tried and tested techniques for creating and enhancing habitats for the benefit of farmland birds, therefore it is envisaged that such measures could be instigated with a high confidence of achieving success (measures outlined in Section 5.2, below). Other species associated with farmland habitats such as harvest mouse and brown hare (both Section 41 species) would be expected to benefit from the habitat enhancement /creation provided.

5.1.3 Hedgerows

5.1.3.1 Where the removal of several kilometres of hedgerow is required to facilitate the development, the length of each removed section would be kept to a minimum. Measures would be put in place to avoid impacts on nesting birds, as outline in the Ecology Chapter of the Environmental Statements that accompany the planning applications. Checks would also be made for any species of conservation concern, such as amphibians, reptiles and hedgehogs, before removing hedgerows. Again, appropriate measures to safeguard these populations have been included in the Ecology Chapter.

5.1.3.2 Hedgerow losses would be compensated for by translocating the hedgerow and new planting. The new planting would take the form of hedgerows and tree belts in green space, which would be managed to benefit biodiversity. The development associated with the Masterplan would be phased and take place over a number of decades. It would therefore be possible to ensure that new planting takes place in advance of hedgerow removal. This would ensure that the planting has time to mature.

5.1.3.3 Any night-time lighting would be kept away from retained hedgerows and would be limited only to those areas where it is absolutely necessary. During construction the retained hedgerows and buffers would be fenced in compliance with British Standards BS5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’, to ensure that they are not subject to accidental damage. In addition, the buffer and adjacent supplementary habitats would

protect the hedgerows from disturbance arising from increased human presence, site traffic, noise and lighting during the construction and operational phases of the proposed development.

5.1.3.4 The hedgerow buffers would support long-grass habitat to maintain and enhance the value of these features for invertebrates. Some buffers would be sown with a native plant mix that would be flower-rich in order to be visually appealing to the local residents. New habitats of value to the hedgerows fauna that would be created within the hedgerow buffers include wildflower-rich grassland, species-rich scrub, trees and tall grassland swales.

5.1.4 Watercourses (River Bure and tributaries)

5.1.4.1 Both the construction site drainage and the SuDS would be designed to protect water quality within the watercourses. As indicated in Section 4.6.3 the stream channel would not be lit. New habitats of value to the terrestrial fauna associated with the watercourses would be created within the buffers, this would include wildflower-rich grassland, species-rich scrub, trees and tall grassland and short grassland. SuDS features would be created close to the watercourse corridor to provide additional habitat for fauna associated with the watercourses.

5.1.4.2 A mosaic of grassland, tall herb, scrub, and woodland habitats would be created in the stream corridors and adjacent areas of green space to create habitats of value to the fauna recorded on the site. Again the planting would be structured to maximise it value to invertebrates, birds and bats to provide suitable foraging habitat and places of shelter.

5.1.5 Mature broad-leaved semi-natural and plantation woodland

5.1.5.1 In advance of site clearance, woodland and individual mature trees would be fenced to ensure that they are not subject to accidental damage during construction. This protective fencing, together with a suitable buffer of semi-natural vegetation to a minimum of 10m from the woodland edge, would ensure that the roots of the trees are not damaged during construction works. The fencing would accord with British Standard BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. The implementation of standard pollution control measures would ensure that these habitats are protected during construction.

5.1.5.2 The buffers to the semi-natural woodland would support scrub and tall grass habitat, so as to provide a soft edge to these areas, and create habitat beneficial to woodland fauna. Additional scrub planting would be used to screen the badger setts on the edge of the woodland and those recorded elsewhere within the Masterplan Site. The scrub would have a scalloped edge to maximise the value of this planting for nesting birds and basking/foraging invertebrates.

5.1.6 Ponds

5.1.6.1 The implementation of standard pollution prevention and control measures during construction would protect water quality during that phase of the development. The SuDS would protect the ponds from pollutants associated with surface water runoff when the site is occupied. New ponds would be created close to the retained ponds to provide additional habitats for aquatic flora and fauna.

5.1.6.2 A mosaic of habitats of value to great crested newts would be created in the green space linking the two existing ponds known to support the species. This would include new ponds, tussocky grassland and scrub. This green link would facilitate the movement of newts between the ponds and maintain the favourable conservation status of the newt population.

5.1.7 Other habitats/features

5.1.7.1 It is proposed to create two railway underbridges that would pass through the railway embankment. This may result in the loss of scrub; however, new native planting associated with the landscaping proposals around these tunnels would provide replacement habitats of value to biodiversity. The underbridge associated with the pedestrian/cycleway would provide a link between the northern and southern side of the railway that would connect terrestrial populations which are currently isolated by the railway embankment, or at risk at mortality from the trains (primarily badgers).

5.1.7.2 The development proposal would also lead to the loss of patches of ruderal herbs and scrub of limited value to nature conservation. New habitats of greater value to nature conservation would be provided which would more than compensate for this loss. There are a few 'individual' trees within the site; the majority of these would be retained within the green space associated with the Masterplan.

5.1.8 Bat roosts

5.1.8.1 The Masterplan Site contains very few natural roost sites with a few bat boxes installed on trees. Artificial roosting sites (bat bricks and bat boxes) would be incorporated into the development areas and installed on trees in the areas of open space. This would lead to an increase in the number of available roost sites and thus, enhance the value of the Masterplan Site for roosting bats. The number of boxes provided would follow the BCT Guidance for zero carbon homes (Williams, 2010).

5.2 Offsite mitigation for farmland birds

5.2.1.1 The proposed development would be 406 ha in area, comprising a mixture of arable farmland (286 ha) and improved grassland (96 ha), with small blocks of woodland (8ha), watercourses, ponds, hedgerows and mature trees. Field surveys revealed that the site supported ten farmland specialist bird species, two of which are listed within the 'arable six' species of concern (i.e. grey partridge and yellow wagtail). The 'arable six' species are those specifically targeted by the Higher Level Stewardship (HLS). Yellow wagtail were recorded nesting on the edge of the Masterplan Site close to Crowmarsh Farm, whilst grey partridge were recorded overwintering, but not nesting. The Masterplan Site also supported approximately 28 pairs of skylark and 64 pairs of yellowhammer. With the exception of linnet (where 28 pairs were recorded), the remaining farmland bird species (starling, stock dove, reed bunting, kestrel and common whitethroat) were recorded in low numbers.

5.2.1.2 The development would lead to the loss of the farmland that supports these birds. Domestic pets (primarily cats) associated with new residents may also lead to an increase in predation affecting birds using the adjacent farmland. The creation of a wide band of open space on the edge of the Masterplan Site would reduce the likelihood of predation and lead to the creation of habitats of value to some of these species; nevertheless, there would be a residual effect on birds, as farmland bird habitat would not remain on the site.

5.2.1.3 It is proposed to mitigate for the adverse effect on farmland birds by funding habitat improvements offsite. Funds would be provided to enhance local habitats for farmland birds through appropriate, proven management regimes to increase the carrying capacity of local habitats. It is considered that such enhancement measures would mitigate for the loss of habitat for farmland birds as a result of the proposed development. The HLS payments targeted specifically at farmland birds aim to provide the three elements considered to limit farmland bird numbers. These are: 1) safe nesting habitat, 2) summer food and 3) winter food. Measures developed as part of HLS which could be adopted include: the creation of in-field nesting habitat

such as skylark plots and beetle banks; the provision of over-wintering seed food as a crop; the provision of bought seed to provide supplementary feeding in winter; the creation of insect-rich foraging habitat such as unharvested fertiliser-free conservation headland and uncropped, uncultivated margins for rare plants on arable land. There are other measures that could be adopted but these would provide habitat for the three elements in line with Natural England's Farmland Bird Advisory Note (Natural England, 2013a).

5.2.1.4 It is not considered necessary to purchase land specifically for the habitat management, since it is not the lack of farmland that is limiting bird numbers, but the lack of appropriate management. It is proposed to contribute funds to a grant-giving body such as the Trust for Oxfordshire's Environment which would guarantee, through a legal agreement, that the money would be used to deliver the proposed benefits for farmland birds in the local area. The detail of this agreement would be set out in a S106 or similar legal agreement which would form part of the permission for each planning application.

5.2.1.5 The disturbance and habitat loss that would have the largest effect on nesting farmland birds would occur during site clearance; it is therefore proposed that the monies would be provided to the grant-giving body at least six months, and ideally one year, in advance of the impacts occurring (i.e. at last six months and ideally one year in advance of site clearance for each phase of the development). The Masterplan would result in the loss of 382 ha of arable land and improved grassland of value to farmland birds. It is proposed that funds provided would be sufficient to enhance 200 ha of farmland for farmland birds for a period of 25 years. The sums would be provided as lump sums in advance of each phase of site clearance sufficient to cover management for the 25-year period. The payments provided would be in line with the payments provided by HLS (Natural England 2013b) as outlined in the table below:

Item	Unit price	Suggested minimum (per 100ha, as per HLS guidance)	100ha site	Annual instalment for 100 ha
1. In-field nesting habitat				
Skylark plots	£5 per plot	20	20	£100
Beetle banks	£580/ha	2ha	2.8ha	£1,624
2. Over-wintering seed food				
Enhanced wild bird seed mix plots (assuming a payment for 3ha over a ten year period)	£475/ha	2ha	3ha	£1,425
Supplementary feeding in winter for farmland birds	£822/tonne	No HLS guide; Entry Level Stewardship 0.2 or 0.5 tonne/ha	3 tonne	£2,466
3. Insect-rich foraging habitat				
Unharvested fertiliser-free conservation headland	£440/ha	2ha	3ha	£1,320
Uncropped, uncultivated margins for rare plants on arable land	£440/ha	2ha	3ha	£1,320
Total per year				£8,255

5.2.1.6 It is considered that providing sums that would cover enhancements on 200ha of land would more than mitigate for the impacts on farmland birds that would be generated by the development on the Masterplan Site. The RSPB have found that they were able to more than

double the number of farmland birds on their Hope Farm Site in Cambridgeshire in a ten-year period by managing their farmland in a manner beneficial to farmland birds (Source: RSPB website). It is therefore anticipated that enhanced management of 200 ha of land would mitigate for the impact on birds associated with the loss of suitable farmland bird habitat within the 400 ha site. The provision of grants to local landowners via a grant-giving body would ensure that the monies are provided for appropriate measures, and that the measures would be implemented since the grants would not be awarded if the works were not completed.

5.3 Securing a net gain in biodiversity

5.3.1 Green Infrastructure

5.3.1.1 In order to minimise the potential effects identified in Section 4, above, the Masterplan has sought to retain the most valuable habitats with appropriate buffer zones linked to areas of green space. Consequently the following buffers zones supporting semi-natural habitats would be provided:

1. The hedgerows would retained within a 20 metre-wide corridor. This is widened to 40 metres on certain hedgerows in the southern half of the site to provide a dark corridor for bats;

2. The streams would be retained within a 60 metre-wide corridor;

3. The woodlands would be provided with a 10 metre-wide buffer;

4. The ponds would be provided with a minimum 10 metre-wide buffer. This buffer would be extended around the pond at Crowmarsh Farm to include the green space associated with a new Nature Reserve. The newt ponds would each have a minimum of a 50 metre buffer linked to green space (SuDS features and retained planted woodland). The pond at Hawkwell Farm would be adjacent to the Country Park.

5.3.1.2 Significant areas of green space would be created throughout the Masterplan Site. This includes areas which would support semi-natural habitats to provide links between retained habitats. This would counteract the effects of fragmentation that could occur as a result of the proposed development. Consequently it is proposed to create green space in the following locations:

1. To link the retained blocks of semi-natural woodland and the more mature plantation to the stream corridor. These woodlands are located close to the River Bure and its tributaries; consequently, the woodlands would form part of a larger area of open space that includes the woodlands and stream corridors.

2. In the northern half of the site, to link the stream corridor with the railway corridor. Two swathes of green space would be created; one associated with the existing stream corridor; and the other a far broader feature that wraps around the western edge of the site and alongside the railway corridor. This broader feature would contain a Country Park, green burial ground, woodland, allotments, a wetland supporting a waste water treatment facility and other areas of open space (see section 5.3.2 for further details).

3. In the southern half of the site, to link the railway corridor with the offsite parkland to the south. Again two belts of green space would be created. One on the western edge of the site would contain the stream corridor, the pond at Crowmarsh Farm, a new Nature Reserve, a woodland fitness trail and other areas of green spaces (potentially including green burial and further allotments). The other belt of green space would comprise green

corridors linking the railway corridor to the retained plantation woodland belts, sports pitches and the ponds supporting great crested newts. School playing fields and other open space associated with primary and secondary schools would also contribute to this belt of green space.

5.3.1.3 Other areas would be created within the development parcels to provide local residents with green space on their door step. These areas are not illustrated on the Masterplan owing to the scale of the plan. It should also be noted that, although much of the green space and green infrastructure that is shown on the Masterplan is illustrated by straight lines, this is also an artefact of the scale of the plan. A more natural edge that integrates the green space with the landscape and existing site contours would be provided.

5.3.1.4 The creation of the interlinked green space and the presence of green 'stepping stones' throughout the development parcels would provide an interconnected habitat network that allows for the movement of fauna across the landscape both during the day and night. A dark corridor would be maintained across the site to enable light sensitive bats, to continue to forage and commute across the site. This corridor utilises the stream corridors in the northern half of the site, and the stream corridor and hedgerow network in the southern part of the site. The corridor follows the route that these bats currently use. The number of lit crossings has been minimised as far as possible and the detailed design would follow the principles set on the Exemplar site to ensure that the dark corridor would be maintained. These involve the use of focussed optics and employing a non-reflective road surface on the bridge crossings. Although there would be leisure cycle and pedestrian routes close to this dark corridor, these would not be lit. The existing trees and shrubs on the stream corridor would be retained, which would ensure that the stream channel would continue to provide a sheltered corridor. The railway corridor would also remain unlit and continue to provide a dark corridor across the site. Other areas of open space would be created within the site as identified in Section 6.2, below, and many of these also would not be artificially lit.

5.3.1.5 The road layout has sought to minimise the number of hedgerow and stream crossings. It is intended that no further breaches of hedgerows would be required as part of the detailed design with internal streets configured so that they do not cross these corridors. Green space (including hedgerows) would be located in front of development so that is not incorporated into curtilage boundaries. The Masterplan has ensured that the green space can be easily accessed for future management and to prevent the urbanisation of these habitats from incorrect management by the occupiers of the development area. This would ensure that the green space remains present for the life of the development.

5.3.1.6 The landscape design concept of 'interwoven' has been incorporated into the green infrastructure strategy to ensure that the landscape character, the requirements for biodiversity, and requirements for the residents, are integrated together to create significant areas of green space protecting retained features, and providing the opportunity to create new habitats of value to biodiversity linked to retained habitats. This green infrastructure also provides amenity value and incorporates the SuDS.

5.3.2 Delivering a net gain in biodiversity

5.3.2.1 The large areas of green space that have been incorporated into the Masterplan which would provide habitats of benefit to biodiversity are listed below:

- A Country Park (13.12 ha);
- A Nature Reserve (7.71 ha);
- Sustainable drainage features (10.06 ha); and

- A wetland waste water treatment facility (6.08 ha);
- Green burial (4 ha);
- Green roof water treatment (3 ha); and
- Woodland Fitness Trail (6.04 ha).

5.3.2.2 The design of these open spaces will come forward with the detailed design for the development. However, within these areas of substantial green space there would be the potential to create spaces and features that would support Section 41 habitats and species. Habitats include:

- Orchards;
- Hedgerows;
- Ponds;
- Lowland meadows:
- Reed beds; and
- Lowland mixed deciduous woodland.

5.3.2.3 These habitats would provide conditions suitable for the Section 41 species that have been recorded on the Masterplan Site and those that may colonise the site in the future:

- Amphibians, common toad, great crested newt;
- Reptiles: common lizard, grass snake;
- Mammals: hedgehog, bats (soprano pipistrelle, brown long-eared bat, noctule); and
- Invertebrates: butterflies (small heath, white letter hairstreak, brown hairstreak).

Country Park (13.12 ha)

5.3.2.4 This would be created on the western edge of the site north of the railway line, and it would be designed to provide a space for informal recreation but also support habitats of value to biodiversity (trees, grassland, wetland and scrub). The detailed design of the habitats within the Country Park would ensure that there would be areas for quiet contemplation that would provide conditions suitable for fauna that are more sensitive to disturbance. The Country Park would be linked to the stream corridor to the north by allotments and tree planting. The wetland treatment area and the green burial ground would also link the Country Park to the stream corridor to the south. The habitats within the Country Park would be linked to the developed area via the retained hedgerow network. It is therefore envisaged that the fauna associated with the retained hedgerows would readily colonise the new habitats in the Country Park. The majority of the Country Park would not be lit.

5.3.2.5 Section 41 habitats that would be created in the Country Park include: lowland mixed deciduous woodland, lowland meadow and ponds. Other habitats that would be created include short grassland, native species-rich scrub and wildflower-rich grassland. The remainder of the Country Park would comprise paths and facilities.

Nature Reserve (7.71 ha)

5.3.2.6 This would be created on the southern side of the railway corridor separated from the main site by the stream corridor. Its purpose would be to provide a site for wildlife that is also suitable for informal recreation. The reserve would support wetland habitats, trees, shrubs and grassland, with a particular focus on creating Section 41 habitats. Access would be managed through the use of a defined footpath network with strategic planting to create a space for quiet contemplation. The native planting would be designed to replicate semi-natural habitats which can be managed by cutting, pruning and occasional vegetation removal. It is not envisaged that the Nature Reserve would be grazed by livestock; however, this would be kept under review as plans for the site develop. The aim of the reserve would be to create semi-natural habitats that support the flora and fauna that are on site and to encourage additional species associated with the newly created habitat to colonise, in particular Section 41 species. There is the potential for the existing farm buildings within this proposed Nature Reserve area to be adapted in order to provide a place of shelter for nesting birds, including species of conservation concern such as barn owl, swift, swallow and house sparrow, and also to provide suitable sites for roosting bats. Alternatively new structures could be created for this purpose.

5.3.2.7 Section 41 habitats to be created in the Nature Reserve include: lowland mixed deciduous woodland, lowland meadow, reed bed and ponds. Other habitats that would be created include wildflower-rich grassland and native species-rich scrub. The remainder of the Nature Reserve would comprise surfaced paths and/or structures for wildlife.

Sustainable Drainage Features (10.06 ha)

5.3.2.8 Two large drainage features would be created in the northern half of the site at the intersection of the river crossing and between the River Bure and Lord's Lane. These features would provide flood storage capacity and be dry for most of the year. These areas would support native grassland herbs and shrubs. They would be designed and managed to provide habitats of value to biodiversity, including the species associated with the hedgerows and stream corridors to which they would be linked.

5.3.2.9 There would be numerous above-ground SuDS features across the Masterplan Site as a whole comprising swales, dry attenuation ponds, ephemeral ponds and wet ponds. Not only would these create wetland habitat that, with appropriate design, would support native flora and fauna; they would be located within the green infrastructure and contribute to the value of these areas as wildlife corridors.

5.3.2.10 Ponds, a habitat of Principal importance, would be created in the SuDS. Other habitats that would be created which would be beneficial to biodiversity include wildflower–rich damp and dry grassland, ephemeral ponds and wet/dry ditches (9.96 ha).

A wetland waste water treatment facility (6.08 ha)

5.3.2.11 Much of the detail for this facility has yet to be determined. However, it is known that waste water treatment would be required and it is anticipated that it would be dealt with on site. It is envisaged that an integrated wetland would be created to enable water to be discharged to the existing stream network. Such a facility would provide a range of wetland features and, although the primary function would be to treat waste water, it would also provide habitats which benefit biodiversity, particularly in association with the tertiary treatment before final discharge. This facility could support wet or damp woodland/scrub, swamp/reed bed habitats and damp/marshy grassland, as well as dry habitats associated with the infrastructure buildings and access routes.

5.3.2.12 Most of this area would not be publically accessible and therefore any habitats created would not be subject to regular human disturbance. It would be located alongside the railway corridor

and provide additional habitat for the fauna associated with this feature. In the event that a wetland waste water treatment facility is not constructed, then the area would be able to support green space and incorporate habitats of value to biodiversity within its design. All planting in this area would comprise native species. Although it may be necessary to install security lighting around particular buildings, it would not be necessary to illuminate the entirety of this area. It is proposed to construct a swift tower in this area.

5.3.2.13 Section 41 habitats that would be created in the waste water treatment facility include: reed beds; ponds, wet woodland and lowland meadow. Other habitats that would be created in this area include damp/marshy grassland and species-rich scrub.

Green burial (4 ha)

5.3.2.14 The detail of this area has yet to be determined, although green burial sites typically comprise a mosaic of grassland and trees. It is likely that an area of 'parkland' would be created.

Green roof water treatment (3 ha)

5.3.2.15 Within the Masterplan Site, it is proposed to create green roofs as part of the drainage strategy. The detail of these roofs has yet to be determined but it is most likely that they would support *Sedum* rather than meadow grass for ease of future maintenance.

Woodland fitness trail (4.6 ha)

5.3.2.16 A woodland fitness trail would be created on the western edge of the site south of the railway line. The woodland would link into the existing site contours and comprise native tree and shrub species. The planting and design would create a habitat that would be of value to biodiversity and in particular invertebrates, birds, bats and badgers (the trail would be located between two large badger setts in the southern half of the site). A pedestrian/cycle leisure route would also pass through this area. The fitness trail and the leisure route would not be lit. This area would be linked to the retained hedgerow network and the dark bat corridor; the fauna associated with these retained features would be expected to colonise the new woodland as it develops. To the north, the vegetation associated with the woodland fitness trail would be linked to the pond at Crowmarsh Farm, and in turn the vegetation would be linked to the new Nature Reserve by the stream corridor. To the south, the vegetation associated with the woodland fitness trail would be connected to green space (burial ground and allotments). As indicated previously, the vegetation associated with the fitness trail would be linked to the bat corridor, which in turn would be connected to the stream corridor and a network of retained hedgerows. Whilst the habitat associated with the fitness trail will be linked to other areas of open space, the trail itself will not be linked to the Nature Reserve to ensure that the reserve maintains its distinctive character.

5.3.2.17 The woodland fitness trail would combine lowland mixed deciduous woodland, a habitat of Principal Importance, with areas of open habitat beneficial to invertebrates and bats (glades and rides).

General amenity green space (11.09 ha)

5.3.2.18 There are several areas within the Masterplan Site that currently have no defined use in the Masterplan. The detail would come forward as part of the Reserved Matters Applications, but these areas would support green space of some value to biodiversity (see Section 6.3 for an evaluation of the habitat that would be created in this area).

Other areas of green space

5.3.2.19 Although the primary function of the community farm, allotments and other food growing areas would not be to provide habitat of value to biodiversity, these areas would nevertheless support a range of fauna. They would provide habitat which would be suitable to support invertebrates, reptiles, birds, bats, hedgehog and badger. If suitable ponds were created in these areas, they would also provide habitat for breeding amphibians.

5.3.2.20 The sports pitches that support amenity grass would provide suitable foraging habitat for hedgehog, badger and bird species of conservation concern which are associated with large areas of short grassland (such as starlings). The areas of green space within the developed areas would also provide habitat for invertebrates and birds if they are planted with species of value to these species groups.

5.3.2.21 Although these habitats may not contribute to the net gain in biodiversity, the creation of such habitats on intensively managed farmland is not considered to result in a loss to biodiversity, and therefore the impact of this habitat creation would be neutral.

6 Measuring a Net Gain in Biodiversity

6.1 The principles of the Defra Metric

6.1.1.1 The net gain in biodiversity has been assessed using both a qualitative assessment of the value of the site prior to and post development, and a quantitative assessment using the Defra metric developed for Biodiversity Offsetting. The Defra metric is a habitat-based assessment. The calculations and explanations provided below have been informed by Defra's guidance for biodiversity offsetting dated March 2012 (Defra, 2012).

6.1.2 Pre-development baseline

6.1.2.1 When considering baseline conditions, the Defra metric takes account of three values. First, it is necessary to assign a **Distinctiveness** value on the scale; Low (2), Medium (4), and High (6). **Distinctiveness** considers the rarity of the habitat on a scale of local, regional, national and international, and the degree to which the species supported are also found in other habitats. The second is the **Condition** of the habitat on the scale; Poor (1), Moderate (2) and Good (3). The **Condition** assessment is based on the guidance provided in Natural England's HLS Farm Environment Plan (FEP) Manual, but also takes account of comments received from consultees to earlier drafts of a similar report. The third value is the **Area** that the habitat covers in hectares. The number of Biodiversity Units provided by each habitat within the Masterplan Site prior to development is calculated by multiplying the values for **Distinctiveness**, **Condition** and the **Area** for each habitat. The sum total for all the Biodiversity Units for each habitat within the site provides the number of Biodiversity Units that the site supports. (See Table 1 in Section 4).

6.1.3 Post-development

6.1.3.1 These three values used pre-development are also considered in the calculation for the site Post Development, and it has been agreed with consultees that the values for Distinctiveness and Condition that have been assigned to the habitats prior to development would be used in the Post Development calculation, i.e. there should be no loss to biodiversity in the retained habitats post-development.

6.1.3.2 The Post Development calculation is also required to take account of risks. Three factors have been developed to deal with the various risks associated with habitat creation, not all of which would be relevant to habitat creation on this site.

Risks

Difficulty

6.1.3.3 The first 'risk' relates to the difficulty of the habitat restoration or recreation. There are four bands from **Low** difficulty, where the area lost must be replaced with a similar area, to **Very High** difficulty, where the replacement habitat must be 10 times larger to generate the same number of biodiversity units. Habitats assessed by Defra as of **Low** (1) difficulty that are potentially relevant to the Masterplan Site are: hedgerows, ponds, traditional orchards and reed beds. A multiplier of 1 would hence need to be used for these habitats, i.e. 1 ha of ponds would need to be created to deliver the same number of biodiversity units as that which would be lost if 1 ha of ponds was removed as a consequence of development. Lowland meadow, lowland mixed deciduous woodland and wet woodland have been identified by Defra as of **Medium** difficulty, a multiplier of 1.5 would need to be used for these habitats, i.e. 1.5 ha of wet woodland would need to be created to deliver the same number of biodiversity units as that which would be lost by the removal of 1ha of wet woodland. The Defra guidance only covers Section 41 habitats; it is considered that the difficulty in creating habitats that are not Section 41 habitats would be **Low**.

Location

6.1.3.4 The second risk relates to the location of the offset, as offsetting sites that are remote from the impact require a greater area for the offset. The pilots defined the area where the offset should be provided. Given that the habitat creation would take place on site no multiplier has been applied.

Time

6.1.3.5 The third risk relates to the time required to restore or recreate the habitat. A net loss is experienced in this time, and more habitats must be provided to compensate for this loss. The guidance identifies that a multiplier of 1.2 should be applied for a habitat that would take 5 years to reach condition requires. On the Masterplan Site this would apply to: ponds; reed beds; ditches; ephemeral ponds; green roofs; species-rich scrub; short grassland; damp/marshy grassland; areas of wildflower-rich grassland. Habitats that take 10 years to reach their target condition would require a multiplier of 1.4. This would apply to: lowland meadow; hedgerow buffers; species-rich scrub. Habitats that would take 20 years to reach their target condition require a multiplier of 2: this would include lowland mixed deciduous woodland and wet woodland. It is not proposed to create habitats which would take more than 20 years to reach their target condition.

How the risks have been applied

6.1.3.6 It should be noted that, in order to calculate the number of Biodiversity Units that the green infrastructure is designed to achieve, it is necessary to divide the units by the various risk multipliers. i.e. 1 ha of ponds of High (6) Distinctiveness and Good (3) Condition with no risks to achievement would deliver 18 Biodiversity Units. When the risk of achievement is Low (1), the habitat would be created on site (no multiplier need be employed), but it will take 5 years to reach its target condition (1.2), thus creating 1 ha of ponds on site would deliver 18/1.2 Biodiversity units i.e. 15 Biodiversity units.

6.2 Baseline conditions

6.2.1.1 As identified in Section 3 of this report “prior” to development, the Masterplan Site supported habitats of value to nature conservation.

6.2.2 Arable land and improved grassland

6.2.2.1 The HLS FEP does not provide guidance on how to assess the condition of arable land and improved grassland. Although the farmland has been found to be of value to farmland birds and had the potential to support brown hare, it was found to be of limited value to other species. Off-site mitigation would be provided to mitigate the impact on farmland birds and brown hare, as outlined in Section 5.2. Consultation with BBOWT has revealed that it is the value of the habitats that should be assessed and it was agreed that these were of **Low Distinctiveness** and **Poor Condition**.

6.2.3 Hedgerows

6.2.3.1 The Defra metric calculation does not assign biodiversity units to hedgerows. They are treated as a separate entity. There are three grades of hedgerow; ‘Low’, ‘Moderate’ and ‘High’. For every metre of Low grade hedgerow lost, a new metre must be planted. In the case of Moderate quality hedgerows every metre lost must be replaced with twice that length, and for High quality hedgerows with three times the length. As indicated previously, the majority of the hedgerows within the Masterplan Site would be retained with appropriate buffer zones (a minimum of 20 metre buffer centred on the hedgerow). However, several kilometres of hedgerow would be removed from their original location. Most of these hedgerows are species-rich supporting a diverse range of trees and shrubs, albeit with a restricted ground flora. These features were found to support hairstreak butterflies and nesting birds. They are also likely to be used by foraging badgers and hedgehogs, and have some value to foraging bats. These features have therefore been assessed to be of **High Quality** and Defra guidance would suggest that any hedgerow lost should be replaced with three times as much planting. As identified above, it is anticipated that the Masterplan would result in the removal of several kilometres of hedgerow. However, instead of replacing these habitats with new planting, it is proposed to translocate the hedgerows elsewhere within the Masterplan Site to create new links within the green space between fragmented hedgerows. New tree and shrub planting within the built development would also compensate for the loss of hedgerows.

6.2.4 Watercourses (River Bure and tributaries)

6.2.4.1 Watercourses are not covered by the condition assessments provided in the HLS FEP handbook. Watercourses that do not hold water throughout the year or in all years are a feature associated with the limestone geology encountered on the Masterplan Site. Although the streams on the site have not been found to support a particularly rare or diverse aquatic invertebrate fauna, such features do support species that are not found within other watercourses. These features are therefore considered to be of **High Distinctiveness**. Water quality in the streams appears to be reasonable; there were signs of localised enrichment and the invertebrate sampling that was undertaken on the Exemplar site revealed that the water was of ‘moderate’ quality. However, given that the streams were located in a largely arable landscape and the signs of nutrient enrichment were localised, it is therefore considered that these features are of **Good Condition**.

6.2.5 Semi-natural broad-leaved woodland

6.2.5.1 Two blocks of semi-mature semi-natural broad-leaved woodland were recorded within the northern half of the site. Many of the canopy trees had been removed in these areas, and the canopy largely comprised shrubs and young Ash and Scots Pine trees. The ground flora was species-poor. This habitat is common in the locality, and the fauna that these woodlands supported (birds, badgers, reptiles and invertebrates) are not limited to woodland but also associated with other habitats. For these reasons these woodlands are considered to be of **Low Distinctiveness**. However, these woodlands have been identified on the basis of aerial photography by Natural England as a habitat of Principal Importance under the NERC Act and therefore, as requested by consultees, they have been categorised as a habitat of **High Distinctiveness**. The HLS FEP considers five criteria when assessing the condition of native semi-natural woodland; the result of this assessment is as follows:

Criterion 1: Native species are dominant. Non- native species and invasive species account for less than 10% of the vegetation cover.

Response: Non-native species do account for less than 10% of the total vegetation cover.

Criterion 2: A diverse age and height structure.

Response: The woodlands are largely missing mature trees and therefore do not fulfil this criterion.

Criterion 3: Free from damage (in the last five years) from stock or wild mammals- there should be evidence of tree regeneration such as seedlings, saplings and young trees.

Response: The woodlands are fenced and not damaged by livestock. However, there is little natural regeneration.

Criterion 4: Standing and fallen dead trees of over 20 centimetres diameter are present.

Response: No such dead trees are present.

Criterion 5: The area is protected from damage by agricultural and other adjacent operations.

Response: The woodlands are fenced and protected from grazing livestock.

6.2.5.2 These woodlands comply with two of the five criteria. Given that they have not been found to support any rare, uncommon or otherwise notable species, these woodlands were considered to be of **Poor Condition**. However, given that these woodlands have been found to be of some value to breeding birds including species of conservation concern, these woodlands have been categorised to be of **Good Condition**, again as requested by consultees.

6.2.6 Plantation woodland

6.2.6.1 The canopy of the plantation woodland adjacent to Hawkwell Farm was dominated by Grey Poplar; this non-native species has clearly originated from planting. The understorey was sparse and the ground flora species-poor. There were several belts of more recently planted woodland in the southern part of the site close to Aldershot Farm and Himley Farm. These largely comprised native tree and shrub species with no distinctive canopy and understorey. The ground flora in these woodland belts was grass-dominated. Such woodlands are relatively common in the locality, and support a restricted fauna comprising largely of species which are present in other habitats such as hedgerows. As such they are considered to be of **Medium**

Distinctiveness. The HLS FEP provides criteria for assessing several different woodland types, however none of them are directly comparable to the plantations on the site. The closest fit is 'mixed woodland' which is woodland with native and non-native species which has been established by planting and natural regeneration. There are three criteria when assessing the condition of mixed woodland, the results of this assessment is as follows:

Criterion 1: This should be an area of trees with complete canopy cover.

Response: The block of mature woodland next to Hawkwell Farm has a complete canopy cover. The shelter belts do not really have a main canopy, but the areas are covered by trees and shrubs.

Criterion 2: The woodland must be free from damage (in the last five years) by stock or wild mammals.

Response: The woodlands do not show significant signs of damage. They are fenced from livestock and deer browsing does not appear to be causing significant damage.

Criterion 3: There should be no evidence of machinery storage, signage or inappropriate management.

Response: There is no evidence of such damage in the woodland or planted shelter belts.

6.2.6.2 Based on the criteria in the HLS FEP for mixed woodlands, the plantation woodland and the planted shelter belts has been categorised as of **Good Condition**.

6.2.7 Ponds

6.2.7.1 There are very few ponds in the site and most did not hold water all year round; no rare or uncommon plant species or aquatic invertebrates were recorded in these features. However, although ponds are a feature of the landscape, small field ponds are not particularly common. In addition, two of the ponds on the site support a medium population of great crested newts, which, owing to the scarcity of ponds in the locality, means that great crested newts are also not particularly common. It is therefore considered that the ponds on the site are of **High Distinctiveness**. The HLS FEP considers six criteria when assessing the condition of a pond, the results of this assessment is as follows:

Criterion 1: The pond should be set within a semi-natural habitat.

Response: All ponds on site are located within an area of semi-natural habitat.

Criterion 2: It should be within 500m of another wetland feature (such as a pond, river or fen).

Response: All ponds within the site are either within 500 metres of the stream or within 500 metres of another pond.

Criterion 3: There should be no obvious sign of pollution or of inappropriate quality of the water supply.

Response: On the site all ponds are either fed by a spring, rain or are on-line with a spring-fed watercourse. In some cases, there are signs of some nutrient enrichment but this is limited and these features would not be considered polluted.

Criterion 4: There should be an absence of damaging non-native plant or animal species.

Response: No non-native plant species have been recorded within the ponds. Non-native North American crayfish have been recorded on an on-line pond which is up-stream and offsite but they have not been recorded within the Masterplan Site. It is appears that the ponds do not currently support non-native animal species.

Criterion 5: The pond should not be stocked with fish or support damaging numbers of wildfowl.

Response: None of the ponds on site appear to be stocked with fish and although waterfowl do use some of the ponds, including the ponds that support great crested newts, the water fowl are not considered to be in 'damaging' numbers.

Criterion 6: It should experience only natural fluctuations in water level.

Response: The ponds on site all appear to experience natural fluctuations in water levels and do not appear to receive significant inputs from other sources.

6.2.7.2 The ponds on the site fulfil all six of the criteria and therefore it is considered that they are in **Good Condition**.

6.2.8 Scrub on the railway embankment

6.2.8.1 This habitat would be largely retained. The value of this wildlife corridor would be enhanced with the provision of open space alongside this feature. Where this feature would be located alongside built development, landscape planting would be used to provide a buffer to the embankment. These measures should ensure that the adjacent land supports a greater diversity of habitats than currently present on the Masterplan Site. It is proposed to construct two new underbridges that would lead to the loss of existing scrub habitat, but this would be compensated for with new planting associated with the new cycle/pedestrian route and the new access road. This feature would continue to be managed by Network Rail. The scrub has been assessed as of **Medium Distinctiveness** and **Moderate Condition**.

6.2.9 Ruderal herbs

6.2.9.1 Within the Masterplan Site there were several large patches of Common Nettle, these were large enough that the area that they occupy could be measured. Common Nettle is one of the most abundant plants in the United Kingdom and it is commonly associated with nutrient-rich habitats around farm buildings and in urban landscapes, it is therefore common in the locality. Although patches of nettles can be of value to wildlife, they do not support uncommon species that are unique to this habitat type. This habitat has therefore been assessed to be of **Low Distinctiveness**. The HLS FEP does not provide guidance on how to assess the condition of habitats comprising solely ruderal herbs. Within the Masterplan Site, the larger areas of nettles were associated with unmanaged habitats that supported terrestrial invertebrates and reptiles they have therefore been assessed to be in **Moderate Condition**.

6.2.10 Other habitats and features

6.2.10.1 Other habitats and features recorded within the Masterplan Site were individual trees, patches of scrub, amenity grassland and buildings. The individual trees were trees that were not associated with the stream corridors, hedgerows, woodlands or farm buildings. The number of trees that fall into this category is very low, and therefore the area that they cover is considered insignificant within the Masterplan Site as a whole. However, these trees are of value to biodiversity, and so have been retained within areas of green space. This green space is either associated with the newt ponds or the extensive areas of green space on the western edge of

the Masterplan Site. It is therefore considered that the biodiversity value of these features would be conserved and that the impact of the development on the flora and fauna associated with these trees would be neutral. The contribution that these trees would have on the Defra metric calculation would also be neutral and for these reasons biodiversity units have not been assigned to the individual trees.

6.2.10.2 Most of the patches of scrub were located within the stream corridors and the hedgerows. The patches of scrub that fall outside these areas are few and the area that they cover is insignificant within the Masterplan Site as a whole. In addition, the scrub habitats were not found to support a unique flora or fauna. The contribution which they make to the arable fields and improved grasslands has hence been considered in the calculation for the biodiversity units assigned to these larger habitat types.

6.2.10.3 The areas of amenity grassland were associated with the farmsteads. These habitats together with the buildings would be retained and continue to be managed by the occupiers of the dwellings. Biodiversity units have not been assigned to these habitats and features.

6.3 The biodiversity value of the site post development

6.3.1 Habitat on site prior to development

6.3.1.1 Leisure routes would be provided in the buffer planting associated with the hedgerows, the retained woodlands and the river corridors. The footprint of these routes comprising a total of 5.35ha has been excluded from the net gain calculation.

Arable land and improved grassland

6.3.1.2 As identified in Section 5.2, above, it is proposed to mitigate for impacts associated with the loss of these farmland habitats through habitat enhancement offsite.

Hedgerows

6.3.1.3 As identified in Section 6.2.2, hedgerows are not included within the Defra metric calculation. As outlined in Section 5.1.2, the Masterplan has sought to maintain the integrity of the hedgerow network; including the road layout designed to reduce fragmentation as far as possible. Nevertheless, several kilometres of hedgerow would be removed, as outlined in Section 6.2.3; this hedgerow loss would be mitigated for with translocation and new planting. The hedgerows have been assessed as High Quality features and the new planting would take the form of tree and shrub planting within the green space. This new planting would take place across the site within the green space and the development parcels. This planting would provide new links where fields have been fragmented by the red line boundary of the Masterplan Site and new links between the retained hedgerows.

Semi-natural broad-leaved woodland, ponds, watercourses (river Bure and its tributaries), plantation woodlands and their associated buffers

6.3.1.4 As identified within Section 5.3.1, the streams and woodlands would be retained with appropriate buffer zones linked to green space. In the long term it is anticipated that the biodiversity value of these habitats would be enhanced through appropriate management and through the planting of semi-natural habitats of value to biodiversity within the green spaces and buffers. Notwithstanding this, the values for **Distinctiveness** and **Condition** that have been assigned to these habitats prior to development would be used in the calculation of the Defra metric post-development as agreed with consultees.

Grassland and scrub on the railway embankment

6.3.1.5 As outlined in Section 6.2.7 above the railway embankment would be largely retained with new planting to compensate for the scrub habitat that would be lost when underpasses are created. Notwithstanding this, the values for **Distinctiveness** and **Condition** that have been assigned to this habitat prior to development would be used in the calculation of the Defra metric post-development as agreed with consultees

Ruderal herbs, other habitats and features

6.3.1.6 Most of the large areas of nettles would be lost beneath the footprint of the development. This habitat loss would be more than compensated for by the habitat creation associated with the new development. As set out in Section 6.2.8, above, the other habitats on site; namely the individual trees, patches of scrub, amenity grassland and buildings, would not be included in the Defra metric.

6.3.2 New habitats

6.3.2.1 The LHMP would ensure that the newly created habitats would be maintained and that remedial action is taken if they fail to meet their targets for habitat creation. Monitoring would also ensure the target habitats are created.

A Country Park (13.12 ha)

6.3.2.2 As identified in Section 5.3.2, it is proposed to create a Country Park in the northern half of the site. Although it would be designed to provide a space for informal recreation, the habitat created would include Section 41 habitats, and therefore comprise native species. The Park would be designed and managed to provide benefits to biodiversity. As identified in section 5.3.2 the aim would be to provide habitats for the species that currently reside on the site. These include Section 41 species, such as hedgehog and hairstreak butterflies, as well as noctule, soprano pipistrelle and brown long-eared bats.

6.3.2.3 The Section 41 habitats that would be created in the Country Park that would be of **High Distinctiveness** and **Good Condition** include: lowland mixed deciduous woodland (4ha), lowland meadow (2ha) and ponds (0.05 ha - equivalent to 5 small ponds). The other habitats that would be created that would be of **Medium Distinctiveness** and **Good Condition** include short grassland (2 ha), native species-rich scrub (2 ha) and wildflower-rich grassland (2 ha). The remainder of the Country Park (1.07 ha) would comprise paths and facilities that would be of **Low Distinctiveness** and **Poor Condition**.

A Nature Reserve (7.71 ha)

6.3.2.4 As identified in Section 5.3.2, above, a Nature Reserve would be created adjacent to the southern side of the railway corridor. This Nature Reserve would build upon the habitats and features already present including the stream corridor, the railway corridor, the pond at Crowmarsh Farm and existing farm buildings. The Nature Reserve would support many of the habitats present in the Country Park; however, an additional objective of the Nature Reserve would be to create more wetland habitats. This would include measures to enhance the value of the stream and the pond at Crowmarsh Farm and the creation of ponds and other wetland features. The aim would be to provide habitats that support Section 41 species.

6.3.2.5 Section 41 habitats that would be created in the Nature Reserve of **High Distinctiveness** and **Good Condition** include: lowland mixed deciduous woodland (1.5 ha), lowland meadow (2 ha), reed bed (1 ha) and ponds (0.05 ha - equivalent to 5 small ponds). Other habitats that would be created that would be of **Medium Distinctiveness** and **Good Condition** include wildflower-rich grassland (1 ha) and native species-rich scrub (2 ha). The remainder of the Nature Reserve

(0.16 ha) would comprise surfaced paths and/or structures for wildlife that would be of **Low Distinctiveness** and **Poor Condition**.

Sustainable drainage features (10.06 ha)

6.3.2.6 As identified in Section 5.3.2, two large drainage features would be created in the northern half of the site to provide flood storage capacity. These features are located alongside the watercourses and hedgerows and contribute to maintaining and enhancing the biodiversity value of these features. These drainage features would be dry for most of the year, and would be planted with native plant species of value to biodiversity, once again with the aim of providing habitat suitable for Section 41 species. The other above ground SuDS provide the opportunity to create wetland habitat.

6.3.2.7 Ponds, a habitat of Principal importance, would be created in the SuDS (at least 0.1 ha equivalent to ten small ponds); these ponds would be of **High Distinctiveness** and **Good Condition**. Other habitats of **Medium Distinctiveness** and **Good Condition** that would be created that would be beneficial to biodiversity include wildflower–rich damp and dry grassland, ephemeral ponds and wet/dry ditches (9.96 ha),

A wetland waste water treatment facility (6.08 ha)

6.3.2.8 As identified in Section 5.3.2 the detail of this facility has yet to be determined; however, if it is required, it would support wetland habitats that are not common in the locality. Such habitats have the potential to support Section 41 species. If a water treatment facility is not required, this area of green space would be used to create habitats and features of value to biodiversity which would then fulfil the requirement to support habitats of similar distinctiveness and condition.

6.3.2.9 Section 41 habitats that would be created in the waste water treatment facility of **High Distinctiveness** and **Good Condition** include: reed beds (2 ha); ponds (0.1 ha- equivalent to 10 small ponds), wet woodland (1 ha) and lowland meadow (0.25 ha). Other habitats of **Medium Distinctiveness** and **Good Condition** that would be created which would be beneficial to biodiversity include damp/marshy grassland (1ha) and species-rich scrub (1.73 ha).

Green burial (4 ha)

6.3.2.10 It is likely that 4 ha of 'parkland' would be created; the aim would be to create an area of grassland and trees of **Medium Distinctiveness** and **Good Condition**.

Green roof water treatment (3 ha)

6.3.2.11 Three hectares of green roofs from part of the drainage strategy. The detail of these roofs has yet to be determined but it is most likely that these roofs would support sedum rather than meadow grass for ease of future maintenance. Sedum roofs would be beneficial to invertebrates and be of **Medium Distinctiveness**, and the aim would be to create a habitat of **Good Condition**.

Woodland fitness trail (4.6ha)

6.3.2.12 The woodland fitness trail would comprise 4.6 ha of lowland mixed deciduous woodland, which is a habitat of Principal Importance of **High Distinctiveness** and **Good Condition**. This includes areas of open habitat beneficial to invertebrates and bats (glades and rides).

General amenity green space (11.09 ha)

6.3.2.13 As identified in Section 5.3.2 there are several areas of general amenity green space within the Masterplan Site that have no formal use assigned to them. It is likely to be possible to create

habitats of value to biodiversity within these areas as part of the detailed design. However, as this has yet to be determined, these areas have been identified as a habitat of **Low Distinctiveness** and **Poor Condition**, since their creation would not lead to a loss in habitat diversity but the gain has yet to be quantified.

Other areas of green space (36.05 ha)

6.3.2.14 These areas comprise the allotments, play areas, Community Farm, school playing fields, sports fields, business park green space and retained ruderal habitats. Whilst these areas of green space do not represent a habitat enhancement, they do represent areas of green space that have the potential to support wildlife. As such they have been assigned **Low Distinctiveness** and **Poor Condition**, where habitats of value to nature conservation could be created to enhance the value of these areas for wildlife. This approach was agreed following consultation with the BBOWT.

6.3.3 The risk to achievement

6.3.3.1 The ratings given for the difficulty, location and time required which have been assigned to the various habitats follow the Defra guidance as set out in Section 6.1.3 above.

6.4 Using the Defra Metric

6.4.1.1 Tables 1 and 2 below provide details of the calculations that have been made using the Defra metric. Table 1 illustrates the number of Biodiversity Units on the Masterplan Site prior to development, and Table 2 provides a calculation with regard to what could be achieved on site through the landscaping proposals. Table 3 illustrates the change, and demonstrates that there is a positive change in the number of Biodiversity Units using the Defra metric.

Table 1 Baseline Biodiversity Units (Prior to Development)

Habitat type	Distinctiveness (Low Medium high i.e. 2, 4, 6)	Habitat Condition (Good Moderate Poor i.e. 3, 2, 1)	Value of 1 ha in biodiversity units	ha on Masterplan Site	Biodiversity units on site
Arable	Low (2)	Poor (1)	2	286.12	572.24
Improved grassland	Low (2)	Poor (1)	2	95.97	191.94
Semi-natural broad-leaved woodland	High (6)	Good (3)	18	3.81	68.58
Plantation Woodland	Medium (4)	Good (3)	12	3.82	45.84
Ponds	High (6)	Good (3)	18	0.26	4.68
Watercourses (River Bure and its tributaries)	High (6)	Good (3)	18	2.41	43.38
Hedgerows	-	High Quality	-	-	-
Grassland and scrub on railway	Medium (4)	Good (3)	12	6.25	75
Ruderal habitats	Low (2)	Moderate (2)	4	0.24	0.96
Total					**1002.62**

Table 2 Biodiversity Units for the Masterplan Site Post Development

Habitat type	Distinctiveness (Low Medium high i.e. 2, 4, 6)	Habitat Condition (Good Moderate Poor i.e. 3, 2, 1)	Value of 1 ha in biodiversity units	ha on Masterplan Site	Difficulty	Difficulty factor	Years to Target Condition	Multiplier	Biodiversity units on site
Retained semi-natural broad-leaved woodland with buffer and additional green space	High (6)	Good (3)	18	5.21	Low (habitat retained)	1	5	1.2	78.15
Retained plantation woodland with buffers	Medium (4)	Good (3)	12	3.92	Low (habitat retained)	1	5	1.2	39.20
Retained ponds plus buffers	High (6)	Good (3)	18	2.67	Low (habitat retained)	1	5	1.2	40.05
Retained watercourses river Bure and its tributaries plus buffer	High (6)	Good (3)	18	14.74	Low (habitat retained)	1	5	1.2	221.10
Hedgerows	-	High Quality	-	-	0				0
Retained grassland and scrub on railway	Medium (4)	Good (3)	12	6.25	Low (habitat retained)	1	5	1.2	62.5
Hedgerow buffer	High (6)	Good (3)	18	32.75	Low	1	5	1.2	491.25
New lowland mixed deciduous woodland Country Park 4ha Nature Reserve 1.5 ha Woodland fitness trail 4.6 ha	High (6)	Good (3)	18	10.1	Medium	1.5	20	2	60.60

Habitat type	Distinctiveness (Low Medium high i.e. 2, 4, 6)	Habitat Condition (Good Moderate Poor i.e. 3, 2, 1)	Value of 1 ha in biodiversity units	ha on Masterplan Site	Difficulty	Difficulty factor	Years to Target Condition	Multiplier	Biodiversity units on site
New lowland meadow Country Park 2 ha Nature Reserve 2 ha WWT 0.25 ha	High (6)	Good (3)	18	4.25	Medium	1.5	10	1.4	36.43
New pond Country Park 0.05 ha Nature Reserve 0.05 ha WWT 0.1 ha SuDS 0.1 ha	High (6)	Good (3)	18	0.3	Low	1	5	1.2	4.50
New reed bed Nature Reserve 1ha WWT 2 ha	High (6)	Good (3)	18	3	Low	1	5	1.2	45.00
New wet woodland WWT 1 ha	High (6)	Good (3)	18	1	Medium	1.5	20	1.4	6.00
New short grassland Country Park 2 ha	Medium (4)	Good (3)	12	2	Low	1	5	1.2	20.00
New scrub Country Park 2 ha Nature Reserve 2ha WWT 1.73 ha	Medium (4)	Good (3)	12	5.73	Low	1	5	1.2	57.3
New wildflower-rich grassland Country Park 2 ha Nature Reserve 1 ha	Medium (4)	Good (3)	12	3	Low	1	5	1.2	30.00

Habitat type	Distinctiveness (Low Medium high i.e. 2, 4, 6)	Habitat Condition (Good Moderate Poor i.e. 3, 2, 1)	Value of 1 ha in biodiversity units	ha on Masterplan Site	Difficulty	Difficulty factor	Years to Target Condition	Multiplier	Biodiversity units on site
New paths and facilities Country Park 1.07 ha Nature Reserve 0.16 ha	Low (2)	Poor (1)	2	1.23	Low	1	5	1.2	2.05
New SuDS grassland, wetland	Medium (4)	Good (3)	12	9.96	Low	1	5	1.2	99.60
New damp/marshy grassland in WWT	Medium (4)	Good (3)	12	1	Low	1	5	1.2	10.00
New green burial parkland	Medium (4)	Good (3)	12	4	Low	1	5	1.2	40.00
New green roof (sedum roof)	Medium (4)	Good (3)	12	3	Low	1	5	1.2	30.00
New general amenity green space	Low (2)	Poor (1)	2	11.09	Low	1	5	1.2	18.48
New allotments[1]	Low (2)	Poor (1)	2	5.33	Low	1	5	1.2	8.88
New play areas[1]	Low (2)	Poor (1)	2	2	Low	1	5	1.2	3.33
New community Farm[1]	Low (2)	Poor (1)	2	1	Low	1	5	1.2	1.67
New school Playing fields[1]	Low (2)	Poor (1)	2	8.08	Low	1	5	1.2	13.47
New sports fields[1]	Low (2)	Poor (1)	2	16.27	Low	1	5	1.2	27.12
New Business Park green space[1]	Low (2)	Poor (1)	2	3.27	Low	1	5	1.2	5.45
Total									**1452.13**

[1]Habitats of similar value to the arable land and improved grassland that they replaced.

Table 3 Change in Biodiversity Units for the Masterplan Site Post Development

Biodiversity Units Prior to Development	Biodiversity Units Post Development	Change in Biodiversity Units
1002.62	1452.13	449.51

6.5 Achieving a net gain in biodiversity

6.5.1.1 Applying the Defra metric that was developed for Biodiversity Offsetting has revealed that the landscaping proposals for the Masterplan Site would create an increase in the number of Biodiversity Units on site. The landscaping proposals would therefore ensure that the Masterplan delivers a net gain in biodiversity as required by PPS 1 and planning policy.

7 Integrating Biodiversity into the Built Environment

7.1.1.1 The detailed design of the built development does not form part of the outline planning applications. Consequently, this net gain calculation has not included the biodiversity benefits that would be generated within the built development. However, there would be opportunities as part of the detailed design to encourage wildlife into the built area. These could include the use of artificial nest and roost boxes, and/or the incorporation of suitable features into the fabric of the buildings; the use of green/brown/blue roofs; street trees; fruit trees within gardens; green walls; and other planting that may not comprise native species but has a structure that provides shelter for fauna; linked gardens that provide significant areas of green space; and the incorporation of native planting within areas of open space and SuDS features.

7.1.1.2 There are other aspects of the detailed design that have the potential to have adverse impacts on the biodiversity value of the site once it is developed. This includes the lighting scheme and details of the access routes (roads, cycle and pedestrian routes). However, the Masterplan provides a framework that would ensure that the impact of these aspects of the development are minimised.

8 Increasing Biodiversity's Resilience to and Ability to Adapt to Climate Change

8.1.1.1 In order to increase the resilience of biodiversity to climate change and ensure it can adapt in the long term the following elements have been incorporated into the Masterplan design:

- Maintaining the ecological diversity of habitats already present on site.
- Providing a range of open spaces would allow for the creation of a diversity of habitats (to include ponds, woodlands, species-rich grassland and wetland habitats) that would provide a diversity of ecological niches.
- Ensuring that existing watercourses are given sufficient space to adapt by allowing for natural processes of erosion and deposition.

- Providing ponds and a SuDS treatment system that would ensure water resources within the site are controlled and maintained for the future. It is anticipated that future rainfall events would be more erratic and SuDS features would be designed to cope with such events.

- Ensuring that retained habitats and newly created habitats form linear corridors that would provide for the migration of species across the site and into the wider countryside as they change their range in response to changes in climate.

- Incorporating measures to control the micro-climate within the developed areas include the provision of interconnected green spaces and corridors, which would help to provide evaporative cooling effects.

- Retaining and improving the riparian corridor, the hedgerows, the woodlands, more recent tree planting and the ponds, and the creation of interconnected green corridors, to help to regulate ambient temperatures across the site.

- Increasing in the area of tree and shrub planting across the built area together with SuDS features to provide green networks and regulate water flow within this area.

- Using native species adapted to the current climate which can cope with the stressed environments that may be created by climate change, where appropriate, within the landscaping, providing habitats that are beneficial to biodiversity and resilient to climate change.

9 Management

9.1 Landscape and Habitats Management Plan

9.1.1.1 A LHMP would be produced as part of the reserved matters application for each planning application. These management plans would be informed by the detailed landscaping proposals that would also be produced at that time. The landscaping planting plans would ensure that the habitats to benefit biodiversity that have been identified in this report would be specified, or habitats of equivalent value created (subject to agreement with the relevant planning authority- Currently Cherwell District Council). The management plans would ensure that the retained habitats and those specially created to benefit biodiversity would be managed appropriately. When the site is occupied local residence should be involved so that they are aware of the value of the habitats within the Site and how their activities may impact positively and negatively on them. Involving local people and encouraging them to become stakeholders would be essential to ensure that the habitats maintain their value to wildlife in the longer term.

9.2 Monitoring

9.2.1.1 Monitoring would be required to ensure that the retained and newly retained habitats are protected, created and managed effectively through the LHMP.

9.2.1.2 The purpose of the monitoring would be to establish whether:

- The retained habitats remain present and in **Good Condition** on site;
- The target habitats including the Section 41 habitats have been created and are on track to be assessed as of **Good Condition** in the target time frame set in the Defra metric calculation;
- The retained and newly created habitats support the Section 41 species present on site prior to development;

- The retained and newly created habitats support viable populations of the protected species present on site prior to development (great crested newts, common pipistrelle bas, badger and reptiles);and
- The retained and newly created habitats support 'new' Section 41 species.

9.2.1.3 The results of the monitoring would be used to inform whether modifications are required to the LHMP and/or whether modifications are required to the implementations of the habitat management on site. The results would also confirm whether a net gain in biodiversity has been achieved in the five to twenty year timeframe set by the Defra metric calculation. The species and habitat data collected during the monitoring would be provided to Thames Valley Environmental Record Centre.

9.3 Funding

9.3.1.1 The proponent(s) of the planning applications would provide funds for a Land Management Organisation in order to safeguard the future management of features of benefit to biodiversity. The detail would be subject to agreement with the local planning authority as part of the Section 106 or similar legally binding agreement. Similarly the applicant would reach agreement with the local planning authority with regard to the provision of staged grants to a conservation grant-giving organisation, such as the Trust for Oxfordshire's Environment, to deliver the offsite mitigation for farmland birds.

9.4 Governance and accountability

9.4.1.1 PPS 1 supplementary guidance on Eco-towns identifies a clear requirement for appropriate governance structures to ensure that:

- There is continued community engagement;
- Sustainability metrics are monitored; and
- Future development continues to meet Eco-town standards.

9.4.1.2 The long-term governance structure adopted for the development would ensure that biodiversity is a key consideration in all aspects of governance and accountability.

10 Conclusions

10.1.1.1 The key aims and objectives of the ETBS are highlighted below:

- *Retain, protect and enhance the 'Key habitats' as identified from the field surveys and assessment process that are present within the proposed development.* This has included the protection and enhancement of the hedgerows, the watercourses (River Bure and its tributaries), the mature and semi-mature woodlands and the ponds.
- *Identify opportunities to create habitats that make a positive contribution to local biodiversity initiatives*. The ETBS demonstrates that Section 41 habitats would be created within the County Park, the Nature Reserve, the woodland fitness trail, the SuDS features and the wetland waste water treatment facility. Other areas of green space across the site provide the opportunity to create habitats of value to species and species groups, including Section 41 species.

- *Identify supplementary, transitional and buffer habitat creation opportunities*. These include allotments; woodland buffers; diverse grassland buffers alongside hedgerows; and, wetland features and grassland around SuDS features.

- I*dentify opportunities for biodiversity within the built environment*. Green roofs form part of the SuDS strategy, bird nest boxes and bat roost boxes would be provided within the built environment as part of the mitigation for the development. Further measures such as, green walls, tree and shrub planting and the creation of wetland features would be delivered as part of the detailed design for the reserved matters applications.

- *Provide good wildlife linkages between habitats across the site that link to the wider countryside thus allowing the free passage of fauna*. There are strategic corridors of green infrastructure across the site, which would in turn link to smaller corridors to be created within the built development.

11 References

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